

Amazon Partners 20



Prepared by Infrapar Sustainability Ltda to Amazon Partners, LLC.

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	Amazon Partners 20, LLC.
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Validation Body	Aster Global Environmental Solutions, Inc.
Project Lifetime	March 21, 2023 to March 20, 2053
GHG Accounting Period	March 21, 2023 to March 20, 2053
History of CCB Status	<p>First Validation</p> <p>In the item - Community Monitoring Plan (CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5) a monitoring plan is presented identifying communities, community groups and other stakeholders to be monitored, variables to be monitored, types of measurements and sampling methods, and the frequency of monitoring and reporting for each type and method. Includes impact indicators and risks to be monitored for the well-being of smallholder farmers/community members and women.</p> <p>In the item - Net positive community well-being (CM2.3, GL1.4), actions that the Project will promote and that will help communities adapt to the likely impacts of climate change are indicated.</p> <p>Exceptional Community Benefits are presented for: exceptional community criteria; short and long-term community benefits; community Participation risks; marginalized and/or Vulnerable Community groups; Net impacts on Women; Benefit Sharing mechanisms; communication of Benefits, Costs and Risks; Governance and Implementation structures; smallholder/community member capacity building;</p> <p>Given the exceptional benefits of biodiversity, it was pointed out that in the Project region the presence of endangered fauna species was verified according to the IUCN Red List of Threatened Species and indicated High Biodiversity Conservation Priority Status for threatened species.</p> <p>Impact monitoring plans for communities and biodiversity were presented.</p>
Gold Level Criteria	
Expected Verification Schedule	March 21, 2024

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1. Summary of Project Benefits

1.1 Unique Projects Benefits

Table 1 - Outcome or Impact Estimated by the End of Project Lifetime

Outcome or Impact Estimated by the End of Project Lifetime	Section Reference
1) Increase of family income with the production and commercialization of vegetable oils and bio jewelry based on forest fruits and seeds.	4
2) Improvement of food security, family income and recompositing of deforested areas with the implementation of agroforestry systems.	4
3) Increase in family income with the implementation of a community-based ecological and ethnocultural tourism project.	4
4) Rescue of the oral and written language of the Shawādawa People.	4
5) Strengthening governance with appreciation of organizations, leadership, and structuring of the Indigenous Council of the Shawādawa People.	4
6) The expected benefits for Biodiversity of the REDD+ Project of the Igarapé Arara Indigenous Land will be to promote the strengthening of the Shawādawa people for the processes of maintenance, monitoring of forest cover and use of natural resources in the Project area, ensuring the protection and protection of conservation of habitats and local biodiversity, including species with some degree of threat according to the IUCN. In addition, the Project area borders other Conservation Units, forming a mosaic of protection area.	5
7) Other benefits expected for the REDD+ Project of the Igarapé Arara Indigenous Land are related to the aid in the generation of knowledge through the support and development of scientific research in the region, which is scarce and represents a gap for knowledge, especially of fishing resources and taxonomic investigation of species of flora and fauna. In addition, scientific knowledge contributes to the preservation of the ancestral customs of the Shawādawa and their sustainable practices of the use of natural resources.	5

1.2 Standardized Benefit Matters

Table 2 - Standardized Benefit Matters

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	Not applicable	
	Net estimated emission reductions in the project area, measured against the without-project scenario	10,865,089 tCO2eq	6

Forest Cover	For REDD projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario	31,465.8 hectares	6
	For ARR projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	Not applicable	
Improved land management	Number of hectares of existing forest production land in which IFM practices are expected to occur as a result of project activities, measured against the without-project scenario	26,271.13 hectares	4
	Number of hectares of non-forest land in which improved land management practices are expected to occur as a result of project activities, measured against the without-project scenario	750 hectares	4
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	597	4
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	278	4
Employment	Total number of people expected to be employed in project activities, expressed as number of full-time employees	20	4
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	10	4

Livelihoods	Total number of people expected to have improved livelihoods or income generated as a result of project activities	815	4
	Number of women expected to have improved livelihoods or income generated as a result of project activities	278	4
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	815	4
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	278	4
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	815	4
	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	278	4
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	815	4

	Number of women who are expected to experience increased water quality and/or improved access to drinking water because of project activities, measured against the without-project scenario	278	4
Well-being	Total number of community members whose well-being is expected to improve because of project activities	815	4
	Number of women whose well-being is expected to improve because of project activities	278	4
Biodiversity conservation	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation, measured against the without-project scenario	35,000	5
	Expected number of globally Critically Endangered or Endangered species benefiting from reduced threats as a result of project activities, measured against the without-project scenario	10	5

2. General

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (G1.2)

The Project for The Origination of Credits for Environmental Services of Verified Avoided Greenhouse Gas Emissions at the Territory of Indigenous Peoples on Indigenous Property Arara do Igarapé Humaitá of the Shawádawa Association, in the municipality of Porto Walter, in the State of Acre, Amazon Biome of the Brazilian Territory, will be called for all purposes of this document of Amazon Partners 20.

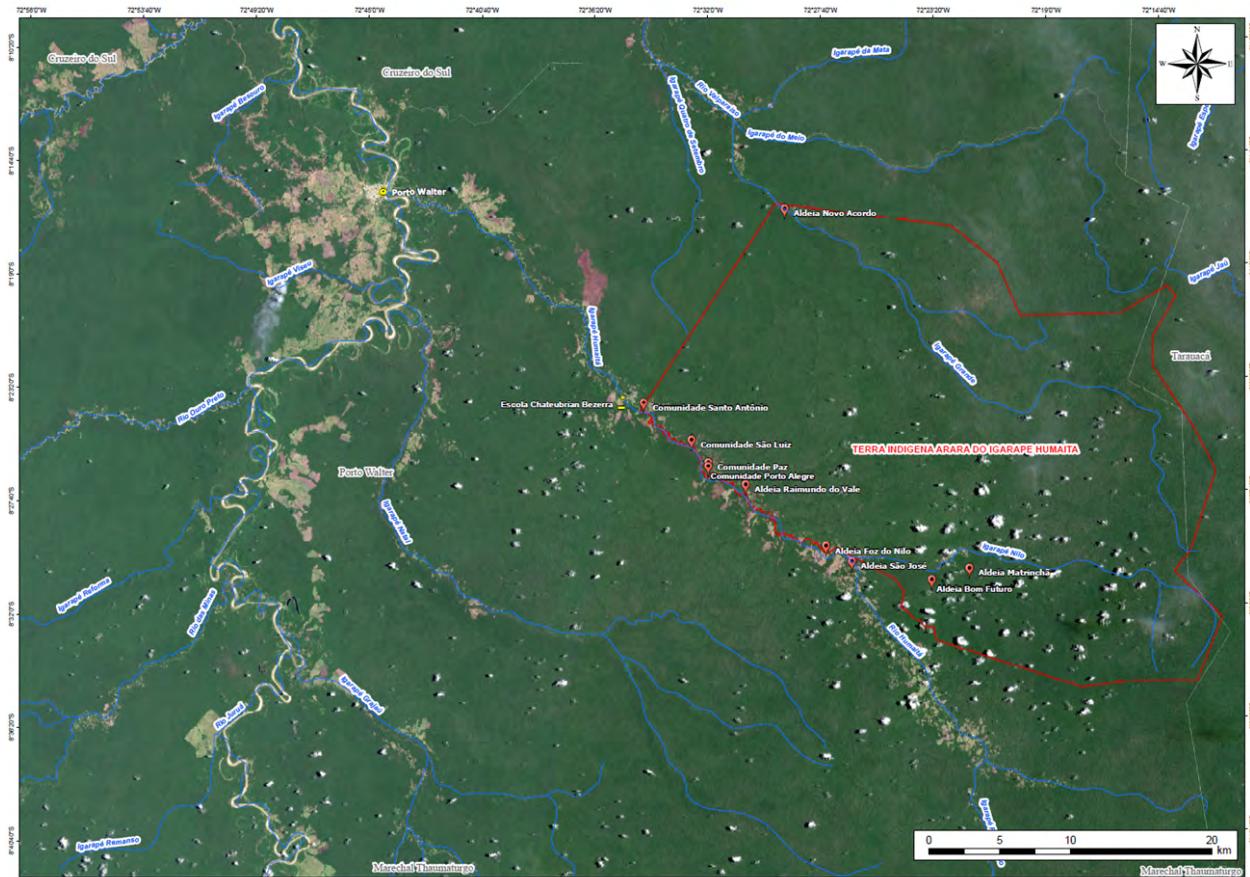
The proponent of the project is Amazon Partners 20, LLC. The project focuses on meeting the assumptions and requirements necessary for Amazon Partners 20 to succeed in certification by VM0015 Methodology for Avoided Unplanned Deforestation, v1.1. VCS Program, as well as its certification by the CCB Program in the Verra Registry.

The Brazilian Amazon Biome region where the Amazon Partners 20 project is implemented registered an increase of 1.1% (INPE 2012 – 2016) in total areas, suffering increasing pressures from anthropic actions, which outline a scenario of intense unplanned deforestation for the next 3 (three) decades, in which the conservation ensured by Amazon Partners 20 will constitute an important barrier by offering differentiated safeguards to the entire effort to stop the deforestation process and contain the emissions of GHG in Brazil.

The property in which the project was developed is denominated as Arara do Igarapé Humaitá Indigenous Land and is located in the municipalities of Porto Walter and Tarauacá / AC Being: 86,805.5819 ha in the municipality of Porto Walter and 766.1146 ha in the municipality of Tarauacá, totaling 87,571.6965 ha and has a total perimeter of 140,047.90km, according to the Certificate number 01/2006 issued November 29, 2006 by the Secretariat of the Patrimony of the Union (SPU¹).

Figure 1 - Villages and communities of the Arara do Igarapé Humaitá Indigenous Land.

¹ In Portuguese: Secretaria do Patrimônio da União



Source: Project Team's Elaboration

The Indigenous Land occupied by 06 villages and 04 communities that form the Association of the Shawādawa People of the Igarapé Humaitá (APSIH²), being the villages called like Raimundo do Vale, Foz do Nilo, São José, Bom Futuro, Matrinchã and Novo Acordo, and the communities called like Santo Antônio, São Luiz, Paz, and Porto Alegre, totaling a population of 815 people.

The project area was set at 76,550.59 hectares and has an estimated reduction of GHG emissions to the atmosphere of 10,865,086 tCO₂eq by the end of the project in 30 years, considering an annual average of 362,170 tCO₂eq.

The reductions and removals of GHG emissions will be achieved through actions foreseen in this project, whose ultimate objective is the prevention of deforestation and the conservation of forests, generating benefits for the climate, biodiversity, and the community.

² In Portuguese: Associação do Povo Shawādawa do Igarapé Humaitá

2.1.2 Project Scale

Table 3 - Project Scale

Project Scale	
Project	
Large Project	X

Source: Team Project Elaboration.

2.1.3 Project Proponent (G1.1)

Table 4 - Project Proponent.

Organization Name	Amazon Partners 20, LLC.
Contact Person	Jay Rogers
Title	Chief Executive Officer (CEO)
Address	Address: 109 E. 17th Street, Suite 450, Cheyenne, WY 82001 – United States of America
Telephone	+1-310-993-9952
Email	jay@amazonpartners.us

Source: Team Project Elaboration.

2.1.4 Other Entities Involved to the Project

Table 5 - Other Entities Involved to the project.

Organization Name	Infrapar Sustainability Ltda.
Role in the project	Technical consultancy for baseline determination, additionality demonstration, calculations.
Contact Person	Breno Figueiredo
Title	Climate Economist
Address	Avenida Paulista 2439 / 14o floor, Cerqueira Cesar, São Paulo/SP – Brazil - Zip Code: 01311-936
Telephone	+55 (11) 99680-8688
Email	breno@infrapar.com

Source: Team Project Elaboration.

2.1.5 Physical Parameters (G1.3)

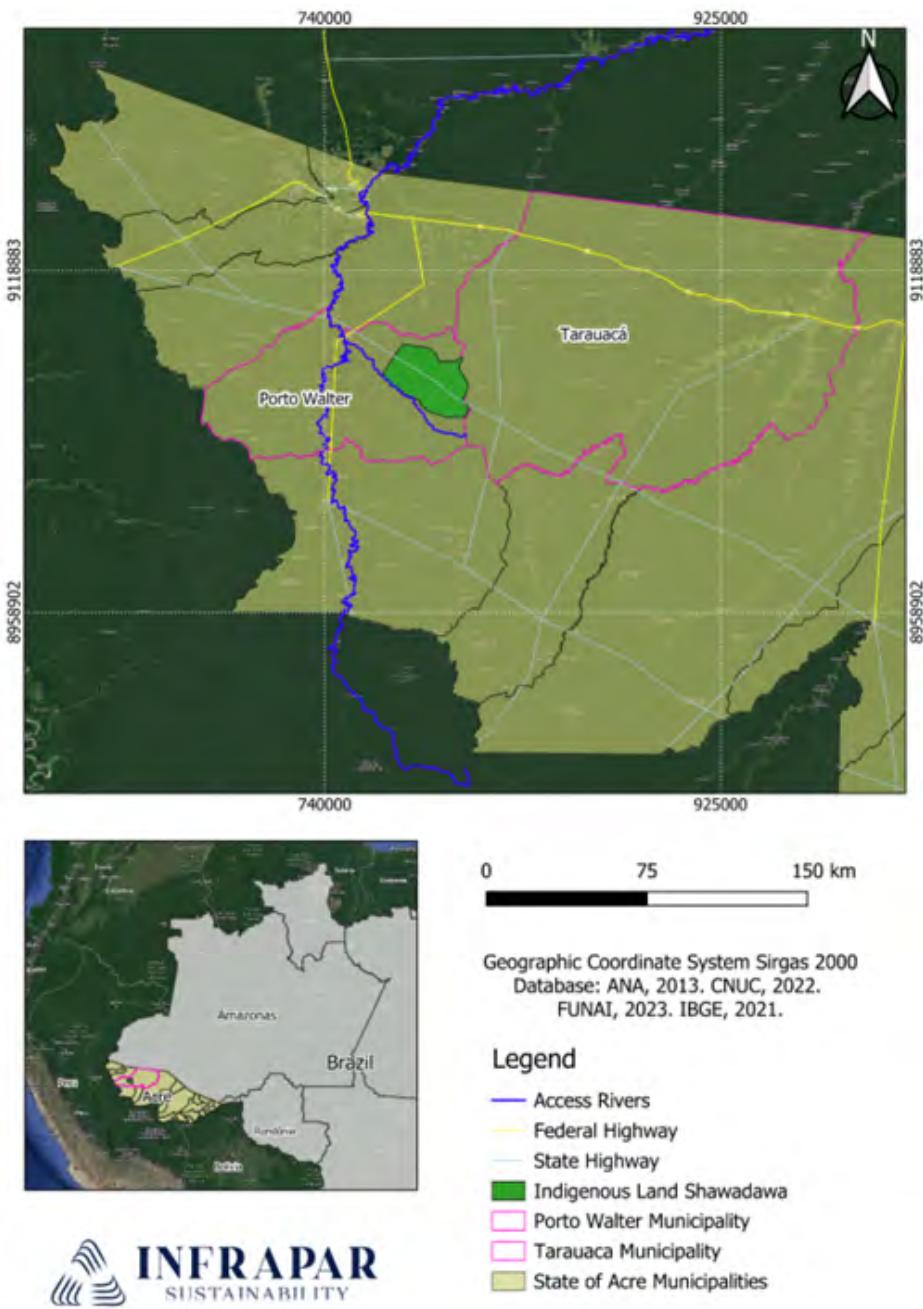
2.1.5.1 Grouped Project

Not applicable.

2.1.5.2 General Location

The property mentioned in this project is located in the State of Acre, one of the 27 territorial units in Brazil. It is in the northern region of the country, bordering the state of Amazonas to the north, state of Rondônia to the east, and the countries of Bolivia and Peru to the southeast and west. It is in the GMT-5 time zone and occupies an area of 164,221.36 Km².

Figure 2 - Map Location of the Arara do Igarapé Humaitá Indigenous Land in Porto Walter/Tarauacá, State of Acre.



Source: ANA, 2013. CNUC, 2022. FUNAI, 2022. IBGE, 2021.

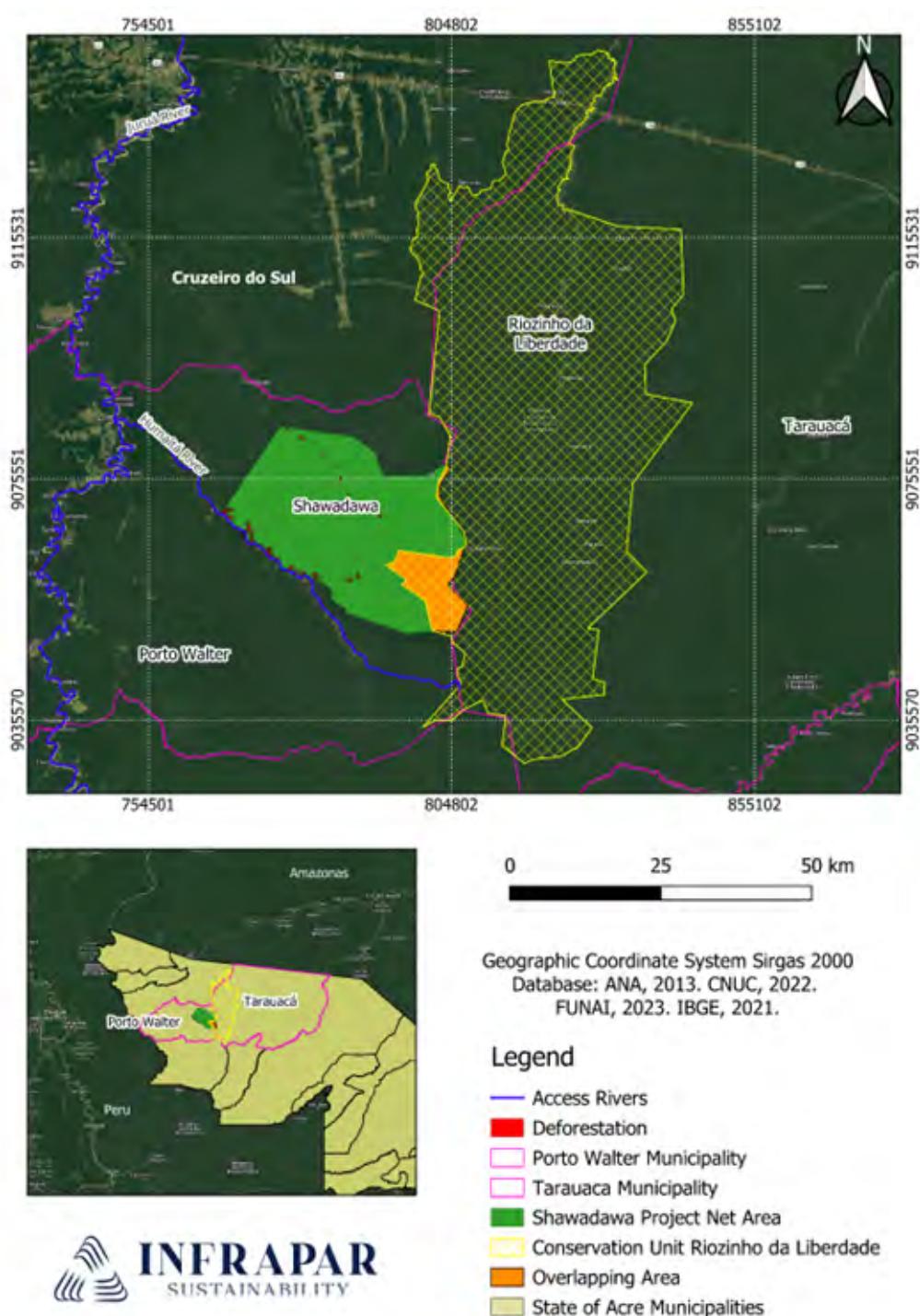
The Indigenous Land (IL) is present in two municipalities: a small part in Tarauacá and most in Porto Walter and is in the northwest of the State of Acre. The central coordinates are 8°25'09" S latitude and 72°23'30" longitude.

2.1.5.3 Project Area

The documentation of the Arara do Igarapé Humaitá Indigenous Land was issued on November 29, 2006 by the Secretariat of Heritage of the Union (SPU) and it states that its total area is 87,571.67 ha, however, due to uncertainties that normally occur in the measurements of its georeferencing and when transforming the coordinates into a shapefile (vector map) there is a small difference (110.96 ha or 0.13%) in the total area. That said, for the purposes of calculations and development of this work, the total area of the Arara Igarapé Humaitá Indigenous Land property of 87,460.735 ha will be considered, which was calculated through the shapefile of the property using the QGIS software version 3.30.0.

In order to calculate the area of the project, the overlapping areas with conservation units, other indigenous lands, settlements, private properties, among others, are subtracted. Besides this, in REDD+ projects, only the area of forests should be considered as useful area for the project, that is, not only the overlaps are deducted from the total area of the property, but also the deforested areas and the areas occupied by rivers. This way, 10,199,096 ha of overlap with the Riozinho da Liberdade Extractive Reserve (Conservation Unit), 711,049 ha of deforested area and the areas occupied by rivers were not considered due to being too small, being then 76,550.59 hectares the net area of the project. The following images show the interpretation of this paragraph.

Figure 3 - Arara do Igarapé Humaitá Indigenous Land, deforested area and overlap with RESEX – Riozinho da Liberdade.



Source: ANA, 2013. CNUC, 2022. FUNAI, 2023. IBGE, 2021.

According to the image above, here is a table with the calculation of the net area of the project.

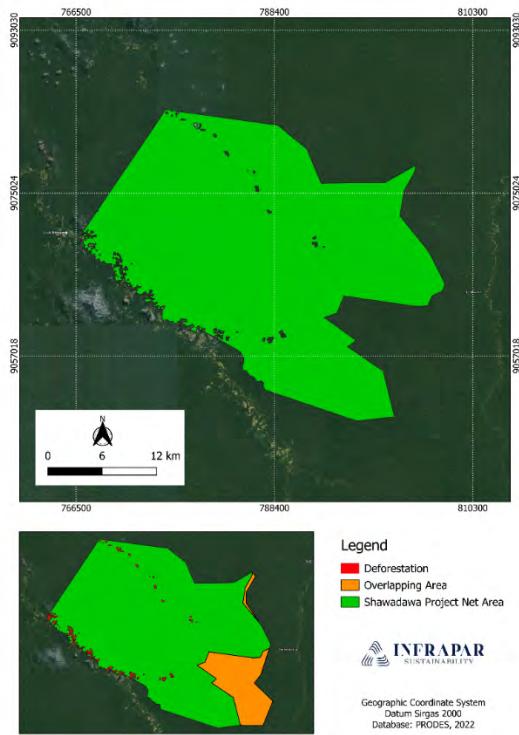
Table 6 – Summary of the Indigenous Land Project Net Area.

Property Name	
Property Area (ha)	87.460,74
Overlapping Area (ha)	10.199,10
Anthropized (ha)	711,05
Project Net Area (ha)	76.550,59
Project Net Area (%)	87,53%

Source: Project Team's Elaboration

The net area of the project can then be seen in the following picture:

Figure 4 - Location of the Arara do Igarapé Humaitá Indigenous Land project area.

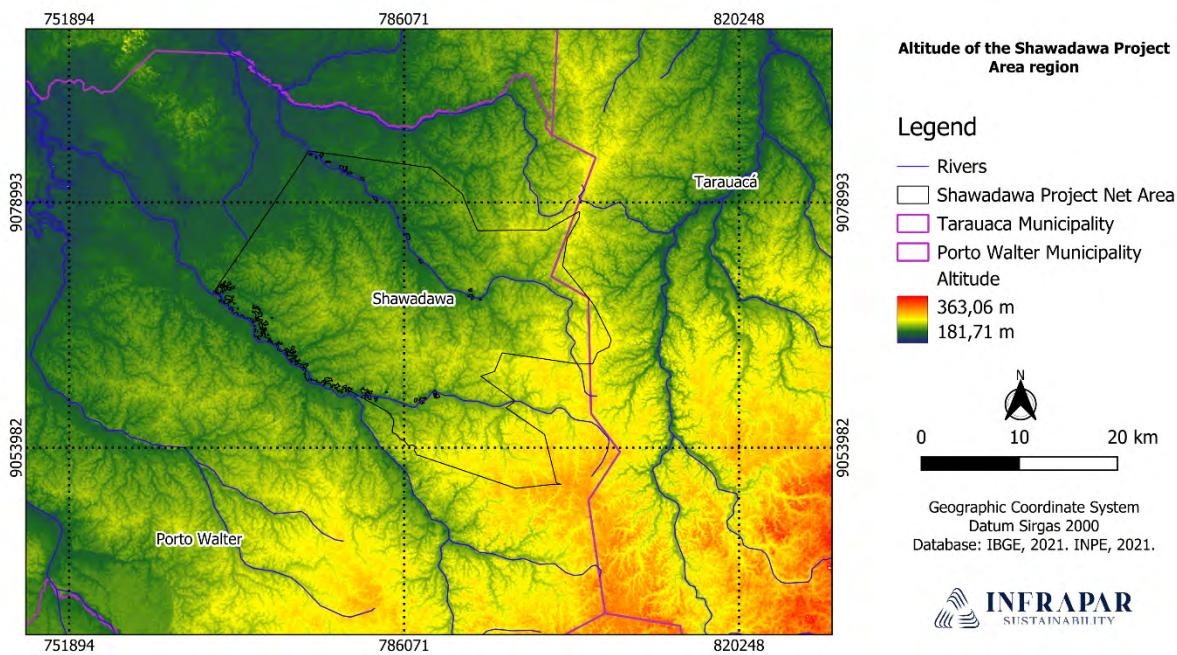


Source: PRODES, 2022.

2.1.5.4 Topography

The average altitude in the Amazon Partners 20 Project region is 227,0 m ranging from 181,71 m to 363,06m.

Figure 5 - Topography of the Amazon Partners 20 Project Area and region.

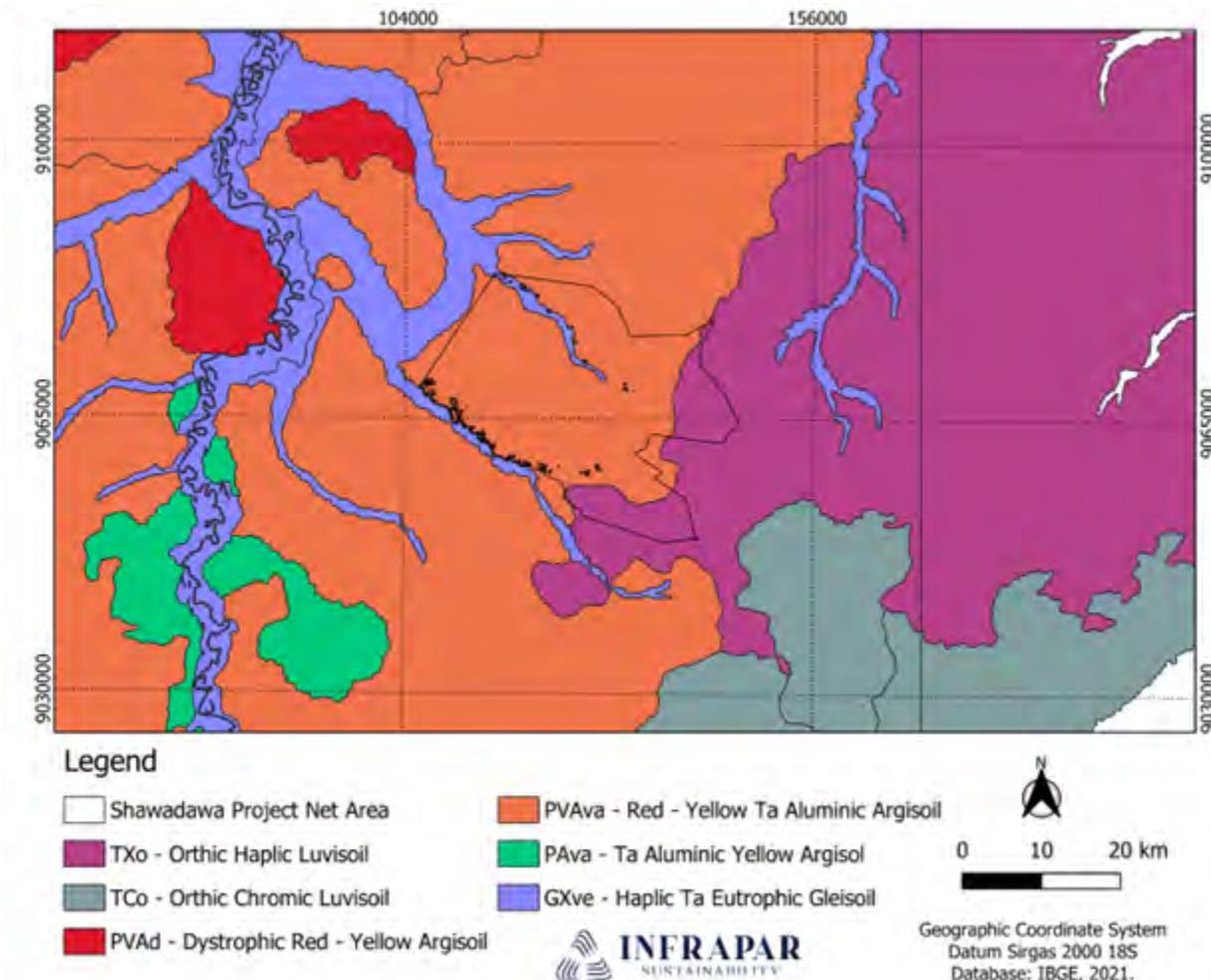


Source: IBGE, 2021. INPE, 2021.

2.1.5.5 Soil

The mostly common soils in the Project Area and region are the PVAv (Ta Aluminic Yellow Argisol) and the Txo (Orthic Haplic Luvisol) with some minor parts of the GXve (Haplic Ta Eutrophic Gleisoi). Soils in the Project Area and its surroundings are showed in the map below.

Figure 6 - Soils in the Amazon Partners 20 Project Area and region.



Source: IBGE (2021)

2.1.5.6 Climate

The climate of the State of Acre is characterized by high temperatures and a high concentration of humidity, thus being defined as a humid equatorial climate (ACRE, 2017). Present in the Intertropical Convergence Zone (ITCZ), the climate is controlled by the action of the winds and by the low equatorial pressures and because it is located in the western part of the Amazon, the state suffers interference from the Continental Equatorial Mass (mEc) and also by the Atlantic Polar Mass (mPa) that acts in the interior of the Amazon channeling the cold air and causing the phenomenon known as “friagem” that can reach values around 10°C (ALVARÃES et al., 2013).

Nimer (1979) highlights the influence of temperature and humidity on climate diversity, using dynamic climatology and the rhythm of air masses. Therefore, for the region where the project is located, it is classified as an Equatorial Warm and Sub-Hot climate type with characteristics of a daily average

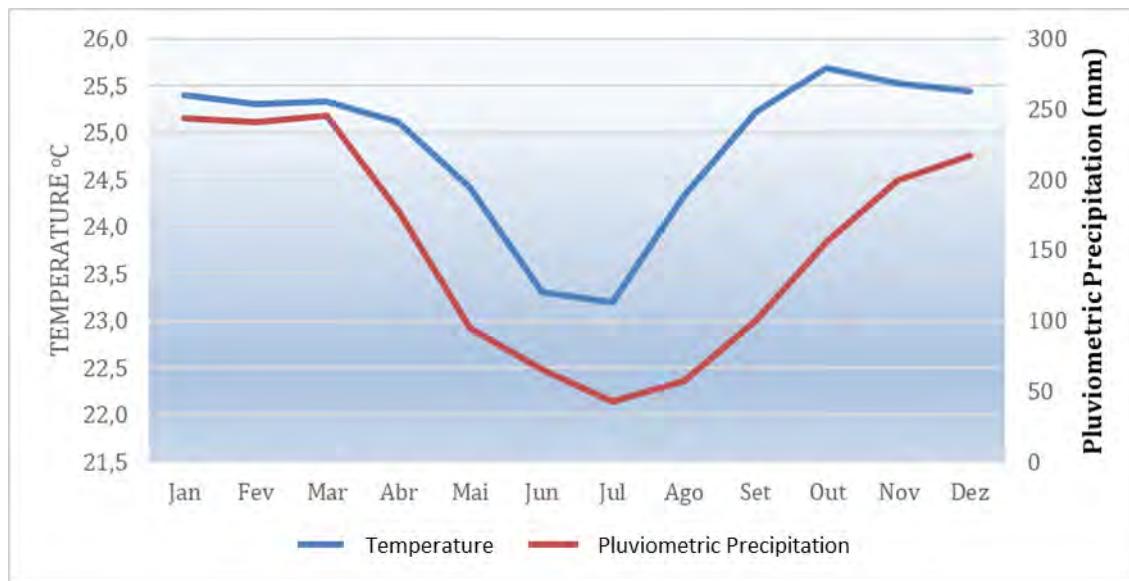
temperature above 18°C in all months, and with a humidity distribution varying between super humid and sub-dry.

The average annual temperature observed for these regions varies between 24.5°C and 25.9°C where the periods with maximum temperatures are between the months of September and October registering variations of 25°C to 26°C. The lowest monthly average temperature values occur in the month of July, registering between 24°C and 24.8°C.

Due to the intense evapotranspiration generated by the Amazon Forest, there is the suction of the trade winds, causing the movement of flying rivers, formed by water vapor accompanied by clouds and propelled by the winds (MOSS; MOSS 2014). This moisture carried by the flying rivers is directed to the Andes Mountains, helping in the circulation of humidity, where for the pattern of atmospheric circulation in the Amazon region, particularities are observed in the state of Acre.

Regarding rainfall, the months of January February presented higher intensity, above 240 mm, and the least rainy with 43 mm (July) on average.

Figure 7 - Annual distribution of rainfall temperature and precipitation of the State of Acre.



Source: Project Teams Elaboration.

2.1.5.7 Hydrology

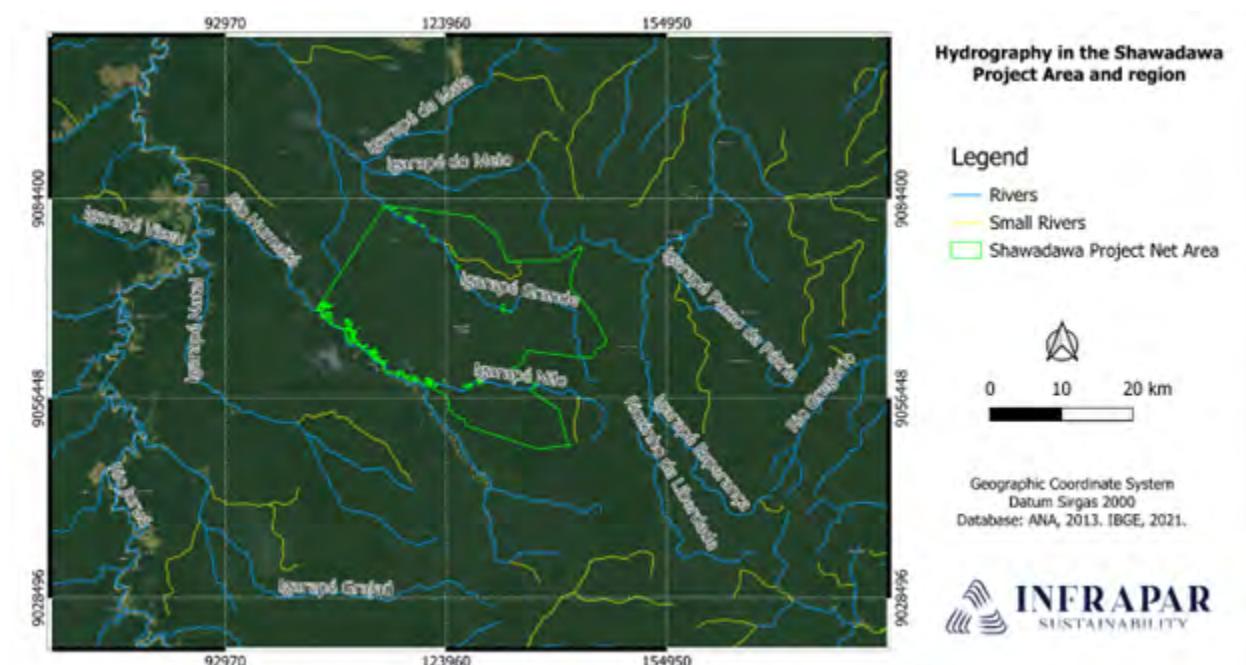
The state of Acre is fully inserted in the Amazon Hydrographic Region, which covers part of the territories of Peru, Bolivia, Colombia, Ecuador, Venezuela, Guyana and Brazil (42%) and occupies a total area of 6,925,674 km². The main river in this region is the Amazon, having its sources located in the headwaters of the Peruvian Andes and its mouth in Ilha do Marajó, state of Pará, northern region of Brazil.

Its importance in the region reflects the dependence of the population for the use of water for navigation, production and supply runoff in addition to fishing and agriculture activities and plant extractives, in addition to being the main access of the city to conservation units, 13 indigenous lands, native rubber plantations, villages, farms, villages and others (ACRE, 2018); SOUSA and OLIVEIRA, 2016).

The Juruá River is the most important tributary of this watershed, its source is located in Peru and runs through the state of Acre until it flows into the Amazon (COSTA, 2012). With turbid waters due to the high concentration of nutrients its waters represent 2% of annual discharge into the Amazon River (WCS, 2018), flooding its plains during the months of December until the beginning of May.

The Arara do Igarapé Humaitá Indigenous Land is located north of the Humaitá River, bordering its right bank. The Humaitá river has its mouth in the Juruá River, which flows into the Solimões River, which finally flows into the Amazon River.

Figure 8 - Hydrography in the region of the Shawādawa Project in Porto Walter/Tarauacá, Acre.



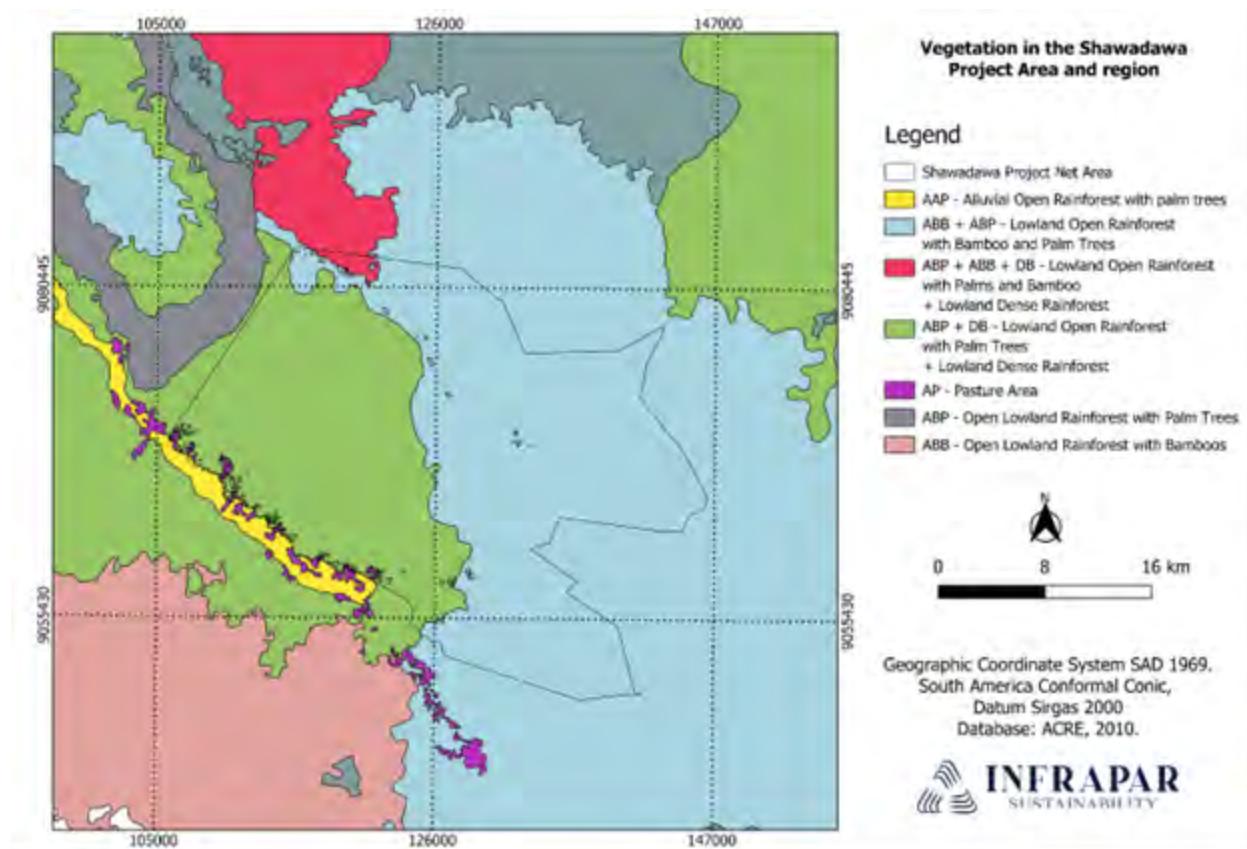
Source: ANA, 2013.

2.1.5.8 Types of Forests

According to the Economic Ecological Zoning of the State of Acre (ACRE, 2006) the open ombrophilous forests represent about 99.15% of the vegetation of the state, with emphasis on the wide occurrence of Open Ombrophilous Forests with bamboo and palm trees. It is observed that in the Project Area (PA) this vegetation occurs in more than 90% of its extension, in order to ensure environmental preservation and the maintenance of local biodiversity.

The Open Ombrophilous Vegetation according to Acre (2000) is characterized by presenting its cover by open forest where the great concentration of species of palms, bamboos and lianas occurs. This type of vegetation was considered for many years as a type of transition between the Amazon Rainforest and extra-Amazonian areas (IBGE, 2012).

Figure 9 - Distribution of forest typologies on the Shawādawa Project Net Area in Porto Walter/Tarauacá, Acre.



Source: Acre, 2010.

According to IBGE (2012) the open ombrophilous forest typology is composed of typical genera, located in less humid areas. They are: *Attalea speciosa* Mart. Ex Spreng. (*babaçu*) and *Attalea maripa* (Aubl.) Mart (*inajá*), that make up the "palm-forest"; *Guadua superba* (*taquara*), which forms the "bamboo-forest"; and *Phenakospermum guianensis* (A. Rich.) Endl. Ex Miq. (*sororoca*). It is characterized by being present in regions between 4° north latitude and 16° south latitude, at altitudes ranging from 5 to 100m, where the climatic gradients are characterized by presenting more than 60 dry days. It also stands out for having four floristic fasciation's: vines, palms, bamboos and sororoca (*Phenakospermum guianensis*) that differentiate it from the ecological physiognomy of the Dense Ombrophilous Forest.

The term Dense Ombrophilous Forest, created by Ellenberg and Mueller-Dombois (1967), replaces Pluvial (of Latin origin) by Ombrophilous (of Greek origin), both have the meaning of "friend of the rains" because this type of vegetation is characterized by phanerophytes - macro and mesophanerophyte sub forms of life,

as well as woody lianas and epiphytes in abundance, which differentiate it from the other classes of formations.

In the state, bamboo forests occur especially in the eastern region, but it is recorded that approximately 75% of the native forests of the state have bamboo as the main or secondary floristic element present in their understory (SILVA, 2019; ACRE, 2006). Among the most common species, the woody bamboos of the genus Guadua stand out, occupying more than 160 thousand km² of the southwest of the Brazilian Amazon (Acre and Amazonas), as well as almost all of the central Amazon of Peru (Madre de Dios and Ucayali) and to the north of the Bolivian Amazon (Pando) (CARVALHO et al., 2013).

2.1.6 Social Parameters (G 1.3)

The Arara do Igarapé Humaitá Indigenous Land is in the Municipality of Porto Walter in the Brazilian Amazon, Juruá Region, State of Acre. The municipality suffers direct influence and has an administrative and economic dependence of the city of Cruzeiro do Sul, the second largest in the state. According to the IBGE (2021), Porto Walter has an estimated population of 12,497 people, MHDI of 0.532; education rate (6 to 14) of 93.3%, population density of 1.42 inhabitants/m² and GDP per capital of R\$ 10,640.19. Bordering the IL are located the settlements Natal Sustainable Development Project and Cruzeiro do Vale Agroextractivism Project and the Riozinho da Liberdade Extractive Reserve.

The Arara people (self-styled Shawādawa¹) belong to the Pano language family. The largest for its members currently resides in the Arara do Igarapé Humaitá Indigenous Land, whose river courses defining its limits are: Riozinho Cruzeiro do Vale (also called igarapé Humaitá, Leonel or Amahuacas), right bank tributary of the Alto Rio Juruá; the Igarapé Nilo, right bank tributary of the Riozinho Cruzeiro do Vale; and Igarapé Grande, source of the Valparaíso River. The limits of this indigenous land amount to approximately 86,700 ha and 138 km, located in the Alto Juruá in the municipality of Port Walter. There is an overlap of the Riozinho da Liberdade Extractive Reserve in 10,566ha (12% of the territory) over the Arara do Igarapé Humaitá Indigenous Land (Correia, 2001) (PGTAI, 2021). According to surveys, the Shawādawa People are composed of six villages and four communities, totaling 815 people.

The population is served by seven schools that offer basic education; and two health centers (Aldeia Foz do Nilo and Raimundo do Vale), with municipal care by SESAI, which provides a medical professional. There are Shawādawa who have taken technical training courses and trained as health agents, sanitary agents, agroforestry agents and bilingual teachers who provide services to the communities.

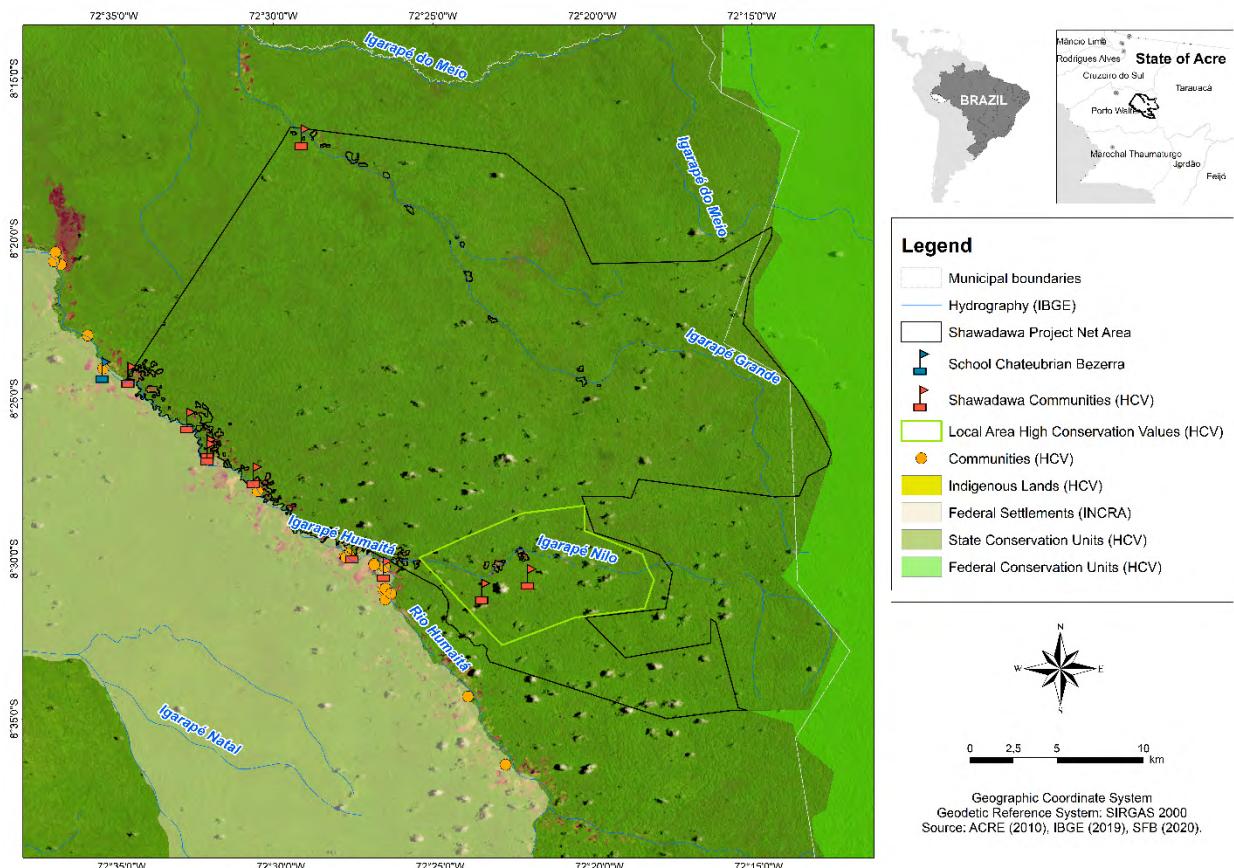
They develop extractive practices, hunting, and fishing throughout their territory. Non-timber extractives is intended for consumption and commercialization of surplus, collecting the species açaí, bacaba, buriti, coco-de-jaci, patoá, cupuaçu and cocoa. The wood is used for the construction of family and community infrastructure (houses, kupixawa, fences, warehouse, each of flour, schools, health post, boats, among others. The fishing is intended exclusively for consumption, with emphasis on the species BODÓ, PINTADINHA, CACHIMBO, TRACAJÁ, JIJU, POLACA, PACU, MATAPIRI, ARRAIA, PIAU STRIPED, PIRANHA, SURUBIM, PIABA, RABO DE FOGO, TAMBUATÁ, BODI, CARÁ, PIABÃO, MANDI, ARRAIA, TRAÍRA, BODÓ GRANDE AND MATRIXÃ. Hunting is the basis of the food diet, with the most hunted animals: TAPIR, COTIARA, PACA, PIG, AGOUTI, CHAPLAIN, ARMADILLO, NAMBU, QUATIPURU, DEER, PECCARY, JABOTI AND JACU.

Agricultural practices are intended for family consumption and economic purposes, marketing the surplus production. The main crops and by-products are flour, corn, beans, rice, cassava, banana, watermelon, yams, sugar cane and pineapple. Cattle ranching is intended for consumption (milk and meat) and commercialization of live animals, with a stock of about 100 head of animals for 700 hectares of pasture.

In historical terms, the defining point of the life of the Shawādawa People was the publication of the FUNAI Decree on 04/18/2006, approving the administrative demarcation of the Indigenous Land Arara do Igarapé Humaitá, totaling 87,571.69 hectares of land.

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

Figure 10 - Location of villages, communities, and local residents in the region of the Project Area of the indigenous Land Shawādawa.



Source: Acre, 2010. IBGE, 2019. SFB, 2020.

Figure 11 - Location of the Leakage Belt, Leakage Management Area and Project Area.

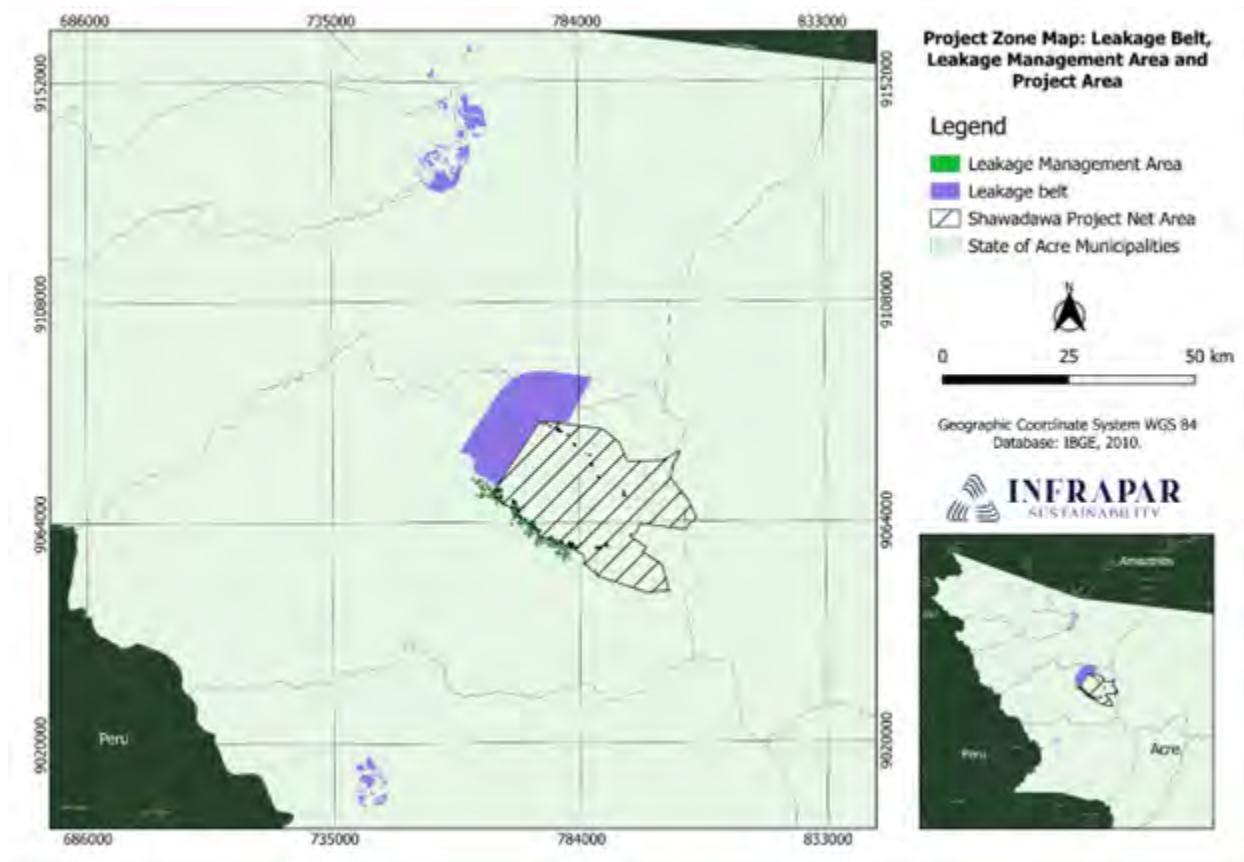
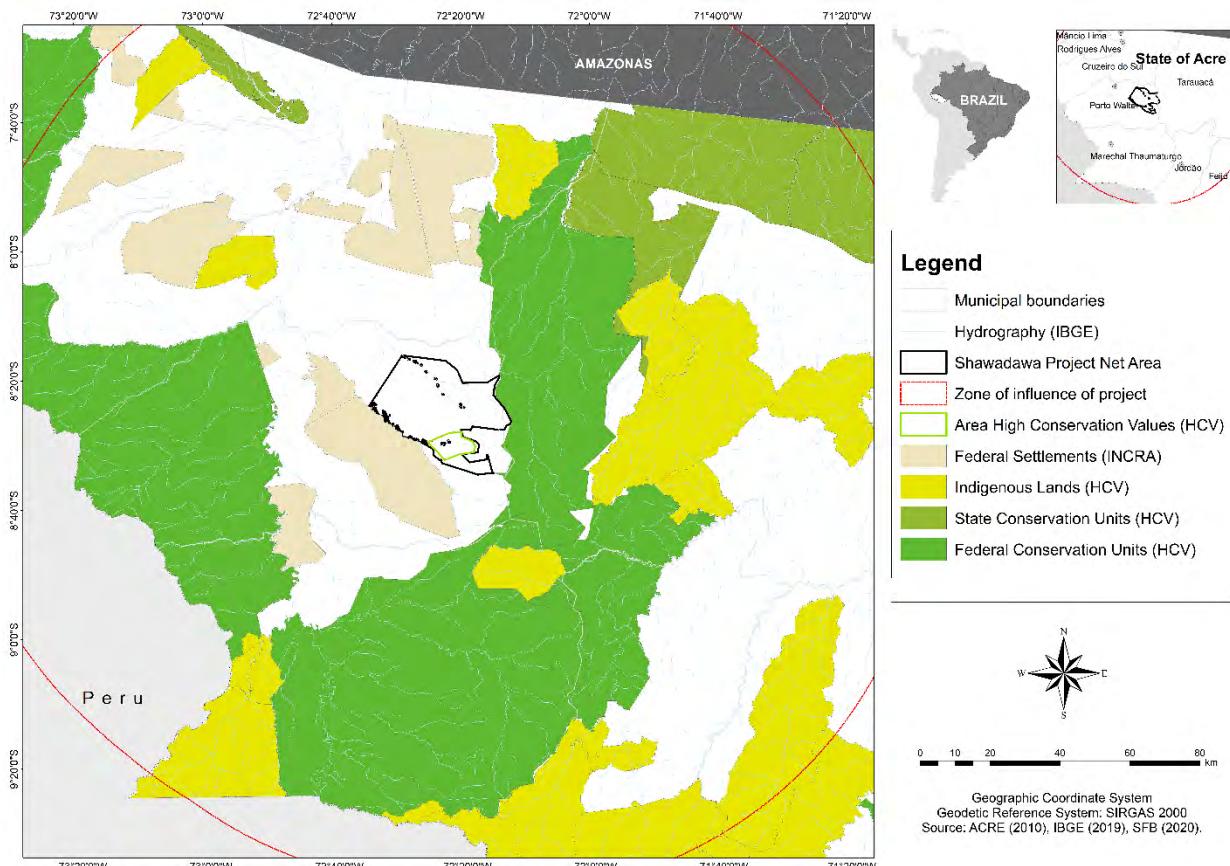


Figure 12 - Location of the Project Zone Map and its HCVs



Source: Acre, 2010. IBGE, 2019. SFB, 2020.

2.1.8 Stakeholder Identification (G1.5)

The identification of stakeholders considered the degree of relationship of social groups and organizations with the territory and the Arara People, the generation or risks of positive and negative impacts and the commitment or potentializing in achieving the objectives of the project. A relevant aspect in the process of identifying the stakeholders is the legal responsibility for the management of the territory and the promotion and protection of human rights and quality of life of the Arara People, with Funai being the main organization with this attribution, in partnership with public and non-governmental entities operating in the municipal sphere, state and federal.

The governance system of the Shawādawa People was evaluated and identified the Associação do Povo Shawādawa do Igarapé Humaitá (APSIH), the Agroextrativista Cooperative Pushuā Shawādawa (CAESP⁴) and the Leadership Council. It was also considered the interaction of the People with organizations linked to the indigenous movement, such as: Organization of the Indigenous Peoples of the Juruá River (OPIR⁵), Organization of the Indigenous Peoples of Acre, Southern Amazonas and Northwest of Rondônia (OPIN⁶), the Association of the Movement of Indigenous Agroforestry Agents of Acre (AMAAIAC⁷), the Organization of Indigenous Teachers of Acre (OPIAC⁸) and the Pro-Indian Commission of Acre (CPI/AC⁹).

In addition, public organizations were identified that act or have direct attributions to support the economic, social, cultural and environmental development of IT, such as: municipal and state departments of education, health, production and environment; and at the federal level, the Special Secretariat for Indigenous Health (SESAI¹⁰).

The analysis of the surrounding scenario shows that there are relevant parts that directly affect the socioeconomic and environmental conditions of the IT, such as the PDS Natal with capacity for 110 families (99 settlers), PAE Cruzeiro do Vale, with capacity for 270 families (268 settlers) and the Resex Riozinho da Liberdade which has an area overlapping the TI of 10,566ha (12% of the territory).

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

Table 7 - Stakeholders description.

Stakeholders	Rights	Interest	Relevance
Novo Acordo Village	Beneficiaries of benefit sharing	Receive project investments: training, improvement of production processes and increase in family income.	High
Raimundo do Vale Village			
Foz do Nilo Village			
São José Village			
Bom Futuro Village			
Matrinchá Village			
Santo Antônio Community			
São Luiz Community			
Paz Community			
Porto Alegre Community			
Association of Shawádawa do Igapé Humaitá People (APSIH)	Legal representative of the Shawádawa	Technical, administrative and financial management of the project	High
Cooperative of Agroextrativista Pushuā Shawádawa (CAESP)	Representative of the Shawádawa People	Project management and production sales	High
Organization of the Indigenous People of the Juruá River (OPIRJ)	None	Support for mobilization and protection of rights	Medium
Organization of Indigenous People of Acre, Southern Amazonas and Northwest Rondônia (OPIN)	None	Support for mobilization and protection of rights	Medium
Association of the Movement of Indigenous Agroforestry Agents of Acre (AMAAIAC)	None	Support for mobilization and protection of rights	Medium
Organization of Indigenous Teachers of Acre (OPIAC)	None	Support for mobilization and protection of rights	Medium
National Indigenous People Foundation (FUNAI)	Territory management	Protection of the human rights and territory of the Shawádawa People	High
Special Secretary for Indigenous People Health (SESAI).	Execution of the indigenous health	Partner in the actions of prevention and health care of the Shawádawa People	High
State and Municipal Secretary of Environment and Infrastructure (SEMA)	None	Contribute to conservation practices and compliance with environmental legislation	Medium
Secretary of Municipal/State Production and National Rural Learning Service (SENAR)	None	Contribute to the dissemination of sustainable practices by offering training	Medium
Municipal and State Department of Education	None	Apply socio-environmental actions in an interdisciplinary way in local schools; partners in the project to rescue the written and oral language of the Shawádawa People	High
National Institute of Colonization and Agrarian Reform (INCRA)	None	Carry out actions together, as the project borders two federal settlements	Medium
Chico Mendes Institute for Biodiversity Conservation (ICMBio)	Management of the Riozinho da Liberdade Extractive Reserve	Resolution of the Extractive Reserve area that overlaps the IL Arara. Partner in IL protection actions.	High
Residents of PDS Natal	None	Risk of negative impacts on IL: invasion, fires, logging, illegal hunting and fishing	High
Residents PAE Natal	None	Risk of negative impacts on IL: invasion, fires, logging, illegal hunting and fishing	High
Public and private tourism institutions	None	Implementation of tourism project	Medium

Source: Project Teams Elaboration.

2.1.10 Sectoral Scope and Project Type

It is a Non-Grouped Project that uses the sectoral scope VCS 14 - Agriculture, Forestry and Other Land Uses (AFOLU). The project has the characteristics of a REDD+ (Reducing Emissions from Deforestation and Forest Degradation) initiative and follows the VM0015 v1.1 methodology for Avoided Unplanned Deforestation (AUD). Finally, this project also considers the methodological standards provided for in the Climate Program, Community + Biodiversity (CCB) with the objective of valuing Verifiable Carbon Units (VCU).

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

The Arara do Igarapé Humaitá Indigenous Land's main objective is to promote joint actions aimed at reducing greenhouse gas emissions (REDD+) resulting from unplanned deforestation and forest degradation, based on actions to strengthen the Shawādawa people who occupy the project area. With the remote monitoring of changes in land use and cover in the perimeter of the area, the monitoring of biodiversity in conjunction with the activities of inspection and support of the institutions responsible for combating hunting and overfishing, illegal logging, burning, mining and other unsustainable practices, as well as encouraging scientific activities and local socioeconomic development on a sustainable basis.

This set of interconnected actions allows the generation of financial resources, mainly from the commercialization of REDD+ credits registered in the VCS (Verified Carbon Standard), associated with social development and the conservation of natural resources and, finally, seeking to ensure adequate financing for the fulfillment of the objectives mentioned above, as well as to allow its maintenance throughout the life cycle of the REDD+ Project of the Arara do Igarapé Humaitá Indigenous Land. These initiatives also promote the preservation of the cultural and ancestral heritage of the Shawādawa people.

Practices related to the use of natural resources by traditional peoples are already considered sustainable, especially for the use of subsistence, since many indigenous and riverine people do not have infrastructure for food conservation. In this sense, regarding the monitoring of biodiversity, the project can help in the identification of the most consumed items and in the management of these resources, avoiding the pressure on them. The project can also enable the construction of agreements and initiatives that seek to combat wildlife trafficking, predatory hunting and fishing, pollution and other activities that negatively impact biodiversity.

Table 8 - Project Activities and Theory of Change.

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
Produce and commercialize native vegetable oils from the species cocão, buriú and mumuru	Elaboration of the project and management plan	Training, implementation of infrastructure, commercialization and income generation; engagement of youth and women	Verticalization of the production chain; engagement of youth and women.	Consolidation of the bioeconomy: income generation and conservation of forest resources
Produce and commercialize biojewelry based on seeds and native vines	Project elaboration	Training, implementation of infrastructure, commercialization and income generation; engagement of youth and women	Engagement of youth and women	Consolidation of the bioeconomy: income generation and conservation of forest resources
Implement agroforestry systems	Project elaboration	Improved food security	Generation of family income with the sale of surplus	Improvement of the food base; reduction of pressure on primary forests; recovery of deforested areas
Implement a community-based ecological and ethnocultural tourism hub.	Elaboration of the project and formalization of institutional partnerships	Implementation of infrastructure, training and engagement in the national and international tourism network	Generation of family income and verticalization of services and attractions; engagement of youth and women.	Family income generation and consolidation of environmental education actions for nature conservation
Promote the rescue of the oral and written language of the Shawádawa People.	Elaboration of the project and formalization of institutional partnerships	Introduction of first language in the school curriculum of educational units; publication of a linguistic notebook of the Shawádawa People	Reconstruction of intergenerational ties.	Strengthening of cultural meanings; the relationship with sacred systems and rites and the symbiosis between the group and nature
Strengthen the governance system by valuing organizations and restructuring the Shawádawa People's Leadership Council.	Project elaboration	Structuring and validation of the governance system	Training and engagement of young indigenous leaders; strengthening of female protagonism in decision-making spaces.	Consolidation of territory management
Promoting land preparation techniques without the use of fire	Formalization of partnership to offer rural technical assistance	Technical assistance offer	Elimination of fire in land preparation.	Reduction of greenhouse gas emissions; land use practices with a lower degree of degradation
Promote the economic engagement of indigenous women	Elaboration of projects and formalization of partnerships	Offer of training and subsidies for the implementation of entrepreneurial initiatives	Consolidation of economic initiatives with female leadership.	Reduction of socioeconomic vulnerability of marginalized groups
Consolidate and implement the Shawadawa People's Life Plan	Life Plan Review	Elaboration of structural projects	Implementation of the Life Plan; Shawadawa Women Life Plan.	Socioeconomic and environmental development on a sustainable basis
Implement an IL monitoring and inspection system	Develop a project and formalize partnerships	Implementation of monitoring tools and infrastructure; training of indigenous agents	Regular monitoring and inspection actions.	Reduction and prevention of illegal hunting, fishing, burning, invasions and illegal logging activities; maintenance of forest cover;
conomic use of fallen trees	Project elaboration	Offering training in marquetry and development of a product line;	Engagement of young people and women; income generation.	Reduction of indicators for the slaughter of timber species; family income generation;
Ichthyofauna Monitoring	<ul style="list-style-type: none"> - Elaborate and implement continuous monitoring actions of Ichthyofauna; - Characterize fishing and fish stocks, based on traditional use; - Foster interactions and partnerships with research centers, control and technical advisory bodies and universities; - Promote actions with control and inspection institutions in the fight against predatory fishing 	<ul style="list-style-type: none"> -Understand the behavior and distribution of species; - Definition of target species for management/intervention; - Presentation of data, studies and diagnoses carried out by the partners, for the population; - Elaboration of fishing agreements, in order to respect the amount that can be consumed, respecting the legislation with regard to reproduction periods (closed season); 	<ul style="list-style-type: none"> - Restoration of species and increase in fish stocks; - Reduction of internal and external impacts and pressures on the general ichthyofauna; 	Actions aimed at the ichthyofauna group will have a great positive impact on populations and fish stocks, but mainly on communities in and around the project area, as the resource is used as a source of food and subsistence.
Herpetofauna Monitoring	<ul style="list-style-type: none"> - Carry out environmental education actions, emphasizing the importance of reptiles and amphibians, in order to reduce death rates of anthropic origin; - Hold informative lectures about species of medical interest and their importance to society; - Define and monitor species that are bioindicators of environmental quality; - Establish partnerships with research and teaching institutions; 	<ul style="list-style-type: none"> - Accompaniment and monitoring of bioindicator species of environmental quality; - Elaboration of informative and didactic materials for communities in and around the project area; 	<ul style="list-style-type: none"> - Presentation of species monitoring results; - Reestablishment of species that suffer anthropic pressure; 	Actions aimed at environmental education and demystification of herpetofauna will contribute to a better understanding of the importance of these animals for the ecosystem and especially for traditional populations, since they are excellent pest controllers and disease vectors, in addition to having medical importance and some species are able to indicate the quality of the environment.
Avifauna Monitoring	<ul style="list-style-type: none"> - Develop and implement actions to monitor bird species; - Identification and monitoring of birds that are bioindicators of environmental quality, threatened with extinction and game birds; - Promote partnerships with universities and research centers; - Identify scientific tourism potential (Birdwatching); 	<ul style="list-style-type: none"> - Present data related to the monitoring of species, indicating the species that suffer the most pressure; - Subsidize communities with information in order to guide hunting agreements; - Foster and consolidate community-based tourism through 'birdwatching'; - Community engagement and appreciation of traditional knowledge about the group; 	<ul style="list-style-type: none"> - Population increase of game birds; - Knowledge about the richness of the avifauna; - Consolidation of community-based tourism activities and income generation; - Presentation of research data and scientific investigations; 	Actions aimed at monitoring the avifauna will contribute significantly to the conservation of biodiversity, better understanding of the composition of the local fauna, in addition to generating information on the species present in the place, especially game species, in addition to presenting alternatives for basic tourism, community through 'birdwatching', valuing local biodiversity, traditional knowledge and reducing pressures and threats to this faunal group;
Mastofauna Monitoring	<ul style="list-style-type: none"> - Develop and implement monitoring actions for mammalian species; - Identification and monitoring of species that are bioindicators of the quality of the environment, threatened with extinction and game; - Promote partnerships with universities and research centers; 	<ul style="list-style-type: none"> - Present data related to the monitoring of species, indicating the species that suffer the most pressure; - Subsidize communities with information in order to guide hunting agreements; 	<ul style="list-style-type: none"> - Population increase of game species; - Great knowledge about the richness of the local mastofauna; - Presentation of research data and scientific investigations; 	Actions aimed at monitoring the mastofauna will contribute significantly to the conservation of biodiversity, better understanding of the composition of the local fauna, in addition to generating information about the species present in the place, mainly game species, presenting relevant information in order to subsidize actions management.

Source: Project Teams Elaboration.

2.1.12 Sustainable Development

Table 9 - Sustainable Development.

Sustainable Development Goals	Project Activities
SDG GOAL 4 - QUALITY EDUCATION	<ul style="list-style-type: none"> • The project guarantees access to education and preservation of culture to the Arara People of Igarapé Humaitá, making it possible to maintain traditional customs and uses of natural resources, especially among younger people. In addition, activities related to the construction of knowledge and knowledge based on customs and the adoption of other more efficient practices for the sustainable management of forest resources, which demonstrate the pressure on natural resources and promote the appreciation of cultural diversity, all of this under the umbrella of view of the costumes of the Shawádawa People. • In order to achieve these objectives, the project focuses on reinforcing the spoken language and dialects, but also on recording and disseminating customs and stories between villages and in the vicinity of the Arara do Igarapé Humaitá IL. Support for the expansion of formal education in the form of Indigenous Education, based on assistance in the training of teachers and indigenous education assistants, children of the Arara IL and the Shawádawa Peoples. Insertion of technical assistance and rural extension services that can improve traditional production practices, always with respect and care for customs.
SDG GOAL 5 - GENDER EQUALITY	<ul style="list-style-type: none"> • The Policies for Women Program: promoting equality and combating violence was built based on two fundamental axes, namely: • Promoting equality, including economic autonomy, strengthening women's participation in politics and in power and decision-making bodies; • National Policy to Combat All Forms of Violence against Women. In this sense, the REDD+ project at IL Arara do Igarapé Humaitá promotes the end of all forms of detection against all women and girls everywhere, especially indigenous women who are discriminated against and suffer from various types of violence due to their condition. gender and traditional peoples. • Strengthening of the governance system with preservation of organizations and precedence of the Shawádawa People's Leadership Council - strengthening of female protagonist in decision-making spaces • Consolidation of the Shawadawa People's Life Plan - Women • Promote the economic involvement of Indigenous women
SGD GOAL 8 - DECENT WORK AND ECONOMIC GROWTH	<ul style="list-style-type: none"> • Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. For the Shawádawa Peoples of the IL Arara do Igarapé Humaitá, guaranteeing this objective can help in sustainable economic growth, with reduced pressure on natural resources. Furthermore, given the condition of vulnerability that many traditional peoples are subjected to, it is imperative to take immediate and effective measures to eradicate forced labor, put an end to modern slavery and human trafficking, and ensure the prohibition and elimination of the worst forms of Child labor. • The REDD+ project can ensure that Shawádawa men, women and children do not accept precarious working conditions in search of financial resources outside the IL area • Production and commercialization of native vegetable oils from the species

	<p>cocão, buriti and murmuru.</p> <ul style="list-style-type: none"> • Production of bio jewelry based on seeds and native vines. • Implementation of a community-based ecological and ethnocultural tourism hub. • Economic use of fallen trees.
SDG GOAL 12 - Responsible consumption and production	<ul style="list-style-type: none"> • To ensure adequate production and consumption standards, the IL Arara do Igarapé Humaitá project promotes access to relevant information and awareness of sustainable development and lifestyles in harmony with nature, as are the ancestral practices of indigenous peoples. As well as, it aims to strengthen scientific research and application of technologies, in the development and implementation of tools to monitor the impacts of sustainable development for sustainable tourism, which generates jobs, promotes culture and local products within the project area and under the guidance of the Shawādawa. • Economic use of fallen trees.
SDG GOAL 13 - CLIMATE ACTION	<ul style="list-style-type: none"> • A REDD+ project already represents, in essence, the adoption of urgent measures to combat climate change and its impacts. Therefore, in the IL Arara do Igarapé Humaitá project, it contributes to the conservation of natural resources and the traditional uses of resources by the Shawādawa people, based on the implementation of good practices in environmental education, raising awareness and human and institutional capacity on mitigation, adaptation , impact reduction and warning of risks and threats that may have negative impacts on nature • Implementation of agroforestry systems. • Promote land preparation techniques without the use of fire. • Economic use of fallen trees.
SDG GOAL 14 - LIFE BELOW WATER	<p>REDD+ projects (Reduction of Emissions from Deforestation and Forest Degradation) represent a good alternative for maintaining the richness and abundance of fish in a region, especially in areas that include traditional peoples. In this sense, the IL Arara do Igarapé Humaitá Project is an activity that allows the understanding of the abundance, richness and distribution of the ichthyofauna and its main species, it allows not only to evaluate the quality indicators and preservation of the watercourses of a place , but help in the construction of actions that make it possible to mitigate the impacts caused, directly or indirectly, to the environment, especially in the Amazon. Fish species of economic and game importance that deserve attention and monitoring targets are the curimatá (<i>Prochilodus nigricans</i>), the piracatinga (<i>Calophysus macropterus</i>), the matrinxã (<i>Brycon melanopterus</i>), the pirarara (<i>Phractocephalus hemioliopterus</i>), the piau (<i>Schizodon fasciatus</i>), surubim (<i>Pseudoplatystoma tigrinum</i>), pirarucu (<i>Arapaima sp.</i>), hake (<i>Plagioscion squamosissimus</i>) and red piranha (<i>Pygocentrus nattereri</i>). The maintenance of water resources, fish species and other ecosystem services in the Amazon Basin are totally linked to the preservation of vegetation cover and exchanges between the aquatic-terrestrial interface.</p>

SDG GOAL 15 - LIFE ON LAND	<p>The project area is extremely important for the permanence of natural environments, such as floodplain forests, dry land and forested environments on white sand such as campinanas, inside and outside its limits, already established by the IL demarcation process.</p> <p>In addition to promoting biodiversity conservation, ensuring the maintenance of ecosystem services such as pests and diseases, pollination, water quality and climate regulation.</p> <p>The IL Arara do Igarapé Humaitá area connects with other conservation areas, forming a relevant mosaic for natural resources in the Bacia the Rio Juruá and for the Southwest of the Amazon. In addition, the project protects High Conservation Value Areas (AVC) by stimulating and improving knowledge about local biodiversity through scientific studies, such as long-term monitoring of flora and fauna. Another important factor is the preservation of the ancestral customs and practices of the Shawādawa people, based on the consolidation of the REDD+ initiative and its financial, technical, educational and socio-environmental benefits.</p>
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Source: Project Teams Elaboration.

2.1.13 Implementation Schedule (G1.9)

Table 10 - Implementation Schedule.

Date	Milestone(s) in the project's development and implementation
November 29, 2022	Signing of the contract between the Project Proponent and the Land Owner (indigenous community), to start the research and development of the carbon credit project.
December 20, 2022	Signature of the contract for the development of the REDD+CCB project signed between the Proponent and the technical team qualified as Project Developer.
December 21, 2022	Beginning of the preliminary phase of data collection for setting up the feasibility study.
March 21, 2023	Delivery of the Feasibility Study which revealed that the project would be economically viable.
March 21, 2023	Start of Monitoring
March 21, 2023	Beginning of the primary data collection stage on the local fauna and biodiversity.
March 21, 2023	Beginning of studies, projections and modeling related to the CCB Climate theme.
March 21, 2023	Beginning of the data collection stage for carrying out the socioeconomic diagnosis and beginning of the Free, Prior and Informed Consent (FPIC) process.
April 1st, 2023	Beginning of the forest inventory stage
April 4, 2023	Beginning of the Forest Inventory to collect data to determine the carbon stock and to collect data on biodiversity.
April 15, 2023	PDD finalization
August, 1st, 2023	Beginning of the validation stage to be carried out by an auditor certified by Verra.
March 21, 2024	Beginning of the 1st stage of verification to be carried out by an auditor certified by Verra.
March 21, 2052	End of GHG accounting period.

Source: Project Teams Elaboration.

2.1.14 Project Start Date

The VCS v4.4 standard states that "the project start date of an AFOLU project is the date on which the activities that led to the generation of GHG emission reductions or removals are implemented."

In this sense, the one chosen as the beginning is March 21, 2023, where there was already a positive result for the feasibility study and that was when the campaigns for data collection in the field for the formation of the baseline began.

2.1.15 Benefits Assessment and Crediting Period (G1.9)

The credit period is 30 years, starting on March 21, 2023 and ending on March 20, 2053.

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

There is no difference.

2.1.17 Estimated GHG Emission Reductions or Removals

Table 11 - Estimated GHG Emission Reductions or Removal.

Year	Estimated GHG emission reductions or removals (tCO2e)
2022	0
2023	52.897
2024	190.591
2025	240.556
2026	258.267
2027	209.610
2028	130.770
2029	199.607
2030	346.748
2031	267.529
2032	231.722
2033	418.546
2034	353.917
2035	454.581
2036	387.858
2037	371.395
2038	410.667
2039	485.446
2040	441.181
2041	318.117
2042	545.115
2043	472.659
2044	397.889
2045	490.730
2046	518.811
2047	460.076
2048	519.861
2049	533.331
2050	557.133
2051	599.476
Total estimated ERs	10.865.086
Total number of crediting years	30
Average annual ERs	362.170

Source: Project Teams Elaboration.

2.1.18 Risks to the Project (G1.10)

The project risks were estimated based on the parameters determined by the AFOLU Non-Permanence Risk Tool V.4.0 published by the VCS Program of the VERRA Standards on September 19, 2019 - in accordance with the other items presented in this VERRA template (especially the calculations of the Baseline of Emissions and Additionality) for the determination of the Risk Buffer. The tables and scores determined by the VERRA Tool are in attachment 3 of this report, which presents, in several of its items, the justifications for the assigned risk score.

Table 12 below presents a set of additional risks determined in this VERRA Standards template, to offer the widest transparency to the process of mitigating risks to the project, fulfilling the requirements of the VCS Program in addition to providing instruments for future Monitoring procedures, Registration and Verification (MRV).

Table 12 - Risks to the Project.

Identify Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
Low engagement and commitment of communities in the implementation of socioeconomic initiatives to reduce emissions from deforestation and degradation	Expansion of activities that degrade the environment: agriculture, livestock and logging	<p>Ensure community leadership in the preparation and execution of economic and socio-environmental projects of interest to you</p> <p>Ensure financial support and continued technical assistance in the preparation, execution and durability of bioeconomy projects</p> <p>Comply with agreements signed between communities and parties involved in the projects</p> <p>Maintain active communication and feedback channels to assess the degree of engagement and the need for new stimulating actions</p> <p>Monitor results</p>
Lack of resources for carrying out bioeconomy projects	Discouragement of the low-carbon economy based on non-timber forest products and prevalence of activities that degrade the environment: agriculture, livestock and logging	<p>Ensure financial support for the preparation of management plans, implementation of infrastructure, community training, market access and continued technical assistance.</p> <p>Verticalization of production chains with the addition of technology and innovation.</p> <p>Comply with agreements signed between communities and parties involved in the projects</p>

		Maintain active communication and feedback channels to assess the degree of engagement and the need for new stimulating actions Monitor results
Low engagement of young people and women in economic and socio-environmental projects	Prevalence of the condition of socioeconomic vulnerability among young people and women	Promoting the role of young people and women in economic and socio-environmental projects. Guarantee the resources (human, financial and infrastructure) for the execution of economic engagement actions and access to decision-making spaces.
		Comply with signed agreements with young people and women and parties involved in the projects
		Maintain active communication and feedback channels to assess the degree of engagement and the need for new stimulating actions Monitor results
Destructuring of the governance system	Commitment to managing the territory, projects and the effectiveness of decision-making	Promote the engagement of young leaders and ensure resources for the functioning of the association, cooperative and Indigenous Council
Increased occurrence of hot spots/forest fires due to anthropic action	Reducional of forest cover	Offer of technical assistance and mechanized cultivation for planting gardens without the use of fire
Increased instances of trespassing, logging, and predatory/illegal hunting and fishing	Degradation of forest cover and compromising essential resources for the subsistence of communities; increase in social conflicts in the region	Implement IL monitoring, protection and surveillance tools Promote environmental education campaigns in communities surrounding the IL Establish partnerships with public institutions to implement preventive actions for environmental monitoring and inspection.
Lack of interest from other communities, public agencies and institutions in establishing collaboration agreements with the TI Arara do Igapó Humaitá REDD+ Project.	The project is already inserted in a context of protection area for being in a recognized Indigenous Land. However, the project's greatest risks come from external anthropic actions such as predatory hunting and fishing, illegal logging, fires and the advance of settlement areas and the expansion of agriculture and livestock.	Establishment of agreements for the sustainable use of natural resources in communities and cities close to the project. Intensification and support for inspection actions, together with bodies and institutions responsible for combating predatory hunting and fishing, illegal logging, burning, mining and prospecting and other activities harmful to the environment and culture of the Shawádawa people.

	<p>The protection of natural resources and maintenance of the project is closely related to the strengthening of inspection actions, environmental education and technical assistance disseminated in the surrounding communities and in cities close to the project.</p>	<p>Support scientific research activities both on biodiversity and on the culture of the Shawādawa people and their ancestral practices.</p>
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Source: Project Teams Elaboration.

2.1.19 Benefit Permanence (G1.11)

Table 13 - Benefit Permanence.

Benefits	Strategy
Produce and commercialize native vegetable oils from the species cocão, buriti and murumuru	Promote the group's engagement in the national and international market network.
	Stimulate associativism and efficient management of production and commercialization.
	Stimulate the verticalization of production with insertion in different market segments.
	Mediate the formalization of government partnerships and funding agencies to consolidate the initiative.
	Provide training and technical assistance
	Implement infrastructure
	Promote the engagement of youth and women
Producing bio jewels based on native seeds	Promote the group's engagement in the national and international market network.
	Stimulate associativism and efficient management of production and commercialization.
	Stimulate the verticalization of production with insertion in different market segments.
	Mediate the formalization of government partnerships and funding agencies to consolidate the initiative.
	Provide training and technical assistance
	Implement infrastructure
	Qualify local multipliers
Implement agroforestry systems	Promote the engagement of youth and women
	Establish partnership with research institutions and technical assistance
	Implement community nursery
	To train agroforestry agents
	Partnership with public institutions and the private sector

Implement a community-based ecological and ethnocultural tourism hub	Empower communities
	Implement infrastructure
	Implement marketing strategy
Promote the rescue of the oral and written language of the Shawādawa People.	Partnership with research and teaching institutions
	Introduce the first language in the school curriculum of educational units
	Elaborate the publication of a linguistic notebook of the Shawādawa People
	Promote intergenerational interaction initiatives
Strengthen the governance system by valuing organizations and restructuring the Shawādawa People's Leadership Council.	Structure and validate the governance system
	Promote meetings of community leaders
	Promote the training and engagement of young leaders with female leadership
Implement techniques for preparing the swidden without the use of fire	Establish partnership with research institutions and technical assistance
	To train agroforestry agents
Promote the economic engagement of indigenous women	Promote meeting of indigenous women
	Define guidelines for women's economic engagement
	Provide entrepreneurship training
	Sign a partnership to offer a line of credit for business implementation and consolidation
Consolidate and implement the Shawadawa People's Life Plan	Promote a review and validation of the Life Plan
	Define implementation strategies, design structuring projects and sources of financial support
Implement an IL monitoring and inspection system	Partner with public institutions and non-governmental organizations
	Implement monitoring and enforcement tools and infrastructure
	To train environmental agents
	Improvement in environmental and territorial surveillance procedures by providing tools such as remote monitoring using high-resolution satellite images, purchasing support equipment, offering workshops on the use of technologies and the process of territorial management. Together with the establishment of agreements and support for inspection institutions, monitoring and territorial management should directly reflect on the maintenance of long-term climate benefits and on the establishment of the limits of the IL Arara do Igapé Humaitá.
	Greater scientific knowledge about Biodiversity and Maintenance of High Conservation Value Attributes: in addition to maintaining the native forest cover, supporting actions to preserve the customs and ancestral practices of the Shawādawa Peoples and providing tools to provide sustainable socioeconomic development. Thus, the Project must implement a long-term monitoring plan for Biodiversity, with the purpose of assessing impacts, implementing mitigation actions and increasing scientific understanding of biodiversity in the region.
Economic use of fallen trees	Train young people in marquetry
	Implement infrastructure

	Develop a line of wood-based products
	Promote engagement with the local, national and international market

Source: Project Teams Elaboration.

2.1.20 Financial Sustainability (G1.12)

The Project has Commercially Sensitive Information that is understood by the **Financial Viability** of the project as well as the financial return that the project offers. This information is referenced in the Financial Health of Implementing Organization(s) (G4.3) item of this document. This Commercially Sensitive Information is available for access by the VVB and Verra at any time.

The Financial Sustainability of the project is based mainly, but not only, on the number of years until the cash flow is balanced, and also on securing the financing necessary to implement and operate the project until it reaches the situation where the cash flow realized guarantees the continuity of the Project. The break-even point of the Cash Flow of this project will be reached in 2 (two) years, which also has a Payback of 2 (two) years. The complete Model of Economic-Financial Analysis designed year by year based on inventories of emissions and market conditions, will be made available privately, as it contains confidential and exclusive information (Commercially Sensitive) owned by the Project Proponent, its Implementing Partner and other associates.

The Amazon Partners 20 Project was also fully financed with the Project Proponent's own resources, so that the resources necessary for the implementation and continuity of the planned activities until the cash guarantee the permanence everywhere.

2.1.21 Grouped Project

Not applicable.

2.2 Without-project Land Use Scenario and Additionality

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

2.2.1.1 Arara do Igapé Humaitá Indigenous Area

The Shawādawa People use all kinds of sources of resources existing in their territory, characterizing themselves as a direct dependence on everything that surrounds them for the maintenance of the aspects that shape their way of life, whether social, economic, environmental, cultural and religious. From the land, the forest, the rivers and the fauna, they extract food, essences for the treatment of diseases, material for the construction of houses, vessels, work instruments, ornaments for their sacred rituals, in short, everything that meets their basic need. In addition, they develop itinerant small-scale agriculture and the raising of domestic animals.

Non-timber extractives are intended for the consumption and commercialization of the surplus, collecting, among others, the species: açaí, bacaba, buriti, coco-de-jaci, patoá, cupuaçu and cocoa. The wood is used for the construction of family and community infrastructure (houses, kupixawa, fences, warehouse, each of flour, schools, health post, boats, among others). The fishing is intended exclusively for consumption, with

emphasis on the species bodó, pintadinha, cachimbo, tracajá, jiju, polaca, pacu, matapiri, arraia, piau striped, piranha, surubim, piaba, rabo de fogo, tambuatá, bodi, cará, piabão, mandi, arraia, traíra, bodó grande and Matrixã. Wild animals complement the basis of the diet, hunting, among others: tapir, cotiara, paca, pig, agouti, chaplain, armadillo, nambu, quatipuru, deer, peccary, jaboti and jacu. The collection of wood gains importance for the construction of houses, boats, fences, flour house, work instruments, warehouse, kupixawa, schools, health posts, among others. Among the species collected are: angelim, cumaru, maçaranduba, aguano, marupá, cedro and itaúba.

In the swiddens they grow cassava to produce flour, corn, beans, rice, banana, watermelon, yams, sugar cane and pineapple, marketing the surplus production. Cattle ranching is intended for consumption (milk and meat) and marketing of live animals.

2.2.1.2 Surroundings of IL: PDS Natal and PAE Cruzeiro do Vale

According to the results of the socioeconomic characterization, in the Sustainable Development Project Natal has a capacity for 110 families, 99 of which are effectively settled; the Cruzeiro do Vale Extractive Settlement Project has a capacity for 270 families (268 settlers). The predominant economic activity in the settlements is extensive cattle ranching. In addition, they develop small family farming, aimed at subsistence and the commercialization of the surplus. Hunting, fishing, and gathering of non-timber products are intended exclusively for the composition of the food diet. In extractives, highlights the collection of açaí, patoá and buriti. The collection of wood is intended for the construction of houses, boats, fences, flour house, work instruments, warehouse, among others. Among the species collected are: angelim, cumaru, maçaranduba, aguano, marupá and cedar. The gardens grow cassava to produce flour, corn, cassava, banana and watermelon. The cattle ranching is intended almost exclusively for marketing.

2.2.2 Most-Likely Scenario Justification (G2.1)

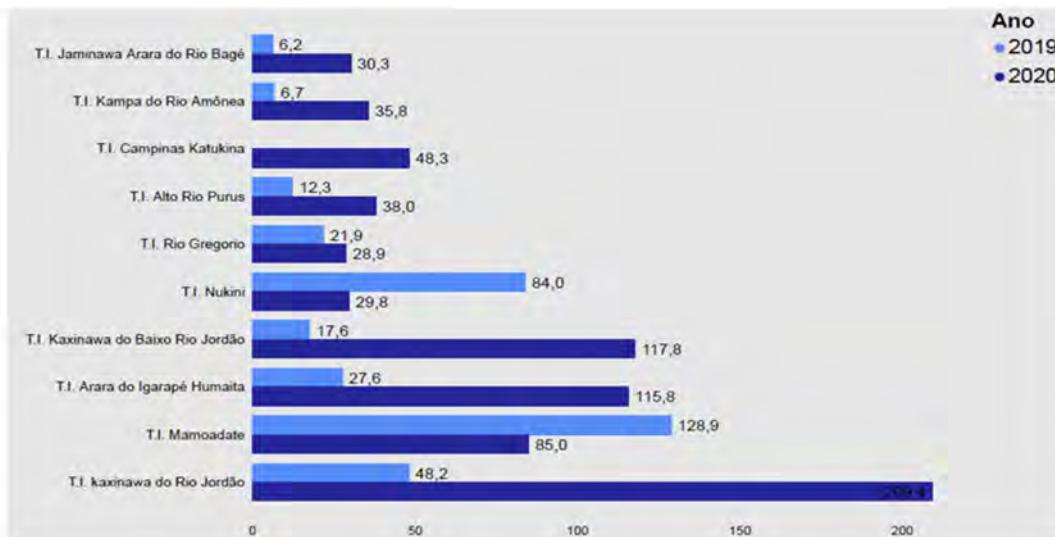
2.2.2.1 Indigenous Land Arara do Igarapé Humaitá

2.2.2.2 Surroundings of IL: PDS Natal e PAE Cruzeiro do Vale

According to data generated by Project Monitoring the Brazilian Amazon Rainforest by Satellite (PRODES¹¹) and National Institute for Space Research (INPE¹²), in the last 10 years, the IL Arara do Igarapé Humaitá It had a loss of approximately 700 hectares of primary forest through logging, driven by the expansion of agriculture and livestock. Annual heat outbreaks peaks are recorded in the months of September in October, resulting from the burning of vegetation to clear the area for agriculture. According to the Plan for the Prevention and Control of Deforestation of the Municipality of Porto Walter, prepared by the Secretary of Environment of the State of Acre, the information collected in the diagnosis and in the participatory workshops it was possible to identify three critical areas in terms of the occurrence of deforestation, fires and forest fires in the municipality. The three areas together represent 17% of the municipality's territory and concentrate 91% of the deforested area. The IL is in the region of Critical Area 3, representing 14% of all deforestation in the municipality, with a tendency of expansion of deforestation in its surroundings and risk of expansion into its interior.

The data show that among deforestation jumped from 27.6 ha in 2019 to 115.8 ha in 2020, occupying the third place among the IL with the highest deforestation rate in the period. Thus, according to the scenario without the project, there is a trend of exponential growth of deforestation of primary forest in the Arara Indigenous Land for the implementation of agriculture and livestock.

