413 REDD PROJECT (413 PROJECT)

Document Prepared by Ecosecurities do Brasil Ltda.

Contact Information (optional)

Project Title	413 REDD Project (413 Project)
Version	1.0
Date of Issue	31-July-2021
Project Location	Brazil, State of Amazonas, Manicoré and Novo Aripuanã municipalities
Project Proponent(s)	413 Environmental, LLC
Prepared By	Ecosecurities do Brasil Ltda.
Validation Body	*Organization and contact name with email address and phone number*
Project Lifetime	01 January 2017 – 31 December 2046; 30-year lifetime
GHG Accounting Period	01 January 2017 – 31 December 2046; 30-year total period
History of CCB Status	*Issuance date(s) of earlier validation statements, dates of previous attempts at validation, etc.*
Gold Level Criteria	Exceptional climate adaptation benefits Exceptional community benefits Exception biodiversity benefits
Expected Verification Schedule	*If known, provide the expected schedule for initial verification*

Table of Contents

1 SUMMARY OF PROJECT BENEFITS

1.1 Unique Project Benefits

Outcome or Impact Estimated by the End of Project Lifetime	Section Reference
1) Conservation of 500,996 hectares of primary, ancient, and undisturbed dense tropical rain forest and a small tract of unique pioneer shrubby vegetation (natural, undisturbed as well), and avoiding conversion of 100,199 ha of forest to pasture by planned deforestation;	2.1.5 3.2.1
2) Long-term climate mitigation, by avoiding the GHG emission of 66,940,883 tCO_{2e} over 30 years, corresponding to an annual average of 2,231,363 tCO_{2e} within the whole project life-span and an annual average of 6,374,716 tCO_{2e} in the first 10-year crediting period;	2.1.17 3.2.1
3) Promoting the welfare of the ca. 1,500 traditional community residents and indigenous people of the region, including improvement of infrastructure, education, health, housing, water, energy, communication, community organization, empowering young women, youth, and elderly, and encouraging the sustainable use of natural resources. Special community research and development projects will be supported;	2.2.3 4.2
4) Expanding the private sector actions in conservation initiatives by creating a connection between REDD project area and official public natural reserves (UCs), indigenous lands, and other protected areas that already exist in the region, reducing threats from agents of deforestation and forest degradation, adding 500,996 hectares of highly biodiverse forest to protected areas;	2.1.5 5.1
5) Protection of hundreds of flora and fauna species and their habitats, some endangered and endemic, including Rosewood tree (*Aniba rosaeodora*, endangered), Brazilian-nut giant tree (*Bertholletia excelsa*, critically important to the community), Black-faced black spider monkey (*Ateles chamek*, endangered), Belem curassow bird (*Crax pinima*, critically endangered), and Amazonian giant pirarucu fish (*Arapaima gigas*, very important to the community). These five key species will be studied in detail by research projects and conservations actions;	5.1
6) Exceptional climate adaptation benefits by systematically analyzing data, monitoring the effects of regional and local climate changes on the local households living close to the project area (traditional, settled, and indigenous), and promoting environmental and climate change education/training among them;	4.5
7) Exceptional community benefits. The project will be implemented around poor communities: RDS Rio Madeira, RDS Juma, Flona Aripuanã, and APA Campos de Manicoré. It is also close to four indigenous reserves of which traditional communities own the rights of managing their resources. The project will generate short-term and long-term net positive well-being for community members and empowerment of community members;	4.5
8) Exceptional biodiversity benefits by promoting the protection of 500,996 hectares of undisturbed rainforest in a zone classified as extreme high priority for conservation by the Brazilian Government. Special research and genetic conservation projects focused on 5 key threatened species will be supported.	5.5

1.2 Standardized Benefit Metrics

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
GHG emission reductions or removals	Net estimated emission removals in the project area, measured against the without-project scenario	Not applicable	-
	Net estimated emission reductions in the project area, measured against the without-project scenario	63,747,157 tCO_{2e}	2.1.17 3.2.1
Forest[1] cover	For REDD[2] projects: The estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario	100,199 ha	2.1.5 3.2.1
	For ARR[3] 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 production forest land in which IFM[4] practices are expected to occur as a result of project activities, measured against the without-project scenario	Not applicable	-
	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	Not applicable	-
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	300	2.3.1.4 4.2
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	200	2.3.1.4 4.2

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)
[2] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping the conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)
[3] Afforestation, reforestation, and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)
[4] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood, and fuelwood (*VCS Program Definitions*)

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
Employment	Total number of people expected to be employed in project activities,[5] expressed as the number of full-time employees[6]	20	2.3.1.5 4.2
	Number of women expected to be employed as a result of project activities, expressed as the number of full-time employees	10	2.3.1.5 4.2
Livelihoods	Total number of people expected to have improved livelihoods[7] or income generated as a result of project activities	350	4.2.1
	Number of women expected to have improved livelihoods or income generated as a result of project activities	200	4.2.1
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	1,500	2.1.1 4.2
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	800	2.1.1 4.2
Education	Total number of people for whom access to, or quality of, education is expected to improve as a result of project activities, measured against the without-project scenario	500	2.3.1.4 4.2.1
	Number of women and girls for whom access to, or quality of, education is expected to improve as a result of project activities, measured against the without-project scenario	300	2.3.1.4 4.2.1
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	300	4.5.2

[5] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, subcontracted workers, and community members paid to carry out project-related work.
[6] Full-time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region, or economic territory (adapted from the UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])
[7] Livelihoods are the capabilities, assets (including material and social resources), and activities required for a means of living (Krantz; Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
	Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	150	4.5.2
Well-being	Total number of community members whose well-being[8] is expected to improve as a result of project activities	1,500	4.2
	Number of women whose well-being is expected to improve as a result of project activities	800	4.2
Biodiversity conservation	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation,[9] measured against the without-project scenario	100,199	2.1.5 3.2.1
	Expected number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities,[11] measured against the without-project scenario	68	5.2

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

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

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

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

2 GENERAL

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (G1.2)

The 413 REDD Project (413 Project) aims to reduce emissions derived deforestation and forest degradation in the Amazonian tropical rain forest. The project proponent is 413 Environmental, LLC, and Ecosecurities do Brasil Ltda have prepared the PD (Project Design). The project applies the Avoided Planned Deforestation (APD) approach and uses CCB and VCS standards and methodologies to a REDD voluntary carbon market.

The project's geographical boundary comprises a parcel land named Matá-Matá (500,996 hectares), with 500,996 hectares of primary ancient and undisturbed areas of tropical rainforest. Thus, the project area comprises 476,995 hectares of dense lowland forest, 17,705 hectares of dense alluvial forest and 5,914 hectares of dense sub-montane forest.

The parcel land is situated in the municipalities of Manicoré and Novo Aripuanã, southern State of Amazonas, Brazil (Fazenda Matá-Matá: 60º 45' 38,917"W and 5º 57' 46,94"S, SIRGAS 2000).

The project simultaneously addresses the issues of climate, community, and biodiversity while conserving a large tract of intact forest in a region that is threatened by deforestation from the expansion of cattle-ranching to a greater extent, and agriculture and other human activities (logging, mining, hydroelectric plants, road building, etc.) to a lesser extent. The project aims to change this paradigm by avoiding GHG emissions, contributing to climate change mitigation, protecting biodiversity (fauna, flora, habitats) and water streams, preventing soil erosion, and improving community living standards. Also, the project aims to promote forest conservation as an alternative to deforestation and forest degradation widely practiced by cattle-ranchers, illegal loggers, land grabbing, among others.

The project will generate GHG emission reductions from changes in land use caused by imminent deforestation and forest degradation. The emission of 66,940,883 tons of CO_{2e} will be avoided with the 413 project, considering a lifespan of 30 years, with an annual average of 2,231,363 tons of CO_{2e} calculated for the whole period (2017-2046) and 6,374,716 for the first 10-year crediting period (2017-2026). The 413 Project seeks to be validated as Golden Level because exceptional climate measures will be undertaken to adapt the population to climate change.

The baseline was conceived from the most-likely scenario, which is converting 20% of the forest to pasture for cattle raising. This is the standard practice in the Amazon region, suffering from growing deforestation rates and forest degradation. The conversion of forests to alternative land uses of up to 20% of private properties is permitted by the Brazilian Forest Code but the project proponent decided to protect forest and avoid deforestation and forest degradation, reducing CO_2 emissions. In the planned deforestation approach, the conversion agent in the baseline is the owner of the area because he has the right to deforest under the current legislation.

Therefore, it is clear that he is the agent of deforestation. Faced with the possibility of carrying out a REDD project, the owner decided not to exercise this right and not to deforest, and should benefit

from it. The climate benefit (avoided CO_{2e} emissions) was calculated for a 30-year period, but after 10 years the baseline will be recalculated, as required by the CCB-VCS standards and methodologies.

The scenario existing before the implementation of the project is challenging form a sustainability perspective. However, the forest in the project area is still protected from human disturbances, as it is located close to public environmental protection areas and indigenous reserves. The threat of deforestation and forest degradation is significant. South of the project, around towns along federal highway BR-230 (Transamazônica) and state roads, AM-174 and AM-360, and deforestation rates are growing very significantly, according to satellite image data analyzed systematically by INPE (National Institute of Space Research) (INPE, 2020).

The 413 Project also aims to provide benefits to at least 1,500 people from the local community, including traditional households living close to the land parcels of the project area and indigenous people of the nearby tribes. The project will improve education, skills training, health and housing, and empowerment of women and young people of those communities. Local households from RDS Rio Madeira (50 communities, ca. 3,812 people), Juma RDS (38 communities, ca. 1,977 people) as well people living in the surroundings of the Flona Aripuanã (National Forest - Flona) and APA of Campos de Manicoré (Environmental Protection Area) will also receive support from the 413 Project. Indigenous communities of Rio Manicoré (70 Múra ethnic people), Pinatuba (478 Múra ethnic people), Sepoti (73 Tenharim ethnic people), and Setemã (77 Múra ethnic people) will also be benefited. The project will provide exceptional benefits to the community as it is located in a socially needy region, where families live under the poverty line of 50% of the more impoverished people in Brazil. Hence, it will seek to be validated as Golden Level.

413 will also provide benefits to biodiversity. A total of 500,996 hectares of undisturbed primary dense rainforest will be protected from deforestation and forest degradation, avoiding death, flight, and genetic erosion of several threatened and endemic key species. Sixty-eight species are considered endangered and/or critically endangered. Five key species were specially selected for specific research and genetic conservation projects, two trees (Brazilian giant nut tree [*Bertholletia excelsa*] and Brazilian rosewood [*Aniba roseaodora*]), and three animals: Black-faced black spider monkey – ape (*Ateles chamek*), Belem Curassow bird (*Crax pinima*), and Pirarucu Amazonian giant fish (*Arapaima gigas*). Activities to be carried out comprise flora inventory cruising, fauna surveys (including but not limited to mammals, herpetofauna, avifauna, and ichthyofauna), identification and registry of seeding mother trees, germplasm banks, nursery building/infrastructure, seedling production, support to thesis and other academic works through cooperation with national scientific institutes and universities. The project will provide exceptional benefits to biodiversity once it is located within a zone considered extremely important to conservation by the Brazilian Government. Therefore, it will seek to be validated as Golden Level.

An ecological trail will be built, and a visitor centre infrastructure will be constructed to approach the community to biodiversity science. The visitor centre will also serve as a meeting and training centre for the use of the neighbouring communities, particularly for the activities related to women and youth empowerment. In addition, a health unit will be built and will be operating to provide medical, psychological, and social assistance, as well as vaccines and primary medicine to the households living in the region.

The project will invest in the periodic field and river patrols in the project area, signage throughout the project accesses prohibiting entry, hunting, and fishing, continuous monitoring by interpretation of satellite images, cooperation with environmental control offices, such as the Environmental Police, the Fire Department, IPAAM (Amazonas State Environment Institute), IBAMA (Brazilian Environment Institute), and ICMBio (Chico Mendes Biodiversity Institute). In addition, other partnerships will be built during the project development.

2.1.2 Project Scale

The 413 Project is considered to be a "Large Project", as the estimated annual emission reductions for the first baseline period is larger than 300,000 tons of CO_2 per year, which is over the maximum limit of project scale.

Project Scale	
Project	
Large project	x

2.1.3 Project Proponent (G1.1)

Organization name	413 Environmental, LLC
Contact person	Jay Rogers
Title	Chief Executive Officer
Address	109 East 17th Street, Suite 450, Cheyenne, WY, 82001
Telephone	310-993-9952
Email	jay@fourthirteenllc.com

2.1.4 Other Entities Involved in the Project

Organization name	Ecosecurities do Brasil Ltda.
Contact person	xxx
Title	xxx
Address	xxx
Telephone	xxx
Email	xxx

2.1.5 Physical Parameters (G1.3)

Location

The 413 REDD Project (413 Project) is located in Manicoré and Novo Aripuanã municipalities, State of Amazonas, northern Brazil (Figure 2.1). The Project area is part of the Sul-Amazonense Meso-region, Madeira Micro-region, according to official maps (Amazonas, 2020), and limited by Madeira River on North/West, BR-230 federal road (Transamazônica) on South, and AM-174/360 state road on East. Five municipalities composed the Madeira micro-region: Apuí, Borba, Humaitá, Manicoré and Novo Aripuanã.

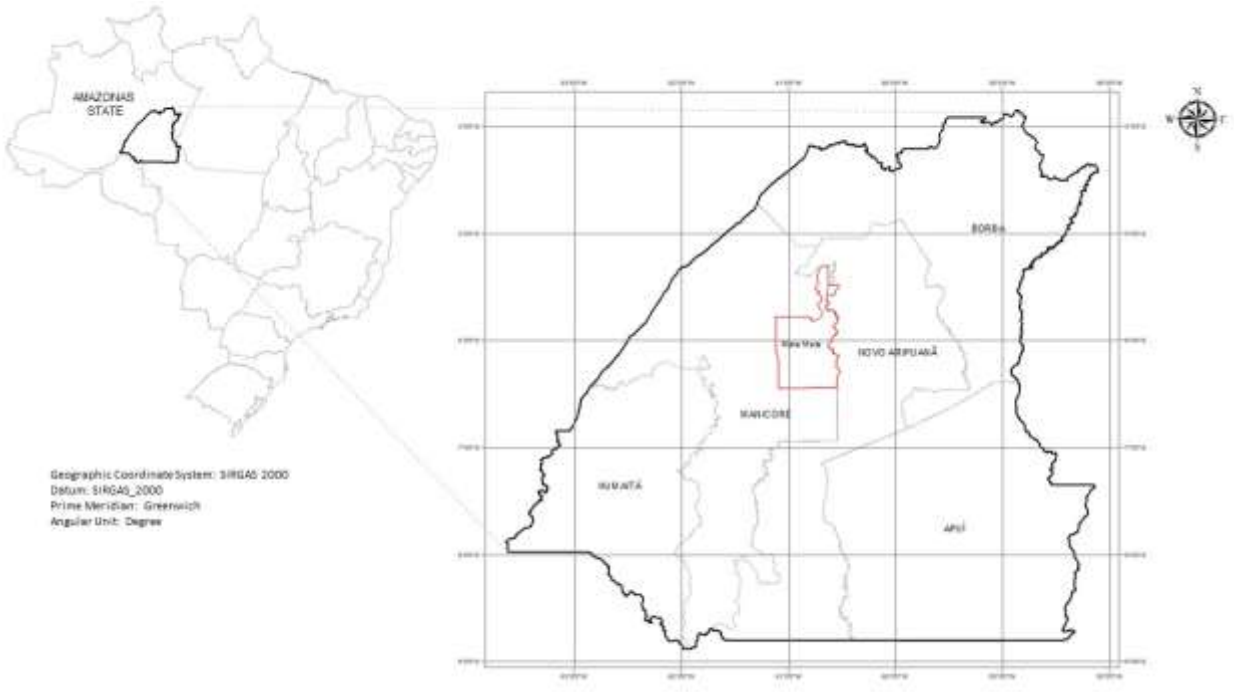


Figure 2.1. Location of 413 Project in Madeira micro-region in the Amazonas State and in Brazil

Note: self-elaborated map using official cartographic sources cited in References

The 413 Project is located in the Amazon Biome, as defined by the official Brazilian Vegetation Map (IBGE, 2013), representing approximately 60% of the Amazon Basin. That hydrographic basin covers nearly 750 million hectares in eight countries: Brazil, Bolivia, Peru, Ecuador, Colombia, Venezuela, Guyana, and Suriname. The so-called “Legal Amazon of Brazil” (Amazônia Legal in Portuguese) encompasses the states of Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia, Roraima and Tocantins. The Amazon Biome represents one of the last large-sized ancient forest ecosystems globally and is a vast and rich reservoir of biodiversity, water, and carbon, where traditional communities and indigenous people resi de.

The 413 Project comprises a distinct and duly documented land parcel named Fazenda Matá-Matá. The total area of this REDD project is 500,996 hectares, covering 100% of the property as of the project start date. The central geodetic coordinates of the property area are shown in Table 2.1.

Table 2.1. Coordinates and area of the 413 Project

Land Parcel	Coordinates (SIRGAS, 2000)		Area (hectares)
Matá-Matá	60º 45' 38,917"W	5º 57' 46,94"S	500,996
Total			500,996

Climate

The region's climate is classified as Af – Tropical Equatorial and Am – Tropical Monsoon, following the Köppen-Geiger classification, with the predominance of the first. Temperature and air humidity are high throughout the year, but seasonal variation can be noticed across the months. Mean precipitation and temperature are ca. 2,500 $mm.year^{-1}$ and 25 to 28ºC, respectively. The rainy season extends from November to April and the dry season from June to September. Apuí has a maximum temperature of 30ºC, a minimum of 20ºC, and an average of 25ºC. Borba has a maximum temperature of 30ºC, a minimum of 20ºC, and an average of 25ºC. Humaitá has a maximum of 37ºC, and a minimum of 23ºC. Manicoré has a maximum of 36.8ºC and, a minimum of 14ºC. Novo Aripuanã has a maximum temperature of 37.5ºC and a minimum of 16ºC (Silva et al. 2010).

Hydrology

The 413 is located in the Madeira hydrographic sub-basin. The main water streams in the region are Aripuanã and Manicoré Rivers, affluents of Madeira River, which in turn is tributary of the Amazonas River, the greatest river in the world in terms of the sheer volume of water that it carries. For the project, Madeira and Aripuanã rivers are particularly relevant because they can be used for transportation during the rainy season, though other smaller rivers and streams also be used on a small scale. Many other permanent and perennial streams can be found throughout the project area, being useful for transport in medium and small size boats. Hydrographic features in the region can be seen in Figure 2.2.

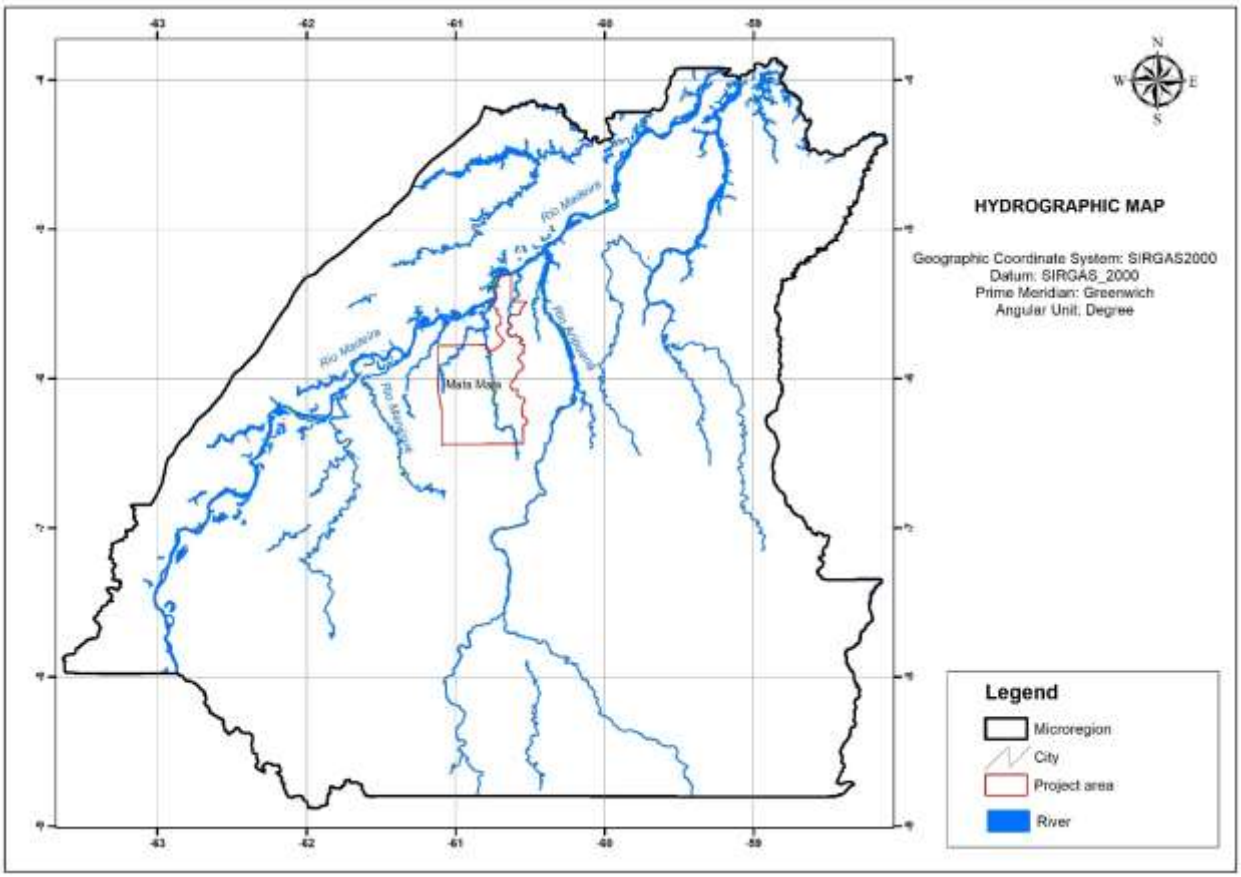


Figure 2.2. Hydrography of the Madeira micro-region where the 413 Project is situated

Note: self-elaborated map using official cartographic sources cited in References

Geomorphology and Topography

Madeira Territory has about 12 geomorphological units distributed in the five municipalities of the Territory (IBGE, 2000). Among the formations are the Amazon Plain, Juma River Plateau – Middle Sucunduri, Roosevelt Depression – Aripuanã, Apiacás Plateau – Sucunduri, Madeira Depression – Canumã, Madeira Depression – Purus, Residual Plateaus of Ji-Paraná – Aripuanã, Pineapple Depression – Tapajós, Residual Plateaus of Madeira – Roosevelt, Juruena Interplanaltic Depression – Teles Pires, Ituxi-Jari Depression, and Chapadas do Cachimbo. Plateaus are flattened surfaces characterized by the factor of erosion surpassing that of deposition. They are located on average from 200 meters. They can take different forms and be called escarpment, mountain range, or plateau. The plains are characterized by being relatively flat and usually located a few meters above sea level. However, they can also occur in high-altitude areas. In this form of relief, the deposition of materials overcomes erosion. Depressions are divided into two major groups. Absolute depressions are those that lie below sea level, and relative depressions are those that lie below the level of neighboring regions and below sea level.

Eighty-five percent of the Amazonas State altitudes are under 100 m, characterized as a flat and low relief. Particularly in the project region, the altitude values of the municipal seats vary from 20 to 150 meters above sea level. The municipality of Apuí has an altitude of 150m above sea level and is among the Brazilian cities with their headquarters located in the highest places in Brazil. Borba (45 m), Humaitá (58 m), Manicoré (45 m) and Novo Aripuanã with an altitude of 20 meters (SEGOV-AM, 2010 and CNM, 2010). The more rugged terrain conditions are an obstacle to the expansion of planting permanent and temporary crops in Madeira. However, it contributes to forestry activities and biodiversity conservation. The areas with the greatest agricultural potential occur in flat areas with gently undulating reliefs in the Territory.

Slope of the micro-region can be seen in Figure 2.3, demonstrating the predominance of flat slope class, ranging from 0 to 8%.

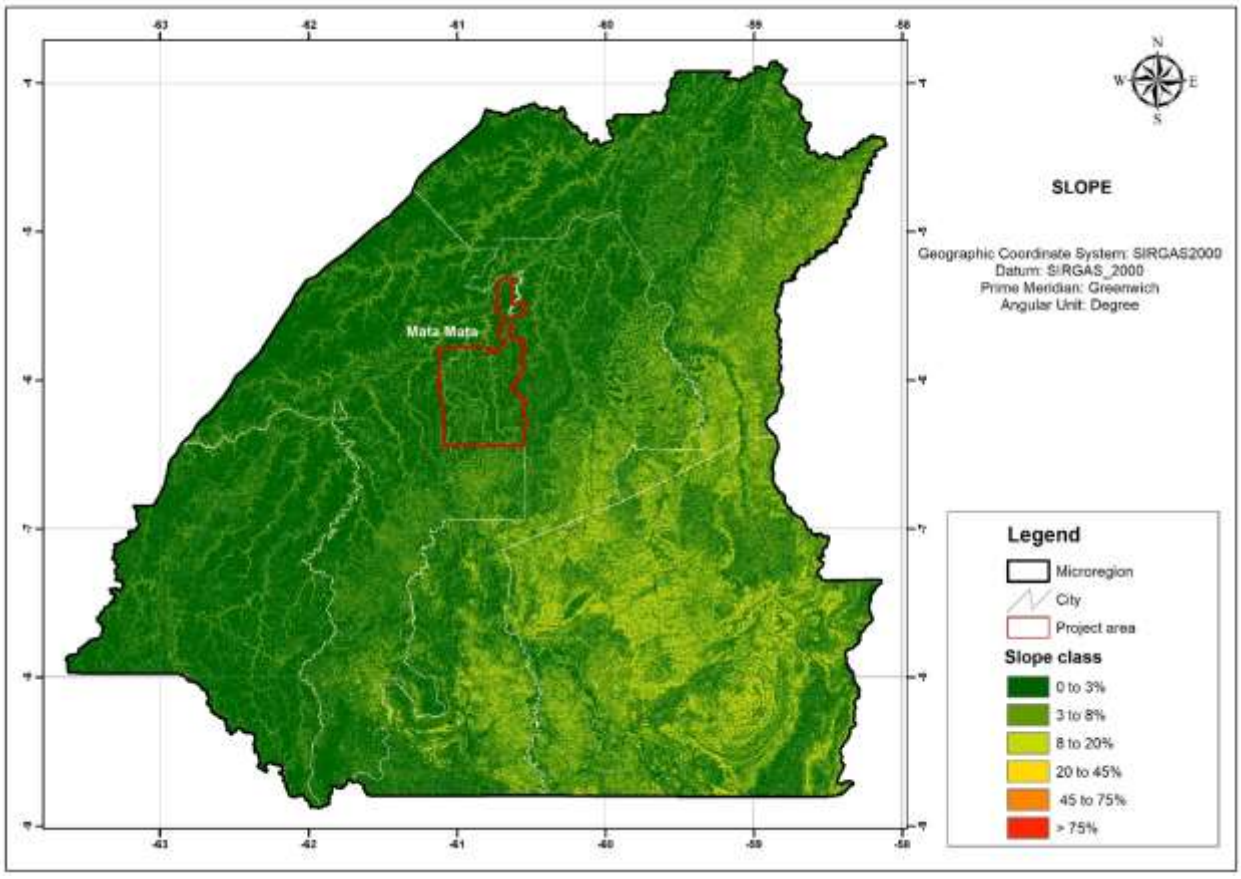


Figure 2.3. Slope of the Madeira micro-region where the 413 Project is situated

Note: self-elaborated map using official cartographic sources cited in References

Geology

The geological formations found in the Madeira Territory consist of Holocene Alluviums, Holocene Terraces, Pleistocene Debris-Lateritic Cover, Beneficent Group, Teles Pires Intrusive Suite, Nova Monte Verde Complex, Roosevelt Formation, Canamã Intrusive Suite, Jamari

Complex, Prosperança Formation, Alter do Chão Formation, Serra da Providência Intrusive Suite, Paleogenic Detritus-Lateritic Covering, Prainha Formation, Iriri Group, Jatuarana Group, Içá Formation, Palmeiral Formation, Rondônia Intrusive Suite, Colider Formation, Parauriti Formation, Solimões Formation, Ciriquiqui Intrusive Suite and Crepori Intrusive Suite. The geological formations are rocky bodies formed by the lithological homogeneity of a commonly tabular shape, usually with lateral continuity and mapped on the earth's surface or in the subsurface.

The basin filling consists of sedimentary packages separated by well-marked unconformities, forming super sequences of periods (IBGE, 2000). From these formations, we can mainly highlight the Holocene Alluviums, Icá Formation, and the Detritus-Lateritic Formation present in most of the Territory. Holocene Alluviums are recent detrital deposits of fluvial, lacustrine, or marine nature, consisting of gravel, sand, silt, and clay transported by current over the floodplain, found along rivers in the region and mainly in the Madeira River. The Icá Formation is a product of Pleistocene sedimentation, covered by aeolian deposits, located in the western portion of the Madeira Territory.

The Cretaceous sequence corresponds to the fluvial deposits of the Alter do Chão Formation, preserved due to subsidence related to the Andean orogeny or the formation of mountains in the Madeira Territory. This formation is found in the eastern part of the municipality of Borba. The Detritus-Laterite Cover is attributed to the post-cretaceous sedimentary origin, with basal conglomeratic occurrences, covered by sandstone layers, claystones, composing deep weathering mantles with red Oxisols. This type of formation is present in a small portion in the municipality of Borba, in the western part of Novo Aripuanã and Manicoré, and the eastern part of the municipality of Humaitá.

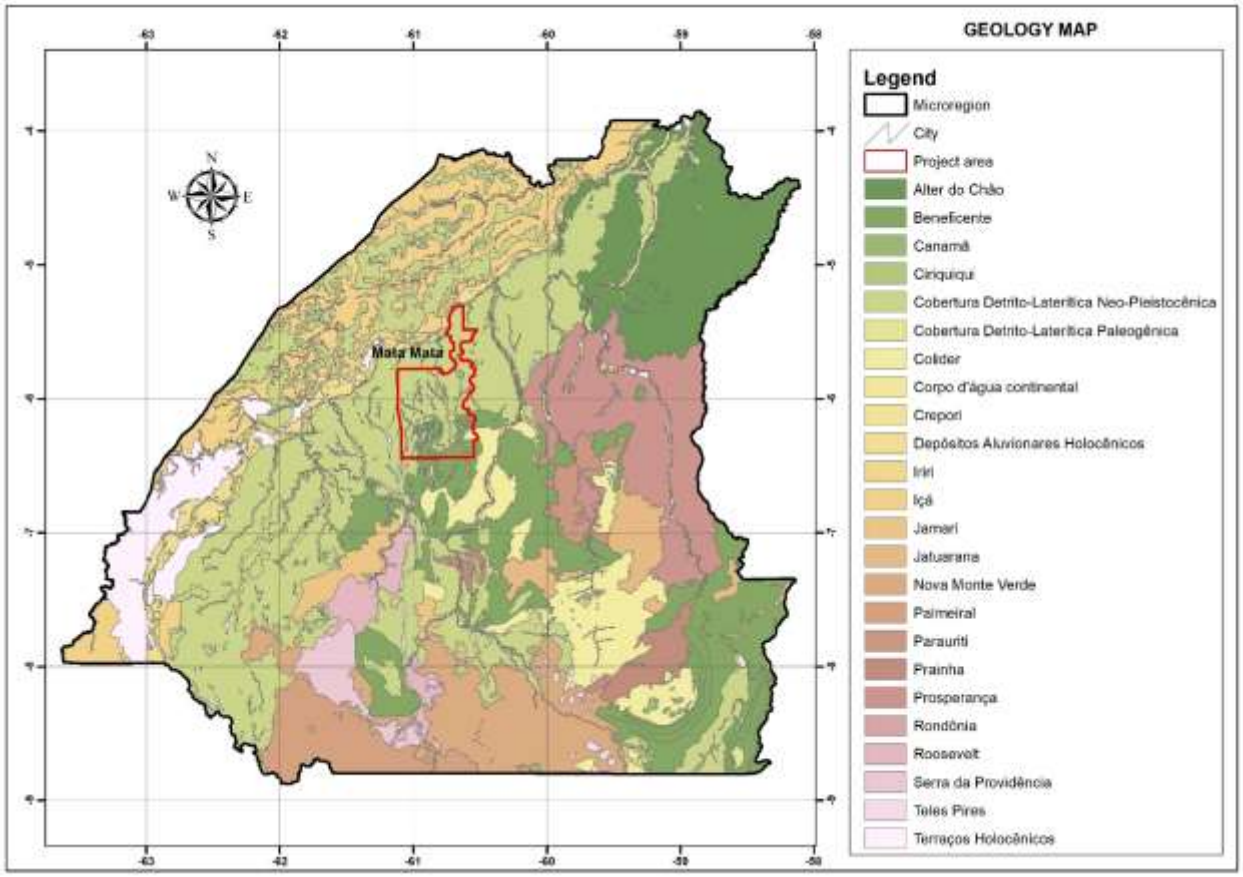


Figure 2.4. Geology of the Madeira micro-region where the 413 Project is situated

Note: self-elaborated map using official cartographic sources cited in References

Soils

The predominant soil class in the project region is Yellow Oxisol (Latossolo Amarelo in the Brazilian Soil Classification System), according to EMBRAPA (2018). Spodosols occur at lower extend, especially along river and stream banks. Oxisols were formed in intense and prolonged weathering environments, which conditioned the substantial disintegration of the matrix rock and almost total decomposition of the primary minerals (Amazonas, 2020).

Although they usually have a low saturation of exchangeable cations (Ca, Mg, K), they can still sustain exuberant forests, such as the Tropical Amazon Forest. This capacity resides in three factors: they exhibit an excellent physical structure, deep that provides robustness to rooting, well drainable that support aeration and water percolation (essential for root respiration), and reasonable retention of water on the surface of clay minerals (essential provision for plants).

Occurrence of Histosols, a soil consisting primarily of organic materials, has not been reported in the project area or its surroundings.

Since the project managers currently do not carry out any economically and commercially driven activities, the soils within the project limits are maintained in their natural features regarding mineral composition and organic matter characteristics. Soils in the region are typically rich in organic matter and lacking in natural fertility. Plowing, harrowing, and other agricultural practices are not carried out in the project area.

Soil descriptions are based upon the Atlas named “Amazonas em Mapas 2020” (Amazonas in Maps 2020) (Amazonas, 2020) and the Brazilian System of Soil Classification published by the Brazilian Agricultural Research Corporation (EMBRAPA, 2018). Soil classes in the region can be seen in Figure 2.5.

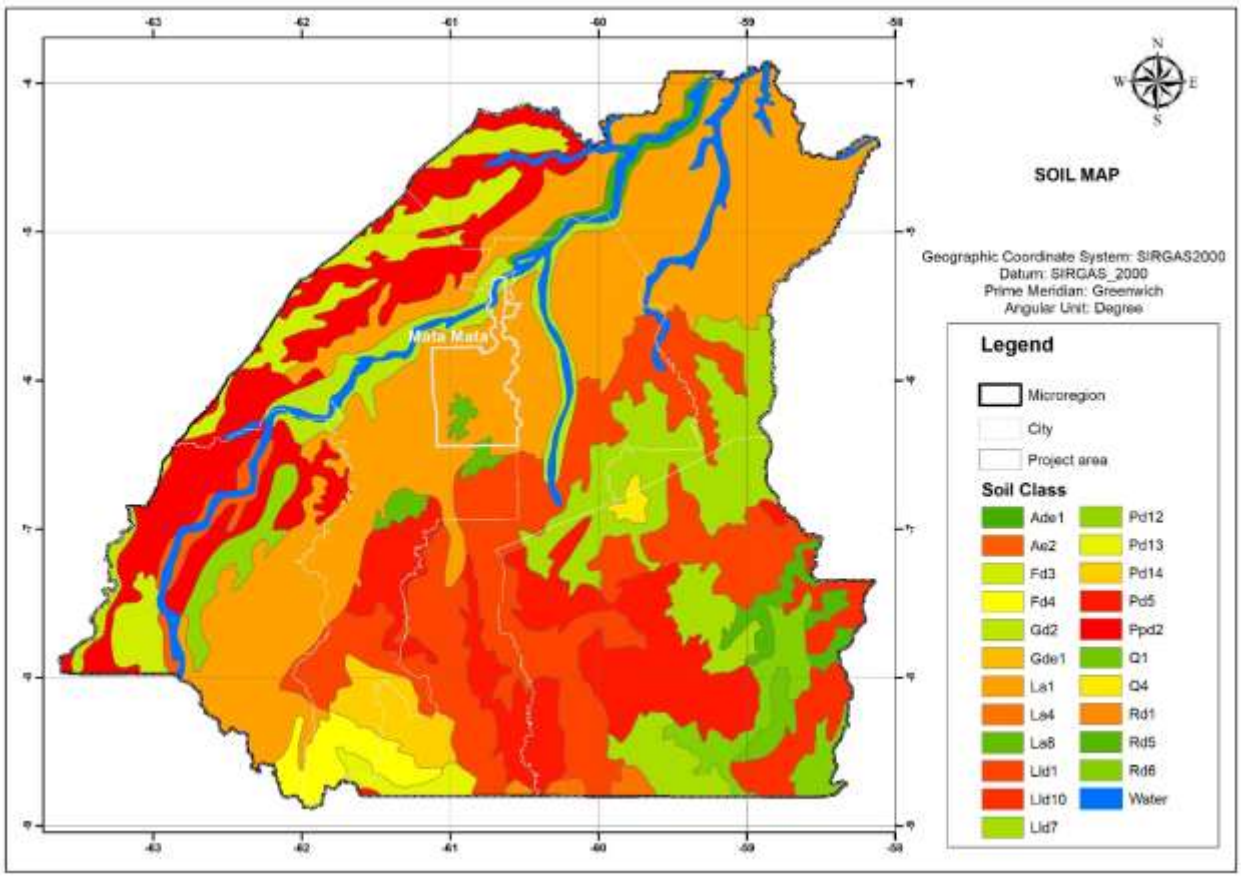


Figure 2.5. Soil classes of the Madeira micro-region where the 413 Project is situated

Note: self-elaborated map using official cartographic sources cited in References

Symbols: Ade1 - Dystrophic and Eutrophic Alluvial Soils; Ae2 - Eutrophic Alluvial Soil; Fd3 - Dystrophic Hydromorphic Laterite 3; Fd4 - Dystrophic Hydromorphic Laterite 4; Gd2 - Gley Dystrophic Soils; Gde1 - Gley - Dystrophic and Eutrophic Soil; La1 - Dystrophic Yellow Oxisol; La4 - Dystrophic Yellow Oxisol; La8 - Dystrophic Yellow Oxisol; Lld1 - Dystrophic Red Yellow Oxisol 1; Lld10 - Dystrophic Red Yellow Oxisol 10; Lld7 - Dystrophic Red Yellow Oxisol 7; Pd12 - Dystrophic Podzolic Soil 12; Pd13 - Dystrophic Podzolic Soil 13; Pd14 - Dystrophic Podzolic Soil 14; Pd5 - Dystrophic Podzolic Soil 5; PPD2 - Podzol; Q1 Deep Sand Quartz Soil 1; Q4 - Deep Sand Quartz Soil 4; Rd1 - Litholic Dystrophic Soil 1; Rd5 - Distrophic Litholic Soil 5; Kd6 - Distrophic Litholic Soil 6; Water - Rivers and Lakes

Vegetation and Ecosystems

The vegetation in the 413 Project is predominantly classified as Dense Lowland Tropical Rain Forest (official acronym Db, Floresta Ombrófila Densa de Terras Baixas) with a small tract of Dense Alluvial Tropical Rainforest (Da) and Dense Sub-montane Tropical Forest (Ds), according to official terminology adopted by the Brazilian Vegetation Map (IBGE, 2013), as shown in Figure 2.6. Although there is a predominance of Db in the Madeira micro-region, other vegetation types also can be noticed, such as Dense Alluvial Tropical Rain Forest (Da), Open Tropical Rain Forest (Ab), and savanna ecosystems (SO and Sp, open savanna, and park savanna, respectively). Db is typically a "Terra-Firme" unflooded ecosystem, whereas Da is confined along rivers and water streams, being frequently ("Igapó", regional name) or partially flooded ("Várzea", regional name) during the rainy season.

Dense lowland rainforest (Db), the predominant in the project land parcel, is a type of vegetation characterized as evergreen forest whose canopy is up to 50 m, with emerging trees up to 40 m in height. It is characterized by exuberant tropical vegetation placed under different vertical strata, with some centenary trees in an emergent layer and hundreds of canopy and understory species, including lianas, and also a large variety of epiphytes, constituting among the largest reservoirs of genetic diversity, of the most different species that inhabit it found in evolved systems and in the most different degrees of complexity. This luxurious flora is a house for a great number of animals and other living organisms.

The 413 property is 100% covered by tropical forest that has not changed in the last ten years prior to the project start (2012) and at the time of this project elaboration (2021). This can be confirmed by analyzing on Landsat satellite imagery taken on both dates and made available to the public by the Brazilian Space Agency (INPE) on its website.

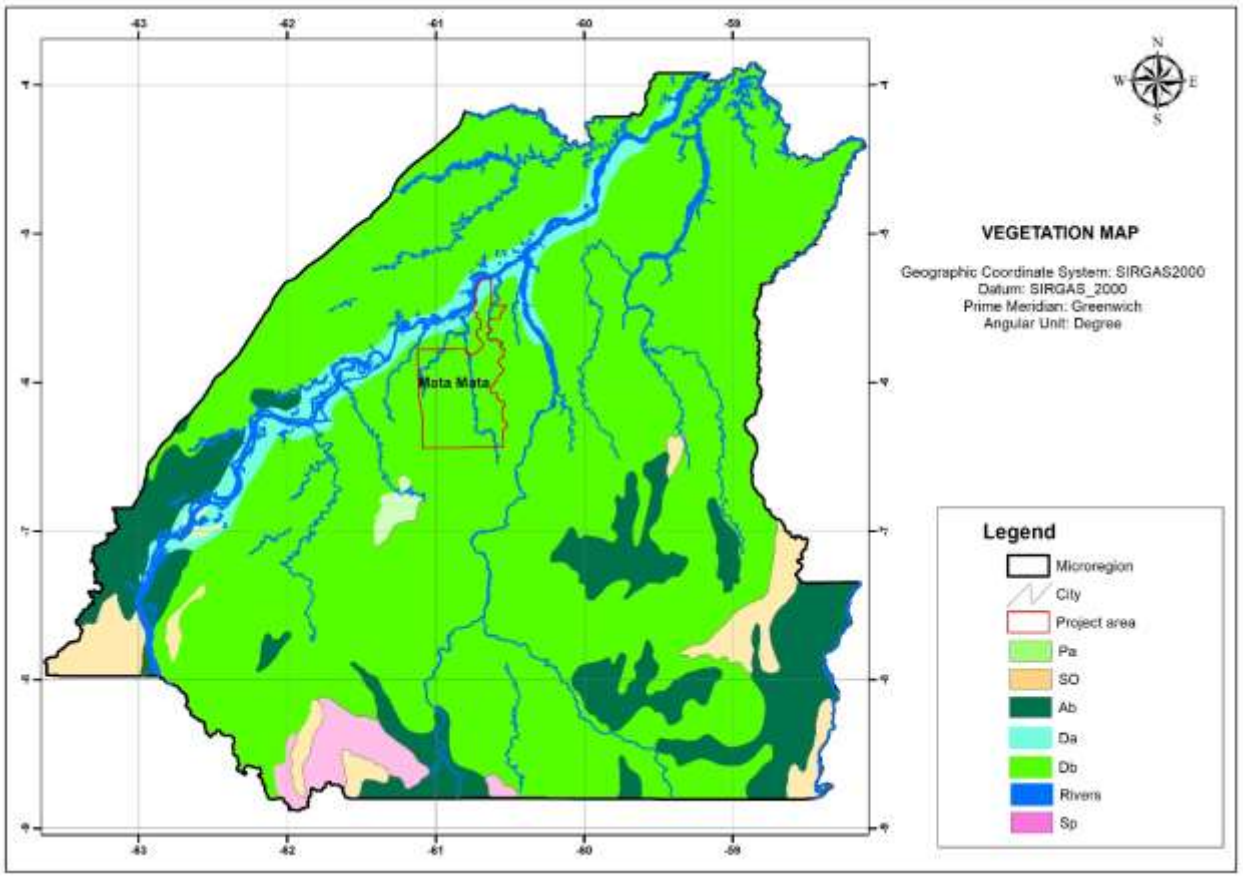


Figure 2.6. Vegetation types of the Madeira micro-region where the 413 Project is situated

Note: self-elaborated map using official cartographic sources cited in References

Symbols: Db – Dense lowland tropical rainforest; Pa - Pioneer shrubby natural vegetation; Da - Dense alluvial tropical rainforest; Open tropical rainforest; SO – Open savanna; Sp – Park savanna

Protected Areas

The project land parcel is situated in a region where several federal and state officially protected areas were formally created by law, some of integral protection and other of sustainable use, according to the Brazilian System of Protected Areas. Activities allowed in the integral protection units are much more limited when compared to sustainable use units. All these protected areas are shown in Figure 2.7. Matá-Matá land parcel borders the RDS Juma (Sustainable Development Reserve) and RDS Rio Madeira. Other surrounding protected areas are Flona Aripuanã (National Forest), Rebio Manicoré (Biological Reserve) and Campos de Manicoré Environmental Protection Area (APA) on south of the project area, not bordering it.