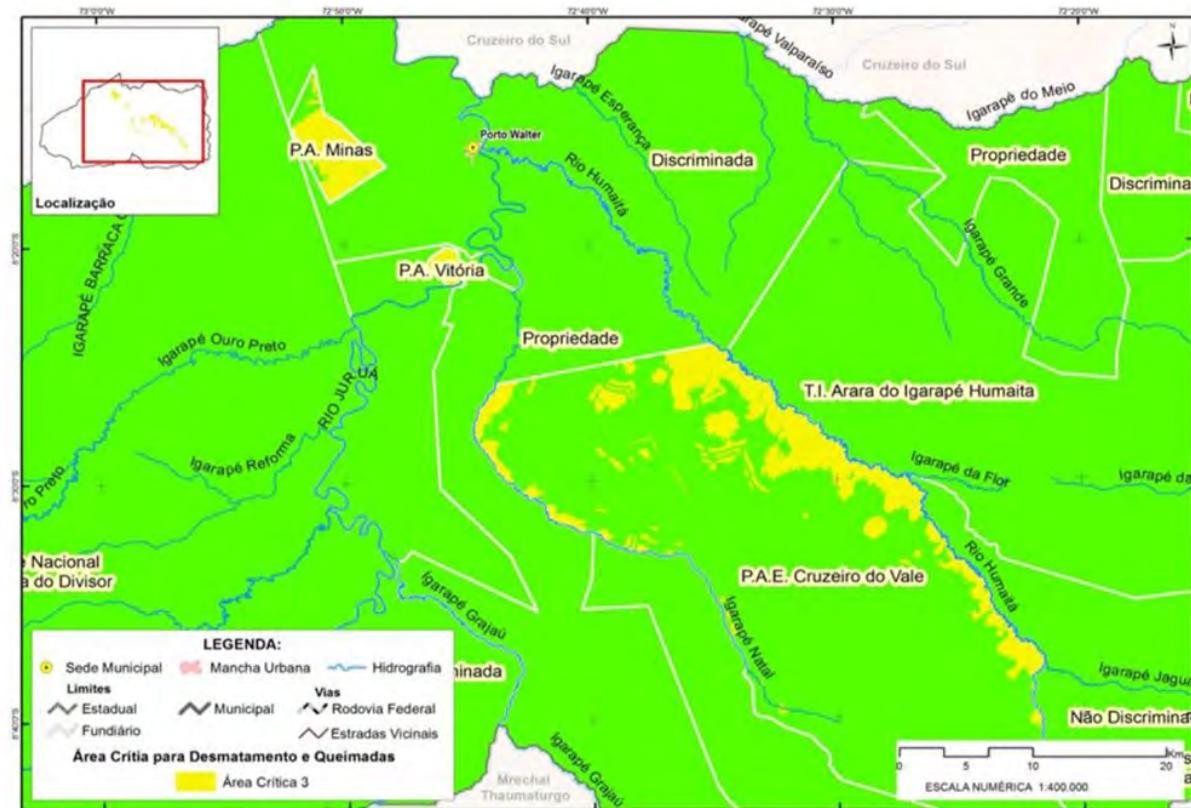
Figure 13 – Indigenous lands.



Source: Inpe/Prodes, 2021 and ZEE – Fase II.

2.2.2.3 Current scenario of deforestation in the region of the IL PDS Natal and PAE Cruzeiro do Vale

Figure 14 - Current scenario of deforestation in the region of the IL PDS Natal and PAE Cruzeiro do Vale.



Source: PPCD – SEMA/AC.

2.2.3 Community and Biodiversity Additionality (G2.2)

The current scenario, with the absence of the Project would be limited in generating benefits to the climate, traditional peoples, and biodiversity. The scenario without the Project tends to progress to the increase of illegal exploratory activities, conversion of forest areas into unplanned irregular occupations, expansion of the area of agriculture and livestock with low productivity and environmental degradation due to the pressure on the use of resources, even within a protection area, the Arara do Igarapé Humaitá Indigenous Land. The limitation of resources and the absence of inspection actions by the public power, increase the pressure of deforestation in the area covered by the IL and with the advance to the limits of the area.

The need for environmental protection of the Amazônia Legal¹³ is unquestionable, with a perception that the environmental loss generated by deforestation is innumerable times greater than the economic gain of degrading activities. The negative impacts of deforestation are significant and interconnected, because in addition to environmental degradation, the cutting or burning of forests releases greenhouse gases (GHGs), responsible for global warming, which in turn directly influences water cycles, which directly affect biodiversity (Ramos, 2014). In addition, the richness and diversity of the traditional knowledge of indigenous peoples, especially the Shawâdawa, and its importance for the maintenance of social, biological and cultural diversity - given that this knowledge is historical, transmitted in an intergenerational way, perfected

over time and always in adjustment with the inhabited place, in compliance with the practices and techniques that maintain the environment in balance (Rodrigues & Santos, 2014).

2.2.3.1 Benefits that would not occur in the absence of the project

2.2.3.1.1 Development of value chains for non-timber forest products

According to preliminary studies, the forest typology of IL demonstrates high potential of oilseed species with market value, especially the cocão, buriti, patauá and murumuru. Bio jewelry, likewise, adds value in the national and international market, especially when incorporating the cultural aspect and the Shawādawa brand. Investments to structure the production chains of non-timber producers (mapping, processing infrastructure, quality control, technical responsibility, training, and structuring for market access) are estimated at approximately 2.5 million reais, a financial volume not available by indigenous organizations. For verticalization, such as the development of product baskets, it is necessary to have access to knowledge, technology, and innovation, depending on the existence of infrastructure and hiring of specialized consultancies or even partnership with research and innovation institutions.

2.2.3.1.2 Implementation of agroforestry systems and techniques of preparation of swidden without fire

The implementation of SAF's¹⁴ and techniques of garden without fire depends on partnership with research and innovation institutions, training of agroforestry agents, implementation of a nursery of agroforestry species, acquisition of implements and agricultural inputs, depending on investments not available by community organizations.

2.2.3.1.3 Implementation of Indigenous Land monitoring and inspection system

Communities don't have available technological tools, technical qualification, and infrastructure to assist environmental agencies to prevent or identify natural events and anthropogenic actions that generate environmental impacts and land occurrences, such as invasions, deforestation, fires, illegal logging and predatory hunting and fishing.

2.2.3.1.4 Laws, regulations, and government arrangements that affect land use

Bill of law 412/2022 that regulates the Brazilian Emissions Reduction Market (MBRE¹⁵) pending in the Federal Senate, awaiting a public hearing.

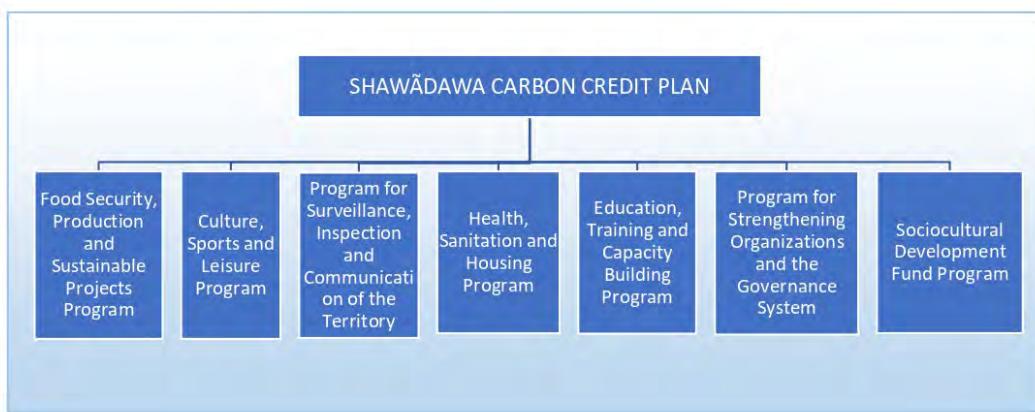
2.2.3.1.5 The Shawādawa Carbon Credit Life Plan with prioritization of programs and projects

The Shawādawa Life Plan for Carbon Credit – in a collective concept elaborated by the indigenous people in a review workshop between March 31 and April 3, 2023 – is a document to organize the Arara do Igarapé Humaitá Indigenous Land, the Shawādawa People, and their organizations to improve living conditions, preserving/conserving the forest and maintaining culture and ancestry for present and future generations.

It is directly linked to the Territorial and Environmental Management Plan of the Arara do Igarapé Humaitá Indigenous Land (PGTI), which in turn is anchored to the ethnozoning of indigenous lands, a strategy of the Ecological and Economic Zoning of the State of Acre, according to State Law No. 1,904, of 07/05/2007, which establishes the ZEE/AC and Federal Decree No. 7,747, of 06/05/2012, which establishes the National Policy for Territorial and Environmental Management of Indigenous Lands – PNGATI¹⁶, and provides other measures and Law No. 13,123, of 05/20/2015, which regulates item ii of § 1 and § 4 of article 225 of the federal constitution, article 1, paragraph j of article 8, paragraph c of article 10, Article 15 and §§ 3 and 4 of Article 16 of the Convention on Biological Diversity, promulgated by Decree No. 2,519 of March 16, 1998; provides for access to genetic heritage, protection and access to associated traditional knowledge, and the sharing of benefits for the conservation and sustainable use of biodiversity; Repeals Provisional Measure No. 2,186-16 of August 23, 2001; and makes other arrangements. Decree No. 7747/2012 – Establishes the National Policy for Territorial and Environmental Management of Indigenous Lands – PNGATI and provides other measures.

It is worth mentioning that the information in the Life Plan is complementary to the information coming from the social axis of the PDD. Next, we will present the general diagram of the Shawādawa Life Plan of Carbon Credit, composed of seven Programs, elaborated in a participatory way.

Figure 15 - Overview of the Shawādawa Carbon Credit Life Plan.



Source: Life Plan/governance structure/research data review workshop

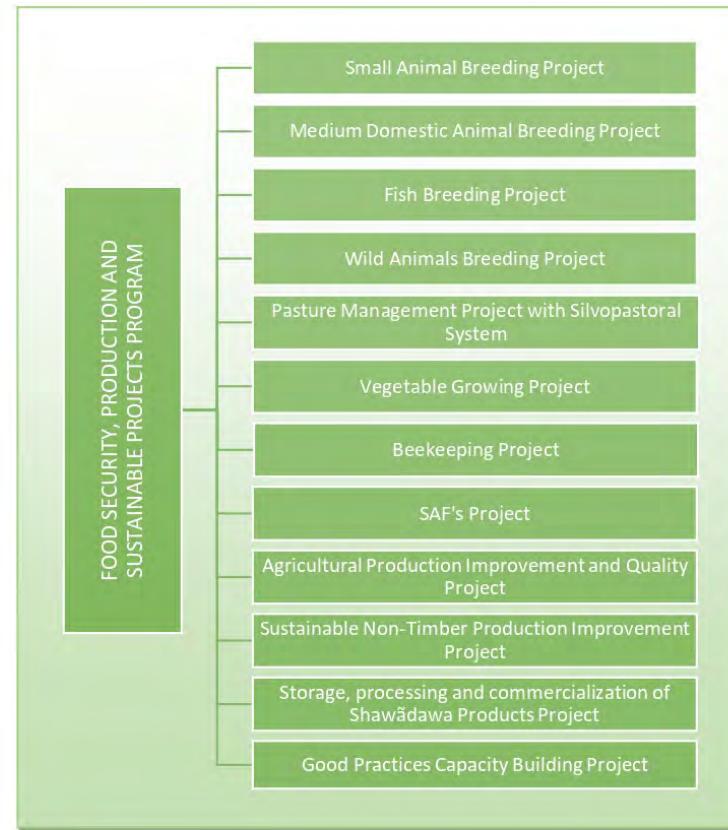
The programs were subdivided into projects, listed and reviewed collectively by the indigenous people. Each program has a brief presentation and the projects, in number of 44, contain justification, brief description about the current situation, situation, future scenario, risks and vision of the future, with the perception of the Shawādawa for 30 years. Crossing the program with the VCS CCB methodology, we also

contemplate the risks without the programs, encompassing impacts and actions necessary to mitigate the risks, as well as the results and impacts of the programs until the end of the useful life of the project.

2.2.3.1.5.1 Food security, production, and sustainable projects program

For the Shawādawa, food security is the realization of the right of regular and permanent access to quality food, in sufficient quantity, without compromising access to other needs, with food that promotes health, respects cultural diversity and is socially, economically, and environmentally sustainable. This will ensure the nutritional improvement of families, avoiding malnutrition and mitigating diseases. The production, in turn, focuses on the market of in natura products or products benefited by the indigenous people, and can be marketed through the families or the Cooperative. Sustainable projects aim to cause less impact on the environment. With the development of techniques and technologies that reduce the emission of polluting gases.

Figure 16 - Food security program with respective projects.



Source: Life Plan Review Workshop/Governance Structure/Research Data.

2.2.3.1.5.2 Small-Size Animal Breeding Project

Project Justification: These creations have several advantages such as the possibility of obtaining high production in small areas, rapid recovery of invested capital and light work, which can be performed with family labor. Poultry farming is a great option to ensure animal protein in everyday life.

Current situation: Although there is breeding of birds (chickens and ducks in their majority) in the villages and communities, they are not enough to guarantee the continuous feeding of indigenous families, being necessary to adopt strategies of creation in closed and open environments.

Where to go with the Project: With the acquisition of chicks, chickens, and roosters, it is intended to carry out the creation in an organized way through small farms, with materials, equipment and other necessary inputs, as well as freely; have training and technical assistance aimed at

Risks without the Project: Insufficient proteins for indigenous food and health.

2.2.3.1.5.3 Mid-Size creation project

Justification of the Project: The creation of medium-sized animals will involve the acquisition and management of pigs, sheep, and goats, in a planned manner and with adequate and separate spaces, so that it does not bring, mainly, damages to the health of the residents.

Current situation: Animal husbandry today is a reality, because since 2006, when the demarcation of the TI took place, the population has increased, with pressure on hunting and fishing, as well as threats and invasions from non-indigenous neighbors who hunt illegally. Therefore, there is a lack of protein in indigenous villages/communities and there are few medium-sized animals.

Where to go with the Project: To raise pigs, sheep, and goats in a planned way in the 11 territorial units of the Arara do Igarapé Humaitá Indigenous Land to ensure the consumption of proteins throughout the duration of the Project.

Risks without the Project: Insufficient proteins for indigenous food and health.

2.2.3.1.5.3.1 Fish Breeding Project

Project Justification: The fishing activity is traditional for this people, but there is not so much abundance in some villages and communities, and it is necessary to seek strategies for raising fish in captivity through ponds or tanks.

Current situation: In recent decades some places in the Indigenous Land, especially in villages and more populous communities, there is a shortage of fish, necessary for the diet. A population jump in the last 20 years, the opening of new communities and population increase in surrounding areas, especially by INCRA's Settlement Projects, overfishing, illegal fishing, and water pollution, are noteworthy as factors that contribute to the decrease in fish.

Where to go with the Project: The Project foresees the construction of weirs and tanks in the 11 villages/communities, with the acquisition of fry, materials, and inputs, being maintained throughout the duration of the Project, to ensure complementation in the feeding of families.

Risks without the Project: Insufficient proteins for indigenous food and health.

2.2.3.1.5.3.2 Wild animal husbandry project

Project Justification: The creation of wild animals in captivity, in addition to representing an alternative source of meat for indigenous families, helps in the conservation of forest animal species, which need to reproduce. The proposal of this Project, therefore, aims at the implementation of breeding sites to meet the protein needs of these families, considering the decrease of these types of animals in some regions of the TI in recent decades.

Current situation: In the most populous villages, such as Raimundo do Vale and Foz do Nilo, wild animals become scarcer, causing indigenous hunters to move for hours and days to get some kind of game for family food. As the resource decreases, the need for nutritional guarantees becomes more evident.

Where to go with the Project: Install breeding grounds for wild animals in the most populous villages and with problems related to hunting. It is intended to manage tracajás¹⁷, turtles, wild pigs, and deer.

Risks without the Project: Insufficient proteins for the food and health of indigenous peoples; greater scarcity of wild animals due to increased population and greater demand for game.

2.2.3.1.5.3.3 Pasture management project with silvopasture system

Project Justification: Silvopasture System (SSP) is the intentional combination of trees, pasture, and cattle in the same area at the same time and managed in an integrated way, with the objective of increasing productivity per unit area. In these systems, interactions occur in all directions and in different magnitudes. It consists of the practice that integrates trees, forage and grazing of domesticated animals in a mutually beneficial way, using the principles of managed grazing. In the Indigenous Land, the pastures are concentrated in the Santo Antônio community, where the indigenous raise oxen in greater proportion, but have an interest in consorting the activity with the planting of trees.

Current situation: There is cattle breeding in the Santo Antônio community. According to the Territorial and Environmental Management Plan, there are two pasture areas in this community, the first with approximately 30 hectares and the second with an average of 24 hectares. Together, they can range between 50 and 60 hectares of pasture. Although punctual, the activity of cattle farming was one of the vectors of transformation of the landscape and occupation in the IL.

Where to go with the Project: The Project can play a key role in avoiding the expansion of pasture areas, and silvopasture integration is an excellent strategy, as it aims to integrate the forest with the already open pasture. This work should be done with technical assistance and with the support of Indigenous Agroforestry Agents.

Risks without the Project: Opening of new pasture areas, reaching other communities and villages, contributing to increased deforestation with the expansion of pastures and the acquisition of more cattle. It is noteworthy that several indigenous people understand cattle farming as an activity inspired by the nearby

settlers and, therefore, if there are no strategies for financial appreciation, part of the forest will be converted into open areas for breeding large animals.

2.2.3.1.5.3.4 Vegetable cultivation project

Project Justification: Vegetables, in addition to providing essential nutrients for the proper functioning of the body, also help in hydration. In turn, low consumption can cause nutritional deficiencies, weakening it and making it more susceptible to diseases. Concerned about the nutritional problem of the families, this project provides for the cultivation and maintenance of gardens for 50% of the Shawādawa families.

Current situation: In addition to collaborating to increase the diversity of food consumption, it contributes to the maintenance of an adequate weight and to the prevention of obesity and other chronic diseases related to poor diet. It is observed in the irregularity in the feeding of the families, with low nutritional quantity.

Where to go with the Project: The body's immunity is built daily, through a healthy food history, with the consumption of vegetables that have vitamins and minerals with anti-inflammatory and antioxidant powers, acting on the body's defense system. Therefore, in addition to satiating hunger, foods have the function of supplying the nutritional needs of the body, which are varied and aim to promote growth, provide energy for work, regulate, and maintain the proper functioning of the organs and increase resistance against diseases. The Project provides for the implementation of vegetable gardens, with the necessary inputs, for 50% of the families in the 11 territorial units of the Indigenous Land.

Risks without the Project: The indigenous people consider the consumption of vegetables necessary because their lack can cause some health problems such as extreme fatigue, 'lazy' intestine, low immunity signs in the skin, gastric problems and even risk of heart problems.

2.2.3.1.5.3.5 Beekeeping Project

Project Justification: Beekeeping is an activity of positive points, both social and economic, in addition to contributing to the preservation of existing ecosystems. Honey strengthens our immune system and collaborates with proper digestion. But its benefits don't stop there: honey is antiseptic, diuretic, antioxidant, soothing, and expectorant. The indigenous people intend to be trained and work with beekeeping in which honey is used for internal consumption for medicinal and feeding purposes, as well as for sale in the local market.

Current situation: Only the São Luís community is dedicated to beekeeping. Even so, this activity was consortium to the Agroforestry System, which also has a weir for fish farming and fruit planting.

Where to go with the Project: Beekeeping activities implemented in the 11 villages/communities during the duration of the Project, with indigenous producers duly trained.

Risks without the Project: Low probability of implementation of the honey production chain in the Indigenous Land.

2.2.3.1.5.3.6 SAF's Project - Agroforestry Systems

Project Justification: An agroforestry system is a form of land use and occupation in which trees are planted or managed in association with agricultural or forage crops. In the Indigenous Land, the main objective of implementing or improving the existing SAF's will be to optimize land use, reconciling forest production with food production, conserving the soil, and reducing the pressure for land use for agricultural production. In this way, the system will improve the physical, chemical, and biological properties of the soils, with less need for fertilizers and pesticides, enabling greater water conservation and biomass production, as well as climate stability. In summary, the implementation of SAF's in the territorial units of IL will allow improvement of the water balance; increase in soil absorption capacity; health and healthy eating for families; greater water infiltration, thus reducing the risk of erosion; decreased emergence of invasive plants; sustainability of the production system and increased productivity.

Current situation: There are SAF's in some villages and communities, and some need cleaning, because there are no more Indigenous Agroforestry Agents in some of these places to perform the services. We emphasize that there are few indigenous agroforestry agents, as they need training and scholarship to stimulate their work. There are, however, successful experiences, such as that of the St. Louis community.

Where to go with the Project: The indigenous people want to increase the areas of SAF's and revitalize the existing ones. They intend to take advantage of areas such as backyards, capoeiras¹⁸, traditional swiddens and old pastures, in disuse. They intend that in addition to feeding families, the Systems enable the feeding of domestic and wild farmed animals, interfacing with other projects presented in the Shawādawa Life Plan for Carbon Credit. It is essential that this Project also has a crossover to the Sociocultural Development Fund because it will be it that will allocate resources for the payment of scholarships of the Indigenous Agroforestry Agents, who must be properly trained to act. Native species of fruits and seeds will also be valued for reforestation in the vicinity of villages and communities.

Risks without the Project: Food and nutritional shortage for indigenous people.

2.2.3.1.5.3.7 Project for the improvement and quality of agricultural production

Project Justification: Prioritizes the quality of agricultural products, so that they reach the market. For this it will be necessary to organize the priority productive chains including productive improvement through the acquisition of machinery, equipment, materials, and other inputs; training in good practices; storage; logistics (storage, transportation, etc.); and market access for marketing the products.

Current situation: The production is still subsistence to feed the families, with little output of quality products to the market, with competitiveness with other regional products. Technical assistance is supported by the experience of a few trained Indigenous Agroforestry Agents.

Where to go with the Project: Improve the quality of production prioritizing, mainly, the products of access to the market and improving the links of the selected productive chains. This implies the adoption of better techniques and technologies, periodic technical assistance, capacity for production processing, properly trained indigenous peoples, management plans of products prepared to reach the market (in natura and processed products) and articulated to buyers, places for storage of production, seal of quality of products, transportation, and marketing plan.

Risks without the Project: Permanence of Shawādawa production aimed at a disorganized subsistence to reach the market.

2.2.3.1.5.3.8 Project to improve sustainable non-timber production.

Project Justification: Non-timber forest products correspond to all products from the forest that are not wood, such as: leaves, fruits, flowers, seeds, nuts, palm hearts, roots, bulbs, branches, bark, fibers, essential oils, fixed oils, latex, resins, gums, vines, herbs, bamboos, plants, among others. In addition to serving as food and for medicinal purposes, the project aims to complement the family income, through the organization of production, aiming at the access of non-timber products to the regional market.

Current situation: The practice of extraction of non-timber products by the indigenous people was passed on from generation to generation, and they are consumed internally, without reaching the market, because there is no organization of the productive chains for this purpose.

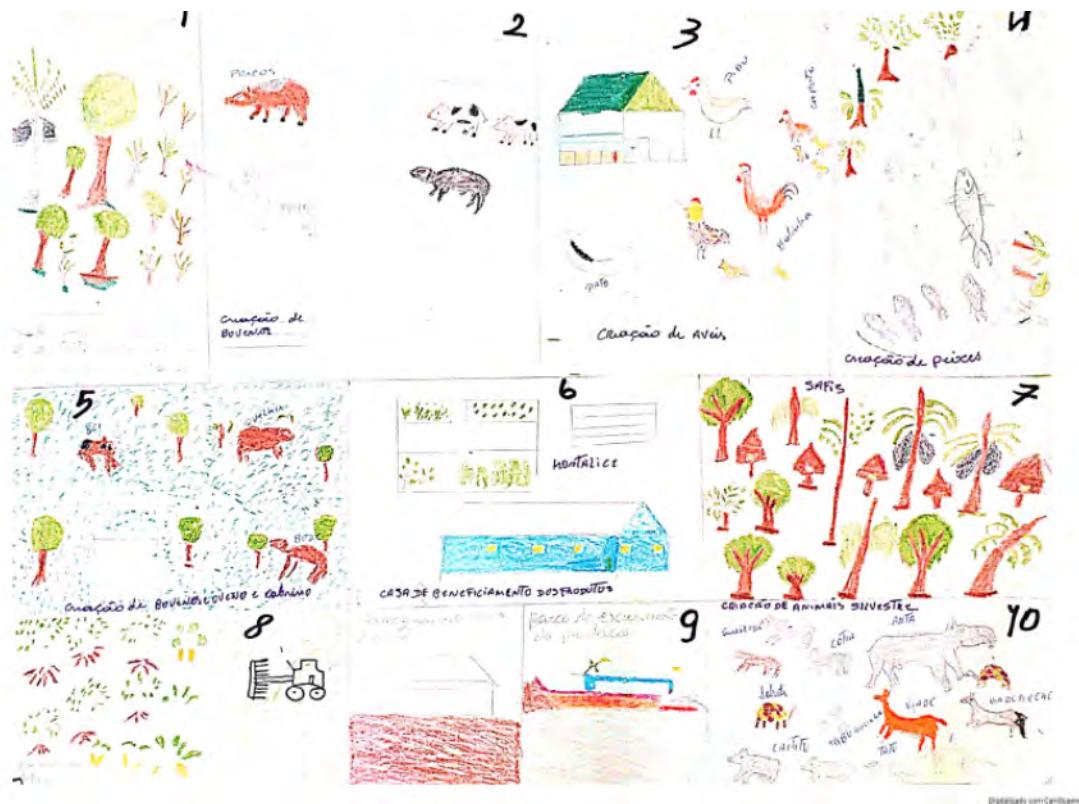
Where to go with the Project: Production chain of priority non-timber forest products with proper organization of production with adoption of best techniques and technologies, periodic technical assistance, capacity for production processing, indigenous people duly trained, management plans of products prepared to reach the market (in natura and processed products) and articulated to buyers, places for storage of production, seal of quality of products, transportation, and marketing plan.

Risks without the Project: Permanence of Shawādawa production aimed at a disorganized subsistence to reach the market.

2.2.3.1.5.3.9 Future Vision of the Program

The mental map below represents the expectation of actions coming from the Project for food security, production, and sustainable projects. In summary, they wish to continue having little cattle breeding, which should be integrated into the silvipastoral system, SAF's should be consortium with bee breeding and should have diversity of fruit trees to supply the communities, and organization of production reaching regional market for marketing of non-timber agricultural and forest products.

Figure 17 - Future vision of the Food Security, Production and Sustainable Projects Program.



Source: Life Plan Review Workshop/Governance Structure/Research Data

2.2.3.1.5.4 Sport, culture and leisure program

The Program is necessary for the strengthening of culture, since there are already internal efforts, but with isolated actions, mainly on the part of some indigenous teachers who carry out research in their villages/communities. It is necessary that there is the strengthening/revitalization of traditional habits and customs, especially the language, music, traditional beliefs, food, architecture, sacred places, games and playful games, graphics and crafts, ritual use of sacred medicines, among other aspects inherent to the Shawádawa culture.

Figure 18 - Sport, culture, and leisure program with respective projects.



Source: Life Plan Review Workshop/Governance Structure/Research Data

2.2.3.1.5.4.1 Ethnotourism Project

Project Justification: The Ethnotourism Project unites income generation for the People with cultural and environmental conservation. Ethnotourism and ecotourism initiatives in indigenous lands are governed by Funai's Normative Instruction No. 3, which establishes norms and guidelines regarding visitation activities for tourism purposes in indigenous lands. According to the foundation, indigenous communities have the autonomy to explore tourism projects in their territories, and the government has the role of monitoring and supervising activities in the villages. The visitations are scheduled with the representatives of the communities or tourism agencies authorized by them. The Project focuses on making visible and ensuring recognition and respect of the Shawādawa culture for external actors, as well as encouraging cultural practices in villages/communities.

Current situation: There is no planning and reception of tourists in villages/communities, as there is no visitation plan. There are no structures, materials, and equipment to develop the works and receive visitors. This Project still needs greater dialogue with the indigenous people, as well as with Funai, the body responsible for the indigenist policy and the guide of ethnotourism in Indigenous Lands. It also deserves articulation with federal, state, municipal and private sector institutions.

Where to go with the Project: With business and visitation plan elaborated, agreed between the villages/communities, and being operated. Also counting on several structures to receive tourists. The ethnotourism project, if planned and executed with sustainability and safety, can support the revitalization and strengthening of culture.

Risks without the Project: For the Shawādawa People and culture not to be negatively affected, the Project will have to be very grounded with protective measures, given the consented insertion of external actors. The absence of ethnotourism actions may also reduce the chances of impacting on the strengthening and revitalization of culture.

2.2.3.1.5.4.2 Handicraft Project

Project Justification: The Indigenous Land has excellent artisans and artisans who are dedicated to the making of beads, made with traditional seeds and other materials brought from the cities. The beads are as contemporary as they are ancient and have been incorporated into aesthetic and ritual manifestations of the Shawādawa, being appreciated for their diversity of colors, size, shapes, qualities of brightness and durability. As well as body painting and ornamentation with teeth, shells, feathers and seeds, the use of beads is essentially linked to corporality, relying on refined elaboration, which values the graphics of the People. Other handicrafts are also made for use and ornaments, such as headdress, pure cotton nets, among other artifacts. This Project is fundamental to ensure the complementation of family income, to guarantee the protagonist of women and young people, as well as to motivate the political and management organization of women, who dream of having, in the future, a cooperative to plan and manage their products.

Current situation: There have been initiatives to value handicrafts, but in a sparse way and aimed at women, even so with a restricted public. There is no planning and feasibility study of handicraft production and its articulation with the market, with adequate marketing. We noticed use in all the villages/communities visited, but there is no structure for making the products (handicraft houses), and the products are made in residential houses in a disjointed and spontaneous way.

Where to go with the Project: Have adequate planning of handicrafts for a scenario of 30 years, counting on a study that gives adequate security and within the limitations of the indigenous, to reach the market and further stimulate the internal use; ensure complementary income for families in 11 villages/communities; valuing identity and memory, since craftsmanship is directly linked to representations of ancestry; valuing traditional knowledge.

Risks without the Project: Without the Project, activities that have been passed from generation to generation may be weakened, running the risk of being in disuse, and the Project is a great opportunity for the transfer of knowledge from artisans to the youngest, ensuring the perpetuation of the activity.

2.2.3.1.5.4.3 Culture Revitalization Project

Project Justification: Due to the contact, habits and customs were forgotten or fell into disuse, being little used in daily life and in special moments in the life of the Shawādawa. In a traditional way they involve dance, music, food, parties, games, playful games, and body paintings.

Current situation: Except for ritualistic ceremonies dance, songs, food, parties, games, playful games and body paintings are little practiced in villages and communities. Cultural representatives do not have the structure and financial resources to carry out cultural revitalization activities.

Where to go with the Project: Strengthening activities in 11 villages/communities. The strategies are vital to ensure the socio-cultural reproduction of the activities for future generations. Strategies should involve elders in line with younger generations.

Risks without the Project: Weakening of culture and forgetfulness of traditional practices that were practiced in the past and that are in the current memory of a few old people, with the risk of being erased from the cultural scene of this People after their deaths.

2.2.3.1.5.4.4 Construction project of traditional centers

Justification of the Project: It is understood by traditional center of the Shawādawa culture places destined to the research and preparation of diverse sacred medicines, as well as application of these in ritualistic contexts, mainly focused on the work of healing. They are material points for the practice of indigenous spirituality, with traditional architecture.

Current situation: There are only two traditional centers located in the Novo Acordo village and Matrinchā community. There is also another with interrupted works in the village of Raimundo do Vale. In this way, in most territorial units, rituals are performed in kupixawa¹⁹ or outdoors. The concept of traditional center is articulated directly to the spirits of nature, hence its approach to the forest, being away from the courtyards of the villages. It turns out that the kupixawa and several "terreiros"²⁰ are within this structure, and healing processes and other specific rituals are not recommended in these places.

Where to go with the Project: The creation of a center in each village and community will strengthen the culture in the execution of traditional practices, since there is hybridization of culture in the Indigenous Land, with Evangelical, Catholic and Daimist beliefs, which influence the indigenous people. It will enable the transfer of knowledge to future generations. This Project provides for cultural actions in all villages and communities, as well as exchanges with other peoples, especially the Pano trunk.

Risks without the Project: Cultural weakening with forgetfulness of activities practiced by the ancestors and interruption of the transfer of traditional knowledge to future generations.

2.2.3.1.5.4.5 Project "Dreams in Shawādawa"

This Project was grouped with the Project of revitalization of culture.

2.2.3.1.5.4.6 Traditional medicine research project

Project Justification: Traditional medicines are understood as the set of practices that involve biotic (fauna and flora) and physical elements, such as certain soils with therapeutic properties. In the specific case of the Shawādawa, there are several types of medicine being considered the main ones timbu (ayahuasca), snuff (tobacco with some type of tree bark), sananga (plant considered as the "eye drops") and kampo, also called kambo (secretion of the frog Phyllomedusa bicolor). Except for snuff and sananga, used more daily, the others are used only in special cases.

Current situation: There are other types of medicines that need to be better researched, as they were used by the ancestors for therapeutic and healing purposes, such as tishu raw and pakayaw. Researchers know little about these medicines, deserving a little more investigation.

Where to go with the Project: These medicines do not necessarily have an entheogenic character like ayahuasca, kambo and snuff, but they are effective in the treatment of diseases of low to high complexity, and can be used through baths, infusions, consumption of syrups and teas. For this they need to ensure structure for research and manufacture of medicines in a specific place, with appropriate materials. This measure will improve the health of indigenous people, as medicines can be combined with other health treatments, including those of official allopathic medicine.

Risks without the Project: Pajé, midwife and old people have knowledge about the use of other types of medicine, which may disappear if the work of passing on knowledge and preparing the medicines in an appropriate place is not intensified.

2.2.3.1.5.4.7 Shawādawa Sports Project.

Project Justification: The Project intends to create places in all villages/communities for the practice of playful games, as well as the execution of traditional and non-traditional sports.

Current situation: There are few structured spaces for leisure and sports in the 11 villages/communities. The few that exist are centered in the villages of Raimundo do Vale and Foz do Nilo.

Where to go with the Project: With adequate structures in 11 villages/communities, ensuring that traditional games and sports are not carried out in moments of exception, but practiced daily by more recent generations. Other non-indigenous sports practices in these places will also be encouraged.

Risks without the Project: There will be a lack of practice of traditional games and sports, allowing their forgetfulness.

2.2.3.1.5.4.8 Construction project of leisure spaces

Justification of the Project: Despite being considered as places focused on community meetings, the kupixawa also have a fundamental role for the realization of leisure activities. In these places, for example, birthday parties are held, reception of people from other places inside the Indigenous Land and outside it, school activities, meetings of groups of people, among others. The indigenous suggested the construction of small squares with traditional characteristics around the kupixawa.

Current situation: Most villages/communities have their kupixawa. However, we note the non-existence of them in some smaller communities. In others, there is a need for reform. In no village/community is there a square or courtyard in the vicinity of the kupixawa, except in the Matrinchã community, which has a courtyard for festivals and sacred ceremonies.

Where to go with the Project: It is intended to reform and build kupixawa in 11 villages/communities, as well as restore area for ceremonies in the Matrinchã community and build 10 courtyards/squares around the kupixawa of other villages/communities.

Risks without the Project: Villages/communities with few leisure options.

2.2.3.1.5.4.9 Project for the valorization of the elderly

Project Justification: In the Shawādawa culture, the elderly is considered as the person who demonstrates experience and holds cultural knowledge, being the one who keeps the secrets and memory of the People. The older person has a role much more related to the transmission of tradition, having high status and being respected in the Indigenous Land. It is necessary that the elderly continue to have continuous participation not only to avoid isolation and improve their quality of life, but to allow intergenerational bonds, social engagement, and the transfer of traditional knowledge.

Current situation: There are few elders in the Indigenous Land. We located some of them in the Matrinchã community that performs the function of shaman, three in the Paz community, two in the Foz do Nilo village and one in the Raimundo do Vale village. They know the ancient stories of the creation of the People, the

contact stories that made possible the territorialization, deterritorialization and reterritorialization of the Shawádawa, aspects of social organization of the past in comparison with the present, cultural aspects (ceremonies, parties, playful games, traditional sports, architectural constructions, cuisine, seeds, and plants used in the past, among others, and mainly, the language.

Where to go with the Project: The project aims to build a memory bank in audiovisual format to record interviews and actions of the elderly about the Shawádawa culture. Understanding the elders as living libraries, the set of records becomes fundamental for future generations and for the use of the records in school and community activities. For this, a memory room must be created in one of the schools that is more central in the Indigenous Land and that has adequate capacity and logistics, with materials and equipment for the conservation of audiovisual material. Indigenous teachers and cultural representatives should be trained to use research equipment, filming, recordings, photographs, video editing, construction and care of collections, preparation of research projects, research methodologies, preparation of materials for dissemination of information, among other necessary capacities for memory preservation.

Risks without the Project: Loss of precious information from ancestral memory and its interruption for future generations.

2.2.3.1.5.4.10 Future Vision of the Sport, Culture and Leisure Program

The representations were produced spontaneously, without arbitrariness of points to be treated. All the above projects are considered relevant, but not all the points of them could be translated in the drawings, with natural prioritization by the workshop participants.

The mental map of culture, sport, and leisure, presents a scenario for 30 years with a visual panorama that includes a structured and properly instrumentalized inn. Revitalization of ritualistic practices with the use of traditional medicines, extracted from the forest, such as the vine (*Banisteriopsis caapi*) to make the sacred tea timbu (*ayahuasca*). Structured spaces for meetings, celebrations and market-oriented spaces can also be observed. Finally, places intended for traditional sport and leisure (games and traditional sports) and coming from outside, such as football.

Figure 19 - Future vision of the sport, culture and leisure program.

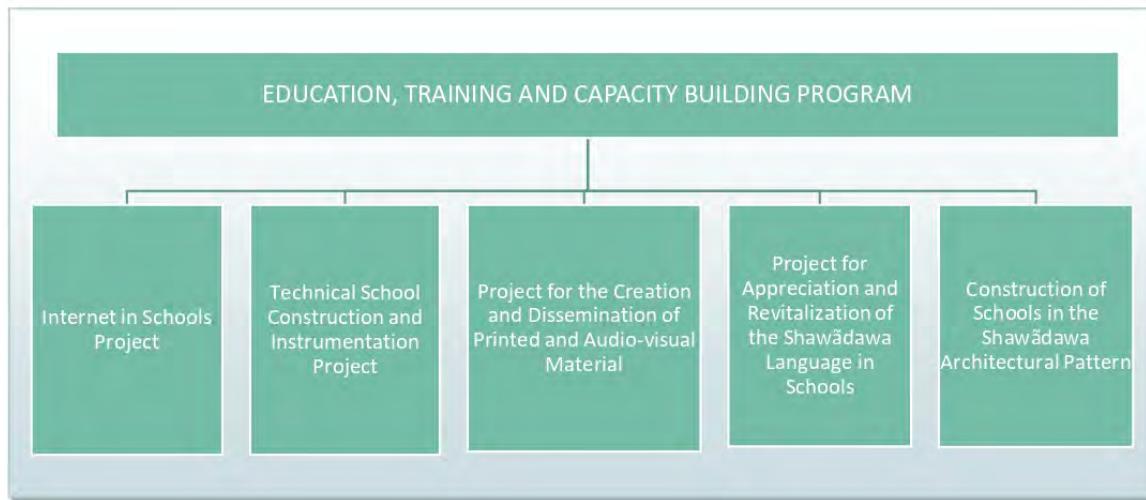


Source: Jefferson Lima, Antônio Alexandre Pereira, Alcione Varela, Aline Lima and Sandro Pereira.

2.2.3.1.5.5 Education, training, and capacity program

The Program encourages the complementation of education actions, as well as training and capacity building of the Shawâdawa at different levels and areas of education. It also aims to revitalize and structure physical spaces, in addition to expanding the knowledge of Shawâdawa students and teachers.

Figure 20 - Program of education, training, and capacity with respective projects.



Source: Life Plan Review Workshop/Governance Structure/Research Data

2.2.3.1.5.5.1 Project of complementation and training and capacity building at middle and higher levels

Project Justification: It is necessary to value, strengthen and structure school education and Shawādawa schools, operating on structural and teaching problems.

Current situation: There is precariousness of education in villages and communities. There are several problems involving deficient physical facilities, even requiring renovations; absence of physical facilities in several villages and communities, as there are outdoor classrooms, impairing the teaching-learning process, especially in the rainy season, and classrooms in teachers' homes and makeshift sheds, which store materials and production equipment; lack of materials and equipment in many schools and those that do exist are insufficient or damaged; absence of teachers to teach classes in high school; lack of teaching material and in the mother tongue; the need for classes in a bilingual format to support language revitalization actions; lack of training; and the absence of higher education courses, including for teacher education.

Where to go with the Project: Reduce the output of indigenous students to study in urban centers; improve the quality of teaching, allowing greater learning of students, with sufficient number of professionals in education and with quality to assume the educational functions; install rooms with higher education courses in partnership with Higher Education Institutions of public and private networks; properly trained education professionals; students prepared for life and for the academic and professional future; to have indigenous schools of reference with self-esteem of students, teachers and communities/villages.

Risks without the Project: Discouragement of high school graduates because many do not have the financial structure to study in urban centers and submit to work in cities, abandoning their studies. In addition, the lack of adequate training and training for teachers may intensify the transfer of inadequate content and methodologies to the teaching-learning process, contributing to the low quality of classes and educational actions. Lack of school meals and didactic, pedagogical and support materials also encourage the low quality of education in the Indigenous Land.

2.2.3.1.5.5.2 Design of school buildings inspired by ancestry.

Project Justification: They seek an adequate, large, and functional school space that values and is inspired by traditional Shawādawa art and architecture, enabling traces of the identity and memory of ancestry, in hybridization with modern architecture.

Current situation: The physical structures of the schools are precarious and in patterns of rural school units. Many of them do not accommodate the number of students, and it is necessary to improvise classrooms to serve children and young people, so that they do not go without studying. In communities there are no schools and in recent communities, such as Candim, the absence of a classroom has been reported.

Where to go with the Project: They intend to have adequate spaces that meet the needs of students, teachers and communities/villages, through physical structure with large classrooms, libraries, playroom, internet rooms, teachers' room, bathrooms, water reservoirs, hydraulic water pump, solar energy (even enabling classes at night for young people and adults who have not had the opportunity to study), coordination and board room, spaces with SAF's, vegetable gardens, workshops. These schools must have appropriate architecture that values the traditionality of the people.

Risks without the Project: Continuity of school constructions in the traditional models offered by the State Department of Education of Acre; permanence of the deficiency in the infrastructure, with a lack of reforms and construction of classrooms; Dropping students out of classrooms.

2.2.3.1.5.5.3 Project to complement school meals

Justification of the Project: This Project does not have the purpose of replacing the school meals that are included as an obligation of the State Government but intends to propose alternatives to complement the diet of the students, aiming at healthier eating and closer to the cultural reality of the People.

Current situation: The school units of the Arara do Igapé Humaitá Indigenous Land receive industrialized products for school meals. This procedure is standard for many schools in indigenous lands and rural areas because they do not have adequate conditions for storing the products. These products are not suitable for the health of children and young people, as ultra-processed foods tend to have high levels of sodium and sugar, which can cause diseases such as hypertension and diabetes.

Where to go with the Project: It is intended to reduce incidences of diseases through healthy and quality food, valuing organic products produced in the interior of the Indigenous Land, even generating income for indigenous producers, through regionalized meals.

Risks without the Project: Development of diseases and lack of perspective of income generation and involvement of producers and their families in the educational process through the contribution to school meals.

2.2.3.1.5.5.4 Project to enhance and revitalize the Shawādawa language in schools.

Project Justification: The Shawādawa language is beyond communication, as it also brings with it the knowledge that marks the identity and thought of the people - their cultural traits, ecological knowledge, religious imaginary and also their history and the specific way of conceiving reality. Thus, it is considered as a living heritage, but known mainly by the elderly, and urgent actions are needed in the scope of schools so that there is expansion and reproduction of knowledge about the language, so that it does not disappear.

Current situation: Due to the aggressive process of contact, the Shawādawa language was sacrificed, due to the determination of the rubber bosses who forbade the use of communication in the mother tongue for decades. Also, for reasons of survival, the Indians who worked for the bosses had to speak the Portuguese. Few indigenous people master the language, and most are old. Some teachers and representatives of culture are extremely concerned with the revitalization of the language but are limited in resources to expand strategies aimed at research and speech, especially in schools, failures in bilingual education.

Where to go with the Project: They intend to educate children and young people in the Shawādawa language. This educational project should be in line with the proposal of representatives of culture, which broadens the horizons of research with the elders and strategies of application of the language to the communities. In schools, this process requires training of teachers in the language, by the most experienced, as well as content that must be passed on bilingually and with appropriate pedagogical material.

Risks without the Project: The disappearance of the language may occur if the revitalization strategies are not adopted. We emphasize that the school is only one of the strategies, because for the survival of the language it is necessary that there is its daily practice.

2.2.3.1.5.5.5 Solar energy project in schools

Project Justification: It is intended to provide schools with solar panel kits, containing generator block, power conditioning block and storage block. The kits, for all schools in villages and communities are necessary for lighting, including for classes at night and events held in school units, as well as the use of equipment to assist in classrooms and support educational activities, such as school meals and technological support.

Current situation: Several schools do not have sufficient and quality energy. In this way, activities compromise the good learning performance and health of the indigenous people, such as the lack of adequate equipment for the kitchens, due to the inexistence or precariousness of electricity.

Where to go with the Project: It is intended that the school units of the Indigenous Land have electricity to facilitate educational quality because it will be possible to use computers and printers, kitchen equipment, as well as allow extension of classes, if necessary, for the night period.

Risks without the Project: There is currently not enough support for schools to have clean and sustainable energy. The existing generators, in addition to being gasoline and diesel, expensive products in the gas stations of Port Walter, pollute the environment, causing even degradation to the climate. In this way, perishable products of school meals can't be packaged, limiting school nutrition, causing diseases due to the consumption of industrialized products, as well as will not allow the teaching of young people and adults, especially parents who are dedicated to the work of gardening, hunting, and fishing and, therefore, are not able to attend any activity in the daytime.

2.2.3.1.5.5.6 Diffusion Project by printed and audiovisual material

Justification of the Project: This Project is fundamental, as it will facilitate the dissemination of printed and audiovisual didactic materials from outside the Indigenous Land, as well as facilitate their production by teachers and other educational professionals, students and communities that will interact in activities with schools. It is a priority that the internal materials are bilingual and are elaborated in a planned way.

Current situation: Several classes of varied disciplines cannot be carried out bilingually because they were not investigated and produced by teachers, with a team of specialized professionals. In this way, the parameter of information is from outside the Indigenous Land, with realities quite different from the students, who are strange and take as true the information coming from the external context, competing effort of the teachers in promoting the adequacy of content in the classroom. It is important to emphasize that the elaboration of bilingual didactic material and its application to the students, would support both in the effort of valuing the mother tongue.

Where to go with the Project: Through the production of printed and audiovisual didactic materials, teachers and other professionals in education, students, and community, will be able to value sociocultural aspects of Shawādawa, with dissemination of information appropriate to their reality.

Risks without the Project: Without the production of materials, there will be a devaluation of culture in the face of the imposition of theoretical-methodological and content-oriented aspects coming from other socio-cultural contexts. In this way, traditional knowledge will be swallowed up by other knowledge of the white world that, in turn, is no less important than local knowledge, but obscures the reality of certain subjects that should be treated from the perspective of these indigenous people.

2.2.3.1.5.5.7 Internet project in schools

Project Justification: Communication and access to the world of information is a priority in the context of schools. The digital culture configures as important allows students, teachers and other professionals in education, the use of new information and communication technologies as a teaching strategy to expand the teaching-learning process.

Current situation: Currently, only the village Foz do Nilo is served precariously with an internet point, because it works irregularly, with low intensity and only in the vicinity of the school, causing many houses not to be served. The rest of the Indigenous Land does not have the service and students and teachers need the service to carry out research and search for information to consolidate knowledge, as well as to carry out exchanges and partnerships for learning with other indigenous people, professionals in education and students from other places on the planet.

Where to go with the Project: The implementation of internet points in schools, considered a priority, will allow the right to research and communication through appropriate tools and virtual environments. They will also be able to disseminate their culture, value their identity as a People, and guarantee knowledge and respect as indigenous citizens.

Risks without the Project: They will remain isolated and deprived of data and information that could be reached quickly through the internet, providing greater speed in the learning process and interest in various educational contents.

2.2.3.1.5.5.8 Construction project of a technical school

Project Justification: Technical and vocational courses are training aimed at meeting some market demand. Unlike degrees, they are faster because they aim to teach the core skills and competencies of a profession. The technical school in the Indigenous Land will involve the main needs for learning or professional technical improvement aimed at the benefit of communities and villages.

Current situation: There are few indigenous people with technical skills (electrician, mechanical, electrotechnical, hydraulic, Indigenous Agroforestry Agents, among others), and it is necessary to hire third-party services. This is mainly since the training and capacity are done in urban centers (usually in Cruzeiro do Sul and Rio Branco), taking away the opportunity for improvement of the indigenous people by the distance, as well as by the lack of financial resources and logistical conditions to study in technical courses.

Where to go with the Project: To enable men and women, especially young people, income opportunities through training in technical courses, as they could work in the Indigenous Land itself, such as offering their services in the surrounding settlements. For this, they intend to have a technical school with adequate structure, well structured, to receive students from all communities and villages, with boarding regime.

Risks without the Project: Departure of indigenous youth in search of training and jobs in urban centers, which can cause various social problems; dependence on third-party services within the Indigenous Land.

2.2.3.1.5.5.9 Future Vision of the Program

All projects will be able to improve the teaching-learning process in the short, medium, and long term. In addition, it will encourage students to continue their studies, since the structuring of school units, qualifications, capacity and teacher training, in addition to pedagogical, didactic and support inputs, are fundamental vectors for quality education in the Indigenous Land.

Teachers, through capacity and training, will be better able to improve learning in the school context. Bilingual materials, equipment, new technologies, healthy school meals, will enable schools to be with a high level of quality that meet all the necessary requirements to avoid dropping out of school.

The dream of the Shawādawa for 30 years is to have schools of excellence for villages and communities, with sustainable solar energy system and water supply. In addition, its distribution implies in classrooms to serve all students, given that currently classrooms are improvised under trees and in the homes of teachers, who work optimizing the daily life of their families with school activities. In this school should also have library and place for the use of internet, toilets, kitchen and cafeteria, mini-auditorium, vegetable garden and gardens.

Figure 21 - Quality School Vision.



Elaboration: José Araújo Pereira, Carlos Germano Amorim dos Santos, Francisco Edivaldo Cazuza, Luzilene Lima da Silva, Maria de Fátima, Júlio Souza and Antônia Elissandra Pereira.

For professional qualification, they would like to implement the structure of a technical school, although they recognize the need for articulation and approval of courses with the SEE/AC²¹ and CEE/AC²². This school will consist of classrooms, library, cafeteria, internet room, leisure and sports area, vegetable garden, yard, bathrooms, and female and male dormitories for the indigenous people of different villages/communities who will take technical courses.

Figure 22 - Mental map of the technical school proposal.



Elaboration: José Araújo Pereira, Carlos Germano Amorim dos Santos, Francisco Edivaldo Cazuza, Luzilene Lima da Silva, Maria de Fátima, Júlio Souza and Antônia Elissandra Pereira.

2.2.3.1.5.6 Program for inspection, surveillance, and communication of the territory

According to the Manual of Protection for Indigenous Lands, prepared by the National Indian Foundation, surveillance is understood as the monitoring of the indigenous people of their territory, based on activities that are already part of their daily lives. The inspection, in turn, is an obligation of the State and aims to protect the Indigenous Land both in its interior, with FUNAI²³ having an important role in this process, as well as other institutions that operate in the surroundings, such as IBAMA²⁴. In general, the Program aims to protect the territory and mitigate and resolve socio-environmental conflicts in the Arara do Igapé Humaitá Indigenous Land.

Figure 23 - Program of inspection, surveillance, and communication of the territory, with respective projects.



Source: Life Plan Review Workshop/Governance Structure/Research Data

2.2.3.1.5.6.1 Inspection and surveillance project

Justification of the Project: The surveillance work is the responsibility of the National Indian Foundation, but due to problems related to the lack of structure, the work is carried out, however, with some limitations, especially due to the lack of sufficient indigenist technicians who may be operating more immediately in the Indigenous Land. Thus, one of the strategies is to work in partnership with the Shawādawa, especially with the Indigenous Agroforestry Agents, which also has the task of monitoring the IL and periodically informing FUNAI and competent institutions about threats and illicit practices carried out within the territory by third parties. For this, it is necessary to train, install surveillance bases, instrumentalize and create communication conditions for the indigenous people.

Current situation: There are invasions and deforestation, mainly of areas in the vicinity of INCRA²⁵ settlements. They urgently need to revive the boundaries of IL as physical support for threats and invasions; Neighbors hunt, fish, and harvest wood illegally from the Indigenous Land; the neighbors of private areas and INCRA settlements pollute the rivers and destroy the riparian forests.

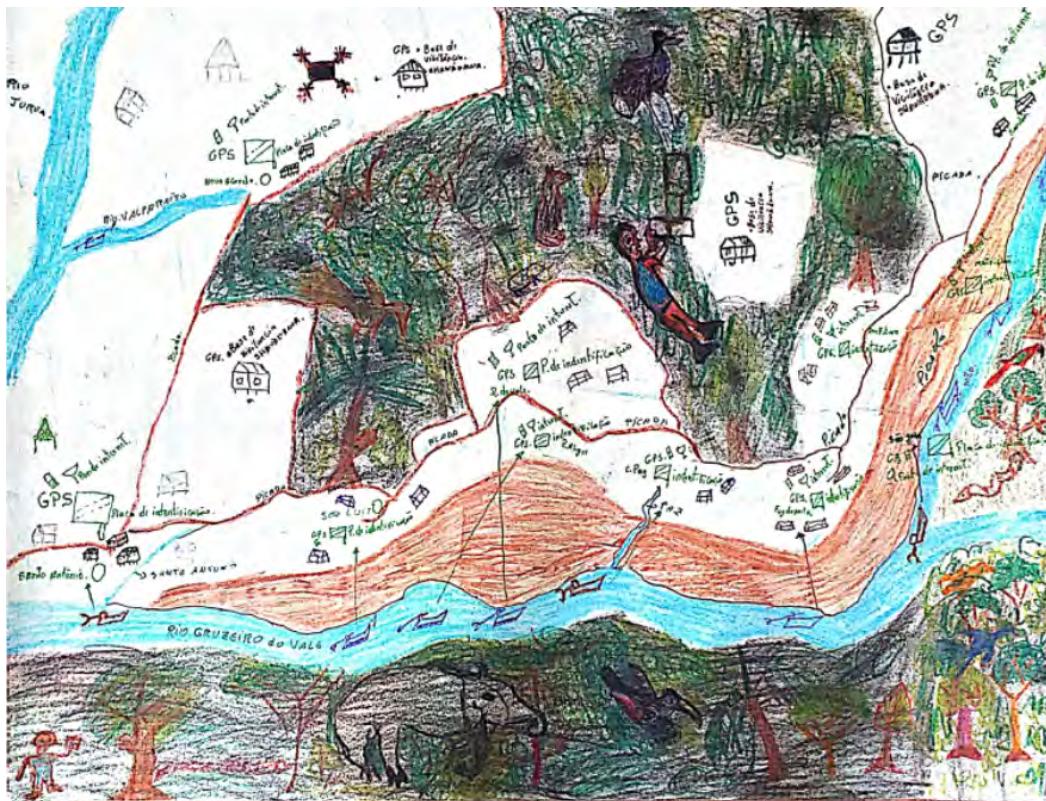
Where to go with the Project: With the Project it will be possible to: (i) place a green mark on the dry line limits of the Indigenous Land; (ii) produce didactic material aimed at raising the awareness of the people and the surrounding residents, about the preservation and conservation of natural resources, as well as waste disposal; (iii) build strategic surveillance bases; (iv) provide the indigenous responsible for surveillance with materials and equipment; (v) implement a communication system (internet) in the surveillance bases, to transfer information to the villages/communities, FUNAI, as well as supervisory bodies and with police power, such as IBAMA, Federal Police, Military Police and Civil Police.; (vi) training for indigenous people who work in surveillance.

Risks without the Project: Increased deforestation in forested areas, as well as in riparian forest, contributing to environmental degradation and disfavoring climate mitigation; population growth in the surroundings, generating garbage accumulation in rivers and streams; verbal and physical conflicts between indigenous and non-indigenous people due to threats and invasions; increased pressure on natural resources, causing species of fauna and flora to have a significant reduction.

2.2.3.1.5.6.2 Future Vision of the Program

The mental map below demonstrates the vision of the indigenous people for the short-, medium- and long-term scenario that includes, mainly, physical structure for surveillance care (bases); Shawādawa duly trained and with the capacity to support FUNAI in surveillance actions, as well as the inspection institutions.

Figure 24 - Mental map of the future vision for the Inspection, Surveillance and Communication Program.

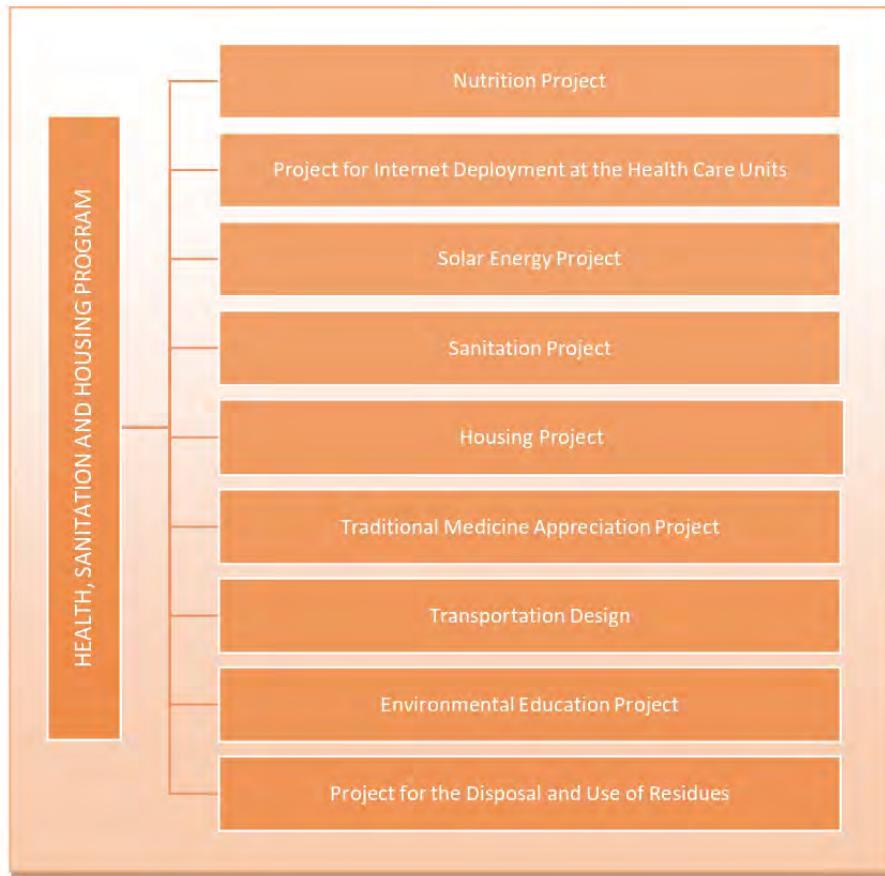


Elaboration: José Ivanilson Pereira Moreira, José Francisco M. da Silva Arara and Cristiano S. Feitosa

2.2.3.1.5.7 Sanitation, health, and housing program

This Program aims to improve the conditions of basic sanitation and housing, complement official health actions and value health and traditional medicine. They seek health with better quality, appreciation of indigenous professionals and appropriate workplaces for local care.

Figure 25 - Sanitation, health, and housing program with respective projects.



Source: Life Plan Review Workshop/Governance Structure/Research Data

2.2.3.1.5.7.1 Traditional medicine project

Project Justification: This Project should be articulated with the proposal of the Program of culture, sport, and leisure, which deals with research with traditional medicines. In the case of health, it aims to apply traditional knowledge in the prevention and treatment of symptoms and diseases. Traditional medicine is understood as the adoption of products and practices that are not part of the standard treatment, based on scientific evidence, see the patient in a global way, which includes mental and even spiritual issues. In this sense, it values the practices of the shaman, the midwife, prayers, elders, and other community representatives who work with prayers and traditional therapeutic plants or intended for the treatment of diseases.

Current situation: There is a strong dependence on allopathic medicines brought by the indigenous health team of the DSEI²⁶, which visits and provides care in the villages/communities once a month. Many families abandoned the practice of using prayers, as well as traditional herbs and plants, being restricted to the oldest and the few existing specialists.

Where to go with the Project: They want traditional medicine to be encouraged and practiced in all villages and communities and to ensure the transfer of traditional knowledge from the older to the younger generations. Live pharmacies will also be established in each of the villages/communities so that herbs and plants are used frequently, consorting natural use to allopathic remedies or in some cases, taking away the dependence on them, according to an agreement between health professionals and traditional specialists. The use of Shawādawa medicines applied in health cases becomes a constant exercise of activation of ancestral memory and strengthening of culture.

Risks without the Project: Traditional therapeutic and healing practices will fall into disuse and be forgotten, since they are carried out by the few specialists that still exist. Dependence on industrialized remedies will be intensified.

2.2.3.1.5.7.2 Nutrition Project

Project Justification: This is a strategic project, as it aims to guide indigenous people to a healthy diet, rich in nutrients and vitamins indispensable for health. The consumption of natural products, free of pesticides and other chemicals, will be encouraged. For this, community vegetable gardens will be implemented in the vicinity of health care units in the villages/communities, as well as in schools, encouraging children and young people to practice healthy eating, which should be associated with other existing foods such as fruits, vegetables, roots, animal meat, fish, cereals, and nuts.

Current situation: There is a strong consumption of industrialized products, especially ultra-processed foods, offering health risks because of the high sodium content, such as canned goods, salt and sugar in excess, packaged products such as cookies and coffees, oil, among other products, which can cause, for example, obesity, hypertension, diabetes, metabolic syndrome, breast cancer and other tumors, irritable colon, asthma, depression, and now heart attack and stroke.

Where to go with the Project: Reduce the risks of diseases in indigenous people through the implementation of community vegetable gardens and nurseries of medicinal plants in villages/communities and school units; Conduct lectures and activities involving families to value the consumption of organic foods. The Project should provide for the accompaniment of a nutritionist.

Risks without the Project: Increase in diseases caused by the frequent consumption of industrialized and ultra-processed products.

2.2.3.1.5.7.3 Housing project

Project Justification: It is intended to build or renovate houses for the Shawādawa families inspired by traditional architectural elements. Therefore, the houses with current models will be hybridized to the traditional Shawādawa concept of architecture, considering the way they organize the world, having housing as one of their essential material representations for well-being. The construction of their houses is endowed with symbolic meaning, allowing expressive senses of culture.

Current situation: Many residences are in precarious conditions, needing renovation or replacement of the house by the construction of a new one. However, most families do not have the financial resources to perform the services, as they require the acquisition of materials and equipment, as well as the hiring of skilled labor, if their residents do not have technical skills or receive help from other indigenous people.

Where to go with the Project: Well-structured and diversified indigenous houses, considering the aspects of architecture and symbolic representations of the Shawādawa culture, in addition to being equipped with a complete solar energy kit and with good power generation capacity.

Risks with the Project: If the project is not well planned, the standardization of the residences in a single model may occur, without allowing diversity of architectural and cultural elements; If there is no proper architectural planning, the houses can despise cultural diversity.

Risks without the Project: Houses with inadequate infrastructure for family housing.

2.2.3.1.5.7.4 Sanitation project

Project Justification: Basic sanitation in indigenous lands is understood as the set of services, infrastructure and operational facilities for drinking water supply, sewage, urban cleaning and management of solid waste and rainwater (BRAZIL, 2007). In Brazil, access to basic sanitation is a right guaranteed by the Federal Constitution of 1988 and incorporated in Law 8,080 of 1990, as a determining factor for health (BRAZIL, 1990). Article 231 of the Brazilian Constitution of 1988 guarantees indigenous peoples the right to citizenship and thus access to quality services, guaranteeing dignity in their lives. However, the reality of sanitation in indigenous lands is quite precarious and still does not allow the scope of what is provided for in the Magna Carta. In the specific case of the Arara do Igapé Humaitá Indigenous Land, the Project will serve to cover deficiencies that have not yet been remedied by the government, such as the water supply and sewage system.

Current situation: The villages and communities do not yet have artesian wells, even though this demand has already been passed on to the DSEI of the Juruá. There is also no rainwater harvesting system, and the water is loaded with rivers, small stream, and creeks, mainly by women, to their homes for feeding and cleaning purposes. There is no water pipe, as well as central water reservoirs and water tanks installed in most homes. The toilets are precarious and many unhealthy, requiring adaptations or safe and hygienic constructions so as not to cause diseases. In recent communities, such as Candim, no toilets were found.

Where to go with the Project: Implement basic sanitation system in all the houses of the 11 villages/communities contemplating toilets, toilets with septic tanks and small water supply systems that serve the families. These measures will improve the health of residents.

Risks without the Project: It can cause symptoms and diseases such as schistosomiasis, yellow fever, amebiasis, hookworm, ascariasis, cysticercosis, cholera, dengue fever, dysentery, malaria, polio, taeniasis and trichuriasis, typhoid fever, hepatitis, skin and eye infections and leptospirosis. It can also cause serious accidents for women and other people seeking water, especially during the rainy season, with susceptibility to falls, causing bruising or fractures.

2.2.3.1.5.7.5 Environmental education project

2.2.3.1.5.7.6 Waste disposal project

Project Justification: Environmental Education can change habits, transform the situation of the planet through local attitudes, providing well-being for people. Awareness and responsible attitudes will mitigate environmental degradation. The main concerns of the Shawādawa concern garbage and its correct disposal in the Indigenous Land, as well as control of deforestation, especially for surrounding residents and fires.

Current situation: Deforestation, with the removal of wood, in some parts of the Indigenous Land is one of the major concerns of the indigenous people since most of them are carried out by residents of the surrounding area. Fires are also a cause for concern, as the lack of fire control can cause large fires, impoverishing the soil, destroying trees and plants, including those of a sacred character, as well as killing and scaring away animals.

Garbage is also one of the serious problems among the Shawādawa. Due to the increase in population, as well as the fact that today most families are salaried, it has led to a great increase in the consumption of certain types of industrialized products, being discarded in the open air, thrown into the forest or into water courses.

Where to go with the Project: Conduct internal campaigns, meetings, lectures, and production of didactic material for schools and communities on garbage, burning and deforestation and on the problems, they may entail, indigenous and non-indigenous conscious.

Risks without the Project: Increase in deforested areas; increase in the number of fires; forest fires; increased pollution of soil, air, and water courses; absence of planning for waste disposal.

2.2.3.1.5.7.7 Transportation project

Justification of the Project: The Project aims to supply the health units of the Indigenous Land with suitable boats for transporting the sick to the seat of the municipality of Porto Walter or for spiritual care, with traditional medicines and childbirth in specific places.

Current situation: The transport between the villages and communities and from these to other localities, including the seat of the municipality of Porto Walter, is done by means of boats. Because the care of the health team of the by the health base is done once a month, indigenous people get sick and are usually taken to the city in private boats, which are not always available, requiring the acquisition of boats intended exclusively for the health units.

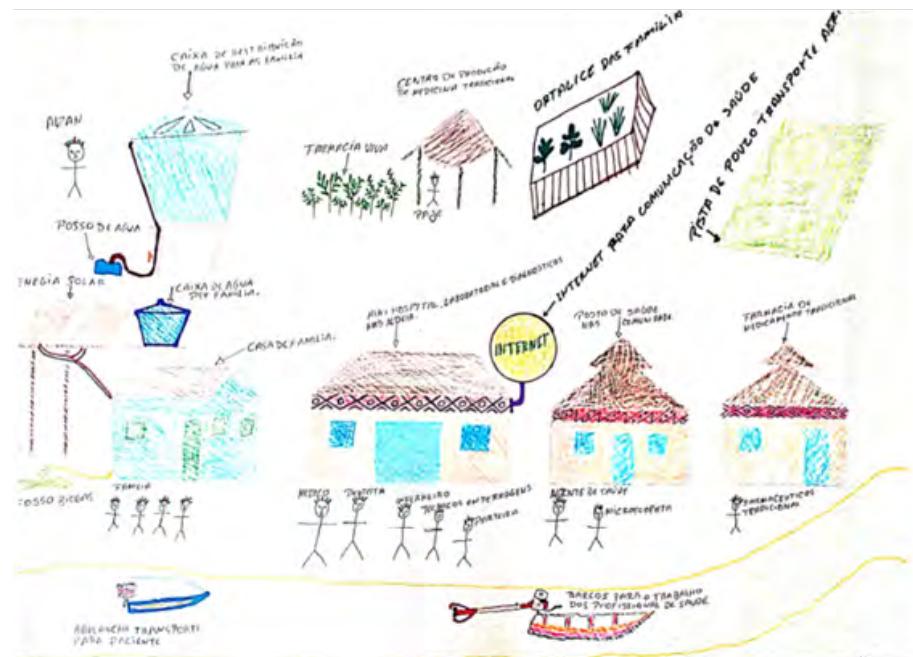
Where to go with the Project: Acquire 11 boats with engines to meet the demand of indigenous health in each of the territorial units of the IL.

Risks without the Project: Deaths of indigenous people due to the absence of transportation for emergency actions.

2.2.3.1.5.7.8 Future vision of the Program

The mental map below presents the scenario for health, sanitation, and housing for 30 years, with eradication of malnutrition and with indigenous people consuming healthy food, as well as living in residences with traditional symbolic and architectural representations, with solar energy, sanitation, internet, and quality water supply. The places destined for health in the villages and communities equipped with boat, equipment, and sufficient materials.

Figure 26 - Future vision of the Program.

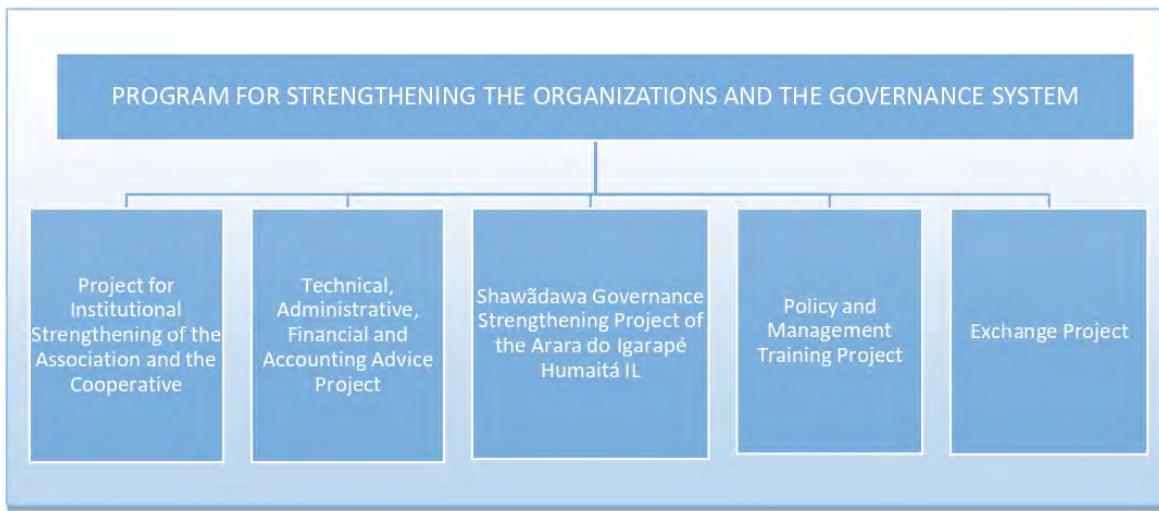


Source: José Ivanilson Pereira Moreira, José Francisco M. da Silva Arara and Cristiano S. Feitosa

2.2.3.1.5.8 Program to strengthen organizations and governance system.

The Program deals with the strengthening of the Association and the Cooperative, as well as the Leadership Council, through adequate infrastructure, training, and inputs necessary for the development of political actions and management of the territory.

Figure 27 - Program to strengthen organizations and governance system with respective projects.



Source: Life Plan Review Workshop/Governance Structure/Research Data

2.2.3.1.5.8.1 Project to strengthen the association and the cooperative.

Project Justification: There are two organizations in the Arara do Igarapé Humaitá Indigenous Land. The Association is responsible for the political and social management of the territory and the cooperative is much more linked to productive and economic actions. Culture and the environment are transversal to both. For greater organization of the work of the organizations, it is necessary investments for the implementation of their physical structures (construction of their headquarters), equipped with adequate materials, equipment, boats and communication.

Current situation: Currently the work of the Association and Cooperative is itinerant and there is no physical headquarters for the work, meetings, and centralization of documents. The indigenous people could not afford to make the project and construction viable.

Where to go with the Project: With physical facilities to give adequate conditions for the work of the Association and the Cooperative. This headquarters should include, minimally, work rooms, large meeting room for members and cooperatives, bathrooms, sustainable water and light structure, internet points, warehouses, and sheds.

Risks without the Project: The lack of a headquarters to centralize the actions of the Association and Cooperative may cause disarticulation in the management processes of the organizations, loss of important documents, in addition to the weakening of their importance before the indigenous people of the Indigenous Land.

2.2.3.1.5.8.2 Technical, administrative, financial, and accounting advisory project

Project Justification: The purpose is to hire a company (OSTPJ²⁷), through bidding, in a transparent process of choice, to carry out advice on the cycle of the Shawādawa Carbon Project supporting activities of planning, execution, monitoring and evaluation of activities. It must be able to prepare technical, administrative, fiscal, and financial documents, even generating periodic accountability.

Current situation: Currently the Association does not have the technical and financial structure to manage the actions and resources arising from the Shawādawa Carbon Project, requiring the hiring of a company team with expertise, with experts of notorious experience.

Where to go with the Project: Manage the actions and resources of the Shawādawa Carbon Credit Project in a careful, responsible, professional, transparent, and ethical way. The manager must give greater security to the application and execution of resources making its management efficient and effective.

Risks: Without the manager, the Project will run risks related to its planning, execution, and monitoring, which may cause poorly planned and executed actions, resources poorly applied and/or without proper application, as well as lack of control over monitoring of actions and resources applied, causing problems during accountability.

2.2.3.1.5.8.3 Governance project of the Arara do Igarapé Humaitá Indigenous Land and training project in policy and management.

Justification of the Project: The Project aims to create conditions for the development of the performance of indigenous leaders in the Indigenous Land, as well as preparation to deal with stakeholders from outside. Among the strategies are various capacities and trainings.

Current situation: The governance structure for decision-making involves the general chief, as well as the local chiefs, who make joint decisions with the communities. It is noteworthy the presence of actors who also have leadership protagonist, because they make decisions that concern the People, such as teachers, Indigenous Health Agents, Indigenous Sanitation Agents, Indigenous Agroforestry Agents, Indigenous Endemic Agents, and representatives of culture. In the field of governance, there are also representatives of the Association and the Cooperative. Recently, a Governance Council was created, responsible for consulting and deliberation of actions for the Indigenous Land. The creation of this Council will allow all leaders to know what is happening with the various areas in which the actors act, supporting them in decision-making.

Where to go with the Project: Indigenous leaders properly prepared, safe and trained to act in the execution and management of their activities in the Indigenous Land. This will involve training in the political, sociocultural, economic, technical, and accounting areas, associations, cooperatives, among others. In addition, the project provides for the integration of leaders, allowing the allocation of resources for internal meetings for decision-making.

Risks: Without the Project, there will be a lot of difficulty in the effective performance of the Leadership Council; information, for the most part, will remain dispersed and restricted to villages/communities, without sharing; Leaders will also have difficulties in acquiring resources to promote training courses, causing deficiencies in several areas of activity, except for some maintained by the government.

2.2.3.1.5.8.4 Exchange project

Project Justification: Aiming at political and management improvement, the exchange for the exchange of knowledge is foreseen, with successful experiences in other indigenous lands and that can serve as a model for the leaderships, especially with alternatives of sustainable initiatives that guarantee the well-being of the People.

Current situation: There are few initiatives to exchange the Shawādawa to other indigenous lands. Usually, they are done individually and without planning with the other representatives.

Where to go with the Project: Improvement of management in the Indigenous Land through successful initiatives elsewhere, which can be used within the scope of the Arara do Igapó Humaitá Indigenous Land.

Risks: Conventional actions without or little efficiency in villages and communities will be carried out and can generate low performance and costly expenditure of resources.

2.2.3.1.5.8.5 Future Vision of the Program

The first mind map represents the elements necessary for the strengthening of the organization, cooperative and governance system (in this case, the leadership council), involving the construction of the headquarters of the Association and the Cooperative complete and well structured, due instrumentalization, training, planning and negotiation of other projects with various stakeholders, including the private sector, from resources from the Shawādawa Carbon Project.

Figure 28 - Future vision of the Program to strengthen organizations and the governance system.



Source: José Ivanilson Pereira Moreira, José Francisco M. da Silva Arara and Cristiano S. Feitosa

Elaboration: Júlio, Francisco, Willian, Raí, Ronaldo, José Márcio, Aparecida, Claude, Juliana, Irislene, Fiécia, José Francisco, Raimundo Pereira, Macivaldo Barbosa Moreira, Raimundo Lima, and José Maria Pereira

The following mental map expresses the concern of the Association, Cooperative and representatives of the Leadership Council, with the fauna of the Indigenous Land, beckoning for actions derived from the Shawādawa Carbon Project for its protection.

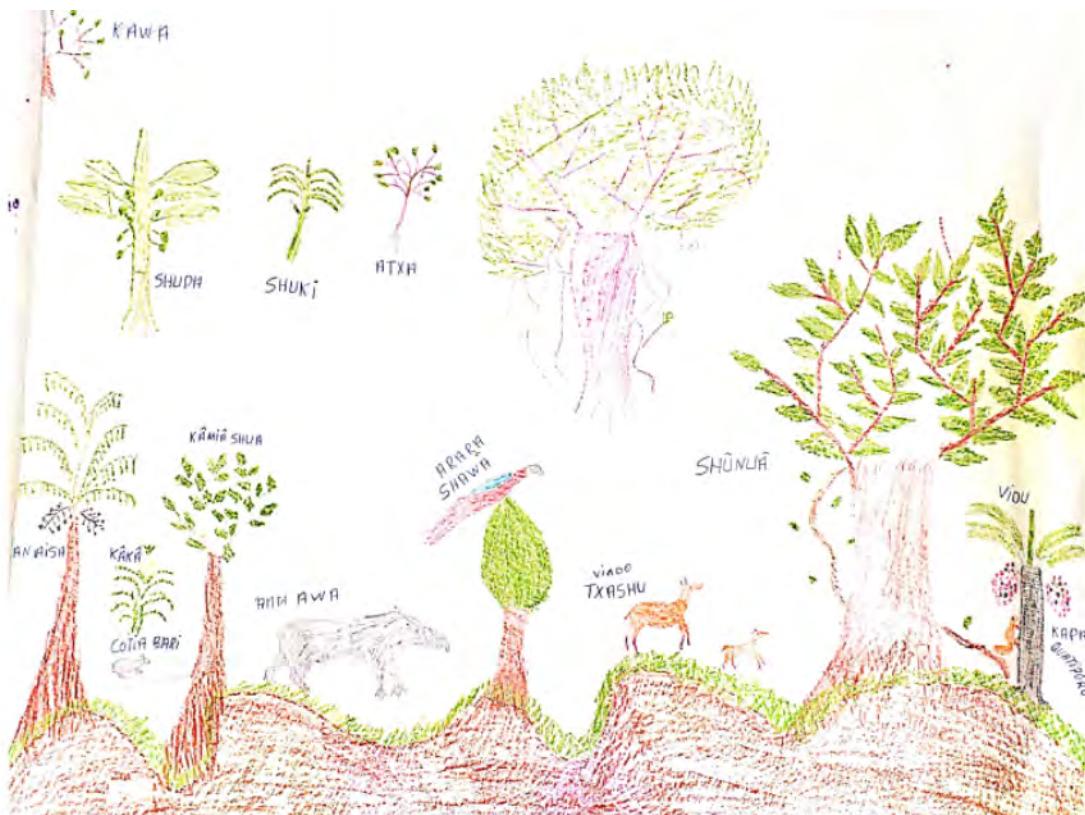
Figure 29 - Commitment to fauna.



Elaboration: Júlio, Francisco, Willian, Raí, Ronaldo, José Márcio, Aparecida, Claude, Juliana, Irislene, Fiécia, José Francisco, Raimundo Pereira, Macivaldo Barbosa Moreira, Raimundo Lima, and José Maria Pereira

Finally, the third mind map aimed at strengthening organizations and the governance system. It deals with the monitoring by the Association and Cooperative, of the sustainable actions arising from the Carbon Project that aims to ensure the forest standing, with the conservation of the flora.

Figure 30 - Commitment to fauna.



Elaboration: Júlio, Francisco, Willian, Raí, Ronaldo, José Márcio, Aparecida, Cloude, Juliana, Irislene, Fiécia, José Francisco, Raimundo Pereira, Macivaldo Barbosa Moreira, Raimundo Lima, and José Maria Pereira

2.2.3.1.5.9 Sociocultural Development Fund Program

The Sociocultural Development Fund will receive a percentage of resources to be applied in emergency actions (natural disasters and diseases that require medical treatment in urban centers) and for families with the following objectives: (i) to improve family income, since some live on the social benefits they receive and others do not have access to this benefit, surviving on what they produce and with difficulties in accessing the market; (ii) support the educational training with quality of indigenous people in technical, technological and higher education in institutions outside the Indigenous Land, through scholarships, so that they return to the territorial unit so that one day they can assume professional responsibilities that are needy and necessary for IL; (iii) support grants for Indigenous Agroforestry Agents (AAFI's) for a period of 30 years in 11 villages/communities.

Figure 31 - Program of the Sociocultural Development Fund with respective projects.



Source: Life Plan Review Workshop/Governance Structure/Research Data

2.2.3.1.5.9.1 Project of emergency actions

Project Justification: The concept of Fund Funds represents the association of percentage of the revenues of the Shawādawa Carbon Project, for application in emergency actions, scholarships in strategic areas, as well as for the complementation of the income of the families, aiming at internal development because it values the culture and the quality of life of the indigenous people.

Current situation: There are problems regarding incentives for the training of students outside IL, as well as payment of Indigenous Agroforestry Agents, who receive subsidies irregularly. Just to exemplify, during the Covid 19 pandemic, AAIFI's had the suspension of payment of their scholarships, being normalized recently, which implies insecurity and discouragement for the category. From another angle, students with high school level do not feel safe to enter higher education, and the lack of resources is the main factor of abandonment in the continuity of studies. Serious illnesses must be treated in urban centers, through the Unified Health System and, although indigenous people have priority care, there are many complaints about the bureaucratic slowness of the State regarding the care of indigenous people in advanced health centers. They also live with natural disasters, such as the possibility of forest fires and flooding of their areas, as occurred with severity between March and April 2023. Families live with strong dependence on social benefits, but not all of them have been able to access them, and some of them live only from production for subsistence and sale of surplus, generating food insecurity.

Where to go with the Project: During the duration of the Project it is expected to: (i) guarantee scholarships for indigenous students so that after graduation, they can return or contribute to the development of their communities/villages; (ii) enable on a continuous basis the payment of scholarships to Indigenous Agroforestry Agents in all communities and villages, during the duration of the Project; (iii) complement the income of the families, through subsidies from the Sociocultural Fund, during the duration of the Project.

Risks without the Project: The risks of the Project focus on the lack of perspective of young people to continue their studies, leading to a lack of qualified indigenous professionals in the Indigenous Land. It should also be noted the difficulty in expanding and maintaining the activities of SAF's, sustainable

swiddens, dams and consortium production systems, as well as surveillance actions and support for inspection, if there are no grants for the AAIFI's, food and nutritional insecurity of families.

2.2.3.1.5.9.2 Future Vision of the Program

The representation below presents a future scenario pointing to improvement in the training processes of indigenous students who, through scholarships, have training conditions in diversified areas of knowledge. In addition, grants may be offered to the sick for treatments in advanced medicine centers. AAIFI's and families will also benefit from the Fund.

Figure 32 - Future vision for the Sociocultural Development Fund.



Elaboration: Ivonaldo Dantas Lima, Cláudio Shawādawa, Gladson Silva de Souza, Erinaldo Nogueira de Souza, Maria Luziane de Souza Queirós and Tainara Barbosa Moreira.

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

The REDD+ Project of the Arara do Igapó Humaitá Indigenous Land has as its central benefit the production of offsets related to Reduced Emissions for Avoiding Deforestation, as described in Section 3 -

Climate. For this section, we used the same interpretation presented by other similar projects already validated by the VCS and CCB standards, such as "The Southern Cardamom REDD + Project".

In addition, the community (Shawādawa people) and biodiversity will also be incorporated as compensation benefits, observing the Climate Change Adaptation Benefits (GL1). Traditional peoples due to their way of life and use of natural resources are directly impacted by climate change, with harmful effects on natural resources, such as alteration in the hydrological cycle.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

2.3.1.1 First meeting to present the project proposal

On 11/28/2022, a meeting was held in Kupishawa as Aldeia Raimundo do Vale between the indigenous leaders of TI with representatives of partner companies to present the proposal for the elaboration and implementation of the Arara do Igapé Humaitá Indigenous Land REDD+ Project, for the generation and commercialization of carbon credits.

2.3.1.2 Participatory Planning Workshop - PPW

Held on 04/20 in the city of Porto Walter, with indigenous representatives (especially the political leaders), the activity was attended by a representative of FUNAI, two representatives of the Municipality of Porto Walter, representative of the company I.S.R.C., a representative of Green Partners, three representatives of the company Catraia and a representative of the company Amazônia Serviços de Consultoria e Serviços Especializados. Initially planned for a full day, this workshop was run only in the afternoon, but fulfilled its objectives: (i) to promote the culturally appropriate engagement of representatives of the proponent and beneficiary indigenous communities; (ii) present and validate the proposal for the execution of the Project; (iii) plan the execution of the work stages: studies of fauna, flora, socioeconomic-cultural, evaluation of social impacts and identification of High Value Attributes; (iv) planning of community consultations for Free, Prior and Informed Consent (FPIC); (v) communicate the laws and norms that must be complied with for studies on indigenous lands and for the protection of data and information.

The meeting was fundamental to resume the conversation about the Carbon Project, showing the importance of conducting the Free, Prior and Informed Consultation as a vital requirement for the process of participation, transparency, and permission of the activities to be carried out in the field and in the office. The final part of the workshop was reserved for the definition of the locations to be held at FPIC with respective dates and adequate logistics.

2.3.1.3 Free, Prior and Informed Consent - FPIC

Convention 169 of the International Labour Organization (ILO) deals with the situation of more than 5,000 indigenous and tribal peoples living in more than 70 countries on the five continents of the world, with an estimated population of 370 million people. In it there are articles that deal with Free, Prior and Informed Consultation.

It is important to note that Prior Consultation as a right of peoples appears numerous times in this Convention. Article 6 is the general clause for consultation. It directs that every event (programs, projects, and actions) to be that directly affects indigenous peoples. It also recommends that it should be done before execution, with the participation of indigenous peoples, allowing the process to be participatory and transparent, with the objective of the FPIC being the consensus by the majority.

Articles 13 and 14 clearly state the obligation of consultation when there is exploitation of natural resources belonging to traditional peoples and communities, even if the resources are owned by the State (Article 15). The FPIC should also be done when the state intends to remove them or when institutions wish to conduct research on the people or their territory.

Finally, Article 4 provides for special measures to protect people, cultures, goods, the environment, and work, since they cannot be contrary to the wishes of peoples. Therefore, there must be consensus between the State, private initiative and the interests of traditional peoples and communities.

The Consultation or Consent is also in line with the Safeguards of Cancún (2010), Mexico, which deals with the seven protections for REDD+ programs related to programs, projects and actions that aim to reduce deforestation, burning and other environmental degradations, with the purpose of improving the conservation and management of natural resources, enabling the improvement of forest carbon stocks. In general, the protections deal with the participation of the actors involved, transparency, protection of biodiversity and ecosystem services, and respect for the rights of indigenous and local communities. About the item in emphasis, it is important to say that there is great concern with the knowledge and rights of indigenous peoples and with international and legal obligations adopted by the UN and signatory countries of the formal instruments for the defense of the rights of indigenous peoples.

The VCS/CCB methodology requires effective participation in the decision-making of acceptance of the Project with access to information, consultation, participation in the decision-making process and its implementation, and prior, free, and informed consent (VCS/CCB, 2017, p. 17). It is recommended that didactic language be used and compatible with the reality of the indigenous people, as well as the use of participatory methodologies in which the actors feel involved by the theme and can be assimilating the proposal, as well as contributing to it.

The Shawādawa don't have a Consultation Protocol, which guides how Free, Prior and Informed Consultation should be done in the Indigenous Land. The Consultation Protocol is understood as a normative instrument, elaborated in a participatory way, by all the villages and communities of the Indigenous Land. Its content must contain information about the history of the People and the Land, culture, customs, as well as how they should be consulted in the case of programs, projects and actions that interfere in their territories and in their lives. Therefore, the government and the companies that will intervene would have to comply with the requirements of the Protocol.

The advantage of having a Protocol is that it ensures that social organization is respected and thus that indigenous people can express themselves. The Protocol guides how the relationship between the villages and communities and the institutions responsible for the intervention will be established, including the limits of this interaction.

The fact that there is no Protocol of Consultation for the Indigenous Land does not exempt any public, private, or civil society institution from carrying out the Free, Prior and Informed Consultation.

It is noteworthy that since November 2022 Shawādawa representatives are being informed about the Project. The clarifications had, mainly, the consent of the general chief of the Indigenous Land, as well as local chiefs and other leaders (teachers, indigenous health agents, indigenous sanitation agents, among others), culminating in the signing of the contract between the Association, Amazon and I.S.R.C.

FPIC in summary:

For the IL Arara Project of the Humaitá Stream, the FPIC was held in three meetings to present the project proposal and contract between parties with the Shawādawa People. The first took place on 03/22/2023 at Raimundo do Vale Village, with the participation of 89 people; the second meeting took place on 03/23/2023 in Foz do Nilo Village, with the participation of 80 people; and the third meeting took place on 03/27/2023 at Aldeia Novo Acordo, with the participation of 49 people.

2.3.1.4 Provision of information during project execution

Access to project documentation will be ensured through direct dissemination in the beneficiary communities through print or digital; in social monitoring; availability to the indigenous association, cooperative and council; on the website of the partner companies; and through the other communication channels provided for in the dialogue procedure with stakeholders.

2.3.2 Dissemination of Summary Project Documents (G3.1)

The project design information was disseminated in three meetings: presentation of the project proposal (28/11/2022); in the Participatory Planning Workshop (20/03/2023) and in the FPIC meetings (03/22, 03/23 and 03/27 of 2023) and during the interviews for socioeconomic data collection in the surrounding communities PDS Natal and PAE Cruzeiro do Vale.

The results of the social monitoring will be disseminated directly to the beneficiary communities in a meeting through oral and written presentations, and availability of data to the indigenous association, cooperative and council.

2.3.3 Informational Meetings with Stakeholders (G3.1)

On 03/20/2023, a meeting was held in the city of Porto Walter to present the project proposal and plan the actions with the participation of indigenous leaders, representative of the Municipal Environment Secretariat and representative of FUNAI, with 28 participants.

For the FPIC were held in three meetings to present the project proposal and contract between parties with the Shawādawa People. The first took place on 03/22/2023 at Raimundo do Vale Village, with the participation of 89 people; the second meeting took place on 03/23/2023 in Aldeia Foz do Nilo, with the participation of 80 people; and the third meeting took place on 03/27/2023 in Aldeia Novo Acordo, with the participation of 49 people.

The dissemination was carried out by the radio of the city of Port Walter, widely heard by all communities; and by the indigenous leaders, mobilized in person and by text message, since all the villages have internet service.

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

The costs, risks and benefits were presented and discussed in three moments. On 03/20/2023, a meeting was held in the city of Porto Walter to present the project proposal and plan the actions with the participation of indigenous leaders, representative of the Municipal Environment Secretariat and representative of FUNAI, with 28 participants.

In the stages of the FPIC, three meetings were held to present the project proposal and the contract signed between the companies and the Shawādawa People's Association. The first took place on 03/22/2023 at Raimundo do Vale Village, with the participation of 89 people; the second meeting took place on 03/23/2023 in Foz do Nilo Village, with the participation of 80 people; and the third meeting took place on 03/27/2023 at Aldeia Novo Acordo, with the participation of 49 people.

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

The validation and verification process in the VCS/CCB Audit will be explained during the face-to-face meeting to return the results of the socio-environmental studies and the PDD Report; formally communicated to public and non-governmental institutions; and the mobilization and dissemination will be carried out by the indigenous leaders and the radio of the city of Porto Walter.

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

The project management will communicate the audit period 30 days in advance to the indigenous leaders in a specific meeting to prepare for receipt of the audit team; and leaders will disseminate to communities and stakeholders in person, by text message and on the radio of the city of Port Walter.

2.3.7 Stakeholder Consultations (G3.4)

The strategy for the execution of the socio-environmental studies for the elaboration of the PDD was defined in the Participatory Planning Workshop (PPW), with the participation of indigenous leaders from all villages and communities, representative of the Municipal Secretariat of Environment and representative of FUNAI. The leaders, youth and women actively participated and established the organization of logistics, costs, community mobilization strategy and the engagement of community members in field surveys. Together with the technical team of fauna and flora, they defined the relevant locations for data collection. The socioeconomic diagnosis and ethnomapping in and around IL were carried out by young indigenous men and women, among whom agroforestry, educational and health agents participated. A methodological leveling workshop was held on 03/22/2023 with the participation of 23 young men and women. The socioeconomic studies were carried out only by indigenous peoples, hired for this purpose. Food preparation, boat rental and guide services were also contracted. The participation of the Arara People was decisive for the success of the results achieved.

Bellow are the results of the consultations carried out during the process of preparation and development of the project.

2.3.7.1 Free Prior Informed Consultation - FPIC

It is noteworthy that since November 2022 Shawādawa representatives are being informed about the Project. The clarifications had, mainly, the consent of the general chief of the Indigenous Land, as well as local chiefs and other leaders (teachers, indigenous health agents, indigenous sanitation agents, among others), culminating in the signing of the contract between the Association, Amazon and I.S.R.C.

Between March 22 and 27, the consultation and free, prior and informed consent was carried out and consolidated in the IT. This consultation was duly agreed and organized with the general chief, local chiefs and technical staff during the planning workshop held at the headquarters of the municipality of Porto Walter. At the time it was decided that the FPIC be divided into three stages, so that indigenous people from all villages and communities would have the opportunity to participate and demonstrate. Thus, the following strategic locations were defined for the realization of the FPIC: (i) Raimundo do Vale village – including the communities of Santo Antônio, São Luís, Paz and Porto Alegre; (ii) Foz do Nilo village – encompassing the communities Candim, Matrinchã, Bom Futuro and São José and, (iii) Novo Acordo village.

The option for division is due to the following reasons: distance between the territorial units, some of which are more distant, such as the Candim community and Novo Acordo village; territoriality of the territorial units, because the communities are closer to the pole village, officially recognized in number of three, even though there are already communities with a village profile, but that needs to go through the sieve of FUNAI; finally, the criterion of expanding participation reaching the diversity of actors (elders, women, young people, shaman, midwife, artisans, among others). Below we will make a description, followed by observations on each of the steps.

2.3.7.1.1 Raimundo do Vale Village:

The FPIC was held in this village on March 22. In addition to the indigenous people, Ildelei Cordeiro, representative of I.S.R.C. (party involved in the contract), Edson Vanda, representative of Green Partners (subleased from Catraia, hired by Infrapar, technical responsible for the preparation of the Project), Ueslei Marques de Oliveira, Camyllé Carvalho Ferreira do Nascimento, Hendryk Zegarra de Freitas, representatives of the fauna team of the company Catraia, were present.

On the occasion were presented essential concepts for understanding the Project such as environmental services, carbon sequestration, pollution, greenhouse gas, climate change, carbon credit, environmental compensation, and REDD.

There was also clarification regarding the definition of a carbon project, associating it with forested areas and in the specific case in question with the IL Arara do Igapó Humaitá in which the indigenous people are protagonists, since they have been guardians of the forest for many centuries. The Project does not remove from them the traditional use of resources but reinforces the need to keep the forest standing through sustainable actions of the use of natural resources, even strengthening existing ones. There was also a reading of the letter from Mr. Jay Rogers of Amazon Partners approving the Feasibility Study, as well as a thorough reading of the Agreement entered between the Association, Amazon and I.S.R.C. in November 2022.

This presentation was foreseen during the planning of the meetings, being a necessity for greater understanding by other actors who did not participate in its signature last year, as well as to answer questions from those who were at the time of signing, giving greater transparency to the process of FPIC. It was highlighted, mainly, functions and distribution of benefits between the parties, in addition to expenses during the first year of the Project.

The importance of carrying out the FPIC was reinforced and the definition and legal basis for its application were presented and that this is only one of the stages of the Process, which will be concluded after two other meetings in different villages, although they acknowledge that the process of clarification on the Project began in November last year, with approximately one hundred and twenty people.

The concern of the indigenous people was expressed if there is no execution of actions resulting from the sale of IL carbon credits. For them, the scenario without intervention may compromise the forest and biodiversity, since they suffer anthropic pressure from neighboring settlement projects and with no prospect of income generation may cut down and burn to constitute pastures, intensively exploit timber forest products and increase areas for agricultural production, causing environmental and climatic damage.

For them, the scenario with the Project will make it possible to strengthen and revitalize culture, ensure food and nutritional security for Shawādawa families, reach the market with priority products, keep the forest standing and the existing biodiversity and give dignity of life to the People complementing essential services guaranteed by the Brazilian State.

The indigenous people stated that the consent of the Project could change their lives positively in the short, medium and long term, so they listened carefully and positioned themselves in relation to the matter as follows: (i) permission for the entry of the technical teams of fauna, flora and social (well-being) to enter the Indigenous Land and collect data and information for the purposes of studies of the Project; (ii) reaffirmation of the Agreement entered into in November 2022, without amendment; (iii) permission to prepare the Project (PDD). It should be said that there was an abstention.

2.3.7.1.2 Foz do Nilo Village:

The second stage of the FPI took place on 23/03 with representatives of Foz do Nilo village and communities Candim, Matrinchã, Bom Futuro and São José. In addition to the indigenous representatives, Ilderlei Cordeiro, representative of I.S.R.C. (party involved in the contract), Edson Vanda, representative of Green Partners (subleased from Catraia, contracted by Infrapar, technical responsible for the preparation of the Project), Ueslei Marques de Oliveira, Camyllé Carvalho Ferreira do Nascimento, Hendryk Zegarra de Freitas, representatives of the fauna team of the company Catraia, participated.

As in the previous stage, the objectives of the workshop were clarified, several concepts were explained before dealing specifically with the Shawādawa Carbon Project, reading all the points of the contract, especially the objective of the Project (to enable the origination and commercialization of carbon credit), the competence and distribution of resources between the parties.

Several clarifications were also requested involving the role of Verra, definition of REDD, use of natural resources during execution, Cancún safeguards and how they relate to the Project, changes in the way of life due to the implementation of actions, monitoring of FUNAI, monitoring, expenses of the first year of execution, term of the contract and renewal, regulation of the carbon market in Brazil.

Finally, the vote of the consultation and consent on the continuation of the project, reaffirmation of the contract and permission to carry out field studies of the fauna, flora and social (well-being) teams. These

points were duly approved by the majority of those present, with 12 (twelve) indigenous people who spoke out against it. We will dwell on this contrary position in this topic.

As mentioned, most of those present at the workshop are in favor of the Carbon Project, since they are representatives of various communities. The village Foz do Nilo has 12 (twelve) families and of these, 08 (eight) are against and 02 (two) in favor. It is in this village that the general chief lives, as well as the president of the Cooperative and they are part of the same family. Thus, the positions (for and against) are within the scope of a family, which had not yet reached a consensus on the issue.

We determined the points that made the position of the eight families contrary to the proposal of the Project: (i) distribution of benefits – they do not agree with the percentage of the distribution of resources and envisioned that the Association would benefit with a percentage between 60% or 65% and not with 50%, as defined in the contract; (ii) greater transparency to the process - mentioned that only at the end of March is being made the Free, Prior and Informed Consultation; (iii) intermediation of another company – disagree with the presence of I.S.R.C. as an intermediary, as they would like the negotiation to be made directly between the Association and Amazon; (iv) Permanent advice – need to be guided frequently, from the signing of the contract to the execution phase; (v) participation processes – put in doubt whether the indigenous people will have participation during the execution of the actions.

2.3.7.1.3 Novo Acordo Village:

The third and final stage of the FPIC was held in the village of Novo Acordo on March 27 and was attended by indigenous peoples, including the chief of the village Raimundo do Vale, who followed up on behalf of the general chief, president of the Association, president of the Cooperative and the anthropological advisor.

We followed the script for the application of the FPIC, but with methodological adequacy. In this way, considering the lack of local energy and the request of the indigenous people for a language compatible with their knowledge, we dispensed with the datashow and built the explanations from their reality. Therefore, the concepts were built collaboratively using group work, construction of mental maps and debate of the representations in plenary. The whole conceptual part was made from three mind maps and also served as a basis for the conversation about FPIC, especially about Article 6 of ILO Convention 169.

At the time, a timeline was also made about the Shawādawa Carbon Credit Project. This activity was attended by some representatives of the village, who were recalling facts related to this construction. As in the villages of Raimundo do Vale and Foz do Nilo, we read the contract, with interventions by the indigenous people, when necessary. It was necessary to clarify the role of the parties and investment in the first year of the contract.

The workshop participants understood all the points presented by the technical team and reaffirmed the contract signed in November 2022, authorized the entry of the fauna, flora and social (well-being) teams to carry out the studies and the elaboration of the Project (PDD). They stressed, however, the need to present the documents, especially the PDD, in a new workshop for indigenous representatives, preferably in a

2.3.7.1.4 FPIC in summary

For the IL Arara Project of the Humaitá Stream, the FPIC was held in three meetings to present the project proposal and contract between parties with the Shawādawa People. The first took place on 03/22/2023 at Raimundo do Vale Village, with the participation of 89 people; the second meeting took place on 03/23/2023 in Foz do Nilo Village, with the participation of 80 people; and the third meeting took place on 03/27/2023 at Aldeia Novo Acordo, with the participation of 49 people.

2.3.7.1.4.1 Participation in meetings

During the three stages there was participation of many indigenous people representing all the villages/communities. The process was dialogical, with participatory and democratic methodologies, providing interventions, agreements, disagreements, and suggestions regarding the process involving the Project.

2.3.7.1.4.2 Didactic

The presentations were made in a didactic way and in language accessible to the participants, so that they could abstract the content and perform interventions, when necessary.

2.3.7.1.4.3 Transparency

There was clarification of the entire process involving the elaboration of the contract between the Association, Amazon and I.S.R.C., studies to be developed by the technical teams of fauna, flora and social (well-being)

2.3.7.1.4.4 Assent

During the three stages of FPIC there was approval by the majority of participants having one abstention in the village Raimundo do Vale, 12 positions against approval in the village Foz do Nilo and unanimous approval in the village Novo Acordo so that: (i) the contract drawn up and signed between the parties in November 2022 was reaffirmed, with the participation of indigenous representatives from all villages and communities; (ii) the entry of fauna, flora and social (well-being) teams was allowed to carry out an information collection activity to subsidize the Project; (iii) the elaboration of the Project was authorized, with the commitment that it be presented in the form of a workshop in the Indigenous Land.

2.3.7.1.4.5 Reservations

Eight families, numbering 12, from Foz do Nilo village, took a stand against the Shawādawa Carbon Project for the following reasons: (i) benefit sharing – they do not agree with the percentage of the distribution of resources and envisioned that the Association would benefit with a percentage between 60% or 65% and not with 50%, as defined in the contract; (ii) greater transparency to the process; (iii) intermediation of

another company – disagree with the presence of I.S.R.C. as an intermediary, because they would like the negotiation to be made directly between the Association and Amazon; (iv) Permanent advice – need to be guided frequently, from the signing of the contract to the execution phase; (v) participation processes – questioned whether the indigenous people will have a stake during the execution of the actions.

2.3.8 Workshop to review the Life Plan and elaborate the governance structure of the Project

At the end of 2022, a document was drafted that was delivered, subsequently, to the act of signing the contract. Designated as the Life Plan, it has 92 pages and contains information on the aspirations to change the lives of indigenous people through the Carbon Project.

This consultancy made a thorough analysis of the document, finding various information tabulated such as activities and actions along with programs and projects that should be discussed and prioritized during the later phase of operational planning. Incomplete information and other information with budget forecast were also verified.

The indigenous people considered it necessary to revise the Life Plan, considering the effort made in the previous year and the views of other actors who were not present in the discussion and its preparation. To this end, between March 31 and April 4, in the village of Raimundo do Vale, the workshop to review the Life Plan and the elaboration of the governance structure of the Project were planned. However, in a plenary vote, during the first day of the meeting, the indigenous people requested the exclusion of the 04 because it is the beginning of Holy Week, causing a replanning of the activities.

The meeting was attended by forty-two leaders from villages and communities including chiefs, president of the Association, president of the Cooperative, general chief, teachers, Indigenous Agroforestry Agent, Indigenous Health Agents, Indigenous Sanitation Agents, cultural representatives, as well as women, youth, elders, and children who accompanied their parents.

Between March 31 and April 2, the work of revising the Life Plan was done and counted on 60 people on the first day, 78 on the second and 101 on the third. As noted, in all these days the planning, methodological choice and mediation of the work of this workshop were carried out. The activities are described and presented below.

2.3.8.1 March 31

There was the official opening of the workshop with speeches by indigenous representatives and the Association. The objectives of the meeting were explained and, subsequently, the discussion of the Plan began in the form of a plenary. We sought to understand the conception of those present about the plan, seeking, from the dialogue, to build a collective concept that could be applied by all. Subsequently, we verify the understanding about the difference between plan, program, project and actions.

We also captured the Shawādawa's understanding of the Indigenous Territorial and Environmental Management Plan – EMP. The EMP is an instrument arising from the Ethnozoning of indigenous lands, which is part of the Ecological – Economic Zoning of the State of Acre in its Second Phase, on a scale of 1:250,000.

The EMP is an instrument arising from the Ethnozoning of indigenous lands, which is part of the Ecological – Economic Zoning of the State of Acre in its Second Phase, on a scale of 1:250,000.

EMP is understood as a planning document elaborated in a participatory and diverse way with most of the indigenous people of an indigenous land constituted by internal agreements to dialogue between the residents of the IL, their neighbors, government sectors, ONGs and the private sector. It contemplates the aspirations for the short, medium, and long term, and should be reviewed within a maximum period of 10 years. In Acre, all indigenous lands have ethnozoning and EMP and some have already been reviewed.

It is regulated by State Law No. 1,904 of June 5, 2007, and by Decree No. 7,747 of June 5, 2012, which establishes the National Policy for Indigenous Environmental and Territorial Management, where ethnodevelopment is a priority and ethnozoning on indigenous lands becomes one of the arms of this policy.

In 2012, the EMP of the Arara do Igarapé Humaitá Indigenous Land was elaborated. The service was done by the Pro-Indian Commission of Acre (CPI/AC), with resources from the Secretary of State for the Environment of Acre (SEMA/AC). The EMP review took place in the year 2021, during the COVID-19 Pandemic, but was not presented to the communities, which are largely unaware of the revised document.

The Shawādawa present at the workshop stated that the EMP is the "backbone" and guide for any program, project or action that may be carried out in the Indigenous Land. More than that, the EMP is for them the Life Plan, although others also have this connotation. They understand the Carbon Project as an instrument for the implementation of many proposals already listed in the EMP. Thus, the Shawadawa Carbon Project is an offshoot of sustainable projects already foreseen in the EMP.

A discussion was opened on whether the Plan drawn up in November last year should be constituted as a program. It was decided to name it the Shawādawa Life Plan of Carbon Credit, considering its direct link to the EMP.

The concept constructed for this Shawādawa Plan of Carbon Project by the indigenous people is the following: document to organize the Arara Indigenous Land of the Humaitá Stream, the Shawādawa People, and their organizations to improve living conditions, preserving/conserving the forest and maintaining culture and ancestry for present and future generations.

Subsequently, axes of work were divided. They were: (i) food security, production, and sustainable projects; (ii) culture, sport and leisure; (iii) surveillance, supervision and communication of the territory; (iv) health, sanitation and housing; (v) education, training and training; (vi) strengthening of organizations and the governance system; (vii) socio-cultural development fund.

The plenary was divided into seven working groups and the indigenous people were separated by their affinities and skills of discussion and contribution to the axes. There was no polarization of people by village or community and the criterion of diversity was respected. It should be noted that the axes later became programs of the Plan.

For three days, the groups selected projects for the programs and answered questions, one for the program and five for each of the proposed projects. The questions posed for the group debate were as follows: (i) program – Why is the program important? (ii) projects – Why was the project chosen? What is the current situation? Where do we want to go with the project? What is the risk if I don't have the project? What can change with the project? These questions were answered on wooden paper, containing the synthesis of the group discussion.

2.3.8.2 April 1st

On this day, the participants of the working groups also elaborated mental maps referring to the vision of the future or scenario for 30 years with the intervention of the Shawādawa Carbon Project.

2.3.8.3 April 02nd and 3rd

Between the days 02 and 03 were made several plenary sessions to present the programs and projects, as well as contributions from the participants. The plenary sessions were divided as follows: (i) day 02 (afternoon) - food security, production, and sustainable projects; culture, sport and leisure; surveillance, supervision and communication of the territory; health, sanitation and housing; (ii) day 03 (morning) - education, training and training; strengthening of organizations and the governance system; socio-cultural development fund.

During the late morning and afternoon of 04/03, a proposal for the management and governance of the resources from the Shawādawa Carbon Project was discussed and elaborated.

Initially, the timeline methodology was used to remember all the projects and actions planned and executed since 2008, with the demarcation of the Indigenous Land until the year 2022. In the construction of the timeline, the indigenous people positioned themselves regarding the positive and negative aspects in the execution of each one. They also demonstrated how the governance of management and resources of the projects and actions was done. This activity lasted from late morning to early afternoon.

The next activity, with division of 4 groups to reflect on the governance structure, was replanned due to lack of time to execute it, because the workshop, designed to last until 04/04, was changed to coincide with Holy Week. This decision, as we have already explained, was the responsibility of the indigenous people and the technical team complied with the agreement. The fact is that there was suppression of time and the construction of the structure had to be carried out in plenary part-time in the afternoon.

The collective debate showed that the indigenous people want a governance structure for the management of resources different from the previous ones because they alleged: (i) poor execution of resources in some projects, with deviations of purposes and lack of control over financial resources, including cases of planning without adequate application of resources; (ii) planning carried out without execution of actions; (iii) execution of resources by external institutions without the participation of indigenous peoples.

The mismanagement of actions and resources in the past has generated insecurity among some indigenous people regarding the financial execution of the Shawādawa Carbon Project.

2.3.8.4 Monitoring the training of indigenous staff to carry out activities in the social area (well-being)

On March 22, in the afternoon, we followed the training of indigenous people for the socioeconomic survey. This training was carried out by the coordinator of the social team, Edson Vanda Pereira, from Green Partner. The map of the Indigenous Land, arranged on a whiteboard, was used to discuss the activities and logistical operation. Two teams were needed, one for the surroundings of the Indigenous Land and the other for the interior of the territorial unit.

Socioeconomic survey in the surroundings of the IL – the Cruzeiro do Vale River was defined to carry out the work, as well as two extreme points, Dois Portos and Suiça. The surrounding region has about 100 families, being defined sampling of 40 families (40%) for the application of closed questionnaires, with application of a maximum of 60 minutes, it was required five days for its completion.

It was requested that the sampling be done sparsely between the two points chosen, being suggested by the coordinator team with a boatman and an interviewer. José Nogueira was responsible for this activity that, subsequently, deemed necessary the insertion of four indigenous people to carry out the activity.

The selection of who will be interviewer and boatman were under the responsibility of the communities, having as criteria availability and knowing how to write well and clearly. It was suggested that the technical team prepare a sketch containing the names of the people who will be interviewed.

Socioeconomic survey in the Indigenous Land – it was proposed to use part of the ethnomapping methodology, especially regarding the use of mental maps. Due to the execution time, the methodology has undergone a slight change. Thus, population aspects, health, education and other data and information on well-being and conflicts were collected through a questionnaire. However, the ethnomapping methodology was used to collect information on the production and occupation of villages and communities. Uses of cardboard and wood paper (to write subtitles) were suggested with a focus on themes related to the occupation of villages and communities, food security and productive aspects. Mental maps should be elaborated, preferably, collectively and with the presence of people who understand and can make the representations.

2.3.9 Socioeconomic survey in the Indigenous Land

This activity was carried out between 03/28 and 04/12 in two villages and eight communities. Its schedule was defined after the training of the indigenous people because we had more clarity about the team and the time of execution of the work, counting on the displacements between the territorial units. A working day was suggested for each village or community, which may be changed in specific cases. This survey did not involve all people, but on average ten to fifteen people with knowledge about the place where they live and surroundings.

Despite the rainy season and dangerous stretches of the Indigenous Land for carrying out this activity at this time of year, such as the Nile stream, the workshops fulfilled their objectives and were held in two villages and eight communities, except for Foz do Nilo.

During the workshop of review of the Shawādawa Visa Plan of Carbon Credit and elaboration, we noticed the absence of representatives of this village, with the exception of the general chief who had great participation in every day and, on 04/03, some members of his family were present, but in very small numbers. At the time, we observed the absence of the local chief of Foz do Nilo, who had participated in the planning meeting giving his consent to the work that was about to begin.

There were two unsuccessful attempts to hold the socioeconomic survey workshop. In the first, on 04/05, we were surprised in the village with the cancellation, made by the local chief and the general chief who, in turn, committed to mobilize the indigenous people so that the activity took place on 04/09. The alleged reason is that there were a reduced number of people, as some families were moving to the Port Walter headquarters for health reasons. It was argued that a representative group would resolve the impasse, but we were told by the leaders to replan the date.

On 04/09, we were informed by the president of the Association, that it would not be possible to carry out the survey due to the family impasse generated. Even so, we decided to go to Foz do Nilo to talk to the local chief and were informed by the president of the Association that the chief was in the forest hunting. Given the situation we decided to cancel the execution of the ethnomapping methodology, as it should involve different actors. However, we maintained the application of the socioeconomic questionnaire, answered by the president of the Cooperative and resident of the village. Regardless of the internal conflict, we were welcomed by everyone in this village.

In addition to the application of the questionnaire and the elaboration of mental maps with subtitles, we conducted interviews with some actors and held rounds of conversations with young people and women, visited places focused on production and culture and also visited other social facilities (schools, kupishawa, health post) and residences of some residents.

2.3.9.1 Mediation of the fauna and flora teams with the indigenous peoples

We also mediated the entry of the fauna and flora teams in the Indigenous Land and held some meetings aimed at monitoring the activities of the professionals in the field along the schedule planned for each of the teams. Below we will describe the mediation and follow-up.

2.3.9.2 Fauna Team

This team, under the responsibility of the company Catraia, traveled from Cruzeiro do Sul to Porto Walter together with the social team and participated in the planning workshop, being presented to the general and local chiefs who participated in the event. On the occasion they reported to the political leaders the purpose of the work, places to be researched and the logistics necessary for its execution, being authorized to enter the area to carry out the research aiming at collecting data and information.

The team was also presented during two stages of the Free, Prior and Informed Consultations, held in the villages of Raimundo do Vale (03/22) and Foz do Nilo (03/23). With a wider audience, they presented the objectives of the work, research locations and aspects related to the logistics of the work.

After the FPIC of Foz do Nilo they headed to the Matrinchã community, located on the Nile creek where they began their activities. The team made its exit from the field on 04/04. I held a conversation requesting some information in the field from the technicians, but the only one's available concern indigenous logistics, so if others are necessary, we recommend that you contact the company Catraia, because they were not passed on to us.

2.3.9.3 Flora Team

The two flora teams, with technicians from the company Tecman, made their entries in the Indigenous Land on 04/01 and 04/04, respectively. The entry into the area had already been authorized by the chiefs on the 20th and FPIC of the villages Raimundo do Vale, Foz do Nilo and Novo Acordo.

On 04/01, the team that was heading to the Matrinchã community made a one-day stop in the village of Raimundo do Vale for presentation. At the time, they were presented to the indigenous representatives who were participating in the workshop to review the Life Plan and to elaborate the governance structure of the Project. At the time, they explained the objective of the flora research, the steps of data and information collection, places where the work was carried out and aspects related to logistics. A meeting was also held

to discuss the Shawādawa culture and the rules and conducts to be followed by the technicians. The team went to work area on 04/02.

On 04/04 we received the second team of flora, having the village Raimundo do Vale and surroundings as a place of work. On this day a meeting was held with the team for technical guidance on the indigenous people and their culture, as well as norms and conducts to be followed. The local chief of the village participated in the conversation.

The follow-up took place with the team located in the village Matrinchā on 04/07 and 04/08 and with the team installed in the village Raimundo do Vale on 04/10. The reports about the activities developed, the challenges encountered, as well as the positive aspects of the work are described below and were divided according to the team.

2.3.9.3.1 Flora Team (Matrinchā Village):

The Nile Stream is quite winding and dangerous during the rainy season and flooding, as was the case in the months of March and April. The rain was the main negative factor for the beginning of the activities or their conclusions, having seen the need to use written notes in the field. When we met with the two technicians there was a two-day delay due to the calendar of Holy Week. The presence of the indigenous people was essential so that they could anticipate the delays resulting from the rains and Holy Week and complete the planning.

They carried out work on the opening of conglomerate-type plots. Until the time of the meeting, they managed to inventory 01 (one) conglomerate, leaving 05 (five) for the completion of the area, in a total of 30 plots around the village Matrinchā.

On 04/08, during the socioeconomic survey, this advisory supported the team to guide the indigenous people in the elaboration of two mental maps, the first referring to the forest species found in the surroundings of the community and the other detailing a plot. The technicians followed the activity until its completion, even providing suggestions.

2.3.9.3.2 Flora Team (Raimundo do Vale Village):

The surroundings of the village Raimundo do Vale presents a unique and very well-preserved forest typology, consisting of Dense Ombrophilous Forest and Ombrophilous Forest with Palm Trees, facilitating the walk of the technicians and the access to the work points. The team also had the help of the "hunting pikes" of the Indians. The two aspects exposed allowed a reduction in the planned schedule from 12 to 7 days.

As mentioned by the team, the area itself presented no obstacle to inventory work in the forest. However, the heavy rains that occurred in the area during the expedition days, and the consequent flooding of the streams, caused many parts of the forest to be flooded or soaked, causing delays. Days after the rains, species of venomous snakes (*Bothrops atrox*) usually appear on the trails or surroundings to sunbathe, this meant risks due to possible snakebite accidents.

Internal conflicts between families in the Foz do Nilo village made the work that would be carried out in that region impossible. Thus, the work points were changed after recommendations from the residents and the anthropological advice of the project. This problem did not affect the work carried out in the IL, since reserve points were used in other localities to supply those who were in the village Foz do Nilo.

The team also deemed necessary environmental education actions for indigenous people involving hunting activities, and it was necessary to observe compliance with the Indigenous Land Management Plan, as well as the agreements regarding the closed period. They also found the slaughter of snakes, venomous or not, during the days worked, being slaughtered at least 5 venomous snakes that appeared on the trails or in the surroundings. The disappearance of species (especially snakes) can cause various types of ecological imbalances in an ecosystem. Although the death of snakes is common to indigenous people, they suggested environmental education actions.

Regarding Carbon's work, they found that the indigenous people have several doubts about the execution of the Project. Some of them were mentioned by the team: (i) When the work is completed will they (the indigenous people) still have the freedom to extract wood for the construction of houses? (ii) If they can no longer extract wood, will they have assistance with inputs to carry out masonry construction? (iii) Will they still be able to hunt and make felling for the construction of swiddens? (iv) The IL area has many creeks and shallow areas with few trees. They worry about whether these issues (areas with few trees) will make the Carbon Credit yield less money.

The indigenous people who helped both field teams, all were dedicated and attentive in all the actions carried out. Their support was essential for an improvement and optimization of the work carried out.

After the completion of the inventories and measurements of the trees by the teams, the data collected will be forwarded to the company Tecman LTDA, for estimation of carbon stock in the Arara do Igapé Humaitá Indigenous Land.

2.3.10 Project clarification meetings in villages and communities

In addition to the workshops (planning, FPIC and revision of the Life Plan/elaboration of the governance structure) ten clarification meetings were held, with the help of the chiefs, about the Project in the villages of Raimundo do Vale and Novo Acordo, in addition to the communities of Candim, Matrinchã, Bom Futuro, São José, Paz, Porto Alegre, São Luís and Santo Antônio. The meetings were held prior to the socioeconomic survey and the following points were presented and discussed: (i) timeline on the Shawādawa Carbon Credit Project; (ii) concept on Carbon Project; (iii) clarifications regarding the signed contract, including the distribution of resources. Doubts were raised by indigenous people during the meetings, and explanations were given to resolve them.

2.3.10.1 Conversation circles and interviews

Seeking to verify current problems and future expectations regarding the Project, roundtables were held with teachers in the village Raimundo do Vale, women (all territorial units, except the village Foz do Nilo), young people (all territorial units, except the village Foz do Nilo), representatives of culture (village Nova Fronteira, village Raimundo do Vale and community Matrinchã) and local chiefs (during the workshops of revision of the Life Plan and construction of the structure of project governance). Interviews were conducted with the president of the Association, president of the Cooperative, general chief, local chiefs, Indigenous Agroforestry Agent in the São Luís community, Indigenous Agroforestry Agent in the Raimundo do Vale village, Indigenous Sanitation Agent in the Raimundo do Vale village, the only shaman of the Indigenous Land in the Matrinchã community, the only IL midwife in the Santo Antônio community, elders in the Raimundo do Vale village and the Paz community, indigenous representatives opposed to the Project.

2.3.10.2 Visits to sacred and traditional places

There were visits to sacred places in the villages of Nova Fronteira (Valparaíso River) and Raimundo do Vale (Cruzeiro do Vale River/Humaitá Stream), as well as in the Matrinchã community (Nile River). The following were observed: (i) places of ayahuasca shape, also called timbu for them; (ii) places of research and study of sacred medicines; (iii) ritualistic "terreiros" intended, mainly, to celebrations with ayahuasca and snuff; (iv) Kupichawas with dual function, serving as a place for meetings and, on specific occasions, for ritualistic and sacred use of medicines; (v) forest sites with the presence of vine (Banisteriopsis caapi) and leaf (Pschotria viridis); (vi) traditional houses in the village of Nova Fronteira and in the Matrinchã community.

2.3.10.3 Visits to productive places

Visits were made to swiddens in the villages of Novo Acordo, Raimundo do Vale and the Candim community. Flour houses were visited in the Candim and Porto Alegre communities, in addition to the village of Raimundo do Vale. The Agroforestry Systems (SAF's) visited were those of Raimundo do Vale, where part of the village was reforested, but we found parts of SAF's cerrado and poorly cared for. However, in the community of São Luís, there is a magnificent SAF, consorting bee breeding, swiddens, fruit, and weir for the creation of fish. The place is well cared for and provides food for the families of the community, being a great example of a successful experience that can be replicated with the implementation of the Project.

In the community of Porto Alegre there is a mill to produce sugarcane honey. The local chief explained that they do not receive social benefits and live exclusively from the production of honey, flour, and the sale of cassava.

There is cattle breeding in the Indigenous Land, but on a small scale, only for internal consumption, thus indicating the presence of small pastures. We observed one of these pastures in the Santo Antônio community.

In the villages and communities was observed the breeding of domestic animals including chickens, ducks and in rare cases, pigs. Except for pigs, birds are raised freely in the courtyard of the territorial units. Details about production data and information can be found in the social team (well-being) report.

2.3.10.4 Meetings with chiefs, presidente of the Association and President of the Cooperative

There were some meetings with local chiefs, president of the Association and president of the Cooperative in the villages of Raimundo do Vale and Novo Acordo, as well as in the communities of Santo Antônio and Matrinchã. The final meeting of the field was also attended by the presidents of the Association and Cooperative.

It was essential to hold a meeting to finalize the field activities, which took place on 04/12 in the Santo Antônio community, the last place in the Indigenous Land where a socioeconomic survey was conducted. Present in this evaluation were the chief of the village Raimundo do Vale, the president of the Association and the President of the Cooperative. Due to the distance and lack of resources, other chiefs could not participate, and other representatives were involved with the socioeconomic survey activity in the

surrounding area. At the time, those present considered the fieldwork of the three teams satisfactory. The following interview fragments reflect the assessment.

Damião Lima de Melo, president of the Association, stated that: "This work of information of everything that is happening about this Project happened. Our people are already being informed. The most important thing about this project is that it involves everyone, the families are participating, the young people, even the children also participated in drawing, they were together. It is very profitable for us because the Project will bring the strengthening of the People. It's making me happy because everybody's involved. The Project was also concerned with informing the surrounding people, as we also need their partnership. I enjoyed the work, all the teams got involved and I believe it will all work out."

James Lima, president of the Pushuã Shawādawa Agroextractivist Cooperative (CAESP) said in a statement that: "We were so happy when we worked on a project like this, still being built, trying to finish, having the participation. We have already worked on several projects, the difference we are seeing is that none was worked in the way that we are working today. He had the participation of all the villages, from the largest to the smallest. It was attended by everyone, including women, who gave their contribution and know what they want for their future. As president of an institution, in the name of the People, I hope that this work will not be in vain, because we have already had other experiences of projects that have created expectations and to this day have not given results. This Project will be a great step towards achieving the future of our People, the well-being of our communities."

José Maria, local chief of the village Raimundo do Vale said that: "Seeing a work like this, I as a chief feel very accomplished. This realization also comes from a time ago. When today I see a team of young people following the debate of this Project and everything that is happening in our villages and communities. When I see this, I feel happy because I remember myself, because I started too young to be seeing young people today seek their future. I rate the work as positive. I did not miss a day of meeting and where I went, where I discussed, I observed the commitment of the Shawādawa People in these meetings, because we are more strengthened when the staff participates, when the staff accompanies, helps in the debates and this left me strengthened. The commitment of the Shawādawa People was covered with participation. We hope that this Carbon Credit Project will change the reality of the Shawādawa People and that it will add and change the situation of education, the situation of health, infrastructure, housing of our people, transportation, and bring other benefits. It is important that the Project helps villages and communities, this People who need to live happily! This Project strengthens because it will help every family and community. When we got the Earth, it was thought to have these projects, for us to live without destroying nature and now this dream is coming true. I want this Carbon Project to work for our People and for it to strengthen our organizations and our People."

2.3.10.5 Surrounding communities

During the interviews with residents of the communities of PDS Natal and PAE Cruzeiro do Vale, around the TI, held in April/2023, relevant information about the objectives and location of the project was presented. To this end, a newsletter was distributed that deals with related topics, such as greenhouse gas emissions, carbon sequestration and the carbon credit market.

In the engagement, the team was careful to use in the approach a language understandable and recognized locally during the explanations, accompanied by a location map and guiding text on the conception and objectives of the project.

2.3.11 Continued Consultation and Adaptive Management (G3.4)

Project management will implement dialogue channels to ensure effective communication with beneficiary communities and stakeholders. In addition, annual consultations will be held throughout the execution of the project, providing opportunities for communities to influence project management, if applicable. Social monitoring will be relevant to evaluate the effects of socioeconomic impacts and generate critical analyses, pointing out, from the perspective of communities, the need for measures to prevent negative impacts or enhance positive impacts.

2.3.12 Stakeholder Consultation Channels (G3.5)

Consultations, data collection and direct social engagement meetings were held with beneficiaries and stakeholders, ensuring the effective participation of communities in the design and execution of activities. The consultations, meetings and data collection are proven through minutes, attendance lists, questionnaires, photographic records and authorizations of direct use of data and images. The information was shared through official documents, norms, applicable legislation, and oral and written understandable language was used.

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

The strategy for the execution of the socio-environmental studies for the elaboration of the PDD was defined in the Participatory Planning Workshop (PPW), with the participation of indigenous leaders from all villages and communities, representative of the Municipal Secretariat of Environment and representative of FUNAI. The leaders, youth and women actively participated and established the organization of logistics, costs, community mobilization strategy and the engagement of community members in field surveys. Together with the technical team of fauna and flora, they defined the relevant locations for data collection. The socioeconomic diagnosis and ethnomapping in the TI and in the surroundings were carried out by young indigenous men and women, among whom agroforestry, educational and health agents participated. A methodological leveling workshop was held on 03/22/2023 with the participation of 23 young men and women. The socioeconomic studies were carried out only by indigenous peoples, hired for this purpose. Food preparation, boat rental and guide services were also contracted. The participation of the Arara People was decisive for the success of the results achieved.

2.3.14 Anti-Discrimination Assurance (G3.7)

The Conduct and Commitments Memorandum for the IL Arara Project of the Humaitá Stream shall provide for measures to prevent the participation of entities involved in any form of discrimination. The Term of Conduct must be complied with by all parties involved in the development of the project, providing for commitment to human rights and ethical values, reporting channel, handling of complaints and application of penalties. In addition, all partner institutions must formally declare by means of a term of commitment: respect all laws and norms established for the protection of human rights, committing not to practice any form of discrimination and harassment, be it race, color, culture, sexual, religious, or political choice.

In addition, the Proponent is committed to the highest universal standards of commitment and respect for the human being in his individuality, and no discrimination or harassment is conceivable.

Also, the project will always be guided based on the Constitution of the Federative Republic of Brazil of 1988, with emphasis on article 5, which provides for individual rights and duties, ensuring the equality of all before Brazilian law. Therefore, prejudice or discrimination against persons is not accepted, whether by race, color, nationality, origin, religion, sex, sexual orientation, social class, marital status, age, physical disability, or other personal characteristics.

2.3.15 Feedback and Grievance Redress Procedure (G3.8)

The processes will be taken to the Territorial Management Group for analysis, discussion and referrals.

Communication channels for feedback and status of claims redress cases will be disclosed in meetings, consultations, events and project activities with communities and Stakeholders, through a documented procedure, containing, but not limited to, communication channels, measures taken, deadlines, feedback, process flow, responsibility, and transparency.

The procedure will be guided by the following lines.

2.3.15.1 Objective

Define a system for handling complaints and repairing damages of any nature resulting from the execution of the project.

2.3.15.2 Definition

Complaint: act or effect of opposing through arguments, protest or claiming something that is considered right or fair by the applicant.

Damage: material (i) is the loss that occurs in the person's assets, that is, loss of goods or things that have economic value; moral (ii) is the violation of someone's honor or image, which results from an offense to personality rights (intimacy, privacy, honor and image); aesthetic damage (iii) constitutes an injury to someone's health or physical integrity, which results in embarrassment.

Third party: person, group, community, or legal entity that has suffered damage.

2.3.15.3 General Conditions

The identification of a claim or demand for damage repair will occur upon receipt through the social communication channels or during the monitoring activities of the project's social impacts. Damages must be compensated or mitigated fairly and according to the particularities of each case, in compliance with current legislation. Cases of damage claims and compensation will be subject to a specific investigation procedure to assess the situation and support applicable measures.

2.3.15.4 Identification and assessment of the need for compensation

The claim or damage is characterized by events caused or resulting from the activity implemented or due to the execution of the project. The need for compensation is the result of objective proof of the negative event. Once the claim or damage is proven, an action plan must be prepared and implemented, predicting each work step, deadline, and responsibilities. The plan should result in a repair report.

2.3.15.5 Ways of conflict resolution

Friendly resolution attempt: The project manager will listen to all complaints and try to friendly negotiate a mutually beneficial and satisfactory solution with the parties involved. The entire procedure will be documented, analyzed with the attention it deserves.

Mediation conducted by a neutral party: if it is not possible to resolve the conflict friendly, a neutral party to the project will be summoned to mediate the demand in order to resolve it. Depending on the nature of the conflict, government agencies may be brought into mediation, such as IBAMA, INCRA, IMAC, etc.

Court or Arbitration: If the neutral third party (mediator) is unable to resolve the conflict, the claim will be directed to the Central Forum of the District of São Paulo, State of São Paulo, or to the Local District, depending on the type of conflict, with attention to legal requirements of a forum other than the elected one above.

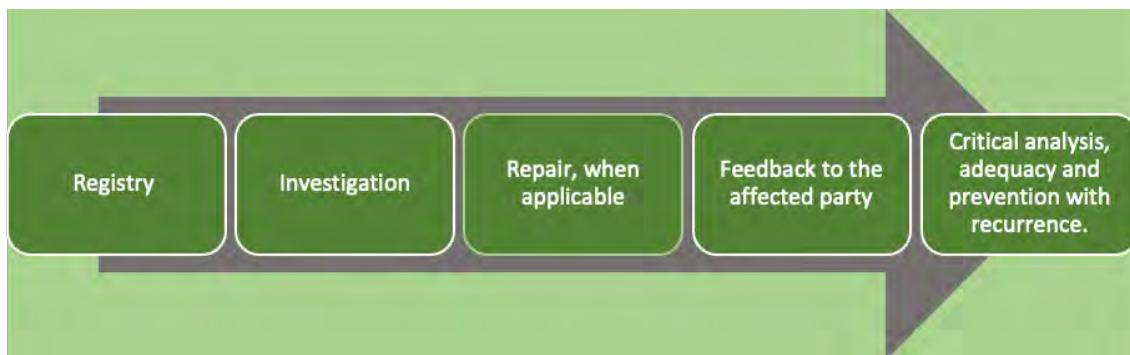
2.3.15.6 Follow up and response in friendly negotiation or mediation.

Feedback to the affected party on the status of the redress process must be carried out to ensure trust and transparency of the resolution process. The feedback must be documented and through official project channels. Every process will be monitored and evaluated to verify the implementation and effectiveness of the actions taken until its closure to verify the need for adequacy of the repair measure.

2.3.15.7 Responsibilities

Damages caused will be evaluated and approved by the Project Management or mediator, after hearing and analyzing the Legal Area.

Figure 33 - Process Flow.



Source: Project Team Elaboration

2.3.15.8 Registration

The records generated, such as meeting minutes, reports, action plans will be archived for a period of 05 years, being kept back-up in the cloud indefinitely. The occurrences, as well as all measures applied and feedback to the affected parties, must be recorded on the Complaint Registration Form.

2.3.15.9 Changes and revisions of the document, if applicable

Changes to documents can be proposed by any collaborator, and the person responsible for the area to which the change refers must make these proposed changes. The amended document must go through the normal approval flow after the amendment.

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

See the entire process in the previous item (Feedback and Grievance Redress Procedure).

2.3.17 Worker Training (G3.9)

The hired workers will undergo an annual performance evaluation to identify professional development needs. Based on the results, a plan for the development of skills and competences will be drawn up and implemented.

To maintain local capacity, strategic group planning and regular meetings will be held to assess progress. The interaction will be stimulated so that everyone has knowledge of the actions and assignments performed by each member of the team.

2.3.18 Community Employment Opportunities (G3.10)

Prior to recruitment, professional development opportunities will be offered in the project's areas of interest so that community members have competitive opportunities to fill job positions. The vacancies should be widely disseminated in the communities, providing criteria that consider the socioeconomic conditions and social vulnerability of the candidates, gender equity and rights of people with special needs.

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

The Project should prepare and disseminate the booklet on workers' rights, and a copy should be delivered at the hiring/integration stage and a presentation should be made to clarify the applicable labor and health and safety legislation. A communication channel must be disclosed to serve the hired workers.

Table 14 - Compendium of Applicable Legislation.

Labor Legislation		
Item	Law/Decree/IN	Description
01	Constitution of the Federative Republic of Brazil of 1988	It deals with Social and Labor Rights (Title II – Fundamental Rights and Guarantees, Chapter II – Social Rights).
02	Consolidation of Labor Laws - Decree-Law No. 5.452/1943	It deals with current labor legislation.
03	Law N. 13.467 de 13/07/2017	Amends articles of the Consolidation of Labor Laws.
Occupational Health and Safety Legislation		
Item	Law/Decree/IN	Description
01	Regulatory Standard 31	This Regulatory Standard aims to establish the precepts to be observed in the organization and in the work environment, in order to make compatible the planning and development of the activities of agriculture, livestock, forestry, forestry and aquaculture with the safety and health and environment of the work.
02	Article 6 of the Consolidation of Labor Laws	This article deals with the protection against the risks of accidents and damage to the health of employees.
National Legislation and International Conventions - Indigenous and Traditional Populations		
Item	Law/Decree/IN	Description

01	Decree-Law No. 6,040, of February 7, 2007	Establishes the National Policy for the Sustainable Development of Traditional Peoples and Communities
02	ILO Convention No. 169 on Indigenous and Tribal Peoples	It guarantees the rights of indigenous and traditional populations to territories, culture to decent work, respecting the peculiarities.

Source: Project Team Elaboration

2.3.20 Occupational Safety Assessment (G3.12)

For the identification and prevention of risks in the execution of the work, the mandatory procedures and standards in health and safety applicable to each function must be implemented: PGRTR³, APR⁴, PCMSO⁵, LTCAT⁶, supply of PPE⁷ and provision of training for risk activities.

2.4 Management Capacity

2.4.1 Project Governance Structures (G4.1)

Follow below is the governance structure proposed for the Project.

³ Rural Work Risk Management Program

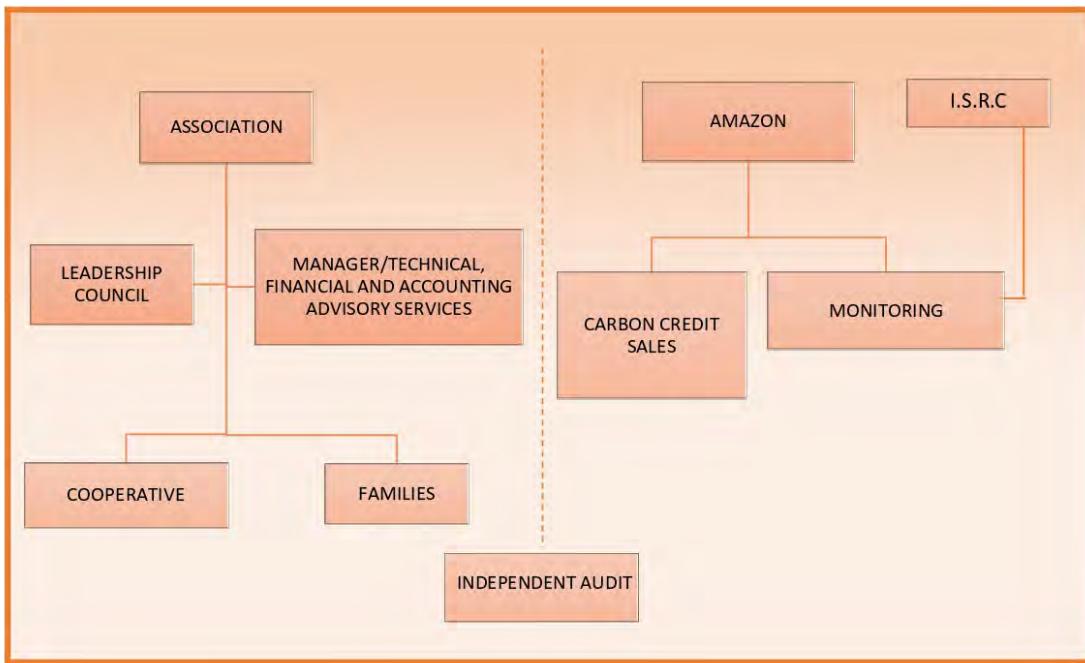
⁴ Preliminary Risk Analysis

⁵ Occupational Health Medical Control Program

⁶ Technical Report on the Work Environment Conditions

⁷ Politically Exposed Persons

Figure 34 - Diagram of the governance structure of the Shawādawa Carbon Credit Project.



Source: Life Plan Review Workshop/Governance Structure/Research Data

2.4.1.1 Amazon Partners 20, LLC

Amazon will be the Project Proponent with Verra and will be responsible for the commercialization of all credits originated, registered, and monitored. Amazon will also be responsible for part of the expenses of the Participatory Monitoring together with the I.S.R.C. Participatory monitoring is understood as the monitoring of the actions of the Project also made by the indigenous people, with technical support. The idea is that the proximity of the Shawādawa to the execution will allow greater involvement and supervision over the actions.

2.4.1.2 Project Management Partner – I.S.R.C Investments and Acessory Ltda

I.S.R.C is a company with more than 11 years with experience in carbon market in the Amazon region. This company will monitor and report on the development of the Project, assisting in local activities, and should be the articulator with the Association of the Shawādawa People of the Humaitá Stream. I.S.R.C. will also be responsible for a portion of the expenses of Participatory Monitoring together with Amazon Partners 20.

2.4.1.3 Landowner - Association of Shawādawa People of The Humaitá Stream

The Association is the legitimate representative of the Shawādawa ethnic group and one of the parties to the contract that will receive part of the benefit sharing. It has the role of being responsible for property security, on-site support in the area, is also financially responsible for all social work, infrastructure and sharing of benefits for indigenous residents in the area. The association must actively participate in all stages of the project, communicate to all indigenous people the steps that should be followed and be the

point of contact with the Project Proponent, and must hold public meetings/consultations and record all meetings in minutes to demonstrate everyone's agreement with the development of the carbon project. It will continue to develop its activities, according to its own statutes, fulfilling its role as political and social articulator of the Shawādawa People internally and with the world beyond the borders of the Indigenous Land. It will also carry out actions of a social, cultural, and political nature.

2.4.1.4 Project Management & Development Partner - Infrapar Sustainability Ltda

Infrapar Sustainability Ltd. is a brazilian private company that acts as one of the pioneers in the Portfolio Management of Environmental Commodities such as Carbon, Climate and Biodiversity Credits, with operations ranging from origination to registration, marketing, monitoring and verification of portfolios. Infrapar is the technical responsible for the execution of the REDD+ CCB Carbon Credit Origination Project in the Arara do Igarapé Humaitá Indigenous Land.

2.4.1.5 Stakeholder – Leadership Council

The Leadership Council is a recent structure in the Indigenous Land that brings together 42 actors (chiefs, teachers, indigenous health agents, indigenous sanitation agents, indigenous agroforestry agents, endemic agents, shaman, midwife, among others) from 03 villages and 08 communities. It has an advisory and deliberative character, respectively. He has the decision-making power with the Association. It will actively participate in the planning of actions, also accompanying the participatory monitoring and evaluation of actions.

2.4.1.6 Stakeholder – Independent Auditory

The Independent Audit aims to analyze and validate the technical, financial, and patrimonial information of the Project. The work must be transparent, and the Association must respect the position of the auditor, who will express his opinions through a report. It should be provided with technical and accounting information, as well as the balance sheet, taxation, and other elements necessary for auditing. It was suggested the independent audit in this Project, so that there is greater security in the application of resources.

2.4.1.7 Stakeholder - Cooperativa Agroextrativista Pushuā Shawādawa (CAESP)

It will be one of the execution arms of the Project, being responsible, mainly, for the projects and actions aimed at environmental, productive and market demands, since its role is to unite social development, productivity, and sustainability, respecting the environment and the culture of the Shawādawa.

2.4.1.8 Stakeholder – Families

They will be the main beneficiaries of the Project. The arrangement should provide for the provision of resources to all of them through the Socio-Cultural Development Fund. Other actions should include the villages and communities and should be planned and agreed annually by the indigenous people, ensuring greater capillarity of resources and territorialization of actions.

2.4.2 Required Technical Skills (G4.2)

For the implementation of the project, Infrapar Sustainability Ltd. acts as a Project Management Office (PMO), to ensure the quality of the services performed and the materials produced in all stages of the project and produces the consolidation of data approved by its Quality Assurance process, preparing the final studies and writing the Project Design Documentation (PDD) based on its models and studies, counting

on a highly qualified multidisciplinary team with decades of experience. The Infrapar Sustainability Ltd. team together with its business partners brings together all the technical skills necessary for the successful implementation of the project, such as in-depth knowledge of the methods related to Verra's VCS and CCB standards, application of territorial management and community engagement with stakeholders, carrying out forest and wildlife inventories, monitoring of biodiversity, realization of projections and modeling necessary for calculation of carbon stocks in soil and forest, application of GIS, socioeconomic and cultural diagnoses, among others.

2.4.3 Management Team Experience: Infrapar Sustainability Ltda.

The experience of the project management team is led by Infrapar Sustainability Ltda, a company founded and directed by engineer Marco Antônio Fujihara and economist Breno Figueiredo, who have accumulated around 40 (forty) years of professional experience, with outstanding work in Sustainable Finance and Active participation in the main Brazilian and international forums related to the development and regulation of Credit Markets for Payments for Environmental Services.

Ágatha Ribeiro

College Student, attending the first year of Business Administration at LaSalle University, was an intern in Administration Technique of Infrapar Research Ltda and later infrapar Sustainability Ltda. where she was hired to work in the ESG Project Development and Carbon Credits teams -as well as in the formulation of content and support to the communities of service provision and employees of the online platform of the companies of the Infrapar Capital Partners initiative. As a high school student she developed her first Business Plan for a start-up as a school work with praise, which brought her closer to the Incubators and Accelerators market in the venture capital industry. She also developed work initially for venture building projects of Ivisix Ventures Ltda still as an intern, before joining Infrapar companies permanently until hiring, where she specializes more and more every day in the areas of Climate Economics, ESG Investing, Impact Investing and Regulatory Economics. You can learn more about Agatha Ribeiro on her LinkedIn page at Ágatha Ribeiro | LinkedIn.

Aline Tristão Bernardes

Aline holds a Bachelor's degree in Biological Sciences from the Federal University of Juiz de Fora, with a Master's degree in Ecology, Conservation and Wildlife Management from the Federal University of Minas Gerais. He has been working for thirty-five years as project manager related to territorial management and environmental conservation, with intense performance in integrated actions of sustainability, relationship and engagement with stakeholders, strategic social investment, conflict management, crises and critical relationships. The professional trajectory begins with participation in the creation and development of projects in Brazilian non-governmental organizations, such as the Biodiversits Foundation (Belo Horizonte, MG) and the Terra Institute (Amorés, MG). She served as Director of Protected Areas of the Minas Gerais Department of Environment and the Forestry Institute of the State of Minas Gerais. Developed studies and projects related to the management of protected areas and environmental funds for financing protected areas and biodiversity in Latin America for the World Bank, Program of Development Units of the United Nations, GTZ and Non-Governmental organizations in the United States and Brazil, such as W Alton Jones Foundation and Brazilian Biodiversity Fund –FUNBIO. She worked for five years as project manager of Integrated Territory Management -GIT at Instituto Bioatlântica -IBIO before being selected as Executive Director of FSC Brazil in 2015, where she remained until December 2020. In 2021, hired by IBÁ, participated in the creation and structuring of the organization that represents the forest certification scheme -PEFC in Brazil. In addition, since 2021, it has supported Soleum in the development and implementation of the sustainability strategy –corporate and territorial. Aline is senior consultant at Infrapar Sustanability. You can know more about Aline at Aline Tristão Bernardes | LinkedIn.

André Dias

André is a Forestry Engineer from the University of São Paulo and has skills mainly in managing social and environmental projects in the Amazon and Cerrado, knowledge of forest management and exploitation of reduced impact, risk management in socio-environmental projects and search for synergy and collective construction. He was an Independent Consultant at IABS (Brazilian Institute of Sustainability Development), Conservation Manager at WWF Brazil where he was part of the risk management team responsible for developing institutional policies to strengthen risk management in conservation projects and protocol development. Carried out the management of conservation projects -PMO (design and implementation of the project management office in WWF Brazil with a portfolio of 80 projects and budget of R\$ 40 million). He was lead auditor in the forest certification process by Imaflora, Operational Manager at the Tropical Forest Institute and participated in the Agroforestry Program-Health and Joy Project where he provided technical assistance and forest extension to riverside communities in the Tapajós River basin in the Amazon. Currently, André is the consultant specialist in environmental sustainability issues for the development of SDE REDD+ (Reduction of Emissions from Deforestation and Forest Degradation) projects at Infrapar Sustainability LTDA. You can know more about André at Andre Dias | LinkedIn.

Breno Figueiredo

Climate Economist, lecturer and professor in the areas of Climate Economics, ESG Investing, Impact Investing and Regulatory Economics, holds a degree in Economic Sciences (1983-1987) from the Faculty of Economics and Administration (FEA) of the Federal University of Rio de Janeiro (UFRJ), holds an MBA in Corporate Finance from the Graduate School of Economics (EPGE) of the Getúlio Vargas Foundation (1995-1996), an MBA in Industrial Organization from the Institute of Industrial Economics (IEI) of UFRJ (1998-1999) and a Post-Bachelor's degree in Logistics and Transportation from the Business School of the University of Miami(2007). He was professor of economic regulation at EPGE/FGV from 1996 to 2001. He was also a certified member of the Project Management Institute (PMI) in 2010/2011. Since 2016 he is interested in the studies and applications of the new area of Sustainable Finance (Green Finance or Green Finance), dedicating himself from 2018, in full, to consulting services and structuring investment projects with the application of methods, metrics and tools of the area of Climate Economics, ESG Investing, Impact Investing and Regulatory Economics. In 2009 he founded the research house called Infrapar Research Ltda, since 2018 fully specialized in Climate Economics, and today also, part of the Infrapar Capital Partners initiative, of which he was the first associated company. Breno Figueiredo is the Chief Economist of the economic research, investment analysis, economic and financial modeling and product development team in Sustainable Finance and Climate Economics that provides support for the different legal vehicles of Infrapar Capital Partners, its clients, partners, investors and funders. He is responsible for Infrapar Capital Partners' initiatives with the United Nations Global Compact and the Verra Standards. In 2020 he formulated for the PSA Soja Brasil project of the Tropical Forest Alliance (arm of the World Economic Forum), an experimental methodology for pricing carbon credits entitled PSA Productivity Princing proposed an algorithm that linked the price of Carbon Credits with agricultural productivity and the potential for avoided deforestation. Also in 2020 formulated for the Brazilian Federation of Banks -FEBRABAN, proposal for climate risk modeling for the credit and investment portfolios of Brazilian banks. In 2021, he was responsible for the economic and financial modeling of the Environmental Services Development Company of the State of Acre (CDSA) and the updating of the values and records of the Company's Judicial Carbon portfolio in the VERRA and IHS Markit records. That same year he worked on the PES Digital project for the optimization of technologies for the lower-cost alternative technologies, based on digital solutions, for measuring GHG emission reductions. by the Tropical Forest Alliance. In the same year, as a venture builder he worked at the foundation of Ecofix Securities S.A. -start-up specialized in solutions for origination of carbon credits in the soil in areas of agricultural production and pastures -service provider for national sustainable agriculture, today, part of the Infrapar Capital Partners initiative. In 2022, as an expert in Regulatory Economics, he worked for the World Economic Forum in the construction of a market proposition for the regulation of the Brazilian Law on Payments of Environmental Services, as a contribution

to the efforts of the Brazil, Climate, Forestry and Agriculture Coalition. Also participated in the preparation and signed the Brazilian contributions by ANEFAC -National Association of Finance, Administration and Accounting Executives for the first regulations of metrics accounting in ESG-Environmental, Social and Governance in the international accounting systems of companies, currently under preparation in the International Standard Sustainable Board-ISSB. In 2022 it also structured Infrapar Sustainability Ltd. Arm of the company Infrapar Capital Partners dedicated to the origination, registration and negotiation of Environmental Service Payment Credits (nod. -CCB Program of the Verra Standards). It is also at the forefront of the implementation of the Tykra Scientific-Technological Institute, which was founded in 2023 for the structuring of lines of research, consulting and professional training focused on methodological and technological development -which contribute to the responsible use resources of the planet's natural infrastructure, adding the value of natural capital to the value of financial capital, for the consolidation of the Sustainable Development Goals. Since 2009, through his venture building company, economist Breno Figueiredo has already originated, provided mentoring and support for the structuring of a dozen new companies and venture projects, disinvesting their equity interests in five of them -with the rest still counting on equity interests of Ivisix Ventures Ltda. - conducted by their respective teams of each company invested. Until starting his own business in the venture capital industry Breno Figueiredo built a solid career as an executive in state, government and investment funds. After joining the federal statal through its Trainee Program in 1987, Breno Figueiredo began his career in the holding company of Eletrobrás Centrais Elétricas Brasileiras S.A. as a econometrist of the Department of Economic Studies. He was Division Manager of the Accounting Department, Manager of 3 (three) different Departments [(i) Credits, (ii) Investments and (iii) Economic-Financial Planning], until becoming Controller in the Corporate and Financial C-Level Team of the company from 1996 to 2001 -a function that accumulated with the mission of implementing the ERP System -Enterprise Resources Planning companies between 1998-2000. In 2002 he assumed the position of DAS-6 in the Federal Government, at the head of the Superintendence of Economic Regulation of the National Land Transport Agency (ANTT) in the mandate of implementation of the regulatory agency, between 2002-2008. In 2009 he founded his own research house, and through it was soon hired to act as Senior Advisor of Investment Funds of GP Investments, in the period 2011-2013. Through the research house also provided support the activities of Promon Intelligens, URBEM Institute, Bio-Atlantic Institute and A.T.Kearney Brazil between the years 2014-2018. He was a member of the Boards of Directors of Eletrosul, CHESF, Eletroacre Energy Company, Amazon Energy Company, and carrier to carrier EletroNET in the telecommunications area (companies of the Eletrobrás Group), as well as Companies' Fiscal Council of the Center for Research in Electric Energy (CEPEL) and the Electric Power Transmission Company (CTEEP) of the Colombian group ISA. You can learn more about economist Breno Figueiredo on his LinkedIn page at [Breno Figueiredo | LinkedIn](#).

Juliana Figueiredo

Juliana holds a bachelor's degree in Business Administration from IBMEC-RJ. With expertise in Business, Business Management, Marketing and Related Support Services. She began her professional career at the University by becoming a Contract and Operations Consultant at Ibmec Jr. Adiante, worked on projects of consolidation and expansion of Closet Bobags,marketplace for sale and rental of luxury bags and accessories, where she was responsible for the curatorship of the platform, assisting in the purchase and evaluation of products and potential customers, later worked on the expansion of the office to the city of São Paulo -in projects with geographically distributed teams. In 2018 it decided to undertake and take the risks of putting up her own business through Ivisix Ventures Ltd., acting since the structuring of the companies that are part of the Infrapar Capital Partners initiative focused focused on the management of the value of the planet's natural infrastructure, through responsible investments in agroforestry system, sustainable agriculture, sustainable infrastructure and unique financial products with ballast in natural capital assets and carbon credits or other payments for environmental services, with companies invested in research, technology, marketing, venture building and ESG Investing. With all her entrepreneurship initiatives focused on the ESG solutions market, Juliana has been dedicating herself full time in her expertise in the area of Climate Economics, ESG Investing,Impact Investing and Regulatory Economics,

working in projects and structuring of businesses related to the markets that make extensive use of these expertises. You can learn more about administrator Juliana Figueiredo on her LinkedIn page at [Juliana Figueiredo | LinkedIn](#).

Lucas Barbosa

Graduated in Chemical Engineering from the Fluminense Federal University in 2017, Lucas had the opportunity to live in Germany for 18 months during his graduation through the Science without Borders program. German Language Learning, Study of Process Engineering at Hochschule Offenburg and conducting an internship in the area of Microbiology and Biochemistry were the main activities. At the conclusion of his graduation, he dissected on the theme of Eco indicators, a work in which CO₂ emissions per ton of production of the compound 1 –Tetradecene were calculated. After returning from abroad and his graduation, he continued teaching private classes in Chemistry, physics and mathematics as he did since 2005, to finally begin his career in the industry in the area of sanitary paper manufacturing in the Charter in Anápolis, Goiás. His performance was mainly in the area of process engineering based on the Lean Manufacturing philosophy focusing mainly on the parameterization of paper machines, standardization, operational training, cost reduction and waste and increased productivity. After 3 1/2 years in the Manufacturing Charter, Lucas was called to work at Suzano, empress unit, in a machine similar to that he worked in the Manufacturing Charter, but with more responsibilities and assignments. At Suzano, Lucas can further expand his knowledge of the paper making process and learn new ways of working in a multinational company. In August 2022, after a total career change, he began his current experience and partnership working with Victor Naoum, being his right-hand man in his company Naoum Ambiental (Environmental Licensing). Over the next 4 months he learned more about management tools, carbon market and self-discipline when working for the first time exclusively in the home office scheme. You can know more about Lucas at [Lucas Barbosa | LinkedIn](#).

Marco Antônio Fujihara

Fujihara is one of the most well-known and respected names in the area of Environmental Sustainability in Brazil and abroad. He is a forest manager, lecturer and teacher in the areas of Environmental Sustainability and Corporate Governance. With extensive experience in the forestry sector currently developing projects to qualify companies in the Kyoto parameters recommended by the energy and steel forest-based sectors and pulp and paper. etc. Evaluates projects in the area of natural resource economy for the World Bank and ITTO -International Tropical Timber Forest Products Organization. He was coordinator of Mercosur, Superintendent of the Brazilian Society of Forests, Coordinator of Natural Resources of Bracelpa: National Association of Pulp and Paper Manufacturers, and Director of Renewable Natural Resources of IBAMA in Brasilia and worked professionally in several Companies. Has courses extension courses in Economics at the University of Agriculture and Forestry Business, Policy and Strategy on Climate Change at Harvard University. Finally Director of Sustainability of PricewaterhouseCoopers in Brazil with operations in Latin America. And he is currently director of the Totum institute and Key Associates with a specific focus on Sustainability and Carbon Finance Business. And co-manager of the Brazil Sustainability Fund in the BNDES Clean Development Program. He also serves as an advisor to FIESP (f Environment Council), S.O.S. Mata Atlântica, ICLEI, Ethos and CPFL Energia, as well as an IPCC/LULUCF reviewer. Key Associados is a management consultancy specialized in sustainability management. Its products include a range of services from the implementation of ISO management to the structuring of business models focused on strategies, finance and technologies. You can learn more from engineer Marco Fujihara on his LinkedIn page at [Marco Antonio Fujihara | LinkedIn](#).

Mariana Naoum

Mariana is a lawyer, graduated in law from Candido Mendes University, specialist in Maritime Law from the Maritime Law Academy and knowledge in the English language, possessing Certificate in English

Proficiency issued by VGC International College in Vancouver, Canada. Mariana has 9 years of experience in the legal area applied to business, maritime, civil, administrative and financial law, beginning her immersion in the area of law since the beginning of graduation, began her career integrating the team of a law firm, and then expanded her knowledge working in the public and private spheres. At Infrapar, Mariana has active operations, leading international contract negotiations following the strictest compliance rules worldwide. It also operates on a day-to-day basis in Land Analysis adopting strict criteria for evaluation and implementation of internal protocols ensuring transparency and efficiency in the process of analysis and regularization. Mariana actively participated in the structuring and creation of a Multi strategy Equity Investment Fund, totally focused on ESG Investing. In recent years, she has been putting all her efforts into specialization in the area of ESG Investing and Climate Regulation. Mariana is managing partner of Infrapar Capital Partners initiative and responsible for the legal area of the Infrapar Research Ltda, Infrapar Sustainability Ltda. You can know more about Mariana at Mariana Naoum | LinkedIn.

Pedro Ferros

Pedro is a third-year student of the International Relations course at the Federal University of São Paulo. He worked for a brief period at the end of 2021 in the internal sales area of PGL, a foreign trade and cargo transport logistics company. He has participated in several MUN's and debates in high school and, after graduation, and is constantly searching for ways and methods to carry forward the culture of debate, dialogue and simulations. Currently Pedro works at Infrapar with reading, archiving and compiling bibliographies related to climate, biodiversity, climate change and international agreements. In addition, he produces bibliographic reviews, articles and helps produce the documents for carbon credit certification. You can know more about Pedro at Pedro Ferros | LinkedIn.

Victor Naoum

Victor Naoum has a degree in Environmental and Sanitary Engineering from Estácio de Sá-UNESA University and graduated in Environmental Management from the Plínio Leite University Center -UNIPLI, has 12 years of experience with performances in the environmental market, passing through different companies throughout this period, being currently CEO of Naoum Ambiental, which is an Environmental Advisory and Engineering company focused on the preparation of studies and projects for various market segments, as well as their approval through environmental licensing at the municipal, state and federal levels. Victor uses his experience to generate sustainable solutions to the projects and enterprises of his clients, bringing the necessary balance to ensure environmental protection, economic viability and social responsibility, following the principles of ESG -Environmental, Social and Corporate Governance always acting in an ethical and transparent way with its customers, respecting its team of employees and market competitors. Victor is Managing Partners of Infrapar Research Ltda and Infrapar Sustainability Ltd. You can know more About Victor at Victor Naoum | LinkedIn.

2.4.4 Project Management Partnerships: Infrapar Suppliers (G4.2)

Infrapar Sustainability Ltda with the participation of other experienced partner teams that played important roles in the data collection phase and preparation that were necessary for the assembly of the PDD. Below, general data of the partner teams:

2.4.4.1 HDOM Consultoria Ambiental Ltda

Francisco Higuchi is Forest Engineer, Dr. in dynamics of Amazonian tropical forests. Executive Director of Hdom Consultoria.

Jessé Burlamaque, Geographer, Master of Science in Tropical Forests. Specialist in Remote Sensing, Geoprocessing and Modeling of the dynamics of use, land use change and forestry (LULUCF).

Valdiek da Silva Menezes, Forest Engineer, PhD student, Master in Tropical Forest Sciences. Specialist in Remote Sensing, Geoprocessing and Modeling of the dynamics of use, land use change and forestry (LULUCF).

Luciana Loureiro, Geographer. Specialist in Remote Sensing, Geoprocessing and Modeling of the dynamics of use, land use change and forestry (LULUCF).

Kamilla Limongi, Graduating in forest engineering. Federal University of Amazonas.

2.4.4.2 Catraia Soluções Ambientais Ltda

Camylle Carvalho Ferreira do Nascimento

Graduated in Biological Sciences from the Federal University of Acre, and volunteer at the Laboratory of Mammal Ecology for one year. He worked in the monitoring of ICMBio's Biodiversity, having carried out surveys of woody plants, frugivorous butterflies, mammals, and game birds during my work at ICMBio. In addition, I am currently doing a postgraduate degree in Management, Auditing and Environmental Expertise to broaden my knowledge and skills in the area.

Catherine Cristina Clear

Forestry Engineer from the Federal University of Acre holds a master's degree in Forest Sciences from the Federal University of Espírito Santos. He has experience in environmental and forestry consulting projects with emphasis on the following areas and activities: sustainable forest management, structuring of the technical processes of the Forest Concession in the state of Acre, participation in a technical team to review the Management Plan of a conservation unit, participatory workshops with traditional communities in Acre, environmental analysis through geoprocessing techniques and environmental licensing of small rural properties.

Douglas da Silva Menezes

Degree in Biological Sciences. He works in fish parasite, with screening, assembly of slides and identification and research in aquatic entomology, where I work on the application of protocols, collection of benthic macroinvertebrates and identification. He has experience in entomology, collection, assembly, and identification of insects. Has experience in preparation of technical report and skills in the field area where he participates in several research projects, extension: internships during graduation in the areas of entomology, parasitology of fish, fungi and others. He is currently working with aquatic and semi-aquatic heteropterans to investigate their composition and abundance in streams of the Acre River basin.

Edson Vanda Pereira dos Santos

Sociologist, graduated from the Federal University of Acre, Specialist in Higher Education Methodology from the Barão do Rio Branco College and master's in development, Agriculture and Society from the Federal Rural University of Rio de Janeiro (UFRRJ). He has 25 years of experience in socio-environmental management of community and business forestry enterprises, working with government institutions, traditional and indigenous communities of the Amazon, companies in the forestry sector and non-governmental organizations. He has been a forest management certification auditor for 12 years; Lead Auditor accredited by SCS Global Service for FSC and CERFLOR certification systems; is an auditor of CCB/VCS Standard carbon projects; for this service, we highlight the experience in the role of auditor in the certification process of the Paiter-Suruí carbon project, Sete de Setembro MT/RO Indigenous Land.

Felipe Ferreira de Oliveira Júnior

Graduated in Forest Engineering from the Federal University of Acre (UFAC), Occupational Safety Engineer. He has a postgraduate degree in the areas of: Agriculture and Agribusiness; Teaching in Environmental Education; environmental and sanitary health surveillance. He has been working since 2016 developing activities such as: Research in the production of bamboo seedlings (Embrapa), socio-environmental technician in the National Forest Inventory, agroforestry technical assistance for cooperatives, associations, and indigenous communities (SEMAPI), consultant for productive increase of the timber and furniture sectors (SENAI), among others.

Fernando Silva Ferron

Graduated in Degree in Biological Sciences from UFAC, I also have technical training in Agriculture. He works in Herpetology in the premises of the Federal University of Acre in the laboratory and in the field.

Giovana de Almeida Calacina

Undergraduate student of the Biological Sciences course at UFAC, PIBIC and works in Ornithology at the Laboratory of Ornithology UFAC

Hendryk Zegarra de Freitas

Graduating in Biological Sciences, main area of activity being Herpetology, experience in the area guaranteed by the volunteer internship at the Laboratory of Herpetology of the Federal University of Acre.

João Vitor Chaves dos Santos

Biologist graduated from the Federal University of Rondônia (UNIR). I work with environmental consulting and Environmental Monitoring. He participated as a monitor of the discipline's animal behavior and conservation biology. Worked with Monitoring in Br-319 In the modules of INPA (National Institute of Research of Amazonas).

Luana Alencar de Lima

Biologist, Master in Ecology and Management of Natural Resources. She is a senior ringer with the necessary authorizations from the National Center for Research and Conservation of Wild Birds – CEMAVE/ICMBio. He has experience in the capture and handling of birds with mist nets, identification, taxidermy and scientific research in wild birds and birdwatcher. He works in environmental consulting with survey and monitoring of fauna - with emphasis on avifauna, coordination / logistics in field activities, training and courses with traditional communities and technical reporting of projects. She participates as a volunteer in the Monitora/ICMBio Program in Conservation Units. She is a collaborating researcher at the Laboratory of Ornithology of the Federal University of Acre, responsible for the maintenance and organization of the scientific collection and database; and experience in nature photography - fauna and flora.

Luiz Henrique Medeiros Borges

Biologist, PhD in Ecology, Master in Ecology and Management of Natural Resources. Specialist in monitoring fauna and biodiversity, experience in field activities and logistics in isolated locations in the South-Western Amazon. He has five years of experience in working with traditional communities, mainly in the coordination of biodiversity monitoring activities, together with the ARPA program, and collaboration in the Integration of Protected Areas of the Amazon Biome program in 2018, in addition to familiarity with the A2.0 program and conducting dialogue with the community members of the Chandless PE about monitoring initiatives.

Rair de Sousa Green

Biologist, Master in Ecology and Management of Natural Resources, PhD student in Animal Health. He has experience in work in the areas of Mastozoology and Monitoring of fauna and biodiversity. With know-how in scientific research activities and environmental education. Participation in biodiversity inventories and experience in projects with traditional communities in Conservation Units of the State of Acre.

Ronaldo Souza da Silva

Biologist, Master in Ecology and Management of Natural Resources (UFAC) and PhD student in Zoology at the Federal University of Pará. He has experience around Ecology, with emphasis on Ecology of fish communities associated with aquatic macrophytes in lakes and ecology of fish on river beaches. He is currently part of the team of the Laboratory of Ichthyology and Aquatic Ecology of UFAC and the Laboratory of Ecology and Conservation of UFPA (LABECO).

Tallysson Pablo Cavalcante Amorim

Graduating during Degree in Biological Sciences, active in the area of Mastozoology, with emphasis on Felidae. Experience in behavior of felids in captivity.

Uéslei Marques de Oliveira

Graduated and bachelor's degree from Centro Universitário São Lucas (2018). He has experience in vertebrate ecology and zoology with emphasis on ornithology. Currently work as a wildlife observation tour guide, focusing on Amazonian birds. Previously from 2019 to 2022 and worked as an Environmental Analyst at UHE Jirau, where worked in wildlife rescue, ichthyofauna and apifauna. Rescue in suction and adduction tube, includes wagon, stoplog, FAR filter and embarked rescue.

Wilker Nazareno da Silva e Silva Junior

Forest Engineer, was coordinator of forest inventory by the Brazilian Forest Service, served as manager of Federal Conservation Unit - Arapixi Extractive Reserve and Chico Mendes Extractive Reserve (ICMBio). He has experience in the elaboration and development of projects aimed at sociobiodiversity and community strengthening, forest inventory work, installation of permanent plots and geoprocessing.

Wirven Lima da Fonseca

Biologist, Master in Ecology and Management of Natural Resources and PhD student of the Network of Biodiversity and Biotechnology of the Legal Amazon (BIONORTE Network). He has experience in Zoology, with emphasis on Herpetology (amphibians and reptiles). Participates in the Research Group (CNPq) Zoo-Ecology of Vertebrates of the Federal University of Acre (UFAC) Campus Floresta in Cruzeiro do Sul, participating in projects on herpetofaunas inventories and on natural history and bio-ecology of snakes and amphibians, in the region of Alto Juruá.

2.4.4.3 Tecman Tecnologia e Manejo Florestal Ltda

Fábio Thaines

Forest Engineer graduated from the Federal University of Mato Grosso, 1999, Specialist in Forest Management, currently at TECMAN, Rio Branco-AC, since 2007, concentrating management of environmental projects and preparation of plans and technical studies.

Igor Agapejev de Andrade

Forest Engineer, Specialist in geoprocessing and forest inventory, graduated from the Federal University of Paraná, 2004 and current by TECMAN, Rio Branco-AC, since 2006, adding experiences in geoprocessing and forest inventory in the Amazon, as well as relationship with communities, rural producers, in participatory methodologies in the areas of Community Forest Management

Martin Acosta Oliveira

Biologist, graduated from the Federal University of Acre, 2016, Master in Ecology and Management of Natural Resources / UFAC / 2019. He has extensive experience in forest inventory, collection and herborization of botanical material.

Adriano da Silva Lima

Parabotanical Technician since 2011, Rio Branco-AC. He has extensive experience in forest inventory, collection and herborization of botanical material.

2.4.4.4 Amazônia Serviços de Consultoria e Serviços Especializados Ltda.

Wladimyr Sena Araújo

Wladimyr Sena Araújo holds a master's degree in Social Anthropology from the State University of Campinas (UNICAMP), an anthropologist with twenty-five years of experience involving jurisdictional REDD+ programs in Acre and Mato Grosso (REM AC and REM MT), territorial planning (ZEE's, OTL, Ethnozoning of Indigenous Lands); Territorial and Environmental Management Plans for Indigenous Lands (PGTAs); mitigation plans for indigenous lands; development of production strategies and market access, such as value chain management plans; elaboration, execution, monitoring and evaluation of programs and projects for diverse audiences, including family farmers, traditional peoples and communities; application of participatory methodologies in traditional communities and peoples (indigenous, quilombolas, rubber tappers, riverside dwellers, descendants of Azoreans, artisanal fishermen, ayahuasqueiros), small farmers, cattle ranchers, institutions (public, private, civil society and NGOs) and the community in general; moderation and reporting of technical meetings; educational research; regional development, spatial planning, coordination, elaboration, implementation, evaluation and monitoring/monitoring and audits in national and international programmes, plans and projects; improvement courses for the elaboration of projects and activities with traditional populations, such as the Course of Elaboration of Projects for Indigenous Communities of the Demonstrative Program for Indigenous Peoples (PDPI), under the PPG7; preparation of reports and technical documents in the areas of Environment, Culture, Socioeconomics, Education; elaboration of anthropological and environmental reports for traditional communities; preparation of technical documents in historical and cultural heritage; Environmental Impact Studies; training and training for diverse audiences.

2.4.4.5 Indigenous People hired to participate in the Project

In addition to the teams described in the previous chapters, this project was concerned with also hiring the participation of the indigenous people who live in the Arara do Igarapé Humaitá Indigenous Land, so that they could not only follow the development of field activities, but also actively participate in these activities. Below, we list all the indigenous people who were hired and paid to participate in the tasks that were carried out in the field, as well as the roles that were played.

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

The project is funded by proponent Amazon Partners 20, LLC, which can maintain the financial health of the project throughout its life. Documents proving this financial health are confidential but may be the audit team under a confidentiality agreement.

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

Amazon Partners 20, LLC has a Code of Ethics and Conduct common to the entire Economic Group to which it belongs. Documents of this nature guide employees in the fight and denunciation of all forms of corruption, especially when their objective is the control of information, also defining prohibited acts in the corporate environment, the maintenance of any involvement with irregular or corrupt practices. The Code of Ethics and Conduct are annexed to this report.

2.4.7 Commercially Sensitive Information (Rules 3.5.13 – 3.5.14)

The Project has Commercially Sensitive Information that is understood by the **Financial Viability** of the project as well as the financial return that the project offers. This information is referenced in the Financial Health of Implementing Organization(s) (G4.3) item of this document. This Commercially Sensitive Information is available for access by the VVB and Verra at any time.

2.5 Legal Status and Property Rights

2.5.1 Statutory and Customary Property Rights (G5.1)

Indigenous lands, in accordance with the sole paragraph of Article 22 of the Indian Statute, shall be inalienable assets of the Union. Despite being considered patrimony of the Union, these lands are considered permanent possessions of the Indians or foresters who effectively occupy the land that, according to the uses, customs, and tribal traditions, holds where they live or exercise activity indispensable to their subsistence or economically useful, as established in the caput of Article 22 of the Indian Statute. In addition, based on Article 39, items I and II of the Statute of Indium, it can be said that indigenous lands are part of the indigenous heritage. It is also worth mentioning the Convention of the on Indigenous and

Tribal Peoples, which in its Article 14 states that the peoples concerned should be granted the rights of ownership and possession over the lands they have traditionally occupied.

According to Article 231 of the Constitution of the Federative Republic of Brazil of 1988, Indigenous Lands are regularized by the Government and must be: (a) permanently inhabited; (b) used for its productive activities; (c) essential to the preservation of the environmental resources necessary for their well-being; (d) necessary for their physical and cultural reproduction; (e) necessary for their physical and cultural reproduction, according to their uses, customs and traditions; (f) inalienable and unavailable, and the rights thereto, imprescriptible.

Currently, the Indigenous Lands to be administratively demarcated by the National Indian Foundation (FUNAI) must follow the procedures set forth in Decree 1775/1996. The following are phases of the recognition process: 1. The identification studies, in which FUNAI appoints an anthropologist to elaborate an anthropological study and coordinate the work of the specialized technical group that will identify the Indigenous Terra in question; 2. The approval of FUNAI, where the report of the anthropological study must be approved by the presidency of FUNAI; 3. the objections of the interested parties; 4. The Declaration of the boundaries of the area and determination of its physical demarcation, made by the Minister of Justice; 6. Approval by the Presidency of the Republic for approval by decree; 7. The registration, carried out after the homologation in the real estate registry of the corresponding district and in the Secretariat of Patrimony of the Union (SPU).

That said, on 12/19/2001, the approval of the land identification studies by FUNAI of the indigenous area object of this Project was published in the Official Gazette and, on 12/04/2002, the Declaratory Ordinance of the Minister of Justice was published, giving definitive possession to the Indians, under the number 1,761. In addition, the Regional Management of the Patrimony of the Union in the State of Acre issued Certificate No. 01/2006 certifying that the property called Arara do Igarapé Humaitá Indigenous Land is registered in the Demarcation and Registration Service, according to administrative process No. 05540.000024/2006-719 (Appendix 1). Currently, the Arara do Igarapé do Humaitá Igarapé Indigenous Land has official recognition approved and registered in the real estate registry office (CRI) and the Secretariat of the Union Heritage (SPU) through Decree s.n. - published on 04/19/2006.

Table 15 - Table of Normative Acts.

Documents	Phase	Number	Date
Ordinance	In identification/Interdicted	31	01/26/2000
Order	Identified/Approved/FUNAI. Subject to Contestation	111	12/14/2001
Ordinance	Declared	1.761	12/04/02
Ordinance	Declared	746	06/01/05
Decree	Homologated/ Registered CRI and SPU	w.n.	04/18/2006
Ordinance	In identification	1.829	02/04/85
Ordinance	Interdicted	PP/2.747	07/31/1987

Source: Project Team Elaboration

Even considering the evidence of land regularity collected, if future doubts as to the ownership of the area will be formulated by third parties other than the Association of Shawádawa Indigenous Peoples and the National Indian Foundation - FUNAI informed here, there are adequate documents for the challenge of the

other claimants on the rights of the Arara Territory of the Indigenous Peoples of the land of the Shawādawa Association.

Regarding access, among the possible ways to access the Arara do Igarapé Humaitá Indigenous Land, the project team opted for the waterway. Departing from the municipality of Cruzeiro do Sul towards the municipality of Porto Walter, it was decided to use the local transport known as "expresso", a type of vessel with structure and metal hull moved by an outboard motor (voadeira⁸), suitable for the transport of people and luggage. The route between the municipalities corresponds to a total distance of 200km with a duration of approximately 5 hours of travel, considering that the Juruá River had good traffic conditions, which does not occur in the driest periods of the year.

In the municipality of Porto Walter, access to the Terra Indígena continues by a waterway, now by a tributary of the Juruá River, the Humaitá creek, located on the right bank of the river (considering the direction from the source to the mouth). Used as the main means of access to Indigenous Land by the residents, the Humaitá creek only allows the traffic of smaller vessels, that is, wooden canoes moved by a tail motor. This type of vessel usually carries four to five people plus luggage.

Indigenous Associations

Indigenous associations and organizations are forms of political representation that symbolize the incorporation, by some indigenous peoples, of mechanisms that make it possible to deal with the institutional world of national and international society. They also allow dealing with territorial demands, assistance such as health and education, and demands of a commercial nature.

Indigenous associations and organizations have existed in Brazil since the 1980s. After the promulgation of the Federal Constitution of the Federative Republic of Brazil in 1988, the number of these representations increased significantly, since the Federal Constitution established the possibility for associations to be constituted as legal entities.

In this sense, the Association of the Shawādawa People of Humaitá Igarapé is a private association opened on 11/26/1998, registered in the National Registry of Legal Entities (CNPJ⁹) under No. 03.098.409/0001-80, Municipality of Porto Walter, Rural Zone, State of Acre, CEP: 69.982-000 and has as its main economic activity activities of social rights associations.

2.5.2 Recognition of Property Rights (G5.1)

The Project respected all the geographical limits, the boundaries of the area and the rights of the Indigenous Community, in addition, the project was carried out with the knowledge and authorization of the National Indian Foundation (FUNAI) and the indigenous peoples.

It is worth mentioning the delimitation of indigenous areas is the responsibility of the National Indian Foundation – FUNAI, through an administrative procedure of land demarcation, in accordance with Decree No. 1,775 of January 8, 1996. The Regional Management of the Patrimony of the Union in the State of Acre issued Certificate No 01/2006 certifying that the property called Arara do Igarapé Humaitá Indigenous Land

⁸ Voadeira is a motor-powered vessel with a metal structure and hull, usually aluminum, most of which is composed of an outboard motor. It is widely used in river transport and fishing, and is a very common means of transport in the Amazon.

⁹ In Portuguese: Cadastro Nacional de Pessoa Jurídica

is registered in the Demarcation and Registration Service, according to administrative process No 05540.000024/2006-719 (Appendix 1).

On November 24, 2022, the Indigenous Association of the Shawādawa People of the Humaitá Stream, through its president Mr. Damião Lima de Melo, issued Letter No. 015/APAIH/2022 to the Regional Coordinator of FUNAI, inviting him to be present at the meetings that would be held on November 29 and 30, 2022, as shown in Appendix 1. The meetings had as their agenda the expression of interest in partnership with a private company to generate carbon credits in the Indigenous Land.

As recorded in the Minutes (Appendix 1), the meeting took place with the presence of the Representative of the Regional Coordination of FUNAI in Juruá, headquartered in the Municipality of Cruzeiro do Sul, state of Acre, Mr. Uandreidas Souza Ferreira. It was also attended by Amazon Partners 20 LLC through its CEO Mr. Jay Rogers and the company ISRC Investimentos e Acessorio Ltda, represented by CEO Mr. Ilderlei Souza Rodrigues Cordeiro, as well as the Indigenous Leaders and other people of the Ethnicity.wa

At the meeting, the presentation and initial schedule of the Carbon Credit Origination Project was held, explaining deadlines, stages of the project and duties and obligations of the parties involved. Afterwards, the doubts were expressed and answered, and the draft of the CONTRACT FOR RESEARCH AND ASSIGNMENT OF CARBON CREDIT RIGHTS was read in all its clauses and the absolute majority agreed to the terms and conditions of the contract. The procedures for signing the contract were made soon after and before the presence of everyone at the meeting.

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

The project area is the Arara Indigenous Land of the Humaitá Project, with administrative demarcation approved by the FUNAI Decree of 04/18/2000 with an area of 87,571.69 hectares. Therefore, it will not encroach on private or government property.

Free, Prior and Informed Consent (FPIC) is mandatory for the development of projects of any nature with indigenous communities, as determined by ILO Convention 169. For the IL Arara Project of the Humaitá Stream, the FPIC was held in three meetings to present the proposal of the project and contract between parties with the Shawādawa People. The first took place on 03/22/2023 at Raimundo do Vale Village, with the participation of 89 people; the second meeting took place on 03/23/2023 at Foz do Nilo Village, with the participation of 80 people; and the third meeting took place on 03/27/2023 at Aldeia Novo Acordo, with the participation of 49 people. The evidence that the Arara People gave their consent is shown in the minutes of the meetings.

Further information on the FPIC process is provided in items 5.3.1 and 5.3.7 of this PDD.

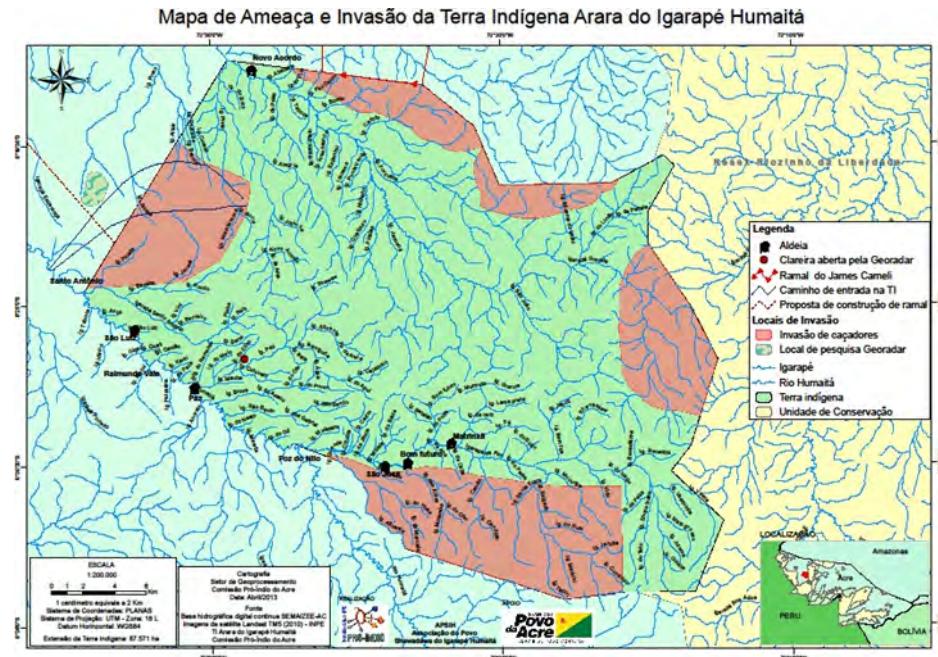
2.5.4 Property Rights Protection (G5.3)

The Project does not foresee any type of relocation of people. On the contrary, all activities value respect for property rights, communities, culture, and subsistence of all the people of the Arara do Igapé Humaitá Indigenous Land. Rights are guaranteed by FUNAI's Homologation Decree and by ILO Convention 169.

2.5.5 Illegal Activity Identification (G5.4)

During the consultations and data collection, the residents reported and identified in the Conflict Map, the occurrence of illegal hunting in the areas of community use, identifying people from outside the IL as practitioners of the crime. The map below indicates the vulnerable or poaching areas in the IL.

Figure 35 - Map of threats and invasions of the Arara do Igarapé Humaitá Indigenous Land.



Source: CPI/AC (2013).

To avoid future cases, monitoring, control, and inspection measures are foreseen in the Implement IL Monitoring and Inspection System Activity. Tools, infrastructure, and partnership with environmental agencies will be implemented for monitoring, access control, routine inspection, preparation of environmental agents and pedagogical work with the surrounding communities with the theme of environmental education and respect for legal and traditional rights, focusing, among others, on crimes against fauna, such as the illegal hunting of wild animals within the perimeter of the IL.

Illegal fishing – Environmental territorial monitoring, monitoring of fishery resources, meetings, and discussions on agreements for the common use of fisheries resources in shared areas and outside the territory.

Illegal timber harvesting – Territorial and Environmental management, through surveillance of the territory.

2.5.6 Ongoing Disputes (G5.5)

No conflicts or land disputes were identified involving rights of possession and use of the land, territories and resources of the IL Arara do Igarapé Humaitá, even because of the condition of being an area recognized as Indigenous Land. However, it is recognized that indigenous lands suffer from anthropogenic pressures related to access to and use of natural resources, such as hunting and overfishing and illegal logging.

In this sense, although there are no direct disputes over the area of the Project and the right to use and occupy the land, the Project enables the construction of agreements with institutions and supervisory bodies to strengthen actions to combat predatory practices of natural resources and the protection of ancestral customs.

It is important to consider that the greatest threats to traditional knowledge come from the compromise of their ways of life and their territories. At the same time, the lack of mechanisms for protecting and valuing this knowledge represents an additional threat. In this sense, the clash of cultures between communities and traditional peoples can cause conflicts already known regardless of peoples and ethnicities, and in this case the Project can help strengthen governance and territorial planning.

It is important to note, however, that there is an overlap of part of the area of the Riozinho da Liberdade Extractive Reserve over the Arara IL of the Humaitá Stream, totaling 10,566 ha (12% of the territory), considered as an error in the process of delimitation of the Resex. The Chico Mendes Institute for Biodiversity Conservation (ICMBio) recognizes the overlapping area as a legitimate right of the Shawādawa People. Dialogues between FUNAI and ICMBio were initiated to correct the da Liberdade.Resex Riozinho

2.5.7 National and Local Laws (G5.6)

The entire project was supported by the legal framework, above all by the 1998 Constitution of the Republic of Brazil, especially Article 225, which stipulates the right of all to an ecologically balanced environment, being an asset for common use by the people and essential to the quality of life, which we must, together with the public power and the community, preserve, and defend it.

Also, as a guideline for the Project, the right to property was considered and respected, in this way the Constitution of the Federative Republic of Brazil of 1988, in article 5, item XXII, provides for individual rights and guarantees the right to property. Article 5 mentioned above guarantees that everyone is equal before the law, without any type of distinction, guaranteeing Brazilians and foreigners residing in the country the inviolability of the right to life, liberty, equality, security, and property. Indigenous peoples, like all citizens residing in Brazil, have the right to enjoy their rights, to be free and equal to other human beings.

Still supported by the Articles of the Federative Constitution of Brazil, Article 231 is also highlighted, recognizing the rights of Indigenous Peoples, their social organizations, customs, languages, beliefs and traditions, and the original rights over the lands traditionally occupied by the Indians, where they have permanent possession, with the exclusive usufruct of the riches of the soil, rivers and lakes in them.

In addition to the enshrined Articles of the Federal Constitution mentioned above, and in relation to the rights of Indigenous Peoples, the project respected all specific rules and legislation, such as Federal Law No. 6,001/1973, which provides for the Statute of the Indian;

Federal Decree No. 1,775/1996, which establishes rules for the administrative procedure for the demarcation of indigenous lands;

Convention No. 169 of the International Labor Conference on Indigenous Peoples of 1989, which became part of the Brazilian legal system through Legislative Decree 143/2002. Assured indigenous and tribal peoples of respect for their identity, territories and decent work.

The 2007 Universal Declaration of the Rights of Indigenous Peoples recognizes collective rights and their struggle as within the framework of the institutions of international law.

The Project also respected the normative Instruction No. 01/PRESI of November 29, 1995 of the National Indian Foundation – FUNAI, which establishes rules that govern the entry into Indigenous Lands for the purpose of developing scientific research, valid throughout the national territory.

Ordinance No. 177/PRES, of February 16, 2006, which regulates the administrative procedure of authorization by the National Indian Foundation (FUNAI) of entry of people into indigenous lands, to guarantee the protection of the right of image of the Indians in case of photographs and videos.