The microregion comprises an extensive protected area, but there are still many private or unofficially public areas that are highly vulnerable to deforestation and forest degradation. Protecting these areas is fundamental to maintaining the integrity of ecological processes,

protecting biodiversity, climate stability, and guaranteeing traditional and indigenous communities´ integrity.

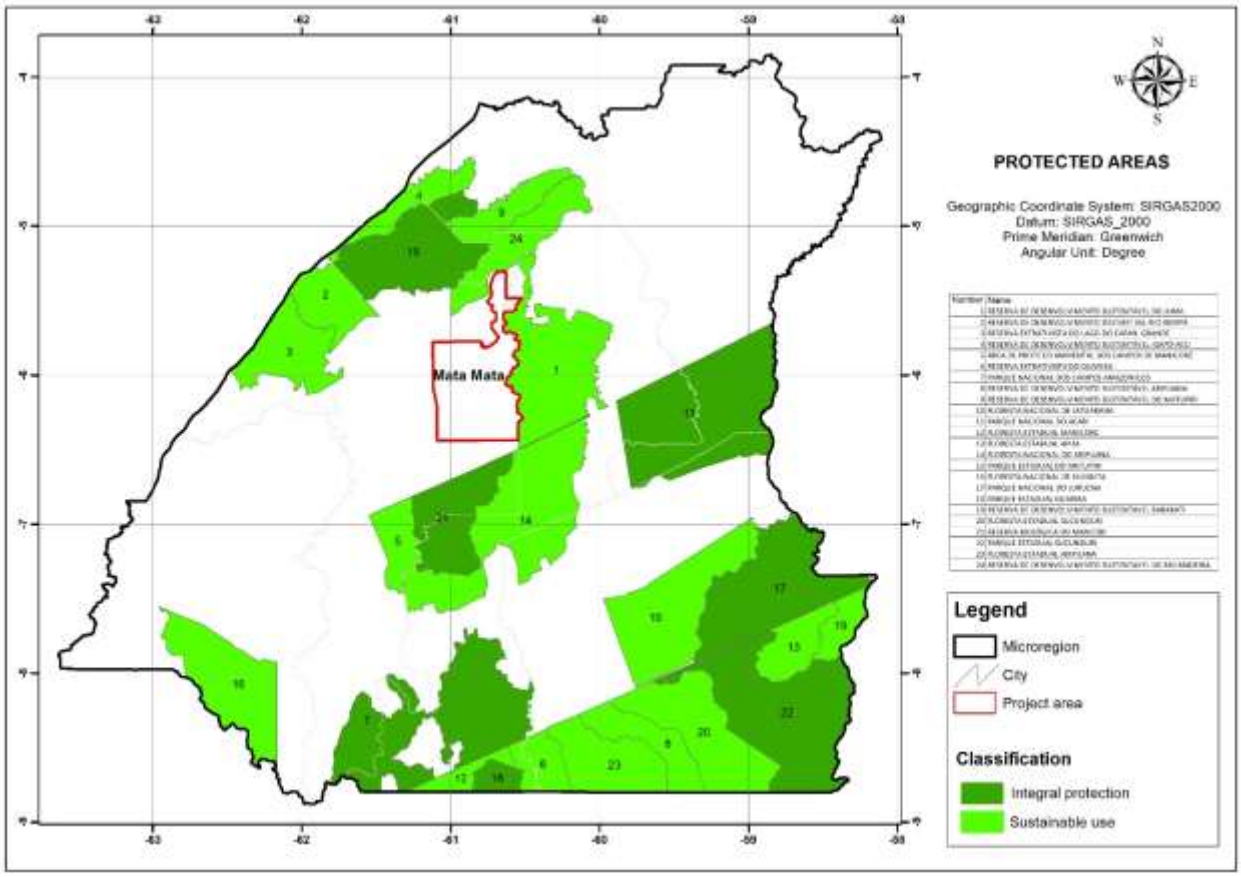


Figure 2.7. Protected areas of the Madeira micro-region where the 413 Project is situated

Note: self-elaborated map using official cartographic sources cited in References

The project area is located within a region considered of great relevance for conservation. Matá-Matá land parcel is almost 100% included in very high or extremely high priority for conservation, sustainable use, and benefit-sharing by the official authorities (Figure 2.8).

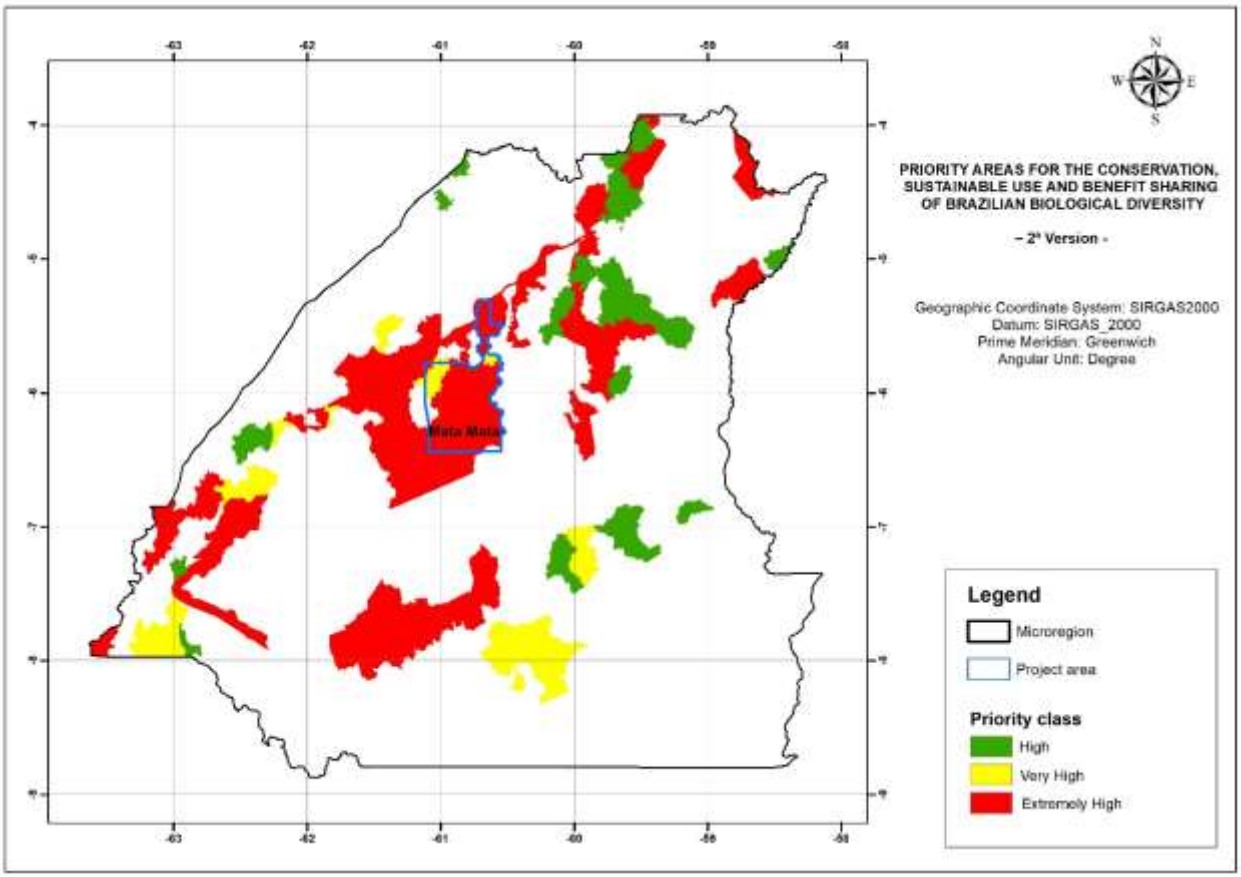


Figure 2.8. Priority areas for conservation according to the Brazilian Government located in the Madeira micro-region where the 413 Project is situated

Note: self-elaborated map using official cartographic sources cited in References

Deforestation and forest degradation

The Madeira micro-region is highly threatened by deforestation and forest degradation due to human perturbation, as seen in Figure 2.9 elaborated from INPE (National Space Research Institute). Deforested and degraded lands surround the land parcel of the 413 Project. Hence, the region's natural vegetation has been altered drastically in the last years as a result of such practices.

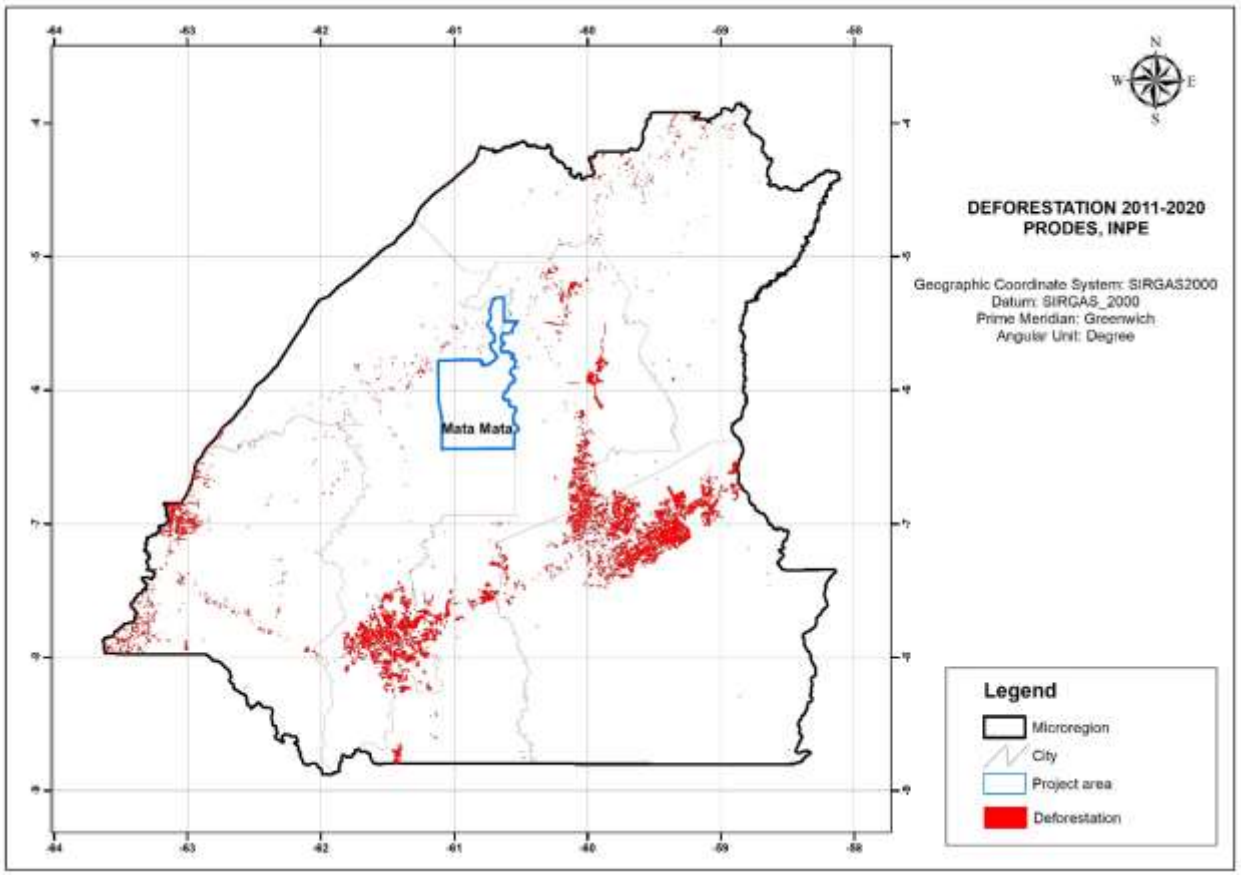


Figure 2.9. Deforestation during 2011-2020 in the Madeira micro-region where the 413 Project is situated

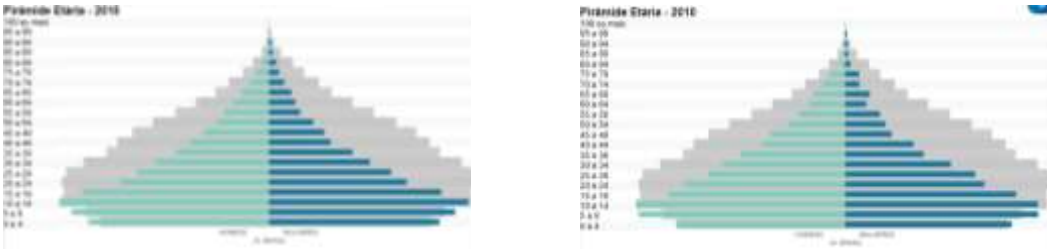
Note: self-elaborated map using official cartographic sources cited in References

2.1.6 Social Parameters (G1.3)

General social parameters

The project is located in Manicoré and Novo Aripuanã, the names of the urban headquarters of the respective municipalities. These towns are located 300 and 419 km by river, from the capital of Amazonas, Manaus. Novo Aripuanã currently has road access via state roads (AM-360 and AM-174) and Manicoré via BR-174 (Transamazônica federal road). Both have fluvial transportation access via Madeira River.

According to the IBGE (2021), based on estimates for the year 2020, the populations of these municipalities are 56,583 and 26,046 people, with demographic densities of 0.90 and 0.52 inhabitants/km^2, respectively. In Manicoré, most of the population lives in rural areas (56%) while in Novo Aripuanã in urban areas (59%). The population consists mainly of children aged 5 to 14, adolescents, and young people up to 19 years of age. About 53% of the population are men and 47% women (Figure 2.10).



a. Manicoré b. Novo Aripuanã

Figure 2.10. Demographic pyramids of Manicoré and Novo Aripuaná municipalities

Source: IBGE (2021)

The literacy percentages of children between 6 and 14 years old are 88.0 and 90.3%, respectively. Average infant mortality rates are 35.71 and 23.36 per 1,000 live births, respectively. The average life expectancy in the State of Amazonas is 72 years, while in the two municipalities in particular ca. 66 years old.

The human development indices (HDI) for both are, on average, 0.580 and 0.5554 for Manicoré and Novo Aripuanã, respectively. The officially employed population is 3.6 and 5.0%, respectively, with average wages of 1.6 to 1.9 minimum wages in the country (minimum wage in Brazil is just over USD 210/month). However, 50% of workers earn less than half of the national minimum wage, i.e., ca. 105 USD/month. The Gini indices of the two municipalities are 0.61 and 0.65, respectively. Poverty rates in these two municipalities are 75.45% and 50.73%, respectively (IBGE, 2021).

According to the IBGE (2021), the majority of the population of these two municipalities declares themselves as Catholic Christians (more than 70%) and Evangelical (Protestant). The main economic activities of the two municipalities are rural, such as planting manioc and manufacturing flour, producing bananas, watermelon, gathering of nuts, rubber, açaí, and wood, artisanal fishery, and animal husbandry (mainly cattle and poultry). Logging is also widely practiced.

Traditional Communities

The existing communities living in the project influence zone are the following:

1. Communities of RDS Rio Madeira: Rio Madeira Sustainable Development Reserve (Reserva de Desenvolvimento Sustentável in Portuguese)

The RDS Rio Madeira houses 25 communities that, together, make up a universe of approximately 480 families. The area is characterized by the occupation of traditional populations, remnants of rubber plantations and many of the current communities were formed due to rubber roads. The main economic activity is agriculture, with bananas being the main commercial product. In some cases, the extraction of Brazil nuts is explored. There is also the possibility of commercial exploitation of wood, copaiba and cumaru. The area has strong potential for ecotourism, including ornithological and educational tourism (ISA, 2021).

More detailed mapping and identification of local communities done by FAS (2017) evidenced 44 different communities living in the RDS Rio Madeira, located mainly along left side riverbanks of Madeira River. Cassava flour, cocoa, açaí, watermelon, banana, nuts, and copaiba oil are the main productive chains for those residents. A total of 1,072 families have been assisted by the Bolsa Floresta program of the State of Amazonas (FAS, 2017). See also section 4 for further details.

2. Communities of RDS Juma: Juma Sustainable Development Reserve (Reserva de Desenvolvimento Sustentável in Portuguese)

According to ISA (2021), about 11 communities inhabit the reserve practicing extractvism (timber and non-timber small-scale or low-intensity activities) and slash and burning agriculture. There are areas of "black earth", which resulted from the agricultural activities of paleoindigenous people who inhabited the region between 1,500 and 2,000 years ago and are used for subsistence cultivation. The extraction of wood, gold, and pebble and the extraction of Copaiba oil are the main economic activities. There is the presence of mahogany and the community interest for harvest and its, commercialization. The region is threatened by the advance of deforestation to plant pasture, soybeans, imminent logging and infrastructure building, such as hydroelectric plants, which have a profound impact on the biota and landscape. It is possible to find utensils such as axes and ceramics in its archaeological sites, and strong eco-tourism potential, including ornithological and educational tourism.

More recent and detailed survey carried out by FAS (2017), detected a larger number of local communities living in this area (Figure 4.3). The total number of distinct communities identified was 38 and the leading product chains noticed were: nuts, banana, copaiba oil, watermelon, and cassava four. These communities are mainly located along the Aripuanã and Mariepauá rivers. A total of 484 families have been assisted by the Bolsa Floresta program of the State of Amazonas, and another REDD+ project registered under VCS and CCB standards also provides social assistance to some of these communities. See also section 4 for further details.

3. Communities of Flona Aripuanã: Aripuanã National Forest (Floresta Nacional do Aripuanã in Portuguese)

It is a sustainable use unit, whose objectives are the following: to promote sustainable multiple-use management of forest resources; the maintenance and protection of water resources and biodiversity; and support the development of methods for the sustainable exploitation of natural resources, seeking to create alternative means of generating income for the local population. Despite being a federal conservation unit (protected area) categorized as Flona, traditional populations reside inside it (ISA, 2021). Pereira et al. (2019) made an overview of these communities and land and social conflicts in this protected area. There is no accurate update data on these communities.

Communities of APA Campos de Manicoré: Área de Proteção Ambiental dos Campos de Manicoré in Portuguese)

It is a sustainable use unit, intending to order the process of occupation in the region, mainly concerning the conciliation of the environmental conservation of natural fields, extremely fragile environments, and the construction of the highway that connects the seat of the municipality of

Manicoré to the district of Santo Antônio de Matupi. Accurate and updated data on these communities are not available.

Rural settlements

Considering the diversity of forms of use and appropriation of natural resources among social groups that inhabit the Amazon, we can say that land tenure triggers a complex mosaic of representations of the world, concrete life, and the types of work developed in it, guaranteeing subsistence of a unique way of life in this region of Madeira.

The ways of using resources in the areas corresponding to the territory under analysis are characterized by this process, permeated by the differentiation of the way of inhabiting, producing, and identifying with the places of possession, especially in the small properties, rural communities and in areas destined to land settlement and regularization projects.

Thus, a large part of the land destined for occupation by rural communities between the interfluvial of the Madeira River and the BR 319 highway passed under the domain of the Union, as recommended by decree no. 1164, of April 1, 1971. Soon, the land regularization programs of the possessions and small properties of family agriculture and the settlement projects will begin to be attended by the responsibilities of the areas administered by the Federal Government through INCRA and the Amazonas state government through the Amazonas Land Institute (Instituto de Terras do Amazonas - ITEAM).

The agrarian context of the Madeira Territory, regarding settlement projects, is characterized in different ways, considering the reality of the occupation of social agents who traditionally inhabit rural communities, with demand for better access to land and claim for ownership or possession. According to Silva (2010), rural communities in the Madeira Territory, based on research data on the profile of the land issue carried out by ITEAM and the Federal University of Amazonas in 2009, indicate that the traditionally occupied lands generally belong to former owners, who left the land title to their heirs. However, through the technical verification carried out by ITEAM, documents that are no longer valid were found, from the heirs living in the area and the known relations. In this case, the lands belong to those who demonstrated their occupation for a number of years, according to the law of adverse possession (usucapião in Portuguese) under Law n. 6,969 of 1981. In general, the founding families of the communities hold a large part of the land, and these lands are divided among their descendants, passing between generations.

The current actions of INCRA and ITEAM in Madeira demonstrate recent progress in implementing assistance policies for settlement projects. However, investing in the improvement of INCRA settlements and expanding their number is one of the strategic measures to promote development in the Territory. Overcoming problems related to land regularization, land grabbing in the surroundings and the areas themselves, poor road conditions, difficulties in marketing production and obtaining credit, lack of electricity, and numerous social conflicts in order to achieve that objective. The agrarian reform model of the settlements in the region must be reformulated to a sustainable model that includes the development of the Environmental Development Plan (PDA) in each rural settlement and areas of small family farmers, with a structure that favors socioeconomic viability (involving the flow of production and access to basic education and health

services) and respect for environmental legislation. The rural settlements existing in the micro-region where the 413 project is situated shown in Table 2.2.

Table 2.2. Rural settlements in the Madeira micro-region where the 413 Project is taking place

Municipality	Name	Type of Project	Area (ha)	Capacity (families)	Number of families settled
Apuí	PA Rio Juma	Federal Settlement	689,000	7.500	6.118
	PAE Aripuanã-Guariba	Federal Agroextractive Settlement	1,226,748.89	80	55
	PAE São Benedito	Federal Agroextractive Settlement	203,088.92	80	80
Borba	PA Puxurizal	Federal Settlement	4,414.66	104	90
	PA Piaba	Federal Settlement	4,400.83	111	99
	PAE Abacaxis	Federal Agroextractive Settlement	687,633.55	130	105
	PAE Trocanã	Federal Agroextractive Settlement	69,812.55	500	351
	PAE Tupana Iguapó - Açu I	Federal Agroextractive Settlement	138,435.00	200	61
	PAE Maripiti	Federal Agroextractive Settlement	108,411.76	600	555
	PAE Anumaã	Federal Agroextractive Settlement	33,430.00	250	195
	RDS Canumã	Sustainable Development Reserve	22,354.86	500	249
Humaitá	PAE Botos	Federal Agroextractive Settlement	101,397.65	300	190
	Flona de Humaitá	National Forest	468,790.00	160	108
	PAE Uruapiara	Federal Agroextractive Settlement	40,860.59	270	182
	PAE Santa Fé	Federal Agroextractive Settlement	4,770.64	50	39
	PAE São Joaquim	Federal Agroextractive Settlement	192,937.20	300	134
	PAE Floresta do Ipixuna	Federal Agroextractive Settlement	29,581.83	170	59
	PAE Novo Horiente	Federal Agroextractive Settlement	19,180.70	40	39
	PDS Realidade	Sustainable Development Project	43,773.41	250	155
	PAE Santa Maria Auxilladora	Federal Agroextractive Settlement	35,419.71	150	99

Table 2.2. Rural settlements in the Madeira micro-region where the 413 Project is taking place – Continuation

Municipality	Name	Type of Project	Area (ha)	Capacity (families)	Number of families settled
Manicoré	PA Matapi	Federal Settlment	34,344.90	371	371
	PAE Matupiri	Federal Agroextractive Settlement	9,712.21	57	57
	PAE Jenipapos	Federal Settlement	40,401.18	380	380
	RESEX do Lago do Capanã Grande	Extractive Reserve	304,146.28	190	190
	RDS Amapá	Sustainable Development Reserve	216,108.73	297	297
	PAE Onças	Federal Agroextractive Settlement	9,500.00	298	298
Novo Aripuanã	PA Acari	Federal Settlment	161,700.00	1.773	820
	RDS do Juma	Sustainable Development Reserve	589,611.28	300	244
	RDS Rio Madeira	Sustainable Development Reserve	283,117.00	700	644

Source: MDA/Incra/SIR (30/09/2007), cited by Silva et al. (2010)

Indigenous communities

Several indigenous communities live on their demarcated lands by the federal government, called Terras Indígenas in Portuguese (acronym TI). There is no overlap of the project areas with these lands and no borders with them as well. The closest indigenous tribes are Pinatuba, Rio Manicoré and Setemã, as shown in the map below (Figure 2.11).

In order to describe the Indigenous Lands in the Madeira Territory, it will be divided into two sub-territories, according to the role of the state of Amazonas: Upper Madeira and Middle Madeira.

A – Alto Madeira Indigenous Lands

The region called Alto Madeira is located in the state of Amazonas and is formed by the municipalities of Humaitá and Manicoré, south of the state. Economically, they are municipalities that survive on agricultural and agro-pastoral production. Manicoré is intersected by the Transamazônica highway that connects Amazonas to the states of Pará and Mato Grosso. Humaitá, in turn, is cut by the BR 230 highway and, more recently, by the BR 319. Both constructions portray the dualism present in the exercise of national developmental undertakings: positive and negative results in various aspects such as the eminent weakening of local ethnic cultures, like the indigenous, in contrast to the region's progress. An attempt to contain and protect this portion of the population from the harmful onslaught of such projects was the demarcation of several indigenous areas in the Alto Madeira, as can be seen below:

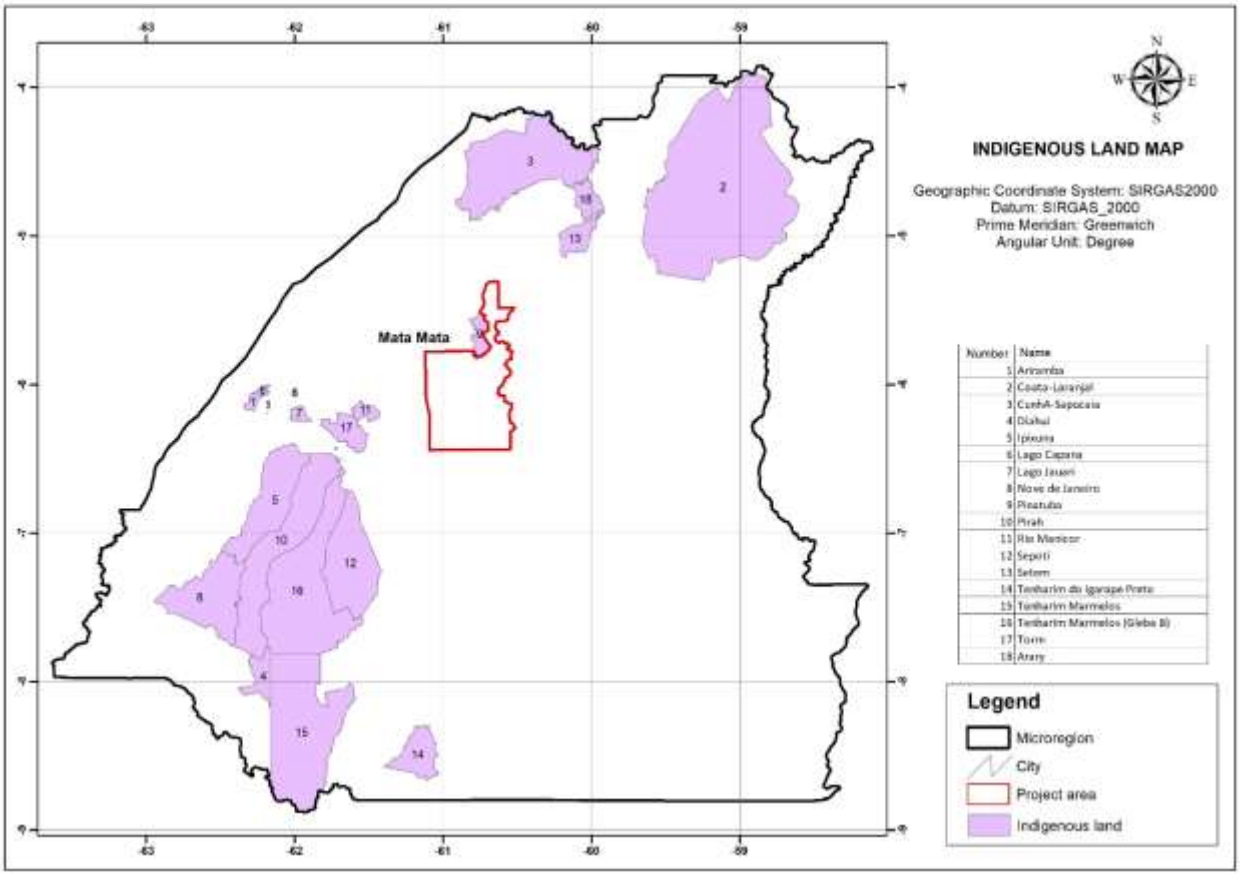


Figure 2.11. Indigenous reserves in the Madeira micro-region where the 413 Project is situated

Note: self-elaborated map using official cartographic sources cited in References

a) Sepoti Indigenous Land

The Sepoti Indigenous Land received the approval of its demarcation through Decree s/n of 10/27/2004 published in the Official Gazette of the Union on 10/28/2004. Intended for the permanent possession of the Tenharim, it is located in a territorial strip of 251,349 hectares that connects the municipalities of Humaitá and Manicoré (AM), with the Marmelos, Sepoti and Riozinho rivers standing out in their territory, with their tributary streams, Igarapé do Peruano, das Pedras, Javari, Barbaço, Água Branca and Água Preta. According to data from the Special Indigenous Sanitary District of Porto Velho, responsible for the health coverage of this Indigenous Land, the population is approximately 73 indigenous people (DSEI, 2008 *apud* Silva et al. 2010). Indigenous people living in the reserve are of Tenharim ethnic.

b) Tenharim Indigenous Land of Igarapé Preto

Approved through Decree s/n published on 20/04/2004 for the occupation of the Tenharim indigenous peoples, currently estimated at approximately 90 indigenous people (DSEI, 2008 *apud* Silva et al. 2010). With a territorial extension of 87,413 hectares, the Indigenous Land is located in

the municipality of Novo Aripuanã and is under the jurisdiction of FUNAI Porto Velho (RO). It receives assistance from the Special Indigenous Sanitary District of Porto Velho (RO). The Association of Tenharim Indigenous Peoples of Igarapé Preto registers the interest in mining by illegal companies and prospectors.

c) Tenharim Marmelos Indigenous Land

Approved through Decree s/n published on 01/08/1996 for the Tenharim indigenous people. Its territorial extension is 497,521 hectares in the municipality of Humaitá (AM), where there are approximately 340 indigenous people (APITEM, 2008).

Its territory is crossed by the BR-230 highway and represented by the Association of the Indigenous People Tenharim Morõgwitá (APITEM). The partnership between APITEM and the company Liga de Eco Pousadas da Amazônia Ltda for the tourist practice of sport fishing stands out.

d) Tenharim Marmelos Indigenous Land (Tract B)

The current legal status is declared by Ordinance 2,367 published on 12/18/2006 as the territory of the Tenharim. Its 473,961 hectares link the municipalities of Humaitá and Manicoré, both in the state of Amazonas According to the Association of Indigenous Peoples Tenharim Morõgwitá, the Indigenous Land suffers threats from illegal loggers and is under FUNAI Porto Velho (RO) jurisdiction and receives assistance from the Special Indigenous Sanitary District of Porto Velho (RO).

e) Ipixuna Indigenous Land

Approved by Decree s/n published on 11/04/1997 as the territory of the Parintintin, this Indigenous Land is located in the municipality of Humaitá, with 215,362 hectares and being administered by FUNAI Rio Branco (AC). According to local leaders, there are records of illegal presence of loggers.

f) Indigenous Land Nove de Janeiro

Approved by Decree s/n published on 11/04/1997, it is located in the municipality of Humaitá (AM) and recognizes the extension of 228,777 hectares for the Parintintin indigenous people. The most populous communities are Traíra and Pupunha which, together with the others, are under the jurisdiction of FUNAI Porto Velho (RO) and receive assistance from the Special Indigenous Sanitary District of Porto Velho (RO). Its location close to BR 230, weakens its timber resources, which suffer constant threats.

g) Diahui Indigenous Land

It received the approval of its administrative demarcation through Decree 27 October 2004 published on 10/28/04 for the permanent possession of the Diajuí indigenous people. Located in the municipality of Humaitá (AM), it features the Taiuí, Jacu, Pacuí and Peixes streams. According to the homologation decree, the Diahuí Indigenous Land confronts the Pirahã Indigenous Land (of the Mark MF-05 to Mark SAT-02/T.I. Diahuí) and Marmelos Indigenous Land (from Marco SAT-P01 to Marco M-20W). Its territorial extension is 47,354 hectares where approximately 88 indigenous people live (RENISI, 2006 *apud* Silva et al. 2010), is under the jurisdiction of the FUNAI

Porto Velho (RO), and receives assistance from the Special Indigenous Sanitary District of Porto Velho (RO).

h) Pirahã Indigenous Land

Located in the municipality of Humaitá (AM), it has 346,910 hectares and is specifically home to an approximate population of 398 Pirahã indigenous people (DSEI, 2008 *apud* Silva et al. 2010) published in the Federal Official Gazette on 11/04/1997.

B – Indigenous Lands of the Middle Madeira Region

The Middle Madeira is composed of the Amazonian municipalities of Novo Aripuanã, Apuí and Borba and has the following Indigenous Lands in its jurisdiction.

a) Torá Indigenous Land

Located at the confluence of the municipalities of Humaitá and Manicoré (AM), it has 54,961 hectares of land area and is home to an approximate population of 108 Torá and Apurinã indigenous people. Its demarcation was approved by Decree s/n of 10/27/2004 published in the Federal Official Gazette on 10/28/2004. The entities responsible government agencies are FUNAI Porto Velho (RO) and the Special Indigenous Sanitary District of Manaus (AM), working to promote indigenous health. The Torá Indigenous Land has potential for the cultivation of bananas, pineapples, cassava, and Brazil nuts. The role of the People's Association stands out here.

b) Pinatuba Indigenous Land

It received the approval of its demarcation through Decree s/n published in the Official Gazette of the Union on 12/11/2001. It is a territorial extension of 29,564 hectares located in the municipality of Manicoré (AM) for the Mura, estimated at 478 indigenous people (DSEI, 2008 *apud* Silva et al. 2010). The governmental bodies present are FUNAI of Manaus (AM) and the Special Indigenous Sanitary District of Manaus (AM).

c) Manicoré Indigenous Land Rio

Approved by Decree s/n published on 12/11/2001 as recognition of the permanent ownership of the Mura people. Located in the municipality of Manicoré, it has 19,481 hectares of land where approximately 70 indigenous people live (DSEI, 2008 *apud* Silva et al. 2010). The governmental bodies present are FUNAI of Manaus (AM) and the Special Indigenous Sanitary District of Manaus (AM).

Governmental and non-governmental organizations

According to Silva et al. (2010), several government and non-governmental organizations are present in the Upper and Middle Madeira region, amongst those are:

ANEEL – National Energy Agency: responsible for regulating the build of the Jirau and Santo Antonio hydroelectric plants on the Madeira River and other activities related to electrical energy.

In 2010, this project had its Environmental License authorization challenged by the National Indian Foundation under the allegation that in the EIA-RIMA (Environmental Studies) prepared by Furnas and Odebrecht (companies responsible for building the plants), the indigenous component was insufficiently addressed, concealing the assertion that its construction will affect several Indigenous Lands and groups of isolated Indians, such as in the Jacareúba/Katawixi and Mujica Nava/Serra Três Irmãos areas, in two geographical references, in the state of Amazonas, to name a few;

Liga de Eco Pousadas da Amazônia Ltda: this tourism company signed a contract with the Association of the Tenharim Morogitá Peoples (APITEM) for the tourism sport modality in the Tenharim Marmelos Indigenous Land as an economic activity;

Indigenous Organizations: APITEM - Association of the Tenharim Morogitá People – municipality of Humaitá; OPIPAM – Organization of the Parintintin do Alto Madeira Indigenous People – headquartered in Humaitá; OPITTAMPP – Organization of the Torá, Tenhari, Apurinã, Mura and Parintintin, and Pirahã Indigenous Peoples – headquartered in Manicoré; UPIMS - Union of Munduruku and Sateré Indigenous Peoples – headquartered in Nova Olinda do Norte; OIMNB - Mura Indigenous Organization of the Municipality of Novo Aripuanã and Borba – headquartered in Borba; OPIAM – Alto Madeira Indigenous Peoples Organization – headquartered in Humaitá.

In the Juma SDR, a state forest reserve near the 413 Project, more than 2 thousand people live within. They have received infrastructure, services, and economic incentives from another REDD+ project carried out in the region. These communities will not be excluded from the 413 Project support actions, but priority will be given to those not yet assisted, chiefly the most reliant among the 480 families of the 25 communities identified by ISA (2021) in the Rio Madeira SDR.

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

The total area of the 413 project is 500,996 hectares, covering 100% of the property as of the project start date. The project location map is provided in Figure 2.1 (see also separate KML file). GHG emissions from deforestation and forest degradation of twenty percent of the project area will be avoided by applying the planned deforestation approach (APD).

As explained previously, the project area is mainly bordered by private and other undeclared public properties and state-federal public, protected areas. The project area does not connect indigenous reserves.

For this project, it is considered that the project's area of influence is the microregion, although, for specific actions of the REDD project, specific areas will be considered. Boundaries of the REDD project is the Matá-Matá land parcel. However, the influence zone, where climate, community, and biodiversity benefits will be provided, is much wider. The influence zone area of the 413 project is 5,460,602 ha, which corresponds to 24.70% of the total area of the Madeira microregion, which is 22,103,001 ha.

Local communities live mainly in or near four protected areas (RDS Rio Madeira, RDS Juma, Aripuanã Flona, and APA of Campos de Manicoré) and four indigenous lands (Pinatuba, Rio Manicoré, Sepoti, and Setemã). In order to share the benefits of the 413 project, priority will be

given to the closest and neediest communities living in or within the vicinity of RDS Rio Madeira, Flona Aripuanã, and APA Campos de Manicoré, as there is already another REDD project that benefits at least part of the RDS Juma communities. The urban areas of Manicoré and Novo Aripuanã will also benefit from the project's social actions and districts and communities situated along the Madeira River.

Eight HCV related to biodiversity were previously identified as explained in detail elsewhere (section 4.1.3) and the community (section 5.1.2). Offsite climate stakeholders and biodiversity benefits will be provided to the influence zone communities as well, so the whole Madeira Micro-region will be favored by the project. In addition, six HCV related to the community were delimited, as seen in Figure 4.5 and described in detail in Table 4.1.

2.1.8 Stakeholder Identification (G1.5)

The stakeholders of the 413 Project were previously identified by analysis of the existing communities and indigenous reserves in the influence zone of the project and throughout the Madeira Micro-region. Internet sites of FUNAI, ICMBio, IBAMA, and IPAAM were used for this purpose. Beyond that, other stakeholders were also identified by means of previous ground surveys in the region and direct contact with some institutional staffs. The list of the potential partners of 413 project is presented in Appendix 1.

The 413 management team plans to conduct a full stakeholder identification process during the project installation phase, as described in Table 2.3.

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

All communities and other stakeholders are listed in Appendix 1. They were identified through institutional internet sites and direct contact with the responsible staff. The stakeholders identified were the following:

- RDS Rio Madeira communities´ associations;
- RDS Juma communities´ associations;
- Flona Aripuanã communities´ associations;
- APA Campos de Manicoré communities´associations;
- Pinatuba Indigenous Reserve;
- Rio Manicoré Indigenous Reserve;
- Sepoti Indigenous Reserve;
- Setemã Indigenous Reserve;
- Rebio Manicoré;
- ICMBio – Chico Mendes National Institute on Biodiversity Conservation;
- IBAMA – Brazilian Institute for the Environment and Renewable Natural Resources;
- FUNAI – National Indigenous People Foundation;
- IPAAM – Amazonas State Environmental Protection Institute;
- Manicoré Municipal Prefecture (Town Hall);
- Novo Aripuanã Municipal Prefecture (Town Hall).

Potential partners of the 413 project are also cited in Appendix 1. The final definition of these partners and their role will be made during the installation phase of the project.

2.1.10 Sectoral Scope and Project Type

The 413 Project belongs to AFOLU category (scope 14 of VCS), REDD – Reducing Emissions from Deforestation and Forest Degradation from Planned Deforestation. The project aims at reducing GHG based upon the Avoided Planned Deforestation and applies Approved VCS Methodology "VM0007 - REDD Methodology Modules (REDD-MF)" and specifically "VMD0006 - Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation/forest degradation and planned wetland degradation (BL-PL)". It is a non-grouped project. This has also been treated as a CCB REDD project, applying the corresponding standards.

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

This section provides a summary description of each project phase and respective activities. The project was organized within three distinct phases (Figure 2.12):

Figure 2.12. Phases of the 413 Project

Project's predicted climate, community, and biodiversity benefits using the so-called Theory of Change causal model that explained how its activities would be achieved is shown in Table 2.3. The basic framework of the project, with its phases, activities, outputs, outcomes, and impacts, is provided here. A first version of the timetable of these activities is given in Appendix 2. The timeline can be revisited after the project start (installation phase).

Table 2.3. Theory of change of the 413 Project

No.	Phase/Activity	Related to*				Outputs	Outcomes	Impacts
		M	CL	CM	B			
1	**PLANNING, PROJECT DESIGN AND CERTIFICATION**							
1.1	Planning and Development of the Project Design Document (PDD)	X			•	• Feasibility study completed; • PDD elaborated; • PDD validated; • PDD revised; • PDD verified/certified; • Baseline scenario revised.	• Rationale of the project conceived and activities planned; • Initial documentation of the project accomplished; • VCUs generated.	• Technical viability of the project demonstrated; • Financial health of the projected guaranteed.
2	**PROJECT INSTALLATION**							
2.1	Initial articulation	x		x		• Internal staff members, outsourced works, and partners of the project identified; • Stakeholders and demands, possible role and form of collaboration identified; • Stakeholders in State and Federal offices to be partners of the project fully identified; • Stakeholders in research and NGO to be partners of the project identified; • Maps and reports on the project installation initial phase elaborated; • Basics projects regarding access, infrastructure, transportation, communications, water, and energy facilities elaborated.	• Labour force of the project defined; • Stakeholders identified; • Partners of the project defined; • Basic maps and documentation of the project obtained; • Basic infrastructure projects duly elaborated.	• Management staff working satisfactorily, under regular and safe conditions; • Stakeholders identified and committed to the project; • Partners identified and committed to the project; • Basic mapping and documentation done; • Infrastructure to be built defined.
2.2	Carbon, biodiversity, and community basic studies	x	x	x	x	• Plant inventory and carbon stock inventory executed; • Cruising of key fauna species executed; • Social survey with the identification of communities and indigenous people and their demands executed; • Community profile and needs identified and a plan to benefit them discussed in a participatory manner and duly reported; • Free, prior, and informed commitments discussed and signed.	• Biodiversity studies accomplished; • Carbon studies accomplished; • Community studies accomplished; • Data bank on local carbon stock, community and biodiversity built.	• Carbon stocks quantified; • Biodiversity basic information available; • Community basic information available; • Stakeholders; commitments accepted.
2.3	Infrastructure construction	x	x	x	x	• Project area identified and signed on the ground; • Access to project area constructed / improved; • Water and energy supply facilities constructed / improved; • Communication facilities constructed / improved; • Nursery built; • Ecological trail constructed; • Health care unit constructed; • Education and training centre constructed.	• Project infrastructure constructed / improved; • Transportation to the project area guaranteed; • Communication among staff, partners, stakeholders and community guaranteed; • Infrastructure to community health improved; • Infrastructure to education and training of the community improved; • Infrastructure to biodiversity studies installed;	• Staff working adequately; • Other stakeholders and partners working adequately; • Community health improved; • Community education and skills improved; • Women and youth empowered; • Plant biodiversity protection improved.

Table 2.3. Theory of change of the 413 Project – Continuation

No.	Phase/Activity	Related to*				Outputs	Outcomes	Impacts
		M	CL	CM	B			
3	**PROJECT OPERATION AND MONITORING**							
3.1	Detailed mapping of the project area	x	x	x	x	• Baseline land and land use change of the project area analyzed and influence zone of the project defined.	• Baseline emissions and reductions calculated and revised; • Project emissions and reductions calculated and revised; • Leakage emissions calculated and revised. • Climate mitigation benefits defined • Climate adaptation benefits defined • Climate adaptation measures monitored • Climate monitoring reported delivered.	• Climate benefits of the project duly reported; • Climate monitoring of the project accomplished; • Climate adaptation implemented.
3.2	Monitoring the project vegetation				x	• Project and leakage emissions and other possible sources of GHG emissions detected and appropriate mitigation measures implemented.		
3.3	Tree carbon inventory		x		x	• Ground and scientifically-sound data on the tree biomass carbon pool and the avoided GHG emissions specific from the project area provided.		
3.4	Non-tree vegetation carbon		x		x	• Ground and scientifically-sound data on the non-tree biomass carbon pool and the avoided GHG emissions specific from the project area provided.		
3.5	Deadwood inventory		x		x	• Ground and scientifically-sound data on the deadwood carbon pool and the avoided GHG emissions specific from the project area provided.		
3.6	Climate mitigation monitoring		x			• Baseline, project emissions, leakage and other sinks and sources of GHG from the project area calculation and monitoring.		
3.7	Climate adaptation monitoring					• Climate adaptation measures.		
3.8	Climate benefits report	x	x			• Climate benefit report.		
3.9	Definition of the local population to be benefited			x		• Local population members defined and involved with the project.	• Community members and representative defined; • Participatory process with community implemented; • Medical and sanitation measures to the local population working; • Education and skills´ training to the local population conducted; • Discussion and dissemination of the project aims and actions to the community implemented; • Youth and women empowering working appropriately; • Income benefit share with community implemented.	• Community welfare improved; • Community income improved.
3.10	Elections of the community leaders	x		x		• Community leaders elected.		
3.11	Permanent health assistance			x		• Health assistance facilities installed and working appropriately.		
3.12	Permanent educational assistance	x		x		• Education facilities installed and working appropriately		
3.13	Technical and other skills training	x		x		• Training facilities installed and working appropriately.		
3.14	Workshops of the management team and community leaders	x		x		• Workshops held.		
3.15	Stakeholders´ additional studies and consultation			x		• Public consultation to community accomplished.		
3.16	Open workshops	x		x		• Open workshops held.		
3.17	Youth empowering actions			x		• Youth empowering actions carried out.		
3.18	Women empowering actions			x		• Women empowering actions carried out		
3.19	Community income share (benefit share)	x		x		• Community income benefit implemented.		
3.20	Climate resilient agriculture and forestry special project		x	x	x	• Training climate resilience accomplished;		
3.21	Food safety special project		x	x	x	• Courses and practice on food safety given;		
3.22	Climate friendly citizenship special project		x	x		• Participatory workshops and other related activities done;		
3.23	Youth future special project		x	x		• Training and dialogue on youth carried out;		
3.24	Water safety and climate special project		x	x		• Courses on water safety and climate given;		
3.25	Community benefit report	x		x		• Community benefit reported delivered;		

Table 2.3. Theory of change of the 413 Project – Continuation

No.	Phase/Activity	Related to*				Outputs	Outcomes	Impacts
		M	CL	CM	B			
3	PROJECT OPERATION AND MONITORING							
3.26	Mother trees identification				x	• Mother trees to serve as a genetic bank in forest to provide propagules to seedling production selected.	• Mother trees selected, identified, and producing seeds; • Seeds collected and stored appropriately; • Seedling production being carried out; • Ecological trial being used by the community, visitors, and other stakeholders; • Research projects on biodiversity under development; • Biodiversity benefits by the project duly recognized and monitored; • Biodiversity adaptation measures monitored.	• Biodiversity protected; • Genetic material rescued and stored; • Biodiversity adaptation measures undertaken.
3.27	Seed and genetic material collection				x	• Genetic material, particularly seeds to produce seedlings of threated key plant species collected and stored.		
3.28	Ecological trail identification				x	• Ecological trail to watch flora and fauna used by the visitors, researchers, and other stakeholders.		
3.29	Nursery activities (seedling production)				x	• Seedlings of key species to forest enrichment in the project area and to donate to community and other stakeholders being produced.		
3.30	Research project on *Betholettia excelsa*				x	• Detailed ecological and silvicultural research on this key Amazon tree species to carry out conservation actions developed.		
3.31	Research project on *Aniba rosaeodora*				x	• Detailed ecological and silvicultural research on this threated tree species to carry out conservation actions developed.		
3.32	Research project on *Ateles ckamek*				x	• Detailed ecological study on this threated ape to develop conservation actions developed.		
3.33	Research project on *Crax pinima*				x	• Detailed ecological study on this threated small bird to develop conservation actions developed.		
3.34	Research project on *Arapaima gigas*				x	• Detailed ecological study on this important fish and carry out conservation strategies developed.		
3.35	Biodiversity monitoring report	x			x	• Report the baseline and project scenario in relation to biodiversity delivered.		
3.36	Biodiversity adaptation measures	x			x	• Appropriate biodiversity adaptation measures accomplished.		

Note: * M – project management; CL – climate; CM: community; B - biodiversity

The 413 Project is not located within a site covered by a jurisdictional REDD+ program.

2.1.12 Sustainable Development

The 413 Project contributes to achieving the global sustainable development goals (SDGs) (Figure 2.13), which are also adopted officially by Brazil. A SWOT matrix shall be built for monitoring and reporting their attainment and the respective provisions, considering the strengths, weaknesses, threats, and opportunities with the development in the project in relation to all 17 SDGs.

Figure 2.13. United Nations Sustainable Development Goals also adopted by Brazil

Source: United Nations Foundations (2021)

2.1.13 Implementation Schedule (G1.9)

The implementation schedule of the 413 project is demonstrated in Table 2.4. Details are provided in Table 2.5. The project start date is 2017 because no deforestation has been noticed during 2017 and 2021, but most activities will take place from 2021 as described below.

Table 2.4. Implementation schedule of the 413 Project

Date	Milestone(s) in the project's development and implementation
01 Aug 2021	Version 1.0 of Project Design Document
	Validation
	…

Table 2.5. Timetable of the project activities and theory of change

No.	Phase/Activity	Year											
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2031+
1	**PLANNING, PROJECT DESIGN AND CERTIFICATION**												
1.1	Planning and Development of the Project Design Document (PDD)	x											
2	**PROJECT INSTALLATION**												
2.1	Initial articulation		x										
2.2	Carbon, biodiversity, and community basic studies		x										
2.3	Infrastructure construction		x	x									
3	**PROJECT OPERATION AND MONITORING**												
3.1	Detailed mapping of the project area		x	x									
3.2	Monitoring the project vegetation		x			x			x			x	x
3.3	Tree carbon inventory		x			x			x			x	x
3.4	Non-tree vegetation carbon		x			x			x			x	x
3.5	Deadwood inventory		x			x			x			x	x
3.6	Climate mitigation monitoring		x	x	x	x	x	x	x	x	x	x	x
3.7	Climate adaptation monitoring		x	x	x	x	x	x	x	x	x	x	x
3.8	Climate benefits report					x			x			x	x
3.9	Definition of the local population to be benefited		x	x									x
3.1	Elections of the community leaders		x	x					x	x			x
3.11	Permanent health assistance		x	x	x	x	x	x	x	x	x	x	x
3.12	Permanent educational assistance		x	x	x	x	x	x	x	x	x	x	x
3.13	Technical and other skills training		x	x	x	x	x	x	x	x	x	x	x
3.14	Workshops of the management team and community leaders			x		x		x		x		x	x
3.15	Stakeholders´ additional studies and consultation			x	x								

Table 2.5. Timetable of the project activities and theory of change - Continuation

No.	Phase/Activity	Year											
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2031+
3.16	Open workshops			x		x		x		x		x	x
3.17	Youth empowering actions		x	x	x	x	x	x	x	x	x	x	x
3.18	Women empowering actions		x	x	x	x	x	x	x	x	x	x	x
3.19	Community income share (benefit share)					x				x			x
3.20	Climate resilient agriculture and forestry special project				x	x	x	x	x	x	x	x	x
3.21	Food safety special project				x	x	x	x	x	x	x	x	x
3.22	Climate friendly citizenship special project				x	x	x	x	x	x	x	x	x
3.23	Youth future special project				x	x	x	x	x	x	x	x	x
3.24	Water safety and climate special project				x	x	x	x	x	x	x	x	x
3.25	Community benefit report					x				x			x
3.26	Mother trees identification				x	x							
3.27	Seed and genetic material collection					x	x	x				x	x
3.28	Ecological trail identification					x	x						
3.29	Nursery activities (seedling production)					x	x	x	x	x	x	x	x
3.3	Research project on *Betholettia excelsa*					x	x	x	x	x	x	x	x
3.31	Research project on *Aniba rosaeodora*					x	x	x	x	x	x	x	x
3.32	Research project on *Ateles ckamek*					x	x	x	x	x	x	x	x
3.33	Research project on *Crax pinima*					x	x	x	x	x	x	x	x
3.34	Research project on *Arapaima gigas*					x	x	x	x	x	x	x	x
3.35	Biodiversity monitoring report					x				x			x
3.36	Biodiversity adaptation measures									x	x	x	x

2.1.14 Project Start Date

January the 1st, 2017. The infrastructure and other project-related activities will start in January, the 1st 2022. The 413 Project claims carbon credits from 2017 because no deforestation has been noticed during 2017 and 2021 (See Figure 2.14).

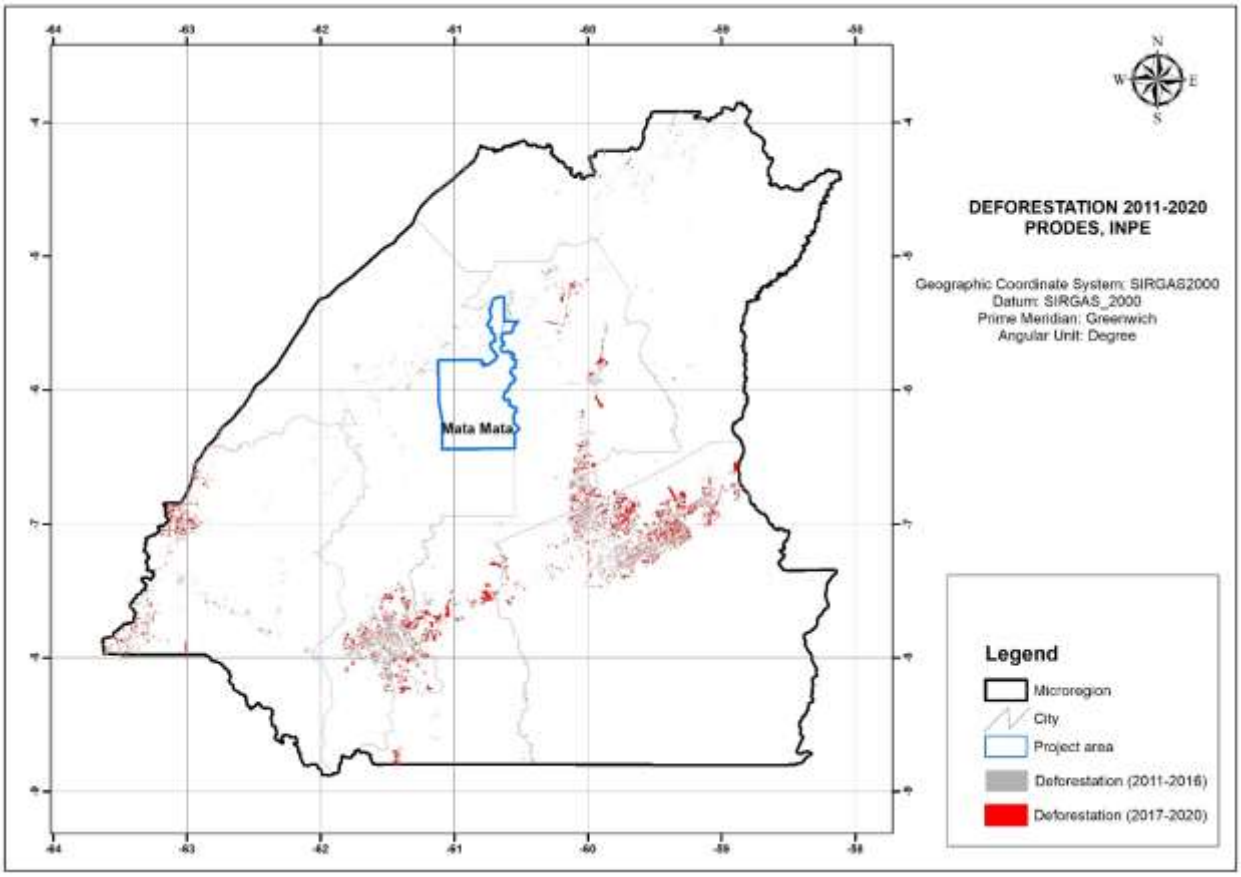


Figure 2.14. Deforestation in the region where the 413 Project is situated

Note: self-elaborated map using official cartographic sources cited in References

2.1.15 Benefits Assessment and Crediting Period (G1.9)

The 413 Project will start on January, the 1st 2017 end on December 31st, 2046, comprising a 30-year total project crediting period. The first crediting period start on January, the 1st 2017 end on December 31st, 2026, comprising a 10-year total project crediting period.

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

This project estimated the baseline scenario for a 10-year period. However, the total crediting period of the project is 30 years, from 2017 to 2046. According to the methodology applied, after 10 years the baseline shall be recalculated. The GHG reductions due to the project implementation within the next crediting period shall also be revisited in 2027. The same rationale will be used to GHG emissions accounting, climate adaptive capacity and resilience, community, and/or biodiversity assessment for the first and subsequent crediting periods.

2.1.17 Estimated GHG Emission Reductions or Removals

The estimated GHG emission reductions of this project are shown in Table 2.6.

Table 2.6. Estimated GHG reductions

Year	Estimated GHG emission reductions or removals (tCO_2e)
2017	22,256,274
2018	22,574,064
2019	8,096,132
2020	1,271,160
2021	1,588,950
2022	1,592,115
2023	1,592,115
2024	1,592,115
2025	1,592,115
2026	1,592,115
2027	1,274,325
2028	956,535
2029	638,745
2030	320,955
2031	3,165
2032 to 2046	0
Total estimated Emission Reduction	**66,940,883**
Total number of years of the first crediting period	10
Total number of crediting years	30
Average annual Emissions Reductions for the first crediting period	6,374,716
Average annual Emissions Reductions	2,231,363

2.1.18 Risks to the Project (G1.10)

The risks to the project were assessed by means of VCS T-BAR "Tool for AFOLU non-permanence risk analysis and buffer determination", dated 19 September 2019, version 4.0. This tool considers a project's internal risk, external risk, natural risk, and mitigation measures which help to reduce risk. See Appendix 3: Project risks table.

2.1.19 Benefit Permanence (G1.11)

The 413 project has a lifetime of 30 years, from 2017 to 2046, with a first credit period running from 2017 to 2026. However, additional measures will be adopted by the project to expand climate, biodiversity, and community benefits beyond the project lifetime.

These measures to be further analyzed during the project development and eventually adopted are the following:

1) Memorandum of understanding with IPAAM and the Secretariat of Environmental of Amazonas State;

2) Transformation of the area as a Private Natural Heritage Reserve (RPPN in the Brazilian System of Protected Areas) or another modality of protected area applicable to the private sector;

3) Inclusion of the project lands within the National System of Environmental Services, if applicable;

4) Search for other national and international financing sources, in addition to resources from the sale of carbon credits from the 413 REDD Project;

5) Search for other sources of funds to maintain the project, such as ecotourism, adventure tourism, canopy tours, wildlife observation, sustainable fishing (catch and release), and donation mechanisms for the project from national and international fund providers.

2.1.20 Financial Sustainability (G1.12)

The financial mechanisms adopted by the project will provide an actual and projected flow of funds adequate for project implementation and for achieving the project's climate, community, and biodiversity benefits. Initial revenues will be contributed by the project proponents and subsequently by the sale of the project's carbon credits.

2.1.21 Grouped Projects

Not applicable.

1) Eligibility Criteria for Grouped Projects (G1.14)

Not applicable.

2) Scalability Limits for the Grouped Projects (G1.15)

Not applicable.

3) Risk Mitigation Approach for Grouped Projects (G1.15)

Not applicable.

2.2 Without-project Land Use Scenario and Additionality

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

After a decrease in deforestation in the Amazon between 2005 and 2015, a new wave of destruction has arrived nowadays. Recent data show the progress of tropical forest destruction in the heart of the Amazon: State of Amazonas. The brand-new victim is the south of Amazonas, which borders the State of Rondônia, one of the most deforested in the region in the Brazilian Amazon. The opening of new roads and accesses into the forest has provoked large-scale cattle-ranching and agriculture activities, activities previously limited to small family farms. The scenario before the project implementation is a rapid and widespread threat to the forest, its fauna, flora, and habitats. In addition to this, there are growing emissions of greenhouse gases from deforestation, forest degradation, and fires.

Since Brazilian legislation allows the clearcutting of 20% of the forest on private property, the most likely scenario is that one. Perhaps even worse because illegal logging, deforestation, and forest degradation occur widely and intensely in southern Amazonas.

The Matá-Matá land parcel, belonging to the Aripuanã River Valley Nucleus, has enough economic viability and feasibility to obtain large profits, if decided to deforest the legal 20% of the area. It is estimated that clearcutting 100,199 hectares (20%) and implementing cattle ranching activities could generate a yearly profit of R$ 368,000,000.00 (Figure 2.15). Hence this scenario is much more economically sustainable when compared to conservation activities, which do not generate any sort of revenue, and are accompanied by other costs such as monitoring, reporting, documentation, protection against illegal activities etc. The economic incentive from the sale of carbon credits is essential for the conservation scenario to happen.

Over the years, there have been several contacts from third parties seeking opportunities to economically exploit the rural property with farming activities and/or extracting native wood, but all were refused due to the owners' decision to preserve the native forest. However, because of the expansion of ranching/agriculture activities in the Amazon Forest, and the costs associated with conservation, it is clear that this scenario is not viable in the long-term. Therefore, the business currently administrated in the project area is not financially attractive and will cease to happen without complementary incentives (ex. carbon credits).

In conclusion, the project without the financial benefits of carbon VCS is not financially competitive with reasonable alternative economic activities. Then, within the legal conditions, the most probable baseline scenario is converting 20% of the land to pasture. In this case, the project activity is determined to be additional

MIDIAGEO GROUP

CAS
Crédito Ambiental Socioeconômico

RELATÓRIO DE RENTABILIDADE ALTERNATIVA AO PROJETO REDD/CAS

A;
413 ENVIRONMENTAL LLC
109 East 17th Street Suite 450
Cheyenne, WYOMING (WY) 82001
USA - United States

Atesto, que a FAZENDA MATA MATA pertencente ao NÚCLEO ARIPUANÃ RIVER VALLEY possui viabilidade econômica suficientes para grande obtenção de lucro se optasse por desmatamento total dos 20% permitidos por LEI, bem como exploração de madeira nativa nos outros 80% da propriedade rural, permitindo segundo as LEI's Brasileiras, uma exploração econômica em 100% da propriedade Rural. Onde;

Aripuanã River Valley - Renda Alternativa

Área de Interesse	*Hectares (ha)*	*Valor médio em R$ para Agropecuária em 20% a.a (anual)*	*Valor médio em R$ para Manejo Florestal em 80% (a cada 20 anos)*
Fazenda Mata Mata	500.000,0000	368.000.000,0000	1.427.280.000,0000
		R$ 368.000.000,00	**R$ 1.427.280.000,00**
		Estimativa a.a. (ano) optando pela degradação "legal" da Floresta Amazônica.	**Estimativa (a cada 20 anos) optando pela degradação "legal" da Floresta Amazônica.**

Ao longo dos anos, desde 2011 houveram vários contatos por parte de terceiros buscando oportunidades de explorar economicamente a propriedade rural com atividades agropecuárias e/ou tirando madeira nativa, mas todos foram recusados devido a decisão dos proprietários de preservar a floresta nativa.

Sem mais, dato e assino;
Cuiabá MT, 08 de setembro de 2021.

Assinado de forma digital por ANDERSON DE OLIVEIRA ALEXANDRE:01967956138
Dados: 2021.09.08 17:24:09 -04'00'
Versão do Adobe Acrobat: 2021.005.20060

R. Pau Brasil, 415 - Jardim das Palmeiras, Cuiabá - MT, 78080-200 | Telefone: [65] 3029-4551 | anderson@midiageo.com.br

Figure 2.15 Alternative Profitability Report

The possible and credible land-use scenarios analyzed in this project are the following:

i. Continuation of the pre-project land use;

ii. Project activity on the land within the project boundary performed without being registered as the CCB-VCS AFOLU REDD project;

iii. Logging the forest for timber production;

iv. Sale of the property.

v. Conversion of 20% of the forest to pasture

These alternatives will be further discussed elsewhere in this section.

2.2.2 Most-Likely Scenario Justification (G2.1)

The VT0001 "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" is applied to demonstrate additionality for the 413 Project. It serves to confirm the baseline scenario by identifying credible alternative land uses.

According to this VT0001 Tool, we identified alternative land use scenarios for the AFOLU project activity, as follows:

i. Continuation of the pre-project land use

The landowner has maintained the property as primary tropical rainforest without human perturbation. However, forest conservation in the project area, as a decision by a private landowner, would be unlikely under any non-carbon, market-related scenario. Since the landowner has costs related to documentation, protection against natural and human perturbation (e.g. land grabbers, fires, etc.), taxes and duties, the continuation of the pre-project land use is unlikely given the absence of revenues necessary to maintain the property.

ii. Project activity on the land within the project boundary performed without being registered as the CCB-VCS AFOLU project

As stated in the previous item (i), the forest conservation in the project area, as a decision by a private landowner, would be unlikely under any non-carbon, market-related scenario. Currently, there are no possibilities to make the project feasible without funds from the carbon project to be registered with the CCB-VCS.

iii. Logging the forest for timber production;

Another possible alternative land use is to manage the forest for logging and timber production in the non-legal reserve. The Brazilian legislation (Forest Code*) allows 20% deforestation in private forestlands located in the Amazon Biome, but the rest shall be maintained as legal reserve (Reserva Legal in Portuguese - RL), i.e., as forest without conversion. So, it is not allowed to convert RL to another land use, at least under the law. Selective logging is allowed under a Sustainable Forest Management Plan (Plano de Manejo Florestal Sustentável in Portuguese -

PMFS), which shall be authorized and inspected by the official environmental institutions (IBAMA and the state secretariat, represented by IPAAM – Amazonas State Environmental Protection Institute).

However, to carry out a PMFS it is necessary to implement infrastructure for forestry logistics. Selective logging is considered to be a main driver for deforestation and induced forest degradation as well, because the newly open roads lead to risk of illegal activities. Without a robust patrol system, the forest area under PMFS becomes more susceptible to invasion and illegal land grabbing, and hence to deforestation and forest degradation.

Forest management (selective logging) in Amazon on a sustainable basis is an economically feasible activity. Although there are still barriers to its application on a large scale in the Amazon region, it is economically and financially attractive. The very limited dissemination and uptake of management techniques by forest owners makes the profitability of agriculture greater in the short term compared to forest management, and the lack of efficient control of illegal and unmanaged timber harvesting are also challenging issues (IMAZON, 2020).

iv. Sale of the property

It is an alternative that may lead to alternative v (most-likely scenario) described below.

v. Conversion of 20% of the forest to pasture

Brazilian legislation (Forest Code) allows 20% deforestation in private lands located in the Amazon Biome, but the rest shall be maintained as legal reserve (RL). The most-likely scenario is the conversion of the 20% of forestland to pasture for livestock management in order to make the property sustainable economically. See also section 3.1.4 for further description of the baseline scenario.

2.2.3 Community and Biodiversity Additionality (G2.2)

The most extensive cause of biodiversity loss in the Amazon is deforestation, which means the complete replacement of hyperdiverse forests by simple ecological systems dominated by a few species, as slash and burning agriculture and pasture for livestock. Studies show that deforestation, as it is currently done, rarely brings benefits to the rural population, generating more poverty and social and agrarian conflicts. Besides leading to the loss of biodiversity, deforestation is also harmful to soil and water resources and increases the risk of expanding large-scale fires and other environmental impacts.

Amazon is the largest and most diverse rainforest region in the world. With about 7,500,000 km^2 of extension and extraordinary environmental heterogeneity, it is home to between 10 and 20% of all species that live on our planet today. About 40,000 species of plants, 2,526 species of terrestrial vertebrates, and 3,000 species of fish are known in the region. The species are not widely distributed in the region, but their distributions are restricted to some well-defined regions, which biologists call “areas of endemism”. For example, in the case of primates, about 65% of species occur in just one area of endemism.

The biodiversity additionality of the 413 is evident once 100,199 hectares of dense undisturbed tropical rainforest will be conserved and not destroyed as permitted by law. Sixty-eight endangered and critically endangered flora and fauna species were identified in the region and will be protected under the project scenario. According to official sources, the project area is situated within a zone classified as of extreme priority to conservation, sustainable use, and benefit share.

Traditional communities and indigenous peoples of Amazon live in harmony with the forest, harvesting wood and non-wood products in a sustainable and balanced way. As historical proof of this is the low occurrence of deforested areas and the conservation of the forest resources by those communities for a long time. Traditional communities know how to deal with the forest without destroying it. However, large-scale agriculture and cattle raising bring a trail of destruction for not considering the role of the forest in the balance of the socio-ecosystem. These activities change the culture of the people and destroy them without social gains.

The conversion of 100,199 hectares of tropical forest would cause negative impacts on communities and indigenous peoples, as it will cause fragmentation of the ecosystem and hinder free movement in the forest and access to the products necessary for their survival. The customary rights of these peoples will be affected, making access to water, plants, and animals essential to the diet and customs of these peoples more difficult.

In addition, deforestation and forest degradation in adjacent areas bring changes in customs and habits of traditional populations, with risks of alcoholism, prostitution, and slave labor, among other negative social impacts. Conserving the forest is the best way to protect those populations from these threats. Unfortunately, the legislation allows deforestation and does not discourage forest degradation. Furthermore, illegal activities are increased as access to agents outside the community proliferates throughout the region. Mineral digging (artisanal gold mining), illegal hunting and fauna trapping and trade, cultivation of exotic species may also bring about severe problems to traditional communities. Land grabbing, violence, and even people's deaths in these communities happen more widely when deforestation and forest degradation occurs. Such illegal activities occur widely in Amazon because the pertinent laws are not being enforced.

Project activities would not have been implemented under the without-project scenario due to significant financial, technological, institutional, or capacity barriers. Private properties usually do not sustain themselves financially without agricultural activities. Promoting conservation outside public areas is a huge challenge because there are no available and significant funding sources to promote conservation and prevent deforestation and forest degradation on private properties. Therefore, it is extremely necessary to use REDD mechanisms to insert private landowners of the Brazilian Amazon into the conservation agenda, giving them the appropriate financial incentives.

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

No distinct community and biodiversity benefits are intended to be used as offsets by the project proponents except the climate benefits.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

Full project description documentation and monitoring reporting will be made available to community and other stakeholders throughout the project lifetime by internet and printed archives deposited in the project headquarters. Any individual or institution interested in the documents may access the project documents for free.

2.3.2 Dissemination of Summary Project Documents (G3.1)

Dissemination of the summary project documentation will be done through the internet site of the project that will allow the free access of all public documents of the project except the commercially sensitive ones.

Hard copy of the PD, validation and verification reports will be also available at the project headquarters/visiting centre to be built in the project area. The main project documents will also be disseminated in open events, workshops, and public consultation meetings to be organized by the project management team. Annual monitoring reports will be distributed to the community leaders and institutional stakeholders, as ICMBio, IBAMA, FUNAI, IPAAM, and NGOs working in the region. The town halls of Manicoré and Novo Aripuanã will also receive such documents. Other dissemination ways can be also utilized to give total transparency to the project, such as radio news, social networks, paper folders, etc.

2.3.3 Informational Meetings with Stakeholders (G3.1)

Annual workshops of the management team and community leaders will be carried out to make a conversation on the planning and actions of the project with the local residents. Besides those workshop meetings, open meetings with all possible stakeholders will be held every two years. Other informal meetings of the management team with individual, groups, and institutions will happen always when necessary. All planned meetings will be previously publicized by the internet, radio, social networks, and written correspondence to the community associations and relevant institutions.

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

Relevant and appropriate information about the potential costs, risks and benefits to communities will be analysed through a participatory and transparent process with the communities. All pertinent information will be provided to communities in a timely manner prior to any key decision they may be making. The management staff of the 413 Project will provide transparency into the decision-making process through consultation to community representatives.

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

The community and other stakeholders will be provided advance information about the auditing process and the auditor´s visit agenda. The schedule of the auditing process during validation and verification will be informed through internet website, social networks, radio messages and

telephone or amateur radio calls to the community leaders. Other forms of communication will also be adopted, if possible and necessary.

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

As stated before, during the site visit, the community and other stakeholders will have the opportunity to have a free conversation with the auditor. The contact of the community leaders and other stakeholders will be informed to the auditing team as well and vice-versa in order to facilitate the direct contact if requested.

2.3.7 Stakeholder Consultations (G3.4)

A prior analysis of all potential project stakeholders was carried out, considering all communities and other stakeholders. The entire design of the project was conceived based on the profile of the communities and the characteristics and cultures of the region. A detailed and in-depth analysis of traditional communities and other stakeholders will be carried out in the project's installation phase.

Two virtual stakeholder consultations were held, via Teams, on the 19th of August and 9th of September 2021. The invites were sent via email to the following stakeholders:

- Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA)
- National Indigenous People Foundation (FUNAI)
- Amazonas State Environmental Protection Institute (IPAAM)
- Manicoré Municipal Prefecture (Town Hall)
- Novo Aripuanã Municipal Prefecture (Town Hall)
- Chico Mendes National Institute on Biodiversity (ICMBio)
- National Institute for Colonization and Agrarian Reform (INCRA)
- Public Ministry of the State of Amazonas (MPAM)
- Brazilian Agricultural Research Company (Embrapa)
- National Institute for Amazon Research (INPA)
- Tropical Forest Institute (IFT)
- Institute of Man and the Amazon Environment (IMAZON)
- Federal Rural University of the Amazon (UFRA)
- Federal University of Amazonas (UFAM)
- Federal University of Acre (UFAC)

- RDS Rio Madeira communities´ associations
- RDS Juma communities´ associations
- Flona Aripuanã communities´ associations
- APA Campos de Manicoré communities´associations
- Pinatuba Indigenous Reserve
- Rio Manicoré Indigenous Reserve
- Sepoti Indigenous Reserve
- Setemã Indigenous Reserve
- Rebio Manicoré
- Sustainable Amazon Fund (FAS)
- Socio-environmental Institute (ISA)

On the 19th of August the only attendee was Weber Braz, an Environmental Policies Coordinator from FUNAI. He stated that FUNAI has a commitment with the ethnodevelopment of the indigenous communities. The organization understands that the carbon issue is intimately connected to the activities of the indigenous communities, affirming that the communities have an important part to play. Therefore, they are open to analysing the PDDs and have an internal sector which focuses on preliminary and feasibility studies for the implementation of this type of project and project activities in the indigenous reserves. The attendee stated that this project would bring forth new information and opportunities. In the end, the attendee solicited the PDD for further information and analysing.

In response, the PDD was translated from English to Portuguese and sent to FUNAI, as solicited. Also, it was made clear that even after the end of the consultation, the proponents would be open to dialogue about the project, accepting any type of comment, question, feedback etc.

On the 9th of August, another round of consultation was held. The stakeholders, as listed above, were contacted via email, telephone and Linkedin. However, there were no attendees this day.

For more information, see Appendix 4 – LSC Report.

2.3.8 Continued Consultation and Adaptive Management (G3.4)

The 413 has planned and implemented a process of continued consultation between its management staff and the communities and other stakeholders about the project.

According to the planning table of the 413 project, various activities will take place throughout the life of the project to make community consultation and receive inputs from members and adapt project management, when needed. The actions planned are:

- Technical and other skills training;
- Workshops of the management team and community leaders;
- Stakeholders additional studies and consultation;
- Open workshops;
- Young empowering actions;
- Women empowering actions.

A timetable of these actions is presented elsewhere in this document.

2.3.9 Stakeholder Consultation Channels (G3.5)

A prior analysis of all potential project stakeholders was carried out, considering all communities and other stakeholders. The entire design of the project was conceived based on the profile of the communities and the characteristics and cultures of the region. A detailed and in-depth analysis of traditional communities and other stakeholders will be carried out in the project's installation phase. Community-elected representatives will be consulted and actively participate in the project management process.

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

The participation of stakeholders in decision-making will be fully provided by the 413 Project through direct contact with representative communities and institutions, respecting different cultures and gender-sensitivity in the implementation of such measures.

2.3.11 Anti-Discrimination Assurance (G3.7)

413 Project adopts an anti-discrimination policy to all its management staff, outsourced workers, ad partners. No discrimination based on gender, race, religion, sexual orientation, or other habits or sexual harassment with respect to the project will be tolerated.

The measures needed to prevent and combat any kind of discrimination are as follows:

1) Training of all members directly involved with the project in anti-racism and anti-prejudice practices;
2) Signing of a term of commitment with good anti-racism and prejudice practices, in all its aspects;
3) Opening of an anonymous communication channel and registration of anti-racism and anti-prejudice complaints;

4) Dissemination of good anti-racism and anti-prejudice practices in all project communication channels, including website, social media and other possible and necessary means throughout the life of the project;

5) Other measures suggested by the community and other stakeholders.

2.3.12 Feedback and Grievance Redress Procedure (G3.8)

413 Project adopts a grievance redress procedure to resolve eventual conflicts throughout the project life span. The process will involve receiving, hearing, responding to and attempting to resolve all grievances within a reasonable time period, which takes into account traditional conflict resolution methods.

All complaints will be respected and dealt with diplomacy, seriousness, and discretion. For all issues raised, an adequate and fair solution will be sought.

Three stages, each with reasonable time limits: attempt at resolution, mediation and arbitration or courts. All efforts will be done to solve the conflicts in the first stage. In case of failure to attempt at resolution, mediation will be tried, by consulting neutral parties on the matter. Only as a last resort, arbitration will apply and, in extreme cases, the court.

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

There will be a formal record of all complaints, without the identification of the complainant, unless he insists on disclosing his name. Registration may be in writing, by email, telephone, and other available channels. Responses to complaints will be made public as quickly as possible, one week for urgent and serious cases and one month for minor issues. All responses will be equally disclosed transparently and recorded in digital and print/written versions.

2.3.14 Worker Training (G3.9)

The 413 project will favor the use of the work skills of people from the communities in the region. The participation of women and young apprentices will be encouraged. Three hundred people are expected to be trained by the 413 Project, being 200 women.

Prior to effective hiring, community members interested in participating as collaborators will be informed in detail about the purpose of the project and trained to understand all the functions necessary for its development. From this, people with the most adequate profile will be recruited to work in the functions that have the greatest ability, but with potential collaboration in all activities conducted by the project.

Vocational awakening workshops will be held periodically. All recruited persons will be skilled in occupational health and safety and in anti-racism and anti-prejudice concepts and applications. Local knowledge will be valued to increase local participation in project implementation. Appropriate safeguards will be taken to prevent a large turnover of people at work and that this does not harm local capacity. At least 250 people are expected to be trained by the project, 150 women.

2.3.15 Community Employment Opportunities (G3.10)

All people in the communities will have equal opportunities to fill all job positions, including management roles if the job requirements are met. Workers will be selected for positions under a fair and transparent process.

Community members, including women, youth and vulnerable and/or marginalized people will have the opportunity to engage in the project, through fair opening of opportunity. Quotas for women, young people and people in special physical conditions may be specified if deemed appropriate and fair, considering that this is a fair and transparent process. At least 20 people are expected to be full-time employed by the project, 10 women.

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

Brazilian Constitution, Chapter II-Social Rights, Articles 7- 11 address labor and social rights, such as: minimum wage, normal working hours, guidance on vacation and weekly leave, guidance on maternity and paternity leave, recognition of collective negotiation with employers, prohibition of discrimination, among others.

In addition to the Constitution, there are two additional decrees related to Brazilian labor laws:

Decree-Law No. 5,452, May 1st, 1943, the so-called Consolidate of Working Laws - CLT (Consolidação das Leis do Trabalho) that provides clarification on hourly, daily, weekly and monthly work hours, employment of minors and women, establishes a minimum wage, establishes worker safety and safe working environments, defines penalties for non-compliance by employers, and establishes a judicial work-related process for addressing all worker related issues.

Law No. 5,889, June 8th, 1973: provides regulation norms to the rural work. This is a complimentary law to the aforementioned 1943 decree because prior to 1973, rural workers did not have the same rights as urban workers. In 1973, this law was established to specify the equality between urban and rural workers, along with compensation for overtime.
There are also several regulation norms from the Ministry of Labor applied to health safety conditions in the labor site, called NRs and described below:

- NR 01 - General Provisions;
- NR 02 - Previous Inspection;
- NR 03 - Embargo or Interdiction;
- NR 04 - Specialized Services in Safety Engineering and Occupational Medicine;
- NR 05 - Internal Accident Prevention Commission;
- NR 06 - Personal Protective Equipment – PPE;
- NR 07 - Occupational Health Medical Control Programs;

- NR 08 – Buildings;
- NR 09 - Environmental Risk Prevention Programs;
- NR 10 - Safety in Electricity Facilities and Services;
- NR 11 - Transport, Handling, Storage and Material Handling;
- NR 12 - Machines and Equipment;
- NR 13 - Boilers, Pressure Vessels and Tabs and Metallic Storage Tanks;
- NR 14 – Ovens;
- NR 15 - Unhealthy Activities and Operations;
- NR 16 - Hazardous Activities and Operations;
- NR 17 – Ergonomics;
- NR 18 - Working Conditions and Environment in the Construction Industry;
- NR 19 – Explosives;
- NR 20 - Safety and Health at Work with Flammables and Fuels;
- NR 21 - Open Pit Works;
- NR 22 - Occupational Health and Safety in Mining;
- NR 23 - Fire Protection;
- NR 24 - Sanitary and Comfort Conditions in the Workplaces;
- NR 25 - Industrial Waste;
- NR 26 - Safety Signaling;
- NR 27 - Professional Registration of the Occupational Safety Technician at the MTB (Revoked by Ordinance GM No. 262/2008);
- NR 28 - Inspection and Penalties;
- NR 29 - Safety and Health in Port Work;
- NR 30 - Safety and Health in Waterway Work;

- NR 31 - Occupational Health and Safety in Agriculture, Livestock, Forestry, Forestry and Aquaculture;
- NR 32 - Occupational Health and Safety in Health Establishments;
- NR 33 - Safety and Health at Work in Confined Spaces;
- NR 34 - Working Conditions and Environment in the Naval Construction, Repair and Dismantling Industry;
- NR 35 - Work at Height;
- NR 36 - Occupational Health and Safety in Meat and Meat Products Slaughter and Processing Companies;
- NR 37 - Safety and Health on Oil Rigs;
- NRR 1 - General Provisions (Revoked by MTE Ordinance 191/2008);
- NRR 2 - Specialized Service in Prevention of Rural Work Accidents (Revoked by MTE Ordinance 191/2008);
- NRR 3 - Internal Commission for the Prevention of Accidents in Rural Work (Revoked by Ordinance MTE 191/2008);
- NRR 4 - Personal Protective Equipment - PPE (Revoked by MTE Ordinance 191/2008);
- NRR 5 - Chemical Products (Revoked by MTE Ordinance 191/2008).

All other regulatory frameworks applicable to the case shall also be adopted by the 413 Project proponents.

2.3.17 Occupational Safety Assessment (G3.12)

Forestry, agriculture, and hunting activities are the main source of labor accidents in the Amazon region (Nogueira et al., 2010). However, the specific potential occupational safety and health risks to project staff, outsourced service providers, community residents and collaborators, etc. have not been yet assessed in a formal manner.

Based on empirical knowledge and literature (Goes et al., 2013), the main occupational risks are linked to chemical, physical, biological, and ergonomic issues. These risks are applicable to field labors who may work in project activities, such as seed collection, nursey activities, patrolling, firefighting, research projects, as well in organizing workshops, field trips and other related activities. Falls of trees chainsaw cut injury, ingestion of poisonous substances or food contamination are also relevant. Moreover, bites from snakes, scorpions, bees/wasps, ants, spiders, and stingrays are cases reported as important causes of occupational accidents in the region. Tropical diseases are also a source of occupational risks, including yellow fever, malaria, leishmaniasis, hantavirus, schistosomiasis, Chagas disease, etc. All these risks could arise due to

project implementation, but they are also often in agriculture and cattle-ranching, so they are not caused by the project itself.

The measures to be taken are as follows:

1) Training in occupational hazards and accidents;

2) Training in first aid;

3) Emergency contact with hospitals and health posts in the region;

4) Use of individual use safety equipment (helmet, leggings, goggles, gloves and protective pants) and collective use safety equipment, when mandatory and necessary;

5) Adoption of oriented labor gymnastics;

6) Vaccination against tropical diseases;

7) Maintenance of a warehouse for basic medicines and first aid materials;

8) Monthly visit by a doctor or nurse, and sporadically by a psychologist ;

9) Vaccination campaigns across the population;

10) Courses on good practices in food preparation and healthy nutrition;

11) Maintenance of a responsible for health and safety, with a channel to everyone involved;

12) Elaboration of a manual of good practice in health and safety at work;

13) Registration and statistics of occupational accidents risks, aiming to guide practices of prevention and minimization of risks;

14) Maintenance of a system of complaints and arraignment of bad practices in occupational safety.

2.4 Management Capacity

2.4.1 Project Governance Structures (G4.1)

413 Project will have the following governance structure (Figure 2.16):

- Management staff: it will be responsible for governance and operational functioning of the project during all its phases;

- Six departments will respond to the Project Manager:

    - infrastructure and logistics,

- climate affairs;
- community affairs;
- biodiversity affairs;
- interinstitutional relationship;
- administration and finance.

- Community Representatives: elected by the community members, they will participate directly in the governance structure of the project and decision-making related climate, community, and biodiversity affairs. Three heads will respond to this council with representatives of:
  - Women: a leader elected by the community will represent it and collaborate in the process of women´s empowerment actions of the project;
  - Youth: a leader elected by the community will represent it and collaborate in the process of youth´s empowerment actions of the project;
  - Elderly: a leader elected by the community will represent it and collaborate in the process of youth´s empowerment actions of the project.

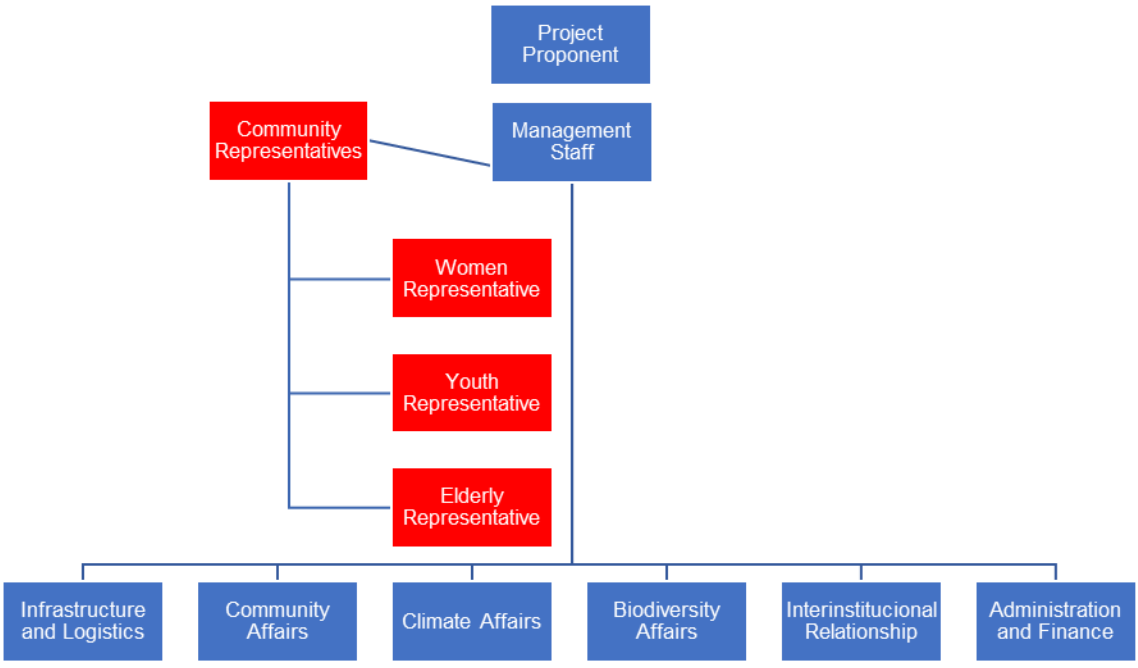


Figure 2.16. Project's governance structures

2.4.2 Required Technical Skills (G4.2)

The proponents and project management team have prior technical skills necessary to successfully implement the project, including community involvement, biodiversity assessment and carbon measurement and monitoring skills. Partnerships will be established to expand this experience and capacity for better project management. Ecosecurities do Brasil Ltda. has a wide experience with carbon projects in Brazil, and its professional team has technical skills that can carry out project activities throughout its phases.

2.4.3 Management Team Experience (G4.2)

The management team have prior technical skills necessary to successfully implement the project, including community involvement, biodiversity assessment and carbon measurement and monitoring skills. Partnerships will be established to expand this experience and capacity for better project management. Ecosecurities do Brasil Ltda. has a wide experience with carbon projects in Brazil, and its professional team has technical skills that can carry out project activities throughout its phases.

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

Partnerships with non-governmental, research and oversight organizations will ensure the project's success. The partners of the project are described elsewhere in Appendix 1.