A set of federal laws allow mitigating risks of changes in governments, combined with independence between the three powers of the Brazilian state, Judiciary, Legislative and Executive. The Project is in line with all legal frameworks.

The Federal Decree No. 6.321/2007, which provides for actions related to the prevention, monitoring and control of deforestation in the Amazon Biome. his Decree was also published to amend and add provisions to Decree No. 3179/1999, which deals with sanctions applied to conduct and activities harmful to the environment.

The Federal Law No. 12.187/2009, which establishes the National Climate Change Policy – PNMC and establishes its principles, objectives, guidelines, and instruments. The Federal Law made official Brazil's voluntary commitment to the United Nations Framework Convention on Climate Change to reduce greenhouse gas emissions.

The Federal Law No. 12.651/2012 is the new National Forest Code which provides for the protection of native vegetation. This Law establishes norms for the protection of vegetation, Permanent Preservation areas and Legal Reserve areas, it also deals with forest exploitation, the supply of forest raw materials, control of the origin of forest products and the control and prevention of fires and provides for economic and financial instruments to achieve its objectives.

The Federal Law No. 14.119/2021 establishes the National Payment Policy for Environmental Services – PNPSA, defining concepts, objectives, guidelines, actions and criteria for the implementation of the National Payment Policy for Environmental Services (PNPSA). The Law also establishes the National Registry of Payment for Environmental Services (CNPSA) and the Federal Program for Payment for Environmental Services (PFPSA), dealing with payment contracts for environmental services. In its article 2, item II, letter C, the law specifically talks about carbon sequestration as a fundamental service for maintaining the stability of ecosystem processes.

Furthermore, in accordance to Article 2 of Law 14.119/2021, the objectives of the PNPSA are between guiding the actions of the public authorities, civil society organizations and private agents in relation to the payment for environmental services, in order to maintain, recover or improve ecosystem services throughout the national territory; stimulate the conservation of ecosystems, water resources, soil, biodiversity, genetic heritage and associated traditional knowledge; economic, social and cultural value of ecosystem services; prevent the loss of native vegetation, fragmentation of habitats, desertification and

other processes of degradation of native ecosystems and foster systemic conservation of the landscape; encourage measures to ensure water security in regions subject to water scarcity for human consumption and desertification processes; contribute to climate regulation and the reduction of emissions from deforestation and forest degradation; recognize individual or collective initiatives that favor the maintenance, recovery or improvement of ecosystem services, through monetary or non-monetary retribution, provision of services or other form of reward, such as the supply of products or equipment; stimulate the development and execution of voluntary private projects providing and paying for environmental services, involving initiatives of companies, Civil Society Organizations of Public Interest (OSCIP) and other non-governmental organizations; stimulate scientific research on the evaluation of ecosystem services and the development of methodologies for the execution, monitoring, verification and certification of payment projects for environmental services; ensure transparency of information relating to the provision of environmental services, allowing the participation of society; establish data and information management mechanisms necessary for the implementation and monitoring of actions for the full implementation of environmental services; encourage the private sector to incorporate the measurement of the losses or gains of ecosystem services in the production chains linked to their business; encourage the creation of an environmental services market; sustainable development.

In this sense, a mechanism is established that aims to harden the caput of Article 225 of the Federal Constitution of 1988, mentioned at the beginning of this chapter, which guarantees everyone the right to the ecologically balanced environment. The PNPSA is directly linked to paragraph I of §1 of the afore mentioned device, according to which it is up to the Public Power to "preserve and restore the essential ecological processes and provide ecological management of species and ecosystems". It is emphasized that the innovation of Law No. 12.651/2012 (New Forest Code) was probably the prediction of the PSA institute, only that the necessary regulation was lacking, a problem that was solved with Law No. 14.119/2021.

The National Commission for REDD+ (CONAREDD+), established by Decree No. 8.576, of November 26, 2015, currently governed by Decree No. 10.144 of November 28, 2019, is responsible for coordinating, monitoring, monitoring and revising the National Strategy for REDD+ and for coordinating the preparation of requirements for access to payments for results of REDD+ policies and actions in Brazil and is formed by the following ministries: (i) Environment; (ii) Economy; (iii) Foreign Relations; (iv) Agriculture, Livestock and Supply; (v) Science, Technology and Communications; (vi) a representative of state environmental agencies; and vii) a representative of Brazilian organized civil society, represented by the Executive Secretary of the Brazilian Climate Change Forum.

At the State level, in 2010, the State of Acre passed a law establishing the Environmental Services Incentive System (SISA) of the Environmental Services Incentives Program (ISA Carbon) and other Environmental Services and Ecosystem Products programs of the State (Law No. 2.308/2010), which will be detailed in item 5.4 of this Report. It also signed a memorandum of understanding with the Governments of California/US and Chiapas/Mexico to discuss the basis of a possible commercial credit for REDD initiatives, which opened the door to new economic opportunities in the environmental services sector.

Although Brazil does not have a complete consolidated legal framework on the regulation of the carbon credits market specifically, several initiatives at the national level are being highlighted and Brazil is moving towards achieving its national regulation.

In this regard, it is important to highlight the Bills that are being processed by the Brazilian Legislative Power with the aim of regulating the carbon credit market, such as:

Law Project (bill) No 4.028/2021 which provides for general guidelines for regulating the carbon market in Brazil.

Law Project (bill) No 528/2021 that aims to regulate the Brazilian Emissions Reduction Market determined by the National Policy on Climate Change - Law No. 12.187, of December 29, 2009.

Moreover, on July 13, 2022, Brazil and Japan signed the first bilateral agreement to promote the regulated carbon market between the two countries. This partnership was signed between the Ministry of Agriculture, Livestock and Supply (MAPA), the Brazilian Agricultural Research Corporation (EMBRAPA) and the Japanese International Cooperation Agency (JICA). On behalf of both countries, the bodies signed a cooperation agreement to exchange and improve sustainable agriculture techniques and agricultural efficiency.

With the provisions of Article 6 of the Paris Agreement and the shift towards the creation and evolution of a global mechanism for buying and selling carbon credits, there is also a shift in partnerships and bilateral agreements that seek to help countries to fulfill their Nationally Determined Contribution (NDCs), with Latin American countries being strong candidates for these measures, since in terms of commitments to a net-zero future, the region is second only to the European Union, with 209 cities and 5 regions different efforts to achieve this goal.

Thus, partnerships such as the one signed between Brazil and Japan demonstrate another step in the journey towards a more sustainable economy. Due to the Japanese experience with three successful bids domestically, Tokyo being the largest with limited domestic jurisdiction and the first of its kind. The exchange of information and techniques used in Japan to create its various carbon pricing mechanisms, in addition to Japan's history of promoting sustainable development projects in partner countries, may be part of the kick needed for Brazil to move in a more sustainable way more agile and take advantage of its privileged position.

2.5.8 Approvals (G5.7)

Because it is an Indigenous Land, the project ensured that the National Indigenous Foundation – FUNAI, participated in all stages where, by force of law, the entity had to take notice and manifest itself.

FUNAI, created through federal law No. 5,371 of December 5, 1967, is the official indigenist body of the Brazilian State that aims to promote and guarantee the rights of the country's indigenous peoples.

That said, even before any execution or signatures of contracts, the Indigenous Association of the Shawādawa People of the Humaitá Stream, on November 24, 2022, issued Letter No. 015/APAIH/2022 to the Regional Coordinator of FUNAI, inviting him to be present at those that would be presented and discussed the expression of interest of partnership with private company for the origination of carbon credit in the Indigenous Land.

The meetings took place with the presence of the regional representative of FUNAI, where all the terms and conditions of the project were discussed, including the reading of the draft of the RESEARCH CONTRACT AND ASSIGNMENT OF CARBON CREDIT RIGHTS. With the agreement of the absolute majority, including FUNAI, the project was approved and the contract signing procedure was carried out in front of the presence of everyone at the meeting.

For the fieldwork phase, Letter No. 0005 was issued on March 16, 2023 by the legal representative of the Shawādawa Ethnic Group of the Arara do Igapé Humaitá Indigenous Land, Mr. José Nogueira da Cruz, in which he presented the list of names, positions and CPF of each professional who would enter the area

to carry out a Forest Inventory, Soil Survey, Vegetation Survey, Construction of the Cartographic Base and Survey of Socio-Economic Data, in order to carry out all the necessary studies for the construction of the project. The letter was signed and received by FUNAI on March 16, 2023 (Appendix 1).

In addition, all those who, previously authorized, entered the area signed the Individual Commitment Term issued by FUNAI, as well as carried the documents that attested to the state of health of each professional, including updated National Proof of Vaccination and copy of the identity document, as directed by FUNAI.

2.5.9 Project Ownership (G5.8)

Project ownership is defined in accordance with VCS Standard v.4.4., item 3.7.1 – number 6: "An enforceable and irrevocable agreement with the holder of the statutory, proprietary or contractual right in the land, vegetation or conservation or management process that generates reductions or removals of GHG emissions that confer ownership of the project on the project proponent" According to the Federative Constitution of Brazil, in its Article 231, the Indians hold the right to the land traditionally occupied by them, including, this being a right of an original nature, that is, they are rights prior to the very formation of the State. Also, in the article mentioned, in its 2nd paragraph, it is established that the lands occupied by the Indians are in their permanent possession, and they are responsible for the exclusive usufruct of riches inherent to the soil, river and lakes in them.

As already mentioned in item 5.5.1 Statutory and Customary Property Rights, the Declaratory Ordinance of the Minister of Justice was published, giving definitive possession to the Indigenous, as well as the Certificate declaring that the property called Arara do Igarapé Humaitá Indigenous Land is registered in the Demarcation and Registration Service. Currently, the Arara do Igarapé do Humaitá Igarapé Indigenous Land has official recognition approved and registered in the real estate registry office (CRI) and the Secretariat of the Union Heritage (SPU) through Decree s.n. - published on 04/19/2006.

In this sense, the demarcation of an Indigenous Land and its recognition by the State is merely a declaratory act, whose objective is purely to specify the extent of the land and to ensure what the legislation establishes, allocating to the Indians the original right to the lands traditionally occupied by them.

2.5.10 Management of Double Counting Risk (G 5.9)

The project does not consider financially viable credits originating outside the Verra Standards for marketing in voluntary markets. By this criterion, the Project is not considered eligible for other GHG Programs. The Project is in the State of Acre, where State Law No. 2,308 of October 22, 2010 (mentioned in the section of National and Local Laws), instituted the System of Incentives for Environmental Services (SISA¹⁰) that covers a Jurisdictional Program of Credits for Emission Reductions, based on the Acre Carbon Standard (ACS). In the same region, policies, and instruments for the future implementation of the ART/Trees Standards are being developed. However, the Project, so far, has not benefited from any credit from the Jurisdictional Programs.

¹⁰ In Portuguese: Sistema de Incentivos por Serviços Ambientais

2.5.11 Emissions Trading Programs and Other Binding Limits

Brazil doesn't have a legally binding national cap on greenhouse gas (GHG) emissions, nor does it have, or is affiliated with, a compliant emissions trading program that accepts REDD+ and CCB credits.

2.5.12 Other Forms of Environmental Credit

The Project is in the State of Acre, where State Law No. 2,308 of October 22, 2010, established the System of Incentives for Environmental Services (SISA) that covers a Jurisdictional Program of Credits for Emission Reductions, based on the Acre Carbon Standard (ACS). In the same region, policies, and instruments for the future implementation of the ART/Trees Standards are being developed. However, the Project, so far, has not benefited from any credit from the Jurisdictional Programs.

2.5.13 Participation under Other GHG Programs

The project is not registered or registered in other GHG programs.

2.5.14 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG program.

2.5.15 Double Counting (G5.9)

The double accounting of the credits generated from this project can be avoided, because the project will be registered in Verra following the rules of the VCS and CCB, where all the credits generated can be traced. It can also be monitored by the newly implemented National System for the Reduction of Greenhouse Gas Emissions (SINARE¹¹), which functions as a single digital hub for the recording of emissions, carbon removals and offsets of GHG emissions, including transactions and write-offs of carbon credits. It is also accompanied by the national REDD+ commission, established by Decree No. 10,144 in 2019, and is responsible for coordinating, monitoring, and reviewing the national REDD+ strategy, as well as coordinating the elaboration of the requirements for access to payments of results of measures and actions related to REDD+ in the country.

3. Climate

3.1 Application of Methodology

¹¹ In Portuguese: Sistema Nacional de Redução de Emissões de Gases do Efeito Estufa

3.1.1 Title and Reference of Methodology

[VM0015 Methodology for Avoided Unplanned Deforestation, v1.1](#): This methodology estimates greenhouse gas emissions from areas where unplanned deforestation is taking place and quantifies the emission reductions achieved by curbing deforestation. The methodology provides a comprehensive set of tools for analyzing both frontier and mosaic deforestation patterns to establish the baseline deforestation rate, monitor emission reductions and assess leakage.

[VT0001 Tool for the demonstration and assessment of additionality in VCD Agriculture, Forestry and other land use \(AFOLU\) Project Activities, V3.0](#): The tool provides a stepwise approach to demonstrate and assess additionality for AFOLU project activities.

[VCS AFOLU Non-Permanence Risk Tool Version 3.1](#): This tool provides the procedures for conducting the non-permanence risk analysis and buffer determination required for Agriculture Forestry and Other Land Use (AFOLU) projects. The tool sets out the requirements for project proponents, implementing partners and validation/verification bodies to assess risk and determine the appropriate risk rating.

Climate, Community & Biodiversity Standards (CCB) v3 and VCS Standard v4.4

3.1.2 Applicability of Methodology

The VCS methodology, VM0015, includes unplanned deforestation and has no geographical restrictions and can be applied globally. In this case, they may include any type of forest and activities such as forest management, biomass for energy, coal production, agriculture and pasture. All these activities can be considered if the deforestation category is not planned, according to the latest guidelines of VCS AFOLU.

Table 16 - Conditions of applicability of VM0015 methodology and how the project meets them.

Conditions of applicability	How the project meets the conditions
Baseline activities may include planned or unplanned logging for timber, fuel-wood collection, charcoal production, agricultural and grazing activities if the category is unplanned deforestation according to the most recent VCS AFOLU requirements.	Baseline activities include future planned forest management, grazing activities and unplanned deforestation.
Project activities may include one or a combination of the eligible categories defined in the description of the scope of the methodology (table 1 and figure 2).	Project activities: protection with controlled logging, fuel wood collection or charcoal production. Old-growth without logging B (Table 1: Project Activity B; Figure 2-A)
The project area can include different types of forest, such as, but not limited to, old-growth forest, degraded forest, secondary forests, planted forests and agro-forestry systems meeting the definition of “forest”.	The project area predominantly includes four types of old-growth forest: Abb+ABB+ABP= Lowland open rainforest with bamboo and palm trees ABP+DB=Open lowland rainforest with palm trees + Dense lowland rainforest APP= Open rain forest with lianas ABP+ABB+DB= Open lowland rainforest with palms and bamboos + Dense lowland rainforest
At project commencement, the project area shall include only land qualifying as “forest” for a minimum of 10 years prior to the project start date.	The project area only includes forested areas. The forests in the project area are old-growth tropical forests and have been present for more than 10 years.
The project area can include forested wetlands (such as bottomland forests, floodplain forests, mangrove forests) as long as they do not grow on peat. Peat shall be defined as organic soils with at least 65% organic matter and a minimum thickness of 50 cm. If the project area includes a forested wetlands growing on peat (e.g. peat swamp forests), this methodology is not applicable.	The project area does not include forests in wetlands, such as floodplain forest or mangrove forest. The project area is composed of soils that do not fall under the definition of peatlands.

Source: Project Teams Elaboration, 2023

3.2 Project Boundary

3.2.1 Step 1. Definition of Boundaries (VM0015)

3.2.1.1 Step 1.1 Spatial boundaries

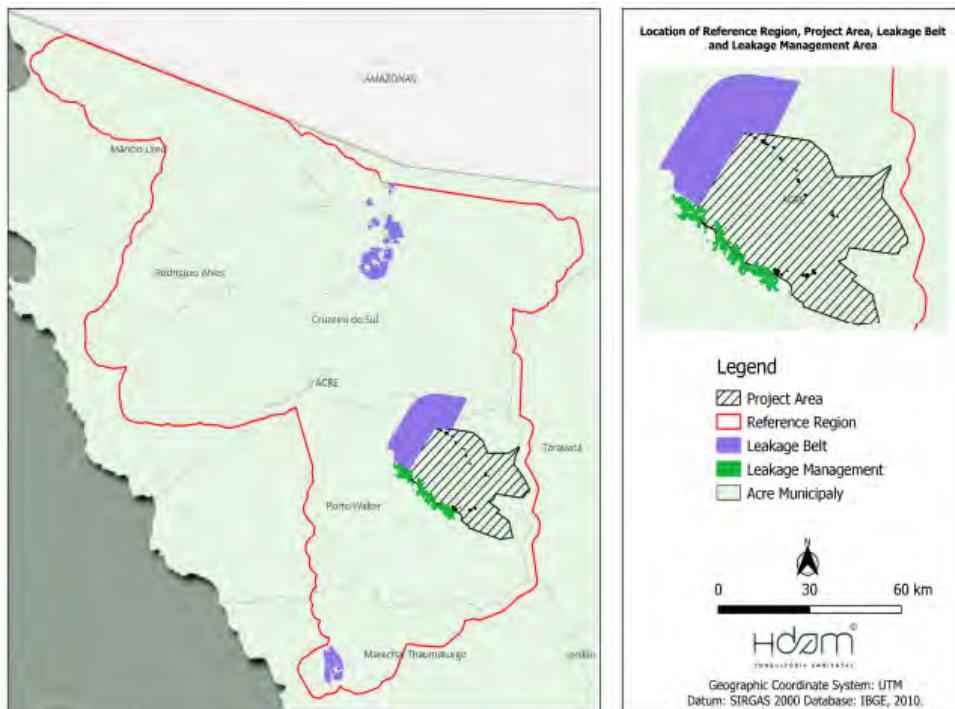
3.2.1.1.1 Step 1.1.1 Reference region

The project activity instances reference region-RR was defined based on spatial data that indicate the historical deforestation trend, based on the modus operandi of land use in the Amazon described in the literature (Soares-Filho et al. 2006), geospatial databases from the Rural Environmental Registry (CAR, 2022), official geographic boundaries (IBGE, 2021), certified rural properties (INCRA), conservation units (MMA, 2021), indigenous lands (FUNAI, 2021), vegetation map (ACRE, 2010) and watersheds limits.

The reference regions delimitations meet the "Forest/vegetation classes", "Elevation", "Slope", and "Rainfall" criteria within the "Landscape configuration and ecological conditions" of VM0015/page 19. It's also accomplished socio-economic and cultural conditions and agents and drivers of deforestation criteria. These criteria are essential for defining the reference region, as they allow the selection of an area that is representative of the natural environment of the project region.

Data referring to the physical aspects of the region in question were used as support for delimiting the reference regions and evaluating the climatic benefits. The use of these data complies with the methodological requirements, enabling a more careful and reliable approach, since these aspects influence the maintenance of biodiversity and ecosystem services offered by the region, especially the climate and vegetation.

Figure 36 - Location of the Reference Region, Project Area, Leakage Belt, and



Source: Project Teams Elaboration, 2023

3.2.1.1.1.1 Agents and drivers of deforestation

The mode of operation of the land use in the Amazon is characterized by a chain of events that result in unsustainable circumstances. The pattern follows the following chronological order: accessibility through the opening of branches and rural roads; the selective logging of the most valuable species; suppression of the remaining vegetation for the implantation of agricultural crops; depletion of macro and micronutrients available in soils; sale or abandonment of land (SOARES-FILHO et al., 2006).

Groups of agents: The agents that lead to deforestation vary between different parts of the region and also in relation to time, as well as cultural and commercial factors. In general, large and medium-sized farmers account for the vast majority of deforestation activity, but small farmers can act as important forces in the places where they are allocated. For the Reference Region of this project, the occurrence of deforestation is linked to activities of fragmentation of land for sale, devaluation of extractive products and formation of swiddens for subsistence, there are occupations along the main access roads found such as: roads, rivers and extensions.

Infrastructure drivers: For the region where the project is allocated the main drivers of deforestation observed is the influence of highways and unofficial roads (extensions), in addition to the proximity to urban centers and navigable stretches of rivers. It was possible to verify the relationship between the location of the access roads with the location of the sources of the rivers and streams, where most of the access roads are allocated in higher portions of the landscape coinciding with the sources of rivers and streams.

3.2.1.1.1.2 Landscape configuration and ecological conditions

Table 17 - Spatial attributes of landscape configuration and ecological conditions in the Reference Region and Project Area.

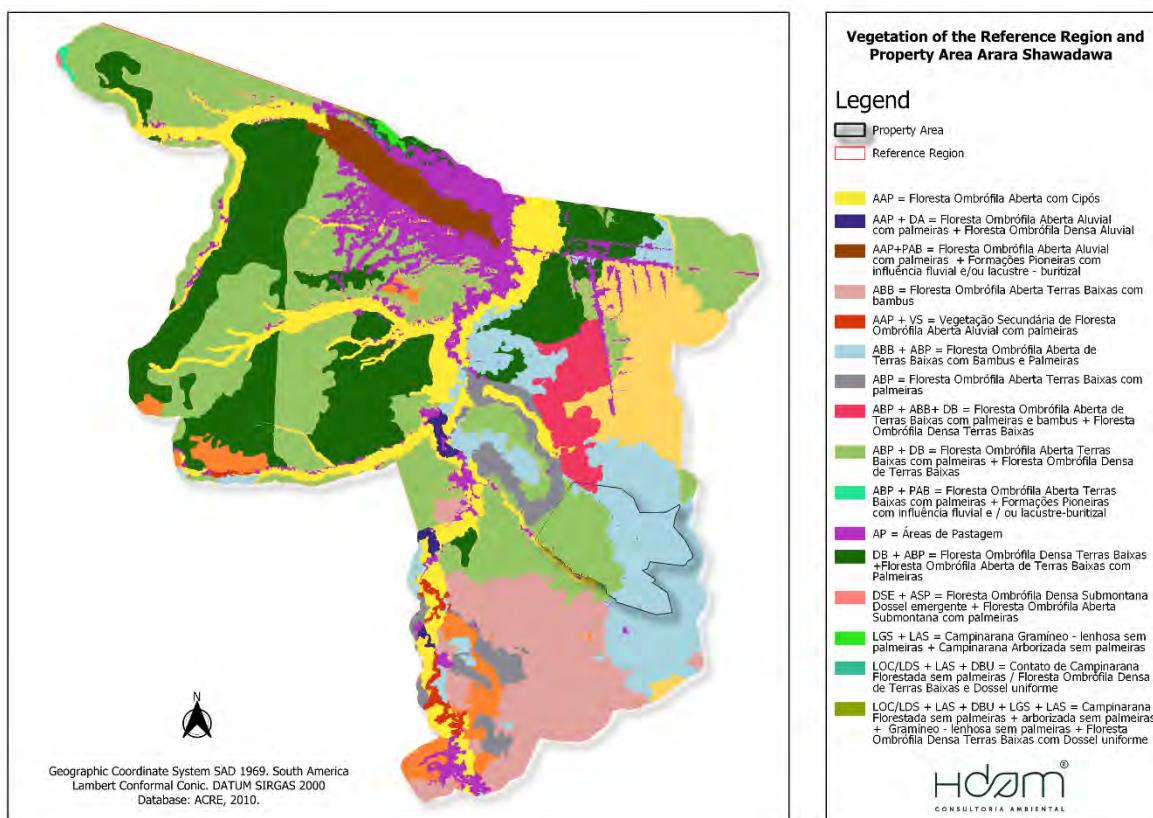
Landscape Element	Source	Refrence Region RR	Project Area PA
Open rainforest with bamboo and palm trees	ACRE, 2010	Yes	Yes
Elevation (m)	TOPODATA/INPE	0-252,44	209,10-252,44
Slope (º)	TOPODATA/INPE	0-9,34	0-9,34
Average annual precipitation (mm)	IBGE, 2010	2000 mm	900-2000 mm

Source: Project Teams Elaboration, 2023

3.2.1.1.3 Vegetation

The project area presents similar characteristics to those of the reference region in several aspects. In relation to vegetation, the largest class of vegetation found in the reference region is also present in the project area, covering a significant part of its extension.

Figure 37 - Vegetation for the Reference Region and Project Area.



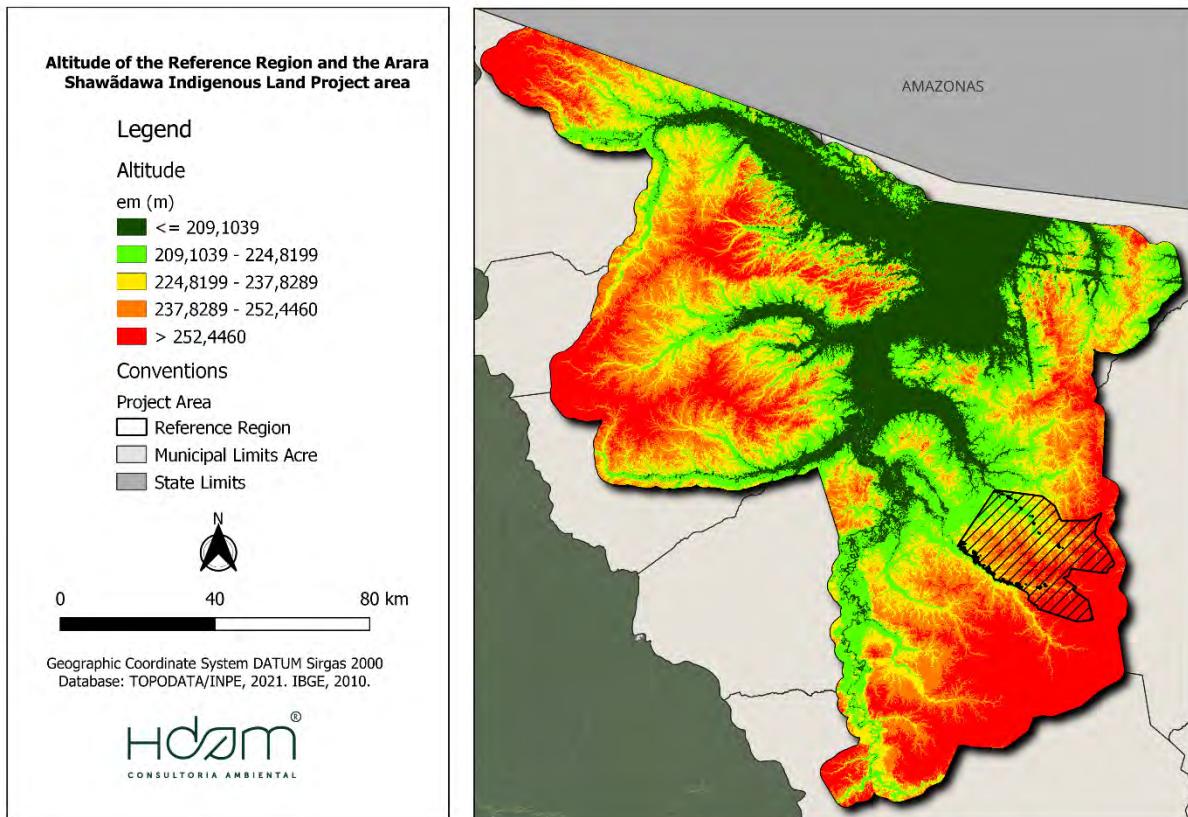
Source: Project Teams Elaboration, 2023

The project area has an average annual rainfall within the same precipitation range as the reference region, which is important for the establishment and development of vegetation.

3.2.1.1.4 Altitude

Project area also presents elevation within the range identified in the reference region, as well as the slope of the area is totally within the slope variation of the reference region, which indicates that the topography of the terrain is quite like that of the surrounding region.

Figure 38 - Altitude in the Reference Region and for the Project Area.

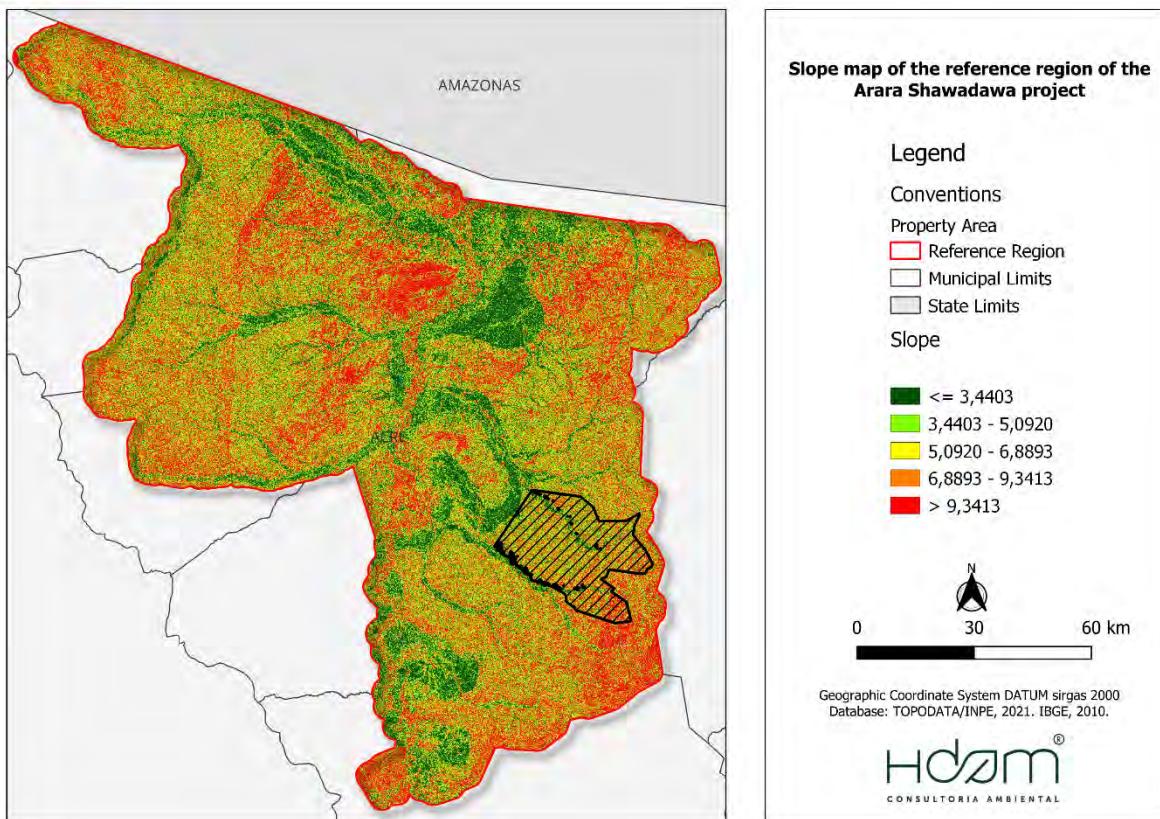


Source: Project Teams Elaboration, 2023

3.2.1.1.5 Declivity

The declivity values of the land of the project area are within the declivity range of the reference region in 100% of the area, which indicates that the slope pattern of the land is the same as that of the surrounding region. This is a relevant factor for the maintenance of vegetation. Therefore, by presenting a slope pattern like that of the reference region, the project area becomes conducive to the establishment and development of vegetation, which can contribute positively to carbon capture and the reduction of emissions and greenhouse gases.

Figure 39 - Declivity in the Reference Region and for the Project Area.



Source: Project Teams Elaboration, 2023

3.2.1.1.6 Climate

To understand the climate of a particular locality it is necessary to consider the influence of climatic elements and factors. In the project area there is a climate of high temperatures and high concentration of humidity. The climate in the project area is characterized as Equatorial Hot and Subhot, according to the IBGE, with average daily temperature characteristics higher than 18°C in all months, and with humidity distribution ranging from super humid to subdry. The average annual temperature observed for these regions varies between 24.5°C and 25.9°C where the periods that present maximum temperatures are between the months of September to October registering variations of 25°C to 26°C. The lowest values of average monthly temperature occur in the month of July, registering between 24°C and 24.8°C.

3.2.1.2 Step 1.1.2 Project area

The area of the Shawādawa Indigenous Land covers a total area of 87,460,735 hectares. As for the net project area (PA) is 76,550.59 hectares, subtracting overlaps and anthropized areas. To delimit this area, the following criteria were used (Figure 11):

The initial limit was the total area of the Arara do Igarapé Humaitá Indigenous Land delimited with limits approved by FUNAI (National Foundation of Indigenous Peoples).

From this polygon were subtracted all the overlapping areas that occurred in the Arara do Igarapé Humaitá Indigenous Land. These are Conservation Units and Settlements, specifically the Riozinho da Liberdade Extractive Reserve. The total overlapping area was 10,199,096 hectares.

The areas deforested until 2021 were also subtracted to meet the criteria of item 1.1.2 of VM0015. The total area of anthropicity was 711,049 hectares.

The last step was to exclude from the Project Area the areas of secondary vegetation and non-forest, (PRODES classification for areas that do not belong to the domain of vegetation with forest physiognomy classified according to the RADAMBRASIL project) (1976).

3.2.1.3 Step 1.1.3 Leakage belt

The Leakage belt refers to the adjacent or nearby area where baseline activities tend to be impacted by project activities, "pushing" deforestation out of the project area. To define the boundaries of the leakage belt, two approaches can be adopted based on VM0015: Opportunity Cost Analysis (Option I) or Mobility Analysis (Option II). For this project, the Opportunity Cost Analysis (Option I) cannot be applied due to the absence of data to support this approach. For the use of this approach, it is necessary to have access to relevant information, such as:

- Average selling price per ton in the region;
- Location of the most important points of sale in the region;
- Average cost of local production and average cost of transportation per kilometer for a ton of product, to perform a proper opportunity cost analysis.

In addition, data obtained through literature and government entities may not be consistent and do not always reflect the reality of the region. Much of the deforestation carried out in the region tends to be illegal, which can make it even more difficult to obtain accurate and reliable data. According to Saraiva (2021), although most of the deforested areas in the Amazon are converted into new areas destined for agriculture and livestock activities, studies on production costs demonstrate that profit is not the main factor of deforestation in the region. Cattle ranching is often used as a means of promoting land ownership, where culturally, areas with standing forests are seen as areas that need to be "cleared", i.e. by cutting down the forest the property is valued. For this study, the Mobility Analysis (Option II) was the most appropriate alternative, as it makes use of a multicriteria GIS analysis to assess the potential mobility of deforestation agents. For this, the algebra method is applied through a weighted overlap to determine the most likely regions of leakage, using the reference region as geographical boundaries. The parameters were classified into three groups and the criteria had a weight of 40%, 30% and 20%, respectively. The following parameters and criteria have been defined:

- a) Project Distance

0-5 km: within the scope of the project;
 5-10 km: medium range;
 >10 km: out of the scope of the project;

b) Road Distance

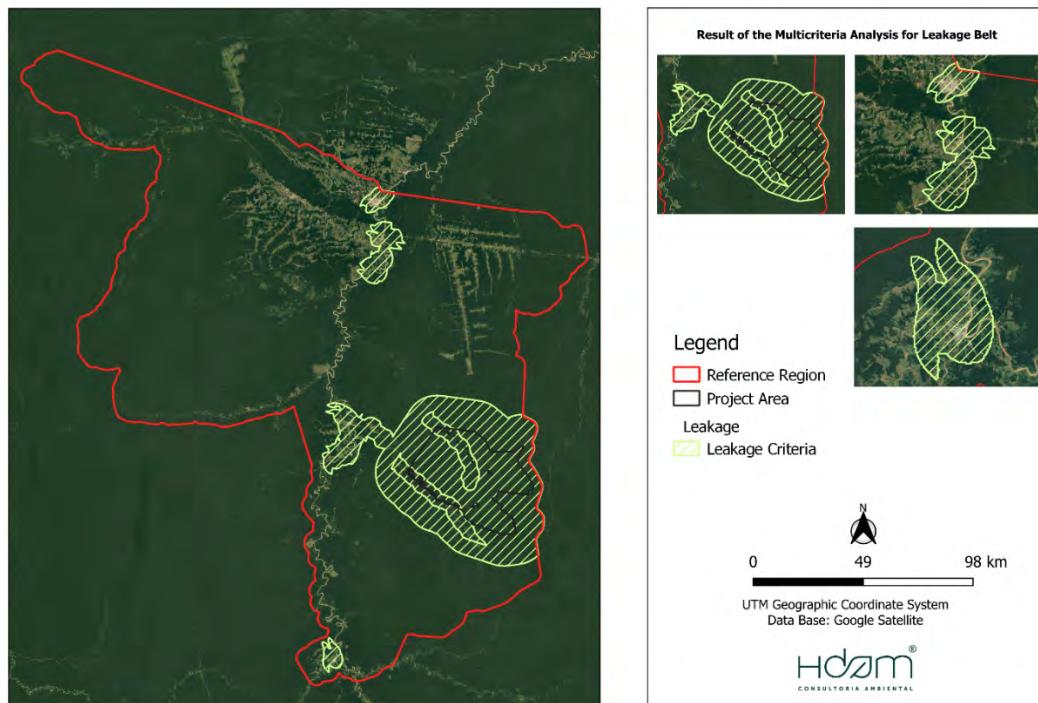
0-2 km: close;
 2-4 km: relatively close;
 >4 km: distant;

c) Hydrography Distance

0-2 km: close;
 2-3 km: relatively close;
 >3 km: distant;

With the multicriteria analysis of the mobility of potential deforestation agents, it was possible to identify the most likely regions of leakage as well as to allow the evaluation of alternatives based on the multiple criteria, considering the relative importance of each one. The criteria used were related to the mobility of deforestation agents, such as: the distance from roads and the presence of navigable rivers. Based on these, it was possible to identify the regions that presented greater ease of access for deforestation agents, as well as areas that presented greater vulnerability in relation to deforestation.

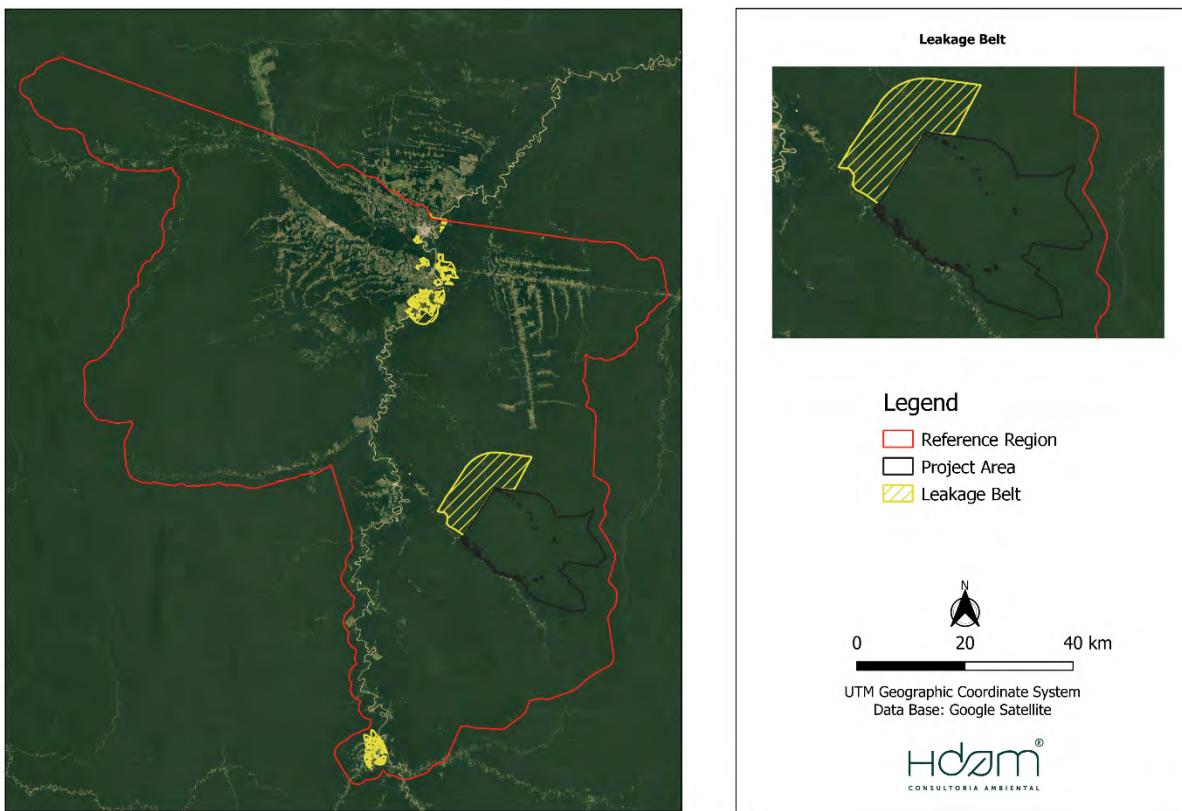
Figure 40 - Result of the multicriteria analysis of the mobility of potential deforestation agents.



Source: Project Teams Elaboration, 2023

The multicriteria analysis resulted in the following polygons for the leakage belt, with an area of 35,447.741 ha.

Figure 41 - Leakage belt polygon.

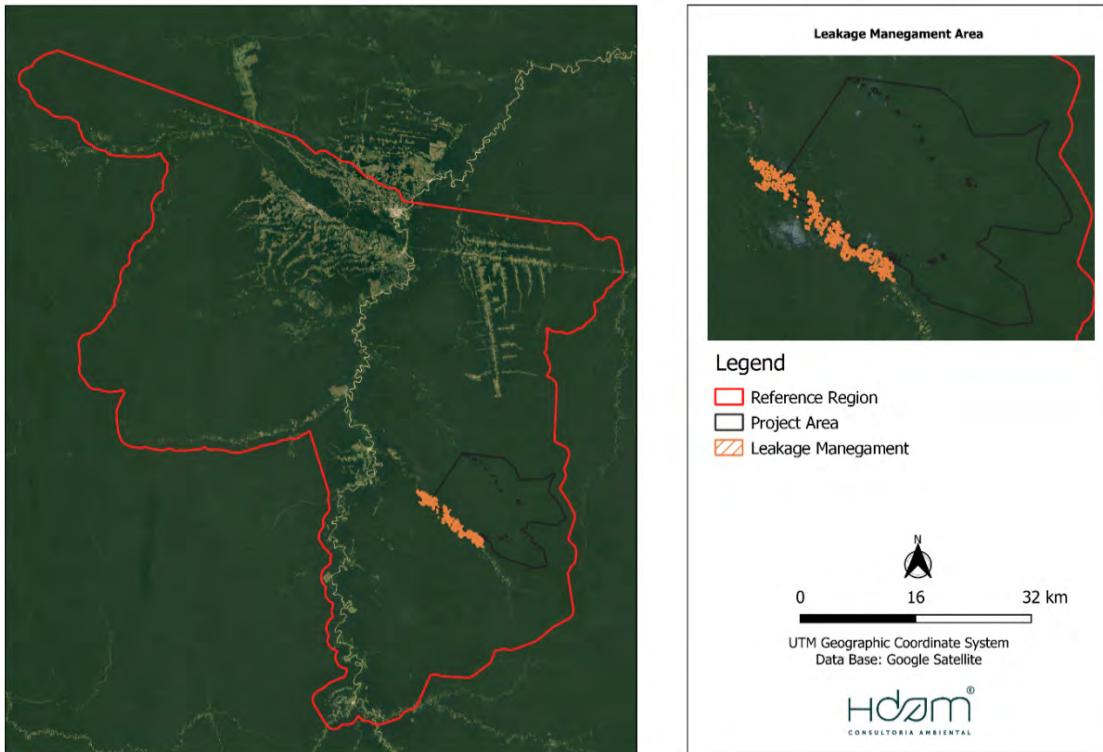


Source: Project Teams Elaboration, 2023

3.2.1.4 Step 1.1.4 Leakage management area

The areas of leak management are the areas where activities that aim to reduce the risk of leakage caused by the displacement of activities will take place. According to VM0015, these areas must be non-forest at the beginning of the project. For this project, areas within the project area or in the leak belt that are non-forestry and where it intends to concentrate the activities of the project, were selected.

Figure 42 - Polygon in the Leakage management area.

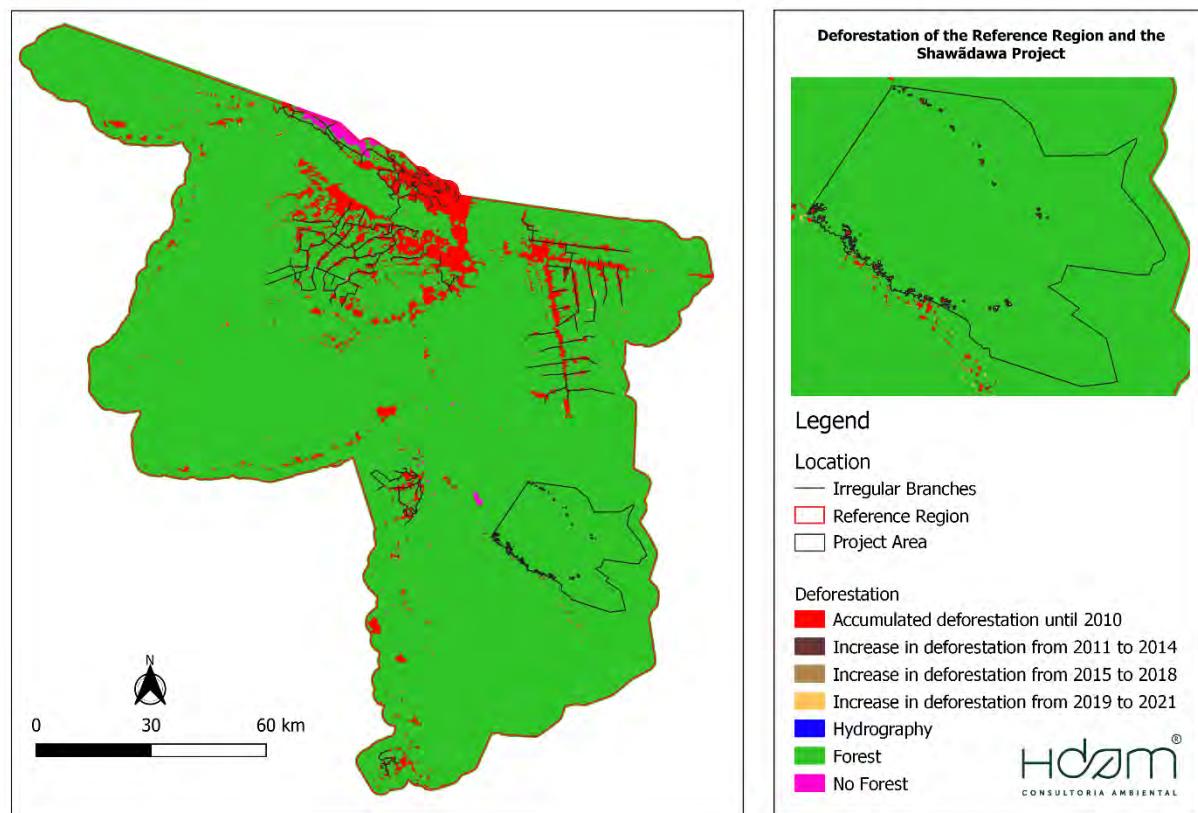


Source: Project Teams Elaboration, 2023

3.2.1.5 Step 1.1.5 Forest

The definition of forest that will be used for measuring deforestation during the project crediting period is FAO 2010, the same definition of forest present in ENREDD+ (Brazil's National REDD+ Strategy, MMA 216): "Forest: an area larger than 0,5ha covered by trees taller than 5m and with over 10% of canopy cover, or with trees capable of reaching these parameters in situ, land areas that are predominantly under agricultural or urban use do not qualify as forests (FAO, 2010)."

Figure 43 - Boundary of the forest in the reference region and project area.



Source: Project Teams Elaboration, 2023

3.2.2 Step 1.2 Temporal boundaries

3.2.2.1 Step 1.2.1 Starting date and end date of the historical reference period

The historical reference period is to the years 2011 to 2021, considering the data availability of PRODES Digital to produce analysis of historical land use and land cover (see Step 2.1)

3.2.2.2 Step 1.2.2 Starting date

The starting date is March 21st, 2023.

3.2.2.3 Step 1.2.3 Starting date and end date of the first fixed baseline period

The fixed baseline period is 10 years (methodology VM0015 page 26) and the end date of the first fixed baseline period is March 21st, 2033.

3.2.2.4 Step 1.2.4 Monitoring period

The monitoring period is one year.

3.2.3 Step 1.3 Carbon pools

Table 18 - Carbon pools included or excluded within the boundary of the proposed AUD project activity.

Carbon pools	Included / TBD ¹ / Excluded	Justification / Explanation of choice
Above-ground	Tree: Included	Carbon stock change in this pool is always significant
	Non-tree: excluded	Final land cover is not perennial crop. Carbon stock in this pool is likely to be relatively small in the baseline compared to the project scenario.
Below-ground ⁺	Included	Recommended according to VM0015
Dead wood ⁺	Excluded	Excluded by conservatism, since carbon stock in this pool is likely to be relatively small in the baseline compared to the project scenario.
Harvested wood products ⁺	Excluded	Excluded by conservatism. Removal of timber is not associated with significantly more carbon stored in long-term wood products in the baseline case compared to the project scenario.
Litter	Excluded	Excluded by conservatism.
Soil organic carbon ⁺	Excluded	Not to be measured in conversions to pasture grasses and perennial crop according to VCS Program Update of May 24th, 2010.

Source: Project Teams Elaboration, 2023

3.2.4 Step 1.4 Source of GHG emissions

Table 19 - Source and GHG included or excluded within the boundary of the proposed AUD project activity.

Source		Gas	Included?	Justification/Explanation
Baseline	Biomass burning	CO ₂	Excluded	Counted as carbon stock change
		CH ₄	Excluded	Non CO ₂ emissions can conservatively be omitted (VM0015)
		N ₂ O	Excluded	Considered insignificant according to VCS Program Update of May 24 th , 2010
		Other	N.A.	No other GHG source was analyzed
	Livestock emissions	CO ₂	Excluded	Not a significant source
		CH ₄	Excluded	The project does not include livestock activities
		N ₂ O	Excluded	The project does not include livestock activities
		Other	N.A.	No other GHG source was analyzed
Project	Biomass burning	CO ₂	Excluded	Counted as carbon stock change
		CH ₄	Excluded	Non CO ₂ emissions can conservatively be omitted (VM0015)
		N ₂ O	Excluded	Considered insignificant according to VCS Program Update of May 24 th , 2010
		Other	N.A.	No other GHG source was analyzed
	Livestock emissions	CO ₂	Excluded	Not a significant source
		CH ₄	Excluded	The project does not include livestock activities
		N ₂ O	Excluded	The project does not include livestock activities
		Other	N.A.	No other GHG source was analyzed

Source: Project Teams Elaboration, 2023

The approach we are adopting is conservative, which is why we decided to omit data on emissions of gases other than CO₂ as established in the methodology. This decision was based on the results of the national inventory of greenhouse gas emissions by federative unit, which pointed out that in Acre State the largest sources of non-CO₂ gases represent rates below or equal to 20% (MCTIC, 2022). For example, agriculture represents 20% of gas emissions in Acre State, while energy represents only 4%. Therefore, we chose to emphasize CO₂ emissions, which are responsible for the majority of GHG emission worldwide.

3.3 Baseline Scenario

3.3.1 Step 2 Analysis of historical land-use and land-cover change (VM0015)

3.3.1.1 Step 2.1 Collection of appropriate data sources

For the accomplishment of the mapping classes of land use and land cover, data from the PRODES Digital program were used, available in raster format for AP, RR, LK. The images used for the Amazon Partners 20 Project date from the period 2011 to 2021 and correspond to the following Landsat 8 satellite coordinates, -8.674 S Latitude and -72.627 W Longitude. The orbits/point of the project correspond to 5/66 respectively.

Table 20 - Data used to identify and map historical LU LC change analysis in the project.

Vector (Satellite or airplane)	Sensor	Resolution		Coverage	Acquisition date	Scene or point identifier	
		Spatial	Spectral			Path / Latitude	Row / Longitude
Landsat 8	OLI	30 m3ters	0,43- 1,390 µm	170x183	15/04/2023	5	66
CBERS 4	IRS-2	40 meters	0,45- 0,68 µm	131	15/04/2023	184, 185	110

Source: Project Teams Elaboration, 2023

3.3.1.2 Step 2.2 Definition of classes of land-use and land-cover

The LU/LC classes used in this project are presented in Table 15, being established as "Forest" and "Deforestation", following the methodological procedures previously described. It is important to highlight that there was no stratification of land use classes, being considered homogeneous carbon stocks. The description of each class and the area that existed before the project started are also presented in the table.

-Forest (1,481,325.706 ha): Forest area of the remaining Reference Region belonging to different types of open vegetation and dense ombrophilous forest.

-Deforestation (55,888.113 ha): Areas of the Reference Region that were originally composed of tropical forest that have been converted to other land uses such as pasture, agriculture, and areas of secondary vegetation.

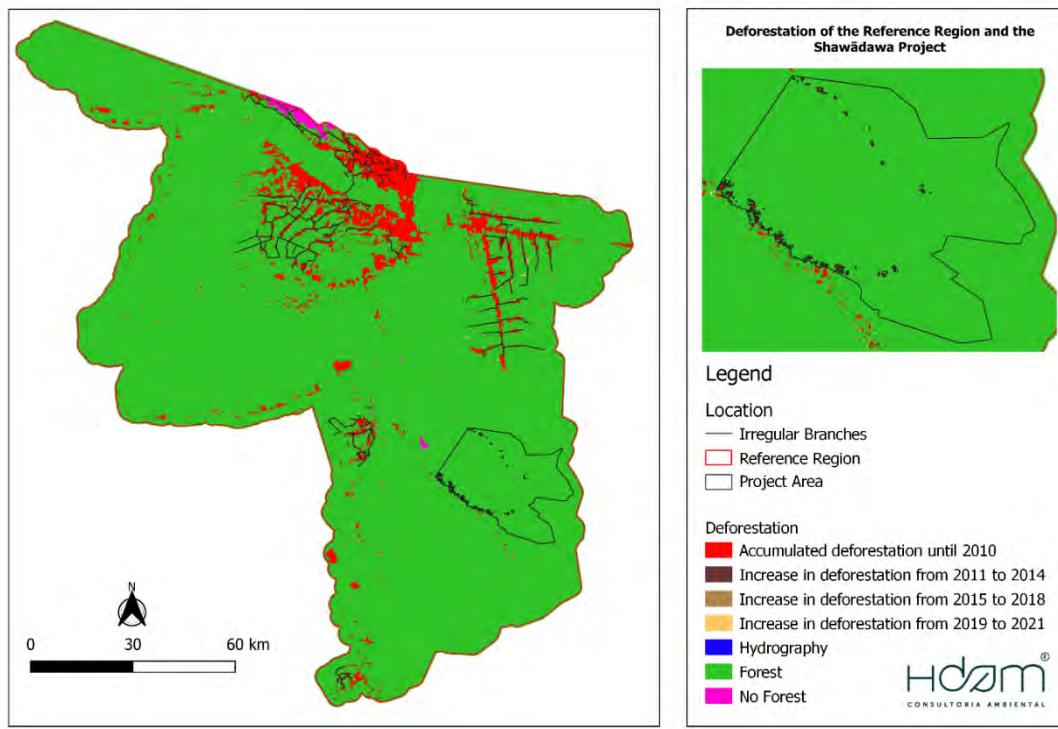
Table 21 - List of all land use and land cover classes existing at the project start date within the reference region.

Class Identifier		Trend in Carbon stock ¹	Presence in ²	Baseline activity ³			Description (including criteria for unambiguous boundary definition)
ID _{cl}	Name			LG	FW	CP	
1	Forest	Decreasing	RR, PA, LK	Yes	No	No	intact primary forest
2	Deforestation	Increasing		RR, PA	Yes	No	

Notes: 1 RR: Reference Region; PA: Project Area; LK: Leakage Belt; LM: Areas of Leakage Management. 2 LG: Logging. FW = Fuel-wood collection; CP = Charcoal Production (yes/no)

Source: Project Team Elaboration, 2023

Figure 44 - Land use and cover map and deforestation for the sub-period analyzed.



Source: Project Teams Elaboration, 2023

3.3.1.3 Step 2.3 Definition of categories of land-use and land-cover change

Based on data obtained in the previous stages, the historical analysis of land cover in the period from 2011 to 2021 was carried out for the Reference Region of this project. For the period observed (2011 to 2021) resulted in a deforested area of approximately 45185,387 ha. Table 6 shows the changes that occurred between the classes of Forest for Deforestation, with a decrease in carbon inventory.

Table 22 - Potential land-use and land-cover change matrix in the Reference Region between 2011 and 2021.

IDct		Initial LU LC class		
		I1	I2	In
Final LU LC class	F1	1,029824438	373,6381942	374,6680186
	F2	246,435989	0,640456553	247,0764456
	Fn	247,4658134	374,2786508	621,7444642

Source: Project Teams Elaboration, 2023

For this project, the transition between two categories of changes in land use was designed, such as the change from areas with forest cover to areas of anthropogenic vegetation (deforestation).

Table 23 - List of land-use and land-cover change categories.

IDct	Name	Trend in Carbon stock	Presence in	Activity in the baseline case			Name	Trend in Carbon stock	Presence in	Activity in the project case		
				LG	FW	CP				LG	FW	CP
	Forest	Decreasing	RR, PA, LK	Yes	No	No	Forest	constant	RR, PA, LK	No	No	No
1/F1	Deforestation	Increasing	RR, PA, LK	No	No	No	Deforestation	constant	No	No	No	No

Notes: 1 RR : Reference Region; PA: Project Area; LK: Leakage Belt; 2 LG: Logging. FW = Fuel-wood collection; CP = Charcoal Production (yes/no)

Source: Project Teams Elaboration, 2023

3.3.1.4 Step 2.4 Analysis of historical land-use and land-cover change

For the project, data from the PRODES platform (Project for Monitoring Deforestation in the Legal Amazon by Satellite <http://terrabrasilis.dpi.inpe.br/>) were used during the period from 2011 to 2021.

PRODES is a project by INPE (National Institute for Space Research) that performs satellite monitoring of clear-cut deforestation in the Legal Amazon, where since 1988 annual deforestation rates have been produced in the region, which are used by the Brazilian government for the establishment of public policies. PRODES mapping is based on images from the LANDSAT 8/OLI, CBERS 4 and IRS-2 satellite, to record and quantify deforested areas greater than 6.25 hectares.

The PRODES estimates are in accordance with the methodological requirements, enabling a more careful and reliable approach (KINTISH, 2007). This system has shown to be of great importance for actions and planning of public policies in the Brazilian Amazon. Recent results, based on analyzes carried out with independent specialists, indicate a precision level close to 95% (INPE, 2023).

3.3.1.4.1 Step 2.4.1 Pre-processing

The choice of images consists of selecting those with the lowest incidence of clouds, adequate radiometric quality, and images with acquisition closer to the dry season in the Amazon, since most deforestation occurs within the dry season.

3.3.1.4.2 Step 2.4.2 Interpretation and classification

(1) Post-classification change detection was used: where two LU/LC maps were performed for two different times, (2011) at the beginning and (2021) at the final year of project analysis.

The methodology used in the maps is based on visually interpreting the images by delimiting the polygons directly on the TerraAmazon system screen. Approximately 600 images from Landsat, Cbers, UK2-DMC or Resourcesat satellites are stored for each year of work. Every past image base is also already generated by the system and in cases of high cloud coverage, images from other satellites (or dates) can be used to compose the scene.

The identification of deforestation is done through the photointerpretation of the Landsat image (or similar satellite) through the delimitation of the new polygons directly on the computer screen, considering only the portion of the image that supposedly still has forest cover. Clearcut deforestation polygons (complete removal of forest cover) whose area exceeds 6.25 ha are identified. The identification of the class alteration pattern is based on three main elements of photointerpretation: tonality, texture, and context.

3.3.1.4.3 Step 2.4.3 Post-processing

The classification result in raster format was transformed into vector format for evaluating the area and the existing classes through the Qis Software 3.28.4.

3.3.1.5 Step 2.5 Map accuracy assessment

PRODES estimates are considered reliable by national and international scientists (KINTISH, 2007). Recent results, based on analyzes carried out with independent specialists, indicate a precision level close to 95%.

3.3.1.6 Step 2.6 Preparation of a methodology annex to the PD.

The description of the methodology is presented in items 6.3.1.4.1, 6.3.1.4.2 and 6.3.1.4.3

3.3.2 Step 3 Analysis of agents, drivers and underlying causes of deforestation and their likely future development (VM 0015)

3.3.2.1 Step 3.1 Identification of agents of deforestation.

The Alto Juruá region, where the reference region of this project is located, is responsible for 10% of deforestation in the State of Acre in 2019 (Acre 2020). The reference region, in turn, extends over six municipalities in the Alto Juruá region: Marechal Taumaturgo, Porto Walter, Cruzeiro do Sul, Rodrigues Alves and Mâncio Lima. It is important to mention that more than 95% of the project area is in only one municipality, Port Walter.

In the reference region, 45,185.39 ha were deforested between 2011 and 2021.

In the north of the reference region is the BR 364 highway, an important vector of occupation where the municipalities with the highest deforestation rates in the state are located.

The reference region is also characterized by the presence of rural settlement projects, conservation units, indigenous territories, private property and lands without discrimination.

In the municipality of Porto Walter, the land category that contributes the most to deforestation is private property with 24% of deforestation, followed by conservation units with 22%, area without destination discriminated with 21%, rural settlements with 14% and with the lowest contribution to indigenous land with 2%. (Acre, 2018a). In Cruzeiro do Sul, the land category that contributes the most to deforestation is rural settlement with 33%, followed by discriminated land (32%), areas without discriminated study (25%) (Acre 2018 b).

Private properties are responsible for 34% of deforestation in the municipality of Porto Walter and these properties correspond to 15% of the municipality's area. The total set of private agricultural properties in the municipality presents 7% of its area deforested, corresponding to the land category with more suppression of native vegetation in the municipality. They are primarily located around the urban area extending to the south of the municipality. There is also private agricultural property north of the reference region (Acre 2018).

In Cruzeiro do Sul, private properties are responsible for 2% of deforestation in the municipality and correspond to 6% of the municipality's area.

These data help to identify that the main agents of deforestation in the reference region are small agricultural owners in rural settlement projects to small and medium-sized private agricultural properties along highways and major rivers in the region. Within the project area, the Arara people who inhabit the Arara Indigenous Land of the Humaitá Igarapé are also agents of deforestation.

3.3.2.1.1 Families in rural settlements

Rural settlement projects are responsible for 14% of deforestation in the municipality of Porto Walter and correspond to 13% of the municipality's area. Rural settlements in this municipality already had about 4% of their area deforested in 2016.

In the project area there are no rural settlements because it is an indigenous territory. In the reference region of the project are the following rural settlement projects: PAE Cruzeiro do Sul, PA Vitória and PA Minas, all in the municipality of Porto Walter.

PAE Cruzeiro do Sul has an area of 78,083 ha and had in 2016 a total of 3% of its deforested area, or 2,201 ha. This PAE is adjacent to the project area and makes up the leakage belt. According to a social study developed by the project team, there are about 280 settled families, remnants of former residents of the Humaitá River and Juruá River region and emigrants from the surrounding cities. They have extensive livestock farming as their main economic activity and family farming. The PDS Natal is in the vicinity of the project area and has 99 settled families.

The PA Vitória does not make up the leakage belt of the project and with only 525 ha, it already had in 2016 more than 71% and its area deforested.

The PA Minas also does not make up the leakage belt and deforestation in 2016 was 10% of its area of 3,105 ha (Acre, 2018).

In Cruzeiro do Sul, rural settlements are responsible for 33% of deforestation in the municipality and correspond to 14% of the municipality. The rural settlements in this municipality already had about 27% of their area deforested in 2016.

3.3.2.1.2 Shawadawa People

In the project area, the Arara people (self-styled Shawādawa), from about 850 families belonging to the Pano linguistic family, currently reside in the Arara do Igarapé Humaitá Indigenous Land. They develop forest extractivism, hunting, fishing, swiddens and the breeding of small wild animals. The formation of swiddens and cattle raising are the drivers of deforestation of primary forests.

3.3.2.2 Step 3.2 Identification of deforestation drivers

3.3.2.2.1 Family farming and livestock

Boosters:

The drivers of deforestation among families in rural settlements and the Shawadawa people are related to family agricultural production and extensive livestock farming.

The small-scale agriculture has as its main social interest the generation of food for subsistence and eventually the commercialization of surpluses. The main products are cassava flour, corn, watermelon and banana.

Extensive cattle ranching, on the other hand, is an important economic asset of families, being configured in a capital stock due to the growing appreciation and high liquidity.

These two activities contribute to the increase in deforestation of primary forests by expanding agricultural activities in the rural settlements of the region, as mentioned earlier.

3.3.2.2 Access to the forest by illegal road and rivers in the region

The access to the forest is an important driver of deforestation in Acre.

Of the 23,350 km² of total deforestation in Acre by 2019, 50% is concentrated in up to 1 km of the road axis and 95% is concentrated in 11 km. About 92% of roads are in the land categories that also concentrate deforestation: settlement projects, private properties, and public lands (Nascimento et ali, 2021).

The same authors also mention that the main justification for the construction and paving of roads in the Amazon is economic development, as occurred with the BR-319, BR-163, Interoceanic Highway and Cruzeiro do Sul-Pucallpa Highway (in the reference region of the project), where the latter has its planned route passing through the Serra do Parque Nacional do Divisor. However, the lack of governance over the expansion of the road network in the Amazon from the main highways is influenced by real estate speculation and commodity markets, neglecting the environmental and socioeconomic impacts on a local and regional scale.

In fact, there is evidence of the lack of integration and understanding between various public agencies responsible for territorial management in the reference region of the project. According to a press release (oeco.com.br accessed on 05/01/2023) the Federal Public Ministry filed civil actions to annul the bidding process for feasibility studies of road construction in the State, including the road that the state government seeks to promote the interconnection of the municipality of Cruzeiro do Sul with the Peruvian municipality of Pucallpa, in the west of the State of Acre and another road connecting the municipalities of Porto Walter and Rodrigues Alves, within the reference region of this project. According to the Public Ministry, these new roads may have impacts on conservation units and indigenous lands. In fact, a federal law process presented in 2019 in the national congress seeks to transform the Serra do Divisor National Park into an Environmental Protection Area, a category with fewer restrictions on use.

The construction of the road between Porto Walter and Rodrigues Alves has the potential to shift the arc of deforestation in the region – strongly influenced by the BR 364 highway that cuts through the State of Acre from east to west – to areas currently less accessible, promoting real estate speculation and facilitating the performance of illegal forestry and opening of areas for agriculture.

In fact, the road connecting Porto Walter and Rodrigues Alves has already been opened and inaugurated by the state government in 2022, even with the existence of actions by the Federal Public Ministry asking for the annulment of the road's operating license.

Also, according to the local press (ac24h.com), the construction of a road linking Porto Walter with the Municipality of Cruzeiro do Sul was completed in September 2022. With a length of 84 kilometers, the road

was built with the support of the state government and municipal governments of the region. Previously, access between these municipalities was only possible by river or air.

3.3.2.3 Step 3.3 Identification of underlying causes.

The main factors inducing deforestation in the State of Acre are very similar between the different municipalities and regions and are related to the following themes: land situation, accessibility and population density, conditions of poverty, lack of economic alternatives, indiscriminate use of natural resources, insufficient technical knowledge, and lack of adequate technology for the specificities of each sub-region.

According to the State Plan for the Prevention and Control of Deforestation and Burning (ACRE 2018c), there are numerous adjacent causes that contribute to deforestation in the municipalities that make up the reference region of the project:

- Inspection and control: a) little or inefficient environmental inspection, including protected areas and indigenous territories, b) absence of environmental and federal agencies in the municipalities and c) lack of physical infrastructure and human resources

- Protected areas and indigenous territories: a) lack of technical assistance and rural extension for the surrounding and indigenous communities, b) lack of specific programs in the surroundings of the Indigenous Territories, c) lack of use plans in rural settlement projects, d) fragile policy to encourage indigenous agricultural production and e) absent or inefficient supervision

- Integrity actions: a) lack of organization of rural communities in associations or production cooperatives, b) lack of integration of institutional actions to prevent deforestation and forest fires

- Public policies to address deforestation and forest fires: a) lack of policies to value forest conservation, b) difficulties in containing land invasion, c) low quality and discontinuity of technical assistance and rural extension services and d) little investment for land regularization

- Production systems: a) lack of organization of local production chains, b) incentive to livestock, c) difficulty of access to credit lines, d) low adherence of rural producers to agroecological practices and e) lack of price guarantee for the commercialization of agricultural production.

Some measures that the project intends to implement to address the causes of deforestation among the Shawadawa people in the region are:

- Consolidation of non-timber extractives as the main source of income

- Implementation of agroforestry systems

- Implantation of gardens without fire and soil recovery to increase the roaming cycles

Together with families in rural settlements, the project identifies the following actions as measures to address the causes of deforestation:

- Monitoring and enforcement to avoid edge effect and expansion into the IT perimeter.

- Diffusion of new land use practices
- Consolidation of non-timber extractivism as the main source of income
- Implementation of agroforestry systems
- Implantation of gardens without fire and recovery of the soil to increase the cycles of itinerancy.

In relation to the deforestation agents identified in this project, the Shawadawa people and families in rural settlements perceive as adjacent causes the influence of regional dynamics with stimulus to investment in livestock as the main economic activity of the Juruá Valley region and the State of Acre, in addition to the social need for food production and income generation by family farming.

3.3.2.4 Step 3.4 Analysis of chain of events leading to deforestation.

It can be observed that the deforestation drivers identified in the reference regions are potentiated by adjacent causes of deforestation present in the Acre landscape. Access to the forest, either through the extensive presence of rivers in the region, or through consolidated or clandestine roads, makes livestock as the first economic activity. The lack of command-and-control actions to guarantee the protection of forest resources encourages the conversion of the forest to other economic uses, mainly livestock. This cycle is reinforced in regions with access to markets and by the difficulty in promoting and consolidating alternative economic activities in the region. In this context, rural settlement projects reproduce this forest conversion dynamic, directing the landscape towards a scenario of deforestation.

According to IBGE data, Acre currently has about 3.8 million head of cattle, with cattle ranching being the main economic activity of the state. In 2021, the highest rate of deforestation in 18 years was recorded, placing Acre in third place in the ranking of the states that have deforested the most in the Amazon, placing agriculture and livestock as the largest vector of forest destruction.

The social groups analyzed follow the dynamics of the development of livestock as the main economic activity. In these properties, cattle ranching has enabled the capitalization of producers, by converting natural resources and family labor into a growing herd, considered as a savings account. However, due to the low technological level used, there is an accelerated process of soil and pasture degradation, resulting in low productivity and profitability of these production systems. Only a portion of producers, particularly large ones, have managed to incorporate technologies that have allowed them to recover degraded areas, increase productivity and profitability of production systems. These factors contribute to the expansion of deforestation of new areas and abandonment of degraded pastures.

3.3.2.5 Step 3.5 Conclusion

By establishing the relationship between deforestation agents, deforestation drivers and the main underlying causes of deforestation in the project's reference regions, the evidence found is conclusive about the future trend of deforestation in the project's geographical region. This analysis reinforces the trend of the presence of deforestation in the landscape with a growing increase in its rates in recent years, reinforcing the importance of establishing alternative mechanisms that value the maintenance of standing forest in the State of Acre.

3.3.3 Step 4 Projection of Future Deforestation (VM0015)

3.3.3.1 Step 4.1 Projection of the quantity of future deforestation

The Reference Region is not divided into strata, since the characteristics of the agents, vectors and causes of deforestation are uniform throughout its length.

3.3.3.1.1 Step 4.1.1 Selection of the baseline approach

Based on VM0015, the choice of a projection approach depends on the specific project conditions, data availability, and the level of uncertainty involved. According to the three possibilities proposed by the methodology of VM0015 of the VERRA standard, the approach of modeling the deforestation rate, approach "c", was adopted.

3.3.3.1.2 Step 4.1.2 Quantitative projection of future deforestation

For the projection of future deforestation, the entire historical period of the project (2011-2021) was considered, with annual deforestation maps projected between 2011 and 2021. The calculated deforestation rate was 2.90% shows high occurrence. This result indicates that the projection of deforestation occurred in regions at high risk of deforestation. Subsequently, it was calculated and specialized through a map of the areas with the highest risk of deforestation in the Reference Region analyzed. For the historical period it was projected until the year 2051.

3.3.3.1.2.1 Step 4.1.2.1 Projection of the annual areas of baseline deforestation in the reference region

As explained previously, approach "c": Modeling, which uses the historical rate, was chosen to predict future deforestation and project the annual deforestation areas at baseline in the region in question. To calculate the annual area of deforestation at baseline for year "n" in the reference region, the methodology equation VM0015 version 1.1 (page 48) was used.

3.3.3.1.2.2 Step 4.1.2.2 Projection of the annual areas of baseline deforestation in the project area and leakage belt

3.3.3.1.2.3 Step 4.1.2.3 Summary of steps 4.1.2

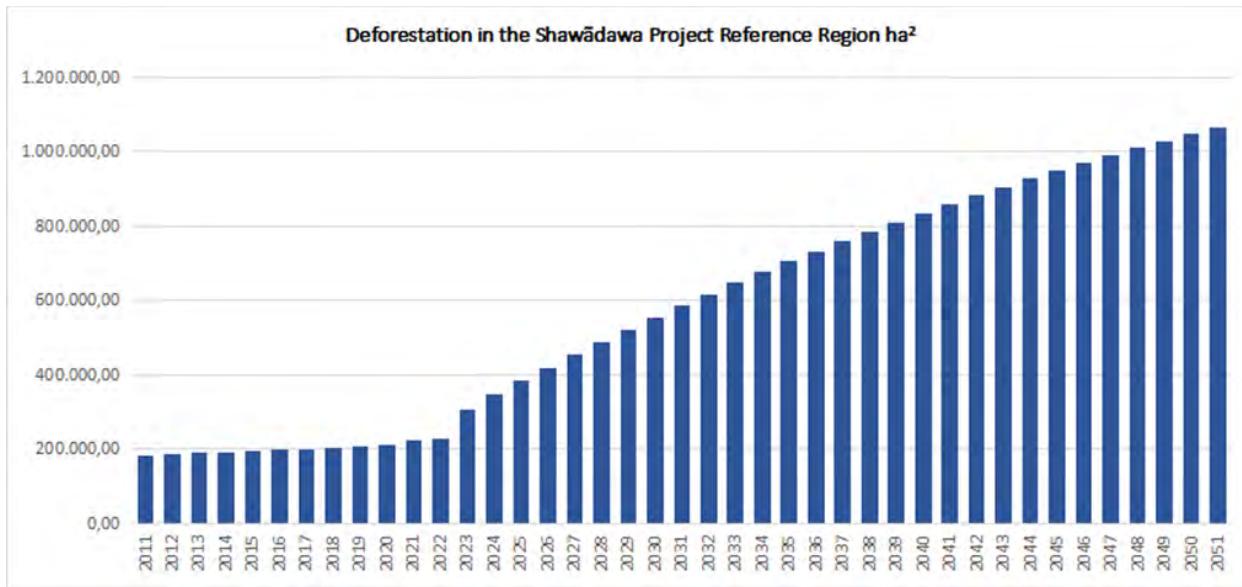
Deforestation projections for the period from 2022 to 2051 are available for the Reference Region, Table X for the Project Area, and Table X for the Leakage Belt. According to the tables presented, a total increase of 1,066,149.48 hectares of deforestation is expected during the period, which represents an annual average of 35,538,316 hectares.

Table 24 - (Table 9a VM0015). Annual areas of baseline deforestation in the Reference Region until 2051.

Project year <i>t</i>	Stratum <i>i</i> in the reference region		Total	
	1	IRR	annual	cumulative
	<i>ABSLRR_{i,t}</i>	<i>ABSLRR_{i,t}</i>	<i>ABSLRR_t</i>	<i>ABSLRR</i>
	ha	ha	ha	ha
2022	6.331,18	6.331,18	6.331,18	228.987,14
2023	78.238,37	78.238,37	78.238,37	307.225,50
2024	38.287,14	38.287,14	38.287,14	345.512,64
2025	37.253,07	37.253,07	37.253,07	382.765,72
2026	36.247,75	36.247,75	36.247,75	419.013,46
2027	35.268,05	35.268,05	35.268,05	454.281,51
2028	34.313,56	34.313,56	34.313,56	488.595,07
2029	33.386,42	33.386,42	33.386,42	521.981,49
2030	32.484,18	32.484,18	32.484,18	554.465,67
2031	31.606,91	31.606,91	31.606,91	586.072,58
2032	30.753,35	30.753,35	30.753,35	616.825,93
2033	29.921,43	29.921,43	29.921,43	646.747,36
2034	29.113,56	29.113,56	29.113,56	675.860,92
2035	28.326,74	28.326,74	28.326,74	704.187,66
2036	27.561,82	27.561,82	27.561,82	731.749,48
2037	26.817,38	26.817,38	26.817,38	758.566,86
2038	26.092,24	26.092,24	26.092,24	784.659,10
2039	25.386,75	25.386,75	25.386,75	810.045,85
2040	24.701,46	24.701,46	24.701,46	834.747,31
2041	24.034,67	24.034,67	24.034,67	858.781,98
2042	23.384,66	23.384,66	23.384,66	882.166,64
2043	22.753,06	22.753,06	22.753,06	904.919,70
2044	22.137,39	22.137,39	22.137,39	927.057,09
2045	21.539,55	21.539,55	21.539,55	948.596,64
2046	20.957,70	20.957,70	20.957,70	969.554,34
2047	20.391,45	20.391,45	20.391,45	989.945,79
2048	19.840,26	19.840,26	19.840,26	1.009.786,05
2049	19.304,75	19.304,75	19.304,75	1.029.090,80
2050	18.783,27	18.783,27	18.783,27	1.047.874,06
2051	18.275,42	18.275,42	18.275,42	1.066.149,49

Source: Project Teams Elaboration, 2023

Figure 45 - Cumulative deforestation until 2051 in the Reference Region.



Source: Project Teams Elaboration, 2023

Table 25 - (Table 9b VM0015). Annual areas of baseline deforestation in the Project Area until 2051

Project year t	Stratum i of the reference region in the project area		Total	
	1	IRR	annual	cumulative
	$ABSLPA_{i,t}$	$ABSLPA_{i,t}$	$ABSLPA_t$	$ABSLPA$
	ha	ha	ha	ha
2022	0	0	0	739,258
2023	158,922	158,922	158,922	898,18
2024	570,458	570,458	570,458	1468,638
2025	717,318	717,318	717,318	2185,956
2026	767,265	767,265	767,265	2953,221
2027	620,407	620,407	620,407	3573,628
2028	385,626	385,626	385,626	3959,254
2029	586,45	586,45	586,45	4545,704
2030	1015,018	1015,018	1015,018	5560,722
2031	780,264	780,264	780,264	6340,986
2032	673,371	673,371	673,371	7014,357
2033	1211,857	1211,857	1211,857	8226,214
2034	1021,028	1021,028	1021,028	9247,242
2035	1306,714	1306,714	1306,714	10553,956
2036	1110,916	1110,916	1110,916	11664,872
2037	1059,959	1059,959	1059,959	12724,831
2038	1167,866	1167,866	1167,866	13892,697
2039	1375,624	1375,624	1375,624	15268,321
2040	1245,765	1245,765	1245,765	16514,086
2041	895,102	895,102	895,102	17409,188
2042	1528,431	1528,431	1528,431	18937,619
2043	1320,635	1320,635	1320,635	20258,254
2044	1107,848	1107,848	1107,848	21366,102
2045	1361,597	1361,597	1361,597	22727,699
2046	1434,524	1434,524	1434,524	24162,223
2047	1267,73	1267,73	1267,73	25429,953
2048	1427,539	1427,539	1427,539	26857,492
2049	1459,505	1459,505	1459,505	28316,997
2050	1519,435	1519,435	1519,435	29836,432
2051	1629,347	1629,347	1629,347	31465,779

Source: Project Teams Elaboration, 2023

Table 26 - (Table 9c VM0015). Annual areas of baseline deforestation in the Leakage Belt until 2051

		Total baseline deforestation in the leakage belt	
<i>IDz</i>	1	<i>ABSLLKt</i>	<i>ABSLLK</i>
Name	Zone 1	annual	cumulative
Project year <i>t</i>	ha	ha	ha
2022	1.012,90	1.012,90	2.440,18
2023	1.664,79	1.664,79	4.104,97
2024	1.559,83	1.559,83	5.664,79
2025	1.513,86	1.513,86	7.178,65
2026	1.427,87	1.427,87	8.606,53
2027	1.202,06	1.202,06	9.808,59
2028	1.324,97	1.324,97	11.133,56
2029	1.457,80	1.457,80	12.591,36
2030	1.492,80	1.492,80	14.084,16
2031	1.194,00	1.194,00	15.278,16
2032	1.482,75	1.482,75	16.760,92
2033	1.190,03	1.190,03	17.950,95
2034	1.249,98	1.249,98	19.200,93
2035	1.163,02	1.163,02	20.363,95
2036	1.092,10	1.092,10	21.456,04
2037	1.048,13	1.048,13	22.504,18
2038	988,16	988,16	23.492,34
2039	933,20	933,20	24.425,54
2040	1.103,07	1.103,07	25.528,61
2041	880,26	880,26	26.408,86
2042	734,38	734,38	27.143,24
2043	744,37	744,37	27.887,61
2044	644,45	644,45	28.532,06
2045	629,47	629,47	29.161,53
2046	365,69	365,69	29.527,22
2047	667,43	667,43	30.194,65
2048	535,54	535,54	30.730,19
2049	493,57	493,57	31.223,77
2050	321,72	321,72	31.545,49
2051	268,78	268,78	31.814,26

Source: Project Teams Elaboration, 2023

3.3.3.2 Step 4.2 Projection of the location of future deforestation

At this stage, a deforestation prognostic model was processed, which projected the future location of areas with probabilities of deforestation and changes in land use and cover for the years 2022 to 2051. From the execution of the LUCC model, in this case a deforesting simulation model.

3.3.3.2.1 Step 4.2.1 Preparation of factor maps

Based on the previous steps, the variables that may have an impact on the occurrence of deforestation in the region in question were identified. Table below shows the 7 variables that were considered as variable factors in the deforestation risk model.

3.3.3.2.2 Step 4.2.2 Preparation of deforestation risk maps

Based on the previous steps, the variables that may have an impact on the occurrence of deforestation in the region in question were identified. Table below shows the 7 variables that were considered as variable factors in the deforestation risk model.

Table 27 - (Table 10 VM0015). List of variables, maps, and factor maps.

Factor Map		Source	Variable represented		Meaning of the categories or pixel value		Other Maps and Variables used to create the Factor Map		Algorithm or Equation used
ID	File Name		Unit	Description	Range	Meaning	ID	File Name	
1	conservation_units100	MMA	probability	Empirical probability for conservation units	0	Probability variation	1	ucs_mma	QGIS
2	road_distance	IBGE + vectorization	meters	Euclidean distance of deforestation increment cells within the historical period	0	Distance variation	2	trecho_rodoviaro_ibge	QGIS
3	hydrography_distance	IBGE	meters	Euclidean distance of deforestation increment cells within the historical period	0	Distance variation	3	drenagem_ibge, massa_agua_ibge	QGIS
4	altitudes100	TOPODATA	meters	Average elevation per pixel of 100 x 100 meters	0	Elevation variations	4	topodata	-
5	slope100	TOPODATA	meters	Average elevation per pixel of 100 x 100 meters	0	Slope variations	5	topodata	-
6	settlements	INCRA	probability	Empirical probability for conservation units	0	Probability variations	6	assentamentos_AC	QGIS
7	change_use	PRODES	meters	Euclidean distance	0	Distance variations	7	PRODES	QGIS

Source: Project Teams Elaboration, 2023

3.3.3.2.3 Step 4.2.3 Selection of the most accurate deforestation risk map

In the models of risks - probabilities of deforestation, elements are inserted as input to the simulation of the LUCC (Land Use and Cover Change) model, such as the variables related to the objects (roads, settlements, and hydrography), transition matrix (which calculates the gross rates and number of cells (pixel matrix) that modified in the model between the years 2011 and 2021. In addition to the transition matrix, the input data entered in this model are the observed map for 2011, and the file with the weights of evidence, which represent the effect of a spatial variable on the change of land use and land cover in this region. This

model aims to calibrate, execute (generate future scenarios) and validate the deforestation simulation model, described in the following steps:

3.3.3.2.3.1 Calibration

The calibration of the model consists of verifying the independence between the categorical and continuous variables used in the deforestation simulation model. For the correlation analysis between the maps, DINAMICA EGO generates the values referring to the Crammer index and Join Information Uncertainty, resulting from the analysis of all the variables observed in the execution of the model.

According to Bonham-Carter (1994), those that values lower than 0.5 in these indices, indicate a significant association between pairs of variables, if this value exceeds, one of the variables should be excluded from the model, or both combined in a single information plane to avoid obliquity in the model. In this stage, two indices exceed the value of 0.5, referring to the hydrographic variables, in transitions 3-2 (forest to deforestation) and 3-1 (forest to urban area), they were subtracted from the analysis.

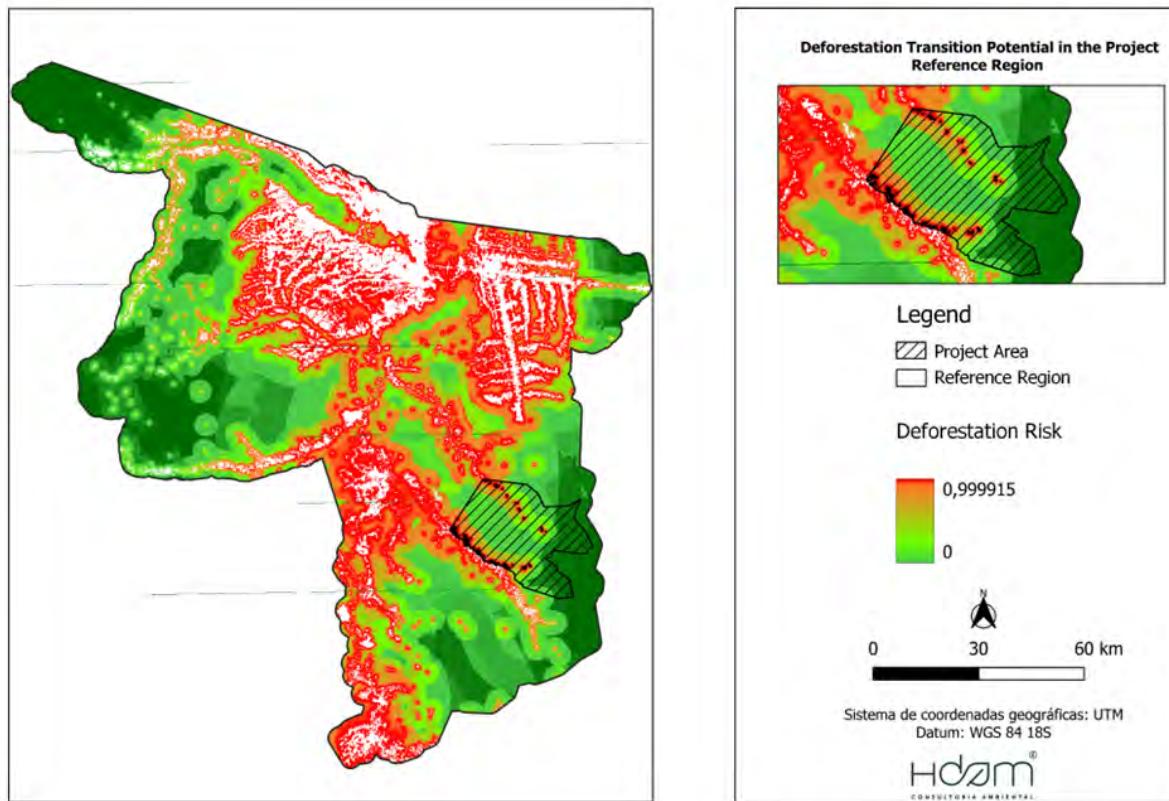
3.3.3.2.3.2 Validation

The validation stage comprises the comparison of the mathematical model already calibrated, considering the variables with correlation with deforestation, with a set of real data. In this phase, a simulated map of land use and occupation corresponding to a historical period is generated. Next, the comparison procedure between the simulated map and the observed map of land use and occupation is performed, referring to the same period. This process allows to evaluate the accuracy of the model and adjust it, if necessary, to make it more accurate in the representation of the dynamics of land use and occupation in the region. At this stage, the deforestation prediction model obtained assertiveness of 72%.

3.3.3.2.3.3 Scenarios

In the scenario projection stage, the deforestation rates that will occur in a future time horizon were estimated, considering some relevant assumptions. Under this project, the projection period comprises the time interval between 2022 and 2051, and the premise adopted is that the annual rate of deforestation observed between 2011 and 2021 follows the same pattern. This approach allows us to assess the magnitude of deforestation and the effectiveness of the actions proposed by the project in reducing deforestation rates in the region.

Figure 46 - Transition potential map for the occurrence of deforestation in the Reference Region.



Source: Project Teams Elaboration, 2023

3.3.3.2.4 Step 4.2.4 Mapping of the location of future deforestation

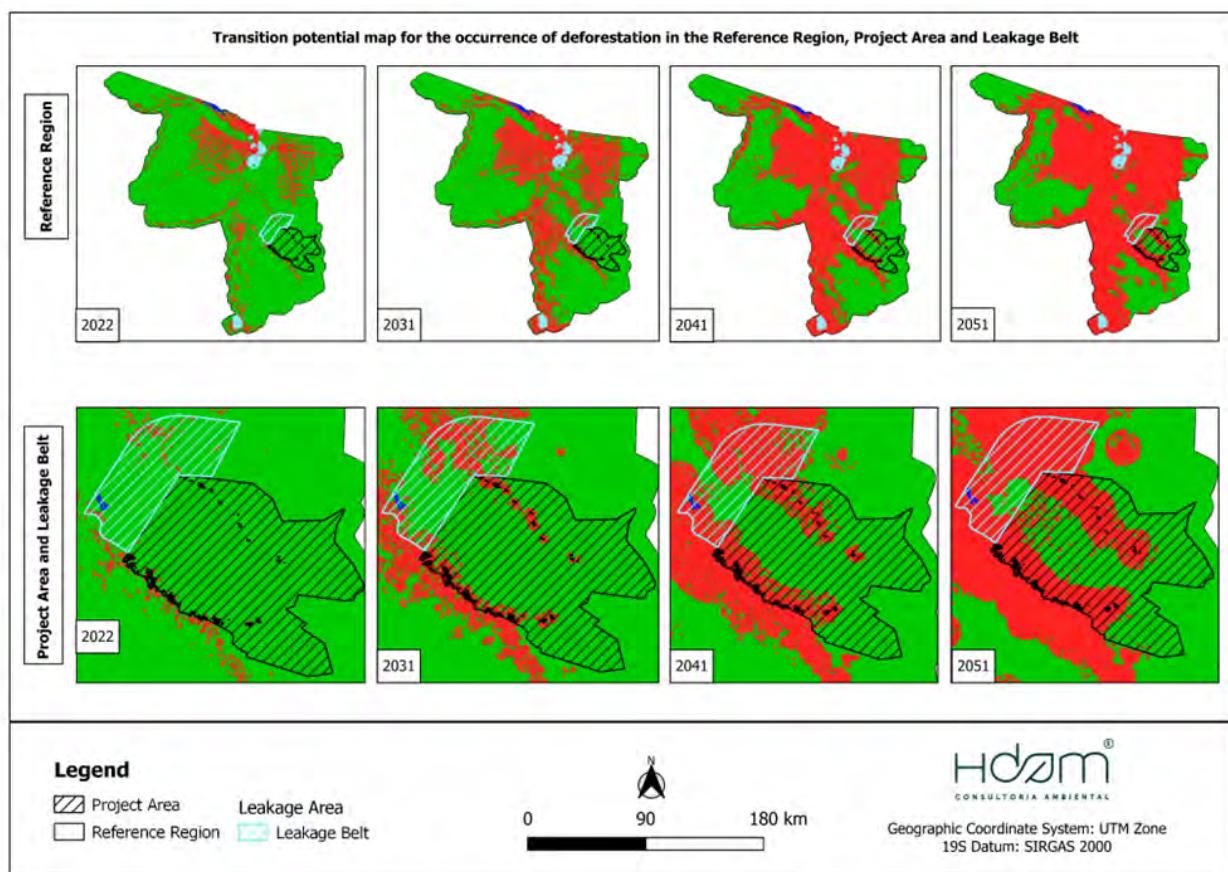
To project future deforestation in the region, annual deforestation maps between 2022 and 2051 were used, considering the entire historical period of the project (2011-2021). The deforestation rate of the historical period was extrapolated to the year 2051, considering the trends observed over the period and the stability of the variables that affect deforestation in the region. To identify the areas with the highest risk of deforestation and to guide preventive and control actions, the spatial allocation of deforestation was performed from the combination of auxiliary variables obtained in the calibration stage of the model. Spatial analysis and geoprocessing techniques were used for this allocation, allowing a precise approach in the identification of the most vulnerable areas.

In this process, several masks were used, first a map of the Euclidean distance was generated from the main access roads, such as navigable roads and rivers. Then, this distance map was staggered between data 0 and 1 using Fuzzy logic. Values close to 1 were those located near the access roads and those close to zero, the most distant areas. Finally, an expansion or restriction mask was added by the

deforestation risk map (transition potential maps) to estimate the effect of access routes on deforestation risk, among other variables.

The distance variable of pre-existing deforestation was dynamically calculated in each iteration of the model, using the Dinamica Ego software. The results are presented in Figure X, which illustrates deforestation in the reference region, project area and leakage belt, as described in Tables 9a, 9b and 9c of the VM0015 methodology, located on pages 49 and 50.

Figure 47 - Projection of land cover in the reference region, project area and leakage belt until year 2051.



Source: Project Teams Elaboration, 2023

3.4 Additionality - Verra Additionality Tool

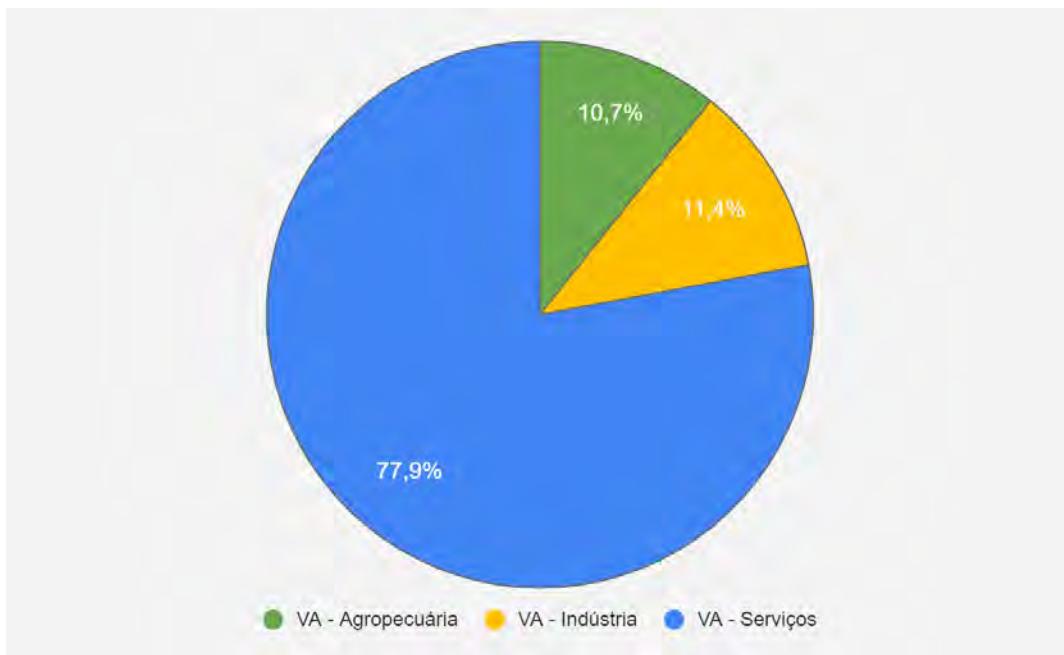
3.4.1 STEP 1. Identification of alternative land use scenarios

To identify the alternative land use scenarios to the VCS AFOLU project, the contribution of economic activities, based on the Gross Value Added (GVA), in the Gross Domestic Product (GDP) of the state of Acre was analyzed. GDP is an important indicator that measures the economic activity of a place (country, state or municipality), and in this way it is possible to visualize the credible scenarios that may occur in the absence of the VCS AFOLU project.

According to data reported in "Acre in numbers (2017)" the GDP of the state of Acre, in 2014, was approximately R \$ 13.46 billion in current values, obtaining a growth of 4.4% in GDP, the fourth highest growth rate among the Brazilian Federation Units. According to the historical series from 2002 to 2014, Acre is in second place in the ranking of accumulated growth (ZEE, 2022).

The Value Added (VA), which corresponds to the difference between the gross value of production and intermediate consumption, obtained a notable participation of the Services sector with almost 78% of the total VA in GDP, followed by the industry sector with 11.4%. The Agricultural sector represented 10.7% of the VA of the state of Acre, as shown in Figure X, R\$ 1.33 billion in total, influenced mainly by the agriculture of temporary crops, such as cassava and corn, in addition to the creation of cattle for beef.

Figure 48 - Value Added (VA) of Acre by economic, in 2014.



Subtitle: 77,9% Services, 11,4% Industry, 10,7% agriculture and livestock.

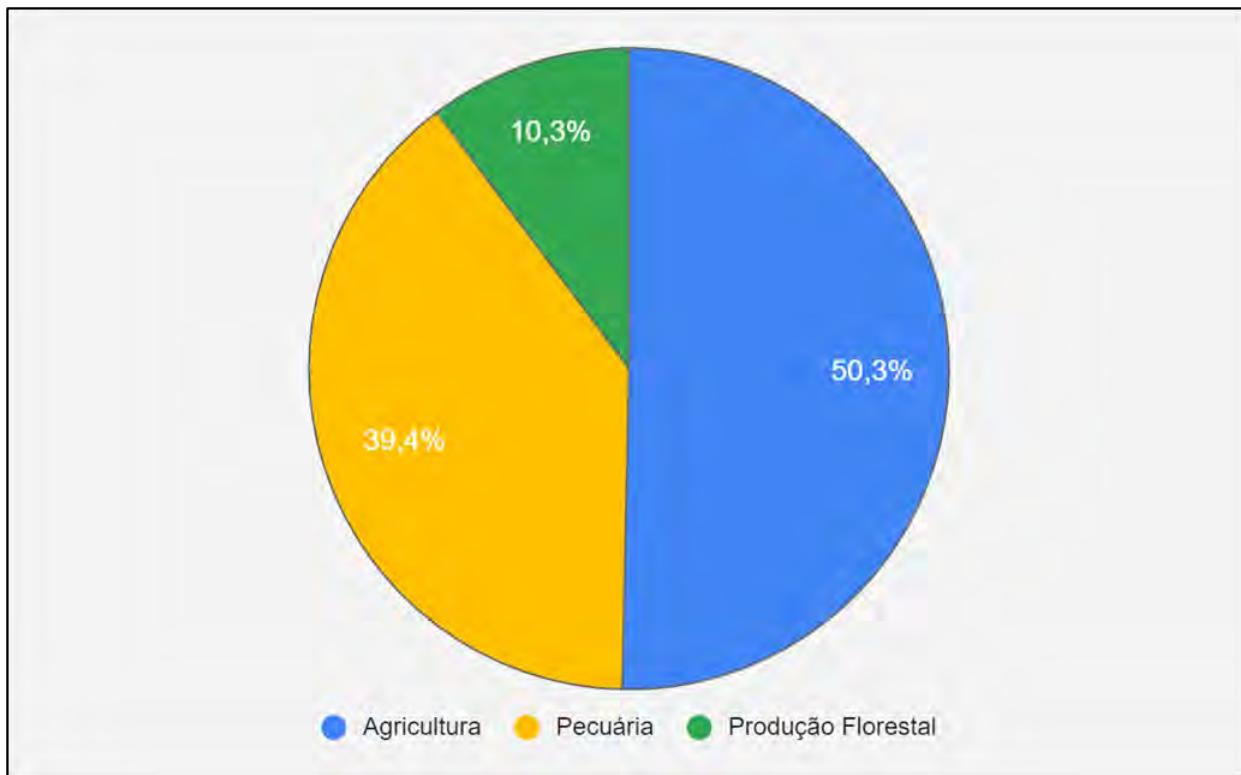
Source: ZEE, 2022

It was assumed that the scenario of pressure on the areas with forest cover, is for the implementation of traditional agricultural activities. Of these, the expectation is the choice of the activity(s) that are: a. of the common practice of the region; and b. that present the greatest potential for financial return. To select the activity(s), an analysis of the activities with the highest VA of the agricultural sector in the state of Acre was performed.

From the analysis of the participation by activity in the VA of the agricultural sector, it was possible to identify that agriculture corresponds to 50.3% (approx. R\$ 667 million) of the total VA, followed by livestock with 39.4% (approx. R\$ 552 million) and finally forest production with 10.3% (approx. R\$ 136 million).

Almost 90% of the total VA of the sector is composed of agriculture and livestock activities, suggesting a strong agricultural culture in Acre, divided into temporary and permanent crops, as well as cattle ranching for beef.

Figure 49 - Participation by activity in the VA of the agricultural sector, in 2014.



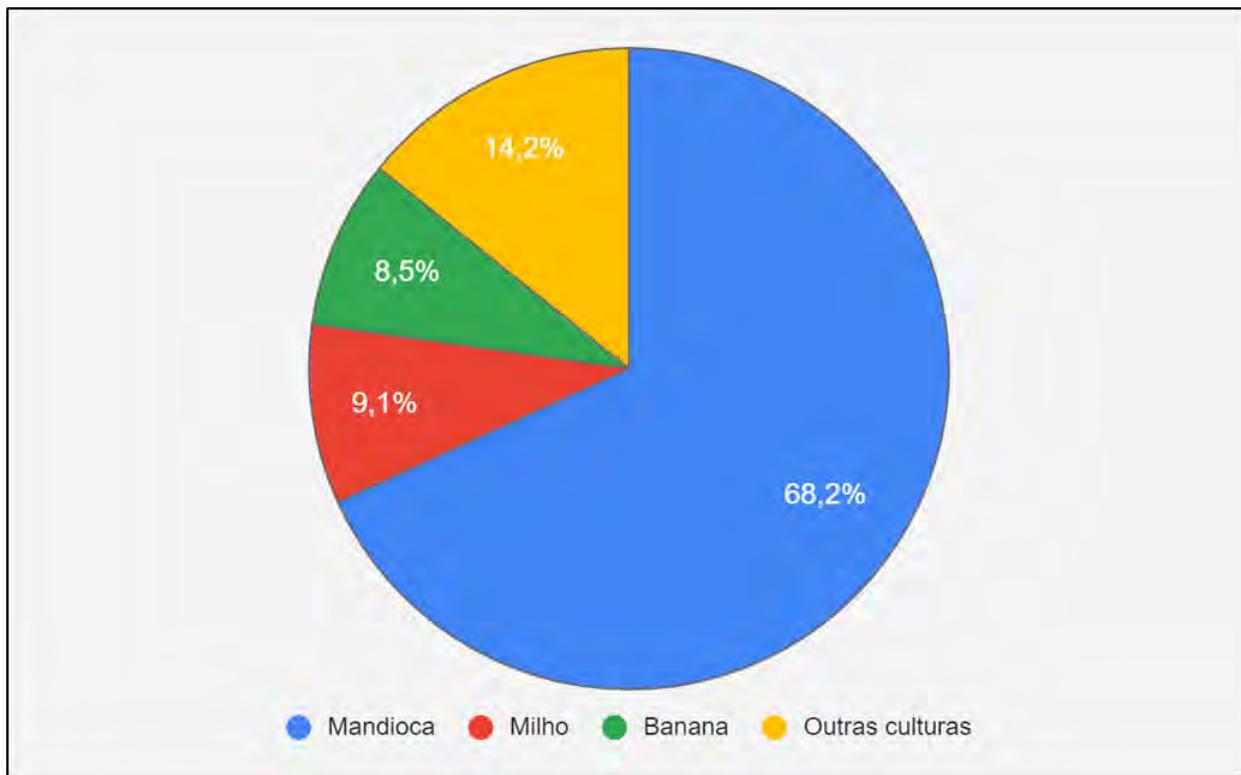
Subtitle: 50,3% Agriculture, 39,4% livestock, 10,3% Forest production.

Source: ZEE, 2022

About the agricultural activity in the state, we analyzed the crops that obtained the highest Gross Production Value (VBP) and, consequently, the highest participation in the VA of agriculture. At first it was noted the presence of temporary and permanent crops, but the one that stood out the most was cassava, with 68.2% of the total VBP of agriculture, reaching R\$ 450 million. Among the temporary crops, the highlight is the

corn crop, with 9.1% (approx. R\$ 60 million) of participation. All other crops (temporary and permanent) accounted for 14.2% of participation in the VA of agriculture.

Figure 50 - Participation of crops in the Agricultural Production Value of Acre, in 2014.



Subtitle: 68,2% cassava, 14,2% Other cultures, 8,5% Banana and 9,1% Corn.

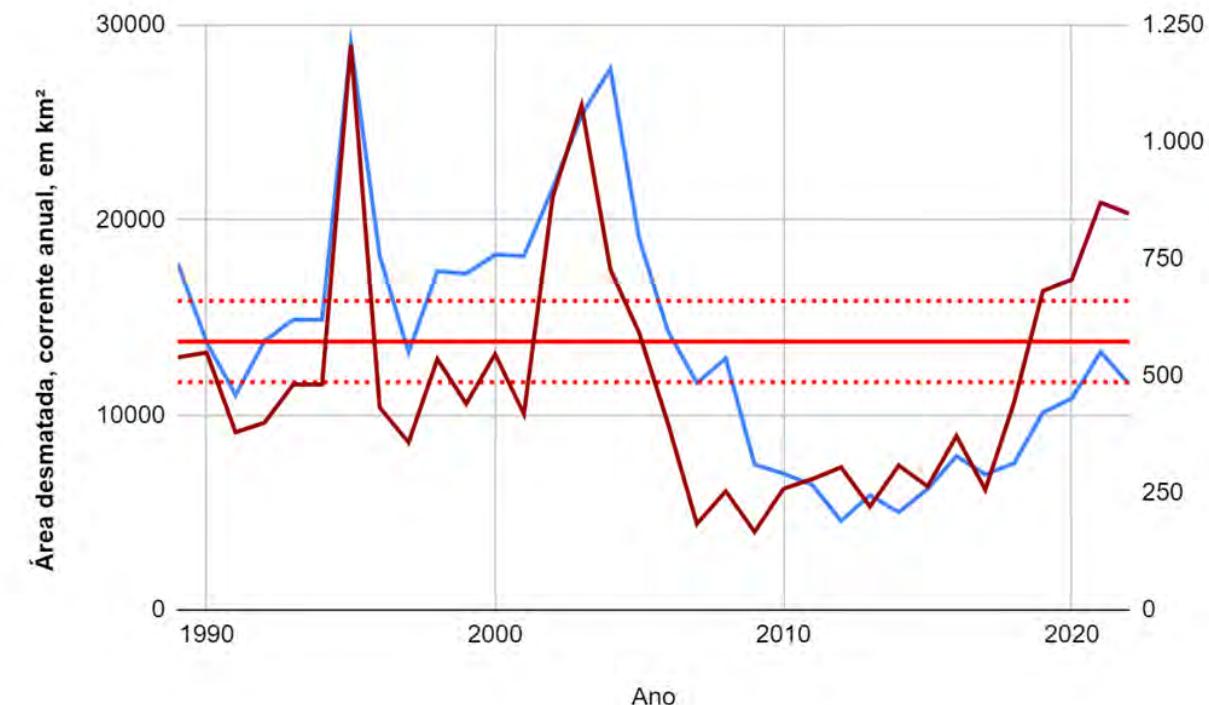
Source: ZEE, 2022

Of the scenarios described above, all corroborate the theses of numerous authors. The main one is that the main uses of the Amazon land are agriculture, selective logging, energy production (hydroelectric, oil and natural gas) and extractivism. The most common model of land use in the region is very well described by Soares-Filho et al. (2006). The process begins with accessibility, through the opening of branches, highways, or roads. These routes are mostly to enable the selective exploitation of wood, characterized by a rustic system, inadequate, antiquated and limited to a few species (ASNER et al. 2005). Then, after exhausting the stock of usable wood, the remaining vegetation is replaced by pasture for cattle raising or, more recently, agricultural crops (soybeans, for example) (SOARES-FILHO et al. 2006).

According to historical data from the National Institute for Space Research (INPE), through the Project for Monitoring Deforestation in the Legal Amazon by Satellite (PRODES), the annual average of the deforested area in the Amazon, until 2022, was 13,722 km² (\pm 2,087 km²) (INPE, 2023). The dynamics of deforestation

in the Amazon during the period 1988-2022 is presented in Figure X. Rates have cyclical peaks, without a clear definition of the reason for the ups and downs.

Figure 51 - Dynamics of annual deforestation in the Amazon (blue line), in the State of Acre (brown line, right axis), annual average (red line) and its minimum and maximum probable estimates (dotted lines), by year from 1988 to 2022.



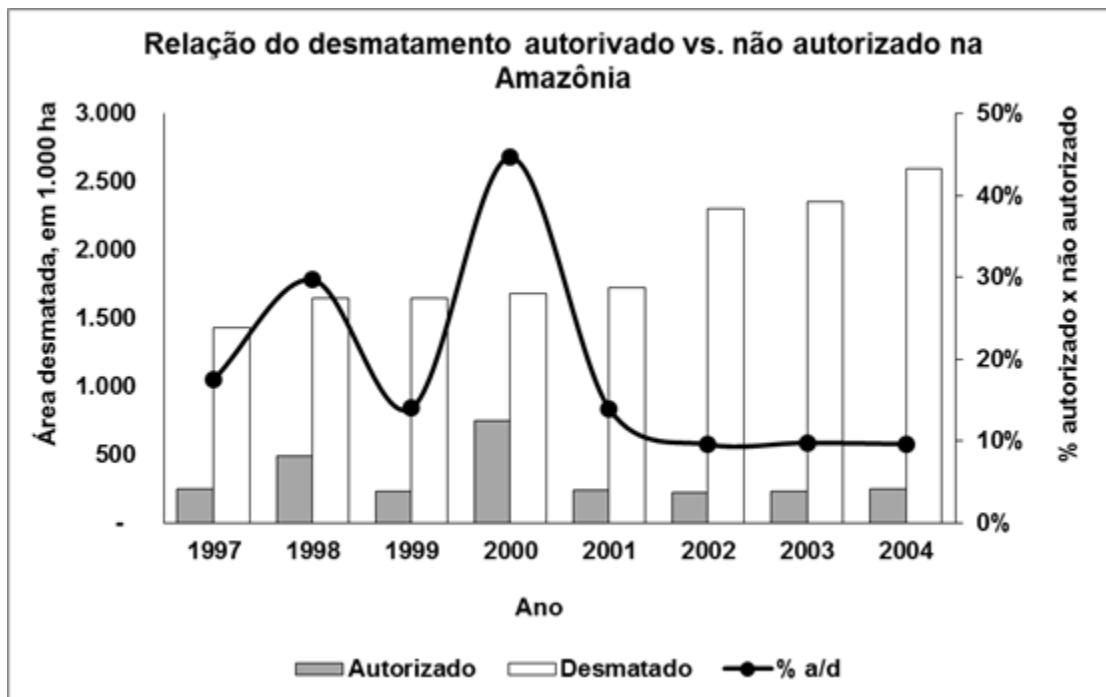
Source: INPE

The estimated accumulated deforestation in the Amazon until 2022 is 844,740 km² by 2022, which corresponds to approximately 17% of the Amazon (assuming a total area of the Legal Amazon, according to SKOLE & TUCKER (1993), of approx. 4.9 million km²). In other words, the Amazon has already deforested 3.4 times the State of São Paulo. Higuchi (2006) tried to correlate deforestation and increase in national GDP and concluded that the signals are weak ($r = 0.36$, $p = 0.17$) to affirm that there is a correlation between these variables. Due to the lack of forest policy in the Amazon, deforestation has had a stochastic behavior, concluded Higuchi (2006).

The crucial point in the dynamics of deforestation in the Amazon is the way in which deforestation is carried out. Much of this deforestation is still done without authorization from the responsible environmental agency, the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), that is, illegal deforestation. Figure X shows the relationship between authorized and unauthorized deforestation during the period from 1997 to 2004 (HIGUCHI, 2006). During this period, the maximum that was achieved was

42% in 2000, that is, 42% of the area deforested that year was authorized by IBAMA. In the last three years evaluated (2002, 2003 and 2004), the authorization does not reach 10% of what was, in fact, deforested.

Figure 52 - Relationship (%) between authorized and unauthorized deforestation in the Brazilian Amazon.



Source: Higuchi, 2006

3.4.1.1 Sub-Step 1a. Identification of credible alternative land use scenarios to the VCS AFOLU project

Acre produces many of the foods it consumes and this production has been growing year by year. In 2022, Acre's Gross Value of Agricultural Production (VBP) is projected by the Ministry of Agriculture and Livestock at R\$2.5 billion, 16% of the state's GDP (ACRE, 2022).

According to the Government of Acre (2017), approximately 90% of the total VA (Added Value) of the agricultural sector is composed of agriculture and livestock activities, divided into temporary and permanent crops and cattle ranching for beef.

Cattle ranching for beef is an important productive activity in the state of Acre, corresponding to 4.23% of the total GDP of production, moving about 522 million reais in 2014. From 2016, the activity obtained authorization to export the canned meat product to the European Union, causing Acre to enter this select group of Federative Units that have support for the export of meat (Acre in numbers, 2017).

According to Sá (2010) beef cattle can be carried out at different technological levels, from traditional or improved systems, using techniques for the improvement of pasture, contributing to the increase of income and reduction of the costs of the activity.

Cassava has several advantages over other agricultural crops having the central role in production, for its cultural and historical relevance, as well as for being the basis of family farming in the state. Economic and financial estimates, such as production costs and income/revenues, are calculated based on work such as Matsunaga et al. (1976) and Silva et al. (2017).

Corn has a high productive potential and is very responsive to technology. The crop has great economic and social importance besides being considered one of the main species of cereals used in Brazil (STRIEDER, 2006). The production of corn (approx. 60% of global production) is intended for animal feed, being used in the form of grains, brans, silage or using feed.

In Brazil, production is mainly destined to the poultry, swine and livestock sectors, representing around 60% of the national production (LIMA, 2020). According to Acre (2017), in 2014 approximately 104.99 million tons were produced, with a production value of approximately R\$ 59.76 million, representing 9.05% of the VBP (ACRE, 2017).

3.4.1.2 Sub-Step 1b. Consistency of credible land use scenarios with mandatory applicable laws and regulations.

-Legal Basis and Current Legislation for the alternative scenarios to the VCS AFOLU project for land use

The Constitution of the Federative Republic of Brazil, of 1988, in Title VIII, Chapter VI (On the Environment) establishes in article 225 that all Brazilians have the right to an ecologically balanced environment, a good for the common use of the people and essential to a healthy quality of life, imposing on the Government and the community the duty to defend and preserve it for present and future generations. Among the main duties of the State, the following stand out: "to preserve the diversity and integrity of the country's genetic heritage". Paragraph 4 of Article 225 of Chapter VI – On the environment – of the Constitution establishes that the Brazilian Amazon forest is a national heritage and its use shall be made, in accordance with the law, under conditions that ensure the preservation of the environment, including the use of natural resources.

-Forest Code

The new Brazilian Forest Code, Law No. 12,651 of May 25, 2012, provides for the protection of native vegetation and amends three laws and repeals two laws and a provisional measure. The Forest Code establishes the limits and extensions of the Permanent Preservation Areas (APP) and Legal Reserve (RL) in all biomes of the country. For the Amazon, it is established that each and every private rural property must register 80% of its area for the RL, that is, the alternative use of the land is allowed in the remaining 20% of the area of the property. But despite focusing mainly on the preservation of Brazil's native vegetation, it also presents some guidelines on the use and exploitation of forest products. It also establishes the rules and appropriate punishments for environmental liabilities (degradation and deforestation).

Alternative land use is the replacement of native vegetation and successor formations by other land cover, such as agricultural, industrial, energy generation and transmission, mining and transportation, settlements or other forms of human occupation (item VI, art. 3, Federal Law No. 12,651/2012).

One of the legal instruments that underpin the licensing and authorization processes for environmental intervention in the State of Acre is: Cemact Resolution No. 3, of June 27, 2008, which defines the technical and administrative procedures related to environmental licensing processes for land use with potentially impacting agricultural crops (ACRE, 2009). Among the permissible activities for implementation in areas of multiple land use, are described by the Division of Land Use (DUS), the Institute of Environment of Acre (IMAC).

3.4.1.3 Sub-Step 1c. Baseline scenario selection

Considering the data presented, based on economic indicators for the state of Acre, the possible realistic and credible scenarios of alternative land use that could occur within the limits of the proposed project area, in the absence of the VCS AFOLU project for the Shawādawa IL are:

Scenario 1: Deforestation for the introduction of cattle ranching activity (traditional system) for cutting, since the production of cattle is an important productive activity of the state of Acre, which since 2016 has been authorized to export to the European Union.

Scenario 2: Deforestation for the introduction of cattle ranching activity (advanced system) for cutting, due to the same fact described in scenario 1.

Scenario 3: Deforestation for the introduction of cassava cultivation and production activity, due to the central role in the production of state agriculture, its cultural and historical relevance, in addition to being the basis of local family farming, cassava culture has a strong tendency to be implemented and expanded to new areas with forest cover.

Scenario 4: Deforestation for the introduction of the activity of culture and production of corn, because it is the second most important temporary crop and constituent of raw material essential to the manufacture of animal feed, the corn crop has a strong tendency to be implemented and disseminated.

Scenario 5: VCS AFOLU Project, the costs of implementation and management of the VCS AFOLU project were based on the expectation presented by the proponent. The revenue, it was assumed that 100% of the carbon credits generated in each year would be traded in its entirety, at an average value of 10.59 USD. Revenue was adjusted based on the same interest rate as the other scenarios.

3.4.2 STEP 2. Investment Analysis

The investment analysis determines whether the proposed project activity, without the revenue from the sale of GHG credits, is economically or financially less attractive than at least one of the other land use scenarios.

3.4.2.1 Sub-Step 2a. Investment Analysis Method

The VCS AFOLU Project (Shawādawa) does not generate any economic or financial benefit other than revenue related to the commercialization of the carbon credits generated by the project. Thus, the investment analysis method is through Cost Analysis (Option I).

As alternative land use scenarios to the VCS AFOLU project, the following were selected:

Traditional livestock - cattle breeding for beef;

Advanced livestock - cattle breeding for beef;

Agriculture - cassava culture;

Agriculture - corn crop;

3.4.2.1.1 Important notes:

Production cost data are from secondary sources, from publications available in the literature;

The values of costs related to the production of the alternative scenarios to the VCS AFOLU project were corrected, annually, based on the expectation of interest of 6.28%, assuming the historical average of the IPCA (National Consumer Price Index), according to IBGE (2023);

The operational costs of the VCS AFOLU project will not be corrected, according to the guidance of the Project Proponent;

The values corresponding to the production of the alternative scenarios to the VCS AFOLU project were converted from Real (R\$ or BRL) US dollar (\$ or USD), considering a projected exchange rate variation of 5% per year, based on the historical average of the exchange rate variation (AASP; Investing; UOL;).

3.4.2.1.2 Profitability analysis by scenario

For the projection of costs associated with Scenario 1: Deforestation for the introduction of cattle ranching activity (traditional system) for cutting and Scenario 2: Deforestation for the introduction of cattle ranching activity (advanced system) for cutting, data on productivity (@ ha-1 year-1), annual gross income (R\$ ha-1) and total annual cost (R\$ ha-1) of the study by Sá (2010) were used.

For Scenario 3: Deforestation for the introduction of cassava cultivation and production activity, data on gross revenue (R\$ ha-1), total operating cost (R\$ ha-1 year-1) and net revenue (R\$ ha-1 year-1) were used from the study by Silva et al (2017).

For Scenario 4: Deforestation for the introduction of corn crop and production activity, data on average gross revenue (R\$ ha-1 year-1) and average net revenue (R\$ ha-1 year-1) from the study by Sá (2013) were used.

All values were adjusted according to the minimum projection of the IPCA (National Consumer Price Index) rate (5.18% per year) and converted to U.S. dollars (USD) as described earlier in this document.

3.4.2.1.3 Comparative analysis

According to the comparative analysis of the Net Present Value (NPV) of the identified scenarios, it was observed that the scenarios "Advanced livestock" and "Cassava culture" presented the most attractive yield results among all the other scenarios evaluated, including the scenario of the VCS AFLOU project.

Table 28 - Comparative analysis of the VLP between the scenarios and the VCS AFOLU project.

Scenario	Net Present Value in 30 YEARS (x1.000 U S D)
Traditional Livestock	\$ 26.212,17
Advanced Livestock	\$ 87.545,56
Cassava Cultivation	\$ 122.277,27
Corn Cultivation	\$ 16.395,79
Project VCS AFOLU	\$ 60.469,20

Source: Project Teams Elaboration, 2023

3.4.2.1.4 Conclusion

According to the economic and financial analysis of the proposed scenarios and the expected revenues of the VCS AFOLU project, it was identified that the VCS AFOLU project activity is economically and financially less attractive than at least the scenario of implementation of pasture systems for cattle (cattle) breeding, assuming the advanced system and cassava crop.

Therefore, it is concluded that the VCS AFOLU Project is additional.

3.4.3 STEP 4. Analysis of “Common Practice”

-Main economic activities of land use

Already described in STEP 1 and its respective Sub-steps.

-VCS AFOLU and similar projects in the region:

To analyze whether AFOLU VCS projects are common in the region, a search was conducted in the systems of standards of methodologies (Verra, Gold Standard and Social Carbon).

In the Gold Standard and Social Carbon standards, no similar project was found or identified in the region/state of Acre.

According to Verra, there are three (3) methodologies eligible for the region, they are: VM0007, VM0011 and VM0015. Specifically, the following were found:

VM0007: Four (4) projects have been identified in the state of Acre, they are:

The Brazilian Amazon APD Group Project

The Valparaiso Project

The Russas Project

The Purus Project

VM0011: No projects identified in the state of Acre

VM0015: One (1) project has been identified in the state of Acre:

Agrocortex REDD Project

Considering a) the total area of carbon credit generation projects and the number of projects and 'establishments' dedicated to this activity and b) the total area of alternative land use projects and the number of establishments dedicated to common practice, it is possible to affirm that the project is additional.

3.5 Methodology Deviations

There was no deviation in the methodology applied.

3.6 Quantification of GHG Emission Reductions and Removals

3.6.1 Baseline Emission

3.6.1.1 Step 5 Definition of the Land-use and Land-cover change component of the baseline.

3.6.1.1.1 Step 5.1 Calculation of baseline activity data per forest class;

We used the combination of the annual deforestation maps of the baseline of each future year with the land use and cover map of the current scenario (initial situation), in order to a set of maps showing which pixels would be deforested each year in the absence of the project activity. The number of hectares that would be deforested were extracted from these maps and the results of the baseline projections showed deforestation of approximately 30,726 hectares in the Project Area between 2022 and 2051 and 30,387 hectares in the Leakage Belt.

Table 29 - (Table 11a VM0015) Annual areas deforested per forest class icl within the reference region in the baseline case (baseline activity data per forest class)

Area deforested per forest class icl within the reference region			Total baseline deforestation in the reference region	
$ID_{icl} >$	1	icl	$ABSLRR_t$	$ABSLRR$
Name >			annual	cumulative
Project year t	ha	ha	ha	ha
2022	6331,182	6331,182	6331,182	228987,135
2023	78238,367	78238,367	78238,367	307225,502
2024	38287,14	38287,14	38287,14	345512,642
2025	37253,073	37253,073	37253,073	382765,715
2026	36247,748	36247,748	36247,748	419013,463
2027	35268,047	35268,047	35268,047	454281,51
2028	34313,56	34313,56	34313,56	488595,07
2029	33386,421	33386,421	33386,421	521981,491
2030	32484,179	32484,179	32484,179	554465,67
2031	31606,91	31606,91	31606,91	586072,58
2032	30753,346	30753,346	30753,346	616825,926
2033	29921,433	29921,433	29921,433	646747,359
2034	29113,561	29113,561	29113,561	675860,92
2035	28326,743	28326,743	28326,743	704187,663
2036	27561,818	27561,818	27561,818	731749,481
2037	26817,38	26817,38	26817,38	758566,861
2038	26092,242	26092,242	26092,242	784659,103
2039	25386,75	25386,75	25386,75	810045,853
2040	24701,457	24701,457	24701,457	834747,31
2041	24034,673	24034,673	24034,673	858781,983
2042	23384,658	23384,658	23384,658	882166,641
2043	22753,058	22753,058	22753,058	904919,699
2044	22137,393	22137,393	22137,393	927057,092
2045	21539,55	21539,55	21539,55	948596,642
2046	20957,697	20957,697	20957,697	969554,339
2047	20391,451	20391,451	20391,451	989945,79
2048	19840,256	19840,256	19840,256	1009786,046
2049	19304,752	19304,752	19304,752	1029090,798
2050	18783,265	18783,265	18783,265	1047874,063
2051	18275,424	18275,424	18275,424	1066149,487

Source: Project Teams Elaboration, 2023

Table 30. (Table 11b VM0015) Annual areas deforested per forest class icl within the project area in the baseline case (baseline activity data per forest class)

Area deforested per forest class			Total baseline deforestation in the project area	
$ID_{icl} >$	1	lcI	$ABSLPA_t$	$ABSLPA$
Name >			annual	cumulative
Project year t	ha	ha	ha	ha
2022	0	0	0	739,258
2023	158,922	158,922	158,922	898,18
2024	570,458	570,458	570,458	1468,638
2025	717,318	717,318	717,318	2185,956
2026	767,265	767,265	767,265	2953,221
2027	620,407	620,407	620,407	3573,628
2028	385,626	385,626	385,626	3959,254
2029	586,45	586,45	586,45	4545,704
2030	1015,018	1015,018	1015,018	5560,722
2031	780,264	780,264	780,264	6340,986
2032	673,371	673,371	673,371	7014,357
2033	1211,857	1211,857	1211,857	8226,214
2034	1021,028	1021,028	1021,028	9247,242
2035	1306,714	1306,714	1306,714	10553,956
2036	1110,916	1110,916	1110,916	11664,872
2037	1059,959	1059,959	1059,959	12724,831
2038	1167,866	1167,866	1167,866	13892,697
2039	1375,624	1375,624	1375,624	15268,321
2040	1245,765	1245,765	1245,765	16514,086
2041	895,102	895,102	895,102	17409,188
2042	1528,431	1528,431	1528,431	18937,619
2043	1320,635	1320,635	1320,635	20258,254
2044	1107,848	1107,848	1107,848	21366,102
2045	1361,597	1361,597	1361,597	22727,699
2046	1434,524	1434,524	1434,524	24162,223
2047	1267,73	1267,73	1267,73	25429,953
2048	1427,539	1427,539	1427,539	26857,492
2049	1459,505	1459,505	1459,505	28316,997
2050	1519,435	1519,435	1519,435	29836,432
2051	1629,347	1629,347	1629,347	31465,779

Table 31 - (Table 11.c VM0015) Annual areas deforested per forest class lcI within the leakage belt area in the baseline case (baseline activity data per forest class)

Area deforested per forest class l_{cl} within the leakage belt area			Total baseline deforestation in the leakage belt area	
$ID_{l_{cl}}$	1	l_{cl}	$ABSLLK_t$	$ABSLLK$
Name >			annual	cumulative
Project year t	ha	ha	ha	ha
2022	1012,899	1012,899	1012,899	2440,176
2023	1664,791	1664,791	1664,791	4104,967
2024	1559,826	1559,826	1559,826	5664,793
2025	1513,858	1513,858	1513,858	7178,651
2026	1427,874	1427,874	1427,874	8606,525
2027	1202,062	1202,062	1202,062	9808,587
2028	1324,974	1324,974	1324,974	11133,561
2029	1457,802	1457,802	1457,802	12591,363
2030	1492,798	1492,798	1492,798	14084,161
2031	1194,003	1194,003	1194,003	15278,164
2032	1482,754	1482,754	1482,754	16760,918
2033	1190,031	1190,031	1190,031	17950,949
2034	1249,977	1249,977	1249,977	19200,926
2035	1163,021	1163,021	1163,021	20363,947
2036	1092,095	1092,095	1092,095	21456,042
2037	1048,133	1048,133	1048,133	22504,175
2038	988,161	988,161	988,161	23492,336
2039	933,2	933,2	933,2	24425,536
2040	1103,071	1103,071	1103,071	25528,607
2041	880,255	880,255	880,255	26408,862
2042	734,382	734,382	734,382	27143,244
2043	744,365	744,365	744,365	27887,609
2044	644,449	644,449	644,449	28532,058
2045	629,472	629,472	629,472	29161,53
2046	365,69	365,69	365,69	29527,22
2047	667,43	667,43	667,43	30194,65
2048	535,543	535,543	535,543	30730,193
2049	493,573	493,573	493,573	31223,766
2050	321,719	321,719	321,719	31545,485
2051	268,776	268,776	268,776	31814,261

Source: Project Teams Elaboration, 2023

3.6.1.1.2 Step 5.2 Calculation of baseline activity data per post-deforestation class;

Method 1 available in the VM0015 methodology was used to define the class that will replace the forest cover in the baseline of the Project (anthropic vegetation in equilibrium). Table X shows the area of zone 1, which covers the Project Area, Leak Belt and Leak Management Areas, and the corresponding areas of each land use/post-deforestation land use change class.

Table 32 - Zones of the Reference Region encompassing different combinations of potential post-deforestation LU/LC classes.

Zone		Name:		Total of all other LU/LC classes present in the Zone		Total area of each Zone	
		ID _{fcl}	1	Area	% of Zone	Area	% of Zone
		ID _z	Name	ha	%	ha	%
1	Zone 1	666.681	100	94.229	14,1340162	666.681	100
Total area of each class fcl		666.681	100	94.229	14,1340162	666.681	100

Source: Project Teams Elaboration, 2023

Table 33 - Annual areas deforested in each zone within the project area in the baseline case (baseline activity data zone).

		Total baseline deforestation in the project area	
IDz	1	ABSLPA t	ABSLPA
Name	Zone 1	annual	cumulative
Project year t	ha	ha	ha
2022	0,00	0,00	739,26
2023	158,92	158,92	898,18
2024	570,46	570,46	1.468,64
2025	717,32	717,32	2.185,96
2026	767,27	767,27	2.953,22
2027	620,41	620,41	3.573,63
2028	385,63	385,63	3.959,25
2029	586,45	586,45	4.545,70
2030	1.015,02	1.015,02	5.560,72
2031	780,26	780,26	6.340,99
2032	673,37	673,37	7.014,36
2033	1.211,86	1.211,86	8.226,21
2034	1.021,03	1.021,03	9.247,24
2035	1.306,71	1.306,71	10.553,96
2036	1.110,92	1.110,92	11.664,87
2037	1.059,96	1.059,96	12.724,83
2038	1.167,87	1.167,87	13.892,70
2039	1.375,62	1.375,62	15.268,32
2040	1.245,77	1.245,77	16.514,09
2041	895,10	895,10	17.409,19
2042	1.528,43	1.528,43	18.937,62
2043	1.320,64	1.320,64	20.258,25
2044	1.107,85	1.107,85	21.366,10
2045	1.361,60	1.361,60	22.727,70
2046	1.434,52	1.434,52	24.162,22
2047	1.267,73	1.267,73	25.429,95
2048	1.427,54	1.427,54	26.857,49
2049	1.459,51	1.459,51	28.317,00
2050	1.519,44	1.519,44	29.836,43
2051	1.629,35	1.629,35	31.465,78

Source: Project Teams Elaboration, 2023

Table 34 - Annual areas deforested in each zone within the leakage belt in the baseline case (baseline activity data per zone).

		Total baseline deforestation in the leakage belt	
<i>IDz</i>	1	<i>ABSLLKt</i>	<i>ABSLLK</i>
Name	Zone 1	annual	cumulative
object year t	ha	ha	ha
2022	1.012,90	1.012,90	2.440,18
2023	1.664,79	1.664,79	4.104,97
2024	1.559,83	1.559,83	5.664,79
2025	1.513,86	1.513,86	7.178,65
2026	1.427,87	1.427,87	8.606,53
2027	1.202,06	1.202,06	9.808,59
2028	1.324,97	1.324,97	11.133,56
2029	1.457,80	1.457,80	12.591,36
2030	1.492,80	1.492,80	14.084,16
2031	1.194,00	1.194,00	15.278,16
2032	1.482,75	1.482,75	16.760,92
2033	1.190,03	1.190,03	17.950,95
2034	1.249,98	1.249,98	19.200,93
2035	1.163,02	1.163,02	20.363,95
2036	1.092,10	1.092,10	21.456,04
2037	1.048,13	1.048,13	22.504,18
2038	988,16	988,16	23.492,34
2039	933,20	933,20	24.425,54
2040	1.103,07	1.103,07	25.528,61
2041	880,26	880,26	26.408,86
2042	734,38	734,38	27.143,24
2043	744,37	744,37	27.887,61
2044	644,45	644,45	28.532,06
2045	629,47	629,47	29.161,53
2046	365,69	365,69	29.527,22
2047	667,43	667,43	30.194,65
2048	535,54	535,54	30.730,19
2049	493,57	493,57	31.223,77
2050	321,72	321,72	31.545,49
2051	268,78	268,78	31.814,26

Source: Project Teams Elaboration, 2023

3.6.1.1.3 Step 5.3 Calculation of baseline activity data per LU/LC change category.

It does not apply, method 2 was not used.

3.6.1.2 Step 6 Estimation of Baseline Carbon Stock Changes and non-CO₂ emissions

3.6.1.2.1 Step 6.1 Estimation of baseline carbon stock changes

3.6.1.2.1.1 Step 6.1.1 Estimation of the average carbon stocks of each LU/LC class

The technical guidelines for carrying out the forest inventory are in accordance with Methodology for Avoided Unplanned Deforestation VM 0015v1.1. Field measurements in each project activity instances were conducted by TECMAN according to the following method:

The method to estimate carbon stock considered the use of sampling of part of the forest, considering the minimum required parameters, such as a 10% error at a 90% confidence level, for the carbon stock variable. Sample plots were arranged in clusters, distributed according to forest typologies present in project area.

We estimated biomass and forest carbon, with statistical analysis according to the sampling method used, in addition we analyzed phytosociological structure of the forest, including its diversity. (see Appendix 2 for forest inventory details).

3.6.1.2.1.1.1 Sampling

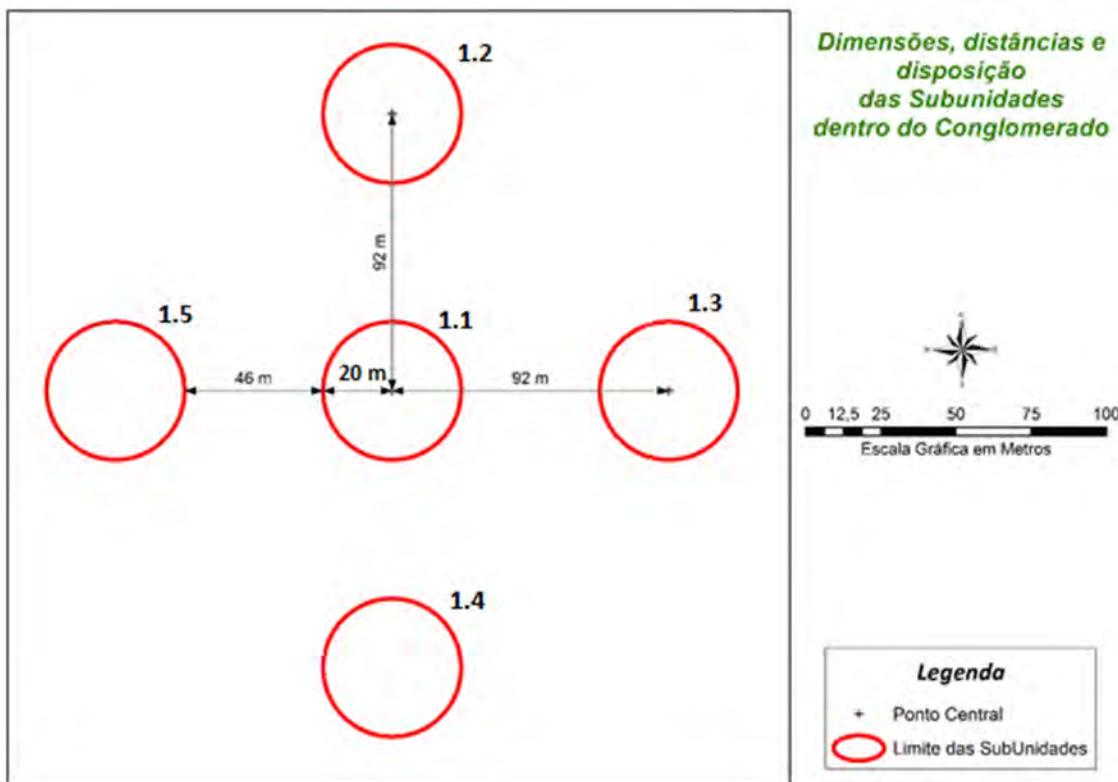
Due to the size of each the project area, sampling was done in clusters, as presented by Pélico Netto and Brena (1997). According to the authors, this type of sampling is a variation of two-stage sampling, where the second stage is systematically organized within the first stage.

This method can offer greater advantages in terms of precision and costs, when compared to simple random sampling, when the inventoried population is large and the variable of interest presents great and even reasonable homogeneity.

3.6.1.2.1.1.2 Plot size and plot shape

The cluster shape was “Malta cross”, consisting of 5 circular plots with an area of 1,256.64 m² each, totaling 6,283.20 m² (0.628 ha) for the cluster.

Figure 53 - Plot shape and cluster shape used in the forest inventory for estimating carbon stock.



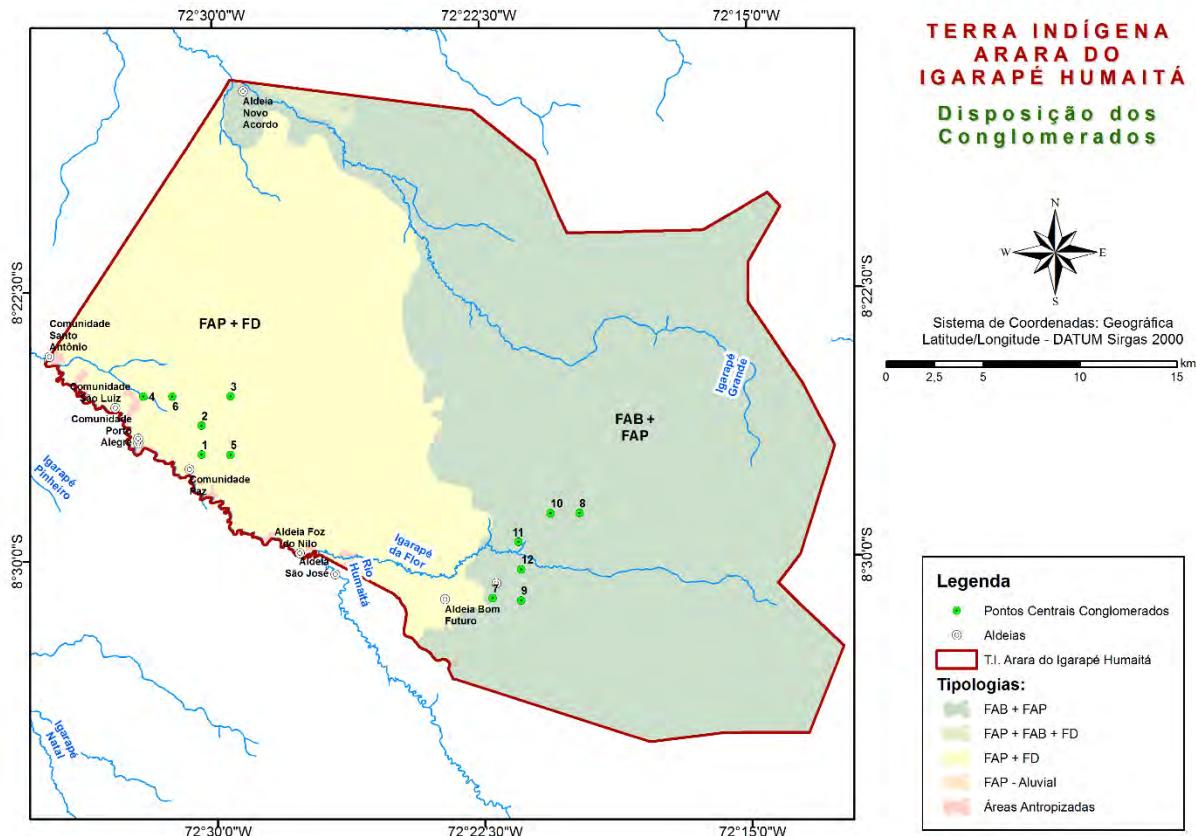
Subtitle: Dimensions, distances and arrangement of subunits in the conglomerate.

Source: Project Teams Elaboration, 2023

3.6.1.2.1.1.3 Plot location

The clusters were randomly distributed in the forest area, considering the main forest types present.

Figure 54 - Cluster allocation in project area.



Source: Project Teams Elaboration, 2023

3.6.1.2.1.1.4 Biomass stocks

The biomass stock was calculated considering the dry biomass below and above the ground, as well as the total dry biomass, using the allometric equations developed by Melo (2017) in the South Western Amazon, in the state of Acre, considering a simple entry model. The equations were adjusted as shown below, where DBH is the main variable to estimate biomass.

Equation 1 – Equation to estimate belowground dry biomass (MELO, 2017).

Equation 2 – Equation to estimate aboveground dry biomass (MELO, 2017).

Equation 3 – Equation to estimate total dry biomass (MELO, 2017).

The carbon stock estimation can be obtained from the product of forest biomass by carbon concentration (Higuchi 2004). In a conservative approach we consider the carbon concentration of 47%, values indicated by the IPCC (Intergovernmental Panel on Climate Change). Therefore, the carbon stock was calculated as follows:

Equation 4 – Equation for converting dry biomass into carbon.

$$C = \text{Biomass kg/tree} * 0.47$$

According to IPCC 2006 Guidelines for National Greenhouse Gas Inventories, the estimated stock in forest inventory must be multiplied by 3.6667 (44/12), since 1 kg of C corresponds to 3.66667 kg of CO₂.

3.6.1.2.1.1.5 Sample size

The sampling intensity adopted was based on regional experiences, considering inventories in large extensions of forests (ACRE, 1992).

Table 35 - Sampling intensity for the forest inventory area.

Information	Values
Total Area	76.542,46 ha
Forest Area	76.402,62 ha
Sample area	7,540 ha
Sample intensity	0,010%
Conglomerates number	12
Parcel numbers (1.256,54 m ²)	60

Source: Project Teams Elaboration, 2023

The sampling effort proved adequate for the inventory carried out, considering the method applied and its formulations set out in Annex 3 of document VM00015 (Equation A3-1). The value of n calculated was approximately 17 plots, compared to the 60 plots launched in the inventory. The number of plots was able to capture the variability of the forest inventoried, keeping the sampling error within the minimum required parameter, in compliance with VM00015, shown below.

Equation A3-1 – Equation and calculation log for determining the sample size, Annex 3, VM00015.

$$n = t^2 * CV^2 E^2 + t^2 * CV^2 N$$

$$n = 1,6712 * 5,94^2 9,932 + 1,6712 * 5,94^2 694,164,31$$

$$n = 16,84$$

n = total number of sample units to be measured

tst = t-student value for a 90% confidence level and 25 plots (t= 1,671)

CV% = coefficient of variation (5,94%)

E% = sample error in percentage (9,93%)

N = population size or maximum number of possible sample units (total area 76.402,62 ha and plot area 0,1256ha)

3.6.1.2.1.1.6 Carbon stocks

The average carbon stock was estimated at 100.484,47 kg/ha (100,48 t/ha), and consequently, the estimate total carbon stock for the population was 7.677.276.648,83 kg (7.677.276,65 t/ha). The allowable sample error in percentage is below what was established as admissible (E=9,93%), providing confidence intervals of 19.946,93 kg/ha (90.511,00 kg/ha ≤ total carbon average ≤ 110.457,94 kg/ha). Considering a 90% probability of success, the true average will be found in this interval.

Table 36 - Forest inventory statistical analysis for the variables Belowground Carbon, Aboveground Carbon and Total Carbon at project area.

Parameter	Notation	Cbb below-ground Carbon	Cab above-ground Carbon	Ctot Carbon Total
Average Carbon per plot	\bar{x}	1.629,49 kg/0,13ha	10.986,63 kg/0,13ha	12.627,25 kg/0,13ha
Average Carbon per hectare	$\bar{x}_{(ha)}$	12.967,06 kg/ha	87.428,85 kg/ha	100.484,47 kg/ha
Total Carbon of the population	X	1.131.133.174,43 kg	7.626.529.114,09 kg	8.765.386.781,84 kg
Mean Square Between Cluster	MQ.	581.916,89	25.401.162,52	33.749.088,79
Mean Square Within Clusters	MQ.	747.698,21	33.066.131,13	43.851.057,65
Within Clusters Variance	S ² d	747.698,21	33.066.131,13	43.851.057,65
Between Clusters Variance	S ² e	-33.156,26	-1.532.993,72	-2.020.393,77
Population variance		714.541,95 kg ²	31.533.137,40 kg ²	41.830.663,88 kg ²
Standard deviation	s _x ²	845,31 kg	5.615,44 kg	6.467,66 kg
Mean variance	s _x	9.698,61 kg ²	423.352,71 kg ²	562.484,81 kg ²
Standard Error	s _x ²	98,48 kg	650,66 kg	749,99 kg
Coefficient of variation:	CV (%)	6,04%	5,92%	5,94%
Error (Absolute):	E	164,57 kg	1.087,31 kg	1.253,30 kg
Error (Relative)	E(%)	10,10%	9,90%	9,93%
Confidence interval (90%):		1.464,92kg/0,13ha	9.899,33kg/0,13ha	11.373,95kg/0,13ha
	CI per plot=	$\leq X \leq$ 1.794,06kg/0,13ha	$\leq X \leq$ 12.073,94kg/0,13ha	$\leq X \leq$ 13.880,55kg/0,13ha
	CI per hecitar =	11.657,44 kg/ha $\leq X \leq$ 14.276,68 kg/ha	78.776,35 kg/ha $\leq X \leq$ 96.081,36 kg/ha	90.511,00 kg/ha $\leq X \leq$ 110.457,94 kg/ha
	CI for population=	890.659.052,66kg $\leq X \leq$ 1.090.775.999,30 kg	6.018.719.357,66kg $\leq X \leq$ 7.340.867.694,57 kg	6.915.277.622,15kg $\leq X \leq$ 8.439.275.675,51 kg

Source: Project Teams Elaboration, 2023

Table presents the average carbon values per hectare for each initial class of land use and cover considered for the baseline scenario.

Table 37 - Estimated values of carbon stocks per hectare of initial forest classes *icl* existing in the Project Area and Leakage Belt.

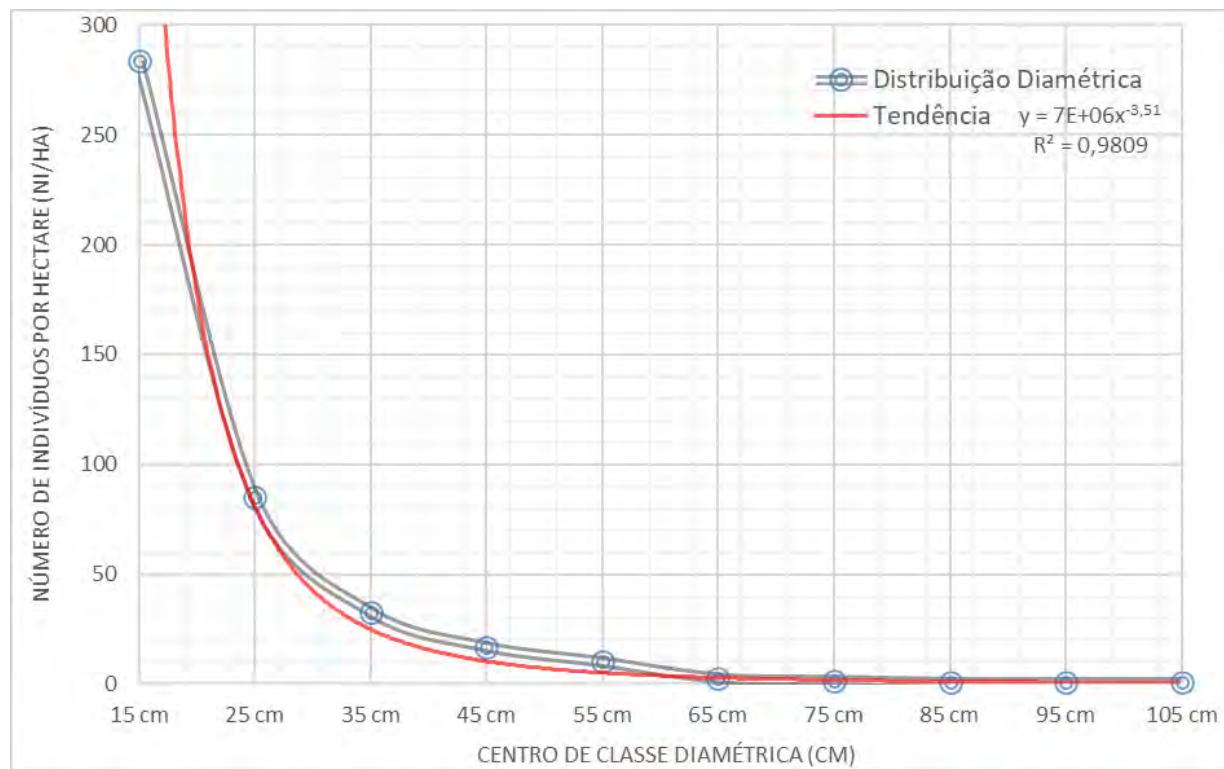
Project year t	Initial forest class <i>icl</i>																C _{tot} <i>icl</i>		
	Name: forest																		
	ID <i>icl</i> : 1																		
	Average carbon stock per hectare + 90% CI																		
	<i>Cab</i> <i>icl</i>		<i>Cbb</i> <i>icl</i>		<i>Cdw</i> <i>icl</i>		<i>Cl</i> <i>icl</i>		<i>Csoc</i> <i>icl</i>		<i>Cwp</i> <i>icl</i> (3)		short lived *	medium lived	long lived ***				
	<i>C stock</i>	+ 90% CI	<i>C stock</i>	+ 90% CI	<i>C stock</i>	+ 90% CI	<i>C stock</i>	+ 90% CI	<i>C stock</i>	+ 90% CI	<i>C stock</i>	+ 90% CI	<i>C stock</i>	+ 90% CI	<i>C stock</i>	+ 90% CI	<i>C stock</i>	+ 90% CI	
2021	t CO ₂ e ha-1	320,57	288,85 – 352,30	t CO ₂ e ha-1	47,55	t CO ₂ e ha-1	42,74 – 52,35	t CO ₂ e ha-1	t CO ₂ e ha-1	t CO ₂ e ha-1	t CO ₂ e ha-1	t CO ₂ e ha-1	t CO ₂ e ha-1	331,87 – 405,01	368,44				

Source: Project Teams Elaboration, 2023

3.6.1.2.1.1.7 Forest Structure

The diametric distribution of individuals trees follows the trend in mature natural tropical forests, showing a decrease in the number of trees as the diameter class increases, approaching an inverse logarithmic function, or “inverted J”

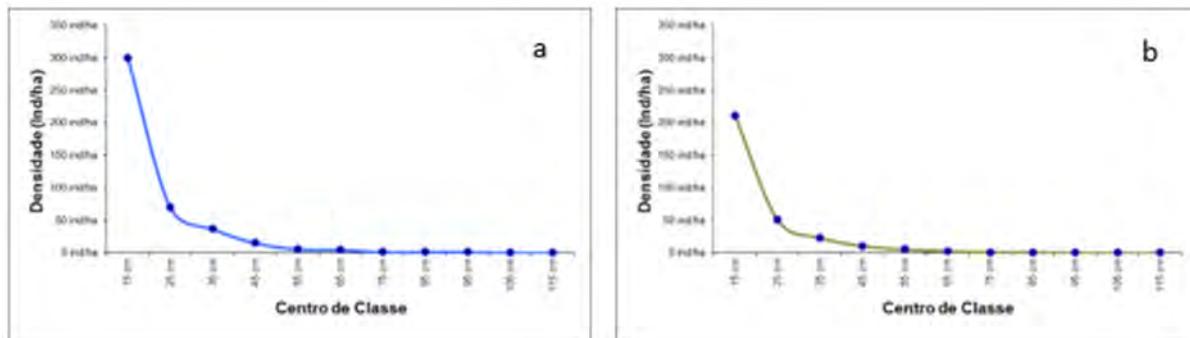
Figure 55 - Diametric distribution in number of individuals per hectare in the project area.



Subtitle: Number of individuals/ha x Diametric distribution.

Source: Project Teams Elaboration, 2023

Figure 56 - Diametric structure of forests in the state of Acre, where: a) Antimary State Forest, Bujari/AC; b) Seringal Itatinga and Porto Central, Manoel Urbano/AC..



Subtitle: Density x Class center.

Source: Project Teams Elaboration, 2023.

When analyzing other forests not subject of forest management or illegal logging in the state of Acre, the same “inverted J” pattern was noted. as can be seen in Figure below for the Antimary State Forest, Bujari/AC (TECMAN, 2012) and for Seringal Itatinga and Porto Central, Manoel Urbano/AC (TECMAN, 2020).

3.6.1.2.2 Step 6.1.2 Calculation of carbon stock change factors

VM0015 says the AFOLU Requirements require methodologies to consider stock degradation in soil carbon, below-ground biomass, dead wood, and harvested wood products in the baseline case. In this project it does not apply because:

- The project baseline does not provide for activities that lead to changes within the project area;
- The carbon stock below ground depends on root biomass and litter dynamics. In a mature forest, without anthropic intervention, the death of trees is balanced by the recruitment of new trees, in this way the forest remains in a dynamic equilibrium, that is, degradation close to 0;
- The project does not provide for logging, therefore, without the export of nutrients and carbon.

3.6.1.2.3 Step 6.1.3 Calculation of baseline carbon stock changes

The project does not foresee activities that lead to the change of carbon stocks in the project area or in the leakage belt, according to item 6.6.1.2.3 Step 6.1.3, so this item is not applicable.

3.6.1.2.4 Step 6.2 Baseline non-CO₂ emissions from forest fires

Non-CO₂ emissions have been disregarded, as no burning will be used for forest clearing.

3.7 Project Emissions

3.7.1 Step 7 Ex Ante estimation of actual carbon stock changes an non-CO₂ emission in the project area

3.7.1.1 Step 7.1 Ex ante estimation of actual carbon stock changes

3.7.1.1.1 Step 7.1.1 Ex ante estimation of actual carbon stock changes due to planned activities

No deforestation activity planned for the scope of this project was foreseen.

3.7.1.1.2 Step 7.1.2 Ex ante estimation of carbon stock changes due to unavoidable unplanned deforestation within the project area

Despite all the mitigating measures adopted in this project it is possible that some unplanned deforestation may happen in the project area. As a conservative assumption, equation 16 of VM0015 was used, where the Efficacy Index (EI) of 0.95 was adopted. This estimated value is used to multiply the baseline projections by the factor (1 - IE) and the result should be considered the estimated ex ante emissions from unplanned deforestation in the project area.

$$\Delta\text{CUDdPAt} = \Delta\text{CBSLt} * (1 - \text{IE})$$

Where:

ΔCUDdPAt: Total ex ante real change in carbon stock due to unplanned and unvoiced deforestation in year t in the project area; tCO₂-e;

ΔCBSLt: Total change of the baseline carbon stock in year t in the project area; tCO₂-e;

IE: Estimated effectiveness index ex ante %

t 1, 2, 3 ... T, year of the credit period of the proposed project; dimensionless.

3.7.1.1.3 Step 7.1.3 Ex ante estimated net actual carbon stock changes in the project area.

Table 38 - Ex ante estimated net carbon stock change in the Project Area under the Project scenario.

Project Year	Total carbon stock		Total carbon stock		Total carbon stock		Total carbon stock	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	$\Delta CPA_{dPA} t$	ΔCPA_{dPA}	$\Delta CPA_{iPA} t$	ΔCPA_{iPA}	$\Delta CUD_{dPA} t$	ΔCUD_{dPA}	$\Delta CPS_{PA} t$	ΔCPS_{PA}
	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	2927,661084	2927,661084	2927,661084	2927,661084
2024	0	0	0	0	10508,97728	13436,63836	10508,97728	13436,63836
2025	0	0	0	0	13214,4322	26651,07056	13214,4322	26651,07056
2026	0	0	0	0	14134,55583	40785,62639	14134,55583	40785,62639
2027	0	0	0	0	11429,13775	52214,76414	11429,13775	52214,76414
2028	0	0	0	0	7104,002172	59318,76631	7104,002172	59318,76631
2029	0	0	0	0	10803,5819	70122,34821	10803,5819	70122,34821
2030	0	0	0	0	18698,6616	88821,00981	18698,6616	88821,00981
2031	0	0	0	0	14374,02341	103195,0332	14374,02341	103195,0332
2032	0	0	0	0	12404,84056	115599,8738	12404,84056	115599,8738
2033	0	0	0	0	22324,82965	137924,7034	22324,82965	137924,7034
2034	0	0	0	0	18809,37782	156734,0812	18809,37782	156734,0812
2035	0	0	0	0	24072,28531	180806,3666	24072,28531	180806,3666
2036	0	0	0	0	20465,29455	201271,6611	20465,29455	201271,6611
2037	0	0	0	0	19526,5647	220798,2258	19526,5647	220798,2258
2038	0	0	0	0	21514,42745	242312,6533	21514,42745	242312,6533
2039	0	0	0	0	25341,74533	267654,3986	25341,74533	267654,3986
2040	0	0	0	0	22949,48283	290603,8814	22949,48283	290603,8814
2041	0	0	0	0	16489,56904	307093,4505	16489,56904	307093,4505
2042	0	0	0	0	28156,75588	335250,2063	28156,75588	335250,2063
2043	0	0	0	0	24328,73797	359578,9443	24328,73797	359578,9443
2044	0	0	0	0	20408,77586	379987,7202	20408,77586	379987,7202
2045	0	0	0	0	25083,33993	405071,0601	25083,33993	405071,0601
2046	0	0	0	0	26426,80113	431497,8612	26426,80113	431497,8612
2047	0	0	0	0	23354,12206	454851,9833	23354,12206	454851,9833
2048	0	0	0	0	26298,12346	481150,1067	26298,12346	481150,1067
2049	0	0	0	0	26887,00111	508037,1079	26887,00111	508037,1079
2050	0	0	0	0	27991,03157	536028,1394	27991,03157	536028,1394
2051	0	0	0	0	30015,83043	566043,9699	30015,83043	566043,9699

Source: Project Teams Elaboration, 2023

3.7.1.2 Step 7.2 Ex ante estimation of actual non-CO₂ emission from forest fires (if forest fires are in the baseline)

Non-CO₂ emissions from wildfires were not accounted for the baseline scenario.

3.7.1.3 Step 7.3 Total ex ante estimations for the project area

Table 39 - Total ex ante estimated actual net carbon stock changes and emissions of non-CO₂ gasses in the Project Area.

Project Year <i>t</i>	Total ex ante carbon stock decrease due to planned activities		Total ex ante carbon stock increase due to planned activities		Total ex ante carbon stock decrease due to unavoided unplanned deforestation		Total ex ante net carbon stock change		Total ex ante estimated actual non-CO ₂ emissions from forest fires in the project area	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCPA_{AdPA_t}	ΔCPA_{AdPA}	ΔCPA_{iPA_t}	ΔCPA_{iPA}	$\Delta CUDdPA_t$	$\Delta CUDdPA$	$\Delta CPSPA_t$	$\Delta CPSPA$	$\Delta EBBPSP_t$	$\Delta EBBPSP$
tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	2927,661084	2927,661084	2927,661084	0	0
2024	0	0	0	0	0	10508,97728	13436,63836	10508,97728	13436,63836	0
2025	0	0	0	0	0	13214,4322	26651,07056	13214,4322	26651,07056	0
2026	0	0	0	0	0	14134,55583	40785,62639	14134,55583	40785,62639	0
2027	0	0	0	0	0	11429,13775	52214,76414	11429,13775	52214,76414	0
2028	0	0	0	0	0	7104,002172	59318,76631	7104,002172	59318,76631	0
2029	0	0	0	0	0	10803,5819	70122,34821	10803,5819	70122,34821	0
2030	0	0	0	0	0	18698,6616	88821,00981	18698,6616	88821,00981	0
2031	0	0	0	0	0	14374,02341	103195,0332	14374,02341	103195,0332	0
2032	0	0	0	0	0	12404,84056	115599,8738	12404,84056	115599,8738	0
2033	0	0	0	0	0	22324,82965	137924,7034	22324,82965	137924,7034	0
2034	0	0	0	0	0	18809,37782	156734,0812	18809,37782	156734,0812	0
2035	0	0	0	0	0	24072,28531	180806,3666	24072,28531	180806,3666	0
2036	0	0	0	0	0	20465,29455	201271,6611	20465,29455	201271,6611	0
2037	0	0	0	0	0	19526,5647	220798,2258	19526,5647	220798,2258	0
2038	0	0	0	0	0	21514,42745	242312,6533	21514,42745	242312,6533	0
2039	0	0	0	0	0	25341,74533	267654,3986	25341,74533	267654,3986	0
2040	0	0	0	0	0	22949,48283	290603,8814	22949,48283	290603,8814	0
2041	0	0	0	0	0	16489,56904	307093,4505	16489,56904	307093,4505	0
2042	0	0	0	0	0	28156,75588	335250,2063	28156,75588	335250,2063	0
2043	0	0	0	0	0	24328,73797	359578,9443	24328,73797	359578,9443	0
2044	0	0	0	0	0	20408,77586	379987,7202	20408,77586	379987,7202	0
2045	0	0	0	0	0	25083,33993	405071,0601	25083,33993	405071,0601	0
2046	0	0	0	0	0	26426,80113	431497,8612	26426,80113	431497,8612	0
2047	0	0	0	0	0	23354,12206	454851,9833	23354,12206	454851,9833	0
2048	0	0	0	0	0	26298,12346	481150,1067	26298,12346	481150,1067	0
2049	0	0	0	0	0	26887,00111	508037,1079	26887,00111	508037,1079	0
2050	0	0	0	0	0	27991,03157	536028,1394	27991,03157	536028,1394	0
2051	0	0	0	0	0	30015,83043	566043,9699	30015,83043	566043,9699	0

Source: Project Teams Elaboration, 2023

3.8 Leakage

3.8.1 Step 8 Ex ante estimation of Leakage

3.8.1.1 Step 8.1 Ex ante estimation of the decrease in carbon stocks and increase in GHG emissions due to leakage prevention measures.

The leak prevention activities that will be implemented in the project have been carefully selected to ensure that there are no significant GHG emissions, as foreseen in VM015. Activities such as Non-Timber Forest Management, low-carbon agriculture, pasture management and agroforestry will be carried out, which aim to improve soil quality, increase productivity, and promote biodiversity conservation, without generating additional GHG emissions. In addition, these activities will be carried out in areas already deforested, so as not to compromise the preservation of existing forests and to avoid the reduction of carbon stocks. Monitoring will be carried out regularly to ensure that no significant emissions occur, and if there is any change in the carbon stock, it will be properly accounted for and reported.

3.8.1.1.1 Step 8.1.1 Carbon stock changes due to activities implemented in leakage management areas.

Not applicable.

3.8.1.1.2 Step 8.1.2 Ex ante estimation of CH₄ and N₂O emissions from grazing animals

Not applicable.

3.8.1.1.3 Step 8.1.3 Total ex ante estimated carbon stock changes and increases in GHG emissions due to leakage prevention measures.

Not applicable.

3.8.1.2 Step 8.2 Ex ante estimation of the decrease in carbon stocks and increase in GHG emissions due to activity displacement leakage.

Project implementation may shift activities that would promote deforestation within the project area outside the project boundaries. If carbon stocks in the leakage belt area reduce more during project implementation than projected, in the case of the baseline, this is an indication that leakage has occurred due to the displacement of baseline activities. The ex-ante, activity displacement leakage can be estimated based on the anticipated combined effectiveness of the proposed leak prevention and mitigation measures and project activities.

Considering the measures and activities that will be developed in this project, I would expect that there will be no reduction in stocks due to deforestation displacement. However, it was conservatively considered a "Leak Displacement Factor". For the calculation of the ex-ante change of the real carbon stock of unplanned inevitable deforestation, a similar equation presented in Step 7.1.2. was used. Multiplying the estimated changes in carbon stock from baseline to project area by a "Displacement Leakage Factor" (DLF), representing the percentage of deforestation that is expected to be shifted outside the project boundary. Starting with a 10% index and decaying over the lifetime of the project.

Table 40 - Ex ante estimated leakage due to activity displacement.

Project year t	Total ex ante estimated decrease in carbon stocks due to displaced deforestation		Total ex ante estimated increased in GHG emissions due to displaced forest fires	
	annual	cumulative	annual	cumulative
	$\Delta CADLK_t$	$\Delta CADLK$	$EADLK_t$	$EADLK$
	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2022	0	0	0	0
2023	0	0	5656,241214	5656,24
2024	0	0	19588,73364	25244,97
2025	0	0	23733,12022	48978,10
2026	0	0	24424,51247	73402,61
2027	0	0	18972,36867	92374,98
2028	0	0	11309,57146	103684,55
2029	0	0	16464,65882	120149,21
2030	0	0	27225,25128	147374,46
2031	0	0	19951,14449	167325,60
2032	0	0	16374,38954	183699,99
2033	0	0	27950,68673	211650,68
2034	0	0	22270,30333	233920,98
2035	0	0	26864,6704	260785,65
2036	0	0	21447,62869	282233,28
2037	0	0	19136,0334	301369,31
2038	0	0	19621,15784	320990,47
2039	0	0	21388,43306	342378,91
2040	0	0	17808,79868	360187,70
2041	0	0	11674,61488	371862,32
2042	0	0	18020,32376	389882,64
2043	0	0	13916,03812	403798,68
2044	0	0	10286,02303	414084,70
2045	0	0	10936,33621	425021,04
2046	0	0	9725,062815	434746,10
2047	0	0	7006,236618	441752,34
2048	0	0	6101,164642	447853,50
2049	0	0	4409,468182	452262,97
2050	0	0	2687,139031	454950,11
2051	0	0	840,4432522	455790,55

Source: Project Teams Elaboration, 2023

3.8.1.3 Step 8.3 Ex Ante estimation of total leakage

Table 41 - Ex ante estimated total leakage.

Project year t	Total ex ante GHG emissions from increased grazing activities		Total ex ante increase in GHG emissions due to displaced forest fires		Total ex ante decrease in carbon stocks due to displaced deforestation		Carbon stock decrease due to leakage prevention measures		Total net carbon stock change due to leakage		Total net increase emissions due to leakage	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	EgLK t	EgLK	EADLK t	EADLK	ΔCADLK t	ΔCADLK	ΔCLPMLK t	ΔCLPMLK	ΔCLK t	ΔCLK	ELK t	ELK
	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2022	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	2927,661084	2927,661084	0	0	5656,241214	5656,24	0	0
2024	0	0	0	0	10508,97728	13436,63836	0	0	19588,73364	25244,97	0	0
2025	0	0	0	0	13214,4322	26651,07056	0	0	23733,12022	48978,10	0	0
2026	0	0	0	0	14134,55583	40785,62639	0	0	24424,51247	73402,61	0	0
2027	0	0	0	0	11429,13775	52214,76414	0	0	18972,36867	92374,98	0	0
2028	0	0	0	0	7104,002172	59318,76631	0	0	11309,57146	103684,55	0	0
2029	0	0	0	0	10803,5819	70122,34821	0	0	16464,65882	120149,21	0	0
2030	0	0	0	0	18698,6616	88821,00981	0	0	27225,25128	147374,46	0	0
2031	0	0	0	0	14374,02341	103195,0332	0	0	19951,14449	167325,60	0	0
2032	0	0	0	0	12404,84056	115599,8738	0	0	16374,38954	183699,99	0	0
2033	0	0	0	0	22324,82965	137924,7034	0	0	27950,68673	211650,68	0	0
2034	0	0	0	0	18809,37782	156734,0812	0	0	22270,30333	233920,98	0	0
2035	0	0	0	0	24072,28531	180806,3666	0	0	26864,6704	260785,65	0	0
2036	0	0	0	0	20465,29455	201271,6611	0	0	21447,62869	282233,28	0	0
2037	0	0	0	0	19526,5647	220798,2258	0	0	19136,0334	301369,31	0	0
2038	0	0	0	0	21514,42745	242312,6533	0	0	19621,15784	320990,47	0	0
2039	0	0	0	0	25341,74533	267654,3986	0	0	21388,43306	342378,91	0	0
2040	0	0	0	0	22949,48283	290603,8814	0	0	17808,79868	360187,70	0	0
2041	0	0	0	0	16489,56904	307093,4505	0	0	11674,61488	371862,32	0	0
2042	0	0	0	0	28156,75584	335250,2063	0	0	18020,32376	389882,64	0	0
2043	0	0	0	0	24328,73797	359578,9443	0	0	13916,03812	403798,68	0	0
2044	0	0	0	0	20408,77584	379987,7202	0	0	10286,02303	414084,70	0	0
2045	0	0	0	0	25083,33993	405071,0601	0	0	10936,33621	425021,04	0	0
2046	0	0	0	0	26426,80113	431497,8612	0	0	9725,062815	434746,10	0	0
2047	0	0	0	0	23354,12206	454851,9833	0	0	7006,236618	441752,34	0	0
2048	0	0	0	0	26298,12346	481150,1067	0	0	6101,164642	447853,50	0	0
2049	0	0	0	0	26887,00111	508037,1079	0	0	4409,468182	452262,97	0	0
2050	0	0	0	0	27991,03157	536028,1394	0	0	2687,139031	454950,11	0	0
2051	0	0	0	0	30015,83043	566043,9699	0	0	840,4432522	455790,55	0	0

Source: Project Teams Elaboration, 2023

3.9 Net GHG Emission Reductions and Removals

3.9.1 Step 9 Ex Ante Total net anthropogenic GHG Emission

3.9.1.1 Step 9.1 Significance assessment

Not applied because the tool indicated by Verra to evaluate the "Tool for testing significance of GHG emissions in A/R CDM project activities", to determine the significance of each of the carbon stock changes calculated ex ante and GHG emissions is inactive

(https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf/history_view).

Data/Parameter	Ctot
Data Unit	tCO22ha-1
Description	<p>The average carbon stock per hectare in all carbon reservoirs in the forest class used in the baseline scenario.</p> <p>This estimate is obtained through the application of allometric equations, expansion factors previously published in the scientific literature and data collected in the field.</p>
Source of data	Calculated
Value applied	Not applicable
Justification of choice of data or description of measurement methods and procedures applied	Estimates of above and below ground biomass were made using forest inventory data and allometric equations performed in areas similar to the Project area
Purpose of data	<p>Calculation of baseline emissions</p> <p>Leakage calculation</p> <p>Baseline scenario determination</p> <p>Calculation of project emissions</p>
Comments	<p>See the documents:</p> <ul style="list-style-type: none"> - Forest Carbon Inventory Report

Data/Parameter	BSAbS=0,009D _{2,685} (R ² =0,901)
Data Unit	kg
Description	Equation to estimate belowground dry biomass
Source of data	calculated
Value applied	BSAbS=0,009D _{2,685} (R ² =0,901)
Justification of choice of data or description of measurement methods and procedures applied	allometric equations developed by Melo (2017) in the Southwestern Amazon, in the state of Acre, considering a simple entry model
Purpose of data	<p>Determination of baseline scenario</p> <p>Calculation of baseline emissions</p> <p>Calculation of project emissions</p> <p>Calculation of leakage</p>
Comments	No comments

Data/Parameter	$BSAbS = 0,009D^{2,985}$
Data Unit	kg
Description	Equation to estimate above-ground dry biomass calculated
Source of data	BSAcS=0,064D _{2,671} (R ² =0,977)
Value applied	BSAcS=0,064D _{2,671} (R ² =0,977)
Justification of choice of data or description of measurement methods and procedures applied	allometric equations developed by Melo (2017) in the Southwestern Amazon, in the state of Acre, considering a simple entry model
Purpose of data	Determination of baseline scenario Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Comments	No Comments

Data/Parameter	BST=0,073D _{2,673} (R ² =0,974)
Data Unit	kg
Description	Equation to estimate total dry biomass
Source of data	calculated
Value applied	BST=0,073D _{2,673} (R ² =0,974)
Justification of choice of data or description of measurement methods and procedures applied	allometric equations developed by Melo (2017) in the Southwestern Amazon, in the state of Acre, considering a simple entry model
Purpose of data	Determination of baseline scenario Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Comments	No Comments

Data/Parameter	Carbon factor (CF)
Data Unit	Kg
Description	Carbon stock determined through reduction equations.
Source of data	<p>IPCC, 2006. Guidelines for National Greenhouse Gas Inventories. https://www.ipcc-nggip.iges.or.jp/public/2006gl/</p> <p>Araujo, Emmanoella & Sanquetta, Carlos & Corte, Ana & Pelissari, Allan & Orso, Gabriel & Silva, Thiago. (2023). Global review and state-of-the-art of biomass and carbon stock in the Amazon. Journal of Environmental Management. 331. 117251. 10.1016/j.jenvman.2023.117251.</p>
Value applied	C= Biomass kg/tree * 0.47
Justification of choice of data or description of measurement methods and procedures applied	This value was obtained by searching the scientific literature.
Purpose of data	<p>Determination of baseline scenario</p> <p>Calculation of baseline emissions</p> <p>Calculation of project emissions</p> <p>Calculation of leakage</p>
Comments	No comments

Data/Parameter	44/12
Data Unit	tCO2e
Description	Conversion factor of carbon mass to mass of CO2e
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 AFOLU
Value applied	44/12
Justification of choice of data or description of measurement methods and procedures applied	Standard IPCC value
Purpose of data	<ul style="list-style-type: none"> - Baseline scenario determination - Calculation of baseline emissions - Calculation of project emissions - Leakage calculation
Comments	No comments

3.10.2 Data and Parameters Monitored

Climate	
Data/Parameter	ABSLPAicI,t
Data Unit	Hectare (ha)
Description	Forest cover areas converted to non-forest cover areas within the Project area
Source of data	Remote sensing images along with GPS data collected in the field
Description of measurement methods and procedures to be applied	For the monitoring of forest cover in the project area, the method of analysis of satellite images will be employed. In the event of unavailability of data from the PRODES system, automatic classification and visual interpretation of images from other optical sensors or SAR data will be used for monitoring.
Frequency of monitoring/recording	Anual
Value applied	Average annual deforestation in the project area during the credit period: 0 ha.
Monitoring equipment	Remote sensing images obtained through a digital processing program will be used, as well as a geographic information system and a navigation GPS.
QA/QC procedures to be applied	In the QA/QC process, images with spatial resolution of 30 m or higher will be used and the minimum mapping unit will be 1 ha. The classifications obtained will be evaluated through data collected in the field, using GPS navigation. A minimum accuracy of 90% is required on the land use and cover classification map.
Purpose of Data	Estimates of project emissions
Calculation method	In the case of detection of areas of unplanned deforestation, the Forest Cover Benchmark Map will be updated through map algebra.
Comments	PRODES: http://www.dpi.inpe.br/prodesdigital/prodes.php

Data/Parameter	$\Delta \text{CabBSLLKt}$
Data Unit	Hectare (ha)
Description	Changes in the total carbon stock in the leakage belt
Source of data	Calculated
Description of measurement methods and procedures to be applied	<ul style="list-style-type: none"> -Creation of the list of preventive leakage activities; -Preparation of a map showing the areas of intervention and the type of interventions; -Identification of areas where preventive activities impact the carbon stock; -The existing non-forest classes in these areas will be identified in the case of the baseline; - Determination of carbon stocks in the identified classes; -Changes in the carbon stock in the areas of leak management in the project scenario will be reported using Table 30.b of the VM0015 Methodology; - Changes in the net carbon stock caused by prevention measures during the fixed baseline period and optionally in the project credit period will be calculated; - The results of the estimates will be reported in Table 30.c of the VM0015 Methodology.
Frequency of monitoring/recording	Determined according to activity
Value applied	Not applicable
Monitoring equipment	Determined according to activity
QA/QC procedures to be applied	Determined according to activity
Purpose of Data	Leakage estimates
Calculation method	Determined according to activity
Comments	Not applicable

Data/Parameter	Frequency of surveillance and patrol operations
Data Unit	Number of operations per year
Description	Record of the number of surveillance operations carried out in the project area and leak belt during the monitoring period
Source of data	Asset Inspection Reports.
Description of measurement methods and procedures to be applied	To be defined
Frequency of monitoring/recording	To be defined
Value applied	Not applicable
Monitoring equipment	Not applicable
QA/QC procedures to be applied	To be defined
Purpose of Data	Leakage estimates
Calculation method	Not applicable
Comments	The Asset Monitoring Reports will be implemented from the validation of the Project.

Data/Parameter	Monitoring of forest cover by high-resolution satellite imagery
Data Unit	Number of operations per year
Description	Reports will be presented to monitor land use and land cover through high-resolution satellite images
Source of data	Monitoring reports
Description of measurement methods and procedures to be applied	Forest cover monitoring data in the Project area and leakage belt will be collected through analysis of high-resolution satellite images. The images of the analyzed periods will be classified automatically, and through visual interpretation, in order to identify changes in land use in the monitored area.
Frequency of monitoring/recording	To be defined
Value applied	Not applicable
Monitoring equipment	High-resolution remote sensing images will be used, processed in a data cloud and in a digital processing program, geographic information system and a navigation GPS.
QA/QC procedures to be applied	Special resolution images of 3,125 m and 5 m will be used, with GSD (Soil Sampling Distance) greater than 4.5 m and 6.5 m, respectively, and the minimum mapping unit will be 1 ha. The validation and evaluation of the classifications will be performed through data collected in the field, with the aid of GPS navigation. A minimum accuracy of 80% is required on the land use and cover classification map. If areas of unplanned deforestation are identified, the forest cover map will be updated using map algebra.
Purpose of Data	Leakage estimates
Calculation method	In the case of detection of areas of unplanned deforestation, the Forest Cover Benchmark Map will be updated through map algebra.
Comments	PRODES: http://www.dpi.inpe.br/prodesdigital/prodes.php

Communities and Other Actors	
Data/Parameter	Number of courses and training
Data Unit	Number per year
Description	Number of courses and trainings taken
Source of data	Monitoring Report and Activity Report
Description of measurement methods and procedures to be applied	Questionnaires and attendance list applied to participants
Frequency of monitoring/recording	Annual
Value applied	Not applicable
Monitoring equipment	Not applicable
QA/QC procedures to be applied	The validation of the information present in the preliminary version of the Project Monitoring Report will be carried out together with the proponents before the official publication of the report.
Calculation method	Not applicable
Comments	No comments

Data/Parameter	Number of producers benefited by the REDD+ Project
Data Unit	Number of families involved with the project
Description	Number of families participating in REDD+ Project activities receiving technical follow-up after the training phase
Source of data	Activity reports and interviews
Description of measurement methods and procedures to be applied	Reports generated by the technical responsible designated to advise the associations participating in the social activities of the Project
Frequency of monitoring/recording	Annual
Value applied	Not applicable
Monitoring equipment	Not applicable
QA/QC procedures to be applied	The validation of the information present in the preliminary version of the Project Monitoring Report will be carried out together with the proponents before the official publication of the report.
Calculation method	Not applicable
Comments	No comments

Data/Parameter	Number of persons trained
Data Unit	Number per year
Description	Number of people trained per year
Source of data	Monitoring Report and Activity Report
Description of measurement methods and procedures to be applied	Structured interviews and supporting documents (attendance list)
Frequency of monitoring/recording	Annual
Value applied	Not applicable
Monitoring equipment	Not applicable
QA/QC procedures to be applied	The validation of the information present in the preliminary version of the Project Monitoring Report will be carried out together with the proponents before the official publication of the report.
Calculation method	Not applicable
Comments	No comments

Data/Parameter	Gross revenue from new activities implemented after the beginning of training courses and technical assistance
Data Unit	Reais (R\$)
Description	Additional revenue generated for participants through new activities, agricultural and/or extractive activities propitiated by the Project
Source of data	Monitoring Report and Activity Report
Description of measurement methods and procedures to be applied	Structured interviews with the families directly involved with the Project.
Frequency of monitoring/recording	Every 3 years (10 reports during the project).
Value applied	Not applicable
Monitoring equipment	Not applicable
QA/QC procedures to be applied	The validation of the information present in the preliminary version of the Project Monitoring Report will be carried out together with the proponents before the official publication of the report.
Calculation method	Not applicable
Comments	The first evaluation will be 3 years after the validation of the Project.

Data/Parameter	Number of productive chains implemented and/or encouraged by the Project
Data Unit	Number of products promoted by the project
Description	List of new production chains implemented by the producers involved in the project.
Source of data	Monitoring Report and Activity Report
Description of measurement methods and procedures to be applied	Reports generated by the technical responsible designated to advise the associations participating in the social activities of the Project
Frequency of monitoring/recording	Annual
Value applied	Not applicable
Monitoring equipment	Not applicable
QA/QC procedures to be applied	The validation of the information present in the preliminary version of the Project Monitoring Report will be carried out together with the proponents before the official publication of the report.
Calculation method	Not applicable
Comments	No comments

Data/Parameter	Frequency of publication of Activity Reports
Data Unit	Verification number/event
Description	Time interval between publications and evaluations of activity reports.
Source of data	Monitoring Report and Activity Report
Description of measurement methods and procedures to be applied	Structured interviews and questionnaires
Frequency of monitoring/recording	Annual
Value applied	Not applicable
Monitoring equipment	Not applicable
QA/QC procedures to be applied	Evaluation of the data compiled and systematized in a meeting with stakeholders to support the planning of future activities.
Calculation method	Not applicable
Comments	No comments

Data/Parameter	Diversity of the vegetal community in permanent plots
Data Unit	Not applicable
Description	Variety of species found in the plant community within the permanent plots
Source of data	Field Data and Forest Monitoring/Inventory Report
Description of measurement methods and procedures to be applied	To be defined
Frequency of monitoring/recording	Once every 2 years
Value applied	Not applicable
Monitoring equipment	Not applicable
QA/QC procedures to be applied	To be defined
Calculation method	Data table
Comments	No comments

Data/Parameter	Status of relevant species in the IUCN Red List of Endangered Species
Data Unit	Not applicable
Description	Continuous monitoring of species relevant to the Project in relation to their status on the IUCN Endangered Species List, with emphasis on species referred to as Critically Endangered (CR) or Endangered (E).
Source of data	Field Data and Fauna and Flora Monitoring Report
Description of measurement methods and procedures to be applied	Systematization and comparison of data and information collected in fauna surveys and ethnozoological interviews with the IUCN Official List, available at: http://www.iucnredlist.org As well as the Brazilian list of endangered species
Frequency of monitoring/recording	Once every 2 years
Value applied	Not applicable
Monitoring equipment	Not applicable
QA/QC procedures to be applied	Comparison of different sources of information (empirical research and traditional knowledge)
Calculation method	Not applicable
Comments	No comments

Data/Parameter	Use of chemical pesticide, biological control agent or other types of inputs
Data Unit	Number
Description	Monitoring the type of inputs used in the project activities, making sure that they are not chemical pesticides, biological control agents or other types of inputs.
Source of data	Agricultural Field Data and Report
Description of measurement methods and procedures to be applied	To be defined
Frequency of monitoring/recording	Annual
Value applied	0
Monitoring equipment	Not applicable
QA/QC procedures to be applied	To be defined
Calculation method	To be defined
Comments	No comments

Source: Project Teams Elaboration, 2023

3.10.2.1 1. TASK 1: Monitoring of Carbon Stock Changes and GHG Emissions for Periodical Verifications**3.10.2.2 According to VM0015, there are three main monitoring tasks:**

- Monitoring of real changes in carbon stocks and GHG emissions in the project area;
- Leak monitoring; and
- Ex-post calculation of the net reduction of anthropogenic GHG emissions.

In each task were included: Technical description of the tasks, data to be collected, overview of data collection procedures, quality control and assurance procedures, data archiving, and, organization and responsibilities of the parties involved in all of the above. In order to allow a transparent comparison between ex ante and ex post estimates, use the same formats and tables presented in Part 2 of the methodology.

3.10.2.2.1 1.1 Monitoring of actual carbon stock changes and GHG emissions within the Project Area**a) Technical description of the monitoring tasks**

Under the project, changes in carbon stocks and GHG emissions will be monitored through the analysis of avoided unplanned deforestation. The team responsible for the project will develop actions to monitor REDD+ activities, which aim to prevent unplanned deforestation, using remote sensing to verify forest cover areas, as well as carrying out field checks in the project area.

Changes in carbon stock due to the conversion of forest to non-forest areas by unplanned and planned deforestation will be monitored. Similarly, changes in carbon stock due to uncontrolled wildfires and other catastrophic events will be monitored and discounted over the Project scenario in cases where they are significant.

All records and maps generated during the implementation of the project will be kept and made available to the VCS verifiers during the verification in order to prove that the planned activities have in fact been executed.

b) Data to be collected

Table 43 - Data to be collected - Monitoring of actual carbon stock changes and GHG emissions within the Project Area

Parameter	Description	Unit	Source	Frequency
ABSLPAt	Annual area of baseline deforestation in the Project	ha (hectare)	Qualified and scientifically recognized	Annual
Δ CUDdPAT	Total change of the real carbon stock due to	tCO2e	Calculated through the detected areas of	Annual
AUFPAicl,t	Areas affected by forest fires in the icl class in which the	ha (hectare)	Adequate sources of detection of forest fires	Whenever forest fires
Δ CUFdPAT	Total reduction in carbon stock due to unplanned (and	tCO2e	Calculated through the affected areas in the	Whenever forest fires
ACPAicl,t	Analysis Area within the Project Area affected by	ha (hectare)	High-resolution satellite imagery and qualified,	Whenever a catastrophic
Δ CUCdPAT	Total reduction in carbon stock due to catastrophic	tCO2e	Calculated through the affected areas in the	Whenever a catastrophic

Source: Project Teams Elaboration

c) Overview of data collection procedures

Monitoring of land use change and land cover within the Project Area

The Project provides for the continuous monitoring of deforestation, both planned and unplanned, in the Project Area. This monitoring will be carried out through forest cover mapping, using qualified and scientifically recognized sources, such as PRODES and DETER, developed by the National Institute for Space Research, as well as MapBiomass, created by a collaborative network of NGOs, universities and technology startups. The selection of the methodology used will undergo a rigorous evaluation, in order to meet the requirements of data quality and accuracy.

To ensure greater flexibility in the deforestation monitoring process, different classification and visual interpretation techniques will be adopted, including complementary mappings using alternative images and sensors, as well as data collection in the field.

Once the deforestation data is obtained, they will be compared with the baseline scenario, allowing the estimation of the greenhouse gas emissions avoided in the monitored period. For this, the differences between expected deforestation and actual deforestation will be considered. This comparison will be fundamental to evaluate the effectiveness of the actions implemented by the Project.

Finally, it is important to highlight that all the data collected during the monitoring will be preserved and will be available for verification by the competent bodies, in order to demonstrate the proper execution of the Project activities.