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

The proponents and the organization responsible for conducting the project are financially healthy to ensure adequate financial support throughout the life of the project.

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

The project proponents declare to comply with all laws applicable and practices to avoid corruption and unethical behavior. The proponents and other entities involved in the project design and implementation are not involved in, or complicit in, any form of corruption such as bribery, embezzlement, fraud, favoritism, cronyism, nepotism, extortion, and collusion. Describe any measures needed and designed to be able to provide this assurance.

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

All information related to the determination of the baseline scenario, demonstration of additionality, and estimation and monitoring of GHG emission reductions and removals (including operational and capital expenditures) are not considered to be commercially sensitive and will be provided in the public versions of the project documents.

Only VCU selling contracts will be not in public versions of the project documents once they are considered commercially sensitive.

2.5 Legal Status and Property Rights

2.5.1 Statutory and Customary Property Rights (G5.1)

413 Environmental, LLC is not the legal owner of the land parcel (Matá-Matá), however they have a 30-year (2017-2047) preservation agreement in place directly with the landowner. The 30-year contract was done in conjunction with Brazilian law and U.S. law. The liens are filed on the land parcel when credits are transacted upon. The landowners and proponents have all rights legally documented in a registry office.

The areas within the project's zone of influence, targets of benefit sharing, are mostly public property, whether they are protected areas of the federal or state government. Indigenous lands properly demarcated are also recognized by project holders as legitimate boundaries. There will be no overlap of officially recognized areas with those contained within the project area boundaries.

Public and private areas that go beyond the boundaries of the 413 property (Matá-Matá) and contain populations to be benefited by the project will not be claimed as part of the REDD project.

The areas and their populations contemplated as beneficiaries of this project are as follows:

- RDS Rio Madeira;
- RDS Juma;
- Flona Aripuanã;
- APA of Campos de Manicoré;
- TI Pinatuba;
- TI Rio Manicoré;
- TI Sepoti;
- TI Setemã.

The location of these areas is shown in Figures 2.7 and 2.11 previously presented in this section.

All customary rights of traditional populations regarding land ownership and use of forest resources will be respected in accordance with the law. Project holders will adopt a non-conflict policy and provide access to land and natural resources to traditional peoples. However, illegal activities or activities that degrade biodiversity and impact the project's beneficiary communities will not be tolerated, and hence reported to the authorities.

2.5.2 Recognition of Property Rights (G5.1)

As stated before, the project proponents are not the legal owners of the land parcel, instead they have a 30-year preservation agreement in place directly with the landowner. The 30-year contract

was done in conjunction with Brazilian law and U.S. law. The liens are filed on the land parcel when credits are transacted upon. The landowners and proponents have all rights legally documented in a registry office.

The customary rights of indigenous peoples and traditional communities living around the project area will be fully respected. In case of any dispute of rights, all diplomatic mechanisms will be adopted to resolve such conflicts.

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

As evidenced by the maps presented in this document, the 413 project does not and will not invade lands belonging to private, government or indigenous and traditional communities. Physically, the project will be confined exclusively to its notary-registered boundaries, although the benefits of the project may extend outside its domain, into nearby communities, localities, and cities. Even so, any initiative in this direction must be preceded by free, prior, and informed consent. In any damage or impact to an affected party with respect to its land, there will be restitution or compensation for it by the project holders.

2.5.4 Property Rights Protection (G5.3)

In principle, this project should not lead to any involuntary removal or relocation of property rights holders from their lands or territories. Nor will it force rights holders to reallocate activities important to their culture or livelihood.

If eventually, during the development of the project, any relocation of housing or activities is required by the right holders, there will be a diplomatic negotiation to be carried out within the terms of an agreement with free, prior consent, providing in its clauses that the affected parties will receive fair and just compensation.

2.5.5 Illegal Activity Identification (G5.4)

The most-likely illegal activities happening in the project area and neighborhoods are the following:

1) Logging;

2) Deforestation;

3) Fuelwood collection;

4) Fires;

5) Mining (mineral digging);

6) Land grabbing;

7) Hunting;

8) Fishing;

9) Drug production and trafficking;

10) Illegal labor.

The following measures will be conducted to reduce such illegal activities:

1) Strategic physical occupation of territory. Physical presence of the project staff and partners in the area will reduce pressure of illegal activities. Some actions initially intended for social project scope should also contribute to the reduction of illegal activities in the project area and neighborhoods;

2) Signage of strategic sites across the project area and surroundings may be helpful in warning potential intruders and criminals that access to the area is not allowed without prior authorization. Only authorized people will be allowed in the area. A visitor registration system will be implemented;

3) Articulation with environmental governmental (IBAMA, ICMBio, IPAAM). This strategy will provide the political support in resolving illegal activities to avoid risks to the climate and biodiversity benefits provided by the project;

4) Deforestation monitoring by satellite imagery. Monitoring of deforestation will be conducted by satellite imagery within the project area and influence zone, including protected areas and indigenous reserves beneficiary of the project. Annual reports will be made available;

5) Ground and fluvial patrolling. The project aims to strengthen and improve the efficiency of existing official patrolling through the provision of quarterly reports of deforestation and costing of logistics items of operations. In addition to the quarterly inspection operations, inspections in cases of complaints will also occur. This action is also directly related to the containment of deforestation and invasions, maintaining forest cover and thus maintaining the climate benefits provided by the project;

6) Leakage management activities. The proponents have no authority, interference or domination over activities conducted outside the 413 project with regarding to illegal activities. However, some social activities for income generation, especially the provision of technical and health care will be developed to reduce leakage risk. In addition, satellite imagery monitoring will be extended from the project area to the leakage belt of the project. Annual reports will be made available;

7) Improving communication facilities will allow to have a better talk channel with the official organisms in charge of labor, justice and public security issues in the region. A channel of complaints on illegal activities will be created. This will also help in reducing risk of illegal activities;

8) Project staff and designated community members will be trained in forest fire control and firefighting;

9) Environmental education and incentive to sustainable use of natural resources, particularly non-timber forest products such as nuts, rubber, açaí pulp, andiroba oil, etc.

10) These measures and another will be decided in a participatory process to be conducted with involvement of the local community and other stakeholders.

2.5.6 Ongoing Disputes (G5.5)

No ongoing or unresolved conflicts or disputes over rights to lands, territories and resources so far exist to the knowledge of the project proponents. In addition, any disputes that were resolved during the last twenty years where such records exist or at least during the last ten years, have been noticed and reported by the government offices to the project proponents.

2.5.7 National and Local Laws (G5.6)

The project proponents of the 413 Project have committed to be in compliance with applicable and relevant national, state, and local laws, including statutes and regulatory frameworks.

Brazilian Federal Constitution, particularly with reference to Chapter 6, Article 225, Paragraph 4:

"The Brazilian Amazonian Forest, the Atlantic Forest, the Serra do Mar, the Pantanal Mato-Grossense and the coastal zone are part of the national patrimony, and they shall be used, as provided by law, under conditions which ensure the preservation of the environment."

Compliance with Law: The 413 Project is in compliance with this law by understanding the Amazon Forest shall be used under the mandatory obligation of preservation of the environment. The REDD Project is a way to reinforce the need for protection it.

Brazilian Forest Code, Law No. 12,651 of May 25th, 2012 and its former versions and revisions, namely: the original Brazil Forest Code, Law No. 4771, September 15th, 1965; Revision of Brazil Forest Code under Law No. 7,803, July 18th, 1989; Provisional Measure under No. 2,166-67, August 24th, 2001.

This law refers to the latest Brazilian Forest Code, which "Provides for the protection of native vegetation; amends Laws Nos. 6,938 of August 31st, 1981, 9,393, of December 19th, 1996, and 11,428 of December 22th, 2006, repealing the Laws No. 4771, September 15th, 1965 and 7,754, of April 14th, 1989, and Provisional Measure No. 2,166-67, of August 24th, 2001, and other provisions."

Amongst several key legal provisions made by the Brazilian Forest Code, it is noteworthy the following:

Chapter I: General Provisions

Chapter II: on the Permanent Preservation Areas:

Section I: Delimitation of Permanent Preservation Areas;

Section III - The licensing is done by the competent environmental authority;

Section IV - The property is registered in the Rural Environmental Registry - CAR.

Compliance with Law: The 413 Project is in compliance with this law. The Permanent Preservation Areas are respected, and the property is registered in CAR.

Chapter IV: on the so-called Legal Reserve Area:

All property must maintain rural area with native vegetation cover, as a legal reserve, without prejudice to the application of the rules on the Permanent Preservation Areas, subject to the following minimum percentages in relation to the area of the property, except as specified in art. 68 of this Act:

(Amended by Law No. 12,727, 2012).

I - located in the Amazon:

a) 80% (eighty percent), in the property situated in forest area;

b) 35% (thirty five percent), in the property situated in Cerrado;

c) 20% (twenty percent), in the property situated in the area of general fields;

II - located in other regions of the country: 20% (twenty percent).

Compliance with Law: The 413 Project is in compliance with this law once it has maintained 80% of forest cover as a legal reserve, as demonstrated by satellite imagery taken 10 years ago and nowadays.

Chapter V: on the suppression of vegetation for alternative use of soil:

Article 26: the removal of native vegetation to alternative land use, both public domain and private domain, depends on the registration of the property in CAR, mentioned in art. 29, and the prior authorization of the competent state agency belonging to SISNAMA (Environment National System), corresponding to national and state environmental agencies. In the case of Amazonas State, the official agency is the Environmental State Secretariat (SEMA).

Compliance with Law: The 413 Project is in compliance with this law understanding that any forest conversion shall be formally authorized by the competent agency.

***Amazonas State Environmental and Forestry laws*:**

Law No. 3,785, July 24th, 2012: provides for the environmental licensing of the State of Amazonas, revokes Law No. 3216, of December 28, 2007, and gives other provisions;

Law No. 3,789, July 27th, 2012: provides for reforestation in the State of Amazonas and other measures;

Decree No. 32,986, November 30th, 2012: regulates Law No. 3789/2012 which provides for reforestation in the State of Amazonas;

Resolution Cemaam No. 15, April 15th, 2013: provides for the State Program for Shared Environmental Management, with the purpose of strengthening environmental management, through cooperation norms between the State and Municipal Environmental Systems: defines the types of local environmental impact for the purpose of exercising the competence of municipal environmental licensing. Considering the criteria of size, polluting potential and nature of the activity, and other measures.

Compliance with Law: The 413 Project acknowledges the need to follow all the environmental and forestry Laws of the Amazonas State and is in compliance with this the relevant legislation, statutes, and other regulatory frameworks.

***Labor Laws*:**

Brazilian Constitution, Chapter II-Social Rights, Articles 7- 11 address labor and social rights, such as: minimum wage, normal working hours, guidance on vacation and weekly leave, guidance on maternity and paternity leave, recognition of collective negotiation with employers, prohibition of discrimination, among others.

In addition to the Constitution, there are two additional decrees related to Brazilian labor laws:

Decree-Law No. 5,452, May 1st, 1943, the so-called Consolidate of Working Laws - CLT (Consolidação das Leis do Trabalho) that provides clarification on hourly, daily, weekly and monthly work hours, employment of minors and women, establishes a minimum wage, establishes worker safety and safe working environments, defines penalties for non-compliance by employers, and establishes a judicial work-related process for addressing all worker related issues.

Law No. 5,889, June 8th, 1973: provides regulation norms to the rural work. This is a complimentary law to the aforementioned 1943 decree because prior to 1973, rural workers did not have the same rights as urban workers. In 1973, this law was established to specify the equality between urban and rural workers, along with compensation for overtime.

Compliance with Law: The 413 Project acknowledges the labor laws of the country and is in compliance with them.

***Laws regarding Communities*:**

Law No. 6,001, December 19th, 1973: provides for the Indigenous Statute. Art. 1: This Law regulates the legal status of native indigenous people and communities, with the aim of preserving their culture and integrating them, progressively and harmoniously, into the national community.

Decree 6,040, February 7th, 2007: establishes the National Policy for the Sustainable Development of Traditional Peoples and Communities.

Compliance with Law: The 413 Project acknowledges the indigenous rights, as well as other traditional communities, and is in compliance with them.

***International Treaties*:** as Brazil is signatory of various international treaties, they shall be domestically complied.

Compliance with Law: The 413 Project acknowledges the international treaties, which Brazil is a Part, and is committed with their accomplishment.

2.5.8 Approvals (G5.7)

The 413 Project is a private business and does not require approval by the country and local governments to run. However, project proponents declare to follow all applicable country and state laws. Formal acceptance by the customarily authorities is not required because traditional communities and indigenous people live offsite the project. However, a dialogue will be held with these communities so that a favorable negotiation can be reached with all the stakeholders and members of the communities to be benefited by the project.

2.5.9 Project Ownership (G5.8)

The owner of the 413 Project is 413 Environmental, LLC, which is also its proponent. The project proponent has a 30-year preservation agreement in place directly with the landowner. The 30-year contract was done in conjunction with Brazilian law and U.S. law. The liens are filed on the land parcel when credits are transacted upon. The landowners and proponents have all rights legally documented in a registry office.

2.5.10 Management of Double Counting Risk (G5.9)

The 413 project does not seek to generate or has received any form of environmental or social credit, including any tradable climate (including, but not limited to GHG-related or renewable energy certificates), community or biodiversity unit.

2.5.11 Emissions Trading Programs and Other Binding Limits

Not applicable.

2.5.12 Other Forms of Environmental Credit

Not applicable.

2.5.13 Participation under Other GHG Programs

The 413 Project does not participate in any other GHG programs.

2.5.14 Projects Rejected by Other GHG Programs

The 413 Project has not been rejected by any other GHG programs.

2.5.15 Double Counting (G5.9)

Double counting of carbon offsets generated by this project will be avoided by formal documentation that no credit sold in the voluntary market will be sold in existing and future

regulatory markets. In addition, the credits of this project will not participate in any compliance mechanism since it is strictly addressed to the voluntary carbon market following CCB and VCS standards.

3 CLIMATE

3.1 Application of Methodology

3.1.1 Title and Reference of Methodology

This project is applying CCB and VCS Standards. VCS standards include "Approved VCS Methodology VM0007, Version 1.4, 3 May 2013, Sectoral Scope 14, REDD Methodology Modules (REDD-MF)" in conjunction with a set of applicable modules and tools, with special reference to "VCS Module VMD0006, Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation/forest degradation and planned wetland degradation (BL-PL), Version 1.3, 08 September 2020, Sectoral Scope 14".

3.1.2 Applicability of Methodology

Approved VCS methodology VM0007 is applicable to Reducing Emissions from Deforestation and Forest Degradation (REDD), which is the case of 413 Project. Moreover, VMD0006 is suitable to calculate baseline, project emissions, leakage, and avoided GHG emissions from planned deforestation REDD projects (APD – Avoided Planned Deforestation, part of VMD0006), which has been developed and described throughout this document.

CCB Standards are applicable to describe all benefits of the 413 Project to climate, community, and biodiversity in addition to VCS Standards.

3.1.3 Project Boundary

The geographical boundary of the 413 Project is a land parcel owned by 413 Environmental, LLC, in the municipalities of Manicoré and Novo Aripuanã, southeastern Amazonas State, northern Brazil. The total area of the project is 500,996 hectares, and the REDD project foresees avoiding GHG emissions from deforestation and forest degradation due to clearcutting and conversion of the forest to pasture on 20% of such area, as allowed by the Brazilian legislation (Forest Code).

The relevant GHG sources, sinks and reservoirs for the project and baseline scenarios are shown in Tables 3.1 and 3.2.

Table 3.1. GHG included or not in the 413 Project boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Carbon Stock Changes	CO_2	Yes	Stock changes were included, once they are mandatory in the methodology.
		CH_4	No	Not applicable.
		N_2O	No	Not applicable.
		Other	No	Not applicable.
	Biomass Burning	CO_2	No	CO_2 emissions are already considered in carbon stock changes.
		CH_4	Yes	CH_4 and N_2O emissions are included because fire is often used for land preparation in cattle ranching in the region.
		N_2O	Yes	
		Other	No	No relevant source identified.
	Fossil fuel Combustion	CO_2	No	Emissions from fossil fuel combustion in the baseline and project case are minimal. As per methodology module E-FCC "Fossil fuel combustion in all situations is an optional emission source."
		CH_4	No	
		N_2O	No	
		Other	No	
	Use of Fertilizers	CO_2	No	Excluded. No increase in fertilizer use is contemplated in the project case as part of leakage mitigation or any other activity.
		CH_4	No	
		N_2O	No	
		Other	No	
	Enteric fermentation of bovine cattle	CO_2	No	Excluded. GHG emissions from enteric fermentation in baseline scenario is not significant by the T-SIG module (less than 5% of the baseline emissions).
		CH_4	Yes	
		N_2O	No	
		Other	No	

Table 3.1. GHG included or not in the 413 Project boundary - Continuation

Source		Gas	Included?	Justification/Explanation
Project	Carbon Stock Changes	CO_2	Yes	Stock changes were included, once they are mandatory in the methodology.
		CH_4	No	Not applicable.
		N_2O	No	Not applicable.
		Other	No	Not applicable.
	Biomass Burning	CO_2	No	CO_2 emissions are already considered in carbon stock changes.
		CH_4	Yes	CH_4 and N_2O emissions are included because fire is often used for land preparation in cattle ranching in the region.
		N_2O	Yes	
		Other	No	No relevant source identified.
	Fossil fuel Combustion	CO_2	No	Emissions from fossil fuel combustion in the baseline and project case are minimal. As per methodology module E-FCC "Fossil fuel combustion in all situations is an optional emission source."
		CH_4	No	
		N_2O	No	
		Other	No	
	Use of Fertilizers	CO_2	No	Excluded. No increase in fertilizer use is contemplated in the project case as part of leakage mitigation or any other activity.
		CH_4	No	
		N_2O	No	
		Other	No	
	Enteric fermentation of bovine cattle	CO_2	No	Excluded. GHG emissions from enteric fermentation in baseline scenario is not significant by the T-SIG module (less than 5% of the baseline emissions).
		CH_4	Yes	
		N_2O	No	
		Other	No	

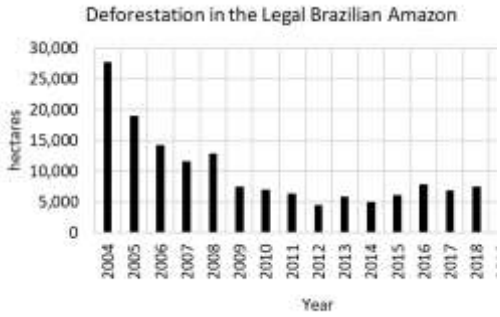
Table 3.2. Carbon pools included in the 413 Project boundary

Carbon Pool	Included/Excluded	Justification/Explanation
Aboveground biomass	Included	Mandatory by methodology. Included because tree aboveground biomass generally is the greatest carbon pool in forest biomass. It includes non-tree woody biomass because stocks of non-tree aboveground biomass are greater in the baseline than in the project scenario, and also because non-tree aboveground biomass is determined to be significant (more than 5% of the tree aboveground biomass) by the T-SIG tool.
Belowground biomass	Included	Not mandatory by methodology. Included in the project because it is generally the second most significant carbon pool in forest biomass and because it is significant (represents more than 5% of the of the tree woody biomass), as indicated by T-SIG tool.
Deadwood	Included	Not mandatory by methodology. Included in the project because it represents more than 5% of the of the tree woody biomass, hence significant as indicated by T-SIG tool.
Litter	Excluded	Not mandatory by methodology. Excluded in the project because it represents less than 5% of the tree woody biomass as indicated by T-SIG tool.
Soil Organic Carbon	Excluded	Not mandatory by methodology. Excluded. Conservatively omitted, as allowed by the methodology.
Harvested Wood Products	Excluded	Not mandatory by methodology. Excluded. No timber harvesting is expected in this project.

3.1.4 Baseline Scenario

After a period of decrease in deforestation rates in the Brazilian Amazon, which took place between 2005 and 2015, there has been a resumption of this activity in the last 5 years, as shown by official data (INPE, 2021). Preliminary data from 2021 point to the consolidation of deforestation rates and forest degradation in the region (Figure 3.1). In the State of Amazonas, in the core of the Amazon, there are some of the last great remnants of the ancient tropical forest. However, the expansion of agriculture and cattle ranching has already reached this state, spreading from the roads and main rivers in the region. The common economical practice has been deforestation to establish pastures for cattle raising, followed, to a lesser extent, by annual agricultural crops.

a



b

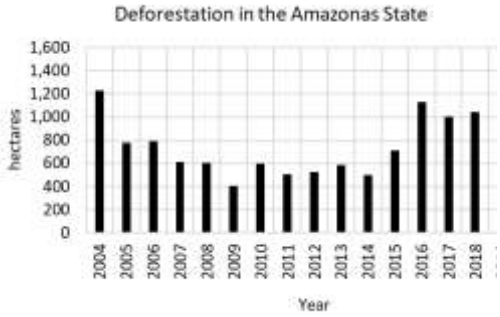


Figure 3.1. Deforested areas in the Legal Brazilian Amazon (a) and in the Amazonas State (b) during 2004 and 2020 (for 2020, data updated on November 30th, 2020)

Source: INPE (2021)

3.1.5 Additionality

The VT0001 "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" is applied to demonstrate additionality for the 413 REDD Project. It serves to confirm the baseline scenario by identifying credible alternative land uses.

According to this VT0001 Tool, the Project, proponent(s) shall apply the following four steps:

STEP 1. Identification of alternative land use scenarios to the AFOLU project activity;

As the outcome of STEP 1:

Sub-step 1a. Identification of credible alternative land use scenarios to the proposed CCB-VCS AFOLU project activity):

i. Continuation of the pre-project land use

The landowner has maintained the property as primary tropical rainforest. However, forest conservation in the project area, as a decision by a profit-driven landowner, would be unlikely under any non-carbon, market-related scenario. Since the landowner has costs related to documentation, protection against natural and human perturbation (e.g. land grabbers, fires, etc.), taxes and duties, the continuation of the pre-project land use is unlikely under to the absence of revenues to maintain the property.

ii. Project activity on the land within the project boundary performed without being registered as the CCB-VCS AFOLU project

Another possible alternative land use is to manage the forest for logging and timber production in the non-legal reserve. The Brazilian legislation (Forest Code*) allows 20% deforestation in

private forestlands located in the Amazon Biome, but the rest shall be maintained as legal reserve (Reserva Legal in Portuguese - RL), i.e., as forest. It is not allowed to convert the legal reserve to another land use. However, logging is considered to be a main driver to deforestation and induce forest degradation as well. Newly open roads lead to risk of illegal activities and without a robust patrol system the forest area becomes more suitable to invasion, and hence deforestation and forest degradation.

Forest management (logging) in Amazon under a sustainable basis is an economically feasible activity. Although there are still barriers to its application on a large scale in the Amazon region, it is economically and financially attractive. The incipient dissemination of management techniques to forest users, the greater profitability of agriculture in the short term compared to forest management, and the lack of efficient control of illegal and unmanaged timber exploitation are challenging (IMAZON, 2020).

iii. Sale of the property

It is an alternative that may lead to alternative iv described below.

iv. Conversion of 20% of the forest to pasture

Brazilian legislation (Forest Code*) allows 20% deforestation in private lands located in the Amazon Biome, though the rest shall be maintained as legal reserve (Reserva Legal in Portuguese).

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

All alternative land uses identified in the sub-step 1a are in compliance with all mandatory applicable legal and regulatory requirements. Illegal deforestation occurs widely in Amazon region, but in this analysis, we focus only on officially authorized legal activities. So, none of the alternative land use scenarios previously cited will be removed from analysis.

Sub-step 1c. Selection of the baseline scenario:

The most likely baseline scenario for this project is the removal of the tropical forest (20% of the non-legal reserve) and establishment of pasture for extensive cattle ranching, which has been the common practice in almost all the States of the Brazilian Amazon and which is spreading also to the State of Amazonas. Therefore, the baseline scenario is the conversion of 20% of forestland of the 413 REDD Project to pasture. The result of this would be the emission of large amounts of greenhouse gases into the atmosphere, exacerbating the effects of global climate change. The objective of this project is to avoid such emissions.

STEP 2. Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios; or

The proposed REDD project is not the most economically and financially attractive activity amongst the options examined.

As mentioned previously, the project activity will not generate any revenue, as the project area will be managed for forest conservation purposes rather than for wood logging or livestock management. On the other hand, REDD project will incur ongoing costs related to documentation (feasibility analyses, PD elaboration, validation, verification, etc.) implementation and management of project activities that need to be covered by some income source. The project proposers expect to generate VCUs from this REDD project to make forest conservation possible and feasible.

Sub-step 2a. Determine appropriate analysis method:

Since the project activity generates no financial or economic benefits to the project proponents other than CCB-VCS related income through VCUs, a simple cost approach is justified.

Sub-step 2b. Option I. Apply simple cost analysis (chosen)

Cattle-ranching is the most widely practiced economically and financially activity by landowners in the region because, though agriculture is considered the most attractive one (Carrero et al., 2015). However, annual crops cannot be grown well in many parts of the Amazon because of poor soil fertility, poor infrastructure, management complexity, and high investments. Management of livestock is simpler and does not require intensive use of technology and resources. Both activities are more economically and financially attractive than the project activity.

Project activity proposed will not generate profit except from the CCB-VCS related income and costs associated shall be covered by the landowner.

Once it is concluded that the proposed VCS AFOLU project produces no financial benefits other than VCS related income, VT0001 Tool recommend proceeding to Step 4 (Common practice analysis).

STEP 4. Common practice analysis

Livestock is a common practice in the vast majority of deforested areas in the Brazilian Amazon. This REDD project proposes to change this paradigm.

Public Conservation Units (UCs – Unidades de Conservação in Portuguese) and Indigenous Reserves (Terras Indígenas in Portuguese - TI) belong to the official (federal, state, and municipal) framework of natural reserves aimed at protecting natural ecosystems and other associated socioenvironmental attributes. These natural public units play an important role in forest conservation of the Amazon biome and all others in Brazil.

Conservation efforts carried out in the Amazonas State include various national, state, and municipal conservation areas, as well as indigenous reserves. While the conservation areas and indigenous reserves have had some successes at maintaining forest cover, the essential distinction between these lands and the project area is that the project area is privately owned and does not have access to government resources to stimulate non-extractive land uses. Although some public initiatives, such as Amazon Fund (Fundo Amazônia in Portuguese), have provided financial support to avoided deforestation projects, to our knowledge, there are no

privately funded projects on private lands with the aim of stopping deforestation in Amazonas without the aid of carbon finance.

In June 2007, the Amazonas State Government launched the Bolsa Floresta Program. Four years later, in 2011, the Federal Government launched the Bolsa Verde Program. Both are aimed at residents of Conservation Units (UCs), and Bolsa Verde also includes residents of agrarian reform settlements. These programs provide social assistance to extractive populations and low-income traditional family farmers and are not intended for any type of support for carbon projects in the voluntary market.

As said before, forest conservation is not the common practice in private lands. Landowners are not used to develop similar activities in the scope of the proposed VCS AFOLU project. Conversely, they are engaged in commercial-driven activities such as logging, agriculture and especially livestock production. Thus, such forest conservation activities have not been sufficiently diffused in the geographical area activity. Costs associated and absence of concrete subsides and other financial flows to forest conservation in private land prevent the development of other modalities of similar projects to the proposed VCS AFOLU project.

Conservation of privately owned forest land in Amazonas state, including the project area and other proxy areas, is generally limited to the legal reserve and designated areas of permanent protection (Áreas de Preservação Permanente – APP in Portuguese). The legal reserve (Reserva Legal – RL in Portuguese) is a requirement of the Brazilian Forest Code for landowners in the Amazon to maintain 80% of the property as forest. However, logging is permitted in such areas once authorized by a control officer.

The landowners would be clearcutting the non-legal reserve on the property in the baseline case. Evidence suggests that landowners with market access (i.e., access to major roads and navigable rivers) have deforested at least 20% of their properties and possibly would logged-over the legal-reserve if permitted.

Result of the Additionality Analysis: as demonstrated above, the project activity, without revenue from carbon credits, is unlikely to take place and is not a common practice in the region. The project is therefore additional to CCB-VCS REDD.

3.1.6 Methodology Deviations

No methodology deviations are reported.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

The baseline emissions calculated in the project is based on the conversion of forest to pasture. In Amazon, the Brazilian law allows a fraction of 20% of the property to conversion. Considering the total area of the land parcel (500,996 hectares), the permitted conversion area is 100,199 ha. The planned deforestation methodology (APD) is applied to the conversion area accordingly.

Three strata were recognized in the 413 Project based on the vegetation types given by the official Brazilian Vegetation Map published by IBGE (2013) (Table 3.3). In the project, the planned deforestation approach is applied exclusively to Stratum 1, due to operational and environmental reasons (Db stratum is associated to water springs and streams). The ex-ante stratification is based on ancillary data as described in "VMD0016 Methods for stratification of the project area (X-STR)", Version 1.1, 9 March 2015, Sectoral Scope 14.

Table 3.3. Areas of strata within the 413 Project Area

Stratum	Acronym*	Description	Area (ha)
1	Db	Dense Lowland Tropical Rainforest	476,995
2	Da	Dense Alluvial Tropical Rainforest	17,705
3	Ds	Dense Sub-montane Tropical Forest	5,914
Water			383
Total			**500,996**

The VCS module (VMD0006-BL-PL) applied to APD (avoided planned deforestation) requires knowledge of the rate (area deforested per year) at which the planned area will be deforested to a given area per stratum (i) per year (t) through the project period.

When a valid verifiable specific plan exists for rate at which deforestation is projected to occur, this rate must be used. Otherwise, the rate must be established by examining proxy areas. Proxy areas may or may not be under the management of the project area's baseline agent of deforestation or class of deforestation agents. In such a case, the rate of deforestation is calculated for at least 6 proxy areas, in accordance with the VCS requirements.

3.2.1.1 Identifying proxy areas

Ten proxy areas were identified within southern Amazonas State (officially called "Meso-region Sul-Amazonense" by the State of Amazonas) to the purpose of the 413 Project. Most of them are in the Madeira Micro-region. These were considered suitable to use as proxy sites from which to estimate rate of planned deforestation in the baseline in accordance with VCS VMD0006 - Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation/forest degradation and planned wetland degradation.

Each proxy site was selected to meet the following criteria:

1. Land conversion practices are the same as those used by the baseline agent, and are similar on large-sized clearings across the same region in Amazonas State, typically involving mechanized clearing and burning;

2. The post-deforestation land use is ranching/pasture, the same as the baseline scenario, confirmed via analysis on appropriate satellite imagery;

3. It has similar management and land use rights as the project area under the business-as-usual scenario, which are similar on large (>1,000 ha) private holdings throughout southern Amazonas State. The property of these areas was confirmed to be private by a process of elimination checking any possible overlap with state lands, indigenous lands, and

settlements regularized by INCRA (Instituto Nacional de Colonização e Reforma Agrária in Portuguese), which is on charge of this issue in the country;

4. It is located within southern Amazonas State (Southern Amazonas meso-region, mostly in Madeira River micro-region);

5. Deforestation is inferred to be legally permitted as the property is fully georeferenced and registered with INCRA and the CAR and under the oversight of the state of Amazonas;

6. The area was deforested within 10 years prior to the baseline period (2011 to 2020);

Then, the project area is similar in vegetation, elevation, slope, and soil type to each proxy area, and hence suitable for conversion to non-forest (pasture) as these proxy sites have been. Southern Amazonas State is mostly covered by dense tropical forest (lowland and alluvial), which also that occurring in the project and proxy areas;

The 10 proxy areas identified are given in Figure 3.2 and described in Table 3.4. All data used to this analysis were extracted from Terra Brasilis System managed by INPE: http://terrabrasilis.dpi.inpe.br/downloads/ and Brazilian Rural Real State Certification System managed by INCRA: https://certificacao.incra.gov.br/, access, on: Jun, 09th, 2021.

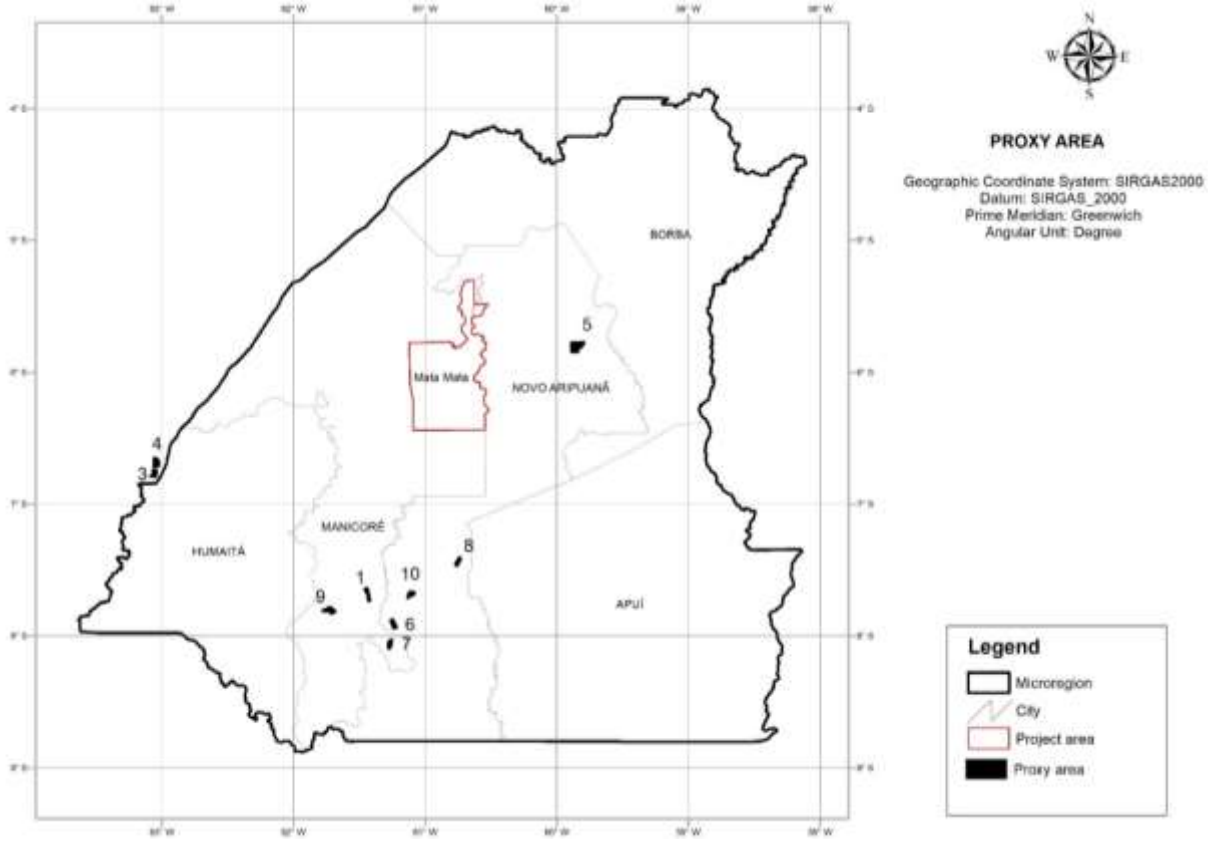


Figure 3.2. Map of the 10 proxy areas in the Madeira River Micro-region

Note: numbers of proxy areas correspond to those in Table 3.4

Table 3.4. Vegetation, soil type, and vegetation of the project area and ten proxy areas

Features of the Area	Unit	Project	Proxy areas										
			All	1	2	3	4	5	6	7	8	9	10
Size	(ha)	Matá-Matá II 154.030,83 ha Alexandre III 7.093,91 ha	19,741	1,391	1,249	1,542	1,190	6,343	1,739	1,392	1,199	2,169	1,526
***Soil Classes**	(%)	Matá-Matá II 95.3% Dystrophic Yellow Oxisol 4.3% Dystrophic Red Yellow Oxisol Alexandre III 100% Dystrophic Yellow Oxisol	-	43% Dys-trophic Podzlic 57% Dys-trophic Red Yellow Oxisol	100% Podzol	100% Podzol	100% Podzol	100% % Dys-trophic Yellow Oxisol	100% Dys-trophic Red Yellow Oxisol	100% Dys-trophic Podzlic	100% Dys-trophic Red Yellow Oxisol	100% Dys-trophic Red Yellow Oxisol	100% Dys-trophic Red Yellow Oxisol
****Climate Classes**	(%)	Equatorial	-	Equatorial	Equatorial	Equatorial	Equatorial	Equatorial	Equatorial	Equatorial	Equatorial	Equatorial	Equatorial
Mean Population Density	(people /km²)	Matá-Matá II (0,97) Alexandre III (0,52)	-	0.97	0.21	0.21	0.21	0.52	0.52	0.97	0.52	0.97	0.52
Slope Class	(%)	Matá-Matá II Class 0-3% - 59.0% Class 3-8% - 35.0% Class 8-20% - 6.0% Alexandre III Class 0-3% - 77.1% Class 3-8% - 22.0% Class 8-20% - 0.9%	-	Class 0-3% - 62.8% Class 3-8% - 30.4% Class 8-20% - 6.8%	Class 0-3% - 73.5% Class 3-8% - 25.7% Class 8-20% - 0.7%	Class 0-3% - 77.3% Class 3-8% - 22.2% Class 8-20% - 0.5%	Class 0-3% - 89.9% Class 3-8% - 9.4% Class 8-20% - 0.8%	Class 0-3% - 55.9% Class 3-8% - 27.24% Class 8-20% - 16.9%	Class 0-3% - 77.2% Class 3-8% - 22.5% Class 8-20% - 0.3%	Class 0-3% - 63.8% Class 3-8% - 30.2% Class 8-20% - 6.0%	Class 0-3% - 66.2% Class 3-8% - 32.3% Class 8-20% - 1.6%	Class 0-3% - 67.5% Class 3-8% - 28.1% Class 8-20% - 4.4%	Class 0-3% - 78.2% Class 3-8% - 21.3% Class 8-20% - 0.5%
Mean Elevation	(m)	Matá-Matá II 90,8m Alexandre III 52,3m	-	178	93	78	106	119	171	187	130	121	159
Min – Max Elevation	(m)	Matá-Matá II 0-79m Alexandre III 0-198m	-	107-255	54-134	20-107	20-134	0-198	107-230	134-255	79-166	20-230	107-230
Mean Slope	(%)	Matá-Matá II 2,5 Alexandre III 2,4	-	3.56	2.62	2.45	1.97	4.71	2.44	3.46	2.99	3.18	2.41
Min – Max Slope	(%)	Matá-Matá II 0-20% Alexandre III 0-20%	-	0-20	0-20	0-20	0-20	0-20	0-20	0-20	0-20	0-20	0-20
Mean Distance to Roads	(km)	Matá-Matá II (road crosses it) Alexandre III 6,0 km	-	15.4	4.9	2.9	6.7k	30	5.3	21.7	10.3	15.3	4.3
Mean Distance to Urban Centers	(km)	Matá-Matá II 75,4km Alexandre III 27,8km	-	173.64	123.98	128.36	113.49	91.0	168.52	178.69	97.35	147.82	204.62
Mean Distance to Rivers	(km)	Matá-Matá II (Border and inner) Alexandre III 11 km	-	51.4	15.7	18.3	16.6	7.9	23.3	24.0	11.5	14.7	20.5
Overlap with Indigenous Lands	(ha)	Matá-Matá II 0 Alexandre III 0	-	0	0	0	0	0	0	0	0	0	0
Overlap with Conservation Areas	(ha)	Matá-Matá II 0 Alexandre III 0	-	0	0	0	0	0	0	0	0	0	0
Rural Property Tenure	(%)	100% Private	-	100% Private	100% Private	100% Private	100% Private	100% Private	100% Private	100% Private	100% Private	100% Private	100% Private

3.2.1.2 Projected annual proportion of land that will be deforested

The deforestation rate for the baseline scenario of the 413 Project was calculated based upon ten proxy areas previously identified. The parameters and values used to this calculation area provided by Table 3.5.

Hence, equation 3.1 was applied to deforestation data of each of the proxy areas and then averaged to derive a baseline rate of deforestation (*D%planned,i,t*), where: stratum *i* at time *t*.

Equation 3.1. Equation for estimating the projected annual proportion of land that will be deforested:

$$D\%_{planned,i,t} = \frac{\left(\sum_{pn=1}^{n^*}\left(\frac{D\%_{pn}}{Yrs_{pn}}\right)\right)}{n} \qquad \text{(Eqn. 3.1)}$$

The calculated rate of deforestation was 8.60, as explained in Table 3.5.

Table 3.5. Proxy areas, parameters and values used to calculate the projected annual proportion of land that will be deforested

Proxy Area	Total Parcel Area (ha)	Area deforested 2011-2020 (ha)	Yrs_{pn}	$\%D_{pn}$	$D\%/Yrs_{pn}$
1	1,391	297	3	21.35	7.12
2	1,250	65	2	5.20	2.60
3	1,542	127	4	8.24	2.06
4	1,190	304	4	25.55	6.39
5	6,343	874	3	13.78	4.59
6	1,739	244	5	14.03	2.81
7	1,392	227	2	16.31	8.15
8	1,199	346	1	28.86	28.86
9	2,169	284	3	13.09	4.36
10	1,526	874	3	57.27	19.09
Average (n=10)					8.60

3.2.1.3 Calculating the annual area of deforestation

Following the VCS module, the area of land cleared annually in the baseline is calculated using Equation 3.2 and the parameters and values described in Table 3.6.

Equation 3.2. Equation for estimating the land cleared annually in the baseline scenario:

$$AA_{planned,i,t} = \left(A_{planned,i} * D\%_{planned,i,t}\right) * L - D_i \qquad \text{(Eqn. 3.2)}$$

Where:

$AA_{planned,i,t}$ = land cleared annually in the baseline scenario of stratum *i* at time *t* (ha);

$A_{planned,i}$ = total and cleared in the baseline scenario in stratum *i* (ha);

$D\%_{planned,i,t}$ = projected annual proportion of land that will be deforested (%);

$L - D_i$ = deforestation likelihood of stratum *i.*

Applying equation 3.2 to the area of planned deforestation (20% of the property, i.e. 100,199 hectares), the maximum area of forest conversion to another land use that could occur in the baseline each year is found, which is 20,000 hectares (8.62% of 500,996 hectares) in each of the first five years of the project, with the remainder planned for the sixth year (199 hectares), thus completing 100,199 hectares.

Table 3.6. Calculation of the annual area of planned deforestation in the baseline, per methodology

Year	Total ***AAplanned,i,t*** (ha)	***AAplanned,1,t*** (ha) (Stratum 1 – Db) Dense Lowland Tropical Rainforest	***AAplanned,1,t*** (ha) (Stratum 2 – Da) Dense Alluvial Tropical Rainforest	***AAplanned,1,t*** (ha) (Stratum 3 – Ds) Dense Submontane Tropical Forest
2017	20,000	20,000	-	-
2018	20,000	20,000	-	-
2019	20,000	20,000	-	-
2020	20,000	20,000	-	-
2021	20,000	20,000	-	-
2022	199	199	-	-
2023	-	-	-	-
2024	-	-	-	-
2025	-	-	-	-
2026	-	-	-	-
Total	**100,199**	**100,199**	**-**	**-**

Note: deforestation in baseline scenario is confined to Stratum 1 (Dense lowland tropical forest). No deforestation has been planned for Stratum 2 (Dense Alluvial Tropical Rainforest) and Stratum 3 (Dense Sub-montane Tropical Forest) due to operational and environmental restrictions.

The clear-cut was planned to be confined to stratum 1 and conversion takes place within the third years. Although the planned deforestation areas for the first three years in the baseline are considerably large, data from the Terra Brasilis and INCRA systems confirm that there are deforested areas in the region that exceed this size. This denotes that there are operational conditions for annual deforestation area of this size.

3.2.1.4 Estimation of Carbon Stocks by Carbon Pools

To calculate baseline emissions, three carbon pools were considered: aboveground biomass (stems, branches, and foliage - AGB), belowground biomass (roots - BGB), both from trees and non-tree vegetation, as well as dead wood (DW) both to forest and pastures. Litter and soil pools were conservatively excluded, as allowed by methodology. The harvested wood products pool is not applicable since there is no predicted forest management activities related to logging and wood milling in the project.

Forest figures were extracted from the Third National Communication of Brazil to the United Nations Framework Convention on Climate Change (Third National GHG Inventory) while pasture values were obtained from a recent peer-reviewed publication on carbon stocks in southern Amazonia (Sanquetta et al., 2021). Forest values of AGB (*CAB_tree+non-tree,i*), BGB, (*CBB_tree+non-tree,i*), DW (*CDW,i*) and totals (*CBSL,i*) and the corresponding pasture (*CAB_post,i*; *CBB_post,i*; *CDW_post,i*) are shown in Table 3.7.