Monitoring of changes in carbon stock and non-CO2 emissions

The monitoring of changes in the carbon stock due to deforestation in the Project Area will be carried out by multiplying the deforested areas identified in year t by the initial average values of carbon stock in the forest class. The result of this multiplication will be subtracted from the carbon stock estimated for the Reference Region in a post-deforestation scenario. This calculation will provide the net carbon stock value that was reduced in year t. If there is a significant reduction in the carbon stock due to deforestation in the Project Area, this reduction will be presented in the verification processes using Table 29 of VM0015.

With regard to the monitoring of emissions of gases other than CO₂, these will be monitored through photointerpretation of high-resolution images and other appropriate sources of detection of forest fires and resulting scars, in order to identify and classify the affected areas. To verify damage and vegetation recovery over time, analyses of the normalized difference vegetation index (NDVI) will be performed. When necessary, there will be field verification of the affected areas. If there are forest areas affected, the reduction of the carbon stock caused by forest fires will be assessed by multiplying the mapped area of forest loss by the average forest carbon stock. If there is a significant reduction in the carbon stock, this reduction will be reported in the verification processes using Tables 25e, 25f and 25g of the VM0015 methodology.

To make the deforestation mapping process more flexible, different classification techniques and visual interpretation can be used throughout the Project, including complementary mapping with alternative images and sensors, as well as data collected in the field. The choice of monitoring methodology will undergo careful evaluation in order to meet the requirements of data quality and accuracy.

Monitoring of natural disturbances and other catastrophic events

The reduction of the carbon stock and the increase in GHG emissions, as well as the reduction of the significant carbon stock caused by natural disturbances or catastrophic events will be controlled, monitored and reported similar to the non-CO₂ emissions in the Project Area. Therefore, if there is a significant decrease in carbon stock due to natural disturbances or catastrophic events, this reduction will be reported in the verification processes using VM0015 Tables 25e, 25f and 25g.

d) Quality control and quality assurance procedures

To ensure the accuracy and quality of the analyses performed, the quality control and assurance procedures described in the VM0015 version 1.1 methodology will be applied, which will be applicable regardless of the type of data used in the monitoring. The evaluation of general accuracy and kappa index will be obtained from a confusion matrix generated by a geographic information system, using at least 100 random points distributed over the analyzed area. Validation will be performed using high-resolution spatial satellite images and/or data collected in the field. It is necessary that the minimum mapping accuracy for each class or category in the land use and cover map is 80%.

In addition to the accuracy process, when necessary, field checks will be carried out in areas where there is conversion of forest areas, whether due to unplanned deforestation, uncontrolled forest fires or other catastrophic events. These field checks will serve to ensure the accuracy of the data obtained from the analyses.

e) Data archiving

The performer will store all Project data and reports in digital files for the entire duration of the Project. All documents relating to Project monitoring will be made available to auditors at each verification event.

f) Organization and responsibilities of the parties involved in all of the above

All procedures described are the responsibility of the project proponent.

3.10.2.2.2 1.2 Monitoring of Leakage

The monitoring of the leak by the Project involves two main scopes, which are:

- I. changes in carbon stocks and GHG emissions associated with leak prevention activities, and
- II. changes in carbon stocks and GHG emissions associated with leakage from displacement of activities.

The procedures applied to this monitoring plan contemplate what is developed and applied within the perspective of the project, thus, within the scope ii) the monitoring of changes in GHG emissions derived from biomass burning was not contemplated, as it was not considered in the baseline.

The following are details about monitoring the two scopes.

a) Technical description of the monitoring tasks

Although no inventory reduction is foreseen in leak prevention activities, should they prove necessary throughout the implementation of the Project, the ex-ante changes in the carbon stock and GHG emissions associated with these activities will be estimated according to step 8 of VM0015. If the results are relevant, they are monitored and the data is made available to verifiers in each verification event using Tables 30b, 30c, 31, 32, and 33 of M0015 version 1.1.

Changes in carbon stock and GHG emissions associated with leakage by displacement of activities will be monitored using the same technique applied in monitoring changes in carbon stock due to the conversion of forest to non-forest areas by unplanned deforestation in the Project Area.

b) Data to be collected

Table 44 - Data to be collected - Monitoring of Leakage

Parameter	Description	Unit	Source	Frequency
$\Delta BSLLKt$	Annual area of baseline deforestation in the Leaket	ha (hectare)	Qualified and scientifically recognized sources	Annual
$\Delta CLPMLKt$	Reduction of the actual carbon stock due to leak	tCO2e	Follow-up report of the project activities that have	Whenever it occurs
$\Delta CADLKt$	Areas of planned deforestation in the icl forest	tCO2e	Calculated through the detected areas of forest	Annual
$EgLKt$	Emissions from grazing animals in the areas in	tCO2e	Existing records on grazing practice	Whenever the event

Source: Project Teams Elaboration

c) Overview of data collection procedures

Changes in carbon stocks and GHG emissions associated with leak prevention activities

Monitoring, considering the data collection procedures, will consider the following activities:

- List of leak prevention activities;
- Mapping of the areas of intervention and the type of intervention;
- Mapping of areas where leak prevention activities have an impact on carbon stock;
- Identification of the non-forest classes existing in these areas in the case of the baseline;
- Estimation of carbon stocks in the identified classes using secondary data (literature);
- Reporting of changes in carbon stock in the areas of leak management under the project scenario using Table 30b of VM0015;
- Calculation of net changes in carbon stock caused by leak prevention measures during the fixed baseline period and credit period of the project;
- Reporting of the results in Table 30c of the approved VM0015.

Changes in carbon stock and GHG emissions associated with leakage by displacement of activities

These will be monitored using the same methods applied to monitor the conversion of forest to non-forest areas by unplanned deforestation in the Project Area. If in the Spillage Belt there is a larger than expected deforestation event for the baseline scenario and it is attributed to deforestation agents in the Project Area, the losses in the carbon stock will be accounted for and reported using either Table 22c or Table 21c of VM0015.

d) Quality control and quality assurance procedures

The control and quality assurance in relation to the monitoring of changes in carbon stock and GHG emissions associated with leak prevention activities will be determined according to the activity, if implemented, while in relation to changes in carbon stock and GHG emissions associated with leakage by the displacement of activities will be carried out through accuracy analysis, as indicated by VM0015.

The validation will be performed through high-resolution spatial satellite images and/or data collected in the field. The minimum mapping accuracy for each class or category on the land use and land cover map should be 80%.

e) Data archiving

The performer will store all Project data and reports in digital files for the entire duration of the Project. All documents relating to the monitoring of the Project will be made available to the auditors at each verification event.

f) Organization and responsibilities of the parties involved in all of the above

All procedures described are the responsibility of the project proponent.

3.10.2.2.3 1.3 Monitoring of ex-post reductions in anthropogenic net GHG emissions

The ex-post calculation of net anthropogenic GHG emission reductions will be done similarly to the ex-ante calculation, differing only that the estimated ex-post changes in the carbon stock and GHG emissions will be used in the case of the project and leakage scenario. The estimated anthropogenic net GHG emissions ex-post and the calculation of the Verified Carbon Units (VCU_t and VBC_t) will be reported using the same table format used for the ex-ante evaluation.

The following are details about monitoring.

a) Technical description of the monitoring tasks

The results will be represented through the use of Table 36 of the VM0015 Methodology, accompanied by spatial data, such as deforestation maps (when available). A map will be updated that will show the cumulative areas credited within the Project Area and this will be presented to the VVB at each verification event.

b) Data to be collected

Table 45 - Monitoring of ex-post reductions in net anthropogenic GHG emissions.

Parameter	Description	Unit	Source	Frequency
$\Delta\text{REDD,t}$	Reductions in net GHG emissions attributable to	tCO2e	Calculation, subtracting the changes in the ex-	Annual
VCU,t	Number of Verified Carbon Units (VCUs) to be made	tCO2e	Calculation, subtracting the project's ex-post net	Annual

Source: Project Teams Elaboration

c) Overview of data collection procedures

The calculation of the number of Verified Carbon Units (VCUs) to be produced by the Project activities in year t will be done through Equations 19 and 20 of VM0015.

d) Quality control and quality assurance procedures

In order to ensure that the data is appropriate for the verification process and that the number of Verified Carbon Units is reliable, we will employ all the tasks and tools listed in part 2 of the VM0015 Approved Methodology.

e) Data archiving

The performer will store all Project data and reports in digital files for the entire duration of the Project. All documents relating to the monitoring of the Project will be made available to the auditors at each verification event.

f) Organization and responsibilities of the parties involved in all of the above

All procedures described are the responsibility of the project proponent.

3.10.2.3 TASK 2: Revisiting the Baseline Projections for the Future Fixed Baseline Period

3.10.2.3.1 2.1 Update information on agents, drivers and underlying causes of deforestation

At the end of each fixed 5-year baseline period, the projected annual areas of deforestation from the baseline to the reference region will be reviewed and eventually adjusted for the subsequent fixed baseline period and subjected to independent validation. Adjustments will be made using the methods described in part 2 of the methodology and using the data obtained from monitoring LU/LC changes in the reference region during the previous fixed baseline period. in addition to statistical and spatial data, studies and information on agents, motivations and underlying causes of deforestation necessary to carry out Steps 2 and 3 of VM0015.

3.10.2.3.2 2.2 Adjustment of the land-use and land-cover change component of the baseline

Step 4 of the VM0015 Methodology will be redone considering the period of the last 5 years and using updated variables on the agents, drivers and underlying causes of deforestation in the Reference Region. The area of annual deforestation and the location of deforestation at baseline are the two main components to be reviewed.

The assumptions and hypotheses considered in the modeling of the dynamic component of future deforestation (population data), as well as the data used in the spatial projection (updating of highways, location and distance of new deforestation) will be reviewed and updated.

3.10.2.3.3 2.3 Adjustment of the carbon component of the baseline

According to the results generated during the changes in the processes of monitoring the carbon stock throughout the Project, the spatial estimate of the carbon component can be reviewed in the VM0015 Methodology version 1.1, Part 3, item 1.1.3. Thus, if there are more accurate estimates, from the use of techniques such as LIDAR or SAR interferometric data, they will be applied in the baseline revisit period.

3.10.3 Monitoring Plan

The Climate Impact Monitoring Plan will cover essential issues for demonstrating the reduction of emissions from deforestation and degradation due to avoided unplanned deforestation, according to the applied methodology VM0015, and changes in carbon stock throughout the life cycle of the project due to changes in land use within the Project Area and the Leakage Belt.

The monitoring plan, as well as the results obtained by the monitoring of the Project will be made available to the public through a page on the official website, using playful and innovative methods such as dashboards and dynamic maps. Summary documents pertaining to the monitoring plan and results, as well as relevant information, will be made available to communities and stakeholders through meetings, lectures and by physical means in the project area and nearby communities.

3.10.3.1 Monitoring plan of the REDD+ Project for 30 years:

3.10.3.2 Conservation measures:

Carry out a survey of the species of fauna and flora existing in the area and establish a protection plan for endangered species.

Implement a forest management program for non-loggers, with the aim of reducing the pressure on the forest and ensuring its conservation.

Establish a network of protected areas, with the aim of protecting the biodiversity and integrity of the ecosystems present in the area.

3.10.3.3 Monitoring deforestation and forest degradation with Landsat satellite imagery

Carry out monitoring of the forest area with Landsat satellite images to detect areas of deforestation and forest degradation.

Use satellite image analysis techniques to evaluate the quality of vegetation cover and identify and monitor the main degradation factors, such as fires, logging, among others in the surroundings of the project.

Establish an early warning system to detect and prevent deforestation and forest degradation.

3.10.3.4 Heat out breaks with INPE data burned.

Use INPE data to monitor hot spots in the area in order to detect possible forest fires.

Establish a network of firefighters and train the team to prevent and fight forest fires.

Conduct awareness campaigns for local people and visitors about the risks of forest fires and the importance of prevention.

3.10.3.5 Evaluation of the monitoring plan:

Conduct periodic evaluations of the monitoring plan and adjust it, if necessary, to ensure its effectiveness in preventing threats to the integrity of the forest.

Establish performance indicators to evaluate the success of the REDD+ project in forest conservation and in reducing greenhouse gas emissions.

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

The Climate Impact Monitoring Plan will cover crucial issues for demonstrating the reduction of emissions from deforestation and degradation due to avoided unplanned deforestation, according to the applied methodology VM0015, and changes in carbon stock over the life cycle of the project due to changes in land use within the Project Area and the Leakage Belt.

3.11 Optional Criterion: Climate Change Adaptation Benefits

3.11.1 Regional Climate Change Scenarios (GL1.1)

Several experiments conducted in the Amazon recognize the action of rising global temperatures, the effects of droughts and other stressors on the growth, maintenance and induction of tree mortality (ZEMP et al., 2017, ESQUIVEL-MUELBERT et al., 2018; Sullivan et al., 2020). Recently, Llopert et al. (2018),

showed that deforestation produces significant changes with rising temperatures of the impacted areas and changes in the precipitation regime, with reduction over the West and increase over the East. When these conditions are combined with intense forest degradation through edge effects and logging, the risk of fires increases dramatically in the Amazon (SILVA JUNIOR et al., 2019).

The Amazon Forest, unlike the Cerrado, does not have adaptations to resist and recover quickly after the fire, so these events are often catastrophic (COPERTINO et al., 2019). Fires in the Amazon, caused by the combination of severe droughts and anthropogenic actions become uncontrollable, the region is increasingly prone to new fires and forest cover losses (LE PAGE et al., 2017; LE QUÉRÉ et al., 2016; SILVA et al., 2020). The climate imbalance in other regions of Brazil and South America is increasingly frequent and prolonged (ELIAS et al., 2020).

In the State of Acre, much research have been developed in the search for understanding the impacts of climate change such as severe droughts and land use (burning and deforestation) from remote sensing analyses (MARENGO et al., 2005; Aragon et al., 2007; SENA et al., 2012; REIS et al., 2019). Silva et al. (2018) verified the dynamics of fires in the Amazon from 1986 to 2016 and the results indicate that with the projections of warmer global climate and the advance of deforestation in the region, they may promote more frequent and intense fires in Acre. Thus, climate change is produced by environmental damage and its consequences condition the environment to become more sensitive to the recurrence of anthropogenic.

3.11.2 Climate Change Impacts (GL1.2)

The fires are activities that are part of the traditional techniques of family farming and practices of traditional peoples in almost all of Brazil, aiming to clear an area for the planting of temporary crops. However, so that the burning does not turn into a fire, it is necessary to apply some safety techniques, among them the construction of firebreaks (LIU; WIMBERLY, 2014). Forest fires do not occur uniformly over space and time, there are places where the occurrence of fires is more frequent, usually because they present greater human concentration and more propitious and dry seasons, being influenced mainly by the increase in temperature, reduction in humidity and consequently, decrease in precipitation (SOARES; BATISTA, 2007).

It is important to remember that forest fires cause damage to the environment, fauna and flora, and to humans, with economic losses and life, in addition to the worrying release of CO₂ into the atmosphere, resulting from the combustion process (SANTOS et al., 2018; Feng et al., 2021).

In this sense, in the area of the REDD+ Project of the Arara do Igapé Humaitá Indigenous Land, due to the condition of being an area of protection and indigenous occupation, it already has a characteristic of sustainable land use, but which are strongly impacted by climate alteration due to climate change, such as severe droughts. These events drive tree mortality, loss of flora and fauna species, decreased water and fishing resources, and increased flammability of the forest and, consequently, the possibility of forest fires.

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

Forest fires result in severe ecological and socioeconomic consequences and are, for the most part, caused by anthropogenic actions (FRANCISCO, 2016). The knowledge of the causes of fires is fundamental to establish specific plans where to intervene in the scope of prevention, including awareness, supervision and, when identified, the accountability of the causative agents (FRANCE et al., 2020; Neves et al., 2021).

For the REDD+ Project of the Arara do Igarapé Humaitá Indigenous Land, workshops and awareness-raising actions can contribute to the improvement of land use and fire prevention modes, the construction of agreements and partnerships with institutions and researched for the establishment of studies in order to promote the understanding of the direct and indirect anthropic impacts caused by climate change.

4. Community

4.1 Without-Project Community Scenario

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

The data presented are the result of primary surveys of socioeconomic data through semi-structured questionnaires, scientific research on the Arara People and the Environmental Territorial Management Plan of the Arara People.

4.1.1.1 General Information

The Arara people, self-styled Shawādawa, also known as "Xawanáua", "Xawanāwa", "Chauā-nau", "Ararapina", "Ararawa", "Araranás", "Ararauás" and "Tachinauás", belong to the Pano ethno-linguistic family.

Most of this people reside in the Arara do Igarapé Humaitá Indigenous Land, located in the municipalities of Tarauacá and Porto Walter, in the Juruá Valley, State of Acre, and 97.74% of the territory is in the second municipality (ISA, 2023).

The Indigenous Land has 87,571.6965 ha and has a total perimeter of 140,047.90km. The area is bordered by: (i) Riozinho Cruzeiro do Vale (also known as Amahuacas, Leonel or Humaitá stream); (ii) Nilo creek, a right bank tributary of the Riozinho Cruzeiro do Vale; (iii) Grande creek, which forms the Valparaíso River. There is an overlap of this territorial unit with the Riozinho da Liberdade Extractive Reserve, corresponding to 10.199,096 ha.

According to data from the DSEI – ARJ (2021), the population in the Indigenous Land corresponds to 815 people divided into 319 men, 278 women, 200 children (between 0 and 11 years old) and 18 elderly (aged over 60 years). It is noteworthy that in the last ten years there has been a great increase in population, causing a new territorial organization, with the implementation of new housing and an increase in the number of swiddens.

The main economic activities are focused on itinerant agriculture, fishing, hunting, animal husbandry and collection in the forest, where they seek to associate the diversification of activities with the maintenance of ecosystem services. There is a strongly defined division of labor with women being responsible for the domestic environment, as well as the creation of animals and plants grown in backyards and vegetable gardens, handicrafts, food preparation, and collection in the gardens. The men are dedicated to hunting, fishing, preparation of the grazed, management of SAFs, transportation. As activities carried out jointly by men and women stand out the production of flour, collection of fruits and plants (focused on food, health, and aesthetic treatment), collection of materials for construction and ceremonies (playful and ritualistic) (PGTA, 2021).

During the field, we could see that there are cattle in the Indigenous Land for internal consumption. There are some pastures, the main one being in the community of Santo Antônio.

The income is guaranteed with part of the production, especially of flour, sold in the municipality of Porto Walter, as well as through social benefits of the Federal Government. They also sell handicrafts. We observed that the São Luís community invests in the production of sugarcane honey and is interested in expanding production. Currently the IL cooperative has signed a contract with a foreign company.

4.1.1.1.1 The Arara People

The Araras (Shawādawa) constitute an indigenous society of the Pano language family, whose speakers can be found in Peru, Bolivia, and Brazil. In the latter country the Pano indigenous societies are in the south and west of the state of Acre, extending east to the western part of Rondônia and towards the north entering the state of Amazonas between the Juruá and Javari rivers (RODRIGUMES, 1994). As for the Araras, they currently reside in the Arara Indigenous Land of the Humaitá Igarapé, located in the municipality of Porto Valter/AC. The river courses that define the limits of this land are the "little river" Cruzeiro do Vale, a tributary of the right bank of the Upper Juruá, the Igarapé Nilo, a tributary of the Cruzeiro do Vale, and the Igarapé Grande, which forms the Valparaíso River. The limits approved in 2006 of this indigenous land are 87,571 ha (CORREIA, 2005).

In the development of the field activities for this Project, a survey of the origin of the Shawādawa was made with the elders, through the methodology of oral history. Next, we will describe an interview conducted with Mr. Eudes and Mrs. Branca in the Paz community on April 10, 2023. The narrative says that:

My parents, my grandparents talked like that... There were indigenous people and there was only one placement that they lived there and there were many children who lived near a samaúma and there was a hawk that made the nest up there and the hawk always took children, the hawk looked for the animals and didn't find, then took a child and leaved with it. One day, he took an indigenous child, and the father was crying and went to the port to bathe when he found a frog that said:

- Cousin, why are you crying?

He said:

- Oh cousin! I don't even tell you! I arrived from the woods just now and the hawk took my son. It's with it there in the samaúma.

The frog said:

"Oh man cousin, why don't you kill him?"

- Oh! If I could I'd have killed it, but I can't.

Then the frog said:

- When you get there, you can go beating around the samaúma and keep paying attention, which will fall his children and then will fall the old man.

He said:

- Oh cousin! So, I'll do that!

Then he ran and kept hitting the samaúma and stood there repairing. Hawk began to fall and was already dying, because of a medicine they had made. Then, when it was about eleven o'clock at night the old hawk began to moan upstairs. It began to moan, and he waited. When it was one o'clock in the morning, he heard the fall. They ran there.

He said:

- Do you see it disgraced? You are used to eating my relatives, my children, now we will eat you!

Then they began to skin the hawk and the indigenous kept the feathers inside a straw basket. He tucked the feathers into the basket and when it was one day, the feathers started to move, and he went and said:

- Man, the rat is already here in the basket nesting with my feathers! This rat is already disgracing my feathers!

Then he took the basket and turned to pour out the feathers to kill the rat. When he shed the feathers, all the indigenous people ran, which were made with the feathers of the hawk. Then ran the Arara, which are the Shawādawa, to one corner, Yawanawá has already run to another, Kaxinawá has already run to another, Sayanawá has already gone to another. It was because of the hawk's feathers that all the indigenous people were produced. That's the story my father told; it was like that told by all my ancestors. It was like that.

(Eudes Pereira, comunidade Paz, 04/10/2023)

Just below, it is possible to visualize the mental map of one of the ancient stories, called "ancient history of the enchanted Arara", which also deals with the origin of the People, being also well respected. This narrative was told to us by Mr. Nonato, in the village of Raimundo do Vale.

Figure 57- Mental map of the history of the enchanted macaws.



Elaboration: Francisco Cazuza da Silva, Antônia Emilin, and José da Silva Cazuza

4.1.1.1.1 Territoriality

The Shawādawa claim that they come from the Amazon, migrating to other places through the Solimões River. Ancient (in this case of migration) and mythical history converges with history, because for certain indigenous people's myth and history are inseparable and are also treated as history, which intersect and update the present time (ARAÚJO, 2020).

The ancient history, which refers to the process of diaspora and Shawādawa migration, is very similar to that of the Noke Ko í (Katukina) other Pano people. For both peoples, the crossing over a mythical alligator, responsible for the first diaspora of the Shawādawa, occurred in an ancestral past. The second is attributed to the correias and the seringal system.

They mentioned that between the nineteenth and mid-twentieth centuries they were installed in the Juruá region, Acre. The narratives converge with the historical formation of Cruzeiro do Sul, created on September 28, 1904. The narratives mention few dwellings in the urban core created by Marshal Thaumaturgo de Azevedo.

Before contact with non-Indigenous and according to the memory of the People, they inhabited the southwest of the Amazon, on the border between Brazil and Peru. The first contact occurred in the early twentieth century, at the height of the first rubber outbreak. At the time, rubber plantations were opened in the region by rubber tappers, who began to count on northeastern labor. Peruvian caucheiros¹² also arrived in the extreme western Amazon to extract rubber.

The contact of the expansion fronts with the Shawādawa was not different from several indigenous peoples who suffered from the runs, species of punitive expeditions at the behest of rubber tappers with the objective of killing or enslaving the foresters (ARAÚJO, 2000). The rushes caused numerous deaths, drastic reduction of populations and subordination to the capitalist regime of rubber plantations, in addition to bringing changes in social organization, culture and economy, one of the main ones being the abandonment of the language by many indigenous people, who began to adopt Portuguese as a language (BEZERRA and NEVES, 2010). At the time, the Shawādawa inhabited the right bank of the Upper Juruá, between the rivers Forquilha, Liberdade, Bajé, Gregório, Humaitá, Tejo, Envira and Valparaíso. Their population reduction was also due to intertribal wars, concomitant with the period (CORREIA, 2012). The narratives below, by Mr. Eudes Pereira and Mrs. Branca, reinforce this statement.

At the time of the races the Arara ran and were all stampeded, so it is like this, Arara for Acre, Arara to other places, has this division. (...) My father told me, that in the time they lived in Bajé. They had a group there. Then an old man went and told his children to go to the garden and then prepare food. Then when it was about fifteen minutes after, he heard that different speech. When he looked at the river, he was already coming... It was the Peruvians who were already coming to finish them off because of the caucho, the rubber. They made a war too. Then when he looked, he saw the guys armed with rifles and mass hats, then when he gave faith to the Peruvians, he already turned back in his career and came screaming and the boys who were tearing off the garden heard the noise of the old man.

- Runs that the cariú [non – Indigenous] comes to kill us! The cariú comes armed, in a hat, and they come to kill, come to finish us off. Run, go to the woods!

Then instead of them jumping down and running, they still went to untie the nets, went to get ready. Then the Peruvians arrived. When they saw the Peruvians coming, they entered the room. It only had one door. Then they came in. When they arrived, they didn't talk, they started shooting. The indigenous had no weapon, their weapons were the arrow. They killed almost everything. The Peruvians killed all the Indians who were there, all of them. Then, there was an Indigenous woman there, very afraid of dying, and offered a bunch of bananas. Then she took the bunch of bananas and asked on her tongue not to kill her, but they shot, and she died with the bunch of bananas stretched out in her hand. The Peruvians wanted the land, because of the caucho. They wanted to take it, so they killed all the indigenous, so that way the land would be free.

¹² The name given to people who works in rubber extraction

(Eudes Pereira, Paz community, 04/10/2023)

My grandmother had the habit of making some clay pots, she did... Then she starts singing the same indigenous song, a song that makes people cry. She starts to sing, and I realize she was crying. I said:

"Grandma, what do you have?" Why are you crying?

Then she said:

- I'm sorry for my relatives. I'm alone here. I'm just not unique because I have my sons and daughters yet, but otherwise I was unique here. In the time of the rushes, they killed a lot of my relatives and the others fled and I have no news of my relatives and neither of them know where I am!

Then she cried with pity for her relatives, the Arara people.

(Dona Branca, Paz community, 04/10/2023)

Therefore, among the worst strategies of the "runs", there is the one aimed at the use of indigenous people to attract or kill indigenous who, historically, belonged to rival groups. This practice also caused "taming" of indigenous who, from the interior of the forest, began to inhabit the banks of the rivers, where the headquarters of the seringal was located (ARAÚJO, 2022, p.41).

The mental map below, drawn by a young man from the Novo Acordo village, expresses the period in which the Shawādawa were dispersed and went to work in the rubber plantations under the domination of the rubber tappers. Physically separated, many suffered mistreatment and were forbidden to practice habits and customs, including speaking their own language.

Figure 58 - Mental map when they worked in the rubber plantations under the domination of the bosses.



Elaboration: Francisco Cazuza da Silva, Antônia Emilin and, José as Silva Cazuza

According to CORREIA (2012), in view of the information on indigenous rights, the Arara began to organize themselves and plead in FUNAI for the land regularization of the land they occupied. In this process, the Arara appropriated the written language, which is not common among the group, to send various correspondence to FUNAI.

Then, they began to operate with the universe of writing with greater intensity but remained in the universe of orality. To meet the indigenous claims, in 1985, FUNAI sent a team to the area to carry out studies for the identification and delimitation of the Arara Indigenous Land of the Humaitá Stream. With the definition of the indigenous land and the expropriation of the owners of rubber plantations, several Arara people under the yoke of the bosses, preferred to abandon the placements to reside in it with their relatives, resulting in a new pattern of residence.

The group settled mainly near the rivers and no longer in downtown areas, as at the height of syringe production. At the beginning of 2000 they were organized in three villages – Raimundo do Vale, Boca do Nilo and Boa Vista. There doesn't have a large maloca¹³ but, a conglomerate of houses whose closest proximity is linked to kinship. Extended families seek to reside in nearby houses inhabited by a nuclear family consisting of a man, his wife, and their children. At the time of the demarcation, the indigenous

¹³ Large collective indigenous dwelling, housing several families

chieftaincy by maloca was replaced by the indigenous leaders in the early 2000s, in several of three, one for each village. Interestingly, the leadership of the Boca do Nilo Village is a white man married to a Arara, elected by vote. In the two other villages, the choice of a leadership was due to the qualifications and political relations of the chosen ones with the national society, which enables them to acquire improvements for the community. Even with the changes in the social organization of the Arara, during the time of the syringe, they began at the time of demarcation a process of cultural rescue (CORREIA, 2012).

The group began to activate the memory to increasingly strengthen its identity and its knowledge about the Arara territory. It is perceived at this moment in the history of the Arara that they began to operate with a memory framed in points of reference. In addition to the discourses about events and great characters, the framing work led to material objects. Thus, the memory is stored in monuments, museums, libraries etc. (Polak, 1989, p. 9-10). In the case of the Arara, the framed memory can be noticed in archaeological sites, cemeteries, ancient gardens, placements, etc., which form historical reference points for the group. These points of reference in the Arara territory, added to the strengthening of the group's identity, built mainly in reference to the ancients, the "runs", and the intertribal wars, allowed them to conquer other claims, in the areas of health, education, agricultural production and transportation. As a result of these demands, two schools and a health post were built. Some Arara have taken courses and trained as health agents or bilingual teachers who provide services to 238 residents in the indigenous land, 26 of whom are married to whites. In the city of Cruzeiro do Sul there are 73 residents, 10 of whom are married to whites. The marriages with the whites and the presence of Arara Indians residing in Cruzeiro do Sul are reflections of the time of the syringe, most of whom migrated to the city due to the precarious conditions in which they lived in the rubber plantations. (CORREIA, 2012).

The first village to be created was Foz do Nilo and, and order of creation the other villages and communities: Boa Vista (already extinct and replaced by the village Novo Acordo), Raimundo do Vale, Novo Acordo, Santo Antônio, São Luís, Paz, São José, Matrinchã, Bom Futuro, Porto Alegre and Candim, the latter created due to the search for isolation from COVID 19.

Currently there are three territorial blocks, with three villages, two of which have clusters of communities. The first is called Foz do Nilo and involves, in addition to the central village, communities of São José, Bom Futuro, Matrinchã and Candim. The second, called Raimundo do Vale, encompasses the communities of Santo Antônio, São Luiz, Paz and Porto Alegre. The third is called the New Deal. Access to the villages is through boat, through the Humaitá creek (PGTA, 2021). We observed an area in the vicinity of the village Raimundo do Vale called Boa Esperança, which has a community profile, but is part of the village.

Figure 59 - Villages and communities of the Arara do Igarapé Humaitá Indigenous Land.

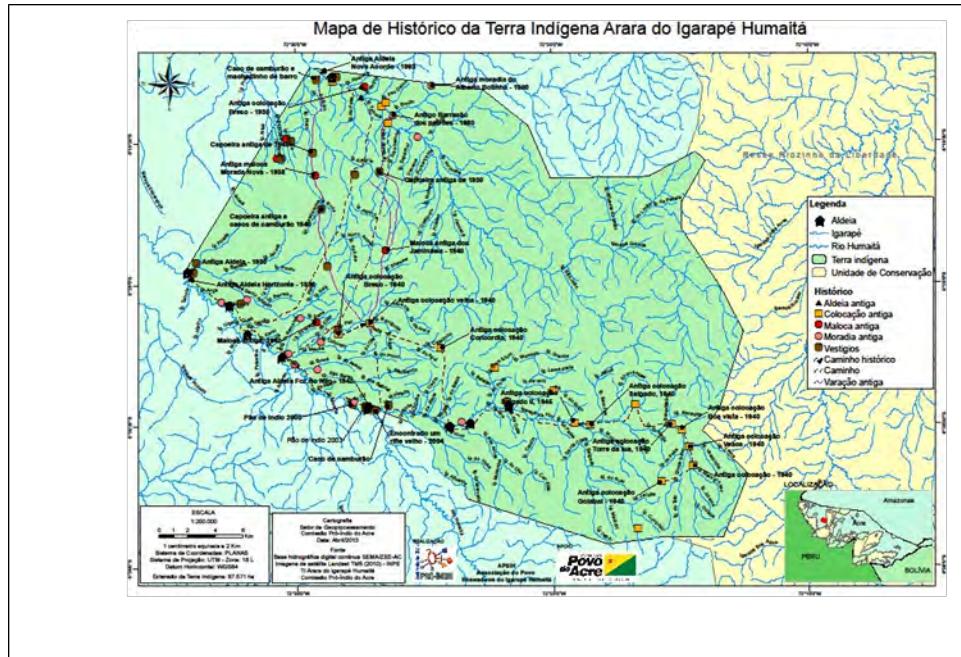


Elaboration: Evanilson Lima da Costa

From the Arara residents in Cruzeiro do Sul and those from the indigenous land it is possible to perceive a distinction between "memory of" and "memory for". The first situates the retained of the past in the past and the second projects the past in the present (WOORTMANN, 1995, p. 114). This distinction is evident when the group seeks to trigger indigenous rights or demand improvements. The information that at first could be considered a "memory for" (the wars, the rushes and the ancients) are triggered as "memory of" and allow the group to project the past into the present. When talking about the past in the process of territorial claim, for example, it seeks to legitimize a present spatial occupation based on the migrations of the ancients or the sites of intertribal wars. The same is true of the ayahuasca ritual, with the frog milk vaccine (used to take away the hunter's bad luck), with mariri (indigenous dance) and others. It seeks to project many of these customs performed by the ancients to the present, to strengthen the identity of the group. With a more cohesive identity than in the time of the seringal, the Arara began in the 1990s the claim for the expansion of the indigenous land occupied by the group. In that decade, with the support of non-governmental organizations and organized in association, the group managed in 2000 to have Funai expand the land to an area of 86,700 ha. They also obtained several boats, engines to make flour, medicines for the health center, material for bilingual schools and financing for productive activities (CORREIA, 2012).

Below is a map that shows historical traces of occupation since time immemorial of the Shawādawa in the area that today is located the Arara Indigenous Land of the Humaitá Stream. In it, different places are georeferenced that were once the malocas/dwellings of the ancestors, traditional swiddens, places where rituals were practiced, etc.

Figure 60- Historical Map of the Arara do Igarapé Humaitá Indigenous Land.



Source: CPI/AC (2013).

4.1.1.1.2 Cultural aspects

The Arara, of the Pano language family, call themselves Shawādawa, but are also known historically by other denominations, such as: "Shawanáwa", "Xawanáua", "Xawanāwa", "Chauā-nau", "Ararapina", "Ararawa", "Araranás", "Ararauás" and "Tachinauás". The "ethno-linguistic" family Pano located in the west-Amazonian is characterized by its great territorial, linguistic and cultural homogeneity. Even if it is possible to present the Pano in "block", one should not forget the real internal diversity. Formed by about 30,000 speakers, the Pano ethno-linguistic family occupies, in the border region between Brazil and Peru, an almost uninterrupted area that extends practically from the upper Solimões to the upper Purus.

Due to the historical, socio-cultural, and economic transformations that the Shawādawa face since contact with non-indigenous society, many have stopped speaking their mother tongue and have adopted Portuguese as their main language. Consequently, other sociocultural elements linked to the language also came to the decline, such as kinship terminology, the possible social division into halves and into four sections (both aspects inherent to groups of the Pano language family).

The kinship model is originally patrilineal, that is, the descent of the group is transmitted, mostly, by men. However, possibly, due to interethnic miscegenation throughout history, this condition has become more flexible and, when Shawādawa women marry non-indigenous men or men of other ethnicities, Shawādawa descent is also allowed to their children.

The social cohesion of the group currently comes from the descent of the "ancients", that is, from the first individuals to contact the agents of the rubber expansion front. The social structure is organized as follows: there are at least three general leaderships – one for each village. In addition, there are other specific

leaders such as health agents, sanitary agents, agroforestry agents, teachers, and women's leadership. There is no uniformity of extended families in each village, with individuals from the main families (Pereira, Cazuza, Nogueira and Varela) in the three villages.

As for knowledge, mythology, and cultural practices, the elders are considered "the guardians of memory" and seek, whenever possible, to transmit it to the younger generations. Currently, there are different festivals and rituals that are practiced by the Shawādawa, such as mariri, the application of kampu, the consecration of *tsibu* or ayahuasca, the use of snuff, smoking with medicinal plants. The first is a celebration held with a series of games and circular dances, as well as the use of traditional adornments and body paintings with annatto and jenipapo. The others are considered medicines that bring physical and spiritual healing to those who need it. During these cultural activities, the elders teach the younger one's traditional songs, prayers, and dances. In this way, it keeps the Shawādawa identity alive.

The subordination of the Shawādawa to the rubber tapper system and the imposition of norms prohibiting various cultural practices meant that, in addition to the weakening of the social organization, the indigenous people were shaken in their traditional knowledge, involving crafts and ways of doing, rituals and celebrations, forms of expression (games, playful games and festivals are some examples), architecture, among other aspects. The demarcation of the land and its expansion served to give security to socio-cultural reproduction, enabling a "process of return" that gradually gains more and more intensity in the revitalization of culture, bringing to the surface cultural representations that are in oblivion and need to be remembered and others that are returning to be practiced.

They highly value the memory of the old, because their knowledge and memories are fundamental for future generations to know the past. As mentioned, the Indigenous Land is another fundamental element for sociocultural reproduction, because in it they practice various rituals, ceremonies, playful festivals and games such as mariri, use of *tsibu* (ayahuasca), application of *Kampu* (secretion of the frog *Phyllomedusa bicolor*), use of medicinal plants for various purposes, use of snuff. The sacred and the playful are practiced through songs, prayers, dances and other manifestations and representations, such as adornments and paintings.

Ayahuasca is known to this people as ¹⁴*tsibu* or *timbu*, the name of a Shawādawa who brought the use of tea through its immersion through the Sant Daime. It is noteworthy that the Daimist religion played a role in revitalizing the use of entheogen in traditional peoples and communities of Acre. Indigenists from FUNAI were also responsible for this return of ritualistic practice, which had been left aside because of the dispersion of the indigenous people, work in the rubber plantations and, in some cases, on cattle ranches, as well as the entry of religious missions and the adherence of the indigenous to other beliefs, such as Pentecostal and other evangelical churches.

Therefore, before the arrival of Peruvian caucheiros and Brazilian rubber tappers, the Shawādawa had a strong connection with their traditional medicines. With the dismantling of the social organization and the pressure on culture, it was inevitable the occurrence of strategies for erasure of memory and the imposition of another, coming from the domains of the colonizer.

For Renard – Casevitz (1992), between the turn of the nineteenth century to the twentieth, the conquest of Amazonian territories due to caucho and rubber was merciless for the indigenous peoples because places

¹⁴ Ayahuasca is a word of the Quechua language and, according to Schultes (1992), means "wine of souls" or even "liana of spirits". This is how, for a long time, the term was treated, in most academic studies. Very recently, studies by linguist Gayle Hiphgine (2013) point out that the term aya-waska refers to the cipó from which a tea of millennial use is made and that its translation among the Napo Runa, who speak Quechua, in Ecuador, corresponds to "cipó with a soul" (ARAÚJO, 2022, p. 22).

and peoples with their cultures were devastated. The few decades have wiped out diverse indigenous peoples, reduced their populations and, inevitably, suppressed their memories.

For indigenous peoples, including the Shawādawa, the *timbu* is a strategic element of resistance and represents one of the strongest diacritical signs of their culture. As for many indigenous peoples, it allows relationships of healing and, mainly, connectivity with the memory of the ancestors, reinforcing the ancient stories and their spiritual origins and explaining the emergence of the People.

The story of the Shawādawa, told in a different guise, does not differ from others of the indigenous peoples of the Juruá Valley, who had lost the practice of ritualistic consumption of ayahuasca. Therefore, the Santo Daime had a fundamental role because to contribute to the process of cultural reorganization of the indigenous, it made a dive taking symbolic representations from other places in the world into the forest but seeking to strengthen ancestral values from each indigenous sociocultural context.

As we stated earlier, *ayahuasca* serves as a diacritical sign and cosmopolitical strategy; It is the powerful drink that unites the worlds and recalls the existence of the indigenous people in them. Therefore, more than serving to perform shamanic flights, dialogue with beings and ancestors, predict the future, locate enemies, and identify the abundance of food, it serves to remember times (ARAÚJO, 2022, p.45). It is against this backdrop that its ingestion allows the reconnection with the past, often painful and merciless, which shows the mistreatment suffered by the indigenous during the process of subordination of the rubber plantations, because this memory, inscribed in the collectivity of the indigenous peoples of the Western Amazon, refers to the time when they began to be violently killed and forcibly incorporated into the capitalist system in the nineteenth and twentieth centuries, through the creation of rubber plantations where those who survived were forced to work, including in the extraction of latex, under the tyranny of whips, name-calling and other mistreatment (ARAÚJO, 2020).¹⁵

For the Shawādawa, the use of *timbu* has a special meaning beyond healing, as it signifies a foundation of ancestry and culture, because the tea that "makes you dream" expresses the great plunge into the past for knowledge/recognition, of their deep realities, the sacred and symbolic waters of the memory of their People.

Sananga (*Tabernaemontana sananho*) is called "eye drops" and has a therapeutic and sacred role. It is a medicine made from the juice of the bark of a root and is applied to both eyes, like an eye drop. One of the differences in relation to white eye drops is that it burns and causes tears. The burning can vary greatly, depending on the "degree" of the medicine. It serves to carry out the cleansing of the eyes, but it has a deeper and more spiritual sense, clearing the spiritual channels, increasing sensitivity.

The *rapé*, medicine most often used during rituals as well as at times in everyday life, is made with tobacco mixed with some kind of tree bark. It is a fine powder, inhaled through the nose. The representatives of the culture believe that aspiration allows to absorb energy from the spirits, ancestry and spiritual beings that inhabit the forest. It is applied by means of straws of *taboquinha* or other similar individual product or collective application called *curipe*.

Finally, *kampu*, less common and applied at special times. It is a secretion extracted from a frog (*Phyllomedusa bicolor*). In short, it is a poison scraped from the back of the frog and inoculated under the skin, aiming at a cleansing (physical and spiritual). The indigenous believe that this medicine acts for the

¹⁵ For the Huni kuin (Kaxinawá) people, also from the Pano trunk, their terrifying visions bring to light cruel episodes that include rapes of Indigenous women in the headquarters of the latex producing units, as well as in their placements inside the forest. Images of indigenous women and children, sold as any commodity in the rubber plantation sheds, also sprout, as human remains that survived the massacres caused by rubber tappers at the behest of rubber tappers (ARAÚJO, 2022, p. 46).

physical, mental, and spiritual rebalancing. The "frog vaccine", as it is commonly known, causes entheogeny, being used to strengthen immunity, also serving to ward off "panema" (bad luck).

It is worth mentioning the great participation of young people in the ritualistic and daily activities of medicine application. We noticed its use in all the villages and communities visited in the months of March and April 2023.

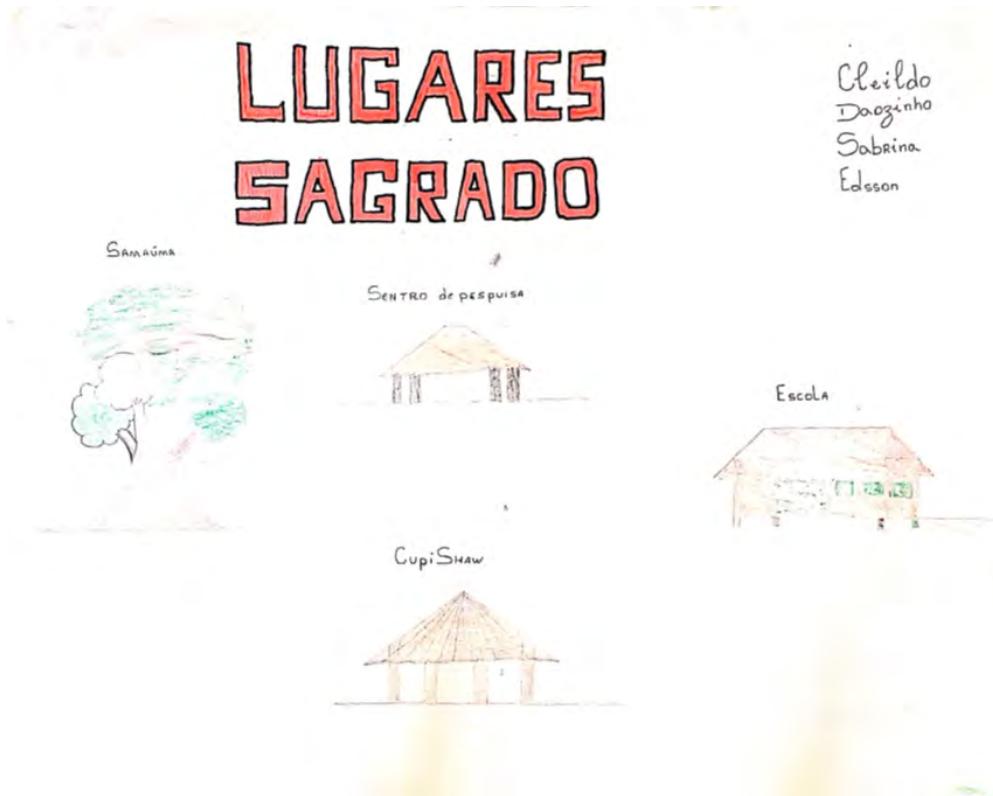
Timbu, sananga, kampu, and rapé, as well as other herbs and plants, are handled in sacred places. There are three main ones that have been reported to us in the field: (i) medical research; (ii) center for the preparation of medicines and the realization of healing and other therapeutic procedures; (iii) the earthling.

The first consists of the forest itself, since it is from it that most of the medicines used and others still in the process of research by the indigenous people are extracted. In the forest there are sacred places with plants and trees respected within the culture, such as *samaúma* (vital source of emergence of the people), *Banisteriopsis caapi* cipó and *Psychotria viridis* leaf, intended for the making of *timbu*, among other vegetables.

The second is the place of preparation of sacred medicines, especially *timbu*. They are the so-called places of form, as well as specific rituals aimed at healing and therapeutic treatments. There are only two centers in the entire Indigenous Land, one being in the village of Novo Acordo, where it is possible to perceive with greater evidence the influence of the Sant Daime religion, and in the Matrinchã community, entering the Nilo creek. There is a third, nearing completion in the village of Raimundo do Vale, built by teachers and local representatives.

The third is the "terreirão". They are open places intended for the use of medicines and for larger festivals and ceremonies. They are usually made around a *samaúma* that as we have already explained has sacred connotation and is a *locus* with the ancestral past of origin. When there is raining, ritualistic activities are transferred to kupishawas.

Figure 61 - Sacred places of the village Novo Acordo.

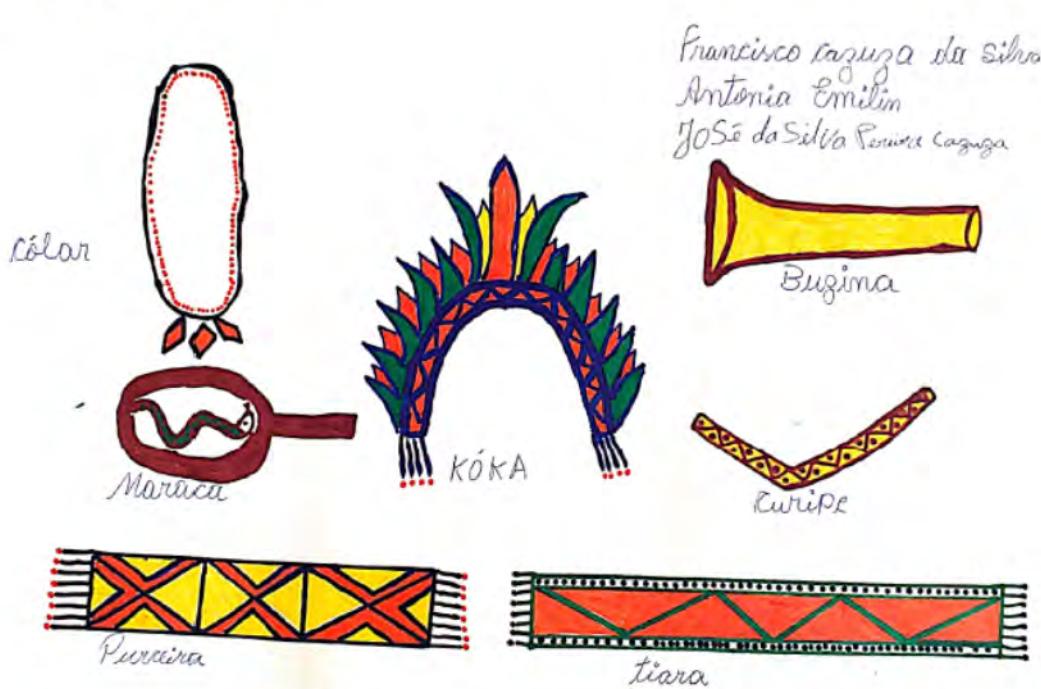


Elaboration: Cleildo, Daozinho, Sabrina, and Edson

There is making of handicrafts by women and men, with young people having great interest in their manufacture. For bracelets, tiaras and bracelets use both traditional seeds and beads brought from elsewhere in Brazil. There have already been initiatives for the organization of women through crafts, but the process has been interrupted.

Figure 62 - Some handicrafts from the Indigenous Land.

Artesanato



Elaboration: Francisco Cazuza da Silva, Antônia Emilin, and José as Silva Cazuza

4.1.1.1.3 Political organization and governance

The general administration of the Indigenous Land is the responsibility of the general chief. He is responsible for the articulation with the chiefs of each village or community. This chief is elected by the others for a period of two years, and renewal may occur. Although it cannot interfere in the decisions of each territorial unit, it can mediate local internal crises.

Local chiefs exercise political power in villages and communities, mediating consultations and decisions of a collective nature with the participation of all (men, women, youth, elders, among others).

Regarding political organization, political leaders are considered crucial to coordinate the internal and external relations of the three villages, although in more recent decades, other actors also make decisions with the villages, such as teachers, Indigenous Community Agents, Indigenous Sanitation Agents, Indigenous Agroforestry Agents and representatives of associations, with a relevant role in articulating with the world outside the territory. They are added to these others who perform traditional functions, such as midwives and shaman (Matrinxã village). In the Indigenous Land there are 41 teachers, 315 students, 09

Indigenous Agroforestry Agents, 04 Indigenous Community Health Agents, 02 Indigenous Sanitation Agents and 03 midwives (DSEI – ARJ, 2021).

They maintain relations with external society through contacts with government institutions (federal, state and municipal), organizations of the (Pro-Indian Commission of Acre, Association of the Movement of Indigenous Agroforestry Agents of Acre, Organization of Indigenous Teachers of Acre, Organization of Indigenous Peoples of the Juruá River and Organization of Indigenous Peoples of Acre.

They recently created the Leadership Council, which has a crucial role in supporting the general chief in decision-making on the Indigenous Land. The planning and execution of sustainable perfume and carbon projects, for example, will pass the scrutiny of this Council.

There are two strong local organizations: Associação do Povo Shawādawa do Igarapé Humaitá (APSIH) and Cooperativa Agroextrativista Pushuā Shawādawa (CAESP). Through the organizations it was possible to establish projects and actions aimed at value chains of wood (community) and non-timber forest products, mainly oilseeds and native forest seeds. It also has initiatives in the value chains of cocão, latex, handicrafts, and native seeds (Idem).

The Ethnozoning with its respective Management Plan is the main instrument of environmental and territorial management of the Indigenous Land of the Humaitá Stream. A review of the Management Plan was carried out in the year 2021. 67 internal, external and mixed agreements were planned, distributed in the following areas: hunting; fishing; animal husbandry; traditional swiddens; Agroforestry Systems; extractivism; Permanent Preservation Area (riparian forest); training of Indigenous Agroforestry Agents; water; culture and crafts; school education; village health; waste management (environmental education); community organization (association and cooperative); communication; surveillance and supervision; production chains; awareness of the surroundings; indigenous people who reside outside the Indigenous Land; dissemination, monitoring and evaluation of the Territorial and Environmental Management Plan. The current situation of the Plan is as follows: 17 agreements implemented, 21 agreements partially implemented, and 29 agreements not implemented (ibid.).

It is essential that all the agreements of the PGTI – Indigenous Territorial and Environmental Management Plan are implemented so that a new cycle of management planning is carried out in the future on top of the successes and challenges. Still, other needs arose after its planning such as clean and sustainable energy to store food, social actions to minimize impacts arising from the consumption of alcoholic beverages in the surroundings of the territorial unit, activities aimed at strengthening and empowering women and strengthening the links of value chains already under development and others to be prospected, with access, without middlemen to other markets, besides the place. However, this perception must be confronted through *on-site* meetings taking into account, mainly, the vision of the indigenous people.

4.1.1.1.4 Community organizations

The Arara People created two community organizations with the objective of claiming rights and formalizing a partnership for the development of the IL: the Association of the Shawādawa People of the Humaitá Stream (APSIH) and the Pushuā Shawādawa Agroextractivist Cooperative (CAESP)

Representative of the Shawādawa People. In addition, it maintains political articulations with other indigenous organizations, such as: Organization of Indigenous Peoples of the Juruá River (OPIRJ), Organization of Indigenous Peoples of Acre, Southern Amazonas, and Northwest of Rondônia (OPIN) and the Association of the Movement of Indigenous Agroforestry Agents of Acre (AMAAIAC) and the Organization of Indigenous Teachers of Acre (OPIAC).

The relations of the Shawādawa with the surrounding society also have a political nature, since many have voter registration and actively participate in municipal, state, and national elections – the DSEI health council. In addition, to improve their socio-economic-cultural interactions, they establish partnerships with different indigenous and non-indigenous institutions, both public and non-governmental.

4.1.1.1.5 Population data

The Arara people have a population of 815 individuals, distributed in 10 villages and communities.

Table 46 - Arara people population.

Villages and Communities	Mens	Womens	Children (below 0 to 11)	Elderly (above 60 years)
Raimundo do Vale	75	61	41	6
Foz do Nilo	53	43	34	2
Santo Antônio	18	11	9	1
Novo Acordo	25	33	17	4
Matrinchã	27	31	21	1
Paz	38	27	21	3
Bom Futuro	32	25	19	-
São Jose	36	40	34	1
São Luiz	15	7	4	-
Subtotal	319	278	200	18
Total		815		

Source: Project Teams Elaboration

4.1.1.1.6 Educational Service

The IL has seven schools offering literacy and Elementary Education I and II, under the responsibility of the State Department of Education and Municipal Department of Education of Porto Walter. Currently the IL has 41 teachers and 315 students enrolled. The institutions don't offer high school, forcing young people to move to the cities.

It is offered the traditional education system, without bilinear education, not incorporating the culture and oral and written language of the Arara People. The improvement in the training of teachers is necessary for the inclusion of methodologies appropriate to the reality and life experiences of the Arara People, including

training in higher education in an indigenous area for the administration of quality high school. The communities demand the hiring of elderly teachers, fluent in the indigenous language, to teach the children literacy, valuing the oral and written language and culture of the Arara People. They want that the students be first literate in the indigenous language and then in Portuguese. It is necessary to produce didactic material in articulation with the education secretariat or other partners, with more robust and in-depth content about our language, culture, and history of the Arara People.

According to the families, the service is precarious, with a lack of appropriate infrastructure. There is a demand for classrooms, tables, chairs, blackboard, teaching materials, school supplies and internet. The lack of adequate transportation also limits the regularity and attendance of the annual school calendar. School meals do not respect local eating habits. Industrialized products are offered. As the food is associated with culture, the residents claim to the municipal government acquisition of local products like, flour, peach palm, gum, banana, yams, papaya, cassava, pineapple, açaí, Jane, vegetables, jerimum, buriti, etc.

4.1.1.1.7 Health care

For preventive care and cases of diseases, IL has two health posts in the municipality, located in Foz do Nilo and Raimundo do Vale villages; four indigenous community health agents; two indigenous health agents; and three traditional midwives. The Special Secretariat of Indigenous Health (SESAI) is responsible for coordinating and executing the National Policy for Health Care of Indigenous Peoples and the entire management process of the Indigenous Health Care Subsystem (SasiSUS) in the Unified Health System (SUS). The diseases that affect the health of the residents are respiratory diseases, dengue, diarrhea, and low back pain.

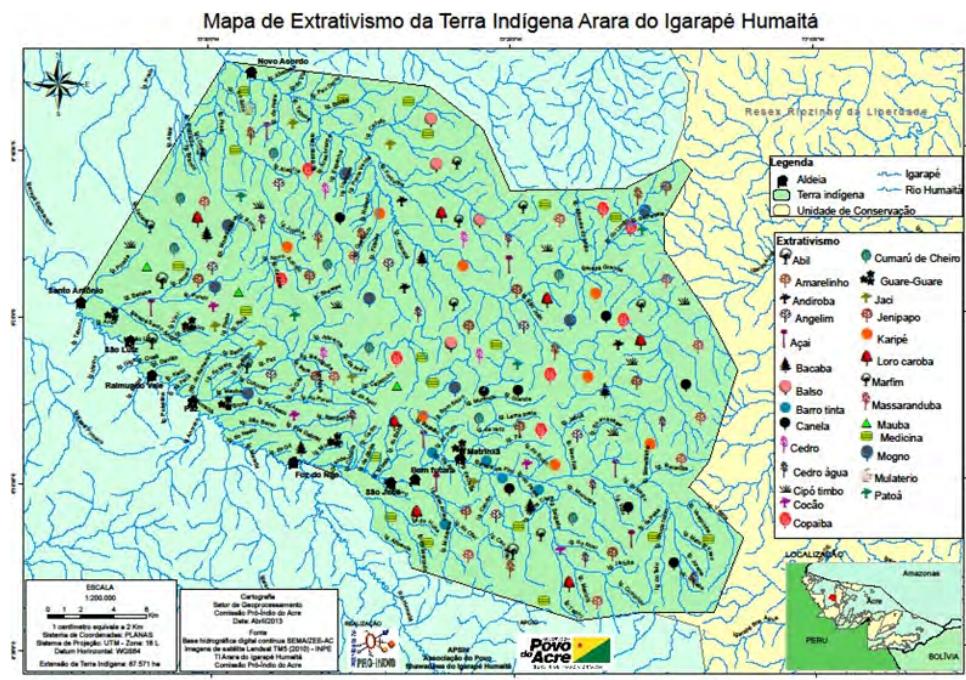
One of the major vectors reported is the consumption of untreated water, leading to the claim, of construction of artesian wells in all villages and communities. For residents, changing eating habits also contribute to new illnesses. For them, natural food prevents diseases and reduces waste. In the past, the diet was more natural and had fewer diseases. Currently with much of the industrialized food, a lot of water pollution, polluted atmosphere every day, new diseases appear.

For the care of the Arara People, it provides a doctor for basic and emergency care. The families reported that, despite the infrastructure, the service is still very precarious. They demand the rescue and valorization of traditional medicine, with the use of natural species and essences and the *pajelança* for the treatment of diseases, reducing the dependence on doctors and industrial medicines. It proposes the promotion of training workshops for young people by the elderly, to use traditional cures. In the communities, there are three traditional midwives.

4.1.1.1.8 Forest Extractivism

The Arara people have great dependence on forest extractivism to meet the basic needs and maintenance of their way of life, used as food, natural remedies, construction of houses, boats, and cultural religious rituals. The non-timber products collected are: açaí, patoá, cupuaçu, buriti, abacaba, coco-de-jaci and cocoa. The wood is used for the construction of family and community infrastructure, such as: houses, kupixawa, fences, warehouse, flour houses, schools, health post, boats, work instruments, among others.

Figure 63 - Map of Extractivism of the Arara Indigenous Land of the Humaitá Stream.

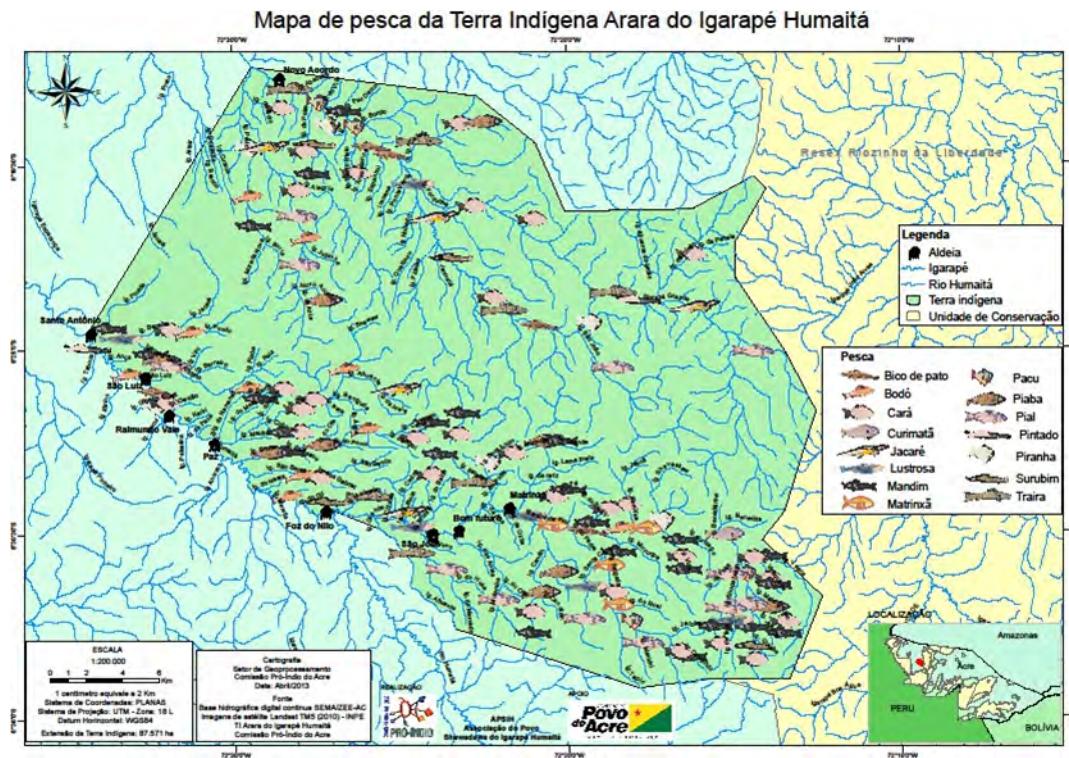


Fonte: CPI/AC (2013).

4.1.1.1.9 Fishing

Fishing is intended exclusively for consumption, with emphasis on the species bodó, pintadinha, cachimbo, tracajá, jiju, polaca, pacu, matapiri, arraia, piau listrada, piranha, surubim, piaba, rabo de fogo, tambuatá, bodi, cará, piabão, mandi, arraia, traíra, bodó grande and Matrixã.

Figure 64 - Fishing Map of the Arara do Igarapé Humaitá Indigenous Land.

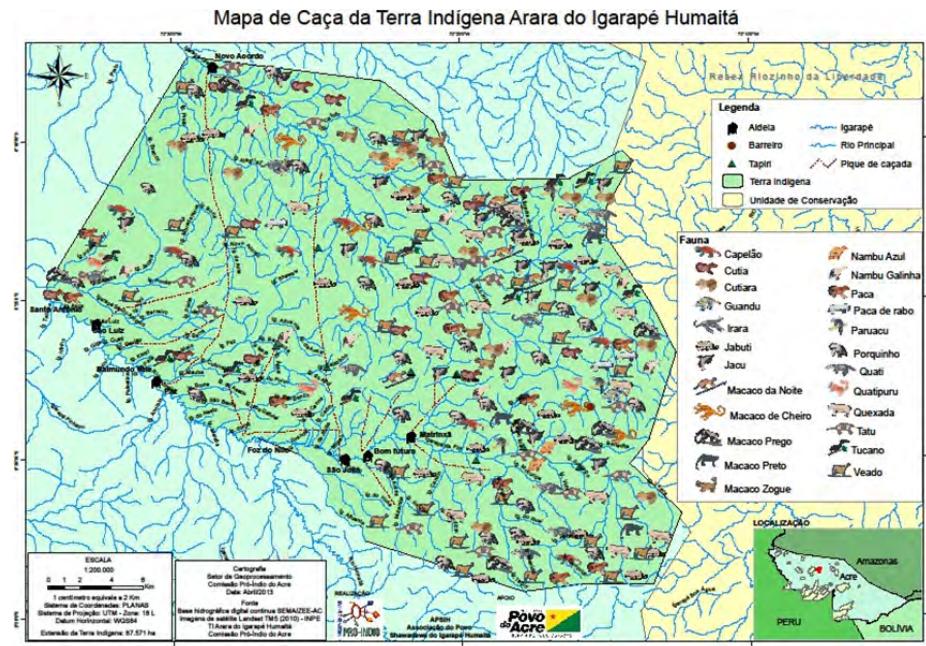


Source: CPI/AC (2013).

4.1.1.1.10 Hunting

Hunting is the basis of the food diet, with the most hunted animals: tapir, cotiara, paca, pig, agouti, chaplain, armadillo, nambu, quatipuru, deer, peccary, jaboti and jacu. Hunting occurs throughout the indigenous territory, according to the map below (PGTAI).

Figure 65 - Hunting Map of the Arara do Igarapé Humaitá Indigenous Land.



Source: CPI/AC (2013).

4.1.1.1.1.11 Economic Aspects

The Shawādawa, as well as most of the indigenous peoples of the Pano language family, have a well-defined sexual division of labor. Its main productive activities to ensure the sustenance of life are itinerant agriculture, animal husbandry, fishing, hunting, and gathering. There are exclusively feminine activities such as the different actions that result from the atmosphere of "caring", that is, the care of the domestic environment, with the children, with the animals of creation (chickens, pigs, ducks, and oxen) with the plants grown in gardens and yards, with the yards etc. In addition, women also engage in the following activities: harvesting in the traditional grazed land; storage of seeds for subsequent planting/feeding; food preparation; body paintings; making of handicrafts, clothing and accessories of cotton, feathers, beads, native seeds and encauchados¹⁶; among others.

The men also have exclusive activities such as: the preparation of the area of the swiddens (mainly in the stages of cutting, drilling, burning, and planting); hunting; some itinerant polyculture production unit implemented from the cutting and burning process; fishing modalities; management of agroforestry systems, individual and collective river transport, among others. In addition, there are mixed and even family activities, such as some types of planting; the production of cassava flour; the harvest of fruit species (cultivated and located in a forest environment); and the collection of food supplements, materials for

¹⁶ The name given to the new way of making rubber, based on the ancient indigenous technique, which dehydrates the latex and combines industrial scientific technology.

construction and for the making of adornments and accessories, medicinal plants, spices, vegetable oils, etc.

The family nuclei receive social, social security and welfare benefits, of which they have the right guaranteed by the Brazilian State. With this subsidy, they acquire utensils and products necessary for the sedentary way of life, such as: gasoline for the boats, oil for the lamps, candles, kerosene, alcohol, lighter, sugar, salt, gunpowder, ammunition, nets, blankets, stowage in general, steel wool, clothes, shoes, among others.

In addition to ensuring food security and nutritional sovereignty from what is produced in the villages, they also sell in the municipality of Porto Walter, the flour produced in the villages (23 flour houses in the TI), corn, *gramixó* (produced in the mill of the Santo Antônio community), bananas, beans as well as farm animals (mainly chickens, pig, oxen), handicrafts (marketed both locally and to other states of the country). In this way, establishing an intercultural dialogue.

The IL has four organizations active in the region, namely: Association of the Shawádawa People of the Humaitá Stream (APSIH), Pushuã Shawádawa Agroextractivist Cooperative (CAESP), Organization of Indigenous Peoples of Acre, Southern Amazonas, and Northwest of Rondônia (OPIN) and Organization of Indigenous Peoples of the Juruá River (OPIRJ). It celebrates different projects in articulation with civil society organizations and grants from international banks. Now, it develops actions related to the consolidation of Community Timber Forest Value Chains and Non-Timber Forest Products (e.g., oilseeds and native forest seeds), combining the conservation of biodiversity and natural resources with income generation. One of the initiatives already consolidated is the development of the production chain of cocão (*Attalea tessmannii* Burret) and encauchados made from the latex of the rubber tree (*Hevea brasiliensis* L.), handicrafts, clothing and accessories with beads, cotton, native seeds (*mulungu*, *paxiubinha*, *paxiubão*, *açaí*, *murmuru*, *cocão*, *jarina* etc.).

The formation of gardens is intended for family consumption and economic purposes, marketing the surplus production. The main crops and by-products are: flour, corn, beans, rice, cassava, banana, watermelon, yams, sugar cane and pineapple. The communities have nine indigenous agroforestry agents

Table 47 - The main crops and by-products

Product	Harvest period	Destination
Banana	October	Consumption
Papaya	July	Consumption
Açaí	January	Consumption and sale
Buriti	Sept to Dec	Consumption and sale
Patoa	September	Consumption and sale
Abacaba	November	Consumption and sale
Cassava	September	Consumption and sale
Cane	October	Consumption
Ingá	April	Consumption
Soursop	March	Consumption
Avocado	February	Consumption
Guava	March	Consumption
Coconut	January	Consumption
Yam	November	Consumption
Lemon	March	Consumption
Biribá	January	Consumption
Cupuaçu	April	Consumption and sale
Cocoa	January	Consumption
Pineapple	August	Consumption
Urucum	February	Consumption

Source: Project Teams Elaboration

Families have the habit of raising animals, such as chicken, pig, duck, sheep, and cattle, intended for consumption and marketing. Beef cattle farming is intended to produce milk and meat and the marketing of live animals. In all, in the IL, it is estimated the existence of a stock of about 100 animals for an area of 700 hectares of pasture.

4.1.1.2 Internal Agreements and progress of actions of the PGTAI - Indigenous Territorial and Environmental Management Plan

4.1.1.2.1 Hunting

Table 48 - Hunting

Internal Agreements	Implemented	Partially Implemented	Not implemented	Observations
I. Hunting trade	X			We can't trade. If not, later on it will be missed.
II. Hunting Cub	X			Let's pay attention, let's not do that. If we don't have that limit, we won't have the next generations.
III. Alligator	X			
IV. Hunting with dog		X		Some insist, but we talk more seriously, swear to call the federal police. If you are stubborn, let's call the authorities.
V. Hunting refuge area		X		We hold awareness meetings

Source: Project Team Elaboration.

4.1.1.2.2 Fishing

Internal Agreements	Implemented	Partially	Not implemented	Observations
		Implemented		
I. Use of tingui	X			
II. Fish reproduction	X			The biggest problem is the surrounding communities that fish in the breeding season. It affects us.

4.1.1.2.3 Breeding of animals

Internal Agreements	Implemented	Partially Implemented	Not implemented	Observations
I. Fish, tracajá, turtle, chickens, ducks, and pigs		X		Some communities have small farms of chickens, pigs, and ducks.
II. Cattle	X			Only the Santo Antonio community has cattle ranching.

4.1.1.2.4 Traditional Fields

Internal Agreements	Implemented	Partially Implemented	Not implemented	Observations
I. Production	X			We are producing for our families, and we market out through middlemen. Important a point of commercialization of ours in the municipality.
II. Area for swidden				
III. Recovery of traditional seeds		X		It would be interesting to hold seed exchange fairs to diversify our products.

4.1.1.2.5 Agroforestry systems (SAF)

Internal Agreements	Implemented	Partially Implemented	Not implemented	Observations
I. Priority areas for the implementation of SAFs		X		We expanded the SAF mainly in two communities
II. Interaction of SAFs with fauna		X		

III. Management of native species in the SAFs		X		We spare some native species that grow spontaneously (e.g., ingá, cupuaçu do mato, açaí, jarina)
IV. Training of AAFIs for the implementation of SAFs		X		We need to empower our AAF more to account for and assist in the food production of communities

4.1.1.2.6 Extractivism

Internal Agreements	Implemented	Partially Implemented	Not implemented	Observations
I. Fruits and seeds	X			
II. Hardwood		X		There are invaders who remove our illegal timber
III. Straws		X		Most younger people are aware. Only the older ones who stubborn a little still.
IV. Medicinal plants		X		We don't have medicinal parks, but we grow medicinal plants in the backyards and around the villages
V. Rubber trees			X	We are not yet collecting seeds from the forest to plant around the villages.

4.1.1.2.7 Permanent Preservation Area (Riparian Forest)

Internal Agreements	Implemented	Partially implemented	Not Implemented	Observations
Conservation of the APPs	X			We are respecting the riparian forests.

4.1.1.2.8 Formation of AAFI – Indigenous Agroforestry Agent

Agreements	Implemented	Partially implemented	Not Implemented	Observations
I. Government			X	The IL AAFIs have not received the scholarship for almost a year.
III. Technical assistance and agroforestry extension			X	We do not have technical assistance from SEPA.

4.1.1.2.9 Water

Agreements	Implemented	Partially implemented	Not Implemented	Observations
Construction of artesian wells			X	We battled with DSEI and SESAI, but to this day we have no artesian well.
Rainwater harvesting			X	We don't have that infrastructure yet. Our women

				struggle to carry water.
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4.1.1.2.10 Culture and Handicraft

Agreements	Implemented	Partially implemented	Not Implemented	Observations
1. Develop workshop of training, where the most people can pass on these knowledge and teaching the youngest.			X	There hasn't been one workshops yet, but if the young people have an interest, the elders teach.
2. Necessary the construction of specific houses for the handicraft production.			X	
3. Realize exchanges inside and outside indigenous land. For us to further strengthen the handicrafts and also other aspects of our culture such as the practices of <i>mariri</i> , indigenous language, cooking, singing, games and <i>caçumadas</i>	X			We started cultural activities in some villages, such as mariri festivals, cooking, games, singing and <i>caçumadas</i> .
4. Recording a DVD with the songs of the Shawádawa people			X	

4.1.1.2.11 School Education

Agreements	Implemented	Partially implemented	Not implemented	Observations
I. Schools: equipped with tables, chairs, blackboard, teaching materials, school supplies and internet. Physical structures need to meet local needs .			X	
II. Teacher education: continuing education			X	We're battling it out. We have a representative of indigenous education in the municipality who is working for this, but we have not yet succeeded. We need to strengthen partnerships with government and educational institutions.
IV. Transport			X	
V. Monitoring of classes		X		In some schools we have monitoring meetings.
VI. Production of didactic material:			X	We need to produce more in-depth teaching material about our language, our culture and history. So far, we only have booklets that do not meet all the learning demand of our students.

VII. Regionalized school meals:			X	We have been calling for regionalized school meals for some time. In a few years we succeeded, but we see the need for it to be permanent. We no longer want our children to eat on industrialized snacks because we are seeing the harm it does with the appearance of new diseases, weakness, and the increase in garbage.
VIII. Hiring Elders				We demand that at least one elder, fluent in the indigenous language, be hired to teach literacy to students in schools.

4.1.1.2.12 Health in the villages

Agreements	Implemented	Partially implemented	Not implemented	Observations
I. Food safety and regionalized snacks			X	Same of item VII of school education.

II. Traditional medicine:		X		Some families use traditional medicinal plants, but we need to expand because it is part of our culture.
III. Rainwater harvesting			X	
IV. Infrastructure			X	
V. Alcohol: Uncontrolled use has caused several social, economic, and environmental problems		X		We hold awareness meetings, and some villages are strengthening the culture and utilizing our traditional medicines.
VI. Midwives and ACIS:			X	
VII. Clearing the paths		X		
VIII. Training for AISAN:		X		

4.1.1.2.13 Environmental Education (Waste Management)

Agreements	Implemented	Partially implemented	Not implemented	Observations
Proper waste management		X		We carry out garbage collection, but we still need to reduce the consumption of products from the city.
The awareness of the surrounding residents is also made necessary, because they pollute the rivers a lot.			X	

4.1.1.2.14 Community Organization (Association and Cooperative)

Agreements	Implemented	Partially implemented	Not implemented	Observations
I. Training of the board of directors and too members for management qualified from association and of the cooperative			X	We need a training course to acquire knowledge in how to manage our organizations.

4.1.1.2.15 Communication

Agreements	Implemented	Partially implemented	Not implemented	Observations
Improve Communication between the villages and between the IL and society			X	In the villages we have only two public phones that don't work very well. The radios don't work either.
Installation of internet			X	We claim for the installation of internet in our villages that currently it is so important for us communication and for our education

4.1.1.2.16 Surveillance and Supervision

Agreements	Implemented	Partially implemented	Not implemented	Observations
I. Green frame			X	Reworking the boundaries of IL is necessary, but we haven't had the support yet to pull it off.
II. Production of didactic material			X	
III. Construction of houses at strategic points			X	
IV.			X	Enforcement organizations don't visit the IL.
Responsibility for supervision				
V. Resources for carrying out Community surveillance			X	

4.1.1.2.17 Production Chain

Agreements	Implemented	Partially implemented	Not implemented	Observations
Development of products for commercialization		X		Existence of some projects for the development of productive chains, such as cacao, by SOS Amazonia.
Establishment of a point of sale of the products in the municipality			X	

4.1.1.2.18 Awareness of the surrounding area

Agreements	Implemented	Partially Implemented	Not Implemented	Observations
Awareness of neighbors so that they don't invade our IL			X	Neighbors hunt, fish and harvest timber illegally from our territory.
Awareness of waste management			X	Neighbors pollute the rivers a lot, which affects us directly.
Awareness of APP protection			X	Neighbors destroy the riparian forest, which affects us directly.

4.1.1.2.19 Relatives that live outside of the indigenous land

Agreements	Implemented	Partially implemented	Not implemented	Observations
I. Relatives who leave LI will not have the right to use our natural resources		X		
II. Let's involve FUNAI and talk with our relatives who left to reside in the municipality, if they want to return to IL, we will support.		X		
III. Representatives of the people are only the authorized leaders		X		
IV. The Shawādawa who marries a white man, if he comes to the indigenous land must obey our rules.	X			

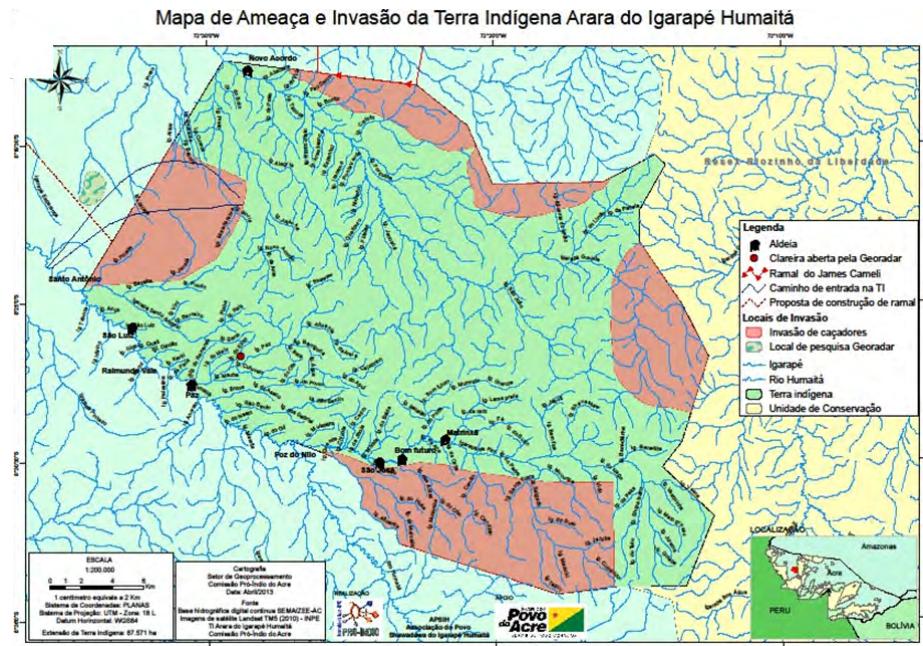
4.1.1.2.20 Disclosure, monitoring and evaluating of PGTA

Agreements	Implemented	Partially implemented	Not implemented	Observations
Our PGTA will be evaluated once a year			X	We don't have our PGTA published yet.
We will make copies of the plan available to all partner institutions.			X	

4.1.1.3 Social and Environmental Threats and Impacts

The families reported the occurrence of illegal hunting in the Indigenous Land, as occurs in the New Accord Community. They identified incursions by hunters in several regions, as shown in the map below.

Figure 66 - Threat Map of the Arara Indigenous Land of the Humaitá Stream.



Source: CPI/AC (2013).

4.1.1.3.1 Surrounding area – PDS Natal and PAE Cruzeiro do Vale.

4.1.1.4 Residents interviewed and demographic condition.

In the PDS Natal 99 families were settled and in the PAE Cruzeiro do Vale 268 families, totaling 367 families. Of this total, about 60 are in the vicinity of the Arara do Igarapé Humaitá Indigenous Land, with an estimated 240 people. Of the total, 46% are composed of women and 54% of men. The study of the age group shows that 55% of the population is composed of adults between 18-49 years old; and 44% of children and young people. Below is the list of residents interviewed during the socioeconomic survey.

Table 49 - Residents

N.	Name of the Resident	Settlement	Place Name
1	Anazílido Araújo da Silva	PDS Natal	-
2	José Menezes da Silva	PDS Natal	-
3	Heleno José Gomes da Silva	PAE Cruzeiro do Vale	Foz do Nilo
4	Luiz Gomes da Silva	PAE Cruzeiro do Vale	Comunidade Boa Vista
5	Raimundo Borges da Silva	PAE Cruzeiro do Vale	Estirão Azul
6	João Josué Pereira de Oliveira	PAE Cruzeiro do Vale	Comunidade Mororó I
7	José Maria Menezes da Silva	PAE Cruzeiro do Vale	Bem Fica
8	Zé Francisco Menez da Silva	PAE Cruzeiro do Vale	Bem Fica
9	José Estevão Batista da Silva	PAE Cruzeiro do Vale	Foz do Nilo
10	Francisco Batista da Silva	PAE Cruzeiro do Vale	-
11	Henrique Gomes Diniz da S.	PAE Cruzeiro do Vale	Benfica
12	Osvaldo Conceição da Silva	PAE Cruzeiro do Vale	Comunidade Mororó
13	Francisco Laésio de Souza Q.	PAE Cruzeiro do Vale	Comunidade Anorato
14	Francisco Demetro da Silva F.	PAE Cruzeiro do Vale	Comunidade Porto das Pedra C. V.
15	Jader Gomes Diniz da Silva	PAE Cruzeiro do Vale	Benfica
16	Liberbanan Ferreira da Silva	PAE Cruzeiro do Vale	Comunidade Mororó I
17	Raimundo Menezes da Silva	PAE Cruzeiro do Vale	Dois Porto
18	Rosimar Melo Soares	PAE Cruzeiro do Vale	Estirão Azul
19	Antônio Batista da Silva	PAE Cruzeiro do Vale	Porto das Pedras
20	Agenário Gonçalves da Silva Neto	PAE Cruzeiro do Vale	Porto das Pedras
21	Maria Mônica Menezes Barbosa	PAE Cruzeiro do Vale	Benfica

Source: Project Team Elaboration.

4.1.1.5 Land situation

The settlement projects were created by the National Institute of Colonization of Agrarian Reform, being the PDS Natal in 2012 and the PAE Cruzeiro do Vale in 2001. According to reports from residents, families have their right secured by tenure titles issued by INCRA. About 75% of the residents interviewed declared to have title to the land. The size of the properties varies between 200 to 500 hectares.

4.1.1.6 Education

The educational service is carried out by the State Department of Municipal Education of Porto Walter, responsible for the stages of literacy and elementary school I and II; and modular high school is offered by the State Department of Education. Educational formation rates show that 30% of the population is illiterate; and 45% by people with incomplete elementary school; A resident with higher education was identified.

The educational problems reported are: lack of meals, difficulty of transportation, lack of teachers, precariousness of infrastructure, such as internet, library and sports court, lack of textbook.

4.1.1.7 Healthcare

The precariousness in health care is the biggest reason for complaint of families. In the study area there is a health center of two community health agents, but without infrastructure for adequate care. In case of serious illness, they are forced to travel to the city of Cruzeiro do Sul in search of care. The diseases that most affect the community are respiratory diseases, low back pain, malaria, diarrhea. The treatment of diseases is used industrial medicines.

4.1.1.8 Sanitation

Domestic sewage is discharged into the land itself (70%), piped to the forest (20%) and piped to the river (10%). There are houses with internal bathrooms, but most of them deposit their feces in the open (60%) or in a black pit (30%); Garbage is burned (60%) or buried (30%). About 90% of households collect water for consumption in strands; and 10% in an artesian well, using chlorine for treatment.

4.1.1.9 Eating habits

The diet of the families is composed of products of the gardens themselves, such as flour, beans, cassava, watermelon, and banana; by fish caught in nearby rivers and streams; by meat from wild animals and domestic animals (chicken, pig and ox). Families also purchase industrialized foods, such as coffee, sugar,

oil, among others; They collect native fruits, such as Brazil nuts, açaí and patauá. Among the most hunted wild animals are: paca, armadillo, tapir, wild pig; Among the most fished species are: branquinha, jundiá, pirarucu, surubim and piau.

4.1.1.10 Economy and source of family income

The main economic activity is livestock. With pasture that reach 500 hectares. Cattle raising is responsible for an intense trade in the region. Part of the agricultural production is marketed, mainly, flour, watermelon, banana; and a portion intended for family consumption. Among the products of the swidden, we highlight: flour, corn, yams, banana and watermelon. It is common to raise and trade chickens, pigs, and sheep.

The interviewees stated that there are public servants in the communities, such as teachers and health agents; It is also common for residents to provide manual service, boat pilot, batting rental, among others. An important income originates in the transfer of income from social programs, such as the family allowance, in addition to pension and retirement.

4.1.1.11 Community organization

The residents of the settlements declared that there were two community organizations: the Association of Producers of the PDS Natal; and the Association of Producers of PAE Cruzeiro do Vale. The creation was motivated to receive INCRA credits and the need to gain a voice in the search for access to rights: installation of electricity, construction of housing, sanitation, health care and education. They declared the need to strengthen associations with support in the elaboration and implementation of economic projects. The Rural Workers Union has an important role for residents, since it is the organization that issues declarations for access to benefits, such as maternity salary, pension, and retirement.

4.1.1.12 Access to energy and communication

About 70% of the families declared that they have a solar panel, used mainly for the use of television and radio. Of the total, three families reported having internet installed. The most accessible means of communication is the radio station in Porto Walter, widely used for sending and receiving messages between communities and relatives.

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

As reported in the dialogues and consultations during the ethnomapping and socioeconomic surveys, the Arara People are a relatively closed group in relation to kinship and crony systems, with their own culture, differentiated from the small farmers of the project region. Their interaction with the surrounding families (PDS Natal and PAE Cruzeiro do Vale) is friendly and mutually helpful. The families know each other by the time of experience and carry out systems of exchange and sharing, such as food, boats, and communication infrastructure (internet). No conflicts of high magnitude involving the groups were identified.

Project actions should increase the level of interaction at the beginning and throughout the project, specifically regarding land use. Considering the measures to mitigate risks and reduce environmental impacts, such as greenhouse gas emissions, with the likelihood of changes in agricultural practices, experiences such as the gardens without fire will be made available to families around the IL. Environmental education actions, dissemination of legislation related to the protection of fauna, flora, indigenous rights, are also themes to be addressed in the execution of the project. In addition, supporting the community organization of the surroundings, through the availability of vacancies in associative training and administrative and productive management, is an opportunity to positively impact the communities surrounding the Project.

4.1.3 High Conservation Values (CM1.2)

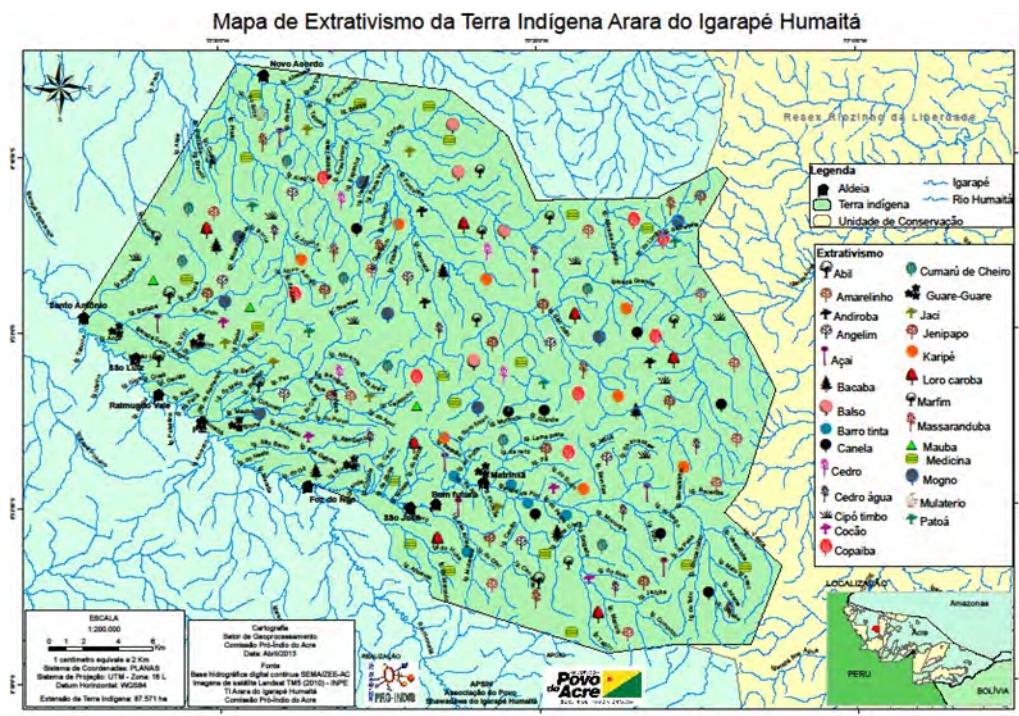
The Arara people consider their entire territory as social and cultural attributes of high value for conservation. They declared to have social, economic, and cultural dependence on their territory, as places of hunting, fishing, collection of products and essential for rituals and cultural festivals. Below is the table and maps of places with special historical and cultural significance, areas of extractives, hunting, and fishing.

Table 50 - High Conservation Values - Communities.

High Conservation Value	Qualifying Attribute	Focal Area
Areas that are fundamental to the substance of communities	Food supply: extractivism, hunting and fishing	The whole territory
Critical Areas for the cultural and traditional identity of communities	Historic places and supply of natural essences for rituals and cultural festivals	The whole territory

Source: Project Team Elaboration

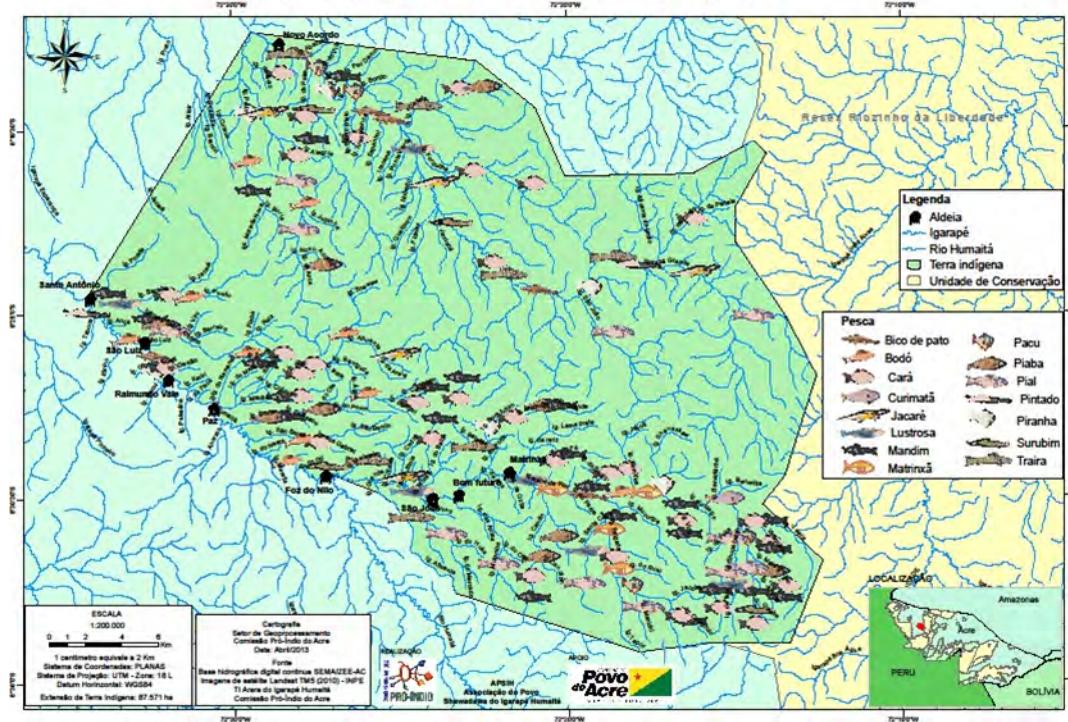
Figure 67 - Location maps of Social Strokes – Community Livelihood.



Source: CPI/AC (2013).

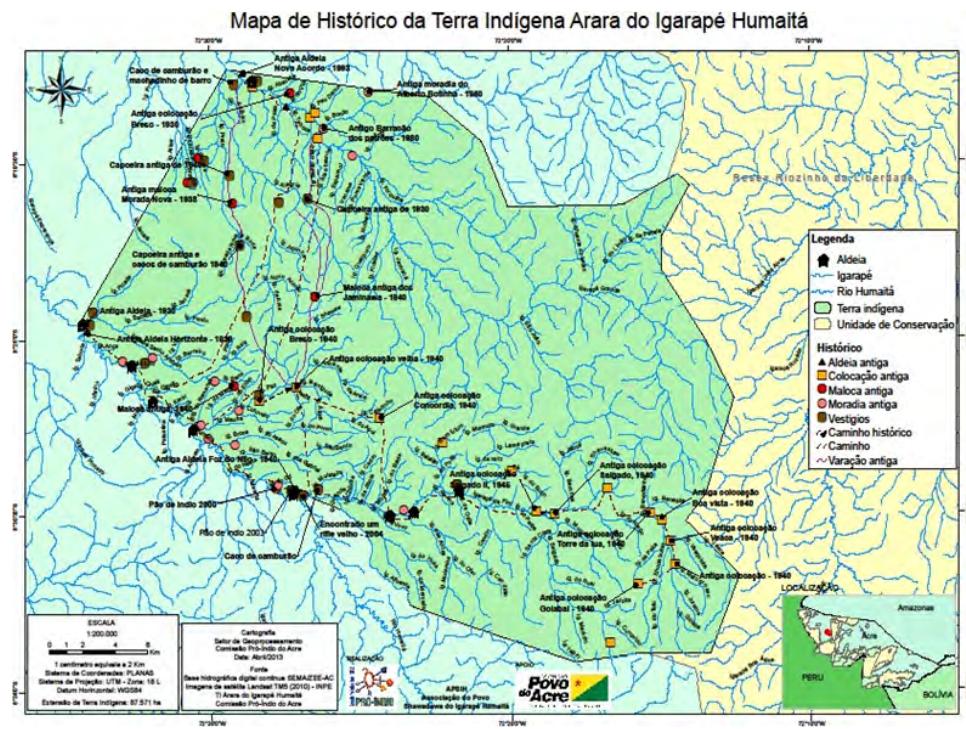
Figure 68 - Location map of Social Strokes – Fishing

Mapa de pesca da Terra Indígena Arara do Igapé Humaitá



Source: CPI/AC (2013).

Figure 69 - Location map of Social Strokes – Cultural Identity.



Source: CPI/AC (2013).

4.1.4 Without Project Scenario: Community (CM1.3)

1-Increase in the rate of greenhouse gas emissions with the permanence of the trend of annual growth in the rate of deforestation and hot spots in the IL resulting from the expansion and consolidation of agricultural activities as the main source of family income; and reducing the quality of life by compromising social and environmental conditions.

2-Increased pressure from poaching, resulting in violent conflicts, compromising the balance of the ecosystem and the food source of the Arara People.

3-Economic precariousness of the Arara People, with dependence on public programs of income transfer, such as the bolsa família.¹⁷

4-Loss of cultural identity with the extinction of the mother tongue of the Arara People.

¹⁷ The Bolsa Família Program is a federal program of direct and indirect cash transfer that integrates social assistance, health, education and employment benefits, aimed at families in poverty. In addition, the Program offers tools for the socioeconomic emancipation of families in situations of social vulnerability.

5-Continuity of the process of dismantling the governance system of the Arara People, compromising the transmission of secular traditions to the youngest, such as the unifying power of the Cacicado¹⁸, the leaders and the grassroots organizations themselves.

6-Continuity of the process of precariousness of the *protagonist* and the social and economic condition of indigenous women.

7-Growth of illegal activities in *the IL* compromising resources essential to the local way of life.

4.2 Net-Positive Community Impacts

4.2.1 Expected Community Impacts (CM2.1)

¹⁸ Institution of leadership in certain primitive societies

Table 51 - Community Impact.

Community Group	Impact(s)	Type of Benefit/Cost/Risk	Change in Well-being
Arara people	Increase in family income	Expected, guaranteed and beneficial	Management and commercialization of extractive products based on vegetable essences and olis, seeds and vines
Arara people	Improved food security and enriched forest cover	Expected, guaranteed and beneficial	Implementation of agroforestry systems
Arara people	Family income generation	Expected, guaranteed and beneficial	Implementation of a community-based ecological and ethnocultural tourism
Arara people	<i>Identity and cultural appreception</i>	Expected, guaranteed and beneficial	Rescue of the oral and written language of the Shawâdawa people
Arara people	<i>Improvement of social, economic and cultural territorial management</i>	Expected, guaranteed and beneficial	Strengthening of the governance system with preservation of organizations and restructuring of the Leadership Council of the Shawâdawa People
Arara people	<i>Improvement of environmental quality and reduction of socioeconomic impacts</i>	Expected, guaranteed and beneficial	Implementation of land preparation techniques without the use of fire
Arara people	<i>Valuing and increasing the protagonism of indigenous women</i>	Expected, guaranteed and beneficial	Economic engagement of indigenous women
Arara people	<i>Reduction of illegal activities that compromise essential resources to the local way of life</i>	Expected, guaranteed and beneficial	Implement a monitoring and supervision system for the IL

Source: Project Team Elaboration

4.2.2 Negative Community Impact Mitigation (CM2.2)

Measures are necessary to consolidate IL boundaries by warning of unauthorized access to IL; promote knowledge and respect for the rights of use of resources by indigenous communities.

Table 52 - Negative Community Impact Mitigation.

Mitigation of AAVCs negative impacts	
AVC 5 e 6	1. Implement a monitoring and supervision system for the IL 2. Promoting environmental education actions in IL 3. Execute demarcation and signaling of the limits of the IL

Source: Project Team Elaboration

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

Net positive impacts:

1-Increase in family income with the management and commercialization of extractive products based on essences and vegetable oils, seeds and cipós.

2-Improvement of food security and enrichment of forest cover with the implementation of agroforestry systems.

3-Generation of family income with the implementation of a community-based ecological and ethnocultural tourism hub.

4-Identity and cultural valorization with the rescue of the oral and written language of the Shawādawa People.

5-Improvement of social, economic, and cultural territorial management with the strengthening of the governance system with valorization of organizations and restructuring of the *Shawādawa People's Leadership Council*.

6-Improvement of environmental quality and reduction of socioeconomic impacts with the implementation of techniques of preparation of swidden without the use of fire.

7-Valuing and increasing the protagonist of indigenous women with the generation of opportunities for economic engagement.

8-Reduction of illegal activities that compromise resources essential to the local way of life with the implementation of IT monitoring and inspection system.

4.2.4 High Conservation Values Protected (CM2.4)

The implementation of the project will not compromise the access of communities and the right to use the natural resources of the territory, as well as the traditional forms of use of natural resources essential to their way of life.

4.3 Other Stakeholders Impact

4.3.1 Impacts on Other Stakeholders (CM3.1)

No negative impacts of the project were identified on land tenure rights and use of natural resources by other stakeholders, such as families living in the vicinity of the IL.

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

No negative impacts of the project were identified on land tenure rights and use of natural resources by other stakeholders, such as families living in the vicinity of the IL.

4.3.3 Net Impacts on Other Stakeholders (CM3.3)

No negative impacts of the project on land tenure rights and natural resource use were identified by other stakeholders, such as families living in the vicinity of IL.

4.4 Community Impact Monitoring

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

Table 53 - Community Monitoring Plan.

Community Group 1	Unit	Verification method	Frequency
AVC 5 e 6	1. Implement a monitoring and supervision system for the IL	Certificados e lista de participação; relatório técnico de resultados	Anual
	2. Promoting environmental education actions in IL	Certificados e lista de participação; relatório técnico de resultados	Anual
	3. Execute demarcation and signaling of the limits of the IL	Certificados e lista de participação; relatório técnico de resultados	Anual
Number of executed trainings	Amount	Certificates and participation list; technical report of results	Yearly
Number of executed trainings	Amount	Certificates and participation list; technical report of results	Yearly
Number of executed trainings	Amount	Certificates and participation list; technical report of results	Yearly
Number of executed trainings	Amount	Certificates and participation list; technical report of results	Yearly
Number of executed trainings	Amount	Technical report situation of the organizations	Yearly
Number of executed trainings	Amount	Technical assistance, production and commercialization	Yearly
Number of executed trainings	Amount	Technical assistance, production and commercialization	Yearly
Number of executed trainings	Amount	Technical assistance, production and commercialization	Yearly
Number of executed trainings	Amount	Technical assistance, production and commercialization	Yearly
Number of executed trainings	Amount	Technical report of results	Yearly
Number of executed trainings	Amount	Minutes, attendance list and technical report of results	Yearly

Source: Project Team Elaboration

4.4.2 Monitoring Plan Dissemination (CM4.3)

Project management will implement dialogue channels to ensure effective communication with beneficiary communities and stakeholders. In addition, annual consultations will be held throughout the execution of the project, giving communities access to the results of the monitoring.

4.5 Optional Criterion: Exceptional Community Benefits

4.5.1 Exceptional Community Criteria (GL2.1)

The project will be carried out in the Arara do Igarapé Humaitá Indigenous Land. The beneficiaries are 815 members from six villages and four communities, with the right of possession and use guaranteed by law. The project zone is in the Municipality of Porto Walter, State of Acre, Amazon region. According to IBGE data, the IDHM¹⁹ of the municipality is 0.532, classified as low.

¹⁹ Municipal Human Development Index

4.5.2 Short-term and Long-term Community Benefits (GL2.2)

- 1.Increase of family income with the management and commercialization of extractive products based on essences and vegetable oils, seeds, and cipós.
- 2.Improvement of food security and enrichment of forest cover with the implementation of agroforestry systems.
- 3.Generation of family income with the implementation of a community-based ecological and ethnocultural tourism hub.
- 4.Identity and cultural valorization with the rescue of the oral and written language of the Shawādawa People.
- 5.Improvement of social, economic, and cultural territorial management with the strengthening of the governance system with valorization of organizations and restructuring of the Shawādawa People's Leadership Council.
- 6.Improvement of environmental quality and reduction of socioeconomic impacts with the implementation of techniques of preparation of swidden without the use of fire.
- 7.Valuing and increasing the protagonist of indigenous women with the generation of opportunities for economic engagement.
- 8.Reduction of illegal activities that compromise resources essential to the local way of life with the implementation of a monitoring and enforcement system of IL.

4.5.3 Community Participation Risks (GL2.3)

Table 54 - Community Participation Risks (GL2.3).

Identify Risk	Necessary and projected actions to mitigate the risk
Low engagement and commitment of communities in the implementation of initiatives	Ensure the community protagonisms in the preparation and execution of economic and socio-environmental projects of interest
	Ensure community protagonisms in the preparation and execution of economic and socio-environmental projects of interest
	Comply with agreements signed between communities and parties involved in the projects
	Maintain active communication and feedback channels to assess the engagement and the need for new stimulating actions
	Monitor results
Lack of resources to effect bioeconomy projects	Ensure financial support for the preparation of management plans, implementation of infrastructure, community training, market access and continued technical assistance.
	Verticalization of production chains with the addition of technology and innovation
	Comply with agreements signed between communities and parties involved in the projects
	Maintain active communication and feedback channels to assess the degree of engagement and the need for new stimulating actions
	Monitor results
Low engagement of young people and women in economic and socio-environmental projects	Promoting the protagonisms of young people and women in economic and socio-environmental projects
	Guarantee the resources (human, financial and infrastructure) for the execution of economic engagement actions and access to decision-making spaces .
	Comply with signed agreements with young people and woman and parties involved in the projects
	Maintain active communication and feedback channels to assess the engagement and the need for new stimulating actions
	Monitor results
Destructuring of the governance system	Promote the engagement of young leaders and ensure resources for the functioning of the association, cooperative and Indigenous Council

Source: Project Team Elaboration

4.5.4 Marginalized and/or Vulnerable Community Groups (GL2.4)

Table 55 - Marginalized and/or Vulnerable Community Groups (GL2.4)

Community Group 1	Indigenous Women
Net positive impacts	Offer trainings, technical assistance and access to a source of financial resources for economic enterprises
Benefit access	Risks: deviation from project objectives and/or community organizations responsible for managing and implementing benefits
Negative impacts	Prevention/mitigation measures: annual socioeconomic monitoring of goals and financial resources destined to the economic engagement of indigenous women

Source: Project Teams Elaboration

4.5.5 Net Impacts on Women (GL2.5)

Table 56 - Net Impacts on Women (GL2.5)

Activity description	Impacts throughout the project		
	Exit (short term)	Results (mid-term)	Impacts (long term)
Strengthen the governance system by valuing organizations and restructuring the Shawâdawa People's Leadership Council	Project elaboration	Structuring and validation of the governance system	Training and engagement of young indigenous leaders; strengthening female protagonism in decision-making spaces
Promote the economic involvement of Indigenous women	Elaboration of projects and formalization of partnerships	Offer trainings and subsidies for the implementation of entrepreneurial initiatives	Consolidation of economic initiatives with female leadership

Source: Project Teams Elaboration

4.5.6 Benefit Sharing Mechanisms (GL2.6)

According to contractual rules, 50% of carbon credits will be passed directly to communities through their representative association. In the process of Free, Prior and Informed Consent, the distribution of benefits will be defined by all community members, validated by the indigenous leaders and council, prioritizing the implementation of the actions provided for in the Arara People's Life Plan, prepared by the communities themselves.

4.5.7 Benefits, Costs, and Risks Communication (GL2.7)

The benefits and risks were presented and discussed with indigenous communities during the meetings to present the project proposal (11/28/2022); in the Participatory Planning Workshop (03/20/2023) and in the CLPI meetings (03/22, 03/23 and 03/27/2023). The information was disseminated by specialists in the field of sociology and anthropology, according to minutes, attendance lists and photographic records. Visual and printed presentations were made using participatory methodology and language appropriate to the local life cycle. The doubts were clarified, as detailed in the minutes of the meeting.

4.5.8 Governance and Implementation Structures (GL2.8)

The six villages and four communities have indigenous leaders and a chief, as well as representatives of community association and cooperative, elected by the Arara People. In addition, the Indigenous Council is in place, which ensures the participation of leaders and members of all villages and communities.

4.5.9 Smallholders/Community Members Capacity Development (GL2.9)

Community engagement actions were carried out in the project design and project elaboration stage, such as the project proposal presentation meetings (11/28/2022); in the Participatory Planning Workshop (03/20/2023) and in the CLPI meetings (03/22, 03/23 and 03/27/2023). In addition, the following actions are planned to strengthen and effectively engage communities in its execution, such as strengthening the governance system with appreciation of organizations and restructuring the Shawādawa People's Leadership Council.

5. Biodiversity

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (B1.1)

5.1.1.1 Introduction

The Amazon Rainforest has about 6.74 million km² and corresponds to almost 50% of the forest remnants of the planet (WWF, 2023). This biome is one of the most important on the planet due to the various ecosystem services provided, for example, the maintenance of the hydrological cycle, biodiversity and carbon stock (Piponiot et al., 2019). Given its importance for the planet's climate, ecological relevance and biodiversity, the Amazon has been suffering numerous negative impacts in the face of irregular human activities, sharply reducing continuous forest extensions and loss of numerous species of fauna and flora as a result of the opening of roads, illegal logging and fires by anthropic actions (Guilherme & Cintra, 2001; Silva et al., 2015; Silva et al., 2022).

One of the strategies created to reduce greenhouse gas emissions was the creation of REDD+ policies, which aim to involve actions to reduce emissions from deforestation and forest degradation, associated with forest conservation, sustainable forest management and increased forest carbon stocks in developing countries (IPAM, 2011). REDD+ projects also aim to enhance actions of initiatives that focus on the conservation of fauna and flora, through the monitoring of biodiversity and not only the carbon stock of the areas (Harvey et al., 2010). The state of Acre is located in the extreme west of Brazil, in the southwest of the Amazon, a region considered a priority for biodiversity conservation due to its high diversity of taxonomic groups (e.g., plants, anuran amphibians, mammals, birds, etc.). (Souza et al., 2003).

Fauna is an important bioindicator of conserved habitats. For example, insects are a diverse group of animals, comprising about 80% of all species on Earth (Brusca & Brusca, 2007). They are found in virtually all habitats, being fundamental to the ecological balance of the planet, playing crucial roles in biogeochemical cycles, pollination of plants, decomposition of organic matter and as a food source for other species (Lawyer et al., 2017). In addition to the diversity of terrestrial environments, aquatic habitats have seasonal and spatial influences, interactions between abiotic and biotic factors in the Amazon region, also explain the richness of the fish fauna, where there are approximately 4,000 species (Albert & Reis, 2011; Reis et al., 2016; Jézéquel et al., 2020). And despite a mega diversity of ichthyofauna (Agostinho et al., 2005), with estimates of more than 10,000 species (Reis et al., 2016), the integrity of Amazonian aquatic ecosystems faces several threats, such as the establishment of reservoirs, habitat loss, modification of the physicochemical characteristics of the water, mining, subtraction of the riparian forest and dissemination of exotic species (Beltrão et al., 2018; Santos et al., 2019).

When it comes to the herpetofauna (amphibians and reptiles), 156 species of amphibians and 155 of reptiles are known so far for the state of Acre (Fonseca et al., 2022). Amphibians are excellent bioindicators of environmental quality due to several characteristics related to their biology (Ramos & Gasparini, 2004). However, the role of reptiles as good bioindicators is still little known (Bertoluci et al., 2009), although lizards are considered good models for ecological studies because they are sensitive to environmental changes (Pianka & Vitt, 2003; Camargo et al., 2010). The bird group are the best-known vertebrates in terms of species identification, natural history, and geographic distribution (Del Hoyo et al., 2019). This happens due to the relative ease of detection of these animals without the need for capture, in addition, bird species occupy a wide niche and are present in almost all environments of the world (Vielliard et al., 2010). According to Pacheco et al. (2021), there are 1,971 species of birds in the Brazilian territory, and it is

estimated that in the Brazilian Amazon there are records of approximately 1,300 species of birds (Marini & Garcia, 2005). Regarding medium and large mammals, these continuously suffer severe impacts on their communities (Benítez-López et al., 2017), due to several factors, the main ones being of anthropic origin, such as agriculture, livestock, and hunting (Wearn et al., 2012).

5.1.1.2 Methodology

Studies were developed in the project Arara Indigenous Territory of the Humaitá Stream, in the State of Acre, to characterize the local fauna and its surroundings, based on the systematization of studies and surveys of primary and secondary data, according to the indicators and methodological references set forth in the Standard of the CCB Program Climate, Community and Biodiversity v3.1.

The surveys related to the theme of Fauna were carried out by the company Catraia Soluções Ambientais Ltda. The surveys related to the theme of Flora were carried out by the company Tecman Tecnologia e Manejo Florestal Ltda, both subcontracted by the developer of the project.

5.1.1.2.1 Fauna/ Biodiversity survey

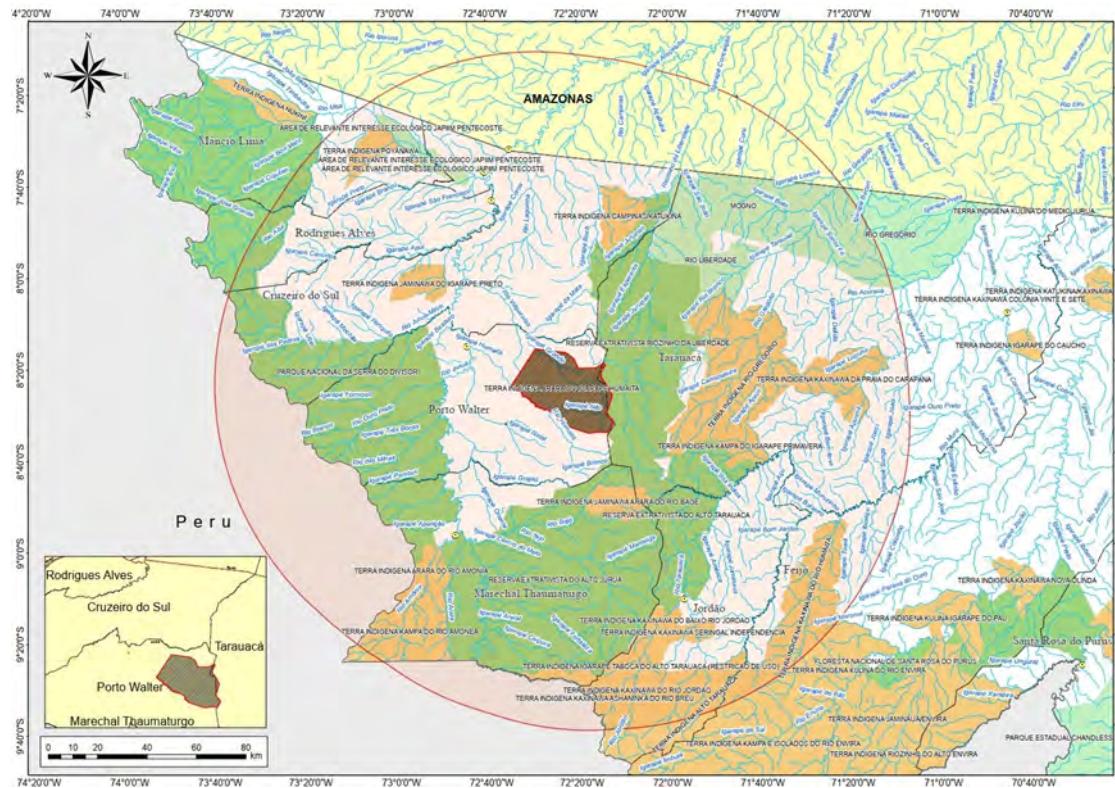
For this project, two configurations of surveys were proposed to obtain information about the local fauna and the surroundings, the first working with secondary data and the second with primary data collected in the field.

5.1.1.2.1.1 Secondary data collection

The systematization of secondary data was performed for the fauna groups (Entomofauna, Ichthyofauna, Herpetofauna, Avifauna and Mastofauna) through information collected in a database of academic-scientific production: articles and scientific reports, dissertations and theses, technical reports and environmental impact studies. For this, SciELO – Scientific Electronic, Library Online (Scientific Electronic Library Online) was used as a base; Capes Periodicals; Web of Science; Scopus and Google Scholar). To obtain more robust data related to the location of species records and to complement the list by systematized secondary database, the technical team will conduct research at the Global Biodiversity Information Facility (GBIF).

To survey the literature and records of each species of the fauna groups, a buffer of 50,000 km², or a circle of 120 km radius, covering the study areas and not extrapolating local watersheds, was used as standard. This pattern is adopted considering that Amazonian rivers are the main responsible for the restriction in the occurrence of a large part of the wild fauna. In the case of published research and articles, we used as reference the base locality of data collection, in this case on an increasing scale: micro watershed>municipality or district>state>watershed. The use of this criterion allowed the technical experts to start the searches specifically in the area in question, since the objective of the study was to list the presence of different organisms with the most varied forms of life, area of occurrence and distribution, behavior, functional attributes etc., which affected the presence of the study species or not.

Figure 70 - Buffer of 120 km delimiting the coverage zone used as a basis for secondary data collection in the surroundings of the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, Acre.



Source: Catraia Soluções Ambientais, 2023.

In the case of published research and articles, we will use as reference the base locality of data collection, in this case on an increasing scale: micro watershed > municipality or district > state > watershed. The use of this criterion allows the technical experts to start the searches specifically in the area in question, since the objective of the study is to map the presence of different organisms with the most varied forms of life, area of occurrence and distribution, behavior, functional attributes, etc., which will affect the presence of the study species or not.

5.1.1.2.1.2 Primary data collection

To complement the information regarding the fauna, sampling of primary data collected in the field during the period from March 21 to April 1, 2023 was performed.

This method was conducted in the area where the project will be implemented, bringing complementary information to the groups: Herptofauna, Avifauna and Mastofauna.

The sampling methodology and execution time was standardized for the fauna groups, where active search was used in the morning (05:30h to 10:30h) and at night (18:00h to 21:00h), totaling eight hours daily.

The herpetofauna methodology was the PLT (Time Limited Search) in the visually accessible microhabitats. When possible, amphibian and reptile species were photographed with a digital camera to aid in identification. The species were identified in the field using the photographic guides, keys and descriptions present in literature.

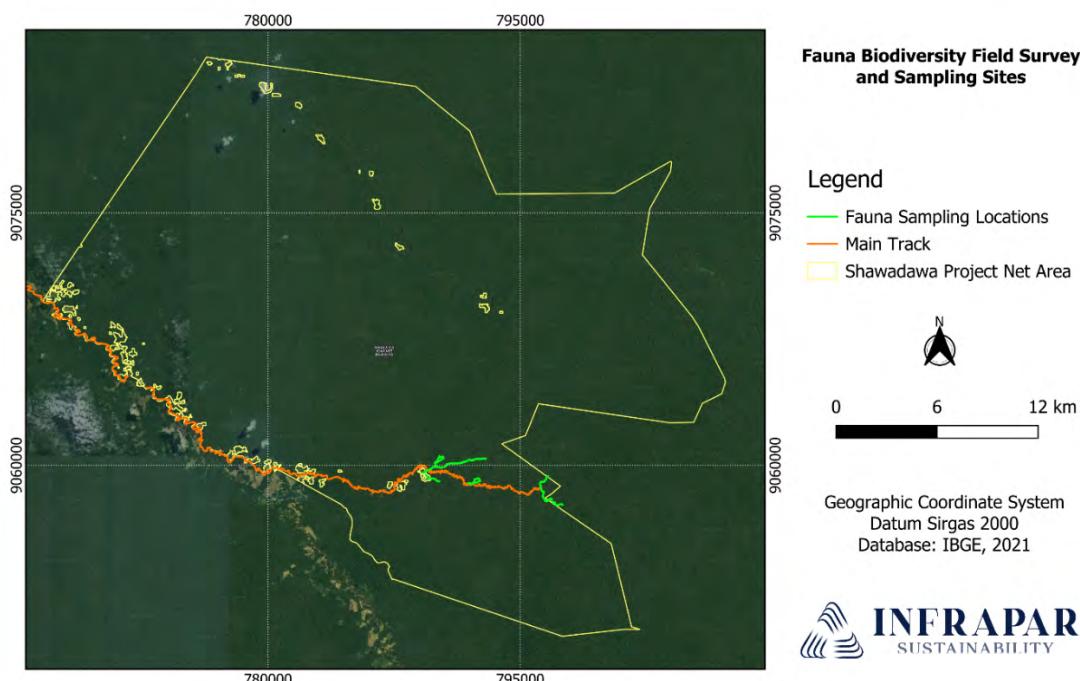
For the Avifauna group, the active search methodology with applicability in Mackinnon's list was used the visual record, which had the aid of binoculars for observation of birds in flight or perched and a digital camera for the photographic records of the specimens. For the vocalization records, the species was recorded by the voluntary singing of the individuals or through the attraction to recordings of vocalizations (playback), stored in a digital device and compact sound player, in order to record the inconspicuous species.

For the sampling of diurnal and arboreal mammals, active search census was carried out at the sampling sites and the installation of camera traps. During this activity, the active search took place for direct and indirect records (traces such as fecal material, tracks, burrows, scratches and among others) were recorded for the list of mammal species. During the sampling of the fauna there were timely observations, that is, casual records that were made at times and places not defined as sampling points/transects. These casual observations aim to add species not registered in the active search method in order to expand and add species to the area of the Arara do Igapé Humaitá Indigenous Land, in Porto Walter, Acre.

The following is a map of which locations the field surveys were carried out:

Fauna, biodiversity, field survey and sampling sites.

Figure 71 - Fauna biodiversity field survey and sampling sites.



Source: IBGE, 2021.

5.1.1.2.2 Flora/ Biodiversity survey

To complement the information regarding the flora, sampling of primary data collected in the field during the period from April 1 to April 13, 2023 was performed.

The forest inventory makes it possible to evaluate the productivity of the forest, its conservation status, its potential for wood production, the composition of the flora, fauna, soil and water. Specifically to meet the scope, the forest inventory aims to evaluate biomass and carbon stocks of the forests object of the study, as well as to evaluate the phytosociological structure of the forest.

The method for the estimates considered the use of sampling of part of the forest, considering the minimum parameters required, such as error of 10% at a reliability level of 90%, for the variable carbon stock. Sample plots will be used arranged in clusters distributed according to the typologies present in the areas.

The expected results are the estimates of biomass and forest carbon, with statistical analysis according to the sampling method, as well as analyses of the phytosociological structure of the forest, including its diversity.

The areas object of the IFD (Diagnostic Forest Inventory) are characterized by large tracts of forest, and due to this characteristic the sampling will be in conglomerates, as presented by Péllico Netto and Brena (1997). According to the authors, this type of sampling is a variation of two-stage sampling, where the second stage is systematically organized within the first stage.

This method is a process that can offer greater advantages in accuracy and costs, when compared to simple random sampling, when the inventoried population is extensive and the variable of interest presents great and even reasonable homogeneity.

The sampling intensity adopted was based on regional experiences and proved to be adequate for the forest conditions. Inventories were considered in large tracts of forests whose intensity was 0.004% (ACRE, 1992). Using this premise, below is presented the sampling intensity for the DIF, considering the amount of existing forest for the Arara Igarapé Humaitá IL area.

Table 57 - Sampling intensity of the diagnostic forest inventory.

Information	Values
Total Area	76.542,46 ha
Forest area (IFD area)	76.402,62 ha
Sample Area	7,540 ha
Sampling Intensity	0,01%
Number of Conglomerates	12
Number of Plots (1,256.54 m ²)	60

Source: Tecman Tecnologia e Manejo Florestal Ltda, 2023.

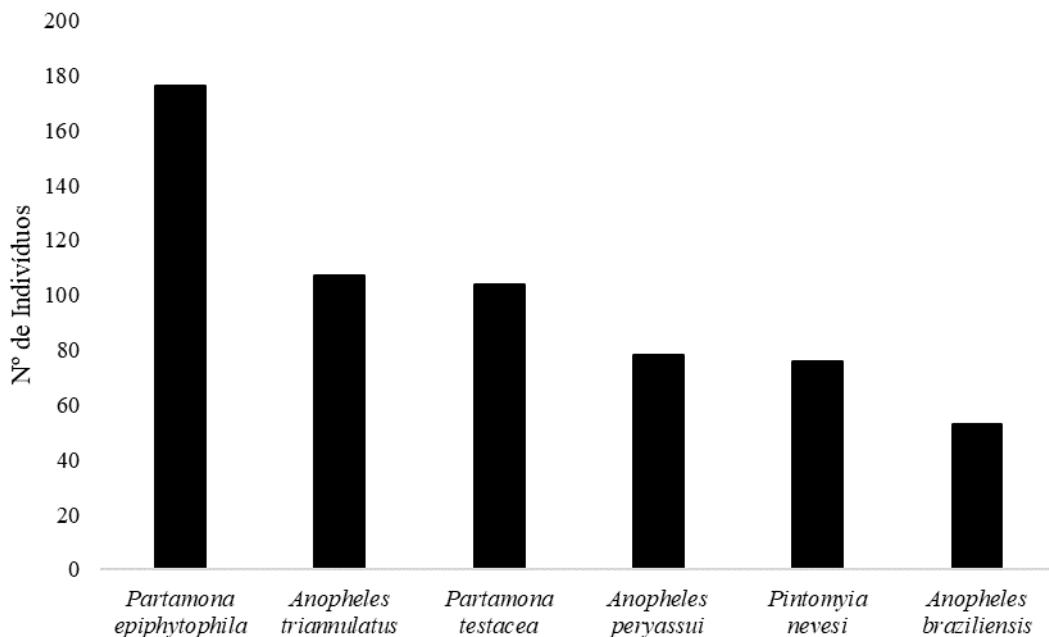
5.1.1.3 Results

We present below the results of the biodiversity survey that was carried out from secondary data found in the available literature and primary data collected during the period in which the teams of Catraia Soluções Ambientais Ltda and Tecman Tecnologia e Manejo Florestal Ltda were in the field.

5.1.1.3.1 Entomofauna

Secondary data were used for the Entomofauna group. A total of 144 taxa were recorded from 1,292 records. The most abundant species were *Partamona epiphytophila* (176), *Anopheles triannulatus* (107) and *Partamona testacea* (104). When considering the localities, it was observed that Cruzeiro do Sul (106 species, 741 individuals), Mâncio Lima (25 species, 310 individuals) and Porto Walter (24 species, 186 individuals) were the municipalities with the highest number of records. The methods most used by the studies were passive searches such as pitfall trap (Martins et al., 2020), Malaise trap (Morato et al., 2008), in addition to active search (Jesus, 2019; Sucupira et al., 2022).

Figure 72 - Abundant entomofauna species recorded in the surroundings of the Arara do Igarapé Humaitá Indigenous Land.



Subtitles: Species richness x Orders and Suborders recorded.

Source: Catraia's Soluções Elaboration

Among the listed species, no threatened and rare species were observed, according to the IUCN Red List. Although none of the listed species is related to the endangered species list, the presence of some species such as *Anopheles trianulatus*, *Psychodopygus davisi*, *Nyssomyia antunesi* and *Rhodnius montenegrensis* demonstrate the indication for the transmission of pathogens related to diseases such as malaria, leishmaniasis and Chagas disease (Confalonieri et al., 2014; Pereira Júnior et al., 2022). Some taxa of the Entomofauna are considered bioindicators of preserved forest areas, as in the case of sandflies that are insects with greater diversity in environments with high vegetation cover (Pereira Júnior et al., 2022). For this group, a richness of 16 species was observed. The same occurs with some species of the genus *Psorophora*, *Sabettus* and *Wyeomyia* (Consoli & Oliveira, 1994).

5.1.1.3.2 Ichthyofauna

The Amazon basin has large dimensions, high species diversity and provides diverse ecosystem services (Sorribas et al., 2016). In relation to the aquatic ecosystems of this basin, there are variations between small streams and massive rivers, often bordered by narrow riparian zones or immense floodplains with vast areas of seasonally flooded forests and lakes, of heterogeneous hydrological conditions and fundamental for the biodiversity and functioning of all these aquatic ecosystems (Melack & Coe, 2021). The unique geochemical and ecological characteristics of rivers, lakes, and flood areas are closely related, forming a set of surfaces that drain rainfall, sediments, and dissolved substances into the main channels (Finer & Jenkins, 2012; Espinoza et al., 2014; Hess et al., 2015; Marengo & Espinoza, 2016; Sorí et al., 2018).

In the Amazon region, rivers are important access routes, and the Juruá River basin stands out in this regard. The Juruá River, due to its exuberant and numerous meanders, typical of floodplains, is considered the most winding river in the world, with a huge floodplain and thousands of lakes (Sousa & Oliveira, 2016; Nagel et al., 2022). This water body, together with its tributaries, are influenced by the intense fluctuation of the water level known as the flood pulse over the seasonal periods (Junk et al., 2012) and this influence not only affects the distribution and abundance of species of fauna and flora, but also the occupation and use of resources by traditional peoples and other social organizations that occupy the margins of the Juruá and its tributaries (Davidson et al., 2012; Pedersen et al., 2019; Nagel et al., 2022).

The diversity of aquatic environments, seasonal and spatial influences, as well as the interactions between abiotic and biotic factors in the Amazon region, explain the richness of the fish fauna of approximately 4,000 species recorded (Albert & Reis, 2011; Reis et al., 2016; Jézéquel et al., 2020) and estimates of 10,000 species occurring in this basin (Reis et al., 2016). The different Amazonian aquatic environments stimulate the occurrence of various strategies, adaptations and evolutionary processes of fish species, for example, while some groups that inhabit the floodplains and igapós need to deal with daily and seasonal variations in the concentration of oxygen, carbon dioxide and temperature, the species of fish of igarapé survive within a less variable environment (Pires et al., 2018). However, although these species are adapted to the most diverse conditions, capable of living in extreme environmental limits, especially with regard to water temperature, low pH, hypoxia and even anoxic conditions, climate change subjects many species of fish to almost physiologically unsustainable conditions (Luis Val & Wood, 2022).

The consequences of habitat loss are diverse and can affect different groups of wild fauna and flora at different scales. In recent years, extreme drought points have been recorded in all Amazonian states and these events are potentiated by direct anthropic actions (deforestation and fire) (Berenguer et al., 2021; Silva et al., 2020; Silva et al., 2018). These impacts alter the hydrological cycle and the hydrological

pathways that supply the streams and rivers, causing harmful modifications to aquatic environments and the ichthyofauna (Castello, 2021). In fact, the integrity of Amazonian aquatic ecosystems faces several threats, such as the establishment of reservoirs, habitat loss, modification of the physicochemical characteristics of the water, mining, subtraction of the riparian forest and dissemination of exotic species (Beltrão et al., 2018; Santos et al., 2019).

Moreover, it is a fact that the replacement of forests by pastures in the Amazon reduces the annual rate of evapotranspiration and modifies atmospheric circulation. The small deforestation can even lead to an increase in precipitation over that deforested area, due to local circulations induced by temperature differences between the forest and the deforested area. However, large-scale deforestation brings major changes to the region's atmospheric circulation and major hydrological impacts, with reductions and increases in precipitation, in large areas of the basin and even in neighboring and remote regions (Correia et al., 2007; Kumagai et al., 2016; Marengo et al., 2018; Lamparter et al., 2018).

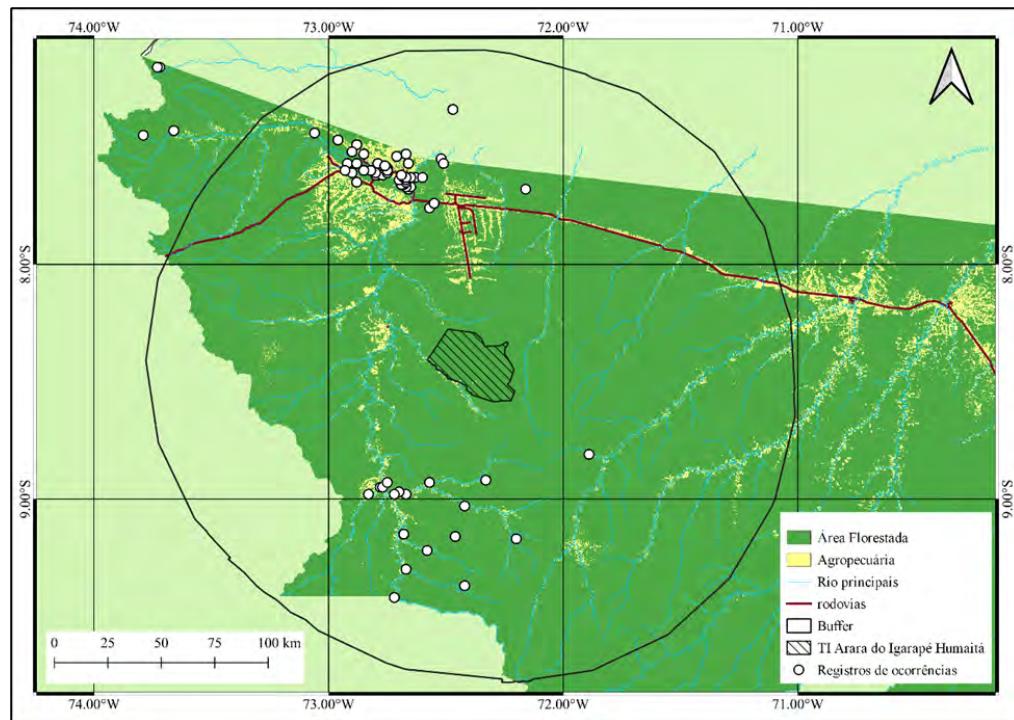
In addition, global climate change, as a result of various indirect and direct anthropogenic impacts on water resources, mainly affects the lives of traditional and riverine communities that depend on water volume for survival. Among the impacts that can be measured and observed, the main ones are the decrease in the availability of the fishing resource caused by the degradation of aquatic environments, changes in the reproductive cycles of the species and overfishing (Fabré et al., 2017). Such impacts are potentiated due to the absence of reliable information on the volume of fish caught in natural environments, which leads to a low effectiveness action on the part of the public power in the management and supervision of these resources.

In this sense, any activity that seeks to understand the abundance, richness and distribution of the ichthyofauna and its main species, allows not only to evaluate the indicators of quality and preservation of the waterways of a place, but also to assist in the construction of actions that enable the mitigation of the impacts caused, directly or indirectly, to the environment, especially in the Amazon. The maintenance of water resources, fish species and other ecosystem services of the Amazon Basin are fully connected to the preservation of vegetation cover and exchanges between the aquatic-terrestrial interface (Castello et al., 2013; Lobón-Cerviá et al., 2015; Wittmann & Junk, 2016; Arantes et al., 2018).

Therefore, REDD+ (Reducing Emissions from Deforestation and Forest Degradation) projects represent a good alternative for maintaining the richness and abundance of fish in a region, especially in areas that include traditional peoples. Given the above, this final report brings to light the richness of fish species, estimated through secondary data collection, for the Arara do Igapó Humaitá Indigenous Territory with incentive to implement REDD+ activities in the municipality of Porto Walter, state of Acre.

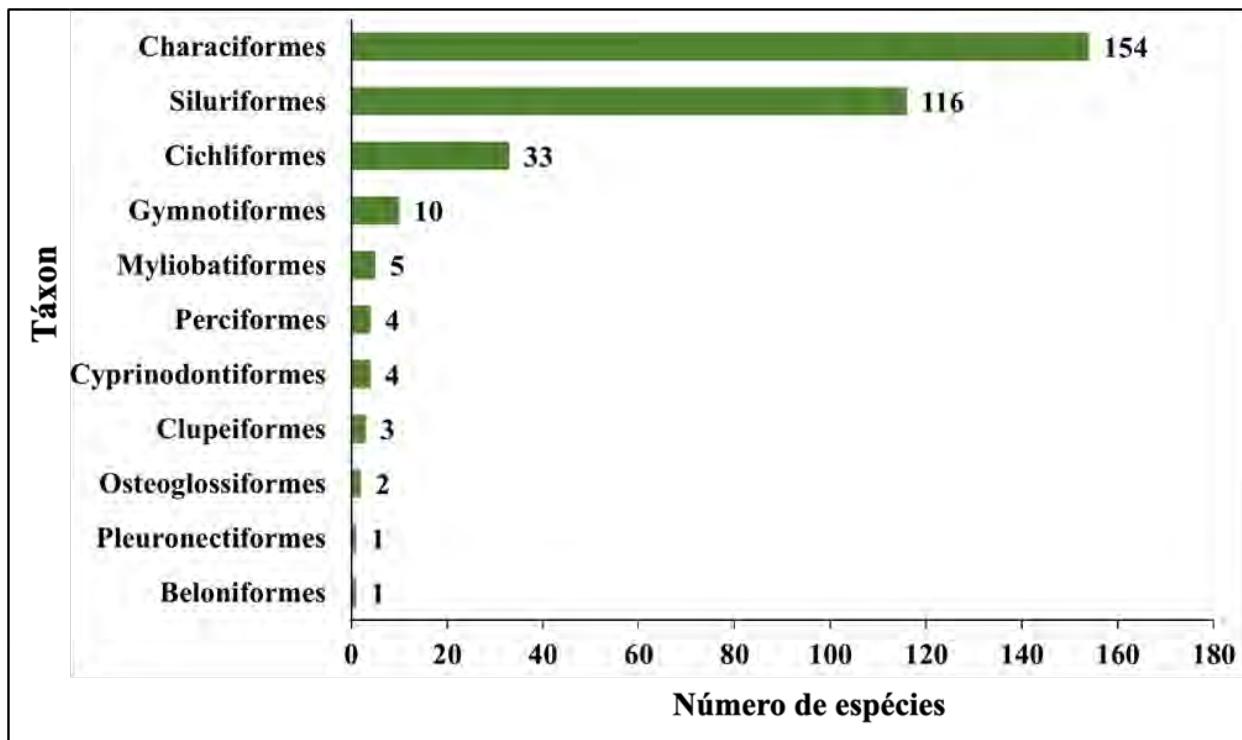
Despite the scarcity of studies in the region, the effort of collecting secondary data resulted in 1735 occurrences, belonging to 337 species, 43 families and distributed in 11 orders of fish (Annex B). The occurrences were recorded near the project area, within the Juruá River basin, as can be seen in Figure 5. Among the orders, the ones with the highest number of occurrences were *Characiformes* with 1030 occurrences, followed by *Siluriformes* with 344 and *Cichliformes* with 268 occurrences. Regarding the Families, *Characidae* presented the highest records (581), followed by *Cichlidae* (n = 268) and *Curimatidae* with 119. Regarding species richness, the richest orders were: *Characiformes* (154), followed by *Siluriformes* (116) and *Cichliformes* (33).

Figure 73 - Map of the occurrence of fish species in the surroundings of the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, Acre, 2023. Land use and land cover data according to Mapbiomas, 2021.



Source: Souza et al. (2020).

Figure 74 - Species richness of fish orders recorded in a buffer of 120 km of the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, Acre, 2023.



Subtitles: Taxon x Number of species.

Source: Souza et al. (2020).

About endemic species it is important to remember that there is a scarcity of data and work with regard to the identification and description of new species, therefore, many species recorded and identified may be new to science or rewritten. However, it is possible to highlight the acarás (*Aristogramma juruensis*, *Aristogramma moae*), and the bagre limpa-vidro (*Corydoras acrensis*) that are endemic to the Juruá River basin (Dagosta & De Pinna, 2019), that is, they have an occurrence restricted to this locality.

Regarding conservation status, according to the International Union for Conservation of Nature (IUCN), the peixe lápis anão (*Nannostomus marginatus*), is Critically Endangered (CR), facing a high risk of extinction in the wild (Annex B). Also, only the stingray species (*Paratrygon aiereba*) is classified as CR, the last Red Book of Brazilian Fauna Threatened with Extinction of ICMBio Chico Mendes Institute for Conservation and Biodiversity, of 2018, according to Araújo et al. (2018) (Annex B). The other species presented low concern status or did not have sufficient data for an evaluation. However, more species may be in danger, so it is necessary to look at these results with caution, requiring a local assessment of the population stocks of these fish species to verify their real conservation status.

Although *Paratrygon aiereba* is widely distributed, its population is critically threatened, with Brazilian projections pointing to a decrease of more than 80% in three generations due to threats such as commercial and ornamental fishing, habitat loss/degradation and contaminants in the water from the expansion of agriculture, mining, sewage, among others (Araújo et al., 2018). Similarly, *Nannostomus marginatus*, listed as critically endangered globally, suffers from the constant pressure of extraction for the ornamental trade, with more than 900,000 individuals exported from Brazil to other countries between 2006 and 2015, according to a study by Tribuzy-Neto et al. (2020). Therefore, it is crucial that conservation measures are implemented to prevent population decline of these species.

Fish species of economic and game importance are also largely migratory species. It is possible to highlight some species that are not considered migratory and that have commercial representation and in the diet of traditional peoples, such as tambaqui (*Colossoma macropomum*); pacu (*Mylossoma duriventre*) and the mandis (*Pimelodus* spp.).

Large catfish and other migratory species are targets of the Amazon fish market as a whole. For traditional peoples who have storage conditions and fishing gear, these specimens make up a valuable source of protein. In this sense, according to the occurrence identified within the Juruá basin and in the vicinity of the Arara do Igarapé Humaitá Indigenous Land, these organisms can be grouped into migrators of great distances: piraíba (*Brachyplatystoma filamentosum*), dourada (*Brachyplatystoma rousseauxii*), piraíba (*Brachyplatystoma platynemum*), jundiá (*Brachyplatystoma juruense*) and jundiá-lavrado (*Brachyplatystoma tigrinum*).

The migratory medium-distance: curimatã (*Prochilodus nigricans*), piracatinga (*Calophysus macropterus*), matrinxã (*Brycon melanopterus*), pirarara (*Phractocephalus hemiolopterus*), piau (*Schizodon fasciatus*), and surubim (*Pseudoplatystoma tigrinum*). Finally, the short-distance migratory ones: pirarucu (*Arapaima* sp.,) hake (*Plagioscion squamosissimus*), red piranha (*Pygocentrus nattereri*).

The matrinxã (*Brycon melanopterus*) and the piraju (*Salminus hilarii*) are migratory fish and bioindicators of high quality habitat, since they occur preferentially in rivers of clean water and with high oxygen content (Lima, 2003). Most species of Gymnotiformes are highly sensitive to anthropogenic changes, including modifications in riparian vegetation and streams, which can lead to decreased abundance of many species or even extinction. Some species of the family Gymnotidae, such as the genus *Gymnotus* as well as the family Hypopomidae (*Brachyhypopomus* spp, *Hypopygus lepturus*), are more abundant in calm-water streams, using leaf litter banks as a resting and feeding area (Zuanon et al., 2015).

Cantanhêde & Montag (2023) observed that *Brachyhypopomus* and *Gymnotus* species are considered indicators of high environmental heterogeneity and forest percentage. Species of Rhamphichthyidae, such as *Gymnorhamphichthys rondoni* (sand shear), use sand microhabitats to forage, being associated with the substrate, that is, they have psamophilous habits (Zuanon et al., 2006; Virgilio et al., 2019). In addition, some species of Trichomycteridae, such as the candiru (*Ituglanis* spp.) also have psamophilous habits, use sand microhabitats to forage, being associated with the substrate, that is, they have psamophilous habits (Zuanon et al., 2006; Virgilio et al. 2019).

5.1.1.3.3 Herpetofauna

The Amazon Rainforest has about 6.74 million km² and corresponds to almost 50% of the forest remnants of the planet (WWF, 2023). This biome is one of the most important on the planet due to the various ecosystem services provided, for example, the maintenance of the hydrological cycle, biodiversity and carbon stock (Piponiot et al., 2019). This biome and its rich biodiversity are threatened, mainly due to deforestation, one of the main sources of greenhouse gases (Nobre et al., 2016),

One of the strategies created to reduce greenhouse gas emissions was the creation of REDD+ policies, which aim to involve actions to reduce emissions from deforestation and forest degradation, associated with forest conservation, sustainable forest management and increased forest carbon stocks in developing countries (IPAM, 2011). REDD+ projects also aim to enhance actions of initiatives that focus on the conservation of fauna and flora, through the monitoring of biodiversity and not only the carbon stock of the areas (Harvey et al., 2010).

The state of Acre is located in the extreme west of Brazil, in the southwest of the Amazon, a region considered a priority for biodiversity conservation due to its high diversity of taxonomic groups (e.g., plants, anuran amphibians, mammals, birds, etc.). (Souza et al., 2003). When it comes to the herpetofauna (amphibians and reptiles), 156 species of amphibians and 155 of reptiles are known to date for the state (Fonseca et al., 2022). In this state, the Upper Juruá region is considered a priority for conservation and inventories of amphibians and reptiles because it presents a high diversity for these two groups (Vogt et al., 2001; Azevedo-Ramos & Galatti, 2002; Fonseca et al., 2022).

Amphibians and reptiles perform essential ecological functions in their ecosystems, controlling populations of insects and other invertebrates, and serving as food for other groups of fauna (Bernarde et al., 2017; Mesquita et al., 2018). Amphibians are excellent bioindicators of environmental quality due to several characteristics related to their biology (Ramos & Gasparini, 2004). However, the role of reptiles as good bioindicators is still little known (Bertoluci et al., 2009), although lizards are considered good models for ecological studies because they are sensitive to environmental changes (Pianka & Vitt, 2003; Camargo et al., 2010).

Taking into account the threats caused by environmental impacts in the Amazon, the importance of amphibians and reptiles for the maintenance and balance of the environment, and the importance of the Upper Juruá region for the conservation of these groups, this final report presents relevant information on the survey of herpetofauna in the Arara Indigenous Land (TI), located in the municipality of Porto Walter, Acre, Brazil, where Carbon Credit Project actions will be implemented.

The survey of the fauna to obtain the primary data of the species was carried out in one stage, covering the seasonal rainy season, for 15 days, counting five days of displacement and 10 consecutive days of data collection in the field. The sampling methods of the Herpetofauna are described below:

5.1.1.3.3.1 Limited demand for day and nighttime (idd and idn)

It consisted of moving on foot, slowly in a transect, looking for visually exposed amphibians and reptiles. The search effort covered all visually accessible microhabitats. In this method it is possible to collect more accurate information about the activity of the animal and its location in the habitat. This method differs from active search in that the researcher traverses transects and does not rummage through the environment, looking only for visually exposed animals (Bernarde et al., 2017). The activities were started in the morning (05:30am to 10:30am) and in the night period (18:00h to 21:00h), totaling eight daily hours of searching. During LDD and LDN, all observed species were recorded in a field booklet. When possible, amphibian and reptile species were photographed with a digital camera to aid in identification. Some specimens were manually captured (amphibians, lizards and non-venomous snakes) for identification at the lowest possible taxonomic level and then released. The species were identified in the field using the photographic guides, keys and descriptions present in literature (e.g., Avila-Pires 1995; Souza 2009; Bernarde et al., 2011; 2013; 2017; Fonseca et al., 2019; Freitas et al., 2020). The nomenclature used for the species follows that proposed by Segalla et al. (2021) for amphibians and Costa et al. (2021) for reptiles.

Figure 75 - Biologist specialist during the Limited Search for Time in the survey of herpetofauna. Photo A represents LDD and photo B represents LDN.



Source: Catraia Soluções ambientais, 2023.

5.1.1.3.3.2 Occasional encounters

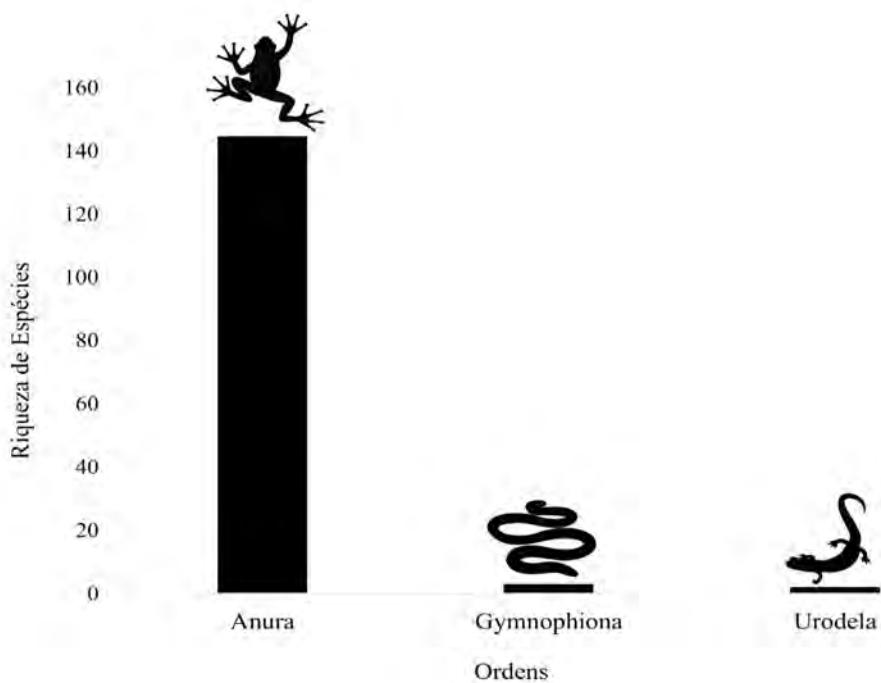
Amphibian and reptile specimens observed after or before LDD and LDN were recorded in the study area. The species recorded during occasional encounters were not used in the data analyses of this report, however, they were used to complement the list of herpetofauna species of the property (Martins & Oliveira, 1998).

5.1.1.3.3.3 Hearing Recordings

During LDD and LDN, anuran amphibian species in vocalization activity were recorded, estimating the number of vocalizing specimens (Heyer et al., 1994).

A total of 288 species were recorded through secondary and primary data for the area and surroundings of the Arara Indigenous Land, of which 150 are amphibian species (3 orders and 17 families; Figure 8) and 138 reptiles (three orders, three suborders, and 27 families; Figure 9), belonging to 44 families (Annex C). Among amphibians, the most representative families in relation to species were Hylidae (56 species), followed by Leptodactylidae (23), Craugastoridae (21) and Dendrobatidae (11). Regarding reptiles, the most representative families were Dipsadidae (41 species; suborder Serpentes), followed by Colubridae (17; suborder Serpentes), Gymnophthalmidae (9; suborder Sauria) and Dactyloidae (7; suborder Sauria).

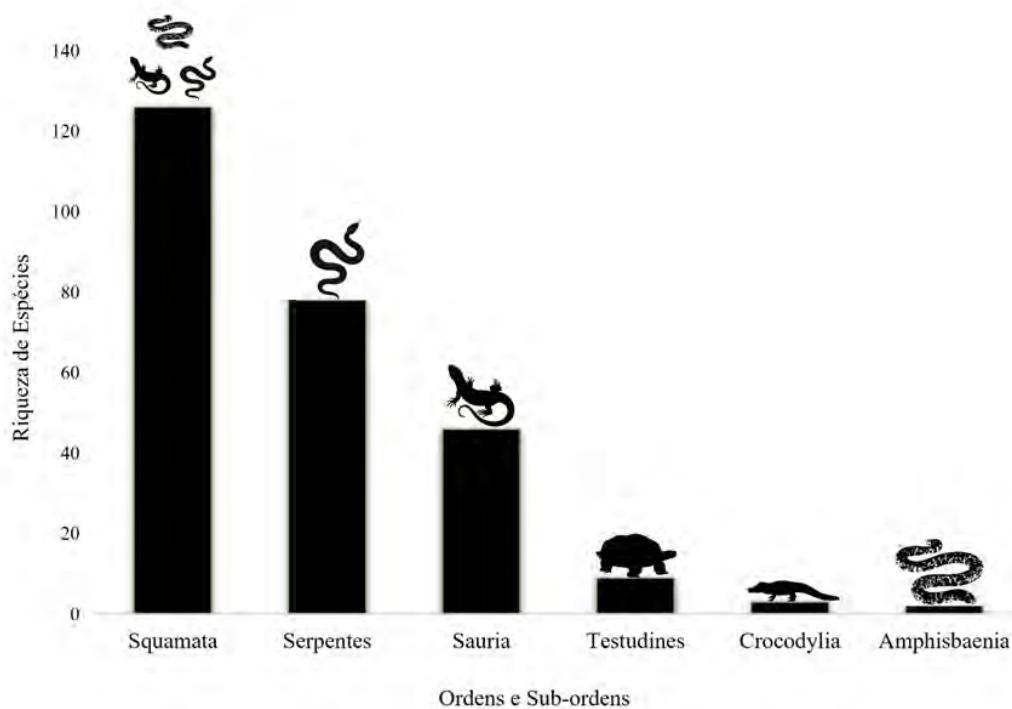
Figure 76 - Representativeness of amphibian species richness by the most representative Orders recorded in the survey of herpetofauna, TI Arara do Igarapé Humaitá and surroundings, Acre, 2023.



Subtitles: Species richness x Orders recorded.

Source: Catraia Soluções ambientais, 2023.

Figure 77 - Representativeness of reptile species richness by the most representative Orders and Suborders recorded in the survey of herpetofauna, IL Arara do Igarapé Humaitá and surroundings, Acre, 2023. Note: Order Squamata is divided into three suborders.



Subtitles: Species richness x Orders and Suborders recorded.

Source: Catraia Soluções ambientais, 2023.

During the collection of primary data in the area of the Arara Indigenous Land, 42 species of amphibians (23) and reptiles (19) were recorded, belonging to 19 families, three orders (Anura, Squamata and Testudines) and two suborders (Sauria and Serpentes). The families with the highest amphibian richness were Hylidae (8), Leptodactylidae (4) and Dendrobatidae (3), while in relation to reptiles, the families Dipsadidae (7), Colubridae and Viperidae (both with two species) were the most representative.

Figure 78 - Amphibians



Source: Hendryk Freitas.

Figure 79 - Reptile species recorded during the survey of herpetofauna in the field in the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, Acre, 2023.



Source: A-C: Hendryk Freitas; D: Uéslei Oliveira.

A – *Potamites ecpleopus*; B – *Enyaliooides palpebralis*; C – Cobra-Cipó (*Chironius scurrulus* – juvenile); D – Jararaca or Surucucu (*Bothrops atrox*); E – Jararaca Vermelha (*Bothrops brazili*); F – Jabuti (*Chelonoidis denticulatus*).

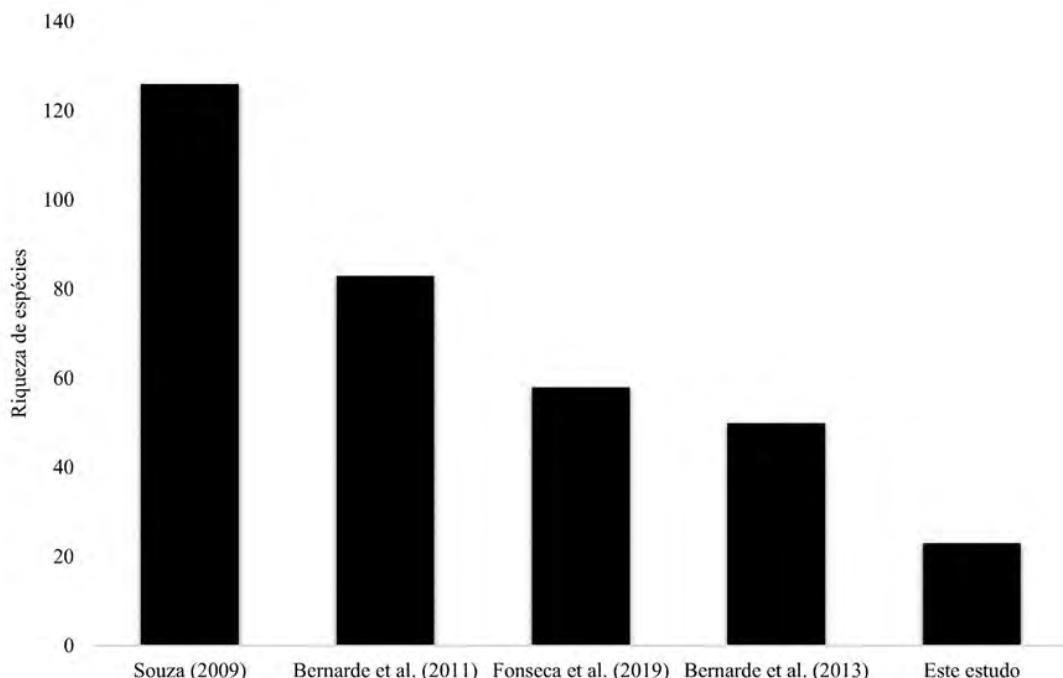
The richness of the herpetofauna recorded in the surroundings and in the project area represents 96% of the amphibian species and 89% of reptiles that occur in the state of Acre (Fonseca et al., 2022). When it comes to the Amazon, the number of species is equivalent to 36.6% of amphibians and 35.8% of reptiles recorded in this biome (Prudente, 2017; Avila-Pires, 2022; Hoogmoed, 2023). The richness recorded in the

area through primary data represents 14.7% of amphibians and 12% of reptile species that occur in the state of Acre (Fonseca et al., 2022).

Compared to studies carried out in the Alto Juruá region, near the Indigenous Land property, the richness of amphibians and reptiles (Figures 12 and 13, respectively) recorded in the project area is quite representative considering the short sampling period. The richness of amphibians obtained in the field corresponds to 18.2% of the species recorded in PARNA Serra do Divisor (Souza, 2009), 27.7% of the richness recorded in RESEX Riozinho do Liberdade (Bernarde et al., 2011), 46% of the richness recorded in the Lower Moa River Forest (Bernarde et al., 2013) and 39.6% of that recorded in Porto Walter (Fonseca et al., 2019).

In relation to reptiles, wealth is considered high, corresponding to 31.1% and 37.2% of the wealth recorded in the municipality of Porto Walter (Avila-Pires et al., 2009; Fonseca et al., 2019, respectively), to 24% of the wealth recorded in the Riozinho do Liberdade RESEX (Bernarde et al., 2011) and to 35.8% in the Lower Moa River Forest (Bernarde et al., 2013).

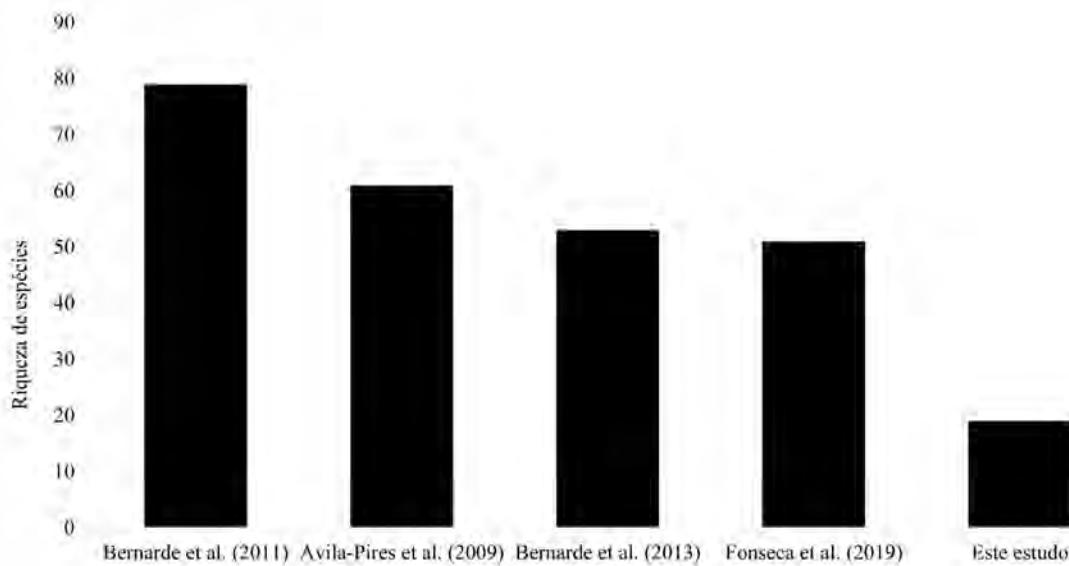
Figure 80 - Representativeness of the richness of reptile species recorded in the survey of secondary and primary data of the herpetofauna in the region and surroundings of the Arara do Igapé Humaitá Indigenous Land, Porto Walter 2023.



Subtitle: Richness of reptile species x authors.

Source: Catraia Soluções ambientais, 2023.

Figure 81 - Representativeness of the richness of reptile species recorded in the survey of secondary and primary data of the herpetofauna in the region and surroundings of the Arara do Igarapé Humaitá Indigenous Land, Porto Walter 2023.

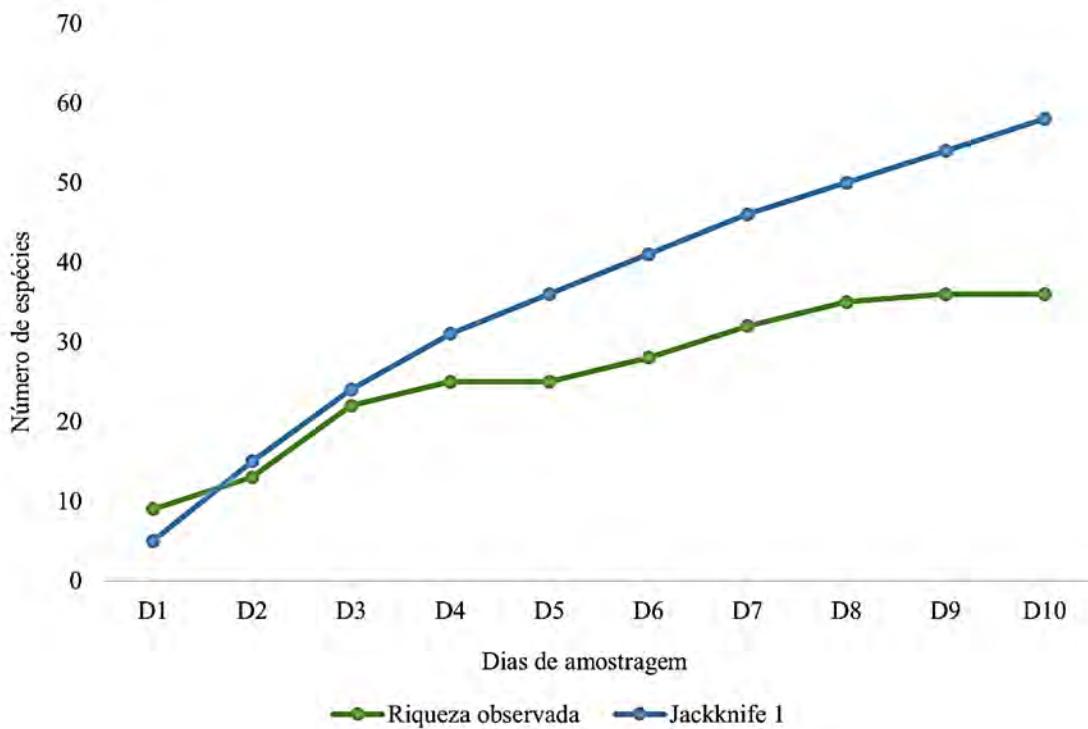


Subtitle: Richness of reptile species x authors.

Source: Catraia Soluções ambientais, 2023.

The sample sufficiency in the accumulation curve of species recorded through primary data in the Arara Indigenous Land did not estimate a stabilization trend in an asymptote and, based on the number of species recorded (36), the Jackknife 1 estimator estimated the possibility of 22 more species being recorded, indicating the need for a greater sampling effort (Figure 14).

Figure 82 - Sample sufficiency observed and estimated in the Herpetofauna survey in the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, Acre, 2023.



Subtitles: number of species x sampling days; observed wealth, jackknife 1

Source: Catraia Soluções ambientais, 2023.

The number of species recorded on the first day of sampling (9) was higher than the estimated number (jackknife 1 = five). This may have happened because the jackknife uses only a portion of the samples, making an estimate, and not all the samples collected. In addition, this result may have been caused by several factors, such as the heterogeneity of the area, the effect of temporal variability and sampling bias.

The richness ($S = 36$) and abundance ($N = 57$) of species recorded in the study area by the PLTD and PLTN method can be considered high even with the low sampling effort employed. In the Shannon-Weiner diversity analysis (H'), the results obtained demonstrate that the area has a high species richness (Table 1). These values of richness and abundance are associated with the degree of preservation of the project area.

Table 58 - Diversity indices obtained through the survey of the Herpetofauna in the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, Acre, 2023.

Abundance (N)	Wealth (S)	Shannon-Wiener (H')	Equitability of Pielou (E)	Dominance (K)
57	36	3.48	0.97	0.03

Source: Project Team Elaboration, 2023.

During the survey of primary and secondary data, no species recorded by these methods was identified as endangered, according to ICMBio's Red Book of Endangered Fauna (2018). In addition, no species corresponded to a new record for the Upper Juruá region or for the state of Acre.

Four species endemics to the state of Acre were recorded: the amphibians *Allobates subfolionidificans* and *Allobates velocicantus*, and the reptiles *Pseudogonatodes gasconi* (suborder Sauria) and the snake *Atractus nawa* (suborder Serpentes). The record of the lizard *Uracentron azureum* in the Isconahua Indigenous Reserve in Peru, on the border with the state, indicates that it may be recorded in the state of Acre in future surveys of herpetofauna.

Among the species considered rare, we highlight the amphibians *Hyloxalus chlorocraspes*, described and known for the municipality of Porto Walter and the region of Ucayali, in Peru (Lötters et al., 2007), and the amphibian *Gymnophiona Nectocaecilia petersii*, described in 1882 and known only for five localities in the Amazon (Maciel et al., 2021). In relation to reptiles, the lizards *Bachia scaea*, known only for one locality in the state of Acre (Fonseca et al., 2019) and in three localities in the state of Rondônia (Teixeira Jr. et al., 2013) and the lizard *Pseudogonatodes gasconi*, stand out.

Of the 78 species of snakes recorded for the area surrounding the Arara Indigenous Land, 12 of them (families Elapidae and Viperidae) have medical importance because they are capable of causing poisoning in humans (snakebite accident). Among these, the jararaca or surucucu (*Bothrops atrox*) stands out, the venomous species most recorded in herpetofaunistic studies in the Amazon (Martins & Oliveira, 1998; Fraga et al., 2011; Masseli et al., 2019; Frazão et al., 2020; Turci et al., 2021; Moraes et al., 2022) is the one that most causes snakebite accidents in this biome (Bernarde, 2014).

Thus, it is important to carry out environmental education actions with traditional populations in order to reduce accidents by venomous snakes in this region. In addition to environmental education, the preservation of these animals is important, as the poisons produced by species of these families have a high pharmacological potential to produce medicines, such as analgesics, anti-inflammatories, antivirals and antibiotics (Bernarde et al., 2017).

At least 15 species of amphibians and reptiles considered hunting were recorded by primary and secondary data methods, among them, species of turtles and alligators that are exploited as food resources of animal protein for subsistence of indigenous, riverine, and extractive peoples, due to the high nutritional value (Campos et al., 2013; Farias et al., 2013; Oliveira et al., 2019).

The jabuti (*Chelonoidis denticulatus*) performs important ecological functions in the ecosystem, as it acts as a seed disperser and consumer of organic matter, contributing directly to the decomposition and cycling of nutrients (Cajaiba et al., 2015). This species, in addition to being used as a subsistence food resource, is heavily trafficked for sale and consumption in urban centers, which ends up decreasing and negatively impacting the populations of this species (Cantarelli, 2006; Eisemberg et al., 2015). Thus, environmental education actions are necessary with the traditional peoples of the Arara Indigenous Land to implement management and conservation actions of the turtle species that occur in the region.

The use of animals or their derivatives for medicinal purposes, known as zootherapy, is a common tradition in several traditional populations (Bernarde & Santos, 2009). The use of secretions found on the skin of certain amphibian species for medicinal purposes has been a practice known for centuries by several indigenous peoples in the Amazon (Daly et al., 1992; Souza, 2009). The secretions of amphibians of the

genus *Phyllomedusa* contain toxins that have a series of bioactive peptides, which have antibacterial, antiviral and analgesic properties (Calderon et al., 2011; Hesselink, 2018).

The "frog vaccine" poisonous secretion present in the skin of the Kambô amphibian (*Phyllomedusa bicolor*), for example, is widely used for medicinal purposes by several indigenous tribes in the Amazon (Souza, 2009). However, the spread and use of the frog vaccine by non-traditional peoples in urban centers increases the risk of biopiracy and violation of the rights of indigenous peoples who hold this traditional knowledge. In addition, populations can be negatively impacted, since, even after the release of the amphibian into the wild, it is uncertain whether the process of extracting the secretion can cause any damage that compromises its ability to survive (Lima & Labate, 2007; Bernarde & Santos, 2009).

The Serpent's record Periquitambóia (*Corallus batesii*) during the collection of primary data demonstrates how preserved the area of the Arara Indigenous Land is, since this non-venomous species is almost exclusively arboreal, being restricted and found only in primary and secondary forest environments, close to aquatic environments (Henderson et al., 2009).

The Jararaca-Vermelha (*Bothrops brazili*) it is a venomous species widely distributed in the Amazon, however, infrequent in studies conducted with snakes in this biome (Cunha & Nascimento, 1975; Bernarde et al., 2012). This species is an excellent indicator of a well-preserved environment, as it is only found in primary forests, not being found in secondary forests or anthropogenic environments (Cunha & Nascimento, 1975).

The species *Scinax ruber* found during primary data collection in the Arara Indigenous Land can be considered an indicator of environmental quality, as it is more frequently found in anthropogenic environments, such as open areas and forest edges, (Lima et al., 2005), corroborating the environment where the specimen was recorded during field sampling in the Arara IL of the Humaitá Stream.

5.1.1.3.4 Avifauna

The Amazon biome is a tropical forest that has the greatest biodiversity on the planet. With its territory more than 6,000,000 km² is divided into nine South American countries and approximately 59% of the Amazon Forest is inserted in Brazil (WWF, 2023) and even with its ecological relevance, illegal deforestation is a threat to the biome. Given its importance for the planet's climate, ecological relevance and biodiversity, the Amazon has suffered numerous negative impacts in the face of irregular human activities, sharply reducing continuous forest extensions and loss of numerous species of fauna and flora as a result of the opening of roads, illegal logging and fires by anthropic actions (Guilherme & Cintra, 2001; Silva et al., 2015; Silva et al. 2022).

To improve biodiversity conservation, it is possible to cover not only public areas of Conservation Units, but also private properties (Gallo et al., 2009). The Reduction of Emissions from Deforestation and Forest Degradation (REDD+) projects is an important action in the conservation and monitoring of fauna and flora and carbon stock (Harvey et al., 2010). Therefore, REDD+ projects are an important instrument for the integration of public policies that are linked to the preservation of fauna and flora, with the objective of mitigating global climate change through the elimination and/or reduction of illegal deforestation, the recovery of ecosystems and the conservation of biodiversity, as these are interconnected with the development of a low-carbon forest economy in the Amazon.

The Amazon basin differs from other regions of the country, where the great rivers influence the distribution of populations, acting as geographical barriers, and in view of this, the centers of endemism are formed, that is, regions that concentrate groups of species that have a restricted geographical distribution

(Guilherme, 2016). The southwestern region of the Amazon, which covers Acre and part of the territory of the Amazon, is located the center of endemism Inambari (Cracraft, 1985). This region of the Inambari encompasses from the foothills of the Andes to the northwest of the Amazon River and houses one of the greatest diversities of the fauna and flora of the biome for having elements characteristic of the Amazon plain and typical species of altitude of the Andes Mountain range (Carcraft, 1985).

The bird group are the best-known vertebrates in terms of species identification, natural history, and geographic distribution (Del Hoyo et al., 2019). This happens due to the relative ease of detection of these animals without the need for capture, in addition, bird species occupy a wide niche and are present in almost all environments of the world (Vielliard et al., 2010). According to Pacheco et al. (2021), there are 1,971 species of birds in the Brazilian territory, and it is estimated that the Brazilian Amazon has records of approximately 1,300 species of birds (Marini & Garcia, 2005). In the state of Acre there is confirmation of 708 species of birds (Guilherme, 2016), and this number may be higher. In the southwestern Brazilian Amazon, there are at least 23 species of birds that are considered endemic, and of these, 12 are restricted to the territory of Acre and the south of the Amazon.

At a time of increasing anthropogenic actions in land use, it is important to understand the impacts of these behaviors on groups of species that have important functions in the ecosystem. Birds are excellent bioindicators of a healthy ecosystem, as they are in all biomes and occupy a wide variety of ecological niches. That is why they are used in the methods of qualitative and quantitative surveys that aim at environmental studies (Vielliard et al., 2010), becoming essential for the detection of changes in the ecosystem, and ahead the responses, ensure the realization of mitigatory and compensatory measures to the possible impacts on terrestrial environments. Thus, this final report presents information on the survey of the avifauna obtained by secondary data of the surroundings of the area through the scientific literature and scientific database sharing portals available on the internet and, by primary data, in the field, in the area of the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, Acre.

The survey of the fauna was carried out in one stage, covering seasonal rainy season, in 15 days, counting 5 days of displacement and ten consecutive days of data collection in the field. The sampling method for the Avifauna group is described below.

5.1.1.3.4.1 Active Search

The applicability of this method of estimating richness is widely indicated for conducting inventories of fauna to obtain information on the richness and composition of species (Ribon, 2010) and one of the ways to make inventories comparable to each other (Santos, 2006). In addition to knowing the abundance and richness of the species represented in the area where the fauna inventory is being carried out, it is a fundamental initial process to make them useful for actions of management strategies and conservation of wild fauna (Silva, 2005).

Mackinnon's lists were made with sequentially enumerated lists, each composed of 10 species (standard number) and this one cannot contain species already listed and, therefore, each species appears only once in the same list. After a list of 10 species has been completed, a new list begins. However, in each new list will be inserted species already registered in previous lists, as long as they are not the same individuals registered. The application of this method will result in a Relative Abundance Index of bird species, here called List Frequency Index (LFI).

To perform the active search with applicability in the Mackinnon list, pre-existing transects and strategic points in the study area were used during the sampling days, in the morning (05:30am to 10:30am) and night (18:00pm to 21:00pm), totaling eight hours/day. During the active search (Figure 15), the specialist recorded in a field notebook all the species detected by audiovisual means. In the active daytime search, the visual record had the aid of binoculars for observation of birds in flight or perched and a digital camera for the photographic records of the specimens. For the vocalization records, the species was recorded by the voluntary singing of the individual(s) or through the attraction to recordings of vocalizations (playback), stored in a digital device and compact sound player, in order to record the inconspicuous species. With this technique it is possible to attract the bird by artificial emission of vocalization, in which it is used to develop an efficient method, capable of attesting to the presence or absence of the species in the study area. This technique was applied with professional ethical conduct, aiming to avoid damage and stress to the bird and the ecosystem.

Figure 83 - Specialist biologist during the active search in the survey of the avifauna, IL Arara do Igarapé Humaitá, Porto Walter, Acre, 2023. A – active daytime search; B – Active nocturnal search.



Source: Catraia Environmental Solutions Collection, 2023.

Species not readily identified in the field were recorded or photographed and later identified and inserted into the field table. The species were identified with the aid of a field guide (Schulenberg et al., 2010) and in the data platforms of BirdNET and Merlin, applications with artificial intelligence that assists in the identification of the vocalizations of wild birds of the world. In addition, it was used as a database for species identification and relevant information on digital citizen science platforms such as Wiki Aves (www.wikiaves.com.br) and Birds of the Word – The Cornell Lab of Ornithology (www.birdsoftheworld.org) and scientific articles published on the latter platform.

5.1.1.3.4.2 Occasional Encounters

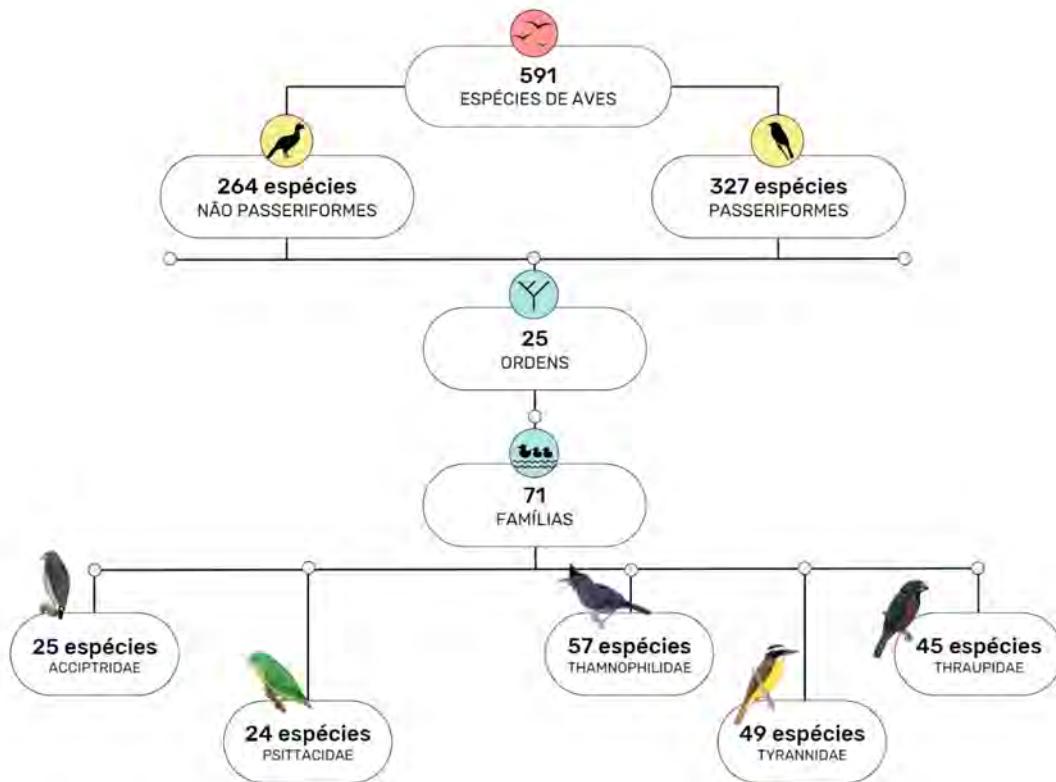
In the survey of the avifauna there were timely observations, that is, casual records that were made at times and places not defined as sampling points/transects. These casual observations aim to add species not registered in the active search method in order to expand and add species to the area of the Arara do Igapó Humaitá Indigenous Land, in Porto Walter, Acre. The bird species recorded during the casual observations will not be used in the data analysis of the report, and these will be used to supplement the list of bird species on the property.

5.1.1.3.4.3 Taxonomic Order, Nomenclature and relevant Information

The taxonomic order, scientific nomenclature and vernaculars used is that recommended by the Brazilian Committee of Ornithological Records - CBRO (Pacheco et al., 2021). For each bird species recorded in this survey, basic information about food guilds is presented (Wilman et al., 2014); the state of conservation (ICMBio, 2022; IUCN, 2023); rare, unusual and punctually distributed birds (Stotz et al., 1996); species associated with the Inhambari endemism center and/or restricted to the southwest of the Brazilian Amazon (Cracraft, 1985; William, 2016); the specialist birds and/or associated with the bamboo-dominated habitats of the genus Guadua (Kratter, 1997; William 2016); migratory birds (Guilherme, 2016; Somenzari et al., 2018); and game species targeted for subsistence hunting (Ojasti, 2000).

A total of 591 bird species belonging to 71 Families and 25 taxonomic orders were recorded (Annex 6). A total of 586 species were recorded in the secondary data survey methodology (Figure 16) and 223 species during the active field search (Annex 6). Of the total number of species recorded, 264 species belong to the taxa of non-passeriformes and 327 species belong to the order Passeriformes. The families with the highest number of species were Thamnophilidae (57 species), Tyrannidae (49 species), Thraupidae (45 species), Accipitridae (25 species), Psittacidae (24 species) (Figure 16).

Figure 84 - Representativeness of the most representative taxa and families recorded in the avifauna survey, Arara do Igarapé Humaitá Indigenous Land and surroundings, Acre, 2023.



Subtitles: 591 bird species, 264 non passerines, 327 passerines, 25 orders, 71 families, 25 accipitridae species, 24 psittacidae species, 57 thamnophilidae species, 49 tyrannidae species and 45 thraupidae species.

Source: Catraia Soluções ambientais, 2023.

In this survey, the List Frequency Index (LFI) was calculated, which discloses the relative abundance of each species as a function of the conspicuity coefficient, through the number of visual and/or auditory contact and the total number of samples. In this study we obtained 43 lists of Mackinnon created during the period of survey of the avifauna in the field. The values of List Frequency Index (Table 2) vary from 0.02 (1 contact) to 0.51 (7 contacts), with an average of 0.23, that is, approximately 2 contacts/species. What is observed is that 58% of the species are abundant in the area, that is, they are more generalist and have a greater number of registered individuals; on the other hand, the species with the lowest number of contacts (52%) are included in categories of discrete and/or inconspicuous and difficult audiovisual contact.

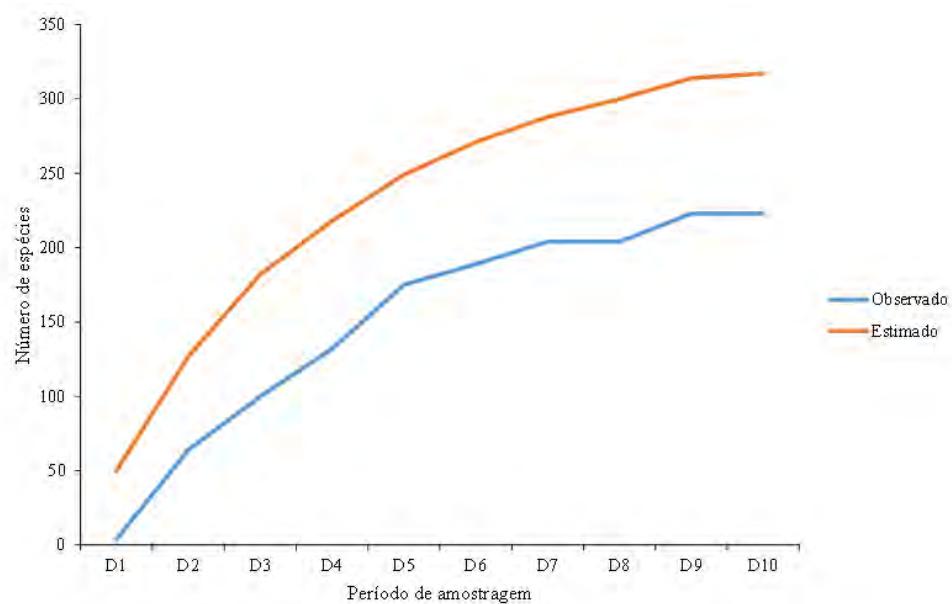
Table 59 - Frequency of contacts with avifauna species with the methodology of the list of Mackinnon, TI Arara do Igarapé Humaitá, Acre, 2023.

Contacts	Average	Number of species per contact
1	0,02	105
2 a 3	0,04-0,06	87
4 a 5	0,27-0,36	26
6 a 7	0,39-0,51	5

Source: Project Team Elaboration, 2023.

Regarding the sample sufficiency in the species accumulation curve in the Arara do Igarapé Humaitá Indigenous Land, the actual number of species observed was 223 species (Figure 17) and the non-parametric richness estimator presented a value higher than that observed in the field (Jack-knife 1 = 317 species; Figure 17). The actual richness observed did not reach levels of stability, mainly due to the number of days of sampling in the field and inclement weather. It is worth mentioning that in tropical regions it is not common to achieve stability in the cumulative curve of species (Santos, 2006), because the high value of species richness depends on greater sampling effort and, especially, more days of sampling in the field.

Figure 85 - Sample sufficiency observed (in the field) and estimated (Jack-knife parameter 1) in the survey of the avifauna, LI Arara do Igarapé Humaitá, Porto Walter, Acre, 2023.



Subtitles: species number x sampling period

Source: Catraia Soluções ambientais, 2023.

In the Shannon-Wiener diversity analysis (H'), the results showed that the area has high richness and uniformity of avifauna species (Table 3). These values of richness and abundance of birds in the Arara do Igarapé Humaitá Indigenous Land can be answered by the conservation of the native flora in the area and with a low rate of deforestation for the formation of swiddens and open areas destined for the formation of villages, since these actions are part of the traditional culture of the Shawādawa ethnic group.

For the maintenance of biodiversity and its ecological importance in the Arara do Igarapé Humaitá Indigenous Land, projects to encourage conservation in the region are necessary. It is worth mentioning some points of threat under the diversity of the avifauna: currently the region of the Juruá Valley has been suffering several actions and anthropic pressures of negative impact, such as the proposal to build a highway that connects Brazil (from Cruzeiro do Sul, Acre) to the neighboring country Peru (in the city of Pulcallpa, Ucayali department), and the construction of this highway will cause irreversible losses to the avifauna, because there are species of economic and environmental interest that need large areas of preserved forests to survive, such as the great raptors, especially the hawk (*Spizaetus ornatus*) and hawk (*Harpia harpyja*) recorded during the field study, in addition to being included in extinction categories – a theme discussed in a specific topic. In addition to illegal deforestation for the formation of open areas for pasture for cattle breeding and land invasion.

Table 60 - Diversity indices in the avifauna survey, IL Arara do Igarapé Humaitá, Acre, 2023.

Abundance	Wealth	Shannon-Wiener (H')	Equitability (E)	Dominance
				(K)
223	5,22	0,96	0,00	

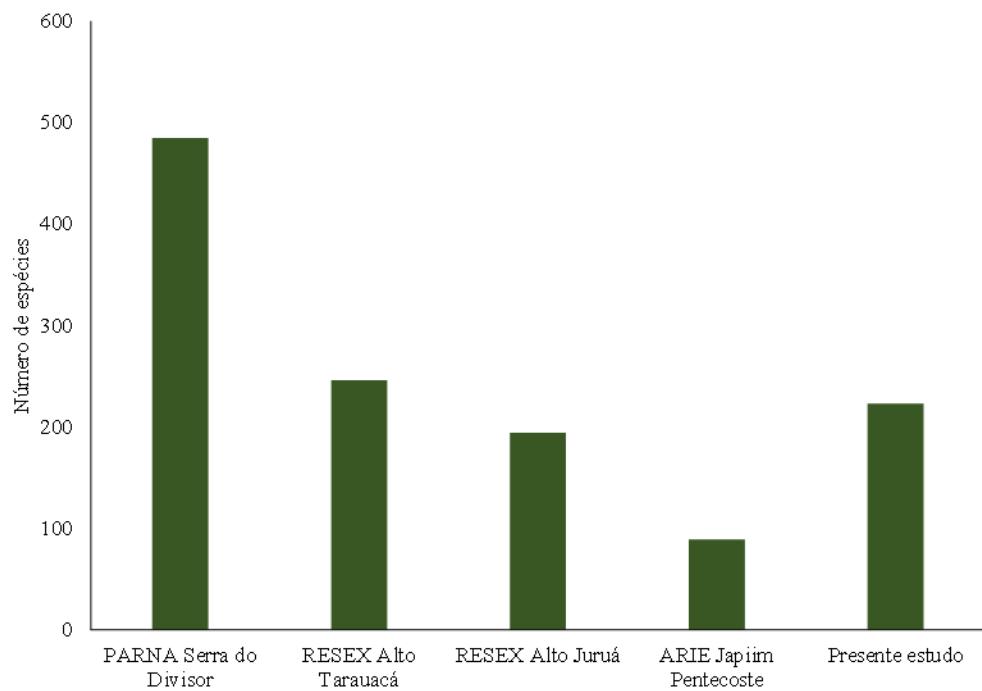
Source: Project Team Elaboration, 2023.

The survey of the avifauna in the surroundings and the field sampling in the Arara do Igarapé Humaitá Indigenous Land revealed that the region has 83.4% of the species recorded for the state of Acre. This richness of the bird group is high and covers practically all the species recorded throughout the territory of the state. Acre is inserted in the Center of Inhambari Endemism, and therefore, there are several species that occur strictly in the region. The Arara do Igarapé Humaitá Indigenous Land is located in the extreme western part of the state, known as the Juruá River basin region. The region has peculiar characteristics in relation to the climatic seasons, relief, and mainly, to the vegetation, in particular the vegetation under white sand (known as campinaranas) and the sub-montana vegetation found in the PARNAs Serra do Divisor. Through these regional characteristics, some species of birds recorded for Acre have a restricted and punctual geographical distribution in the Juruá River basin, as is the case of the choca-do-acre (*Thamnophilus divisorius*), the rabo-de-arame (*Pipra filicauda*), the capitão-de-coroa (*Capito aurovirens*), the coroa-de-fogo (*Heterocercus linteatus*), the cabeça-encarnada (*Ceratopipra rubrocapilla*) and the iratauá-pequeno (*Chrysomus icterocephalus*).

The secondary data acquired in the GBIF (Global Biodiversity Information Facility) platform presented the following partial information for the Conservation Units (CU) of the western region of the state (Figure 18):

485 bird species for the Serra do Divisor National Park; 246 species in the Alto Tarauacá Extractive Reserve; 194 species in the Alto Juruá Extractive Reserve; and 89 species in the ARIE Japiim-Pentecostes. These results are of citizen science origin, in which people who practice the observation of wild birds in the region make their records available on open access platforms. The western and far western region of the state of Acre is considered an Important Bird Area (IBA). An area is considered IBA because it has unique habitats worldwide for the conservation of bird populations (Life International, 2023). The IBAs are identified by national conservation organizations and thus designated, become concrete targets for nature conservation actions, and are also used to strengthen the networks of Protected Areas already existing.

Figure 86 - Representativeness of the richness of bird species in Conservation Units recorded in a survey of secondary data of the avifauna in the region and surroundings of the Arara do Igapé Humaitá Indigenous Land, Porto Walter, 2023.



Subtitle: Number of species x Conservation Units.

Source: Catraia Soluções ambientais, 2023.

The bird species recorded in this field survey and secondary data were classified into the following food guilds (Figure 19): insectivores ($n= 328$ species), omnivores ($n = 86$), frugivores ($n= 86$), carnivores ($n= 37$), nectarivores ($n= 21$), piscivores (14), granivores ($n= 14$) and dentritivores ($n= 4$) (Annex D).