Table 3.7. Carbon pools considered for calculation of the baseline scenario

Carbon pools		
Cpre BL ($tCO_{2e}.ha^{-1}$) – forest		
CAB_pre,i (tCO_{2e} ha^{-1})	Aboveground biomass (AGB)**	517.37
CBB_pre,i (tCO_{2e} ha^{-1})	Belowground biomass (BGB)	146.04
CDW_pre,i (tCO_{2e} ha^{-1})	Deadwood (DW)	44.29
Total Cpre BL (tCO_{2e} ha^{-1})	Total	707.70
Cpost BL ($tCO_{2e}.ha^{-1}$) – pasture		
CAB_post,i (tCO_{2e} ha^{-1})	Aboveground biomass (AGB)	5.17
CBB_post,i (tCO_{2e} ha^{-1})	Belowground biomass (BGB)	6.34
CDW_post,i (tCO_{2e} ha^{-1})	Deadwood (DW)	7.44
Total Cpost BL (tCO_{2e} ha^{-1})	Total	18.95
Differences ($tCO_{2e}.ha^{-1}$): forest – pasture		
CAB_pre,i - CAB_post,i (tCO_{2e} ha^{-1})	Aboveground biomass (AGB)	512.2
CBB_pre,i - CBB_post,i (tCO_{2e} ha^{-1})	Belowground biomass (BGB)	139.7
CDW_pre,i - CDW_post,i (tCO_{2e} ha^{-1})	Deadwood (DW)	36.85
Total Diferences (tCO_{2e} ha^{-1})	Total	688.75

* Values for Db (Stratum 1) Dense Lowland Tropical Rainforest because Da and Ds stratum are not planned to be clearcut;
** includes non-tree vegetation (see Brasil, 2015).

3.2.1.5 Estimation of Carbon Stock Changes and GHG Emissions

Equation 3.3 is applied to calculate the carbon stock changes and GHG emissions in the baseline scenario ($\Delta C_{BSL,i,t}$).

Equation 3.3. Equation for estimating carbon stock changes in the baseline scenario:

$$\Delta C_{BSL,i,t} = AA_{planned,i,t} * \left(\Delta C_{ABtree,i} + \Delta C_{ABnon-tree,i} + \Delta C_{LI,i}\right) + \sum_{t-10}^{t}\left(AA_{planned,i,t}\left(\Delta C_{BBtree,i} + \Delta C_{BBnon-tree,i} + \Delta C_{DW,i}\right) * \frac{1}{10}\right) + \sum_{t-20}^{t}\left(AA_{planned,i,t} * \left(C_{WP100,i} + \Delta C_{SOC,i}\right) * \frac{1}{20}\right) \quad \text{(Eqn. 3.3)}$$

The first part of Eq. 3.3 corresponds to the carbon stock changes of AGB from replacing forest to pasture (baseline). In turn, the second refers to the emissions from root and deadwood

decomposition in a 10-year lifespan. The third refers to emissions from long-lived wood products, which will be omitted from our calculations once logging and wood milling is not taking place in the project.

Stock changes in belowground biomass and dead wood and the corresponding emissions were calculated and are shown in Table 3.8 and 3.9.

The annual BGB emissions are calculated applying Equation 3.4.

Equation 3.4. Equation for BGB emissions in the baseline scenario:

$$\Delta C_{BBtree+non\text{-}tree,i,t} = AA_{planned,i,t} * (CB_{Btree+non\text{-}tree} - CBB_{post}) * 1/10 \quad \text{(Eqn. 3.4)}$$

Annual BGB emission for year 1 is 20,000 * (146.04 – 6.34) * 1/10 = 279,400 tCO_{2e}. From the second year, it is necessary to add the annual BGB emissions from previous year(s).

For Year 2: 20,000 * (146.04 – 6.34) * 1/10 + 279,400 = 558,800 tCO_{2e}

For Year 3: 20,000 * (146.04 – 6.34) * 1/10 + 558,800 = 838,200 tCO_{2e}

For Year 4: 20,000 * (146.04 – 6.34) * 1/10 + 838,200 = 1,117,600 tCO_{2e}

For Year 5: 20,000 * (146.04 – 6.34) * 1/10 + 1,171,600 = 1,397,000 tCO_{2e}

For Year 6 to 10: 199 * (146.04 – 6.34) * 1/10 + 1,171,600 = 1,399,783 tCO_{2e}, and afterwards deforestation does not take place anymore.

Annual DW emissions are calculated in a similar way, using Equation 3.5.

Equation 3.5. Equation for DW emissions in the baseline scenario:

$$\Delta C_{DW,t} = AA_{planned,i,t} * (C_{DWtree+non\text{-}tree} - CD_{Wpost}) * 1/10 \quad \text{(Eqn. 3.5)}$$

The annual emission for year 1 is 20,000 * (44.29 – 7.44) * 1/10 = 73,700 tCO_{2e}. From the second year, it is necessary to add the annual BGB emissions from previous year(s).

For Year 2: 20,000 * (44.29 – 7.44) * 1/10 + 73,700 = 147,400 tCO_{2e}

For Year 3: 20,000 * (44.29 – 7.44) * 1/10 + 147,400 = 221,100 tCO_{2e}

For Year 4: 20,000 * (44.29 – 7.44) * 1/10 + 221,100 = 294,800 tCO_{2e}

For Year 5: 20,000 * (44.29 – 7.44) * 1/10 + 294,800 = 368,500 tCO_{2e}

For Year 6 to 10: 199 * (44.29 – 7.44) * 1/10 + 294,800 = 369,234 tCO_{2e}, and afterwards deforestation does not take place anymore.

Table 3.8. Emissions from steady decomposition of belowground biomass post deforestation in the project area ($CBSL_{BB}$ - $C\ post_{BB}$, tCO_{2e})

Year	BGB Emissions from Deforestation ($t\ CO_2$)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032...
2017	2,794,000	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400						
2018	2,794,000		279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400					
2019	2,794,000			279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400				
2020	2,794,000				279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400			
2021	2,794,000					279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400	279,400		
2022	27,828						2,783	2,783	2,783	2,783	2,783	2,783	2,783	2,783	2,783	2,783	
2023																	0
2024																	
2025																	
2026																	
2027																	
2028																	
2029																	
2030																	
2031																	
2032																	
Total	**13,997,828**	**279,400**	**558,800**	**838,200**	**1,117,600**	**1,397,000**	**1,399,783**	**1,399,783**	**1,399,783**	**1,399,783**	**1,399,783**	**1,120,383**	**840,983**	**561,583**	**282,183**	**2,783**	**0**

Table 3.9. Emissions from steady decomposition of dead wood post deforestation in the project area, (C_{BSLDW} - C_{postDW}, tCO_{2e})

Year	DW Emissions from Deforestation ($t\ CO_2$)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032...
2017	737,000	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700						
2018	737,000		73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700					
2019	737,000			73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700				
2020	737,000				73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700			
2021	737,000					73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700	73,700		
2022	7,341						734	734	734	734	734	734	734	734	734	734	
2023																	0
2024																	
2025																	
2026																	
2027																	
2028																	
2029																	
2030																	
2031																	
2032																	
Total	**3,692,341**	**73,700**	**147,400**	**221,100**	**294,800**	**368,500**	**369,234**	**369,234**	**369,234**	**369,234**	**369,234**	**295,534**	**221,834**	**148,134**	**74,434**	**734**	**0**

The emissions from carbon stock changes in biomass (AGB+BGB) and deadwood area shown in Table 3.10.

Table 3.10. Calculation of the baseline annual carbon stock changes of planned deforestation

Year	$AA_{planned}$	C_{BSL}	C_{postAB}	C_{BSLBB}-C_{postBB}	C_{BSLDW}-C_{postDW}	ΔC_{BSL}
2017	43,086	22,291,226	222,753	279,400	73,700	22,867,079
2018	43,086	22,291,226	222,753	558,800	147,400	23,220,179
2019	14,028	7,257,608	72,524	838,200	221,100	8,389,433
2020	0	0	0	1,117,600	294,800	1,412,400
2021	0	0	0	1,397,000	368,500	1,765,500
2022	0	0	0	1,399,783	369,234	1,769,017
2023	0	0	0	1,399,783	369,234	1,769,017
2024	0	0	0	1,399,783	369,234	1,769,017
2025	0	0	0	1,399,783	369,234	1,769,017
2026	0	0	0	1,399,783	369,234	1,769,017
2027	0	0	0	1,120,383	295,534	1,415,917
2028	0	0	0	840,983	221,834	1,062,817
2029	0	0	0	561,583	148,134	709,717
2030	0	0	0	282,183	74,434	356,617
2031	0	0	0	2,783	734	3,517
2032 to 2046	0	0	0	0	0	0
Total	**100,199**	**51,840,060**	**518,030**	**11,189,914**	**2,951,670**	**66,499,674**

Furthermore, since fire after deforestation is a common practice, is the emissions from biomass burning shall be calculated. Following VMD0006, the Equation 3.5 is applied using parameters and values cited in Tables 3.11 and 3.12.

Equation 3.6: Equation to estimate emissions from biomass burning in the baseline scenario:

$$GHG_{BSL\text{-}E,i,t} = E_{BiomassBurn,i,t} = \sum_{g=1}^{G}\left(\left(\left(A_{Burn,i,t} * B_{i,t} * COMF_i * G_{g,i}\right) * 10^{-3}\right) * GWP_g\right) \quad \text{(Eqn. 3.6)}$$

Where:

$E_{BiomassBurn,i,t}$	Greenhouse emissions due to biomass burning as part of deforestation activities in stratum *i* in year *t*; tCO_{2e} of each GHG (CO_2, CH_4, N_2O);
$A_{Burn,i,t}$	Area burnt for stratum *i* at time *t*; ha;
$B_{i,t}$	Average aboveground biomass stock before burning stratum i, time t; tonnes d.m. ha^{-1};
$COMF_i$	Combustion factor for stratum *i*; dimensionless (default value derived from Table 2.6 of IPCC, 2006);
$G_{g,i}$	Emission factor for stratum *i* for gas g; kg t^{-1} dry matter burnt (default values derived from Table 2.5 of IPCC, 2006)

GWP_g	Global warming potential for gas g; t CO_2/t gas *g* (default values from IPCC AR5 – IPCC (2013): CO_2 = 1; CH_4 = 25; N_2O = 298)
g	1, 2, 3 … *g* greenhouse gases;
i	1, 2, 3 … *M* strata;
t	1, 2, 3 … *t* years elapsed since the start of the REDD.

Table 3.11. Parameters and values used to calculate annual Ex-Ante GHG emissions

Parameter	Description	Value	Justification
$GHG_{BSL-E,i,t}$	Greenhouse gas emissions as a result of deforestation activities within the project boundary in the baseline stratum i during project year *t*; t CO_{2e} $year^{-1}$	See Table 3.13	Calculated below.
$E_{BiomassBurn,i,t}$	Non-CO_2 emissions due to biomass burning in stratum i in year *t*; t CO_{2e}	See Table 3.13	Calculation Below. Biomass burning is expected to occur in the project case.

Table 3.12. Parameters and values used to calculate baseline GHG emissions from biomass burning

Gas	COMF	G	GWP
N_2O	0.59	0.2	265
CH_4	0.59	6.8	25

Source: IPCC (2006), Tables 2.5 and 2.6

Nitrous oxide (N_2O) and methane (CH_4) emissions from biomass burning are calculated as follows:

Nitrous oxide:

Year 1: 13,852 * (517.37 / (44/12) / 0.47) * 0.59 * 0.2 * 0.001 * 265 = 131,509 tCO_{2e};

Methane:

Year 1: 13,852 * (517.37 / (44/12) / 0.47) * 0.59 * 6.8 * 0.001 * 28 = 467,152 tCO_{2e};

Being:

$B_{,i,t}$ corresponds to the dry aboveground biomass CAB_pre,i / (44/12) * 0.47 (see value in Table 3.7);

44/12 = conversion from CO_2 to C;

0.47 = conversion of C to AGB dry weight.

To calculate the baseline emissions, then Equation 3.6 is applied, resulting in Table 3.12.

Equation 3.6 used to estimate carbon stock changes and GHG emissions in the baseline scenario:

$$\Delta C_{BSL,planned} = \sum_{t=1}^{t^*} \sum_{i=1}^{M} \left(\Delta C_{BSL,i,t} + GHG_{BSL-E,i,t} \right) \qquad \text{(Eqn. 3.6)}$$

Where:

$\Delta_{BSL,i,t}$ = as given by Eqn. 3.3 and Tables 3.13 and 3.14;

$GHG_{BSL\text{-}E,i,t}$ = as given in Tables 3.13 and 3.14.

Table 3.13. Calculation of the sum carbon stocks changes and GHG emissions in baseline scenario

Year	ΔC_{BSL} (tCO_{2e})	$E\text{-}N_2O$ (tCO_{2e})	$E\text{-}CH_4$ (tCO_{2e})	GHG_{BSL} (tCO_{2e})	$\Delta C_{BSLplanned}$ (tCO_{2e})
2017	22,867,079	409,055	1,453,060	1,862,115	24,729,194
2018	23,220,179	409,055	1,453,060	1,862,115	25,082,294
2019	8,389,433	133,181	473,089	606,270	8,995,703
2020	1,412,400	0	0	0	1,412,400
2021	1,765,500	0	0	0	1,765,500
2022	1,769,017	0	0	0	1,769,017
2023	1,769,017	0	0	0	1,769,017
2024	1,769,017	0	0	0	1,769,017
2025	1,769,017	0	0	0	1,769,017
2026	1,769,017	0	0	0	1,769,017
2027	1,415,917	0	0	0	1,415,917
2028	1,062,817	0	0	0	1,062,817
2029	709,717	0	0	0	709,717
2030	356,617	0	0	0	356,617
2031	3,517	0	0	0	3,517
2032 to 2046	0	0	0	0	0
Total	**70,048,259**	**951,290**	**3,379,210**	**4,330,500**	**74,378,759**

3.2.2 Project Emissions

Expected project emissions are estimated ex-ante and apply Equation 1 (Eqn. 3.7 in this document) of module M-MON (VMD0015, Version 2.2, 08 September 2020, Sectoral Scope 14) of Methodology VM0007. Values for individual parameters are explained in Tables 3.14 and 3.15 and the results derived in Tables 3.16 to 3.18.

Ex-ante projections of deforestation in the project case assume no deforestation and forest degradation have taken place once of the project proponent has committed to not undertake land clearing and activities or forest degradation on the property.

Equation 3.7: equation to estimate net GHG emissions in the REDD project scenario:

$$\Delta C_{WPS-REDD} = \sum_{t=1}^{t^*}\sum_{i=1}^{M}\left(\Delta C_{P,DefPA,i,t} + \Delta C_{P,Deg,i,t} + \Delta C_{P,DistPA,i,t} + GHG_{P-E,i,t} - \Delta C_{P,Enh,i,t}\right)$$

(Eqn. 3.7)

Where:

$\Delta C_{WPS-REDD}$	Net GHG emissions in the REDD project scenario up to year *t**; tCO_{2e};
$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project area in the project case in stratum *i* within the project area in year *t*; tCO_{2e};
$\Delta C_{P,Deg,i,t}$	Net carbon stock change as a result of degradation in the project area in the project case in stratum *i* within the project area in year *t*; tCO_{2e};
$\Delta C_{P,DistPA,i,t}$	Net carbon stock change as a result of natural disturbance in the project area in the project case in stratum *i* within the project area in year *t*; tCO_{2e};
$GHG_{P-E,i,t}$	Greenhouse gas emissions as a result of deforestation and degradation activities within the project area in the project case in stratum *i* in year *t*; tCO_{2e};
$\Delta C_{P,Enh,i,t}$	Net carbon stock change as a result of forest growth and sequestration during the project in areas projected to be deforested in the baseline[2] in stratum *i* in year *t*; tCO_{2e};
i	1, 2, 3, …*M* strata;
t	1, 2, 3, …*t** years elapsed since the start of the REDD VCS project activity.

Equation 3.8: equation to estimate GHG emissions in the project scenario:

$$GHG_{P,E,i,t} = E_{FC,i,t} + E_{BiomassBurn,i,t} + N_2O_{direct-N,i,t} \qquad \text{(Eqn. 8)}$$

Where:

$GHG_{P,E,i,t}$	Greenhouse gas emissions as a result of deforestation activities within the project area in the project case in stratum *i* in year *t*; t CO_2-e

$E_{BiomassBurn,i,t}$	Emission from fossil fuel combustion in stratum *i* within the project area in year *t*; t CO_2-e
$E_{BiomassBurn,i,t}$	Non-CO_2 emissions due to biomass burning in stratum i in year t; t CO_2-e
$N_2O_{direct-N,i,t}$	Direct NO_2 emission as a result of nitrogen application on the alternative land use in stratum *i* within the project area in year *t*; t CO_2-e
i	1, 2, 3, …*M* strata
t	1, 2, 3, …*t** years elapsed since the start of the REDD VCS project activity

Table 3.14. Parameters and values used to calculate net GHG emissions in the REDD project scenario

Parameter	Description	Value	Justification
$\Delta C_{WPS\text{-}REDD}$	Net GHG emissions in the REDD project scenario; tCO_{2e}	See Table 3.18	The REDD project does not cause significant GHG emissions, and project emissions were calculated under such an assumption
$\Delta C_{P,DefPA,l,t}$	Net carbon stock changes as a result of deforestation in the project area in the project case in stratum i at time t; t CO_{2e}	Set to 0	As the agent of deforestation has committed to not deforest
$\Delta C_{P,pools,Def,u,i,t}$	Net carbon stock changes in all pools in the project case in land use u in stratum i at time t; tCO_{2e} ha^{-1}	688.75	See Table 3.7
$\Delta C_{P,Deg,i,t}$	Net carbon stock changes as a result of degradation in the project area in the project case in stratum i at time t; tCO_{2e}	Set to 0	As the agent of deforestation has committed to not degrade the forest
$\Delta C_{P,DistPA,l,t}$	Net carbon stock changes as a result of natural disturbance in the project area in the project case in stratum i at time t; tCO_{2e}	Set to 0	Forests in Amazonas state have a low incidence of abnormal natural disturbance that may lead to significative GHG emissions
$GHG_{P\text{-}E,i,t}$	GHG emissions as a result of deforestation and degradation activities within the project area in the project case in stratum i in year t; tCO_{2e}	Set to 0	The agent of deforestation has committed to not deforest and degrade forest. No biomass burning, N fertilizers and significant GHG emissions from fossil fuel combustion are expected. See also Table 15 below
$\Delta C_{P,Enh,l,t}$	Net carbon stock change as a result of forest growth and sequestration during the project in areas projected to be deforested in the baseline in stratum i at time t; tCO_{2e}	Set to 0	Conservatively excluded because growth rates of primate forests are low once, in the long-term, they are in more or less a steady-state condition. According to VMD0015, it is conservative to assume that no carbon stock enhancement is occurring

Table 3.15. Parameters and values used to calculate annual ex-ante GHG emissions

Parameter	Description	Value	Justification
$GHG_{P,E,i,t}$	Greenhouse gas emissions as a result of deforestation activities within the project area in the project case in stratum i in year t; tCO_{2e}	Set to 0	As the agent of deforestation, has committed to not deforest and degrade forest. No biomass burning is expected to take place in the project scenario. No N fertilizers will be applied in the project scenario. GHG emissions from fossil fuel combustion are not significant.
$E_{BiomassBurn,i,t}$	Non-CO_2 emissions due to biomass burning in stratum *i* in year *t*; tCO_{2e}	Set to 0	Biomass burning is expected to occur in the project case
$E_{FC,i,t}$	Emission from fossil fuel combustion in stratum *i* within the project area in year *t*; tCO_{2e}	Set to 0	GHG emissions from fossil fuel combustion are not significant.
$N_2O_{direct\text{-}N,i,t}$	Direct N_2O emission as a result of nitrogen application on the alternative land use in stratum *i* within the project area in year *t*; tCO_{2e}	Set to 0	No N fertilizers will be applied in the project scenario.

Table 3.16. Calculation of the net carbon stock change as a result of deforestation in the project case

Year	$\Delta C_{P,DefPA,u,i,t}$ (tCO_{2e})	$\Delta C_{P,pools,Def,u,i,t}$ (tCO_{2e})	$\Delta C_{P,DefPA,i,t}$ (tCO_{2e})
2017	0	688.75	0
2018	0	688.75	0
2019	0	688.75	0
2020	0	688.75	0
2021	0	688.75	0
2022	0	688.75	0
2023	0	688.75	0
2024	0	688.75	0
2025	0	688.75	0
2026	0	688.75	0
2027	0	688.75	0
2028	0	688.75	0
2029	0	688.75	0
2030	0	688.75	0
2031	0	688.75	0
2032 to 2046	0	688.75	0
Total	0	688.75	0

Table 3.17. Calculation of $E_{BiomassBurn,i,t}$ for the project scenario

Year	$A_{DefPA,u,i,t}$ (ha)	$E\text{-}N_2O$ Biomass Burning (tCO_{2e})	$E\text{-}CH_4$ Biomass Burning (tCO_{2e})	$E_{\text{-Biomass Burning}}$ (tCO_{2e})	$GHG_{P\text{-}E,i,t}$ (tCO_{2e})
2017	0.0	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0	0.0
2020	0.0	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0	0.0
2022	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0	0.0	0.0
2030	0.0	0.0	0.0	0.0	0.0
2031	0.0	0.0	0.0	0.0	0.0
2032 to 2046	0.0	0.0	0.0	0.0	0.0

Table 3.18. Calculation of net GHG within the project area under the project scenario

Year	$\Delta CP,DefPA,i,t$ (tCO_{2e})	$\Delta CP,DegPA,i,t$ (tCO_{2e})	$\Delta CP,DistfPA,i,t$ (tCO_{2e})	$GHG\text{-}E,i,t$ (tCO_{2e})	$\Delta C_{WPS\text{-}REDD}$ (tCO_{2e})
2017	0	0	0	0	0
2018	0	0	0	0	0
2019	0	0	0	0	0
2020	0	0	0	0	0
2021	0	0	0	0	0
2022	0	0	0	0	0
2023	0	0	0	0	0
2024	0	0	0	0	0
2025	0	0	0	0	0
2026	0	0	0	0	0
2027	0	0	0	0	0
2028	0	0	0	0	0
2029	0	0	0	0	0
2030	0	0	0	0	0
2031	0	0	0	0	0
2032 to 2046	0	0	0	0	0
Total	0	0	0	0	0

Thus, the project case emissions will be set to 0 once no deforestation and forest degradations is expected to occur under the REDD project.

3.2.3 Leakage

Leakage emissions from displacement of planned deforestation are estimated in compliance with the VCS REDD methodology VM0007, specifically the LK-ASP and LK-ME modules. These modules provide for accounting for activity shifting leakage resulting from displacement of deforestation activities by the agent of deforestation and estimating GHG emissions caused by the market-effects leakage related to extraction of wood for timber.

Estimation of Activity Shifting Leakage

Activity shifting leakage due to displacement of planned deforestation was assessed using a series of equations outline in *LK-ASP* tool. The primary equation is listed as Equation 3.9. Other equations applied are 3.10 and 3.11. The parameters, values used, and the justification are given in Table 3.19.

Equation 3.9: equation to estimate leakage from displacement of planned deforestation:

$$\Delta C_{LK-AS,planned} = \sum_{t=1}^{t^*}\sum_{i=1}^{M}\left(\left(LKA_{planned,i,t} * \Delta C_{BSL,i}\right) + GHG_{LK,E,i,t} + LK_{peat}\right) \quad \text{(Eqn. 3.9)}$$

Equation 3.10: equation to leakage area from displacement of planned deforestation:

$$LKA_{planned,i,t} = A_{defLK,i,t} - NewR_{i,t} \quad \text{(Eqn.3.10)}$$

$LKA_{planned,i,t}$	The area of activity shifting leakage in stratum *i* at time *t*; ha
$NewR_{i,t}$	New calculated forest clearance by the baseline agent of the planned deforestation in stratum *i* at time *t* where no leakage is occurring; ha
$A_{defLK,i,t}$	The total area of deforestation by the baseline agent of the planned deforestation in stratum *i* at time *t*; ha
i	1, 2, 3, … *M* strata
t	1, 2, 3, … *t** years elapsed since the start of the REDD project activity

If $NewR_{i,t}$ exceeds $A_{defLK,i,t}$ then $LKA_{planned,i,t}$ must be set as zero as positive leakage is not considered under the VCS.

$$GHG_{LK,E,i,t} = E_{BiomassBurn,i,t} + N_2O_{direct-N,i,t} \quad \text{(Eqn. 3.11)}$$

Where:

$GHG_{LK,E,i,t}$	Greenhouse gas emissions as a result of leakage of avoided deforestation activities in stratum *i* in year *t*; t $CO_{2+}e$
$E_{BiomassBurn,i,t}$	Non-CO_2 emissions due to biomass burning in stratum i in year t; t $CO_{2+}e$
i	1, 2, 3, … *M* strata
t	1, 2, 3, … *t** years elapsed since the start of the REDD project activity

In this project, no peatland deforestation will happen, so LK_{peat} component is neglected.

Table 3.19. Parameters and values used to estimate activity shifting leakage of the project

Parameter	Description	Value	Justification
$\Delta C_{LKAS,\ planned}$	Net greenhouse gas emissions due to activity shifting leakage for projects preventing planned deforestation; tCO_{2e}	See Table 3.20 for calculations	Calculated below
$LKA_{planned,i,t}$	The area of activity shifting leakage in stratum i at time t; ha	Set to 0	No activity shifting will be caused by the REDD project since no economical/commercial activity or deforestation/degradation has been carried out so far in the project area and elsewhere by the agent of deforestation
$\Delta C_{BSL,i}$	Net carbon stock changes in all pools in baseline stratum i; tCO_{2e} ha^{-1}	688.75	Provided in Table 3.7
$GHG_{LK,E,i,t}$	Greenhouse gas emissions as a result of leakage of avoided deforestation activities in stratum i in year t; t CO_{2e}	See Table 3.20 for calculations	Calculated in Table 3.20 under the assumption of no GHG emissions in project case
$LK_{peat,t}$	Net greenhouse gas emissions due to leakage to peatlands as a result of implementation of a planned deforestation project at time t; t CO_{2e}	Set to 0	The agent of deforestation does not own any peatland and hence deforestation will not be displaced to peatlands.

Table 3.20. Calculation of activity shifting leakage for of the project

Year	$LKA_{planned}$ (ha)	$\Delta C_{BSL,i}$ (tCO_{2e}/ha)	$GHG_{LK-E,i,t}$ (tCO_{2e})	$\Delta C_{LK-AS,planned}$ (tCO_{2e})
2017	0	688.75	0	0
2018	0	688.75	0	0
2019	0	688.75	0	0
2020	0	688.75	0	0
2021	0	688.75	0	0
2022	0	688.75	0	0
2023	0	688.75	0	0
2024	0	688.75	0	0
2025	0	688.75	0	0
2026	0	688.75	0	0
2027	0	688.75	0	0
2028	0	688.75	0	0
2029	0	688.75	0	0
2030	0	688.75	0	0
2031	0	688.75	0	0
2032 to 2046	0	688.75	0	0

Table 3.21. Calculation of GHG emissions from biomass burning for the leakage areas

Year	$LKA_{planned}$ (ha)	E-N_2O Biomass Burning (tCO_{2e})	E-CH_4 Biomass Burning (tCO_{2e})	E-Biomass Burning (tCO_{2e})	$GHG_{LK-E,i,t}$ (tCO_{2e})
2017	0	0	0	0	0
2018	0	0	0	0	0
2019	0	0	0	0	0
2020	0	0	0	0	0
2021	0	0	0	0	0
2022	0	0	0	0	0
2023	0	0	0	0	0
2024	0	0	0	0	0
2025	0	0	0	0	0
2026	0	0	0	0	0
2027	0	0	0	0	0
2028	0	0	0	0	0
2029	0	0	0	0	0
2030	0	0	0	0	0
2031	0	0	0	0	0
2032 to 2046	0	0	0	0	0
Total	0	0	0	0	0

Estimation of Market Leakage

Market leakage (*ΔCLK-ME*) is equal to the sum of market effects leakage through decreased timber harvest (*LKMarketEffects,timber*) and decreased harvest for fuelwood / charcoal production (*LKMarketEffects,FW/C*). As there is no timber harvest and fuelwood or charcoal collection predicted by the baseline agent of deforestation, market leakage set to 0.

Thus, the net leakage (*ΔCLK*) is calculated by Equation 3.12. Parameters and values used are found in Table 3.22 and results are provided in Table 3.23.

Equation to calculate net leakage:

$$\Delta CLK = \Delta CLK\text{-}AS,planned + \Delta CLK\text{-}ME + \Delta CLK\text{-}AS,degrad\text{-}FW/C \quad \text{(Eqn. 3.12)}$$

Table 3.22. Parameters and values used to estimate net leakage

Parameter	Description	Value	Justification
ΔC_{LK}	Net greenhouse gas emissions due to leakage; tCO_{2e}	Calculated in Table 3.23.	Calculated in Table 3.23
$\Delta C_{LK\text{-}AS,planned}$	Net greenhouse gas emissions due to activity shifting leakage for projects preventing planned deforestation; tCO_{2e}	Set to 0	No activity shifting is predicted by the agent of deforestation
$\Delta C_{LK\text{-}AS,unplanned}$	Net greenhouse gas emissions due to activity shifting leakage for projects preventing unplanned deforestation; tCO_{2e}	Not applicable	Not applicable, as this is not an unplanned REDD project.
$\Delta C_{LK\text{-}ME}$	Net greenhouse gas emissions due to market-effects leakage; tCO_{2e}	Not applicable	No market-effect happens because logging and wood milling do not occur in the project
$\Delta C_{LK\text{-}AS,degrad\text{-}FW/C}$	Net greenhouse gas emissions due to activity shifting leakage for degradation caused by extraction of wood for fuel; tCO_{2e}	Not applicable	No fuelwood and charcoal are collected from the project area

Table 3.23. Calculation of the net GHG emissions due to leakage

Year	***ΔCLK-AS,planned*** **(tCO_{2e})**	***ΔCLK-ME*** **(tCO_{2e})**	***ΔCLK*** **(tCO_{2e})**
2017	0	0	0
2018	0	0	0
2019	0	0	0
2020	0	0	0
2021	0	0	0
2022	0	0	0
2023	0	0	0
2024	0	0	0
2025	0	0	0
2026	0	0	0
2027	0	0	0
2028	0	0	0
2029	0	0	0
2030	0	0	0
2031	0	0	0
2032 to 2046	0	0	0

Calculation of Uncertainty

Uncertainties were calculated for the baseline and project scenarios based upon VCS X-UNC module. Two sources of uncertainty were considered for the baseline case, i.e. rate of deforestation and carbon pools. For the project case, only uncertainty of carbon pools was taken into account because no deforestation is going to rake place.

Per the X-UNC module, *UncertaintyBSL,RATE* is calculated as the 95% confidence interval as a percentage of the mean of the area deforested in each proxy (*D%pn*) divided by the number of years over which deforestation occurred in each proxy (*Yrspn*). The 95% confidence interval as a percentage of the mean deforested percentage of each proxy area (*D%pn*) was calculated from data contained in Table 3.24.

The mean and standard deviation of *D%pn* were 20.37 and 14.88, respectively. Hence, the relative standard error (95% confidence interval) was calculated as 52.26%, and *UncertaintyBSL,Rate (%)* as 2.40% (Table 3.23). Uncertainty of carbon pools was assumed to be 3.38%, as reported by the LULUCF Reference Report of the Third National Communication of Brazil to UNFCCC (MCTI, 2015) (page 97). Then, applying equation 6 of the VCS VMD0017 (X-UNC), results in 4.14 overall uncertainty in the baseline scenario.

No deforestation rate is expected in the project scenario. Therefore, the uncertainty is solely due to the carbon pools, which is 3.38%, as explained before and shown in Table 3.25.

Equation 3.13 is applied to calculate overall uncertainty:

$$Uncertainty_{REDD-BSL,t^*} = \sqrt{Uncertainty_{BSL,RATE,t^*}^{\ 2} + Uncertainty_{REDD-BSL,SS}^{\ 2}} \quad \text{(Eqn.13)}$$

Where:

$Uncertainty_{REDD-BSL,t^*}$	Cumulative uncertainty in REDD baseline scenario up to year *t** (%);
$Uncertainty_{REDD-BSL,t^*,RATE,t^*}$	Cumulative uncertainty in the baseline rate of deforestation up to year *t* (%);
$Uncertainty_{REDD-BSL,SS}$	Total uncertainty in the combined carbon stocks and greenhouse gas sources in the REDD baseline scenario (%);
t	1, 2, 3, … *t** time elapsed since the start of the project activity (years).

The allowable uncertainty in the VCS REDD methodology is ± 15% at the 95% confidence level. Accordingly, when this precision level is met, then no deduction should result for uncertainty. So, no deduction was applied in the 413 Project.

Table 3.24. Calculations of uncertainty in baseline scenario

Uncertainty REDD-BSL,RATE,t* **(%)**	***D%pn* 95% Confidence Interval as % of mean**	***Yrspn***	**Uncertainty *REDD-BSL,SS* (%)**	**Uncertainty *REDD-BSL,t**** **(%)**
2.40	52.26	30	3.38	4.14

Table 3.25. Calculations of uncertainty in project scenario

UncertaintyBSL,Rate (%)	***D%pn* 95% Confidence Interval as % of mean**	***Yrspn***	**Uncertainty *REDD-BSL,SS* (%)**	**Overall Uncertainty (%)**
-	-	-	3.38	3.38

3.2.4 Net GHG Emission Reductions and Removals

The 413 Project area is expected to generate a net GHG emission reduction of 63,747,157 tons CO_{2e} over 30 years, with 70,830,174 tons CO_{2e} of estimated baseline emissions or reductions and a non-permanence deduction of 7,083,017 tons CO_{2e} due to buffer risk. No project emissions and leakage are predicted by this project once other activities such as timber harvesting, charcoal/fuelwood collection are not taking place. Tables 3.26 and 3.27 show the ex-ante GHG emission reductions expected to be generated by the 413 Project over the 30-year crediting period.

Table 3.26. Ex-Ante Estimated of Net Emission Reduction Credits

Year	Estimated baseline emissions or reductions (tCO_{2e})	Estimated project emissions or removals (tCO_{2e})	Estimated leakage emissions (tCO_{2e})	Risk buffer (%)	Deductions for AFOLU pooled buffer account (tCO_{2e})	GHG credits eligible for issuance as VCUs (tCO_{2e})
2017	24,729,194	0	0	10	2,472,919	22,256,274
2018	25,082,294	0	0	10	2,508,229	22,574,064
2019	8,995,703	0	0	10	899,570	8,096,132
2020	1,412,400	0	0	10	141,240	1,271,160
2021	1,765,500	0	0	10	176,550	1,588,950
2022	1,769,017	0	0	10	176,902	1,592,115
2023	1,769,017	0	0	10	176,902	1,592,115
2024	1,769,017	0	0	10	176,902	1,592,115
2025	1,769,017	0	0	10	176,902	1,592,115
2026	1,769,017	0	0	10	176,902	1,592,115
2027	1,415,917	0	0	10	141,592	1,274,325
2028	1,062,817	0	0	10	106,282	956,535
2029	709,717	0	0	10	70,972	638,745
2030	356,617	0	0	10	35,662	320,955
2031	3,517	0	0	10	352	3,165
2032 to 2046	0	0	0	10	0	0
Total	**74,378,759**	**0**	**0**	**10**	**7,437,876**	**66,940,883**

Table 3.27. Emissions Reductions (tCO_{2e}) expected to be generated by the 413 Project over the 30-year crediting period

Estimated emissions and reductions of the 413 Project	tCO_{2e}
Baseline GHG emissions and reductions	74,378,759
Project emissions and reductions	0
Leakage emissions	0
Buffer pool discount	7,437,876
Total Net Emission Reductions	66,940,883

3.3 Monitoring

3.3.1 Data and Parameters Available at Validation

The documents available at Validation will be the following:

- PDD version;
- Project activities table and schedule;
- Documents of legal proof of land tenure and rights;
- Official Vegetation Map;
- Protected Area Maps;
- Indigenous Lands Maps;

- Map of deforested areas in the last 10 years;
- Proxy Area Data;
- Baseline, Project Emissions, and Leakage Calculations Worksheets;
- Others, on demand.

3.3.2 Data and Parameters Monitored

Climate (emission and reductions) data and parameters to be monitored in this project are provided in Table 3.28. Units, frequency, and procedures are also given.

Table 3.28. Climate data and parameters to be monitored

Variable to be Monitored	Explanation	Unit	Frequency	Procedure
$AA_{planned,i,t}$	Land cleared annually in the baseline scenario of stratum *i* at time *t*	ha	Annually	Satellite imagery analysis
$A_{planned,i}$	Total and cleared in the baseline scenario in stratum *i*	ha	Annually	Satellite imagery analysis
$D\%_{planned,i,t}$	Projected annual proportion of land that will be deforested	%	Annually	Satellite imagery analysis
$L - D_i$	deforestation likelihood of stratum *i*;	%	Annually	Satellite imagery analysis
$C_{AB\_pre,i}$	Carbon stock in forest aboveground biomass	tCO_{2e} ha^{-1}	Every 5 years	Carbon inventory in field
$C_{BB\_pre,i}$	Carbon stock in forest belowground biomass	tCO_{2e} ha^{-1}	Every 5 years	Carbon inventory in field
$C_{DW\_pre,i}$	Carbon stock in forest deadwood	tCO_{2e} ha^{-1}	Every 5 years	Carbon inventory in field
$C_{AB\_post,i}$	Carbon stock in pasture aboveground biomass	tCO_{2e} ha^{-1}	Every 5 years	Carbon inventory in field
$C_{BB\_post,i}$	Carbon stock in pasture belowground biomass	tCO_{2e} ha^{-1}	Every 5 years	Carbon inventory in field
$C_{DW\_post,i}$	Carbon stock in pasture deadwood (tCO_{2e} ha^{-1})	tCO_{2e} ha^{-1}	Every 5 years	Carbon inventory in field

Table 3.28. Data and parameters to be monitored - Continuation

Variable to be Monitored	Explanation	Unit	Frequency	Procedure
$E_{BiomassBurn,i,t}$	Greenhouse emissions due to biomass burning as part of deforestation activities in stratum *i* in year *t*; tCO_{2e} of each GHG (CO_2, CH_4, N_2O);	tCO_{2e} ha^{-1}	Annually	Calculation/ Modeling
$A_{Burn,i,t}$	Area burnt for stratum *i* at time *t*	ha	Annually	Calculation/ Modeling
$\Delta C_{WPS-REDD}$	Net GHG emissions in the REDD project scenario up to year *t**	tCO_{2e} ha^{-1}	Annually	Calculation/ Modeling
$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project area in the project case in stratum *i* within the project area in year *t*	tCO_{2e} ha^{-1}	Annually	Calculation/ Modeling
$\Delta C_{P,Deg,i,t}$	Net carbon stock change as a result of degradation in the project area in the project case in stratum *i* within the project area in year *t*	tCO_{2e} ha^{-1}	Annually	Calculation/ Modeling
$\Delta C_{P,DistPA,i,t}$	Net carbon stock change as a result of natural disturbance in the project area in the project case in stratum *i* within the project area in year *t*	tCO_{2e} ha^{-1}	Annually	Calculation/ Modeling
$GHG_{P-E,i,t}$	Greenhouse gas emissions as a result of deforestation and degradation activities within the project area in the project case in stratum *i* in year *t*	tCO_{2e} ha^{-1}	Annually	Calculation/ Modeling
$\Delta C_{P,Enh,i,t}$	Net carbon stock change as a result of forest growth and sequestration during the project in areas projected to be deforested in the baseline[2] in stratum *i* in year *t*	tCO_{2e} ha^{-1}	Annually	Calculation/ Modeling
$E_{BiomassBurn,i,t}$	Non-CO_2 emissions due to biomass burning in stratum *i* in year *t*	tCO_{2e} ha^{-1}	Annually	Calculation/ Modeling
$E_{FC,i,t}$	Emission from fossil fuel combustion in stratum *i* within the project area in year *t*	tCO_{2e} ha^{-1}	Annually	Calculation/ Modeling
$N_2O_{direct-N,i,t}$	Direct N_2O emission as a result of nitrogen application on the alternative land use in stratum *i* within the project area in year *t*	tCO_{2e} ha^{-1}	Annually	Calculation/ Modeling

Table 3.28. Data and parameters to be monitored - Continuation

Variable to be Monitored	Explanation	Unit	Frequency	Procedure
$\Delta C_{LKAS,\ planned}$	Net greenhouse gas emissions due to activity shifting leakage for projects preventing planned deforestation	$tCO_{2e}\ ha^{-1}$	Annually	Calculation/ Modeling
$LKA_{planned,i,t}$	The area of activity shifting leakage in stratum *i* at time *t*	ha	Annually	Satellite imagery analysis
$\Delta C_{BSL,i}$	Net carbon stock changes in all pools in baseline stratum *i*	$tCO_{2e}\ ha^{-1}$	Annually	Calculation/ Modeling
$GHG_{LK,E,i,t}$	Greenhouse gas emissions as a result of leakage of avoided deforestation activities in stratum *i* in year *t*	$tCO_{2e}\ ha^{-1}$	Annually	Calculation/ Modeling
ΔC_{LK}	Net greenhouse gas emissions due to leakage	$tCO_{2e}\ ha^{-1}$	Annually	Calculation/ Modeling
$\Delta C_{LK\text{-}AS,planned}$	Net greenhouse gas emissions due to activity shifting leakage for projects preventing planned deforestation; tCO_{2e}	$tCO_{2e}\ ha^{-1}$	Annually	Calculation/ Modeling
$\Delta C_{LK\text{-}AS,unplanned}$	Net greenhouse gas emissions due to activity shifting leakage for projects preventing unplanned deforestation; tCO_{2e}	$tCO_{2e}\ ha^{-1}$	Annually	Calculation/ Modeling
$\Delta C_{LK\text{-}ME}$	Net greenhouse gas emissions due to market-effects leakage; tCO_{2e}	$tCO_{2e}\ ha^{-1}$	Annually	Calculation/ Modeling
$\Delta C_{LK\text{-}AS,degrad\text{-}FW/C}$	Net greenhouse gas emissions due to activity shifting leakage for degradation caused by extraction of wood for fuel; tCO_{2e}	$tCO_{2e}\ ha^{-1}$	Annually	Calculation/ Modeling

3.3.3 Monitoring Plan

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

The monitoring plan and the respective summaries of the periodic reports provided for in the planning and activities table will be published on the project's website, and also on the Verra platform page. Digital reports will be sent to all stakeholders and partners of the project. Printed versions will be made available at the project headquarters and provided to any individual or institution, on demand.

3.4 Optional Criterion: Climate Change Adaptation Benefits

This project seeks to be validated to the Gold Level for climate change adaptation benefits.

3.4.1 Regional Climate Change Scenarios (GL1.1)

Amazon forest is threatened by ongoing climate changes, which are expected to make this region gradually hotter and drier. These effects are more intense in global climate simulations by models that connect peaks in the temperature of surface water in the Pacific Ocean with the El Niño phenomenon. Past events suggest that the connection between the Pacific Ocean-surface temperature and El Niño is real. The estimated impact of climate changes on the Amazon are even worse in models that include biospheric feedback effects, pointing to the disappearance of forested areas and subsequent heating of the exposed soil, which leads to greater carbon emissions that further affect climate and kill more forest.

A previously unappreciated climatic threat became apparent in 2005, when a devastating drought struck Amazonia. This type of drought is linked to a gradient of water temperature from the North to the South Atlantic Oceans, which is part of an oscillation that is becoming more intense. The formation of the patch of warm water in the tropical North Atlantic is worsening due to the reduction of aerosol loads over this area of the ocean, a situation that is expected to intensify in the forthcoming decades as a result of continued global warming. Whether such a scenario will come to take place depends on our efforts towards limiting the emission of greenhouse gases from fossil-fuel combustion and deforestation. Brazil is among the countries with the most to lose from global warming, possibly risking the loss of the Amazon rainforest (Fearnside, 2009).

Different climate models produce a wide range of results for the future climate in Amazonia. One model in particular, the UK Meteorological Center's Hadley Center model, indicates a catastrophic shift to a drier, warmer climate in the Amazon, resulting in the death of nearly all of the forest by 2080 (Cox et al. 2000, 2004). At the time of the Fourth Assessment Report (AR-4) of the Intergovernmental Panel on Climate Change (IPCC, 2007), several other models indicated the Amazon was becoming significantly drier, among them the National Center for Atmospheric Research (NCAR) model. from the USA, and the ECHAM model from the Max Planck Institute, from Germany. Some models, such as the CSIRO, from Australia, indicated no change in Amazonia, while a model from the Geophysical Fluid Dynamics Laboratory (GFDL) in the U.S.A. indicated more rainfall in Amazonia (Kundzewicz et al., 2007).

The indication of increased rainfall in Amazonia in the GFDL model was the result of an error in the model that has already been corrected (Fearnside, 2009). Even so, the results are quite varied, and it is important to evaluate the different models for the specific purpose of representing the future climate in Amazonia, as well as to consider how best to interpret the meaning of the remaining uncertainty for policy. The catastrophic results of the Hadley Center model were first published in the journal Nature in 2000. It is extremely disturbing that nine years of intensive work by various research groups has not identified a specific error that would invalidate this result, although the results other models are comparatively less catastrophic. Some comfort for us derives from the fact that the Hadley model indicates a current climate in Amazonia that is hotter and drier than today's real climate is (Cândido et al. 2007). This means that the numerical values for temperature and drought in the simulated future climate are probably also exaggerated. However,

the simulated future climate goes so far beyond the tolerance limits of Amazonian Forest trees that it would cause high mortality even if the changes are less extreme than the simulations indicate.