Figure 87 - Food guilds of the species recorded in the survey of the avifauna in the surroundings and area of the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, 2023.



Subtitles: insectívoros 55,4%, frugívoros 14,5%, onívoros 14,5%, carnívoros 6,2%, nectarívoros 3,5%, granívoros 2,3%, piscívoros 2,3% and dentritívoros 0,6%.

Source: Catraia Soluções ambientais, 2023.

The food guilds of the birds recorded are of species typical of open environments, primary forest and forest edges and the feeding of the bird species is closely linked to the type of vegetation present in the habitat. The study area is mainly composed of primary vegetation composed of Open Ombrophilous Forest with palm trees bamboo and small open areas. The taminiophilids (cuttlefish and the like) were the species that most recorded the insectivorous food guild (9.6%). The birds of the family Thamnophilidae are generalists in habitats, but there are also some species that have a specific relationship with the vegetation composed of bamboo. The habitats dominated by bamboo of the genus Guadua have biotic and abiotic conditions favorable for the arrival and permanence of several species of insects that use the micro-habitat such as the culms and internodes for reproduction, therefore, creating conditions with greater availability of food resources, benefiting the species of birds that have intimate association with these habitats. Insectivorous species are specialists and abundant in forests, edges and open areas because they have an improved field of view, possessing efficiency to forage for insects and other invertebrates (Terraube et al., 2016). The species included in the frugivorous and omnivorous food guilds are more resilient to generalist habitats (Guilherme & Cintra, 2001; Henriques et al., 2008), and adapted to look for food available for a limited time, such as trees with fruits and seeds (Alencar & Guilherme, 2020).

In this survey, two databases were used to classify the conservation status of bird species: the Official List of Endangered Species of Brazil, of the Chico Mendes Institute for Biodiversity Conservation (ICMBio) and the Red List of Threatened Species, International Union for the Conservation of Nature (IUCN). Most of the species recorded have a conservation status of 'least concern' – 574 species (Appendix D); in relation to

the species that are in extinction categories (Table 4): 'near threatened' are the species *Morphnus guianensis* and *Harpia harpyja*; in the 'vulnerable category', the species *Tinamus tao* and *Chaetura pelagica*.

Table 61 - Avifauna species included in categories of endangered species recorded in the avifauna survey in the area and surroundings of the Arara do Igarapé Humaitá Indigenous Land, Acre, 2023.

Species	Popular Name	ICMBio	IUCN
<i>Tinamus tao</i>	azulona		VU
<i>Tinamus guttatus</i>	inhambu-galinha		NT
<i>Chen jubata</i>	pato-corredor		NT
<i>Macropygia xi tuberosa</i>	mutum-cavalo		NT
<i>Chaetura pelagica</i>	andorinhão-peregrino		VU
<i>Phainopepla leucogastra</i>	jacamim-de-costas-brancas		NT
<i>Calidris subruficollis</i>	maçarico-acanelado		NT
<i>Maria agami</i>	garça-da-mata		VU
<i>Morphnus guianensis</i>	uiraçu	VU	NT
<i>Harpia harpyja</i>	gavião-real	VU	NT
<i>Zaetus ornatus</i>	gavião-de-penacho		NT
<i>Piebus torquatus</i>	pica-pau-de-coleira		NT
<i>Pionites leucogaster</i>	mariquinha-de-cabeça-amarela		VU
<i>Molius couloni</i>	maracanã-de-cabeça-azul		VU
<i>Formicarius rufifrons</i>	pinto-do-mato-de-fronte-ruiva		NT
<i>Syndactyla ucayalae</i>	limpa-folha-de-bico-virado	VU	NT
<i>Topus cooperi</i>	piúí-boreal		NT

Subtitles: ICMBio = Chico Mendes Institute for Biodiversity Conservation; IUCN = International Union for Conservation of Nature; VU – vulnerable; NT – almost threatened.

Source: Catraia Soluções ambientais, 2023.

The rapinante uiraçu (*Morphnus guianensis*), according to the conservation status lists, it falls into two categories of extinction of concern. Due to its large size, it resembles the gavião-real (*H. harpyja* –an individual was spotted flying over the area of the Arara IL, personal communication Uéslei Marques). With the geographical distribution is similar to that of the gavião-real (northern Central America, southern Amazon basin and coastal forests of the Atlantic Forest), the uiraçu It occurs at very low densities and requires large areas of suitable habitat and, as a result, is observed at low frequency. Because it is categorized as 'near threatened' and due to its rarity, it is estimated that in Central America the population has declined by 50% or more due to habitat loss due to deforestation, and the trend is that this decrease is happening along its geographical distribution.

As this species lives in rainforest that is in rapid decline, the main threats under the uiraçu are the deforestation of primary forests for conversion of pastures and agricultural areas (Smith, 2020) and fragmentation. As previously mentioned, the species has large body size, and makes it vulnerable to poaching, especially due to the perceived threats to livestock. The uiraçu (*M. guianensis*) may be more tolerant of climate change (different from the gavião-real), however, they are still sensitive to all environmental changes except minimal levels of disturbance. Due to its rarity and requirement for conserved habitats, it is estimated that an individual of *M. guianensis* has a life span of between 11 years (in captivity) to 18 years (in the wild), and has a low reproduction rate, and therefore there is no accurate information about the population size of the species in the world. Through this information, it is necessary conservation programs and research on reproduction, population and environmental education in the area where the species is registered, as it will be a key factor in planning the future of the *Morphnus guianensis*.

The Amazon is one of the biomes that hosts one of the highest levels of endemism and the largest numbers of bird species in the country (Sick, 1997; Marini & Garcia, 2005) and the geographical distribution of birds recorded in Brazil is irregular, with some species classified as rare, unusual or punctually distributed (Stotz et al., 1996). Regarding the rare species (**Annex D**), during the survey of secondary information, 17 species considered rare or punctually distributed were recorded, such as the jacu-estalo-do-bico-vermelho (*Neomorphus pucheranii*), the topázio-de-fogo (*Topaza pyra*), o socoí-zigue-zague (*Zebrilus undulatus*), the pinto-do-mato-de-fronte-ruiva (*Formicarius rufifrons*) and the capitão-de-colar-amarelo (*Eubucco tucinkae*).

Research over the past five decades in the forests of the southwestern Amazon shows that the region is home to incredible wealth (Kratter, 2020). The species pinto-do-mato-de-fronte-ruiva (*Formicarius rufifrons*) it is a rare and little-known species, recorded only in the southeastern region of Peru (Schulenberg et al., 2010) and in Brazil, it was recorded in the upper Juruá region (Whittaker & Oren, 1999). Another important record is the topázio-de-fogo (*Topaza pyra*). This species seems to be largely restricted to primary terra firme and campinaranas forests (del Hoyo et al., 2020) and in the state of Acre it is associated in whitewater environments, such as the Moa River, Parnaíba Serra do Divisor, Mâncio Lima, Acre.

In the region of the Arara do Igarapé Humaitá Indigenous Land, 24 species of birds were recorded, which are restricted to the Inambari endemism center, to the southwest of the Amazon and to the extreme west of the state (Annex D), highlighted: the tucaninho-de-nariz-amarelo (*Aulacorhynchus atrogularis*); the tiriba-rupestre (*Pyrrhura rupicola*); the choca-do-acre (*Thamnophilus divisorius*); the anambé-da-cara-preta (*Conioptilon mcilhennyi*), the barranqueiro-ferrugem-do-acre (*Clibanornis watkinsorum*) and the mãe-de-taoca-de-cauda-barrada (*Oneillornis salvini*; This number of endemic species from the region of the Arara Indigenous Land area and its surroundings covers the total value of endemism in the southwest of the Amazon (Guilherme, 2016), disclosing the high value of positive impact that the Juruá region has in relation to the diversity of birds and the conservation of fauna in general.

Figure 88 - Species restricted to the Inambari Endemism Center recorded during the survey of the avifauna in the field, TI Arara do Igarapé Humaitá, Porto Walter, 2023.



A - tucaninho-de-nariz-amarelo (*Aulacorhynchus atrogularis*); B - mae-de-taoca-de-cauda-barrada (*Oneillornis salvini*).

Source: Catraia Soluções ambientais, 2023.

The Juruá region is known for the great biodiversity that is linked to the peculiar characteristics of the region. In the years 1996-1997 expeditions were carried out to survey the avifauna for the construction of the Management Plan of the Serra do Divisor National Park Conservation Unit (PNSD), created in 1989. In view of all the records of the avifauna made in the PNSD, a new species was registered for Science in the Jaquirana mountain range, and named as *Thamnophilus divisorius* (Whitney et al., 2004), in honor of the place of registration, being, the popular name baptized as 'choca-do-acre'. This species has a distribution restricted to the Brazilian territory, being found only in the extreme west of Acre (Figure 21). There is little information on the reproductive biology and ecology of the acre cuttlefish (*T. divisorius*), however, the habitat is well characterized: sites with sandy soils, with low species richness of the flora, trees with short stature and with the presence of terrestrial bromeliads (Schulenberg & Kirwan, 2020), therefore, characteristic habitat of mountain tops.

Figure 89 - Geographical distribution of the Acrean cuttlefish (*Thamnophilus divisorius*) in Brazilian territory. Species recorded in the survey of secondary data of the avifauna of the surroundings of the Arara do Igarapé Humaitá Indigenous Land, Porto Walter.



Source: Schulenberg & Kirwan, 2020

Regarding the birds associated and/or specialists with the bamboo-dominated habitats of the genus *Guadua* in southwestern Amazonia (Annex D), 16 species were recorded. These species are associated with the bamboo-dominated habitats of the genus *Guadua* (Guilherme, 2016), regionally known as the ‘tabocais’, as for the maria-topetuda (*Lophotriccus euphantes*), the barranqueiro-de-topete (*Anabazenops dorsalis*), the pica-pau-lindo (*Celeus spectabilis*), the choquinha-ornada (*Epinecrophylla ornata*) and the barranqueiro-ferrugem-do-acre (*Clibanornis watkinsorum*).

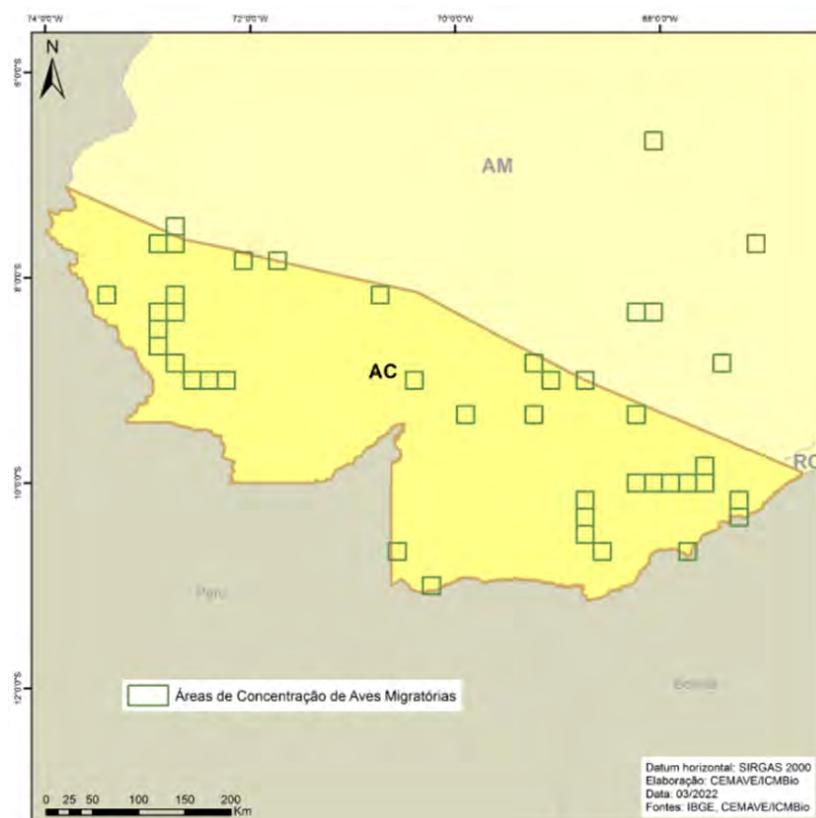
An important record in this survey of the avifauna was the barranqueiro-ferrugem-do-acre (*C. watkinsorum*), restricted bird of the Inambari endemism center and associated with bamboo-dominated habitats of the genus *Guadua*. In the scientific literature only one communication note is available, in which it is the correction of the scientific nomenclature (Costa, 2017), and there are no other publications that deal with the biological, reproductive, or ecological descriptions of the species.

Because it is a species with a restricted, rare and inconspicuous distribution, so far, there are only five photographic records for Brazil, all of which are in the state of Acre (Wikiaves, 2023) and auditory records. Given this fact, to conserve habitats is to ensure the maintenance and survival of species that have a close association with these bamboo forests, where in most cases, the global distribution of these species overlaps with the region of habitats with *Guadua* domain.

The state of Acre is one of the important migration routes (Figure 22) of birds in the Brazilian territory. A total of 31 migratory species were recorded (Annex D), that is, 40% of the total migratory species that use

the territory of the state as the main route. Among the migratory bird species, 13 are Nearctic migrants (MN), which move from the Northern Hemisphere to the Neotropical region, such as the sabiazinho-de-óculos (*Catharus swainsoni*) and the sanhaço-escarlate (*Piranga olivacea*); 13 species are austral migrants (MA), originating in the south of the South American continent: the enferrujado (*Lathrotriccus euleri*) and the príncipe (*Pyrocephalus rubinus*); and five species are intratropical migrants (IM) who perform regional migration, that is, in the interior of the American continent, especially the cabeça-seca (*Mycteria americana*) and the baiano (*Sporophila nigricollis*). It is worth mentioning other important species that use the territory of the state in their migration route: the tuiuiú (*Jabiru mycteria*), the águia-pescadora (*Pandion haliaetus*), the falcão-peregrino (*Falco peregrinus*) and the bacurau-chintá (*Hydropsalis parvula*).

Figure 90 - Concentration of migratory birds in the state of Acre, in particular, the region of the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, Acre.



Source: Report of Areas of Concentration of Migratory Birds in Brazil, National Center for Research and Conservation of Wild Birds (CEMAVE/ICMBio), 2022.

These species migrate from the region of origin to the Amazon due to changes in the climatic season, and the territory of Acre is an important route for their wintering season, as these birds use forest areas as a

place of refuge, search for food resources, rest, nesting and, consequently, permanence of small populations in the region. As is the case of the bacurau-chintã (*Hydropsalis parvula*). This species is considered as a southern migrant in Acre, however, there are records of nesting and nestlings (young), confirming the permanence of populations of *H. parvula* non-state (Almeida et al., 2022). It is worth mentioning an important record observed during the survey of secondary data for this report: in 2019 a new record for the Acre region and Juruá basin, the Nearctic migratory falcão-peregrino (*Falco peregrinus*). This species is native to North America and can be found all over the planet except Antarctica. However, it does not nest in South America. It is considered the fastest bird of prey in the world and one of the best studied species. The species is categorized as 'least concern' on the IUCN Red List of Conservation Status, however, because it is a raptor and carnivore, in the recent past, the species was the target of predatory hunting (of eggs, nests and adult individuals) and anthropogenic actions (such as the use of toxic products in pastures), thereby causing the population to decline. Due to the problem of the species, there have been conservation actions towards the population of *Falco peregrinus*, and currently, the population has managed to establish itself all over the world.

During field sampling, four new species were recorded for the region: the azulona (*Tinamus tao*), the joão-folheiro (*Metopothrix aurantiaca*), the abre-asa-do-acre (*Mionectes amazonum*) and the balança-rabo-do-acre (*Polioptila parvirostris*). The species abre-asa-do-acre (*M. amazonum*) it is a rare species, unusual and has restricted distribution center of endemism Inhambari and the state of Acre. Its first record was in the PN Serra do Divisor (Whitney et al., 1997), where, until then, it was considered a sub-species of *Mionectes macconnelli amazonum* and after comparison studies between the collected specimens, it became a monotypic species, that is, it is not recognized sub-species (Hoyo et al., 2004). The species is not categorized as endangered. It is found in habitats near water streams in conserved forests. Recent research has revealed that the abre-asa-do-acre It is highly sensitive to disturbances in its habitat. In areas that have suffered disturbances caused by fires, making the site an open area, the number of individuals in the populations has decreased dramatically and/or have been extinguished locally. In our field survey, an individual of *Mionectes amazonum* (Figure 23) was observed next to a mixed flock in the treetops, demonstrating that the area presents good environmental conditions in the maintenance and survival of rare and inconspicuous species.

Figure 91 - New record for the region recorded in the avifauna survey, TI Arara do Igapé Humaitá, Porto Walter, Acre, 2023. In the photo, the specimen of the Acre-winged opener (*Mionectes amazonum*).



Source: Catraia Soluções ambientais, 2023.

Hunting animals are those species that are usually hunted by riverine communities and/or isolated from the Amazon for the consumption of animal protein. A total of 39 species considered hunting were recorded (Appendix D), with emphasis on the taxonomic family Tinamidae (n = 11 species), with emphasis on azulona (*Tinamus tao*) and the inhambu-de-coroa-preta (*Crypturellus atrocapillus*). The other species considered hunting were the jacutinga-de-garganta-azul (*Aburria cumanensis*), the pato-do-mato (*Cairina moschata*), and the jacamim-de-costas-brancas (*Psophia leucoptera*), the arara-vermelha (*Ara chloropterus*) and the tucano-de-papo-branco (*Ramphastos tucanus*).

During the field survey of the avifauna, several individuals of azulona (*Tinamus tao*) were recorded by auditory means. The recording of the vocalization and/or photograph of the species (eggs or specimen) is of interest to Science, where information on the biology and ecology of the species is scarce (Brennan, 2004). In the red book of the Brazilian fauna threatened with extinction, *T. tao* appears in the category vulnerable to extinction (VU), directly affecting the reproduction and maintenance of the population of this species in floodplain forests and terra firme in the Amazon.

The record of inconspicuous birds, such as the azulona (*T. tao*), and other important game species such as the inhambu-de-coroa-preta (*Crypturellus atrocapillus*), species restricted to the southwestern Amazon, with few records in Brazil, cracidae such as the jacutinga-de-garganta-azul (*Aburria cumanensis*) and jacamins, as the jacamim-de-costas-brancas (*Psophia leucoptera*), endemic to the Inambari endemism center, indicates that the area of the Arara do Igarapé Humaitá Indigenous Land has minimal anthropogenic changes and suffers little or no intense action to hunt for subsistence, therefore, the area has favorable conditions for maintenance, shelter and other resources necessary for the permanence of species inserted in the hunting category, some strongly threatened with extinction.

The area has several species of birds that are considered as bioindicators of environmental quality, that is, areas considered conserved and that have minimally favorable ecological conditions for survival and maintenance of bird species. Firstly, some species recorded in the secondary data survey, such as the uru-de-topete (*Odontophorus stellatus*), the topázio-de-fogo (*Topaza pyra*), the anambé-una (*Querula purpurata*), the topetinho-ruivo (*Lophornis cf. delattrei*), the taperuçu-de-coleira-branca (*Streptoprocne zonaris*), the quetzal-pavão (*Pharomachrus pavoninus*), and among other species that need preserved habitats and are sensitive to intense environmental changes.

During the field survey, the following species of bioindicator birds were recorded: the mariinha-de-cabeça-amarela (*Pionites leucogaster*), the flautim-pardo (*Cnipodectes subbrunneus*) the papa-formiga-barrado (*Cymbilaimus lineatus*; Figura 25C), the formigueiro-de-taoca (*Hafferia fortis*), the uirapuru-veado (*Microcerculus marginatus*) and the cabeça-branca (*Pseudopipra pipra*).

Wild birds have rapid responses to habitat changes at various scales (Sick, 1997). Some bird species are considered more sensitive than other species (Stotz et al., 1996), and those with high sensitivity are considered and recommended as good indicators of environmental quality (Gardner et al., 2008), therefore, what has been observed in this survey shows that there are several species of specialist and/or restricted birds with high sensitivity to environmental changes. The records of these species sensitive to environmental changes in the surroundings of the project area is an important sign that the region has good ecological balance conditions for the maintenance of the local avifauna, without great pressure and threat to the continuous conservation of these species.

Figure 92 - Bird species considered bioindicators of environmental quality recorded in the avifauna survey, TI Arara do Igarapé Humaitá, Porto Walter, Acre, 2023.



A - marianinha-de-cabeça-amarela (*Pionites leucogaster*); B - flautim-pardo (*Cnipodectes subbrunneus*); C - papa-formiga-barrado (*Cymbilaimus lineatus*); D - formigueiro-de-taoca (*Hafferia fortis*); E - uirapuru-veado (*Microcerculus marginatus*); F - cabeça-branca (*Pseudopipra pipra*).

Source: Catraia Soluções ambientais, 2023.

5.1.1.3.5 Mastofauna

The global environmental crisis is driving a myriad of species to the brink of extinction (Cardillo et al., 2004; Román-palacios & Wiens, 2020). Among the most vulnerable species are large land mammals (Ceballos & Ehrlich, 2002) particularly herbivores (Atwood et al., 2020), which have suffered steep population declines due to the ongoing massive anthropogenic pressure on terrestrial ecosystems. Over the next 50 years, the global human population is expected to exceed 10 billion (Lutz et al., 1997; Lutz et al., 2001), putting increasing pressure on ecosystems.

Natural Protected Areas (NPAs) play a vital role in biodiversity conservation (Wittmyer et al., 2008). These spaces are fundamental as a conservation strategy to safeguard the remaining habitats and species. ANPs, which include Conservation Units (CUs), Indigenous Lands (ILs) and military areas, are home to 54% of the remaining forests of the Brazilian Amazon and contain 56% of their forest carbon (Soares-filho et al., 2010).

The ILs as well as other types of Protected Areas, in addition to playing a fundamental role in the conservation of biodiversity, also act as barriers to the advance of deforestation (Nepstad et al., 2006; Soares-son et al., 2010; Ricketts et al., 2010). Forest loss within the ILs was less than 2% in the period 2000-2014, while the average area deforested in the Amazon in the same period was 19% (Crisostomo et al., 2015). This low rate is related to the traditional modes of territorial occupation of indigenous peoples, their way of using natural resources, customs and traditions that, in most cases, result in the preservation of forests and the biodiversity contained in them (Balée, 2006).

Medium and large mammals continuously have severe impacts on their communities (Benítez-López et al., 2017), due to several factors, the main ones being of anthropic origin, such as agriculture, livestock and hunting (Wearn et al., 2012). Studies that evaluate parameters of terrestrial fauna communities are considered essential for assessing ecosystem health, especially in regions inserted in the context of high biological diversity such as Acre. Based on previous monitoring studies in REDD+ areas, Botelho et al. (2018) cite that the state of Acre is considered extremely important for the conservation of mammals, as 86% of its area is occupied by forests (INPE, 2020), counting mainly that 46% of the state's territory is protected by Natural Protected Areas. This reinforces the need for survey and monitoring studies of mammals. This report aims to survey the fauna of medium and large mammals of the Arara Indigenous territory of the Igarapé Humaitá and its surroundings, elaborating a list of the species that occur in this region of the State of Acre.

The Mastofauna survey was carried out during 10 consecutive days of field data sampling. For the registration of mammals in the IL Arara property, different methods commonly used for mammal sampling were used, such as census in transects, use of camera traps, counting of traces and traces (feces, excavations, hairs, bones, etc.). (Peres & Cunha, 2011).

For the sampling of diurnal and arboreal mammals, an observer was carried out by an active search census at the sampling sites (Figure 25). The active search was carried out by traversing the pre-existing trails, and in these same transects, there was the installation of camera traps. During this activity, the active search for direct and indirect records (traces such as fecal material, tracks, burrows, scratches and among others) were recorded for the listing of mammal species. The trails were covered at an average speed of 1.25 km/h, in the day (on average 5:30 a.m. to 10:30 a.m.) and at night (6:00 p.m. to 9:00 p.m.), totaling eight hours/day (Figure 25). From this method, a total sampling effort of seven days was employed.

The species were identified following the taxonomic nomenclature proposed by (Abreu et al., 2022). To obtain a measure of the abundance of the species, the Relative Abundance Index (RAI) was used as a

measure of the abundance of the species in each area, since the RAI has a strong relationship with the actual abundance of the species.

Figure 93 - Specialist biologist during the active daytime search in the survey of Mastofauna, IL Arara do Igarapé Humaitá, Porto Walter, Acre, 2023.



Source: Catraia Environmental Solutions Collection, 2023.

Based on the evaluation of the local vegetation and logistical feasibility, in order to sample an area that allows obtaining data regarding the community of medium and large mammals, two traps were installed, sampling stations composed of a trap BUSHNELL TROPHY CAM HD, often used for mammal sampling (Tobler et al., 2008), installed in a tree approximately 40 cm from the ground. The traps were configured to operate 24 hours a day, with an interval of 30 seconds between photos/videos. Baits were not used in the sampling stations in order to avoid possible biases for some species.

Mammal sightings conducted outside of the designated times and locations of the active search methodology are considered occasional records. These records were used to assist in the elaboration of the species list, but were not considered in the analyses of standardized data, since they were obtained outside the standard methodology (Peres & Cunha, 2011). During the active search, mammal specimens

were recorded both by direct observation (visualization) and by indirect evidence, such as fecal material, tracks, burrows, scratches, among others. This information was annotated to compose the list of mammal species.

The species were identified based on Emmons and Feer (1996), Eisenberg and Redford (1999) and Reis et al. (2006), the traces of the species were identified through field guides (Becker and Dalponte, 1991), the taxonomy of the species follows that proposed by Abreu et al. (2022), the conservation status of the species was classified according to the categories used by the International Union for Conservation of Nature (IUCN) and the Red Book of Brazilian Fauna Threatened with Extinction (ICMBio, 2022). The list of species was generated from the information collected through the sampling methods, and the absolute richness and abundance indices were generated from the field records, not considering the occasional records.

After searches in the open access platforms of scientific journals, and database on Biodiversity, GBIF and iNaturalist were obtained 185 records of mammals, being registered 63 species, belonging to nine orders and 25 families. The most representative orders in terms of species richness were Primates (S=19) and Rodentia (S=13) (Annex E), this pattern of predominance of primates and rodents is documented and is reflected in other regions of the southwestern Amazon (Calouro, 1999; Borges et. al., 2015).

During the 10 days of the field data collection, 22 species of small, medium and large mammals belonging to 17 Families and 7 Orders were recorded (Annex E). In the study area it was common to find traces of mammals, such as: tracks, burrows, feces, among others (Figure 26).

This number is significant if we consider the days of sampling and limited by inclement weather and logistics of access to the property. The most representative orders in relation to richness (S) considering records were Primates (S=7) and Rodentia (S=7). The species most frequently sighted in abundance (N) during the study were *Saguinus weddelli* (N=40). It is a small primate that lives in a forest edge area and is associated with other primates forming a mixed flock, that is, it is not so judicious in terms of habitat, it is a species with a large distribution (Peres, 1997).

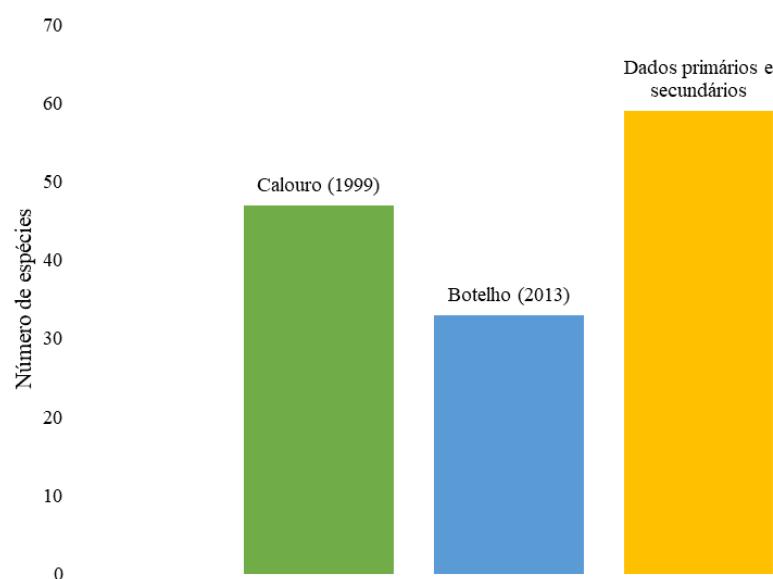
Figure 94 - Traces of mammal species in the area of the Arara Indigenous Land, Porto Walter, 2023. From left to right: A – Deer tracks (*Mazama americana*); B – Feces from porco-do-mato (*Pecari tajacu*).



Source: Catraia Environmental Solutions Collection, 2023.

When compared with conservation units that are in the surroundings of the landscape where the Arara IL property is inserted, it is observed that the richness of species recorded in only 10 field days is relevant. When compared with literature data, the richness of mammal species estimated for the region of the Arara Indigenous Land exceeds the richness of areas already studied. The Serra do Divisor National Park (PARNA Serra do Divisor), A protected area, for example, has a list of 47 mammal species (Calouro, 1999). In another area protected by law in the Alto Tarauacá RESEX (Alto Tarauacá Extractive Reserve), it presented 33 species (Botelho, 2013).

Figure 95 - Comparative graph of the list of mammal species recorded through secondary data and other areas already sampled in the surroundings of the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, 2023.



Subtitles: Species number x species recorded by each author.

Source: Calouro (1999) and Botelho (2013).

Also based on the secondary data obtained from platforms on global biodiversity (GBIF and Specieslink), it can be observed that the IL Arara Property presents a relevant richness of mammal species, compared with bibliography data from two Conservation Units, the Serra do Divisor National Park and the Alto Tarauacá Resex.

Part of the Arara Indigenous Land directly affects the area of the former Forest Reserve of the Territory of Acre, created by Decree No. 8,843 of July 26, 1911 (Brasil, 1911). The Arara do Igarapé Humaitá Indigenous Land has also been included in a continuous "mosaic" of 23 existing federal lands in the Upper Juruá, which composes a wide region of environmental relevance for indigenous and regional populations, with great national and international interest. Among the lands belonging to the federal government, existing in the upper Juruá, are a National Park, three Extractive Reserves and 19 Indigenous Lands. The environmental importance of this "mosaic" of lands is enormous due to the rich biodiversity found in the forest, for example, in the region of Alto Juruá, Souza (2009) conducted a survey of amphibian species in

the Serra do Divisor (Extractive Reserve of the Alto Juruá and in the Serra do Divisor National Park), registering 126 species, being the largest variety ever found in the same locality of the planet.

To evaluate the structure of the mammal community in a property, we used indices related to species richness and dominance, based on data collected during field sampling. The results showed a high richness and abundance of species recorded in the study area, considering the sampling effort (as shown in Table 5), indicating a diverse and balanced community. In addition, the lack of a dominant species was reflected by the evenness index, which was also high. Therefore, it can be concluded that the mammal community of the IL Arara property is structured and complete, with high diversity and balance between species.

Table 62 - Diversity indices in the avifauna survey, IL Arara do Igarapé Humaitá, Acre, 2023.

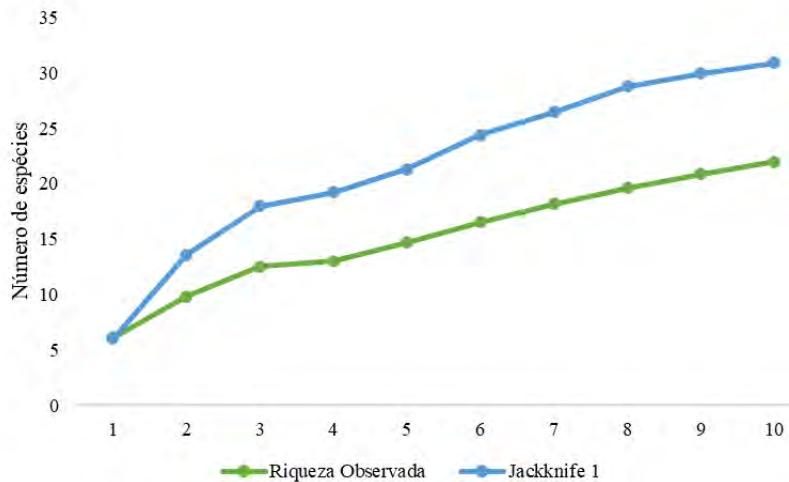
Diversity index	Data in the field
Wealth (S)	22
Individuals (N)	157
Dominance (D)	0.1205
Shannon Diversity (H')	2.484
Equitability J (E)	0.8035

Source: Project Team Elaboration, 2023.

According to MacArthur & MacArthur (1961) the hypothesis around the influence of habitat complexity on diversity, considers that the composition of animal species and their abundances depend on components of vegetation structure, because heterogeneity increases the availability of niches and species diversity.

When the Jackknife 1 richness estimator was used, we observed that, with a greater use of effort in the field, the estimated richness is 31 mammal species in the IL Arara Property (Figure 28). The curve of species records did not show a tendency to reach asymptote, that is, it did not reach stability, which means that with greater sampling effort more species will be recorded.

Figure 96 - Sample sufficiency observed (in the field) and estimated (Jack-knife parameter 1) in the survey of the mastofauna, IL Arara do Igarapé Humaitá, Porto Walter, Acre, 2023.



Subtitles: Species number x Jack-knife parameter 1 and Sample sufficiency observed.

Source: Catraia Soluções ambientais, 2023.

The main threats are habitat loss and fragmentation as a result of agricultural activities (Michalski & Peres, 2005). Habitat fragmentation, coupled with hunting pressure, has become a major challenge for the conservation of the forest environment, depending on the species' ability to adapt to altered environments (Buchmann et al., 2013).

In Brazil, the onças-pintadas (*Panthera onca*) they currently occur in five of the six major biomes, and their populations are subject to different threats regionally, making them more vulnerable in some areas than in others (Sollmann et al., 2008; Nijhawan, 2012). The species is 'Critically Endangered' in the Atlantic Forest due to a drastic population reduction in the last three decades (Beisiegel et al., 2012), as this biome is severely threatened by habitat loss and fragmentation (Tabarelli et al., 2005). In contrast, the Amazon and the Pantanal, given their extent, habitat suitability and comparatively lower levels of fragmentation, are considered the two main strongholds of the onça-pintada, both nationally and globally, although their status is 'Vulnerable' in both biomes (Cavalcanti et al., 2012; de Oliveira et al., 2012).

Table 63 - Mastofauna species included in endangered categories recorded in the avifauna survey in the area and surroundings of the Arara do Igarapé Humaitá Indigenous Land, Acre, 2023.

Order	Scientific name	IUCN
Pilosa	<i>Myrmecophaga tridactyla</i>	VU
Cingulata	<i>Priodontes maximus</i>	VU
Primates	<i>Callimico goeldii</i>	-
Primates	<i>Ateles chamek</i>	EN
Carnivorous	<i>Atelocynus microtis</i>	NT
Carnivorous	<i>Speothos venaticus</i>	NT
Carnivorous	<i>Leopardus wiedii</i>	NT
Carnivorous	<i>Leopardus pardalis</i>	-
Carnivorous	<i>Puma yagouaroundi</i>	-
Carnivorous	<i>Panthera onca</i>	NT
Carnivorous	<i>Lontra longicaudis</i>	-
Perissodactyla	<i>Tapirus terrestris</i>	VU
Artiodactyla	<i>Tayassu pecari</i>	NT
Rodentia	<i>Dinomys branickii</i>	NT

Subtitles: IUCN = International Union for Conservation of Nature; VU – vulnerable; NT – near threatened; EN – In danger.

Source: Project Team Elaboration

¹ Near threatened (NT): The species is included in this category when, assessed by the classification criteria, it is close to being classified or is likely to be included in one of the threat categories ('Critically Endangered', 'Endangered' or 'Vulnerable') in the near future.

² Vulnerable or Vulnerable (VU): A species is Vulnerable when the best available evidence indicates that it faces an elevated risk of extinction in the wild in the very near future, unless the circumstances that threaten its survival and reproduction improve.

It is estimated that only 55% of the remaining natural areas are adequate to sustain the populations of onças-pintadas (Ferraz et al., 2011). The main immediate causes of this decline were habitat loss, commercial hunting, retaliatory hunting, and the depletion of prey populations (Paula et al., 2011). As the onças-pintadas (*Panthera onca*) and the onças-pardas (*Puma concolor*) are large and ecologically sensitive predators with extensive area requirements, it is unlikely that UCs will be sufficient to conserve viable populations of these felids in the long term unless they can move and survive outside the boundaries of UCs (Soulé & Noss 1998; Hoogesteijn et al., 2002).

The gatiara (*Bassaricyon alleni*) is a species of carnivore that occurs in the west of the Amazon, related to the most productive areas of this biome, where almost nothing is known about its natural history and was practically unknown in Brazilian territory (Sampaio et al., 2010; Almeida et al., 2022). The greatest threats to the conservation of this species are related to habitat loss. This threat may be more present precisely in the areas to the east of its "new" geographical distribution (wood-purus interfluvium), where the forest cover may soon be drastically reduced, influenced by the reconstruction of the BR-319 (Manaus-Porto Velho) and the construction of two hydroelectric dams (Jirau and Santo Antônio) on the Madeira River (Porto Velho - RO).

The macaco-barrigudo (*Lagothrix cana*) has several characteristics in common with species of the genus *Ateles*: it has a basically frugivorous diet, being an important disperser of large seeds; has a low reproductive rate; prefers tall, dense primary forests and is very sensitive to hunting pressure (Peres, 1994; Reis et al., 2011; Nunes & Orsini, 2016). Because it is an important species for seed dispersal and predation, the macaco-barrigudo plays a crucial role in the maintenance of forests.

The tatu-canastra (*Priodontes maximus*) is currently classified as "vulnerable" on the IUCN (International Union for Conservation of Nature) Red List of Threatened Species, meaning the species faces a high risk of extinction in its natural habitat. The main threats to the survival of the tatu-canastra are indiscriminate hunting, habitat loss due to agricultural expansion and road construction, as well as roadkills (Desbiez et al., 2019).

The macaco Parauacu (*Pithecia spp.*), or "macaco voador", A medium-sized South American primate, it got its nickname because of its ability to traverse the treetops calmly. These rainforest dwellers use their sharp teeth to open hard seeds and spread them as they circulate through the treetops, which makes them an important part of the ecosystem (Marsh, 2014) (Figure 29).

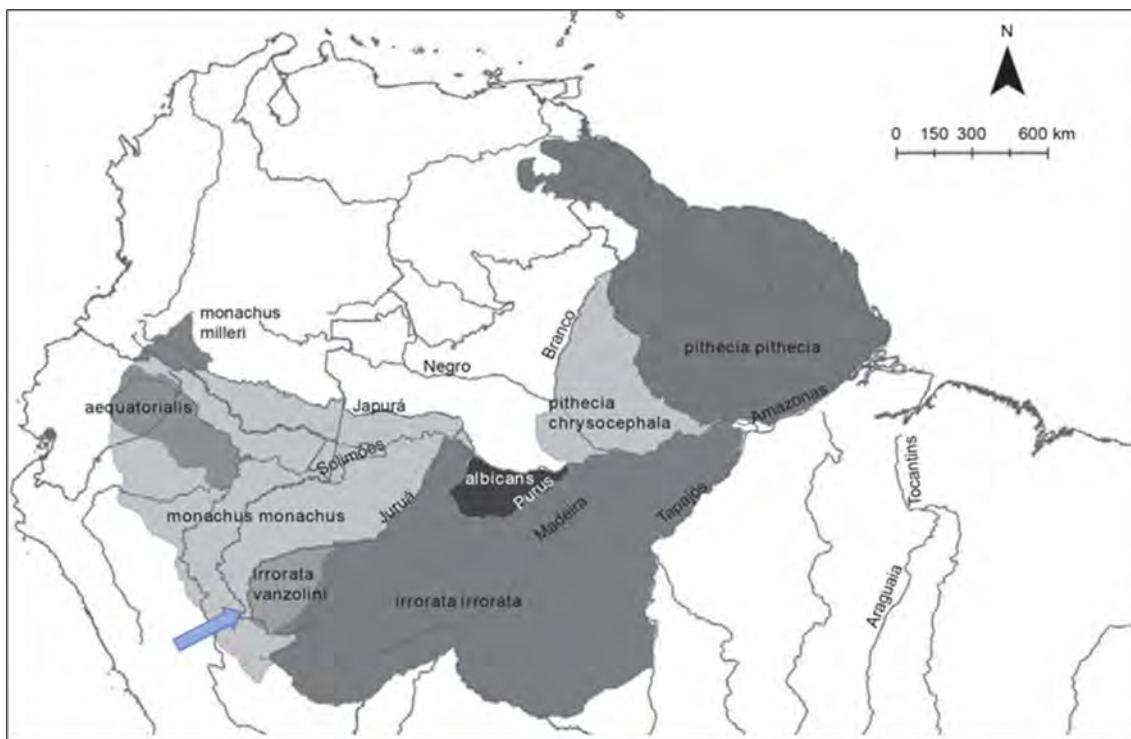
Figure 97 - Parauacu de Vanzolini (*Pithecia vanzolinii*) recorded in the Arara do Igarapé Humaitá Indigenous Land, Porto Walter Acre, 2023.



Source: Catraia Soluções ambientais, 2023.

After 67 years, Nunes & Serrano-Villavicencio (2017) reported the rediscovery of a primate named parauacu de "Vanzolini" (*Pithecia vanzolinii*) in the upper Juruá River basin, more specifically in the Riozinho Liberdade Extractive Reserve (Acre). The animal was known only through the skins in museums, and the formal description of the species was made in 1987 by Philip Hershkovitz, who has never seen a living specimen. The distribution of this animal passes through some regions of Brazil where data collection is scarce, resulting in large information gaps (Figure 30). The sighting of the parauacu de "Vanzolini", It was only the fifth known record of the species. Unfortunately, there is very little knowledge available about the biology of this animal, being classified as "insufficient data" by the IUCN.

Figure 98 - Restricted distribution of the parauacu de 'Vanzolini' (Pithecia Vanzolini).



Map source: De Sousa & Silva Júnior et al. (2013).

In the 1980s, documentation of the depletion of the local population of vertebrate species and consequent trophic cascades (Dirzo & Miranda, 1991) led to concern that structurally intact tropical forests would lose ecological function due to defaunation caused by hunting (the "empty forest hypothesis" [Redford, 1992]).

Hunting is a practice that has been strongly associated with declining populations of several animal species. Unfortunately, the search for bushmeat has led to the illegal and unsustainable hunting of many species, including the Queixada (*Tayassu pecari*), which is one of the most targeted. This species is highly vulnerable to hunting, which puts its long-term survival at risk (Gomes, 2017). In addition to the Queixada, another frequently hunted species is the cateto (*Dicotyles tajacu*). However, studies show that the cateto It is able to adapt to environmental changes, managing to inhabit regions with low hunting pressure. This ability to adapt can help ensure the survival of the species in areas where hunting is controlled and limited. However, this activity may pose a threat to the maintenance of the *T. pecari* and the *D. tajacu* in fragmented landscapes with high hunting pressure (Gomes, 2017).

Hunters' preference focuses on larger mammals, such as the ungulates (tapirs, deer) and large rodents (pacas, agoutis), due to the cost-benefit ratio that maximizes meat production with less effort and the palatability of these species (Alves & van Vliet, 2018; Ramos et al., 2020; Oliveira et al., 2022).

The macaco-preto (*Ateles chamek*) it is an important seed dispersing species, which can cause changes in the structure of plant and vertebrate communities (Peres & Palacios 2007). There are records of strong hunting impact in the Amazon on large primates, mostly frugivores (Peres & Dolman, 2000). For example, a rubber tapper placement can slaughter more than 21 monkeys a day, according to hunting records about

macacos-barrigudos (*Lagothrix lagotricha*), macacos-aranha (*Ateles chamek*) and guaribas (*Alouatta* sp.) (Peres 1991).

The tapir (*Tapirus terrestris*) it is considered the most sensitive species to hunting pressure among neotropical ungulates (Bodmer et al., 1988), despite being an efficient seed disperser, it is among the most hunted species. Anthropogenic factors such as subsistence, commercial and sport hunting have been reducing the biomass of these animals, which in addition to changes in the regeneration patterns and diversity of some plant species, puts their populations at risk of extinction (Tobler et al., 2008).

Hunting most dramatically affects large vertebrates – those over 5kg – which comprise the largest component (65-78%) of animal biomass in unhunted sites (Peres, 2000). Large frugivorous apes are often abundant and highly visible in unhunted locations. Given their large body mass and gregarious social structure, great apes are valuable prey species for human hunters, providing easy detection and a great reward for meat. Hunters' preference can vary based on several of these factors, as well as cultural taboos (da Silva et al., 2005). Given this size selectivity, large vertebrates can be drastically reduced at hunting sites, while smaller non-target species escape hunting pressure (Peres & Dolman, 2000).

Given the mandate in most Amazonian countries to co-manage resources in multi-use protected areas and indigenous lands (Ruiz-Pérez et al., 2005), the recognized need to ensure the role of wild meat for the food security of poor and isolated human populations in the tropics (Nasi et al., 2011), and the continued interest of researchers in understanding the consequences of defaunation for forest regeneration (Dirzo et al., 2014; Wright et al., 2007), it is of critical importance that robust and accurate methodologies be used to assess hunted vertebrate populations and inform their management.

The tamanduá-bandeira (*Myrmecophaga tridactyla*) is the largest representative of the order Pilosa. The species has a terrestrial habit and is solitary, with the exception of the mother with her offspring, during the breastfeeding period, and the breeding season, when couples can be formed. They can have activity throughout the day and night, depending on the temperature and rain (Camilo-Alves & Mourão, 2006). The main threats identified for the taxon were: fire, agriculture, livestock, deforestation, increased road matrix, habitat disconnection and habitat reduction. Other secondary or regional threats are: hunting, persecution, indirect poisoning by insecticides applied for the control of ants and termites in areas of plantations and livestock (Braga, 2010).

Miranda (2008) reported that because it is a species that has low reproductive potential, has prolonged parental care, long gestation periods and only one offspring per year, pathogens that can affect reproductive success, can be extremely harmful to populations of giant anteaters in free life.

Speothos venaticus, popularly known as cachorro-vinagre, it lives in the rainforests of far eastern Central America and northern South America. According to Oliveira (2009), in the north of Brazil, the animal has a wide distribution, but lacks exact locations. In Acre there are records of *A. microtis*, Serra do divisor National Park (Calouro, 1999), in the Chico Mendes Extractive Reserve (Rosas, 2006; Rosas & Drumond, 2009), in the Cazumbá-Iracema Extractive Reserve (Oliveira, 2012) and in the Chandless State Park (Borges, 2014). The cachorro-vinagre it lives in groups that can range from 2 to 12 individuals (Sheldon, 1992) and its body is morphologically adapted to hunt its prey, one of its main prey being the species *Dasyprocta novemcinctus*, the tatu-galinha (Lima et al., 2012).The species is classified as Near Threatened by the IUCN (DeMatteo et al., 2011), and was considered vulnerable in the Amazon (Jorge et al., 2013). Threats to the animal include habitat loss and human invasion, reduced prey numbers due to poaching, and risk of contamination by diseases passed on by domestic dogs (DeMatteo, 2008).

Another species that is present on the Arara TI Property and that deserves attention is the short-eared crab-eating fox, *Atelocynus microtis*, a rare species of canid found in a variety of environments, such as forests of terra firme, marshes, forests with patches of bamboo or pioneer forests along rivers. The diet of

A. microtis is generalist carnivore, but also includes fruits (Leite-Pitman & Willians, 2011). By preferring undisturbed environments, according to Leite-Pitman and Willians (2011), one of the greatest threats to these animals is the loss of habitat, as well as the decrease in the amount of prey due to excessive hunting and diseases. It is likely that nearly 30% of the habitat of the short-eared crabby will be lost or become unsuitable by 2027 (Rocha et al., 2020). The species is listed as Near Threatened by the IUCN (Leite-Pitman & Willians, 2011), however, in their study, Rocha et al. (2020) suggest reassessing the status to reflect the serious threat to the species' conservation.

The onça-pintada (*Panthera onca*) It is a top-of-the-chain predator, meaning it is at the top of the food chain and plays a key role in regulating the populations of its prey. As a predator, the onça-pintada contributes to the balance of ecosystems, maintaining control over the population of herbivores and preventing overpopulation of these species. In addition, the onça-pintada has an important role in maintaining biodiversity, as its presence is a sign that the ecosystem is healthy and in balance (Tobler et al., 2014). It is currently in the "Near Threatened" category (IUCN, 2020).

The paca-de-rabo (*Dinomys branickii*) moved from its classification "Vulnerable" to "Least Concern" on the IUCN Red List, due to its wide distribution including in protected areas (Roach, 2017). Currently the only living representative of the rodent family known as Dinomyidae. The fact that this species is naturally rare is one of the main factors that, associated with the hunting pressure exerted in various regions within their fragmented distribution area, make them more susceptible to disappearance, highlighting the importance of protected areas located in the area of occurrence of these species (Roach, 2017). There are few studies with the animal in its natural habitat, but there are some ancient records about its reproduction and birth of offspring in captivity (Collins & Eisenberg, 1972). The observation of puppies in the Arara Indigenous Land makes their conservation even more important.

Figure 99 - Individual of paca-de-rabo (*Dinomys branickii*) recorded in a camera trap during the survey of the Mastofauna in the Arara do Igapé Humaitá Indigenous Land, Acre, 2023.



Source: De Sousa & Silva Júnior et al. (2013).

Figure 100 - Adult female and offspring of paca-de-rabro (*Dinomys branickii*) recorded in a camera trap during the survey of the Mastofauna in the Arara do Igarapé Humaitá Indigenous Land, Acre, 2023.



Source: De Sousa & Silva Júnior et al. (2013).

Carnicer (2018) identified in his research that the pacarana can lose areas with climatic suitability in a short period, including within protected areas. Factors such as natural rarity, long gestational time and low number of chicks, hunting pressure and its fragmented distribution are factors that indicate the importance and need to understand *D. branickii* and protect the areas where the species occurs (Borges, 2014; Neto et al., 2017).

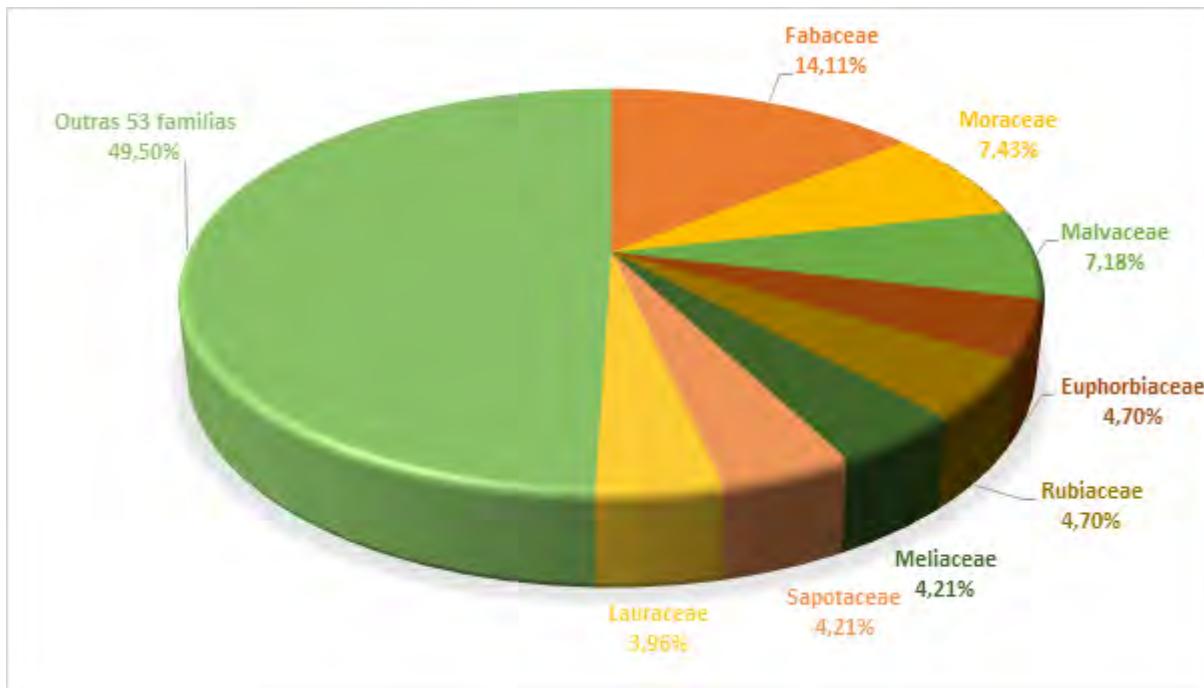
5.1.1.3.6 Forest Composition

5.1.1.3.6.1 General data

Data processing indicated the existence of 404 tree species distributed in 61 botanical families, with 3,276 individuals (Attachment 1 and 2 Flora).

The Fabaceae family is the most abundant, with 14.11% of the identified species (n=57) representing 13.06% of the individuals surveyed (n=428), followed by Moraceae (7.43% of the species and 8.67% of the individuals), Malvaceae (7.18% of the species and 9.71% of the individuals), Euphorbiaceae (4.70% of the species and 3.21% of the individuals), Rubiaceae (4.70% of the species and 2.35% of the individuals), Meliaceae (4.21% of the species and 4.24% of the individuals), Sapotaceae (4.21% of species and 4.43% of individuals) and Lauraceae (3.96% of species and 2.01% of individuals). These 8 most abundant families concentrate about 50.50% of all species and 47.68% of inventoried individuals.

Figure 101 - Distribution of botanical families and their representativeness in the sampled population.



Subtitles: 49,50% – Other families.

Source: BRITO et al., 2007.

The composition of the forest is completed with the identification of 15 species of liana (including one Unidentified) and 14 species of palm. No bamboo species was sampled, probably due to the inclusion diameter (DBH > 10 cm), however, the reports of the inventory team indicate the presence of the species *Guadua* sp. in the portion of FAB+FAP forest, however, with regrowth of those who had died. The most abundant family is Arecaceae (palm tree) with 598 individuals sampled for 14 species, while for lianas (lianas) the families with the highest occurrence was the Fabaceae with 4 species, totaling 5 individuals. A total of 44 individuals considered lianas (lianas) were inventoried.

The phytosociological parameters of a forest population can provide support for various actions in different fields of knowledge, such as recovery of degraded areas, production of seeds and seedlings, identification of threatened, rare and endemic species, decision on management actions for conservation purposes, among others (BRITO et al., 2007).

The results of the phytosociological parameters are in attachment 3 Flora, where the estimated total density was 434.49 individuals per hectare, equivalent to the total basal area of 1,957.132 m²/km². These values are close to those found in the Antimary State Forest, Bujari, Acre, whose estimated total density was 404 ind/ha and total basal area 1,983.82 m²/km² (TECMAN, 2012), while for Seringal Itatinga and Porto Central, in Manoel Urbano, Acre, the estimated total density was 311 ind/ha, totaling 1,487.22 m²/km² of total basal area (TECMAN, 2020).

It was also higher than the values for the areas of Jaraguá, Santa Rosa and Senegal. For the Santa Rosa area, located in Santa Rosa do Purus, Acre, the density was 342.18 ind/ha and total basal area of 1,719.097 m²/km² (TECMAN, 2023a); for the area Jaraguá, Bujari, Acre, the density was 363.19 ind/ha equivalent to the total basal area of 1,623.898 m²/km² (TECMAN, 2023b); and for the Senegal area, Assis Brasil, Acre, the density was 243.98 ind/ha equivalent to the total basal area of 1,556.66 m²/km² (TECMAN, 2023c).

Among the 404 tree species identified, about 135 species (33.41%) presented absolute density (AD) equal to or greater than 1.00 ind/ha. The most abundant species, whose AD is greater than 5 ind/ha, were: *Rinorea guianensis* (20,292 ind/ha); *Otoba* sp. (11,008 ind/ha); *Pseudolmedia laevis* (9,284 ind/ha); *Quararibea guianensis* (7,295 ind/ha); *Inga* sp. (6,764 ind/ha); *Rinorea* sp. (6,631 ind/ha); *Iryanthera* sp. (6,499 ind/ha); *Theobroma cacao* (6,101 ind/ha); *Guarea* sp. (5,836 ind/ha); and *Cordia nodosa* (5,570 ind/ha). These species represented approximately 19.63% of the absolute density of the inventoried population.

The species with the highest dominance (DOr ≥ 1.0%) represent approximately 28.02% of the total, where the species *Rinorea guianensis* was the most dominant with 3.71%, followed by the species: *Otoba* sp. (3,03%); *Eschweilera coriacea* (1,94%); *Handroanthus serratifolius* (1,87%); *Pseudolmedia laevis* (1,82%); *Ceiba pentandra* (1,81%); *Iryanthera* sp. (1,68%); *Apuleia leiocarpa* (1,64%); *Brosimum lactescens* (1,42%); *Aspidosperma carapanauba* (1,28%); *Castilla ulei* (1,27%); *Banara nitida* (1,25%); *Pterocarpus rohrii* (1,10%); *Guatteria foliosa* (1,09%); *Apeiba echinata* (1,06%); *Macrocnemum roseum* (1,03%); and *Senegalia polyphylla* (1,02%). The species with large diameter (DBH > 90 cm) are among the most dominant in the forest: *Apuleia leiocarpa* (Garapeira); *Brosimum alicastrum* (Manitê); *Brosimum lactescens* (Inharé); *Castilla ulei* (Caucho); *Ceiba pentandra* (Samaúma-branca); *Ceiba samauma* (Samaúma); *Copaifera multijuga* (Copaiba-preta); *Copaifera* sp. (Copaiba); and *Otoba* sp. (Ucuúba);

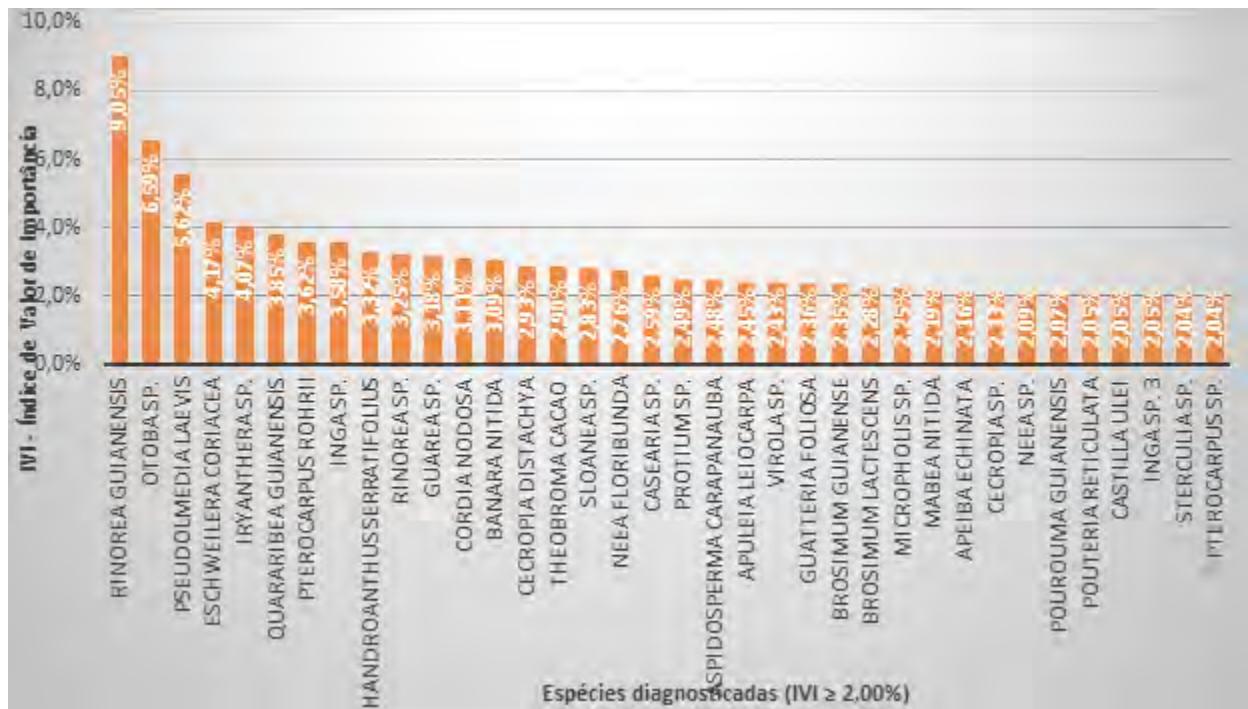
Regarding the absolute frequency, the species that presented values higher than 50% were: *Pseudolmedia laevis* (61,67%), *Pterocarpus rohrii* (51,67%) and *Quararibea guianensis* (50,00%), representado cerca de 4,39% da frequência total.

In the first positions of the Importance Value Index (IVI%), which characterizes the importance of each species in the studied forest (from the horizontal perspective), the species stand out (IVI > 3%): *Rinorea guianensis* (9,05%); *Otoba* sp. (6,59%); *Pseudolmedia laevis* (5,62%); *Eschweilera coriacea* (4,17%); *Iryanthera* sp. (4,07%); *Quararibea guianensis* (3,85%); *Pterocarpus rohrii* (3,62%); *Inga* sp. (3,58%); *Handroanthus serratifolius* (3,32%); *Rinorea* sp. (3,25%); *Guarea* sp. (3,18%); *Cordia nodosa* (3,11%); and *Banara nitida* (3,09%).

These species presented absolute density of approximately 96 individuals per hectare and absolute dominance of 404.336 m²/km², representing for about 22.01% of the total of individuals and 20.66% of the

basal area per km² sampled. The relative frequency (rRf) calculated for these species was 13.83% of representativeness in the sampled plots (Table 15). The species with higher IVI, at least theoretically, present greater conditions of use of the resources of their habitat.

Figure 102 - Distribution of inventoried species according to Subtitles: (IVI).



Subtitles: IVI x inventoried species

Source: TECMAN, 2020.

5.1.1.3.6.2 Threatened, endemic and rare species of flora

According to the Ordinance of the Ministry of the Environment, No. 148, of June 7, 2022 (BRAZIL, 2022), regarding the update of the National List of Endangered Species, in the project area there are 5 species categorized as Vulnerable (VU) (Chart 1). In relation to species Protected by Law, only *Hevea brasiliensis* (Seringueira), according to Decree 5.975/2006, it was identified in the study area.

Table 64 - List of species in Annex I of the National List of Endangered Species, Ordinance No. 148/2022.

Scientific name	Family	Vernacular name	Category	IVI%	Position IVI
<i>Apuleia leiocarpa</i>	Fabaceae	Garapeira	VU	2,45%	21 ^a
<i>Cedrela odorata</i>	Meliaceae	Cedro-rosa	VU	0,55%	173 ^a
<i>Ipeea brasiliensis</i>	Euphorbiaceae	Seringueira	Protected	0,54	178 ^a
<i>Cedrela fissilis</i>	Meliaceae	Cedro-branco	VU	0,33%	225 ^a
<i>Imburana acreana</i>	Fabaceae	Cerejeira	VU	0,21%	277 ^a
<i>Lezilaurus itauba</i>	Lauraceae	Itaúba	VU	0,18%	292 ^a

Source: Project Team Elaboration, 2023.

The species identified in the table above participate in the structure of the forest differently. Using the data of the phytosociological parameters, presented above, it can be inferred that the species *Apuleia leiocarpa* (garapeira) participates more in the structure of the forest, it is more important when compared to the other species listed in Chart 1, since its IVI% was equal to 2.45%, occupying 21st position of importance value. The other species in Chart 1 presented IVI below or approximately 1%, indicating, at least for the population studied, low participation in the forest structure.

According to the data contained in the [REFLORA¹ \(Plantas do Brasil: Resgate Histórico e Herbário Virtual para o Conhecimento e Conservação da Flora Brasileira\)](#) none of the species inventoried in the Arara - Shawādawa IL area are endemic to Acre.

5.1.1.3.6.3 Forest diversity analysis

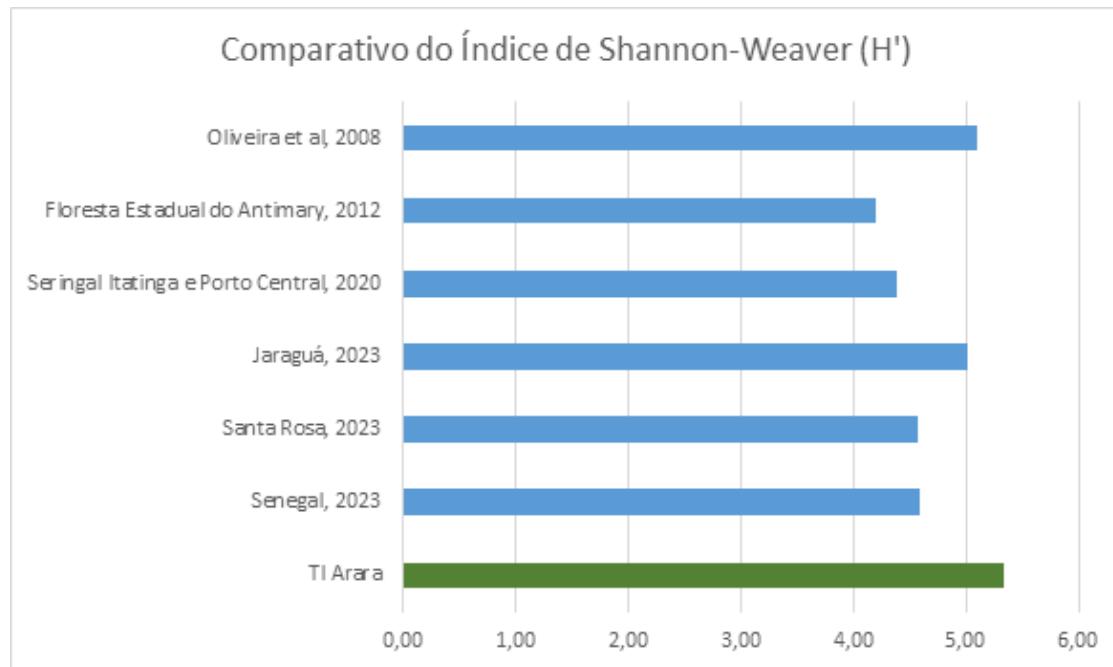
Diversity is composed of the variety of species and the number of individuals within each species and most often diversity studies are related to patterns of spatial and environmental variation. It is not correlated with the number of individuals per hectare of the population, but with the set of species and their number of representatives (CARVALHO, 2019).

The Shannon-Weaver Index (H') was used, which considers equal weight between rare and abundant species, providing an idea of the degree of uncertainty in predicting which species would belong to an individual randomly removed from the population. The higher the value of H' , the greater the floristic diversity of the population under study, corroborating Sapretti Jr. et al. (2003), who states that values above 3.11 indicate well-preserved plant formations.

The Shannon-Weaver Index (H') for the inventory was 5.34, thus indicating that the forest is well diversified. Oliveira et al (2008) indicated the same situation in the evaluation in the region of Manaus, whose index obtained was $H'=5.10$ (Figure 10).

Comparatively, the calculated index was higher in relation to the State Forest of Antimary and Fazenda Jaraguá, where the indexes were respectively 4.2 (TECMAN, 2012) and 5.01 (TECMAN, 2023a), as well as, for an area located in Manoel Urbano, Seringal Itatinga and Porto Central, the index was 4.38 (TECMAN, 2020). For the Santa Rosa do Purus area the Shannon-Weaver Index was 4.58 (TECMAN, 2023b), similar to the one found for Senegal of 4.60 (TECMAN, 2023c). In the figure below, a comparison between the indexes of the referential studies is presented.

Figure 103 - Comparison of Shannon-Weaver Indices in different forest areas.



Source: TECMAN, 2020.

5.1.2 High Conservation Values (B1.2)

Although the area of the Arara do Igapé Humaitá Indigenous Land is surrounded by protected areas, most protected areas suffer from insufficient administration and patrolling, a common portrait of Amazonian CUs (Marques & Peres, 2015). Initially, a descriptive assessment of the High Conservation Values (HCVs) is provided. The key to identifying the High Conservation Value Attributes established by the HCV Resource Network is to consider the characteristics related to biodiversity and human occupation in the project area. The Arara IL region has four of the six HCVs required by (Nigel Pitman, 2011; Panfil & Harvey, 2016).

Table 65 - Evaluation of the High Conservation Values recorded in the region of the Arara do Igarapé Humaitá Indigenous Land, Porto Walter, Acre.

High Conservation Value	For the REDD+ Project area of IL Arara do Igarapé Humaitá, four of the six HCVs are considered, as follows: HCV 1 - area contains globally, regionally or nationally concentrations of biodiversity values (Endemism, Threatened Species and Refuge); HCV 2 - Large globally, regionally, or nationally significant landscape-level areas where majority viable populations; HCV 3 - areas that are within or contain rare, threatened or endangered ecosystems; and HCV 6 - critical areas for the traditional cultural identity of local communities (in this case, the ancestral culture and customs of the Shawádawa people).
Qualifying Attribute	Arara do Igarapé Humaitá, it is possible to consider the HCVs listed here due to the fact that the Project area comprises a mosaic of Conservation Units, about 23 areas, that together ensure the protection of a set of species with distinct characteristics, with high endemism and relevance, many still unknown and/or have few studied, such as the Parauacu vanzolini monkey (<i>Pithecia vanzolinii</i>). We also have the importance for the maintenance of water resources and the hydrological cycle within the Juruá River Basin. The Juruá region has peculiar characteristics in relation to the climatic seasons, relief, and mainly, the vegetation, in particular the vegetation under white sand (known as campinaranas) and the sub-mountain vegetation found in PARNA Serra do Divisor. Due to these regional characteristics, the region has endemism of fish, such as angelfish (<i>Apitogramma jruvensis</i> , <i>Apitogramma moae</i>), and the glass-cleaner catfish (<i>Corydoras acrensis</i>). Of the amphibians <i>Allobates subfolionidificans</i> and <i>Allobates velocicantus</i> , and the reptiles <i>Pseudogonatodes gasconi</i> and the snake <i>Atractus nawa</i> . Of approximately 24 species of birds, among them stand out: the yellow-nosed toucan (<i>Aulacorhynchus atrogularis</i>), the rock-throated parakeet (<i>Pyrrhura rupicola</i>); the choca-do-acre (<i>Thamnophilus divisorius</i>); the black-faced anambé (<i>Conioptilon mcilhennyi</i>) and the barranqueiro-ferrugem-do-acre (<i>Clibanornis watkinsorum</i>). In addition to the species, of mammals such as the jaguar (<i>Panthera onca</i>) and giant armadillo (<i>Priodontes maximus</i>). In addition to the biological importance, there is the protection of ancestral customs and practices not only of the Shawádawa people, but also of the other indigenous peoples who occupy the Juruá region.
Focal Area	The REDD+ Project at IL Arara do Igarapé Humaitá can guarantee the maintenance and improvement of the natural characteristics of the ecosystem/habitat of an important Amazon region, in addition to preserving the ancestral customs of the Shawádawa people and other traditional peoples of the Juruá River Basin. In this sense, the total project area (76,550.59 hectares) of the IL must be managed and verified for the conservation of biodiversity and cultural heritage, especially in areas close to the villages, due to the interest in the use of resources by the indigenous people, ancestral and sustainable practices, but which can be improved to ensure food security and socioeconomic development, respecting ways of life and the conservation of natural resources.

Source: Project Team Elaboration.

The project area has attributes of high biological and ecological value that allow the maintenance of faunal species, a great diversity of natural landscapes, and the unique beauty of tropical forests. The richness and diversity of species is linked to the diversity of habitats and the abundance of food, a fundamental element to ensure the stability of the animal populations that reside there (Sampaio et al., 2010).

Within this context to guide the following items in this document, we considered the guidelines for the identification, management and monitoring of high values, as stated in the literature, such as the Guide to Forests of High Conservation Value (Jennings et al., 2003), General Guide for the Identification of High Conservation Values, Brown et al., 2013), Common Guidance for the Management & Monitoring of High Conservation Value, Brown; Senior, 2014) and Climate, Community and Biodiversity Standards", from The Climate, Community and Biodiversity Alliance (CCBA, 2013).

5.1.3 Without-project Scenario: Biodiversity (B1.3)

The Arara do Igarapé Humaitá Indigenous Land is already a Natural Protected Area established by the constitutional norm, Decree 5.758/2006, which establishes the National Strategic Plan for Protected Areas

(PNAP), defining indigenous lands as protected areas (alongside the conservation units and the lands of the remnants of quilombos) and setting a series of goals in terms of socio-environmental public policies. Thus, it is clear that indigenous lands have a socio-environmental function to fulfill, consistent in the mission of ensuring a dignified life for indigenous people according to their customs and traditions and in the preservation of natural resources (biodiversity).

However, even with these fundamental constitutional rights already established for the project area, there are several threats to indigenous territories. The establishment of an IT ensures the preservation of the valuable indigenous intangible cultural heritage, the right of physical and cultural survival of the Shawádawa People and the conservation of biodiversity and environmental balance, but these processes clash with globalization and the cultural losses of traditional peoples, which alter the ways of living, implying the adoption of environmentally unsustainable practices by the indigenous people in a context of political and economic pressures resulting from the expansion of the "agribusiness", the demand for minerals and energy, among other problems (Abi-Eçab, 2011).

In recent years, extreme drought points have been recorded in all Amazonian states and these events are potentiated by direct anthropic actions (deforestation and fire) (Berenguer et al., 2021; Silva et al., 2020; Silva et al., 2018). The burning of forest biomass popularly known as burning is a recurrent and ancient practice in the country and is characterized as one of the world's main contributors to greenhouse gas emissions. Added to this are other threats such as mining, the growth of infrastructure enterprises, predatory hunting and fishing, illegal logging, the advance of settlements and irregular occupation of land, agriculture, livestock, biopiracy and drug trafficking. Thus, in the absence of the Carbon Credit Project in the area and surroundings of the Arara do Igapé Humaitá Indigenous Land, biodiversity will be negatively impacted, mainly by anthropogenic deforestation actions. Among the main threats in a scenario without the project we can mention:

- The advance of deforestation from the possible construction of a highway that connects Brazil to Peru, entering the territorial limits of the Serra do Divisor National Park Conservation Unit, considered the CU with the greatest biodiversity on the planet.

- Deforestation and real estate speculation in the surrounding area due to implementation and illegal opening of dirt road without an environmental impact study, which interconnects the municipalities of Rodrigues Alves and Porto Walter.

- Forest deforestation to create open areas for monoculture plantations and potential risk of the presence of insecticides and fertilizers aimed at insect control. The use of toxic products in pastures causes irreversible damage to soil, water and air, and the quality of life can be altered by excessive contact with these highly toxic products.

- Loss of biodiversity due to biopiracy and increased illegal exploitation of natural resources.

- The increase in hunting pressure on medium and large fauna (birds and mammals) that can lead to empty forests with a simplified structure, with a predominance of common species and few ecological roles to be played, resulting in a reduction in the richness of plant species and consequently in the carbon stock.

- Loss of single-occurrence habitats, represented in this southwestern region of the Amazon, which may affect the extinction of endemic, rare and threatened species.

- Loss of biodiversity due to pollution of water and soil degradation, directly affecting the survival of aquatic and/or semi-aquatic species that depend directly on these environments for survival.

-Propensity and permeability of the area for the occurrence of exotic and invasive species of fauna and flora, which tend to accompany the advance of deforestation and roads. Because they are non-native species, some species are opportunistic and generalist in habitats, occupying an ecological function of unnatural predator, causing a problem in local biodiversity and habitat imbalance.

-The introduction of non-native species by the project would negatively impact the ecosystem of the region, since many species can transmit diseases and parasites to native species, including diseases to humans.

-Impacts on fauna and the loss of species diversity that is associated with resources for survival and maintenance of these.

-Population decline of some fauna species.

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (B2.1)

Table 66 - Expected Biodiversity Change.

Type	Estimated Change	Justification of Change
REDD+ Project Activities	Reduction of deforestation and forest fires.	The project's actions seek to reduce forest deforestation by strengthening the production chains, offering skills and training for the use of natural resources in a sustainable manner, in order to guarantee the maintenance of the traditional way of life, in addition to using techniques to optimize the land use and fire management.
REDD+ Project Activities	Monitoring of endangered species	The project's actions seek to implement monitoring initiatives that contribute to the identification and protection of endangered species, in order to guarantee their continuity in the territory, as well as the continuity of the performance of their ecological functions.
REDD+ Project Activities	Management, use and consumption of natural resources.	The project's actions seek alternatives to reconcile the management of natural resources and their use to satisfy the needs of the communities, aiming to provide the longevity of these resources, in addition to strengthening the ancestry and traditional way of life of the original peoples over generations .

Source: Project Team Elaboration.

5.2.2 Mitigation Measures (B2.3)

The data collected for the studies related to biodiversity of the REDD+ Project of the Arara do Igapó Humaitá Indigenous Land were satisfactory in order to assess the current context of biodiversity conservation in the project area and in the surroundings. However, longer studies are needed to elucidate the variations that occur in the biotic community and taxonomic investigation of the species.

Therefore, in order to seek improvement in the population conditions of the species and mitigation of the impacts caused by internal and external factors, the project proposes a plan for monitoring the fauna and flora, in order to deepen the knowledge of the biota of the region. In this way, the objective is to provide mitigation of potential impacts on local biodiversity, important species for conservation (triggers), and attributes of high conservation value (HCVs). The potential impacts caused by the predatory action of hunting and fishing, illegal logging and other anthropogenic actions harmful to the environment.

In addition, according to Pyles et al. (2022) in addition to the planning of carbon recovery strategy are also considered actions that bring benefits to biodiversity, since conservation policies focused only on carbon can fail to protect biodiversity. In this sense, the construction of partnerships with research institutions and researchers who can collect data to contribute to a greater knowledge of the floristic composition, fauna and distribution of species, in addition to the establishment of biodiversity monitoring actions.

The process of sensitization and knowledge sharing is also necessary in order to ensure the maintenance of HCVs, especially the 6, in the traditional cultural identity of local communities. These actions have a positive impact on biodiversity, as they ensure the interaction between ancestral customs and good traditional practices.

5.2.3 Net Positive Biodiversity Impacts (B2.2, GL1.4)

The actions proposed under the REDD+ Project of the Arara do Igapé Humaitá Indigenous Land seek to generate several benefits to the climate, traditional peoples and biodiversity. The main benefits generated to biodiversity are linked to the reduction of deforestation and forest degradation and conservation of biodiversity and habitats, as well as the ancestral customs of the Shawádawa people.

The implementation of the Project's activities, already described above, produce a direct and positive impact on biodiversity, such as the maintenance of vegetation cover and the conservation of biodiversity, acting directly against the loss of habitats and against the fragmentation of local vegetation cover due to the removal of illegal wood and other anthropogenic impacts. These positive impacts are due to avoided deforestation, improvements in practices in the use of natural resources, monitoring of deforestation and biodiversity. In addition, it is considered the strengthening of territorial management and leadership in the preservation of the customs and culture of the Shawádawa people.

The process of implementing biodiversity monitoring, which can promote the creation of areas dedicated to the conservation of species and habitats, combined with REDD+ policies, has become an important ally for biodiversity conservation. This broadens the conservation areas of varied habitats, encompassing essential groups such as large mammals, which are extremely important for the maintenance of ecosystem services. In this sense, REDD+ becomes an alternative to mitigate climate change, which can benefit not only the Amazon rainforest, but also the people who live in it, such as indigenous peoples.

5.2.4 High Conservation Values Protected (B2.4)

The project area has attributes of high biological and ecological value that allow the maintenance of faunal species, a great diversity of natural landscapes, and the unique beauty of tropical forests. The richness and diversity of species is linked to the diversity of habitats and the abundance of food, a fundamental element to ensure the stability of the animal populations that reside there (Sampaio et al., 2010).

The Project area has a High Conservation Value attribute related to biodiversity, which has already been described in the High Conservation Value Attributes section and is related to forest areas that contain or are contained in rare, threatened or endangered ecosystems. The measures proposed to ensure the integrity of this ecosystem and thus, maintain and improve this attribute are activities already incorporated by the Project. Therefore, the potential positive and negative impacts for this area have already been described and the activities of the Project already aim to generate positive impacts on this attribute. With

special emphasis on HCV 6, which is to meet the needs of preserving the traditional customs and practices of the Shawádawa people.

5.2.5 Species Used (B2.5)

As a sustainable and ancestral way of life, some species are of great importance for survival, mainly as a source of subsistence for the indigenous people. The plant extraction of non-timber forest products (NTFP) from native species of the region, such as castanha-do-brasil, latex, açaí, among others. As a practice within the Shawádawa culture there is also the collection of fruits and seeds, subsistence hunting and fishing, use of animals for the production of adornments and props such as macaws (*Ara sp.*) and species of *Accipitridae* (hawks) due to the use of feathers and food. In addition, there are cassava swidden crops for consumption and production of other foods and beverages, as well as corn, bananas, beans, watermelon and rice used in subsistence food and trade with neighboring communities.

In this sense, the species of hunting interest and use in traditional ancestral customs become the target of biodiversity monitoring, and the process of productive improvement of the swidden can represent significant improvements in food security, reduction of pressure on resources and economic strengthening of the Shawádawa people of the Arara do Igarapé Humaitá Indigenous Land.

5.2.6 Invasive Species (B2.5)

The REDD+ Project at IL Arara do Igarapé Humaitá encourages the use of native species by the Shawádawa, such as Brazil nuts, açaí, cassava, cupuaçu, among others, respecting the traditional way of life and use of natural resources. Despite this, some non-native species are used by the indigenous people because they were introduced in the region a long time ago, dating back to the historical period and are still part of the local culture, serving as a source of food and income for the indigenous people.

Widely cultivated in other regions of Brazil, these exotic species are not recognized for threatening and/or harming native species.

No invasive species will be introduced or have their population increased as a result of Project activities, remembering that this Project promotes the use of native species. Furthermore, it is imperative for the Project to maintain the customs and way of life of the indigenous people, which are sustainable, but which can be improved for well-being and food security, in addition to generating income.

5.2.7 Impacts of Non-native Species (B2.6)

Not applicable.

5.2.8 GMO Exclusion (B2.7)

Not applicable.

5.2.9 Inputs Justification (B2.8)

Not applicable.

5.2.10 Waste Products (B2.9)

All waste and other products used and resulting from the project must be disposed of and stored in accordance with the safety standards of each one. For this, each product must be classified according to:

- Function of potential risks to the environment;
- The function of risks to human health;
- Due to their nature and origin (ABNT NBR 10.004/2004), once discarded incorrectly, these products can generate great impacts and environmental and social damages to the affected areas.

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Measures (B3.2)

The possible negative impacts of the Arara do Igapé Humaitá IL REDD+ Project on biodiversity outside the Project zone are not expected, nor are leaks resulting from the implementation of its activities expected. This fact can be explained by the area of the Project being surrounded by conservation units (CUs), in addition to the fact that the Arara do Igapé Humaitá Indigenous Land is already a recognized protection area that adds to the socio-environmental activities that are designated to mitigate any possible leaks, thus providing harmony between the traditional peoples and their customs with the nearby communities and other neighboring peoples.

5.3.2 Net Offsite Biodiversity Benefits (B3.3)

As previously mentioned in the section above (section 8.3.1), no negative impacts are expected outside the Project zone, nor are leaks expected from the activities carried out. Therefore, mitigating actions are not necessary. In addition, the socio-environmental activities carried out by this Project are already designated to mitigate possible leaks that may occur.

As the Project area is surrounded by conservation units (CUs) and due to the recognition and consolidation of the Arara do Igapé Humaitá IL, there are positive impacts on biodiversity outside the Project zone, with the main positive impacts expected with the consolidation of the mosaic of conservation areas for biodiversity, which serves as a refuge and protection for threatened species and ecosystems and are places where ecological processes can occur without any anthropic intervention or only with sustainable use, and the functioning of the Project area.

5.4 Biodiversity Impact Monitoring

5.4.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

To expand the list of species and monitor the possible population fluctuations linked to the implementation or not of the project, in order to understand how the project will actually benefit the biodiversity of the area, it is suggested the implementation of a local fauna monitoring program, considering mainly the participation, including the local community in the process of sampling and collection of fauna information through standardized methodologies. In a survey on participatory and community monitoring actions, studies found that surveillance, monitoring and management actions aimed at biodiversity were more successful when the local community was included in the process.

To expand the list of species and monitor the possible population fluctuations linked to the implementation or not of the project, in order to understand how the project will actually benefit the biodiversity of the area, it is suggested the implementation of a local fauna monitoring program, considering mainly the participation, including the local community in the process of sampling and collection of fauna information through standardized methodologies. In a survey on participatory and community monitoring actions, studies found that surveillance, monitoring and management actions aimed at biodiversity were more successful when the local community was included in the process.

To monitor the local fauna, an annual biodiversity monitoring plan is suggested (Tables XX), including invertebrates, fish, amphibians, reptiles, birds and mammals. The sampling protocols will follow the standard for each group of fauna, considering about 10 days of sampling per year, and linking the use of technology tools focused on citizen science for the inclusion of the local community. The monitoring actions will generate information not only designed and focused on biodiversity, but also for the local community, since riverine communities depend on the protein of wild animals for their subsistence. Listing and monitoring the abundance and/or density of fauna species is imperative to assist local populations in defining the best use of biodiversity, collaborating for the protection and conservation of endangered species.

The monitoring plan should include, training methodology for the community on sampling of the fauna groups to be monitored, training for the use of monitoring technologies, planning and delineation of the annual monitoring actions including joint decision making of the targets to be monitored, curation and analysis of field data as well as analytical reporting of the information.

Biodiversity monitoring will include fish stock assessment studies as there is a dearth of information. Indigenous peoples, in general, do not have habits and so little fishing equipment that make it possible to catch migratory catfish or other species of great biomass such as the pirarucu (*Arapaima gigas*), and do not have the capacity to store animal protein, due to the absence of electricity and household appliances. Therefore, the strong fishing pressure in the Juruá River Basin is entirely caused by overfishing activities, a fact that reinforces the need to build fishing and inspection agreements beyond the Arara do Igapé Humaitá Indigenous Land.

Given the above, the implementation of the ichthyofauna monitoring process should be considered, highlighting the species of greatest commercial interest and threatened already presented in this report. The initiative will allow obtaining relevant information for the maintenance of fishing resources and the investigation of the species that occur within the Arara do Igapé Humaitá IL. It is also important to consider the construction of fishing agreements and effective enforcement actions carried out by municipal and governmental institutions and agencies in the Juruá River basin. Such initiatives will enable the implementation of participatory monitoring, strengthening of governance and territory management for the inhabitants of the Arara do Igapé Humaitá Indigenous Land.

In addition to the monitoring plan, it is possible to implement a participatory monitoring initiative carried out in cooperation with the Shawādawa, in which some of the indigenous people are selected and trained to collect information in the region. Information on the presence of endemic species and included in lists of threatened species and the presence of invasive exotic species, as well as an increase or decrease in

observations. The use of technological tools for the monitoring of fauna, pressures and threats are increasingly present in actions developed in areas of protection due to the easy use and sharing of information, in addition to ensuring the security of the information collected and the identity of the collector.

Table 67 - Action plan planned for the Environmental Monitoring Program for fauna, IL Arara do Igarapé Humaitá, Porto Walter, Acre.

CAUSE	FACTOR	What	Why	Where	When		Who	How
		What will be done?	Why will it be done?	Where will it be done?	Where will it be done?		By whom will be done?	How will it be done?
		ACTION PLAN	EXPECTED RESULT	LOCATION	Beginning (dd/mm/yyyy) or season of the seasonal	Duration (days)	ACCOUNTABLE	HOW WILL IT BE DONE?
Fauna	1.1 Ichthyofauna Monitoring	Monitor fish community	Population estimatives of fish species, to monitor population fluctuations of migratory species of economic interest and bioindicators, in addition to evaluating the year-by-year impact of the project implementation process.	IL Arara do Igarapé Humaitá	Seasonal transition period of every year	10	Catraia Soluções Ambientais	Hiring a new service; training of local and surrounding communities to use a participatory monitoring tool for social inclusion (Application for recording fishing) and monitoring by a responsible biologist.
Fauna	1.2 Herpetofauna Monitoring	Monitor amphibians and reptiles community	Population estimatives of amphibian and reptile species, to monitor population fluctuations of bioindicators species, in addition to evaluating the year-by-year impact of the project implementation process.	IL Arara do Igarapé Humaitá	Seasonal transition period of every year	10	Catraia Soluções Ambientais	Hiring a company, Implementation of monitoring trails following the PEL standard, annual sampling conducted by a biologist specialist in the group.
Fauna	1.3 Avifauna Monitoring	Monitor bird community	Population estimatives of birds, to monitor population fluctuations of migratory species of economic interest and bioindicators, in addition to evaluating the year-by-year impact of the project implementation process.	IL Arara do Igarapé Humaitá	Seasonal transition period of every year	10	Catraia Soluções Ambientais	Hiring a company, Implementation of monitoring trails following the PEL standard, annual sampling conducted by a specialist biologist in the group with sampling through capture and recapture with banding for population monitoring.
Fauna	1.4 Mastofauna Monitoring	Monitor mammal community	Population estimatives of fish species, to monitor population fluctuations of economic interest and bioindicators species, in addition to evaluating the year-by-year impact of the project implementation process.	IL Arara do Igarapé Humaitá	Seasonal transition period of every year	10	Catraia Soluções Ambientais	Hiring a company, Implementation of monitoring trails following the PEL standard, annual sampling conducted by a specialist biologist in the group with sampling, using a standardized methodology for estimating abundance and population density.

Source: Project Team Elaboration, 2023.

5.4.2 Biodiversity Monitoring Plan Dissemination (B4.3)

The monitoring plan and any monitoring results obtained will be disseminated and disseminated in the Technical Chambers on REDD+ carried out by the REDD+ Project of the Arara do Igarapé Humaitá IL. The information will also be available to indigenous and Shawādawa people, stakeholders and the public through virtual channels such as websites. In addition, the Project will enable the strengthening and dissemination of traditional customs through the sharing of information and scientific publications carried out from the process of monitoring fauna and other socio-environmental research initiatives.

5.5 Optional Criterion: Exceptional Biodiversity Benefits

In the Project region, the presence of endangered fauna species was verified according to the IUCN Red List of Threatened Species. As already described in section 5.1.1 – Existing Conditions, the species considered threatened following the criteria established by the IUCN are:

-Critically Endangered (CR)

Fauna: *Nannostomus marginatus*, *Paratrygon aiereba*, *Morphnus guianensis* e *Harpia harpyja*

-Endangered (EN)

Fauna: *Lagothrix cana*

-Vulnerable (VU)

Fauna: *Tinamus tao*, *Chaetura pelágica*, *Priodontes maximus*, *Panthera onca* and *Bassaricyon alleni*.

5.5.1 High Biodiversity Conservation Priority Status (GL3.1)

The State of Acre, located in the southwest of the Amazon basin, hosts high diversity for many taxa among plants and animals (Souza et al., 2003), with approximately 88% of its forest cover conserved (Acre, 2010). It is inserted in the Western Corridor of the Amazon, which is considered as one of the richest regions in terms of biodiversity in the world, being a priority area for conservation and "hotspot" for various groups, because of the high diversity and endemisms (Calouro 1999; Souza et al., 2003; Ayres et al., 2005; Souza, 2009).

The extinction of mammals in forest environments can directly affect the organization of flora and the food chain. The main impact is the increase in the amount of plant species that do not count on the dissemination by vertebrate animals, to the detriment of other species that have larger seeds and depend on the dispersal carried out by these animals (Peres et al., 2016). This change in vegetation composition, due to the absence of dispersing animals, may impair the trade of carbon credits, as large trees may be less likely to reproduce, reducing the area's ability to retain carbon (Bello et al., 2015).

The presence of naturally rare species, such as the tatu de rabo-mole (*Cabassous unicinctus*) and the cachorro-do-mato-de-orelhas-curtas (*Atelocynus microtis*), in the area of the Arara Indigenous Land of the Humaitá Stream, it highlights the fundamental role of REDD+ in filling gaps in the distribution of these species and providing valuable information about their ecology. The *Cabassous unicinctus*, For example,

it is a rare armadillo with few confirmed occurrences in the Amazon region, in the same way, we have the *Ateocynus microtis* an equally rare species. The registration of these species is of great importance for the monitoring and conservation of local biodiversity, as well as for the development of effective strategies for the preservation of rare and endangered species.

5.5.2 Trigger Species Population Trends (GL3.2, GL3.3)

Table 68 - Trigger Species.

Trigger Species	<i>Pantera onca, Harpia harpyja, Ateles chamek, Tapirus terrestris e Morphnus guianensis</i>
Population Trend at Start of Project	The Amazon biome has more than 6.74 km ² and species of interest for conservation. Due to the territorial size and their populations, there are some species that lack information on population density. However, it is estimated that in the Amazon, the population of Panthera onca (NT) is composed of 64 thousand individuals; of the Harpy harpyja (VU) from 118 thousand to 225 thousand individuals; the species Ateles chamek (EN) is estimated at 25-80 individuals/km ² ; Tapirus terrestris (VU) from 0.20 – 3.7 individuals/km ² ; and Morphnus guianensis (NT) of 2-4 individuals/km ² .
/ithout-project Scenario	Environmental impacts of anthropic origin would be the main threats to the loss of biodiversity without the project, where: the loss of forest cover due to the opening of roads favors forest fragmentation; loss of biodiversity due to deforestation for the creation of monocultures and pastures for cattle raising and the exploitation of timber and non-timber natural resources; Biopiracy action and the increase in the illegal exploitation of natural resources; Loss of biodiversity due to emission from water bodies and soil degradation, directly affecting the survival of fauna species.
With-project Scenario	The IL Arara do Igarapé Humaitá has an extensive area of forest and is located in a priority area for the conservation of various groups of animals and plants. Positive impacts include: Refuge for species that inhabit the surroundings; Conservation of forests and local ecosystems (campinaranas, floodplain forests, terra firme forests, among others); Promote environmental education and the participation of traditional populations living in the area; Valuing the traditional knowledge of indigenous peoples and traditional populations in the region; Decrease in deforestation in the region, promoting the preservation of local fauna and flora and, thus, guaranteeing the conservation of natural resources in the region; Enable future scientific research on the natural history and ecology of fauna species.

Source: Project Team Elaboration, 2023.

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