Climate change is already happening and is already having impacts, and the greater the warming, the greater the future impacts and risks that humanity will face, including the possibility of irreversible damage to ecosystems, biodiversity, agricultural production and the economy and society in general. Effective inclusion of climate change adaptation can help build a more resilient society in the medium term.

In the Amazon, the observed warming from 1949 to 2017 ranges from 0.6 to 0.7°C, according to various sources of temperature data. Although there are some systematic differences, all sources point to greater warming in recent decades, with 2017 being the warmest year since the mid-20th century (Marengo, 2018, Figure 3.3).

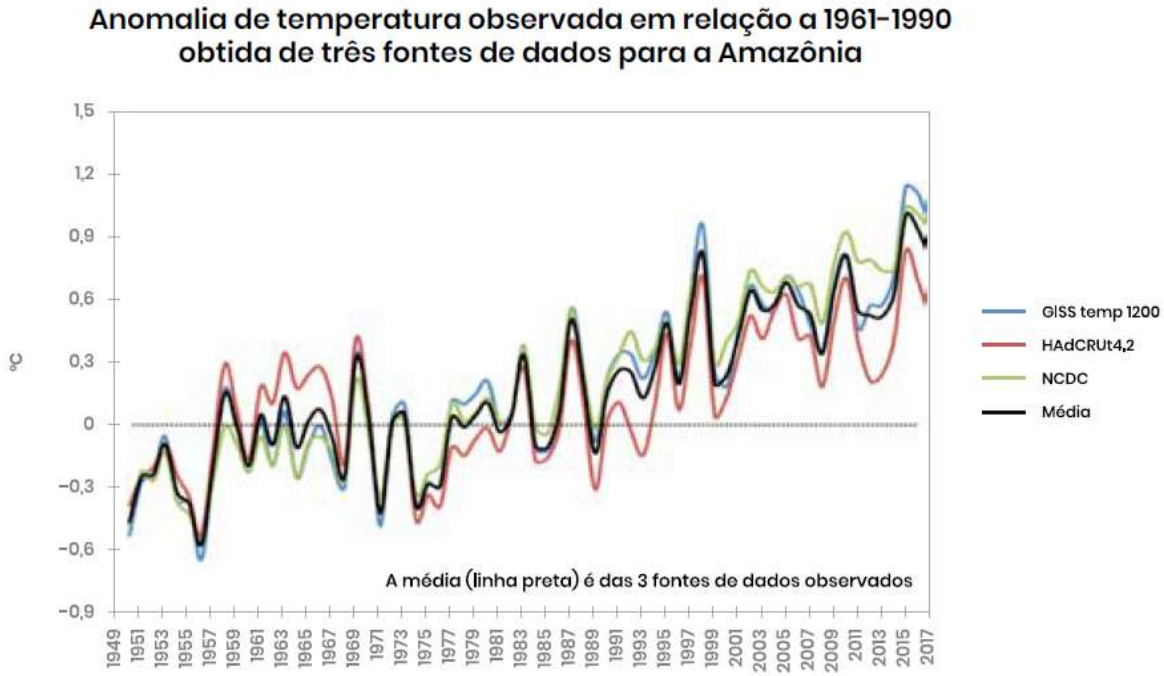


Figure 3.3. Temperature anomaly observed in relation to 1961-1990 obtained from three data sources for the Amazon

Sources: GISS-NADA Goddard Institute for Space Studies, EUA, NCDC-National Climatic Data Center, EUA, HAdCRU-Hadley Centre-Climaté Research United, United Kingdom

The climate change scenarios for the Amazon, projected by complex climate models and presented by the IPCC, point to an increase in the average air temperature projected by the end of the 21st century well above 4ºC and a reduction in rainfall of up to 40% in the Amazon (Figure 3.4). This change in air temperature has the potential to generate major imbalances in ecosystems vital to humanity's survival. According to the National Plan for Adaptation to Climate Change, South America is the continent with the highest risk of species extinction (23%). The attribution of causes

suggests that human influence may be more important compared to natural causes, according to previous IPCC reports and the recent synthesis on global warming above 1.5ºC (Figure 3.5).

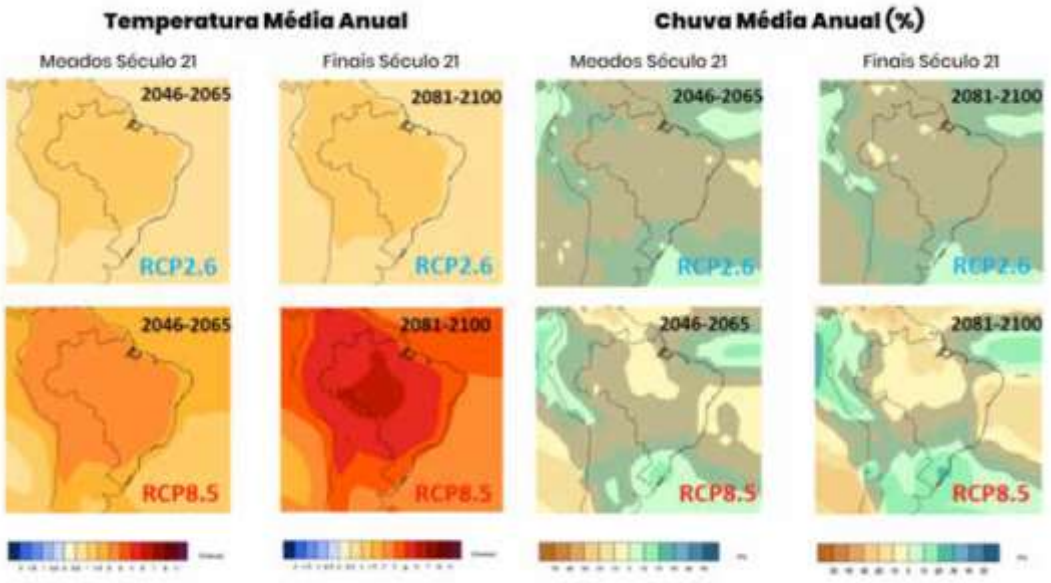


Figure 3.4. Projections of temperature changes and rainfall in the tropical region of South America produced by the IPCC AR5 model set for 2046-2065 and 2081-2100 with low emissions (RCP2.6) and high emission (RCP8.5) scenarios, for the period 1981-2010

Source: Marengo (2018)

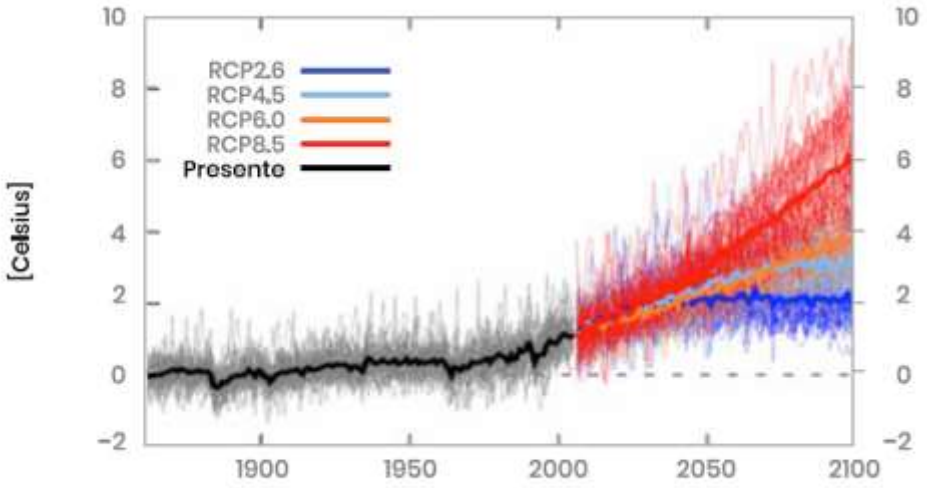


Figure 3.5. Temperature change projections up to 2100 for the various IPCC A5 emission scenarios for the Amazon

Source: Marengo (2018)

3.4.2 Climate Change Impacts (GL1.2)

Global warming can have the most diverse consequences, many terrestrial, aquatic, and marine species have already changed their geographic distribution, seasonal activities, migration patterns, abundance, and intraspecific interactions in response to ongoing climate change (high confidence). According to IPCC AR5, impacts from extreme weather events, such as droughts and fires reveal the significant vulnerability and exposure of some ecosystems – and many human systems – to current climate variability. Impacts of such climate-related extremes include changing ecosystems, as is the case in the Amazon.

Human-induced climate change are acknowledged as one of the major threats to biodiversity over the 21st century. However, species/populations are not equally affected by climate change. Therefore, identifying where and which species are more vulnerable to climate change is especially important to guide conservation efforts. Ribeiro et al. (2016) evaluated mammal exposure to climate change and assessed the effectiveness of Amazon network of Protected Areas (PAs) as a buffer to the impacts of climate change on "critically-exposed" species. The author also developed a spatial conservation scheme for mammals in the Brazilian Amazon that efficiently identifies highly exposed areas within species current and future distributions in which conservation efforts should be targeted in order to mitigate the impacts of climate change on the biodiversity found in the Brazilian Amazon. The author found that mammals might face high exposure to climate change and Protected Areas will probably not be efficient enough to avert impacts of climate change on "critically-exposed" species.

Climate change will have profound effects on biodiversity and carbon storage capacity in the Amazon, a critical region for the world's climate. Each scientific expedition describes new species at all levels of the phylogenetic scale, but their biology and adaptive capacity in the face of environmental changes are unknown. The effects of climate change can be opposite, depending on biology, adaptive capacity and the distribution and occurrence of species in different ecosystems. Supposedly, species with restricted habits and occurring in small populations are more vulnerable than species that have greater adaptive plasticity and are continuously distributed over wider regions. Species that have suffered or suffer fragmentation in their environments may have a decrease in size of their populations due to the increase in inbreedings that generate loss of genetic variability which, in turn, result in a reduction in the adaptive capacity and, consequently, in a reduction in the reproductive capacity. Populations of territorial fish species are naturally more structured than migratory species, which are generally made up of only one population. Recent molecular studies, based on mitochondrial and nuclear DNA characteristics, have provided the identification of the real genetic diversity of animal and plant populations, supporting species management plans under environmental pressure. Microsatellite loci (SSR – single strand repeats) are the most used in this type of study. Therefore, the fragmentation of ecosystems in the Amazon could increase the effects of climate change in the region (Val & Val, 2008).

Climate change will impact well-being and biodiversity in the influence area of the 413 project. Climatic events increase the vulnerability of human and natural systems. Global environmental and climate changes have been aggravating along the last decades but only circulated by the media over the recent years. This process poses a challenge to society and government on the causes and the role of environmental change on health conditions. Climate change can have impacts on human health in different ways. On the one hand, it impacts directly, as in the case of heat waves,

or deaths caused by other extreme events such as hurricanes and floods. But often, this impact is indirect, being mediated by changes in the environment such as changes in ecosystems and biogeochemical cycles, which can increase the incidence of infectious diseases, which are dealt with in more detail in this document, but also non-communicable diseases, which include malnutrition and mental illness. It should be noted, however, that not all health impacts are negative. For example, the high mortality observed in winters could be reduced with increasing temperatures. The increase in areas and dry periods can also reduce the propagation of some vectors. However, it is generally considered that the negative impacts will be more intense than the positive ones (Barcellos et al., 2008).

Seasonal climate fluctuations have effect on the dynamics of vector diseases, such as the higher incidence of dengue in summer and malaria in the Amazon during the dry season. Extreme events introduce considerable fluctuations that can affect the dynamics of waterborne diseases, such as leptospirosis, viral hepatitis, diarrheal diseases, etc. These diseases can worsen with floods or droughts that affect the quality and access to water. Respiratory diseases are also influenced by fires and the effects of thermal inversions that concentrate pollution, directly impacting air quality, especially in urban areas. In addition, malnutrition situations can be caused by losses in agriculture, especially subsistence, due to droughts and abrupt floods, among others.

The main expected impacts in the project area and its surroundings are as follows:

1) Gradual savannization of the Amazon, especially in the southern portion where the project area is located, with changes in ecosystems and patterns of natural occurrence of species;

2) Loss of plant and animal populations, especially endemic species;

3) Forest fragmentation and habitat loss;

4) Extreme weather events, with more severe rains and storms, also affecting family and subsistence farming;

5) Increased temperature, with greater incidence of droughts and fires, and agricultural losses, affecting food security in the region;

6) Migration of people from the community in search of conditions and life in the cities of Manicoré and Novo Aripuanã, and in other larger cities;

7) Impacts on ichthyofauna and effects on artisanal fishing, also affecting the food security of communities;

8) Increased incidence of tropical diseases and other types of medium/large scale epidemics (possibly even pandemics);

9) Stress and higher incidence of diseases in animals raised for the production of animal protein by traditional communities;

10) Impacts on nutrient cycling and soil biota, decreasing productivity in cultivated areas and in the forest itself.

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

Based on the causal model described in response to G1.8, the measures designed to assist communities and biodiversity to adapt to the probable impacts of climate change are the following (Table 3.29):

Table 3.29. Measures designed to assist communities and biodiversity to adapt to the probable impacts of climate change

No.	Adaptation Measure	Directed to		Outputs	Outcomes	Impacts
		Community	Biodiversity			
1	Permanent maintenance of contact with institutions that issue climate alerts for the region	x	x	Climatic alerts reported to the local population	Local population always alerted about extreme weather events and risks of storms, fires, etc.	Less climatic risks to local population
2	Permanent training on the topics related to climate change, vulnerabilities, mitigation and adaptation measures	x	x	Training courses to 200 local people	Local population well informed and motivated to adopt mitigation and adaptation measures to combat climate change	Less climatic risks to local population
3	Building the community health unit to mitigate potential tropical illness	x		Health unit built and population better assisted	Local population gets better knowledge on and less vulnerable to tropical illness	Increased life quality and improved health of local population
4	Fluvial and terrestrial transportation measures to adapt the local population to effects of extreme climatic events	x		Roads and berths along riverbanks improved	Better transportation facilities to local population	Better infrastructure to local population
5	Technical extension courses on low carbon agricultural practices, and water and energy smart use	x		Training courses to 100 people	Use of a wider range of plants to food production by the local population	Food, energy, and water security for the local population
6	Training in practices of wider use of local biodiversity and adaptation of forest plants into crops	x	x	Training courses to 100 people	Use of a wider range of plants to food production by the local population	Food security for the local population
7	Monitoring deforestation and forest degradation rates in the region to analyze the effects of climate change on biodiversity		x	Annual maps of deforestation and forest degradation elaborated	Improvement of the knowledge on forest (and biodiversity) response to climate change	Biodiversity benefited
8	Analysis of the variation in the production of açaí, Brazil nuts, rubber, fish and other essential products and definition of adaptation strategies in situations of shortage/reduction in supply	x	x	Seasonal yield of the essential products recorded and analyzed	Local population prepared and adapted to unexpected climatic effects on their crops	Food security for the local population
9	Maintaining permanent contact with agricultural and forestry research and extension institutions to encourage the use of plant varieties more adapted to the reality of climate change	x	x	Agricultural and forestry extension institutions involved	Use of a wider range of plants to food production by the local population	Food security for the local population
10	Continuous forest inventory to analyzed the effects of climate change on species adaptation to environment over a long-term lifetime		x	Triennial carbon reports executed	Improvement of the knowledge on forest (and biodiversity) response to climate change	Biodiversity benefited

4 COMMUNITY

4.1 Without-Project Community Scenario

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

The 413 Project proponents and their landowner partners are private business. The landowners have been protecting this forest overtime. Consequently, traditional and indigenous people living nearby have been benefited by non-deforestation measures practiced so far.

Various traditional communities and indigenous people live in its influence zone and in the Madeira microregion as previously shown in section 2.

Cattle-ranching farms and settlements are also part of the regional socio-economy in Madeira micro-region. Intensification of human occupation in the region has increased deforestation rates, forest degradation and fires, as seen Figure 4.1.

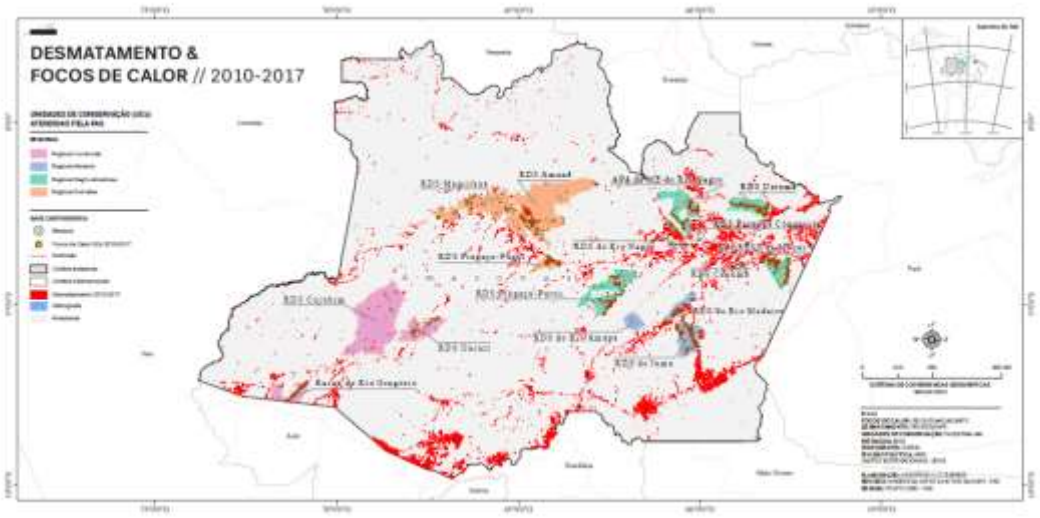


Figure 4.1. Deforestation and fire spots in Amazon State during 2010-2017

Source: FAS (2017)

The existing communities living in the project influence zone are the following:

1) Communities of RDS Rio Madeira: Rio Madeira Sustainable Development Reserve (Reserva de Desenvolvimento Sustentável in Portuguese)

The RDS Rio Madeira houses 25 communities that, together, make up a universe of approximately 480 families. The area is characterized by the occupation of traditional populations, remnants of rubber plantations, and many of the current communities were formed due to rubber roads. The main economic activity is agriculture, with bananas being the main commercial product. In some cases, the extraction of Brazil nuts is explored. There is also the possibility of commercial

exploitation of wood, copaiba, and cumaru. In addition, the area has strong potential for ecotourism, including ornithological and educational tourism (ISA, 2021).

More detailed mapping and identification of local communities done by FAS (2017) evidenced 44 different communities living in the RDS Rio Madeira, located mainly along the left side riverbanks of Madeira River (Figure 4.2). Cassava flour, cocoa, açai, watermelon, banana, nuts, and copaiba oil are the main productive chains for those residents. A total of 1,072 families have been assisted by the Bolsa Floresta program of the State of Amazonas (FAS, 2017).

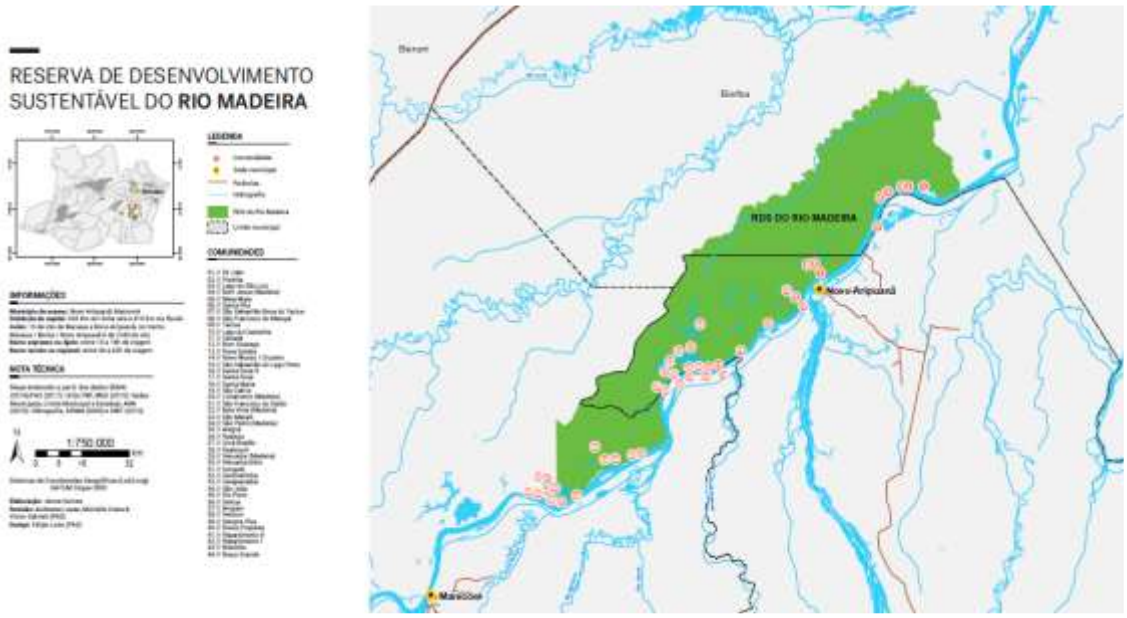


Figure 4.2. Communities of the RDS Rio Madeira

Source: FAS (2017)

2) Communities of RDS Juma: Juma Sustainable Development Reserve (Reserva de Desenvolvimento Sustentável in Portuguese)

According to ISA (2021), about 11 communities inhabit the reserve practicing extractvism (timber and non-timber small-scale or low-intensity activities) and slash and burning agriculture. There are areas of "black earth", which resulted from the agricultural activities of paleoindigenous people who inhabited the region between 1,500 and 2,000 years ago and are used for subsistence cultivation. The extraction of wood, gold, and pebble, and the extraction of Copaiba oil are the main economic activities. In addition, there is the presence of mahogany and the community interest for its commercialization. The region is threatened by the advance of deforestation to plant pasture, soybeans, the imminent logging, infrastructure building, such as hydroelectric plants, which have a profound impact on the biota and landscape. In its archaeological sites, it is possible to find utensils such as axes and ceramics. Strong eco-tourism potential, including ornithological and educational tourism.

A more recent and detailed survey carried out by FAS (2017), detected a larger number of local communities living in this area (Figure 4.3). The total number of distinct communities identified was 38 and the main product chains noticed were: nuts, banana, copaiba oil, watermelon, and cassava four. These communities are mainly located along the Aripuanã and Mariepauá rivers. A total of 484 families have been assisted by the Bolsa Floresta program of the State of Amazonas, and another REDD+ project registered under VCS and CCB standards also provides social assistance to some of these communities.

Figure 4.3. Communities of the RDS Juma

Source: FAS (2017)

3) Communities of Flona Aripuanã: Aripuanã National Forest (Floresta Nacional do Aripuanã in Portuguese)

It is a sustainable use unit, whose objectives are: to promote sustainable multiple use management of forest resources; the maintenance and protection of water resources and biodiversity; and support the development of methods for the sustainable exploitation of natural resources, seeking to create alternative means of generating income for the local population. Despite being a federal conservation unit (protected area) categorized as Flona, traditional populations reside inside it (ISA, 2021). Pereira et al. (2019) made an overview of these communities and land and social conflicts in this protected area. There is no accurate update data on these communities.

4) Communities of APA Campos de Manicoré: Área de Proteção Ambiental dos Campos de Manicoré in Portuguese)

It is a sustainable use unit, with the objective of ordering the process of occupation in the region, mainly in relation to the conciliation of the environmental conservation of natural fields, extremely

fragile environments, and the construction of the highway that connects the seat of the municipality of Manicoré to the district of Santo Antônio de Matupi. Accurate and update data on these communities are not available.

Traditional communities living in the four places formerly cited are mostly composed of mixed indigenous people, Portuguese Brazilian, and African descendants. Many of them descent from former ancient rubber tapers and nut collectors coming from northeastern Brazil and other Amazonian regions. They speak Portuguese and are Christians, either Catholics or Evangelicals. There is no specific data on their income but, based on IBGE data from Manicoré and Novo Aripuanã municipalities, and more than 50% of the workers earn less than half of the national minimum wage, i.e. ca. 105 USD/month, according to official data (see also Section 4.5.1 for further description). The population is roughly fifty to fifty considering men and women, and most are children and young, according to IBGE data (IBGE, 2021).

They are organized in their self-managed communities and choose their leader or representative for dialogue with other communities and external persons/institutions. Some communities are organized as associations and cooperative-like arrangements. In cultural terms they are very close one another, although some light diversity among the different communities may be noticed.

They usually live in very simple wooden family houses, mostly covered with fiber cement tiles (a few still use straw cover), sometimes on stilts when their houses are close to the rivers (Figure 4.4). Hygiene conditions are modest, but some have access to locally treated water with chlorination and electricity from a diesel generator. They use fuelwood for cooking, though some also have gas stoves. Access to health care is mainly done in the municipal offices of Manicoré and Novo Aripuanã, and in more complex cases in the capital Manaus, 300 km and 419 km from fluvial transportation, respectively. The transportation from the communities to towns is made by unpaved roads and rivers. Communication is precarious and cell phone coverage is only available at urban areas.

The communities have a close interaction with the forest and live off many of its products, such as Brazilian nuts (castanha), açai berry pulp (polpa de açaí), cocoa seeds, andiroba oil, and hunting and fishing. Small-scale slash-and-burn agriculture and agroforestry systems are very commonly practiced. Timber harvesting is only practiced on small scale. They cultivate cassava for the manufacture of flour and other products, important in their daily diet, as well as fruits and vegetables, especially bananas, watermelon, pumpkin, among others. They raise pets on a small scale to produce milk, eggs, meat, etc. Handicraft is also produced on small scale.

Besides the communities previously mentioned there are also several indigenous reserves in the region. Four are included in the influence zone of the 413 Project, as already explained in section 2: TI Pinatuba, TI Rio Manicoré, TI Sepoti, and TI Setemã. They belong to the Múra and Tenharim ethnic groups and speak their own language and most communicate well in Portuguese. Each tribe has its own leader selected by their customary manner. The practice their own spiritual rituals, but most Christianism has introduced and propagated among them by frequent missions coming from elsewhere.

The Mura occupy vast areas in the water complex of the Madeira, Amazon and Purus rivers. They live both in Indigenous Lands and in regional urban centers such as Manaus, Autazes and Borba.

Since the first news of the 17th century, they have been described as a navigating people, with wide territorial mobility and excellent knowledge of the paths through streams, holes, islands and lakes. In their long history of contact, they suffered various stigmas, massacres and demographic, linguistic and cultural losses. Originally speaking an isolated language, the Mura began to use Nheengatú (General Amazonian Language) in exchanges with whites, African descendants, and other indigenous populations. In the 20th century, Portuguese became the main language used. At present, despite the historical changes, the Mura make several efforts to be fully recognized as a distinguished people.

Figure 4.4. Photo of a community in the region

Source: FAS (2017)

Portuguese-speaking, the Mura combine miscegenation and territoriality in their current forms of self-denomination. When asked about their birthplace or about their indigenous identity, the Mura

usually answer: “I am a legitimate caboclo from the Madeira River”. By “legitimate caboclo” they seek to clarify the particular condition of the ethnic group: it affirms the political determination to be Mura despite historical changes. Thus, there is the appropriation of a regional term, “caboclo”, normally used with contempt by the regionals to define the “impure”, “acculturated” Indian. Positivized by the Indians, the term “caboclo” starts to identify what it is to be Mura today: a mixed Indian, whose genealogy is the result of the incorporation of Northeastern, Maranhenses, Peruvians and non-Indians in general, who came to compose the ethnicity through marriages, most of the time, with women wall. By “caboclo” the Mura alludes to the biological component, indigenous blood, even if mixed; by “legitimate” it means belonging to a certain geographical area; a river, igapó or lake, for example. He is no longer “pure Indian” because he lived the civilizing process with all its terrible hues from the colonial period to the present. By assuming themselves as “legitimate caboclos”, the Mura reaffirm their awareness of the complex historical process experienced by the group in order to maintain itself as such. The regional society, however, frequently questions whether the Mura were “real Indians”.

Until the beginning of the 20th century, the Mura of the Madeira and Solimões rivers spoke the Mura language, from an isolated linguistic trunk. Since the time of the conquest, these Indians also began to use the general language (or Nheengatu), which was gradually replaced by Portuguese.

In 1826, an anonymous observer recorded that the Mura from the mouth of the Madeira spoke “the general language in addition to its three slang – the nasal articulate, the guttural and the harmonica” (C. Moreira Neto, 1988: 358). A similar linguistic situation was described by Barbosa Rodrigues (1875) in the Urubu river; Tastevin (1923) near Manaus; and Nimuendajú, in relation to the Mura of the Madeira and Solimões rivers.

Apaitsiiso, a language spoken by the Pirahã, current inhabitants of the Marmelos and Maici rivers, classified by Nimuendaju (1946) as a sub-group Mura, has these same characteristics. The studies Everett (1983) and Gonçalves (1988, 2001) describe it as a tonal language, in which meanings are eminently established from tone relationships. Through whistles and shouts, for example, speakers are able to generate a specific communication modality, especially effective for conversations over long distances.

The general language, designed by the Jesuits from the Tupi-Guarani languages of the coast, was until the expulsion of the Jesuits and the creation of the lay government of the Pombalino Directory (1755), the official language of the colony in Grão-Pará, imposed on all natives in missions, in business relationships, and in labor discipline efforts. Until the 19th century, the Mura used it extensively in communication with colonists, missionaries, black slaves and other indigenous peoples. This, however, does not mean that they had abandoned the Mura language. In the 20th century, Nheengatu lost its role as an intercultural lingua franca to Portuguese.

Currently, the Mura, Portuguese speakers, as well as other Amazonian peoples who have lost their mother tongues, reaffirm Nheenhatu as an indigenous language. In many cases, the Mura associate terms and phrases in the general language spoken by their elders to the Mura language itself. At present, the Mura are making efforts to enhance the linguistic and cultural recovery of the various “slang” of the Mura language.

Due to the wide mobility and dispersion of the Mura over a vast territory, global population counts are highly inaccurate and difficult to carry out. The gathering of surveys published by Funai, produced within the scope of land regularization processes, carried out between 1991 and 2008, point to an approximate population of 9,300 people living in Indigenous Lands.

This calculation, however, does not include the population of villages and Indigenous Lands whose demarcation processes have not yet been completed, not even the inhabitants of urban centers, which hinders, or even prevents, the planning of adequate public policies to serve the population. wall, both in the villages and in the cities.

The Mura's economy, although oriented towards subsistence, is marked, to varying degrees, by broader work and trade activities: sale of flour, participation in ventures carried out by fishing or ecotourism boats, as well as extraction of wood and straw for the marketing in cities. Such activities occupy the population of the villages in different ways. Different communities form different economic profiles, in a gradient that goes from those more focused on the activity of extracting and commercializing wood, to those more focused on agricultural activities and commercialization of regional fruits. In general, the Mura villages provided crew for the boats or fishermen for the commercial fishing and ecological tourism boats.

In their recent history of contact with national society, the Muras played the role of the semi-slave worker, who sells his labor power and land in exchange for health care and manufactured goods, in a series of economic cycles that marked the whole Amazon. The type of work relationship that was historically imposed on the Muras, far from welfare and the tutelage of the federal government and totally at the mercy of the unscrupulous exploitation of bosses and regatões, starts, at the end of the 20th century, to reproduce itself internally in the relationships that are between the leaders and the Mura communities.

In the division of labor, men hunt, fish and open the ground for new gardens and for the expansion of plantations. Children and women supply their daily meals with fish, which can be interspersed with game meat eventually obtained by men. The boys start hunting at the Cunha-Sapucaia IT very early, accompanying their parents on hunting trails that are the domain of each family.

In communities more focused on logging activities, it is men who penetrate the forest in search of wood, being, however, helped by young people and children, who generally help with other tasks. Women are responsible for taking care of the gardens. The entire community participates in the Brazil nut harvest. For the commercialization of the surplus, follow the division by family units.

The Mura combine activities of different natures to guarantee their livelihood. The food base is fish, easily found in the region's streams and rivers, which is consumed roasted or cooked with cassava flour, produced by each family unit, in community flour houses (generally owned by an extended family). They also consume coffee, sugar, rice, pasta, salt and cookies, items purchased in the city. Medicines, clothing, fuel, and tools are also purchased.

Mura gardens, in general, are replanted in a different location from the previous one every two harvest cycles. Cassava derivatives are widely consumed throughout the year. The villages have at least one equipment for the production of flour, although the wish is that each extended family has its own flour house. In their gardens, they plant several types of cassava, as well as other roots and tubers that balance and supplement their diet with necessary nutrients.

The Mura are skilled fishermen and hunters. They enjoy fish - jaraqui, traíra, peacock bass, matrinxã - and game meats, such as tapirs, deer, peccaries, capuchin monkeys, howler monkeys, tortoises, peccaries, cotia, curassows and aracuã. Such activities are practiced in traditional ways, but they do not fail to make use of technologies incorporated from the regionals. Fishing is done with an arrow, spear and hook. In hunting they use dogs. Only a few residents have a shotgun.

The collection of various types of nuts stands out as one of the main activities of all communities. They are highly appreciated and complete their diet, along with the various fruits found in the region, such as açai, amapá, babassu, bacaba, buriti, piquiá, tucumã, uixi; as well as house fruits planted in the vicinity of houses, such as avocado, pineapple, acerola, banana, cocoa, coffee, cashew, sugarcane, carambola, coconut, cupuaçú, guava, jackfruit, jambo, genipap, jutaí, orange, lime, lemon , papaya, mango, passion fruit, peach palm and watermelon.

Extractive activity is a traditional Mura practice, which precedes and surpasses agriculture in importance. It was with the collection and sale of Brazil nuts that the Mura developed the mechanisms to deal with the consumer market. The experience gained is used in the sale of wood, the product most demanded by the local market. With the decadence of the Brazil nut era, the growth of logging and pastoral activities throughout the region was registered.

Tenharim is the name by which three indigenous groups are known who live today in the region of the middle course of the Madeira River, in the south of the State of Amazonas, belonging to a broader group of peoples who call themselves the Kagwahiva. In addition to the same self-denomination, the Kagwahiva peoples speak the same language, belonging to the Tupi-Guarani family, and are organized according to the same system of matrimonial moieties named after birds. As for the three Tenharim groups, the one from the Sepoti river has recent origins from the one from the Marmelos river, but the one from the Preto creek has no known common origin with the other two, but is an old ally.

The Tenharim groups live in the region defined by anthropology as Madeira-Tapajós, each located in a different area and geographically identified: Marmelos river, Sepoti river, and Preto creek. The group from the Marmelos river and the one from the Preto creek maintain an alliance that dates back to the period before the contact, which took place in the mid-20th century. The Sepoti group, on the other hand, emerged in the 1940s, when two women from the Marmelos River got married to regionals and went to live down a tributary of this river. Although the system is patrilineal and the individuals of Sepoti descend from two deceased regionals, the assumed identity is Tenharim.

The Tenharim of the Marmelos River, the Preto Stream and the Sepoti River are all bilingual. However, on the Preto creek and on the Sepoti river, the indigenous language was almost lost and is now being resumed. Among the Tenharim of the Marmelos River, there is the use of the native language within the group and Portuguese in relations with the outside world.

In addition to agricultural production, the Tenharim live off hunting, fishing, and gathering. There is, by some domestic groups, an intense production of handicraft, consisting of bows, arrows, headdresses, necklaces, bracelets, and rings, which are sold in Porto Velho and on occasional trips.

The beginning of the dry season, around June, in the south of Amazonas, is marked by the clearing of the forest and the beginning of the planting of gardens. In the Transamazônica (Tenharim do Rio

Marmelos), at that time, many families left the village to live temporarily in their "farms", preparing the crops and improving their coexistence. Some chose to live in these places permanently, keeping a house for temporary stays in the village. In the "sites", it is possible to observe the introduction of new plants, such as watermelon and, in some cases, also the creation of cattle. But despite the low market cost, flour remains the priority production.

In Transamazônica and in the Preto creek, the excess flour is exchanged for industrialized products in the village itself. This exchange is carried out with merchants who arrive from the city already with the population's orders. In general, these individuals overvalue industrialized products and undervalue Tenharim products. In addition to flour, they are also interested in acquiring Brazil nuts and copaiba oil. To transport the products, they use the Tenharim truck or the city hall truck, which travels weekly along the Transamazônica highway, taking the population that lives along the road. On the Sepoti River, trade is carried out with the regatões, who arrive in the village with boats loaded with industrialized products for exchange.

The village on the Marmelos river is a reference for all the Tenharim groups. There, the traditional festivals that bring together most of the Kagwahiva groups take place. Only the Kagwahiva from the upper Machado region (Amondawa, Uru-eu-wau-wau, Juma and Karipuna) participate in these moments. However, more recently, with the articulation of the regional indigenous movement, there is a tendency for these rituals to bring together all Kagwahiva groups. The main one of these parties is Mboatava, which takes place between July and August and has a very close relationship with the domestic group. On this occasion, an individual takes over the organization of the party and summons the best hunters and fishermen to go on an expedition. While the hunters are away, a lot of mandio'y flour is produced by the individuals who are part of the organizer's household group. The chef allows the removal of green bananas from his gardens to deposit them near his house, in addition to distributing many products provided by Funai, which are found in his warehouse. In addition to the banana, which will be ripe for the party, and the flour, the Tenharim promote expeditions to collect nuts to prepare the main dish of the party, tapir meat cooked in the nut's milk.

Several groups of hunters, summoned by the organizer of the party, depart in different directions and go hunting and fishing at the same time (usually going on boat expeditions). Everything is roasted (preserved by exposure to simmering fire) and a few days later, a certain place close to the village is arranged for a meeting and subsequent triumphant arrival of all in the village. When the hunters loom in the distance, the remaining men are already painted and yell and fire upwards, saluting them. The party organizer then starts singing and playing the flute, walking around the houses. The game is cooked and part of the fish is distributed along with the mandio'y flour. The chestnut is crushed, put to boil with the tapir meat and then served with the flour in the form of a mush.

At the same time, the men begin to dance in the terreiro of the party organizer's home group. All, properly dressed in headdresses and skirts, carrying long bamboo flutes and accompanied by the tapping of their right foot on the floor, dance in circles, pointing their Yreru, long bamboo flutes, towards the center. In the circle of dancers, the women are later integrated, who enter under the arms of their respective husbands.

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

The different communities, both in the RDS Rio Madeira and in the RDS Juma, have interacted in different ways for a long time, through social and economic actions. These traditional communities also have interactions with indigenous communities, but on a smaller scale, as access to indigenous reserves is more restricted. Indigenous people from the Múra ethnic group already have a history of more open interaction with other communities. These interactions will be further analyzed and monitored during the development of the 413 project.

4.1.3 High Conservation Values (CM1.2)

HCV Vales related to community are identified in Figure 4.5 and also shown in Table 4.1.

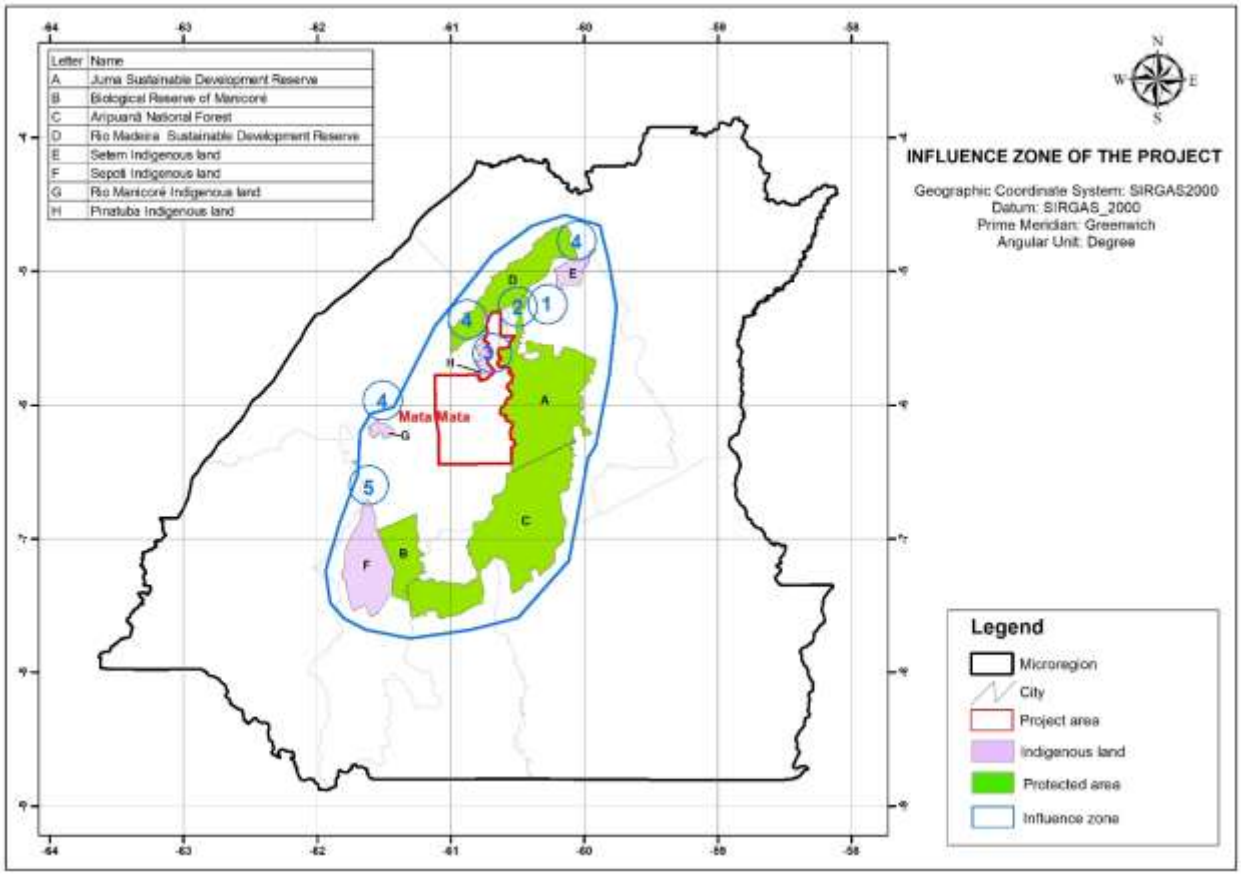


Figure 4.5. Location of HCV related to communities in the project influence zone

Table 4.1. HCV related to communities in the project influence zone

High Conservation Value 1	Food source: pirarucu fish (*Arapaima gigas*)
Qualifying Attribute	Pirarucu is a very important source for all communities, especially those living along riverbanks. It represents a source of protein and income.
Focal Area	Riverbanks of Madeira, Aripuanã, and Mariepauá rivers
High Conservation Value 2	Food source: açai palm (*Euterpe oleraceae* fruits)
Qualifying Attribute	Açai is a main food source to all Amazonian communities, and particularly to those living in the project´s influence zone. RDS
Focal Area	Borders with RDS Rio Madeira and RDS Juma
High Conservation Value 3	Food source: Brazilian nuts (*Bertholletia excelsa* fruits)
Qualifying Attribute	Nuts are widely in traditional Amazonian dishes. In addition, this non-timber forest product represents a great income source to small producers and communities not involved with agriculture or during offseason. It also has a great importance to regional and national trade markets.
Focal Area	Borders with RDS Rio Madeira and RDS Juma and along Madeira, Aripuanã, and Mariepauá riverbanks
High Conservation Value 4	Food source: Copaíba oil (*Copaifera langsdorffii*)
Qualifying Attribute	This oil is extracted from the trunk and to be removed it is necessary to pierce the trunk to the core, the inner part of the trunk formed by dead cells in which no water is transported. This oil extracted from Copaiba is used for cosmetics, but its use has been strengthened and established by the herbal industry. The oil has antibiotic, anti-inflammatory, antiseptic and healing properties. That's why it is widely used at home to cure small skin lesions and throat and lung diseases. In addition to its use in cosmetics and herbal medicines, the oil can be used as a fuel for engines and for the manufacture of paints and varnishes. The medicinal properties of the plant were proven and registered in 1972 at the US Food and Drug Administration. It is very important as an alternative source of income for communities.
Focal Area	Throughout the region, especially on the borders with RDS Rio Madeira and RDS Juma

Table 4.1. HCV related to communities in the project influence zone - Continuation

High Conservation Value 5	Culturally significant area: Múra´s tribes
Qualifying Attribute	Múra´s cultural traditions, such as festivals, music, dance, language (Pirarrã), customs, and culinary need to be preserved.
Focal Area	TI Pinatuba, Rio Manicoré, and Setemã
High Conservation Value 6	Culturally significant area: Tenharim tribe
Qualifying Attribute	Múra´s cultural traditions, such as festivals, music, dance, language (Kagwahiva), customs, and culinary need to be preserved.
Focal Area	TI Sepoti

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

The most-likely without-project scenario is the advance of cattle-ranching and large-scale agriculture to the region and migration of alien people from other parts of Brazil into the influence zone of the 413 project. This continuous process in Amazon has been moving people from the region of the States of Rondônia, Mato Grosso, Pará and Acre to the south of Amazonas through the opening of new roads and logging followed by deforestation for the purpose of installing cattle farms.

As a result of these migratory processes, many people from traditional communities sell their land to new occupants and go way to cities, especially the young ones. Many areas of land used by the communities are squatters and invaded by cattle raisers, miners, and land grabbers, causing great social disturbances and violence.

Many people from local communities fit into the timber and ranching model that promotes degradation and deforestation in the region, joining these practices, either as owners or workers. This mischaracterizes the traditional community model, its way of life close to and attached to the values of the forest and extractivism with a low environmental impact.

Therefore, the expected changes in welfare conditions and other characteristics of communities and community groups in the without-project land use scenario are negative. This project aims to encourage forest conservation and maintain the traditional community model, with improvements in their living conditions, but without detracting from small-scale production, with a strong connection with the forest and ancestral customs. The project then sets out to combat climate change in partnership with traditional communities and indigenous peoples while protecting biodiversity and mitigating climate change.

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CM2.1)

The expected community impacts arising from the 413 Project are shown in Table 4.2. All actions will be decided by participatory processes and the corresponding impacts will be followed through the monitoring plan.

Table 4.2. Expected community impacts arising from the 413 Project

Community Group 1	Communities of RDS Rio Madeira
Impact(s)	Identify impact(s): health, education/training, labor, income, empowerment, climate, and biodiversity
Type of Benefit/Cost/Risk	Direct predicted benefits: health unit and education/training units built and made available to community; costs will be covered by the project proponents and risks will be assessed in a participatory process with the community, and duly monitored/mitigated.
Change in Well-being	Positive changes in health, education, labor, income, food security, women, and youth empowering, among others related to climate and biodiversity
Community Group 2	Communities of RDS Juma
Impact(s)	Positive changes in health, education, labor, income, food security, women, and youth empowering, among others related to climate and biodiversity
Type of Benefit/Cost/Risk	Direct predicted benefits: health unit and education/training units built and made available to community; costs will be covered by the project proponents and risks will be assessed in a participatory process with the community, and duly monitored/mitigated.
Change in Well-being	Positive changes in health, education, labor, income, women and youth empowering, among others related to climate and biodiversity

Table 4.2. Expected community impacts arising from the 413 Project - Continuation

Community Group 3	Communities of Flona Aripuanã
Impact(s)	Positive changes in health, education, labor, income, food security, women, and youth empowering, among others related to climate and biodiversity
Type of Benefit/Cost/Risk	Indirect predicted benefits: health unit and education/training units built and made available to community; costs will be covered by the project proponents and risks will be assessed in a participatory process with the community, and duly monitored/mitigated.
Change in Well-being	Positive changes in health, education, labor, income, women, and youth empowering, among others related to climate and biodiversity
Community Group 4	Communities of APA Campos de Manicoré
Impact(s)	Positive changes in health, education, labor, income, food security, women, and youth empowering, among others related to climate and biodiversity
Type of Benefit/Cost/Risk	Indirect predicted benefits: health unit and education/training units built and made available to community; costs will be covered by the project proponents and risks will be assessed in a participatory process with the community, and duly monitored/mitigated.
Change in Well-being	Positive changes in health, education, labor, income, women, and youth empowering, among others related to climate and biodiversity
Community Group 5	Múra indigenous communities at TI Pinatuba, TI Rio Manicoré and TI Setemã
Impact(s)	Positive changes in health, education, labor, income, food security, women, and youth empowering, among others related to climate and biodiversity
Type of Benefit/Cost/Risk	Indirect predicted benefits: protection of livelihood and culture; costs will be covered by the project proponents and risks will be assessed in a participatory process with the community, and duly monitored/mitigated.
Change in Well-being	Positive changes in health, education, labor, income, women and youth empowering, among others related to climate and biodiversity. Services provided to other traditional communities will also made available to indigenous people, when authorized by FUNAI.

Table 4.2. Expected community impacts arising from the 413 Project - Continuation

Community Group 6	Tenharim indigenous community at TI Sepoti
Impact(s)	Positive changes in health, education, labor, income, food security, women, and youth empowering, among others related to climate and biodiversity
Type of Benefit/Cost/Risk	Indirect predicted benefits: protection of livelihood and culture; costs will be covered by the project proponents and risks will be assessed in a participatory process with the community, and duly monitored/mitigated.
Change in Well-being	Positive changes in health, education, labor, income, women, and youth empowering, among others related to climate and biodiversity. Services provided to other traditional communities will also made available to indigenous people, when authorized by FUNAI.

4.2.2 Negative Community Impact Mitigation (CM2.2)

Necessary and designed measures to mitigate any negative impacts on the well-being of community groups and to maintain or improve HCV attributes related to community well-being will be taken in consultation with the community. These measures will be consistent with the precautionary principle and will prioritize the neediest, most vulnerable communities and members with emergency demands.

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

All groups in the community, whether traditional or indigenous, will have net positive benefits from the with-project scenario. Improvements in health conditions, education, job training will increase their life standards, which would not happen in the absence of the project. The ZC1 Project plans to support various community activities to improve life standards through partnership with Bolsa Floresta Program, developed by the Amazonas State.

The 413 project aims to achieve the Gold Level for climate change adaptation benefits. Thus, project activities will help communities adapt to the likely impacts of climate change, especially with regard to warnings of extreme weather events such as droughts, floods, etc., adaptation in land and river transport to these emergencies and production control measures to monitor the temporal evolution and the effects of climate change on their food security. Actions in the health area will also be adopted, with a view to monitoring and preventing the occurrence of tropical diseases aggravated by the impacts of climate change. Other measures may be undertaken after community consultation.

4.2.4 High Conservation Values Protected (CM2.4)

The 6 HCV previously identified will not be negatively affected by the project, on contrary, they will be protected by the project proponents. Protection of forests on the borders with RDS Rio Madeira and RDS and actions to protect Múra´s and Tenharim lands will implemented by the project.

4.3 Other Stakeholder Impacts

Other stakeholders of this project are those listed in Appendix 1, but not limited to them.

4.3.1 Impacts on Other Stakeholders (CM3.1)

Potential positive impacts of the 413 Project to other stakeholders include, but are not limited to, the following impacts:

- The health unit to be built by the project will also be made available to other interested parties;
- Forest extension and low carbon agriculture training will also be offered to other stakeholders, promoting permanent crops with native species (fruit growing), such as açai, nuts, cocoa, guarana, etc;
- Knowledge and experience of the project will be discussed and disseminated during open workshops. There will also be a cultural exchange and with other stakeholders besides those identified in this project, considering their best practices, lessons learned, etc.;
- The results of research and other project initiatives will be widely disseminated through digital media and social media with the whole society, in Portuguese and English.

Project proponents have identified the following potential negative impacts on other stakeholders as a result of the project:

- Generation of conflict in the surrounding areas not directly benefited by the project, whether due to envy or other causes, hurting external interests to the beneficiaries;
- Increased land cost in the region due to project implementation;
- Decrease in land value in case of impediment to road construction and access to markets on adjacent properties;
- Migration of people from outside the communities out of the project zone causing pressure on protected forest outside the project in its influence zone or vice versa.

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

There are a great number of steps that can be taken to mitigate the project's potential negative impacts on other stakeholders.

As far as is known, there is a good relationship between the communities in the project's area of influence and throughout the region. Any conflicts that may exist must be resolved through diplomatic channels and legal channels. The project proponents will closely monitor community benefits throughout its influence zone.

Youth and children from the surrounding communities and elsewhere will be allowed to attend the educational and training actions of the project, as well as be assisted by the and health unit. Labor

opportunities will also be offered to people outside the project´s influence zone, when necessary and justified.

Regarding the increase in the cost of land, it is believed that the project will have less impact than the construction of other works and roads in the region that will certainly increase its value. The project will encourage conservation practices and guide landowners not to deforest or degrade the forest, but to use areas that are already open and degraded.

On the other hand, the project could have impacts on the depreciation of land values on neighboring properties due to limited access to markets and other facilities. It is not intended that the project will build roads that can pass through the property as this poses a risk to the integrity of the project. However, the Project Proponents will engage adjacent landowners to promote other forest conservation projects expanding beyond the project boundaries. Maintaining forest cover, at the expense of building roads or establishing other large-scale livestock farms, has positive benefits for the climate, community, and biodiversity.

There may be migration of people, internally and externally to the project's zone of influence. This will be monitored and actions to mitigate possible effects of this on the project will be taken in discussion with the community involved in the project. In addition, a partnership will be signed with the agencies of the State of Amazonas, particularly with the FAS in order to minimize the impacts of migration, encouraging social stability in the region through social programs.

4.3.3 Net Impacts on Other Stakeholders (CM3.3)

The 413 Project is not expected to result in net negative impacts on other stakeholders. These stakeholders will also be identified, consulted and allowed to participate in the project with the consent of the beneficiary communities and other direct project collaborators. Other communities will be able to participate in the project activities through the use of its health and training infrastructure, as well as other actions to be developed related to climate and biodiversity monitoring.

4.4 Community Impact Monitoring

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

Communities will be identified, and their profile described in detail. Structured and free interviews will be conducted with members of all communities identified and mapped by the project. The following variables will be raised: 1. Location (coordinates), 2. Information on the family nucleus; 3. Land information; 4. Residence information; 4. Access to energy, drinking water, basic sanitation, public health, transport, etc.; 5. Sociocultural data in general (religion, sports, food preparation and consumption, etc.); 6. Individual data: gender, age, education level, physical and mental health, etc. 6. Interest in working on the project; 6. Skills and job potential; 7. Ethno-botanical knowledge, 8. Collective engagement, associativism and participation in social programs; 9. Sources of income, 10. Others. Specialists from the region will be hired to carry out a social diagnosis of the communities and interact with their members. The communities will be continuously monitored to evaluate the impacts of the project on their life standards. All variables raised will be periodically analyzed and synthesized in reports

Table 4.3 shows data and parameters to be monitored by the 413 Project regarding community.

Table 4.3. Data and parameters to be monitored by the 413 Project regarding community

Variable to be Monitored	Explanation	Unit	Frequency	Procedure
Number of women involved and benefited from the project	-	Number	Annually	Recording signed lists
Number of women participating in the management team of the project	-	Number	Annually	Recording signed lists
Number of women employed by the project	-	Number	Annually	Recording signed lists
Number of women trained by the project	-	Number	Annually	Recording signed lists
Number of children/young people involved and benefited from the project	-	Number	Annually	Recording signed lists
Number of young people employed by the project as trainee	-	Number	Annually	Recording signed lists
Number of young people trained by the project	-	Number	Annually	Recording signed lists
Number of marginalized/vulnerable people identified	-	Number	Annually	Recording signed lists
Number of marginalized/vulnerable people identified	-	Number	Annually	Recording signed lists
Food donation	-	kg	Monthly	Recording lists
Number of health consults and exams	-	Number	Annually	Recording signed lists
Number of people vaccinated	-	Number	Annually	Recording signed lists
Number of education/training courses given by the project	-	Number	Annually	Recording signed lists
Number of climate warnings emitted to communities	-	Number	Annually	Digital record

Table 4.3. Data and parameters to be monitored by the 413 Project regarding community - Continuation

Variable to be Monitored	Explanation	Unit	Frequency	Procedure
Number of elderlies identified and benefited	-	Number	Annually	Recording signed lists
Sports´ events supported by the project to community	-	Number	Annually	Recording signed lists
Building material to adapt climate change provided by the project	-	kg/m	Annually	Digital record
Requests for assistance, complaints, compliments, and individual meetings	-	Number	Annually	Recording signed lists
Number of people receiving climate change warnings	Golden Level	Number	Annually	Recording signed lists
Number of houses adapted to climate change	Golden Level	Number	Annually	Recording signed lists
Number of people adopting to low carbon agriculture, adapted to climate change	Golden Level	Number	Annually	Recording signed lists

4.4.2 Monitoring Plan Dissemination (CM4.3)

The community monitoring plan will be made available and disseminated to the community member and other stakeholders through the project´s internet website and by means of Verra platform. Annual summaries of the community monitoring and results will also be disseminated through biennial workshops of the management staff (including the community representatives) and open events and public consultation process. Digital files of the community monitoring will be transparently made available to community members, institutions, and authorities. Printed version of the monitoring plan will made available under request. Other communication ways, such as radio programs, social networks, etc. will be used for this purpose.

4.5 Optional Criterion: Exceptional Community Benefits

This project seeks to be validated to the Gold Level for exceptional community benefits because it is included in poor region of Brazil in which more than 50% of the populations live under the poverty line.

4.5.1 Exceptional Community Criteria (GL2.1)

This project is located in the municipalities of Manicoré and Novo Aripuanã, with 50.73% and 75.45% of poverty, according to IBGE (2021) (Figure 4.6). The officially employed population is

very low, 5.0 and 3.6%, respectively, with average income of 1.6 to 1.9 minimum wages of the country (minimum wage in Brazil is just over USD 210/month). However, 50% of workers earn less than half of the national minimum wage, i.e. ca. 105 USD/month, according to official data. Therefore, the 413 Project fits to the exceptional community criteria.

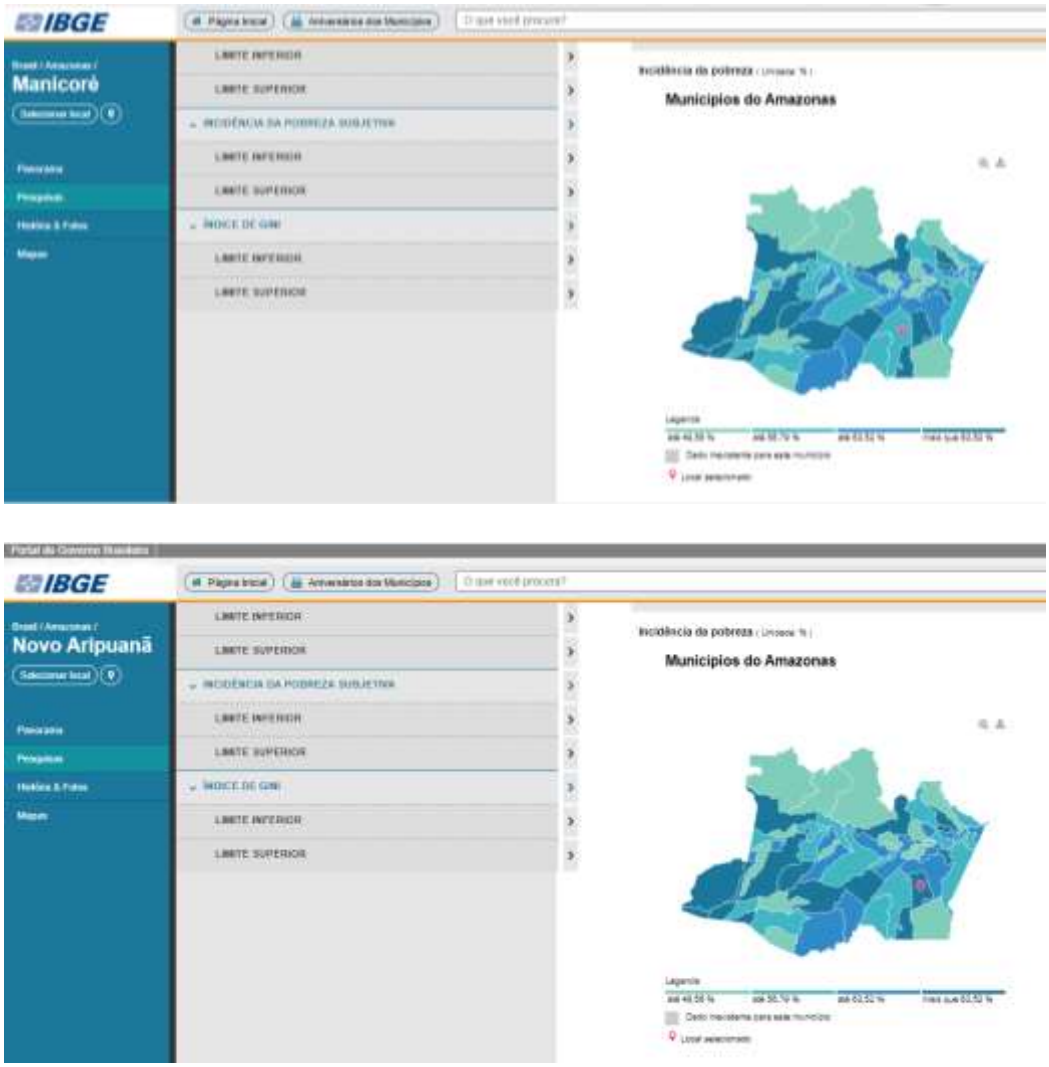


Figure 4.6. Poverty incidence in Amazonas State according to IBGE (2021)

Source: https://cidades.ibge.gov.br/brasil/am/manicore/pesquisa/36/0?tipo=cartograma

In addition, extra measures will be adopted by the 413 Project to benefit community regarding adaptation to climate change. Extreme climate event alerts will be disseminated to communities to inform them previously when such events will happen. Meteorological data will be collected in a station to be installed in the project headquarters, which will be also connected to weather forecast. Families will also be benefited by access to cheaper building materials when climatic events cause damage to their houses. Roads and riverbanks will also be reformed to adapt climate change.

4.5.2 Short-term and Long-term Community Benefits (GL2.2)

The smallholders/community benefits from this project will be the following:

1) Improve health assistance through construction of a health unit and its maintenance by the project;

2) Improved health of youth through promotion of sport activities for community members;

3) Better transportation conditions by improvement of the existing roads and riverbank infrastructure;

4) Better communication facilities;

5) Improvement of water access;

6) Improvement of food security by donation of seedlings of indigenous plant species, and the corresponding technical assistance;

7) Facilitating active involvement in climate and biodiversity issues through participatory process in project´s decision-making strategies and activities;

8) Communities receive alert on extreme climate events, such as storms, drought, etc;

9) Improvement of technical skills by promoting courses, meetings, workshops, lives, etc. addressed to low carbon agriculture;

10) Improved knowledge on the açai, nut, rubber and fish production by recording and analyzing continuously their crop data;

11) Measures to encourage cooperative and association;

12) Creation of opportunities to handicraft production and trade;

13) Empowering women and youth through training, job opportunities, and participation in project´s decision-making;

14) Income share benefit from the project.

4.5.3 Community Participation Risks (GL2.3)

The eventual risks for small producers/community members participating in the project will be identified by a participatory process. This will be done by regular workshops of the project management team with the community representatives.

The joint team will develop strategies and actions to avoid negative impacts on these small landowners and producers, prioritizing those most in need and dependent on the social actions

undertaken by the project. Families and people with the greatest degree of vulnerability will be identified from the beginning of the project and will be closely followed through the community monitoring plan. Quality of life indicators related to housing, health, food, training, and work skills will be used for this purpose. In the case of more serious and urgent risks, emergency actions will be taken to avoid social collapse. Social workers will collaborate in this task.

4.5.4 Marginalized and/or Vulnerable Community Groups (GL2.4)

The identification of and project actions to marginalized and/or vulnerable community groups is provided by Table 4.4.

Table 4.4. Marginalized and/or vulnerable community groups, net positive impacts, benefit access and negative impacts

Community Group 1	Women
Net positive impacts	Women will receive special attention from the project. Human rights, climate, biodiversity, low-carbon agriculture and labor will be a priority in the educational and training process. It is intended that the community participation process always have female leaders. The income benefit process should be led by women.
Benefit access	Cultural barriers or risks that prevent women from being empowered and playing a leading role in the project's actions will be debated with the community, analyzed and faced with a view to preventing the benefits from reaching them. This will be a participatory process.
Negative impacts	Steps will be taken to identify any factors that may negatively affect women's participation and access to project benefits, such as prejudice, violation of rights, etc. Channels for denouncing the lack of respect for human rights and free access for women will be registered, debated and resolved with the community. Diplomatic actions will be employed to deal with the complicated situations that arise, in the first instance. Other measures can be used if necessary.
Community Group 2	Youth
Net positive impacts	Youth will also receive special attention from the project. Climate, biodiversity, labor skills, and youth rights and future will be a priority in the educational and training process. Youth will also have open opportunities to collaborate in the project management actions.
Benefit access	Cultural barriers or risks that prevent youth from being empowered and participating actively in the project's actions will be debated with the community, analyzed and faced with a view

	to getting an adequate and fair solution. This will also be a participatory process.

Table 4.4. Marginalized and/or vulnerable community groups, net positive impacts, benefit access and negative impacts - Continuation

Negative impacts	Steps will be taken to identify any factors that may negatively affect youth´s participation and access to project benefits, such as prejudice, violation of rights, etc. Channels for denouncing the lack of respect for human rights and free access for youth will be registered, debated and resolved with the community. Diplomatic actions will be employed to deal with the complicated situations that arise, in the first instance. Other measures can be used if necessary.
Community Group 3	People under food security and health risk
Net positive impacts	This group will be identified at the beginning of the project and specific actions will be taken to assist them in an emergency, with actions to donate food, carry out consultations and health examinations, as well as guidance and training.
Benefit access	Specific measures will be taken to address this group of needy people in an emergency. They are also prioritized in the income share benefit process.
Negative impacts	Steps will be taken to identify people of this group and any factors that may negatively affect access to benefit share from the project.
Community Group 4	Marginalized people
Net positive impacts	This group will be identified at the beginning of the project and specific actions will be taken to assist them in an emergency, with actions to identify the reasons of the marginalization and the most urgent needs of this group. Psychological and material support will be provided to them. They will also be prioritized in training actions of the project and in the income share benefit process.
Benefit access	Specific measures will be taken to address this group of needy people in an emergency. They are also prioritized in the income share benefit process.
Negative impacts	Steps will be taken to identify people of this group and any factors that may negatively affect access to benefit share from the project.

4.5.5 Net Impacts on Women (GL2.5)

Women will be empowered by the 413 Project that will improve their well-being. The net impacts on women from this project will be the following:

1) Participation in decision-making of the project strategies and actions, including joining the management staff;

2) Participatory training on women rights and well-being;

3) Improved women body and mind health facilities, thorough prevention measures, medical treatment, and psychological assistance;

4) Improved health of young ladies (girls) through promotion of sport activities for community members;

5) Training to improve their knowledge on climate and biodiversity;

6) Opening privileged job opportunities;

7) Facilitating communication access against to women right violation;

8) Facilitating women organization and association.

4.5.6 Benefit Sharing Mechanisms (GL2.6)

Small producers / community members will participate fully and effectively in defining the decision-making process and the distribution mechanism for benefit sharing through a participatory process and meetings with their representatives. Benefit sharing will take place transparently in relation to project financing and costs, as well as benefit sharing.

4.5.7 Benefits, Costs, and Risks Communication (GL2.7)

Benefits, costs, and risks of the project will be communicated to smallholders/community by means of workshops and meetings to be held at least every year. Extension technicians of the project will be continuously in touch with communities through visits scheduled and consented by the community leaders and representatives. Other communications ways will me also used for this purpose, such as written reports and social networks, when applicable. Reports contents will be explained to community members through their representatives and people communicated will identified and asked whether he/she is enlightened enough.

4.5.8 Governance and Implementation Structures (GL2.8)

A proposal for shared project management with the community will be presented, which will be discussed and implemented after a free, prior, and informed consent process. The definition of the project's governance and implementation structure will be democratic and based on ESG best practices.

4.5.9 Smallholders/Community Members Capacity Development (GL2.9)

The 413 Project will count with active participation of community members in its conception, implementation, management, and monitoring actions. All instances will have the active participation of genuine community representatives selected from themselves, in addition to promoting the empowerment of women and youth.

Among the project's objectives is the improvement of educational conditions and work skills, with an increase in the standard of living of community members. Strong involvement in biodiversity and climate issues is planned as well, with the intimate participation of community members. Special attention will be paid to small producers and those with lesser resources (very needy).

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (B1.1)

The Madeira micro-region has a total area of 22,103,001 hectares, of which 9,284,547 ha are legally protected by federal and state protected areas (UCs Unidades de Conservação in Portuguese or Conservation Units) (42.01%). Yet, 3,954,645 ha of indigenous lands (Terras Indígenas in Portuguese) (17.89%) besides being house of traditional populations also contribute to the protection of biological diversity. In these protected lands, biodiversity is well conserved, given the low degree of human intervention so far. There is a very large number of threatened/endangered and endemic species (and their habitats) sheltered by this network of public areas designed to protect the Amazon environmental and socio-cultural attributes.

While there is a large area protected by law, there is an even larger area of private land that permeates and borders the protected areas. In these lands, the focus of the owners is on developing livestock and agricultural production activities to make their properties economically feasible once no public resources are readily available to promote conservation on private forestland.

The most commonly practiced activities are logging and cattle-ranching. Both processes can lead to complete forest clearing (deforestation) or forest degradation (logging). It is allowed by law to deforest up to 20% of the property and to practice selective logging on the remaining 80% of the forest. It is very common to use fire in these activities to reduce woody debris and facilitate mechanized operations in pasture or crop. Fire is also used to renew the pasture when grass-fields loose productivity along the years.

In addition to the legal activities as stated before (cattle-ranching and timber harvesting), there are many illegal activities that escape from state control and surveillance by private owners. Both legal and especially the illegal activities lead to a picture of great impact on local and regional biodiversity.

Several rare and centuries-old tree species are simply felled down, generally without applying any forestry technics, removed from the land, and sold out to some sawmill provider (called toreiros in the region). Some woody debris may remain on the deforested land. Roots may or not be removed, depending on the farmer´s financial conditions. Almost all plant biodiversity is quickly lost, and fauna is driven away to adjacent areas not yet degraded or deforested.

The impacts on biodiversity are severe once all the local fauna and flora are immediately replaced by exotic grasses, usually *Brachiaria* spp., and cattle. Intensive livestock producers supply beef to local slaughterhouses that process the product and sell it to the domestic and external markets. Today Brazil is one of the largest beef exporters in the world.

The increase in deforested areas in the south of the State of Amazonas to cattle-ranching (and to a lesser extent to seasonal crops) takes place mainly along larger roads and on riverbanks. The growing anthropic perturbation on the nature resulting from the expansion of the agricultural frontier leads to a picture of forest fragmentation and the formation of extensive areas of secondary forests with low diversity and dominated by opportunistic species. The picture is even more drastic when

fire is used, which favors ruderal species that hinder the natural regeneration of more advanced species in the course of ecological succession. The resilience of forest to the impacts is diminished when the regional forested matrix (which is the source of propagules) is also lost and fire or chemical products (pesticides) are used to pasture management, preventing the natural regeneration.

Thus, in summary, in the current (baseline) scenario, irreparable losses to biodiversity are noticed as a result of the following processes:

1) Reduction of biodiversity by converting the forest with hundreds of species of tropical fauna and flora to an agroecosystem composed essentially of pasture and cattle;

2) Indiscriminate use of fire destroys unique plant species and scares away fauna, also promoting losses in soil biota;

3) Edge effect due to increasing forest fragmentation, harming gene flow, migration and species reproduction;

4) Genetic erosion caused by the intense extraction of noble wood species, which generally take centuries to become able to logging. Therefore, there is an irreparable loss of biodiversity at the genetic level;

5) The conversion of undisturbed primary forests into secondary forests with a high concentration of opportunistic and ruderal colonizing species affects the regeneration of climatic plant species and reduces the supply of food and shelter to fauna, severely affecting the food chain. Fauna reproduction is also severely affected, which leads to a reduction in populations, especially at the top of the food chain;

6) The conversion of forests to pastures and secondary vegetation also promotes the unwanted dispersion of invasive species, some of which are exotic to the ecosystem. This causes biological contamination that also has negative impacts on indigenous biodiversity;

7) The application of pesticides to control invasive plants in pastures and agricultural areas contaminates water sources and the soil, impacting ichthyofauna, herpetofauna, and aquatic mammals;

8) Combined with logging and agricultural activities, predatory animal capture, hunting and fishing on these properties and their surroundings, significantly reduce populations of various elements of fauna;

9) The opening of roads and accesses for logging activities and the establishment of pastures encourage the spread of other legal and illegal activities in the region, such as mining (gold and other mineral digging, called garimpo in Portuguese), for example. Mining has a high impact on the soil, contaminates water bodies with mercury, and chases fauna away;

10) In addition to promoting damage to biodiversity, deforestation and forest degradation activities on properties cause damage to protected areas, whether by their invasion, illegal logging, uncontrolled spread of fire, etc;

The 413 proposes to change these existing conditions by promoting forest conservation and avoiding conversion of the natural ecosystem to pasture and crop (deforestation) and other degrading activities.

5.1.2 High Conservation Values (B1.2)

In the 413 Project area and associated region (influence zone), High Conservation Values (HCV) in relation to biodiversity can be recognized. High Conservation Values are those which are biological, ecological, social, or cultural values considered outstandingly significant at the national, regional, or global level. In this section, some HCV values related to biodiversity of the 413 Project will be cited, with special emphasis on protected areas, threatened, rare and endemic species, as well as large landscape-level areas where populations occur species in natural patterns of distribution and abundance. Table 5.1 provides a list of various HCVs previously identified in the project areas and their influence zone.

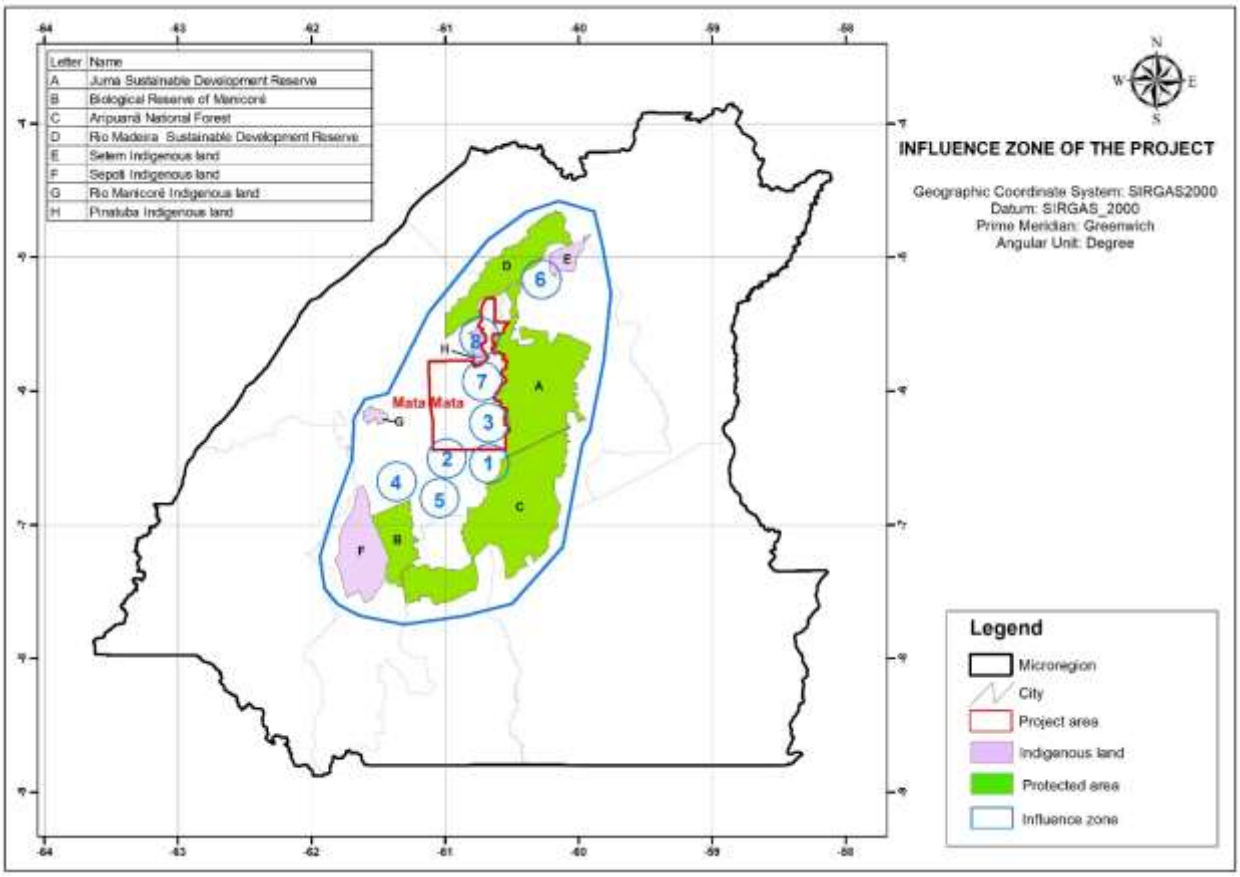


Figure 5.1. Project zone map with project area, communities assisted and HVC

Note: self-elaborated map using official cartographic sources cited in References

Blue numbers correspond to identified HCV as described in Table 5.1

Table 5.1. Biodiversity HCV associated to the 413 Project

1) High Conservation Value Category	Protected Areas
Qualifying Attribute	The 413 Project aims to contribute effectively to the maintenance of a large-sized tract of undisturbed primary forests in Southern Amazonas. The area is on a private property surrounded by a mosaic of federal and state environmental protection units. The project area is located on a region considered ox extreme priority to forest conservation by the Brazilian Federal Government, and also through the creation of Private Sustainable Development Reserves (RPDSs), provided for by the Amazonas State System of Conservation Units (SEUC). The 413 project adds 500,996 hectares of ancient very well conserved forests connecting various total protection and sustainable conservation units (Unidades de Conservação – UCs in Portuguese).
Focal Area	Borders with Juma Sustainable Development Reserve and with Rio Madeira Sustainable Development Reserve.
2) High Conservation Value Category	Flora Threated / Endangered / Endemic Species
Qualifying Attribute	Various flora species occurring in the region of the project listed by the International Union for Conservation of Nature (IUCN) are potentially threated / endangered, with some of them endemic. The 413 Project will identify and propose measures to protect them. Some examples of trees species: *Bertholletia excelsa* (Brazilian nut giant tree) and *Aniba rosaeodora* (Brazilian rosewood) will be addressed with special interest.
Focal Area	Throughout the project area, particularly where significant populations of those species occur in Matá-Matá land parcel.
3) High Conservation Value Category	Fauna Endangered Species
Qualifying Attribute	Many fauna species occurring in the region of the project listed by the International Union for Conservation of Nature (IUCN) are potentially threated / endangered, with some of them endemic. The 413 Project will identify and propose measures to protect them. Some examples: endangered Black-faced black spider monkey *Ateles chamek*, critically endangered bird Belem curassow (*Crax pinima*), and Amazonian giant pirarucu fish (*Arapaima gigas*). These five key species will be studied into detail by research projects. Other important species to be focused on the monitoring plan of the project are: large-sized harpy-eagle (*Harpia harpyja*), mammals *Panthera onca*, *Leopardus tigrinus*, *Leopardus wiedii*, *Pteronura brasiliensis* and *Speotus venaticus*, mantee (*Trichechus inunguis*), and pink dolphin (*Inia geoffrensis*).
Focal Area	Throughout the project area, particularly where significant populations of those species occur, along the riverbanks and water streams.

Table 5.1. Biodiversity HCV associated to the 413 Project - Continuation

4) High Conservation Value Category	Rare or endangered ecosystems
Qualifying Attribute	There is occurrence of natural grass fields where some endemic fauna and flora species live, on the southwestern border of the Matá-Matá parcel. It is a rare and endangered ecosystem recognized by the Brazilian federal governmental. This recognition led to the establishment of the Campos de Manicoré Environmental Protection Area by presidential Decree on 11 April 2016. The purpose was to protect biological diversity and control the process of human occupation of the region, particularly along the road built between Santo Antônio de Matupi on BR-230 and the urban area of Manicoré municipality on the Madeira River. Santo Antônio do Matupi is a major center of logging in the region.
Focal Area	The field grass natural ecosystem situated on the border of Matá-Matá land parcel.
5) High Conservation Value Category	Areas that support significant concentrations of a species during any time in their lifecycle
Qualifying Attribute	According to ISA (2021), the Biological Reserve of Manicoré (Manicoré Rebio), a 359,063 ha federal protected area, located between the Madeira and Aripuanã rivers, has plant physiognomy dominated by Dense Rain Forest and Pioneer Formations. It is home to a great diversity of palm trees, such as babassu and açaí, and endangered species, such as Brazil giant nut tree (*Bertholletia excelsa*), Rosewood (*Aniba rosaeodora*), Amazon cherry (*Amburana cearensis* var. *acreana*), Brazilian mahogany (*Swietenia macrophylla*), among others. With its heterogeneity of environments, the region has an especially high and poorly studied fauna diversity. It is estimated that the Madeira River basin is home to around 800 species of birds, representing almost half of the country's avifauna, making it one of the richest bird regions in the world. Furthermore, it is one of the areas with the highest occurrence of primates in the Amazon, with a high degree of endemism.
Focal Area	The border of Matá-Matá land parcel with the Manicoré Rebio to extend the protection belt of the above-mentioned populations where high concentration of endangered plant species occur.

Table 5.1. Biodiversity HCV associated to the 413 Project - Continuation

6) High Conservation Value Category	Areas that support significant concentrations of a species during any time in their lifecycle
Qualifying Attribute	According to ISA (2021), the Sustainable Development Reserve of Rio Madeira (RDS Rio Madeira), a 283,117 state UC, has a mosaic of eight different vegetation types (ecosystems): Lowland Dense Rain Forest with emergent canopy, Alluvial Dense Rain Forest along the stream beds, forming the “Igapós Forest” (flooded forest) with a large number of water springs. It is a Pleistocene refugee. The area of the Madeira-Purus interfluve, where the RDS is located, is an area of great importance for the conservation of biodiversity to protect several endemic species that are potentially vulnerable to human threats. It houses a heterogeneous environment that includes natural meadows and woody grass-fields (campinaranas), where several unique species of fauna and flora occur, mainly birds.
Focal Area	The Madeira riverbank on the north of the project land parcel.
7) High Conservation Value Category	Areas that support significant concentrations of a species during any time in their lifecycle
Qualifying Attribute	According to ISA (2021), Juma Sustainable Development Reserve (Juma RDS), a 589,611 state UC, is by the Aripuanã River, is composed of diverse forest ecosystems: Lowland Dense Rainforest, Submontane Dense Rainforest, Alluvial Dense Rain Forest, flooded forests by muddy water ("varzea"), by transparent and black waters ("igapó"), and mixed systems, in addition to formations pioneers with fluvial and/or lacustrine influence. The region of the lower Aripuanã river is one of the most interesting places in the entire Amazon from the point of view of biodiversity conservation. High species richness, records of taxa new to science, patterns of endemism on opposite banks of the river (included in the reserve) and the presence of a unique and extensive plant formation in meadows. About 242 plant species have already been identified. Among mammals, there are up to 21 species of tamarins, marmosets, and monkeys, which represents the greatest diversity of primates in the entire planet. At least three new species of fish, two from the Mariepaua River, were found. More than a third of all Brazilian avifauna is found in the region, around 400 species already registered, and it is estimated that this number could reach 600.
Focal Area	Places in contact with or near the Juma RDS.

Table 5.1. Biodiversity HCV associated to the 413 Project - Continuation

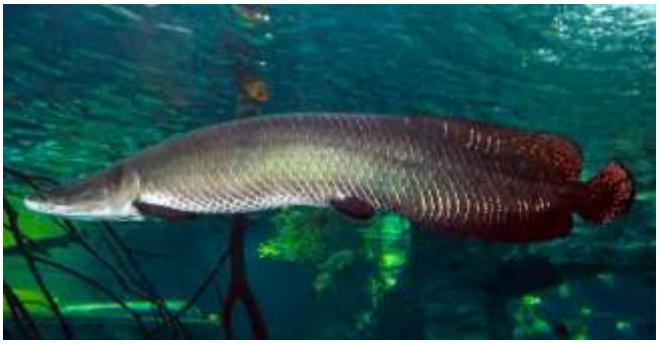
8) High Conservation Value Category	Areas that contain significant concentrations of species during any period of their life cycle (e.g. migration, feeding grounds and nesting areas)
Qualifying Attribute	Many fauna species occurring in the region of the project listed by the International Union for Conservation of Nature (IUCN) are potentially endangered. The 413 Project will identify and propose measures to protect them. Some examples of mammals, birds, amphibia and fishes: *Pteronura brasiliensis* (Brazilian giant otter), *Panthera onca* (Jaguar), *Puma concolor* (Cougar), *Inia geoffrensis* (Pink dolphin), *Epipedobates macero* (Manu poison frog), *Arapaima gigas* (Pirarucu, Amazon giant fish), among others.
Focal Area	Throughout the project area, particularly where significant populations of those species occur, especially along the riverbanks and water streams. A proper fauna inventory and monitoring framework will be developed by the 413 Project.

Bertholletia excelsa
(Brazilian giant nut tree)

Ateles chamek
(Black-faced black spider-monkey)

Aniba rosaeodora
(Brazilian rosewood)

Crax pinima
(Belem currasow)



Giant Amazonian Pirarucu fish

Figure 5.2. Target species of special biodiversity research projects

5.1.3 Without-project Scenario: Biodiversity (B1.3)

Conversion of forest to pasture for extensive cattle-ranching is the most-likely scenario on private properties of the Amazon region. This practice destroys the rich fauna and flora biodiversity of the tropical rainforest ecosystem. The without-project scenario is the replacement of the forest great biodiversity to pasture and livestock. The 413 Project has been developed to protect biodiversity while reducing emissions from deforestation and forest degradation.

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (B2.1)

Biodiversity will be affected if conversion of forest to pasture takes place in the project area. Fires and other biodiversity degradation activities might also bring about impacts to local and regional biodiversity (influence zone). The main expected biodiversity changes and the corresponding justification are listed in Table 5.2, as follows:

Table 5.2. Expected biodiversity changes of the 413 Project

Biodiversity Element	Plant biodiversity, in general
Estimated Change	Building and managing an ecological trail to provide knowledge about local biodiversity to local community and visitors
Justification of Change	Building an ecological trail with species identification and other biodiversity features to promote environmental education and good practices on biodiversity to community (especially youth) and visitors from the towns of the region.
Biodiversity Element	Plant biodiversity, in general
Estimated Change	Establishment of an herbarium, fruit, and seed collections facilities to environmental education, training, and research activities.
Justification of Change	Installing a laboratory to carry out basic research activities and display to community (especially youth) and visitors in general the local flora through a plant collection and a germplasm bank.
Biodiversity Element	Exotic and invasive plant and animals
Estimated Change	Measures to control the introduction of exotic invasive species.
Justification of Change	Introduction of invasive plants and animals may negatively affect the reproduction and trophic chain of indigenous species. Therefore, a specific task force will be formed to disseminate information to local community about this problem and adopt participatory measures to mitigate them.

Table 5.2. Expected biodiversity changes - Continuation

Biodiversity Element	Biodiversity in general and environmental education
Estimated Change	Creation of an education and training center on biodiversity.
Justification of Change	Installing an education and training center to hold workshops, meetings, and other events with the active participation of the local community. Women and youth empowering will take place by developing special activities addressed to those people.
Biodiversity Element	Flora: large-sized climax highly valuable timber trees
Estimated Change	Avoiding genetic erosion; Avoiding reduced pollination agents, collapse, and dieback.
Justification of Change	Some highly valuable timber trees are logged over in the region, causing genetic erosion because the best specimens are felled down to sawmills. Various species also occur in a low density within forest (rare) and depend on specific pollination agents to reproduce. Deforestation and forest degradation may reduce the population and the pollination agents (insects and bats), reducing population. Severe reduction of populations may lead to collapse and dieback. The project aims to protect a large forest tract to maintain populations in equilibrium. The 413 project will identify and select mother trees of those important and threated species to seed collection and genetic rescue. Seeds will be stored, and seedlings will be produced to forest enrichment when necessary and also made available to community under request. Those plants will be monitored by permanent sample plots to analyze their regeneration pattern. Two special research projects dedicated to *Bertolletia excelsa* and *Aniba rosaeodora* will be carried out for at least 10 years.
Biodiversity Element	Flora: natural regeneration of trees and shrubs
Estimated Change	Avoiding climate change impacts on natural regeneration of those life forms; Monitoring the understory plant communities and natural regeneration of key tree species and enrichment if necessary; Promote forest enrichment when needed.
Justification of Change	Climatic extreme events (reduced precipitation and humidity; savannization - change of tropical rainforest to savanna) may prevent tree/shrub natural regeneration. The project aims to protect a large forest tract to maintain the continuous regeneration of such species. In addition, the project will identify and select mother plants to seed collection and genetic rescue. Seeds will be stored, seedlings will be produced and planted in places where natural regeneration is not occurring regularly. Those plants will be monitored by permanent sample plots.

Table 5.2. Expected biodiversity changes - Continuation

Biodiversity Element	Flora: natural regeneration and growth of palms (Arecaceae)
Estimated Change	Avoiding climate change impacts on natural regeneration of those palms, such as reduced precipitation patterns and humidity; Keeping a germplasm bank of some key palm species; Improvement of food diversity and guarantee of food supply to fauna and local communities.
Justification of Change	As stated before, climatic extreme events and reduced precipitation and humidity (savannization - refers to the gradual transition of the tropical rainforest into savanna) may prevent natural regeneration of some life forms. Flowering of various palms may take decades, and a changing climate may alter this pattern. Growth and survival of palms is also threatened under the baseline scenario. So, the 413 project proposed to protect a large forest tract to maintain the natural regeneration and growth patterns of such life forms. Açaí (*Euterpe oleraceae*) and several other palms are very important from the ecological and community perspectives (food security). In addition, the project will identify and select mother trees to seed collection and genetic rescue of threated endemic palms. Those plants will be monitored by permanent sample plots. Seeds will be stored and seedlings of those species will be produced and made available to community and also for forest enrichment.
Biodiversity Element	Flora: survival and growth of ferns (Dicksoniaceae and Cyatheaceae)
Estimated Change	Avoiding climate change impacts on natural survival rates and growth pattern of ferns; Avoiding genetic erosion of ferns collected by illegal activities in the region; Keeping a germplasm bank of some key palm species.
Justification of Change	Those life forms are highly dependent on a shade and humid understory to survive and grow. Climate change may affect the habitats of these plants and lead to reduced biodiversity of various taxa. Growth and survival of ferns are threated under the baseline scenario due to expected reduced precipitation and understory humidity. So, the 413 project proposed to protect a large forest tract to maintain the population growth and survival of those species. Those plants will be monitored by permanent sample plots.

Table 5.2. Expected biodiversity changes - Continuation

Biodiversity Element	Flora: plants important as fruits and herbs to fauna and community
Estimated Change	Maintenance of availability of indigenous fruits and herbs used by fauna and traditional communities, by avoiding deforestation and forest degradation in a large forest tract; Widening diversity of food to fauna and local community; Keeping a germplasm bank of some key palm species.
Justification of Change	Climate change may alter ecological processes related to flowering, fruiting and seed dispersal of many useful fruits and herbs to community, such as Brazilian nut (*Bertolletia excelsa*), açaí (*Euterpe oleraceae*), cupuaçu (*Theobroma grandiflorum*), among others. Changes in temperature and precipitation patterns may reduce the availability of those plants to local people and fauna. The 413 project proposes to protect a large forest tract to maintain the population of those species. In addition, the project will identify and select mother trees to seed collection and genetic rescue. Seeds will be stored, and seedlings of those species will be produced and made available to community and also for forest enrichment. Those plants will be monitored by permanent sample plots.
Biodiversity Element	Fauna: key pollination insects and bats
Estimated Change	Conservation of habitat for bees and bats, very important to pollination of tree species by avoiding deforestation and forest degradation in a large forest tract.
Justification of Change	Deforestation and forest degradation are driven forces to bee dieback. Bats´ biology may also be affected by climate changes. The 413 project proposes to protect a large forest tract to maintain the population of those species under natural conditions. Fauna surveys will be carried out to monitor the population of bees and bats in the project area and surroundings and design appropriate mitigation and adaptation measures to protect fauna in general.

Table 5.2. Expected biodiversity changes - Continuation

Biodiversity Element	Fauna: birdlife
Estimated Change	Conservation of habitat for birds, with emphasis on some threated and endemic species; Environmental education to local community to avoid illegal capture and trafficking wildlife in the region, particularly birds; Opening of a reporting channel against illegal activities in the project area regarding the capture and trafficking of birds; Memorandum of understanding with Environmental Police and IPAAM to widen patrol and control over the project area.
Justification of Change	Deforestation and forest degradation destroy avian habitats and trophic chain. The 413 project proposes to protect a large forest tract to maintain the population of birdlife under natural conditions. Fauna surveys will be carried out to monitor the population of bees and bats in the project area and surroundings and design appropriate mitigation and adaptation measures to protect fauna in general. A special research project on endangered bird species will be supported by the project with focus on *Crax pinima*, a critically endangered bird species.
Biodiversity Element	Fauna: mammals
Estimated Change	Conservation of habitat for mammals, with emphasis on some threated and endemic species; Environmental education to local community to avoid illegal capture and trafficking wildlife in the region, particularly mammals; Opening of a reporting channel against illegal activities in the project area regarding the capture and trafficking of mammals; Memorandum of understanding with Environmental Police and IPAAM to widen patrol and control over the project area.
Justification of Change	Deforestation and forest degradation destroy the habitats and cause discontinuity and risks in trophic chain of mammals. Some endemic and threated taxa are particularly vulnerable. The 413 project proposes to protect a large forest tract to maintain the population of birdlife under natural conditions. Fauna surveys will be carried out to monitor the population of mammals occurring in the project area and surroundings and design appropriate mitigation and adaptation measures to protect fauna in general. A special long-term research project on *Ateles chamek* (Black-faced black spider monkey) will be supported by the project to save that species from extinction.

Table 5.2. Expected biodiversity changes - Continuation

Biodiversity Element	Fauna: reptiles and amphibians
Estimated Change	Conservation of habitat for herpetofauna communities, with emphasis on some threated and endemic species under risk of extinction by climate change and local/regional deforestation and forest degradation; Environmental education to local community to avoid illegal capture and trafficking wildlife in the region, particularly mammals; Opening of a reporting channel against illegal activities in the project area regarding the capture and trafficking of mammals; Memorandum of understanding with Environmental Police and IPAAM to widen patrol and control over the project area.
Justification of Change	Climate change may promote changes in environmental conditions needed to survival and reproduction of reptiles and amphibians. Changes in temperature and precipitation patterns, for instance, may reduce populations and lead some to extinction. Increase in predation by anomalous humidity (drought) conditions, illegal hunting and fires are potentially dangerous. Deforestation and forest degradation destroy the habitats and cause discontinuity and risks in trophic chain of reptiles and amphibians. Some endemic and threated taxa are particularly vulnerable. The 413 project proposes to protect a large forest tract to maintain the population of birdlife under natural conditions. Fauna surveys will be carried out to monitor the population of reptiles and amphibians occurring in the project area and surroundings and design appropriate mitigation and adaptation measures to protect fauna in general.

Table 5.2. Expected biodiversity changes - Continuation

Biodiversity Element	Ichthyofauna: fishes
Estimated Change	Conservation of fishes endangered by deforestation, forest degradation and illegal or predatory fishery, mainly on riverbanks; Environmental education to local community to avoid illegal fishery and overfishing in the region; Patrolling the project area along the riverbanks to avoid illegal mining and overfishing; Partnership with the Environmental Police and IPAAM to widen control over the project area to avoid illegal activities.
Justification of Change	A special long-term research project on *Arapaima gigas* has been proposed to benefit the local population in terms of food security and avoid predatory capture of this giant Amazonian fish. Fauna surveys will be carried out to monitor the population of fishes occurring in the project area and surroundings and design appropriate mitigation and adaptation measures to protect them.

5.2.2 Mitigation Measures (B2.3)

Appropriate mitigation measures shall be undertaken to maintain those 10 HCV attributes previously described and threatened flora and fauna taxa under the precautionary principle. Table 5.2 identified various changes to me promoted by the 413 Project in terms of benefit to biodiversity, but other mitigation actions will also be done to protect biodiversity against human perturbation.

So, mitigation measures undertaken by the 413 Project regarding biodiversity will be the following:

1) Establishment patrol units in charge of identifying potential invasion risks into the project area and in particular into the 10 HCV zones previously identified, as well as avoiding illegal practices against the fauna and flora;

2) Establishment of partnership with the State Environment Police and IPAAM to denounce and curb activities harmful to biodiversity;

3) Establishment of a partnership with federal agencies (IBAMA, ICMbio, and others) linked to environmental protection at the national level, forming a task force against potential damage to biodiversity, particularly on the borders with public protected areas;

4) Environmental education and training on the importance of protecting biodiversity, environmental legislation and environmental services, with special reference to protection of the HCV previously identified and other vulnerable natural attributes;

5) Partnership with research organizations to promote conservation strategies and actions in the region focused on the HCVs;

6) Partnership with FUNAI to engage the indigenous communities on the project objectives and biodiversity protection action in the project area, particularly in HCVs;

7) Partnership with other protected areas and REDD projects in the region;

8) Promote sustainable use of biodiversity, avoiding illegal access to the threated HCVs;

9) Empowering women and youth to promote biodiversity services;

10) Establishment of a task force to control invasive species, with special reference to HCVs.

5.2.3 Net Positive Biodiversity Impacts (B2.2, GL1.4)

The project´s anticipated net impacts on biodiversity in the project zone will be positive compared with conditions under the without-project land use scenario. This is demonstrated by the following framework (Table 5.3):

Table 5.3. Net positive biodiversity impacts

With the project	Without the project	Golden Level
Intensification of patrolling the project area against invasions, deforestation, and forest degradation	Normal occasional patrolling the project area against invasions, deforestation, and forest degradation	
Frequent and detailed monitoring of forest cover, deforestation, and forest degradation by advanced satellite imagery tools	Conventional monitoring forest cover by INPE	Changes in forest ecosystems due to climate change detected
Flora biodiversity continuously inventoried and better known	Flora biodiversity scarcely known	Flora behavior under climate change known
Fauna biodiversity continuously inventoried and better known	Fauna biodiversity poorly known	Fauna behavior under climate change known
Infrastructure to environmental education and training established adequately in the project area	No environmental education and training infrastructure established	
Community highly engaged in biodiversity conservation and motivated to contribute to the project´s objectives	Community not engaged and motivated	
Infrastructure to research established adequately in the project area	No research infrastructure	Long-term research projects on adaptation of biodiversity to climate

		change conducted
Germplasm of key species preserved	No germplasm preserved	Germplasm rescued to adapt biodiversity to climate change
Seedlings of key species produced	No seedling produced	Seedlings of various species been produced to adapt biodiversity to climate change
Supply of important plants and animals to the community well-known and guaranteed	Superficial knowledge on the important plants and animal to community and risks associated to food safety	Community involved with biodiversity adaptation to climate change
Conservation of many species and better knowledge on them	Loss of many species without any previous study	
Low risk of species threat and extinction	High risk of species threat and extinction	

Table 5.3. Net positive biodiversity impacts – Continuation

With the project	Without the project	Golden Level
Low risk of unsustainable use of biodiversity by the local communities	High risk of unsustainable use of biodiversity by the local communities	

Biodiversity vulnerability to climate change detected	No detection of the effects of climate change on the local/regional biodiversity	Measures to protect vulnerable sites regarding biodiversity undertaken

5.2.4 High Conservation Values Protected (B2.4)

The project will not negatively affect the HCVs related to biodiversity. On contrary, it will increase the already established network of federal and state protected areas in 500,996 hectares.

5.2.5 Species Used (B2.5)

Only indigenous species which occur naturally in the project will be used. No introduced species will be used for the REDD project purposes. This excludes the exotic species used by the community.

5.2.6 Invasive Species (B2.5)

No invasive species will be used for the REDD project purposes. Conversely, invasive species identified in the project area will be controlled.

5.2.7 Impacts of Non-native Species (B2.6)

Not applicable, once non-native species will not be used in the 413 Project.

5.2.8 GMO Exclusion (B2.7)

The 413 project guarantees that no GMOs generate GHG emissions reductions or removals.

5.2.9 Inputs Justification (B2.8)

No fertilizers, chemical pesticides, biological control agents and other harmful inputs will be used by the 413 Project, once it is aimed at promoting biodiversity conservation under complete natural conditions.

5.2.10 Waste Products (B2.9)

All waste generated by the project will be identified, classified (separated), destined, and treated adequately. A detailed plan on waste management will be prepared by the project staff. The local community members will be encouraged to reduce, reuse, and recycle all their waste. The composting of organic waste will be encouraged. A small waste and effluent treatment plant will be built in the project. Hazardous and health waste will be packed separately and transported to a more suitable destination. Emissions from waste generation, even if not significant, will be accounted for. All emissions of GHG and other polluting gases will be inventoried, and appropriate mitigation measures will be undertaken.

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Measures (B3.2)

Table 5.4 lists the negative offsite biodiversity impacts and the mitigation measures.

5.3.2 Net Offsite Biodiversity Benefits (B3.3)

Table 5.4. Potential biodiversity impacts on the project area and offsite, as corresponding mitigation measures

Impacts	Potential impacts on biodiversity in the Project Area	Potential impacts on biodiversity outside the project zone	Mitigation measures
Negative	Risk of forest fires an illegal logging and deforestation/degradation coming from adjacent areas; Risk of overhunting and/or overfishing of species with low abundance for community subsistence.	Risk of forest fires an illegal logging and deforestation/degradation on adjacent areas; Increasing hunting and fishing pressure in areas adjacent to RESEX (leakage of activities).	Patrolling ar partnership with environmenta offices (IBAMA, IPAAM, ICMBio) ar Environment Police; Environment education ar partnership with loc communities
Positive	Greater knowledge of the status of biodiversity in the region; Maintenance of the levels of biodiversity and conservation status of flora and fauna; Decrease of illegal hunting and fishing by	Increased connectivity with other protected areas and forest areas; HCV on the borders and adjacent to the project area protected; Better understanding on the regional biodiversity;	

	non-residents who exert strong pressure from hunting and fishing;	Food supply to resident communities.	

5.4 Biodiversity Impact Monitoring

5.4.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

The forest inventory will be carried out by the stratified sampling process, considering the forest strata identified in the phytophysiognomies (forest types) previously identified by IBGE and by interpretation of satellite images. After stratification, initially 50 sample units will be installed using the fixed area method, with an area of 1,000 m2, that is, 20 m wide x 50 m long. The ideal number of sampling plots will be statistically calculated a posteriori and the inventory complemented, if necessary, to reach the 10% precision of the carbon stock error limit. All trees with dbh (diameter at breast height = 1.30 m from the ground) above 20 cm will be identified, measured in dbh and will have their total heights estimated by reference beacon. The trees contained within the plot will be mapped to scale. A 20 m x 20 m sampling subunit will be installed inside each plot to cover the trees with a dap between 5 and 19.9 cm, which will also be measured in the dap, height and properly identified. Tree individuals with a dbh less than 5 cm will be measured in sampling units of 10 m x 10 m contained within the 20 m x 20 m unit. Shrubs, herbaceous plants and other forms of plant life will be identified in 4 subunits of 1 m x 1 m. The sampling plots will be permanent and will be remeasured every 5 years. Specialists will be hired to carry out this activity and partnerships with research institutions in the region will be established. Analytical reports will produced throughout project life time.

The fauna inventory and monitoring will be carried out using different methodologies depending on the considered faunal group. A combination of on-site surveys by experts, community interviews and cameras strategically installed at sampling sites will be used. Traps and nets will be used for some faunal groups. Footprints, tracks, singing audition will be complementary approaches to be employed. The main faunal groups to be monitored are: avifauna, mammals, herpetofauna and ichthyofauna. Specialists will be hired to carry out this activity and partnerships with research institutions in the region will be established. Analytical reports will produced throughout project life time

Table 5.5 shows data and parameters to be monitored by the 413 Project regarding biodiversity.

Table 5.5. Data and parameters to be monitored regarding biodiversity

Variable to be Monitored	Explanation	Unit	Frequency	Procedure
Number of tree species identified and measured	Data from forest continuous inventories will provide information on changes in tree diversity within the project lifetime besides recruitment, growth, and mortality rates	Number per hectare and total	Every 3 years	Forest Inventory
Number of non-tree plant species identified	Data from forest continuous inventories will provide information on changes in tree diversity within the project lifetime besides recruitment, growth, and mortality rates	Number per hectare and total	Every 3 years	Forest Inventory
Occurrences of fauna by species	Continuous fauna cruising will provide species recorded in the project area and surroundings and estimates on population size and ecological behavior	Number	Every 3 years	Fauna cruising
Number of mother trees selected to germplasm bank	Specific field work will provide information to plan and execute a germplasm bank following the scientific protocol	Number	Year 1 and 10	Specific field work
Number of seed collected	Seeds will be collected from the mother trees and stores accordingly to conserve germplasm	Number	Year 1 and 10	Counting at nursery
Number of seedlings produced	Seedlings will be produced to enrichment of the forest and distribution to community	Number	Annual	Counting at nursery
Number of women trained and involved with biodiversity issues	Women will be trained and involved with biodiversity goals of the project	Number	Annual	List of participants signed

Table 5.5. Data and parameters to be monitored regarding biodiversity - Continuation

Variable to be Monitored	Explanation	Unit	Frequency	Procedure
Number of young people trained and involved with biodiversity issues	Women will be trained and involved with biodiversity goals of the project	Number	Annual	List of participants signed
Research studies supported	Various research projects will carry out in the project area during its lifespan	Number	Annually	Projects, articles submitted, accepted, or published
Number of dead trees due to drought and other climatic events	Climate change, natural and human disturbances may lead to increased mortality rates of tree species within the project area	Number	Every 3 years	Field cruising
Deforested x protected area	Deforestation and forest degradation and their impacts on biodiversity will be assessed through satellite imagery analysis	ha	Annually	Satellite imagery analysis
Number of visitors in the project are	Stakeholders and external people will be visiting the project area. So, the number of visitors will be recorded	Number	Continuously	List of participants signed
Number of researchers in the project area	Various researchers will carry out specific studies in the project area. So, the number visits will be recorded	Number	Continuously	List of participants signed
Number of sample material collected	An herbarium with plant samples will be set up in the project area, to environmental education and training purposes	Number	Continuously	Counting at laboratory
Amount of waste yielded	A waste management plan will be elaborated and executed by the 413 project team	kg	Weekly	Weighing

Table 5.5. Data and parameters to be monitored regarding biodiversity - Continuation

Variable to be Monitored	Explanation	Unit	Frequency	Procedure
Number of exotic invasive species identified and controlled	Exotic potentially invasive species need to be identified and controlled within the project limits	Number	Continuously	Field cruising
Number of seedlings planted to enrichment purposes	Forest enrichment may be necessary to supply food to fauna and local community	Number	Annually	Field cruising
Number of recorded hunted/dead animals	Impacts of hunting on biodiversity will be monitored	Number	Annually	Field cruising
Illegal entry in the project area	Illegal activities and their impacts on biodiversity will be monitored	Number	Annually	Field cruising
Number of fire spots recorded	Fires are responsible to destruction of biodiversity in the project area and its borders	Number	Annually	Satellite imagery analysis and field cruising
Number of km patrolled	Patrolling is an essential activity to protect biodiversity within the project limits and borders	km	Annually	From the vehicles
Number of accesses on the project´s website	Stakeholders will be interested and may contribute to its objectives	Number	Annually	Digital automatic counting

5.4.2 Biodiversity Monitoring Plan Dissemination (B4.3)

Biodiversity monitoring plan will be made available through the project´s site on the internet as well as by the Verra platform. Digital versions of annual summary reports will be made available to the community, partners, and other stakeholders. Printed copies will be available on demand. During public consultation meetings the results of monitoring will be presented to all participants and discussed with them in order to improve the monitoring process/plan. Local authorities and the organized society will be also invited to contribute to formulate revised versions of the biodiversity monitoring plan.

5.5 Optional Criterion: Exceptional Biodiversity Benefits

This project seeks to be validated to the Gold Level for exceptional biodiversity benefits.

The exceptional benefits to biodiversity of the 413 are the following:

1) Conservation of 500,996 hectares of dense tropical rainforest considered mostly of extremely high priority in the Amazon Biome according to Brazilian Government;

2) Germplasm bank for the most important tree species of the project area;

3) Seed storage and seedling production for the most important tree species of the project area;

4) Five special research projects on extremely important flora and fauna taxa: *Betholletia excelsa* (Brazilian giant nut tree), *Aniba rosaeodora* (Brazilian Rosewood), *Ateles chamek* (Black-faced black spider monkey), *Crax pinima* (Belem currasow), and *Arapaima gigas* (Amazonian giant fish, pirarucu).

5) Adaptation measures to protect biodiversity against climate change.

5.5.1 High Biodiversity Conservation Priority Status (GL3.1)

The International Union for Conservation of Nature (IUCN) has identified the following species as Vulnerable, Endangered, and Critically Endangered in the State of Amazonas (Table 5.4). The complete list for the State was obtained under request to IUCN website. Two species (a tree and an ape) focused on this project are highlighted in Table 5.6.

Table 5.6. IUCN Species Red List for the Amazonas State, Brazil

Scientific name	IUCN Red List Category
1) Couratari atrovinosa	Endangered
2) Virola surinamensis	Endangered
3) Ficus ramiflora	Endangered
4) Tabernaemontana muricata	Endangered
5) Chrysophyllum superbum	Critically Endangered
6) Cariniana pauciramosa	Endangered
7) Chrysophyllum durifructum	Critically Endangered
8) Lecythis prancei	Endangered
9) Guarea crispa	Endangered
10) Guarea sprucei	Critically Endangered
11) Helicostylis heterotricha	Endangered
12) Micropholis caudata	Critically Endangered
13) Micropholis grandiflora	Critically Endangered
14) Micropholis retusa	Endangered

15) Micropholis submarginalis	Endangered
16) Perebea glabrifolia	Critically Endangered
17) Pouteria minima	Endangered
18) Pouteria polysepala	Critically Endangered
19) Pouteria fulva	Endangered
20) Pouteria juruana	Endangered

Table 5.6. IUCN Species Red List for the Amazonas State, Brazil - Continuation

Scientific name	IUCN Red List Category
21) Pouteria tarumanensis	Endangered
22) Rinorea bicornuta	Endangered
23) Inga suberosa	Endangered
24) Astrocaryum minus	Critically Endangered
25) Saimiri vanzolinii	Endangered
26) Phragmipedium klotzschianum	Endangered
27) Aniba rosaeodora	Endangered
28) Roupala nonscripta	Endangered
29) Euplassa madeirae	Endangered
30) Guatteria hispida	Endangered
31) Hymenopus adolphoduckei	Endangered
32) Lorostemon coelhoi	Endangered
33) Diospyros tarim	Endangered
34) Pera manausensis	Endangered
35) Kerianthera preclara	Endangered
36) Homalolepis cavalcantei	Endangered
37) Dicymbe puncticulosa	Endangered
38) Cymbopetalum euneurum	Endangered
39) Euxylophora paraensis	Endangered
40) Aniba ferrea	Endangered
41) Dicymbe arenicola	Endangered
42) Duguetia subcordata	Endangered
43) Macairea cuieirasii	Endangered
44) Aripuana cullmaniorum	Endangered
45) Talisia granulosa	Critically Endangered

Table 5.6. IUCN Species Red List for the Amazonas State, Brazil – Continuation

Scientific name	IUCN Red List Category
46) *Hirtella conduplicata*	Critically Endangered
47) *Garcinia albuquerquei*	Endangered
48) *Tachigali candelabrum*	Endangered
49) *Hirtella kuhlmannii*	Endangered
50) *Pradosia lahoziana*	Critically Endangered
51) *Caraipa balbinensis*	Endangered
52) *Chrysophyllum wilsonii*	Endangered
53) *Pouteria resinosa*	Endangered
54) *Mezilaurus micrantha*	Endangered
55) *Talisia ghilleana*	Endangered
56) *Erisma fuscum*	Endangered
57) *Byrsonima frondosa*	Endangered
58) *Byrsonima souzae*	Endangered
59) *Catostemma albuquerquei*	Endangered
60) *Pera pulchrifolia*	Critically Endangered
61) *Triplaris physocalyx*	Endangered
62) *Lophanthera pendula*	Endangered
63) *Eschweilera rankiniae*	Endangered
64) *Acmanthera longifolia*	Critically Endangered
65) *Byrsonima rodriguesii*	Endangered
66) *Ateles belzebuth*	Endangered
67) *Ateles chamek*	Endangered
68) *Saguinus bicolor*	Critically Endangered

Moreover, according to the Red Lists of the threated flora and fauna of Brazil, published by ICMBio (2013, 2018), which used the IUCN methodology, the 5 target species to special research projects occurring in the project area are the following (Table 5.7):

Table 5.7. Five target species for special biodiversity conservation by the 413 Project

Scientific name	Common name	Group	Threat degree	Relevance
Aniba rosaeodora Ducke	Pau-rosa (Brazilian Rosewood)	Tree	Endangered	Biodiversity Commercial use
Bertholletia excelsa Bonpl.	Castanheira (Giant Brazilian nut tree)	Tree	Vulnerable	Biodiversity Community and commercial use
Ateles chamek (Humboldt, 1812)	Macaco-aranha-de-cara-preta (Black-faced black spider monkey)	Ape	Vulnerable	Biodiversity
Crax fasciolata pinima (Pelzeln, 1870)	Mutum-pinima (Pinima mutum / Belem curassow)	Bird	Critically under extinction threat	Biodiversity
Arapaima gigas (Schinz, 1822)	Pirarucu (Giant Amazonian fish)	Fish	Almost threated	Biodiversity Community and commercial use

5.5.2 Trigger Species Population Trends (GL3.2, GL3.3)

Table 5.8 provides a list of trigger species population trends of the 413 Project.

Table 5.8. Trigger species population trends

Trigger Species	*Aniba rosaeodora*
Population Trend at Start of Project	Unspecified population trend, continuing decline in area, extent and/or quality of habitat, according to IUCN.
Without-project Scenario	Logging, wood harvesting, and fires. Populations throughout the species range have seriously declined because of rosewood oil extraction. Where there has been exploitation the population is devoid of mature trees and significant signs of regeneration are absent. Trees of all sizes are harvested indiscriminately; the whole tree and its roots being destroyed. The sole producer at present is Brazil, although the species was wiped out through exploitation over large areas in French Guiana between 1910 and 1930. Harvesting is costly and is taking place in more and more remote locations concentrated around Amazon tributaries, principally in Amazonas and Pará states. Mobile distillation factories have also moved deep into the forest and trees. Levels of exploitation have significantly declined with increased use of synthetic oils.
With-project Scenario	Conservation actions. Substantial wild stands are believed to exist still in areas which are unlikely to be exploited. Silvicultural studies have been carried out elsewhere by FCAP (currently UFRA) with the assistance of UK institutions, as published by IUCN. The 413 Project aims to trigger this key threated tree species by continuous forest inventories and promoting a special research project on its auto-ecology and synecology. The 413 Project also will select mother trees from significant populations, forming a germplasm bank, and producing seedlings to guarantee the species survival.
References, as given by IUCN:	Calderon, E. (compiler) 1997. Lista de plantas Colombianas en peligro. July 1997 Version. Instituto de Investigacino de Recursos Biologicas Alexander von Humboldt. (unpublished). Coppen, J.J.W. 1995. Flavours and Fragrances of Plant Origin. FAO, Rome.

	Erfurth, T. and Rusche, H. 1976. The marketing of tropical wood. FAO, Rome. FAO Forestry Department. 1986. Databook on endangered tree and shrub species and their provenances. FAO, Rome. IBAMA. 1992. Lista oficial de espécies da flora Brasileira ameaçadas de extinçao (unpublished). Kubitzki, K. and Renner, S. 1982. Flora Neotropica: Lauraceae I (Aniba and Aiouea). New York Botanic Gardens, New York. Oldfield, S., Lusty, C. and MacKinven, A. (compilers). 1998. The World List of Threatened Trees. World Conservation Press, Cambridge, UK. Pires O'Brien, J. 1997. Additional information on Brazilian tree species. Van der Werff, H. 1994. Annotations - list of threatened plants of South America. Varty, N. 1996. Data collection forms for Brazilian Atlantic forest species. WCMC. (comp.) 1996. Report of the Second Regional Workshop, held at CATIE, Turrialba, Costa Rica, 18-20 November 1996. Conservation and Sustainable Management of Trees project (unpublished).

Table 5.8. Trigger species population trends - Continuation

Trigger Species	*Bertholletia excelsa*
Population Trend at Start of Project	Although protected by law, *B. excelsa* is under strong extractive pressure due to the collection of its seeds for industrial and food purposes, which already has been restricting the recruitment of new individuals in some subpopulations. In addition, it has been facing a significant continuous decline in length and quality of the habitat in much of its distribution, due to the expansion of agricultural activities. It is suspected that the despite legal protection, *B. excelsa* suffers from timber harvesting due to its large size and straight trunk, typical of Lecythidaceae. So, considering the current and potential threats to which it is subjected, and estimating the generation time of the species of at least 50 years, it is possible to suspect that *B. excelsa* will suffer a population decline of at least 30% in the next 100 years.
Without-project Scenario	Logging and wood harvesting, fires
With-project Scenario	Conservation actions. The 413 Project aims to trigger this key threated tree species by continuous forest inventories and promoting a special research project on its auto-ecology and synecology. The 413 Project also will select mother trees from significant populations, forming a germplasm bank, and producing seedlings to guarantee the species survival.
Reference	Livro vermelho da flora do Brasil / texto e organização Gustavo Martinelli, Miguel Avila Moraes; tradução Flávia Anderson, Chris Hieatt. - 1. ed. - Rio de Janeiro: Andrea Jakobsson: Instituto de Pesquisas Jardim Botânico do Rio de Janeiro, 2013. 1100 p.; 30 cm.

Table 5.8. Trigger species population trends - Continuation

Trigger Species	*Ateles chamek*
Population Trend at Start of Project	Declining, continuing decline of mature individuals, according to IUCN. It is included on Appendix II of CITES. The Black-faced black spider monkey is widespread and relatively common where not hunted for its meat (Konstant and Rylands 2013). In Bolivia, *Ateles chamek* population densities are usually between five and 25 animals/km², reaching a maximum of 80 animals/km² at sites where not hunted (R. Wallace pers. comm). Where densities are highest, its distribution correlates with local habitat heterogeneity, such as areas with adjacent floodplains or terra firme forests (Haugaasen and Peres 2005). The highest recorded densities for *A. chamek* were observed in the Manu National Park in Peru, where White (1986) estimated 31 individuals/km², McFarland Symington (1988a) 25-31 individuals/km², and Endo et al. (2010) 14-49 individuals/km². In the Noel Kempff Mercado National Park in Bolivia, Wallace et al. (1998) estimated 32 individuals/km², and in the Guaporé Biological Reserve in Brazil, Alves (2013) estimated 26 individuals/km² in igapó clear-water flooded forest. Factors determining different Ateles population densities in various habitats and study sites are discussed by McFarland Symington (1988b), who concluded that high densities depend on the abundance and productivity of certain key plant resources. In Brazil, Peres (1997) estimated densities of *Ateles chamek* in várzea white-water flooded forests and unflooded forests along the Rio Juruá as reaching 2.6-6.0 individuals/km², while Haugaasen and Peres (2005) in the lower Rio Purús region estimated densities of only 0.3-0.5 individuals/km². Iwanaga and Ferrari (2002) recorded sighting rates averaging 0.69 individuals/10 km (range 0.11-2.40) at 33 survey sites in the state of Rondônia, Brazil. They found that the sighting rate was slightly lower in areas

	where *A. chamek* and *Lagothrix cana* occurred together (0.58 individuals/10 km) than in areas where *L. cana* is absent (0.73 individuals/10 km). There is an inferred population decline of at least 50% in the past three generations (45 years) which is also inferred to ongoing and suspected to continue in the future. This population decline is inferred primarily due to loss of area of occupancy and extent of occurrence due to habitat loss and degradation, in addition to threats faced by hunting. This taxon is restricted to primary forest. The population decline and local extinction of Ateles in most areas with human activity are the result of hunting pressure that is often associated with habitat destruction and degradation (van Roosmalen and Klein 1988, Peres 1997, Parry et al. 2007). The species of the genus are present in altered/fragmented areas but generally do not persist for long periods (Peres 1990, 1997). In Brazil, populations of *Ateles chamek* suffered a serious decline, with local extinctions in many areas (Zanon et al. 2008). In Peru, the taxon is extinct due to hunting in adjacent areas of the Panguana Biological Station, in lower Río Llullapichis and along the Río Pachitea (Freese et al. 1982). During surveys of the lower Río Urubamba and in the interfluve between the Ríos Urubamba and Tambo in Peru (which includes areas with high human intervention and hunting pressure), the species was one of the least recorded (Aquino et al. 2013).
Without-project Scenario	Hunting & trapping terrestrial animals, logging & wood harvesting, annual & perennial non-timber crops, livestock farming & ranching, mining & quarrying are the main threats, according to IUCN. No conservation actions undertaken. The major threat to the species is subsistence and market hunting (with guns) for food. An additional threat is habitat loss due to agricultural expansion (mainly soya), especially in the southern portion of the species' range. Only 32% of the species' area of occupancy lies within protected areas.
With-project Scenario	Conservation actions. The 413 Project aims to trigger this key threated ape species by supporting a special

	research project to better know its biology and designing a conservation plan to increase its population.
References, as given by IUCN	Alves, S.L. 2013. Efeitos do tipo de floresta e da estrutura de habitat em assembleias de primatas no sudoeste da Amazônia. Universidade Federal do Pará/Museu Paraense Emílio Goeldi, Belém, Brazil. Aquino, R. and Encarnación, F. 1994. Primates of Peru / Los Primates del Perú. Primate Report 40: 1-127. Aquino, R., Cornejo, F. M. and Heymann, E. W. 2013. 2013. Primate abundance and habitat preferences on the lower Urubamba and Tambo rivers, central-eastern Peruvian Amazonia. Primates 54: 377-383. Boer, L. E. M. de and Bruijn, M, de. 1990. Chromosomal distinction between the red-faced and black-faced black spider monkeys (Ateles paniscus paniscus and A. p. chamek). Zoo Biology 9: 307–316. Collins, A.C., 2008. The taxonomic status of spider monkeys in the twenty-first century. . In: C. J. Campbell (ed.), Spider Monkeys: Behavior, Ecology and Evolution of the Genus Ateles, pp. 50-78. Cambridge. da Cruz Lima, E. 1945. Mammals of Amazônia, Vol. 1. General Introduction and Primates. Contribuições do Museu Paraense Emílio Goeldi de História Natural e Etnografia, Belém do Pará, Brazil. Eisenberg, J. F. 1973. Reproduction in two species of spider monkeys, Ateles fusciceps and Ateles geoffroyi. Journal of Mammalogy 54: 955-957. Eisenberg, J. F. 1976. Communication mechanisms and social integration in the black spider monkey (Ateles fusciceps robustus), and related species. Smithsonian Contributions to Zoology 213: 1-108. Endo, W., Peres, C.A., Salas, E., Mori, S., Sanchez-Veja, J.-L., Shepard, G. H., Pacheco, V. and Yu, D. W.

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Table 5.8. Trigger species population trends - Continuation

Trigger Species	*Crax pinima* or *Crax fasciolata pinima*
Population Trend at Start of Project	Decreasing, 1 to 49 individuals, according to IUCN. Given how infrequently this species has been recorded in the wild, it is likely to be very rare. In 2014 it was considered unlikely that more than 20-30 individuals existed (*A. Lees* in litt. 2014). Although the species has since been recorded at Gurupi Biological Reserve, the total population is still assumed to be very small and is placed in the band 1-49 mature individuals. An analysis of forest loss from 2000-2012 found that the rate of forest loss within the species' range was equivalent to 28% across three generations (Tracewski et al., 2016). Given that the species is also susceptible to fragmentation, edge-effects and hunting, it is likely that the rate of decline over the past three generations has been greater than this, and has been placed in the band 30-49%. A model of forest loss in the Amazon basin since 2002 (Soares-Filho et al. 2006), combined with the species's approximate maximum range and data on its ecology and life history (following the methods of Bird et al. 2011), suggests that the species will lose 78-88% of suitable habitat in the Amazonian portion of its range (as defined by the model, and which accounts for c. 68% of the total area of suitable habitat for this species) over 35 years (estimate of three generations). The pessimistic scenario for forest loss suggests that the species will lose at least 60% of its global extent of suitable habitat over this period. By also factoring in additional declines owing to the species' susceptibility to fragmentation, edge-effects and hunting, the suspected rate of population decline could be 70% over 35 years. However, estimated recent rates of forest loss in the species' range have been equivalent to 28% across three generations (Tracewski et al., 2016). The projected future decline is therefore placed in the band 50-79%.
Without-project Scenario	Hunting & trapping terrestrial animals, logging & wood harvesting, annual & perennial non-timber crops,

	livestock farming & ranching, mining & quarrying are the relevant threats, according to IUCN. Hunting is likely to represent a significant additional threat. No conservation actions undertaken.
With-project Scenario	Conservation actions. The 413 Project aims to trigger this key threated ape species by doing a special research project to better know its biology and designing a conservation plan to increase its population.
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Table 5.8. Trigger species population trends - Continuation

Trigger Species	*Arapaima gigas*
Population Trend at Start of Project	Unspecified according to IUCN. Continuing decline in area, extent and/or quality of habitat. It is listed on CITES Appendix II. Included in international legislation and subject to international management / trade controls.
Without-project Scenario	Overfishing. Uncontrolled use and trade. No conservation actions undertaken.
With-project Scenario	Conservation actions. The 413 Project aims to trigger this key threated ape species by doing a special research project to better know its biology and designing a conservation plan to increase its population.
References, as given by IUCN	Baillie, J. and Groombridge, B. (eds). 1996. 1996 IUCN Red List of Threatened Animals. pp. 378. International Union for Conservation of Nature, Gland, Switzerland and Cambridge, UK. Groombridge, B. (ed.). 1994. 1994 IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland and Cambridge, UK. IUCN. 1990. IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland and Cambridge, UK. IUCN Conservation Monitoring Centre. 1986. 1986 IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland and Cambridge, UK. IUCN Conservation Monitoring Centre. 1988. IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland and Cambridge, UK.

APPENDICES

Appendix 1: Stakeholder Identification Table

This appendix provides two table, the first list the stakeholders and the second the partners of the project.

Table 1A1. Stakeholders of the 413 project

Stakeholder	Role	Interest	Overall Relevance to the Project
ICMBio – Chico Mendes National Institute on Biodiversity Conservation	Federal institution responsible to maintain the integrity of the national-level protected areas system	Conservation of biodiversity and sustainable use of natural resources	Since 413 Project is situated in a zone comprised of various protected areas, ICMBio is a key partner to carry out conjunct conservation strategies
IBAMA – Brazilian Institute for the Environment and Renewable Natural Resources	Federal institution responsible for the environmental licensing, environmental quality control, authorization to use natural resources and environmental inspection, monitoring and control in the national level	Conservation of biodiversity and sustainable use of natural resources	IBAMA is a key partner because it is in charge of inspection, monitoring and control activities, very important for the environmental integrity of the project
FUNAI – National Indigenous People Foundation	Federal institution responsible for protecting and promoting the rights of indigenous peoples in Brazil. It is also responsible for promoting studies on identification and delimitation, demarcation, land title regularization and registration of lands traditionally occupied by indigenous peoples, in addition to monitoring and inspecting indigenous lands in Brazil	Indigenous peoples´ rigths	FUNAI is another key partner because their role in the relationship with indigenous people. It can facilitate the identification of the tribe members to be benefit from the project their needs

Table 1A1. Stakeholders of the 413 project - Continuation

Stakeholder	Role	Interest	Overall Relevance to the Project
IPAAM – Amazonas State Environmental Protection Institute	It is responsible for Environmental Control in the State of Amazonas, through the actions of Licensing, Inspection and Environmental Monitoring of activities potentially and effectively polluting and degrading the environment, as well as those related to Environmental Education	Conservation of biodiversity and sustainable use of natural resources	IPAAM is a very important partner of the project because it is in charge of inspection, monitoring and control activities in the State of Amazonas
Manicoré Municipal Prefecture (Town Hall)	Manicoré Municipal Executive Power Headquarters	Socioeconomic development of the population	Political, infrastructure and services to the project can be provided by the local government
Novo Aripuanã Municipal Prefecture (Town Hall)	Novo Aripuanã Municipal Executive Power Headquarters	Socioeconomic development of the population	
Pinatuba Indigenous Reserve	Land traditionally occupied by indigenous people, on a permanent basis, used for their productive activities, and essential for the preservation of natural resources necessary for their well-being and their physical and cultural reproduction, in accordance with their uses, customs and traditions. Indigenous lands are inalienable and unavailable assets of the Union, and the rights of indigenous peoples over them do not expire.	Indigenous peoples´ rigths	Indigenous leaders can facilitate the relationship between the project management team and the community. They can contribute to the benefit share process
Manicoré Indigenous Reserve		Indigenous peoples´ rigths	
Sepoti Indigenous Reserve		Indigenous peoples´ rigths	
Setemã Indigenous Reserve		Indigenous peoples´ rigths	

Table 1A1. Stakeholders of the 413 project - Continuation

Stakeholder	Role	Interest	Overall Relevance to the Project
RDS Rio Madeira communities´ associations	State sustainable use, protected area	Communities´ welfare, conservation of biodiversity and sustainable use of natural resources	Representatives of the protected areas and the community leaders will contribute significantly to all climate, biodiversity and community aims of the 413 project. They will participate actively in the conception and execution of the 413 project management plan
RDS Juma communities´ associations	State sustainable use, protected area	Communities´ welfare, conservation of biodiversity and sustainable use of natural resources	
Flona Aripuanã communities´associations	Federal sustainable use, protected area	Communities´ welfare, conservation of biodiversity and sustainable use of natural resources	
APA Campos de Manicoré communities´associations	Federal sustainable use, protected area	Communities´ welfare, conservation of biodiversity and sustainable use of natural resources	
Rebio Manicoré	Federal integral, protected area	Conservation of biodiversity	Management staff can be helpful in biodiversity studies to be carried by the 413 project and help in conservation strategy definitions

Table 1A2. Partners of the 413 project

Partner	Form of partnership	Interest	Overall Relevance to the Project
UFAM – Federal University of Amazonas (GO)	Memorandum of understating to carry out research projects related to community welfare and biodiversity	Develop research related to community welfare and biodiversity	Contribute to the validation of the biodiversity and community benefits of the 413 project
UFPR – Federal University of Paraná (GO)	Memorandum of understating to carry out research projects related to carbon stock inventory, baseline, project, and leakage monitoring	Develop research related to climate benefits	Validate the climate benefits of the 413 project through specific research projects addressing carbon monitoring
INPA – Instituto Nacional de Pesquisas da Amazônia (GO)	Memorandum of understating to carry out research projects related to carbon stock inventory and biodiversity	Develop research related to climate benefits and flora biodiversity	Contribute to validate the climate benefits of the 413 project through specific research projects addressing carbon monitoring and biodiversity benefits of the project in relation to two key species: *Bertholletia excelsa* and *Aniba rosaeodora*
Museu Paraense Emilio Goeldi (GO)	Memorandum of understating to carry out research projects related to flora (biodiversity)	Develop research related to biodiversity	Contribute to analyze the overall flora biodiversity in the 413 project
ICTBio – Instituto de Ciência e Tecnologia em Biodiversidade (NGO)	Memorandum of understating to carry out research projects related to fauna (biodiversity)	Develop research related to fauna biodiversity	Contribute to analyze the overall fauna biodiversity in the 413 project

Table 1A2. Partners of the 413 project - Continuation

Partner	Form of partnership	Interest	Overall Relevance to the Project
Instituto de Desenvolvimento Sustentável Mamirauá (NGO)	Memorandum of understating to carry out research projects related to fauna (biodiversity)	Develop research related to fauna biodiversity	Contribute to validate the biodiversity benefits of the project in relation to three key animal species: *Ateles chamek, Arapaima gigas*, and *Crax pinima*

Appendix 2: Project Risks Table

Risks to community and biodiversity were already addressed in sections 4 and 5, respectively. Here, the VCS NON-PERMANENCE RISK REPORT will be provided.

The risk analysis has been conducted in accordance with the VCS T-BAR "Tool for AFOLU non-permanence risk analysis and buffer determination", dated 19 September 2019, version 4.0. This tool assesses a project's internal risk, external risk, natural risk, and mitigation measures which help to reduce risk. The risk ratings and supporting evidence are detailed in Tables below. Letters in the risk factor column correspond to the risk factor explained in Tables 1 to 11 of the VCS AFOLU Non-Permanence Risk Tool.

The 413 Project will employ a non-permanence risk deduction of 10%, as detailed by Tables 1 to 11 of the VCS Tool.

Table 2A1. Project Management Risk

Project Management		Rating
a)	Species planted (where applicable) associated with more than 25% of the stocks on which GHG credits have previously been issued are not native or proven to be adapted to the same or similar agro-ecological zone(s) in which the project is located.	0
b)	Ongoing enforcement to prevent encroachment by outside actors is required to protect more than 50% of stocks on which GHG credits have previously been issued.	2
c)	Management team does not include individuals with significant experience in all skills necessary to successfully undertake all project activities (i.e., any area of required experience is not covered by at least one individual with at least 5 years' experience in the area).	0
d)	Management team does not maintain a presence in the country or is located more than a day of travel from the project site, considering all parcels or polygons in the project area.	0
e)	Mitigation: Management team includes individuals with significant experience in AFOLU project design and implementation, carbon accounting and reporting (e.g., individuals who have successfully managed projects through validation, verification and issuance of GHG credits) under the VCS Program or other approved GHG programs.	-1
f)	Mitigation: Adaptive management plan in place.	-1
Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] Total may be less than zero.		0

Table 2A2. Financial Viability Risk

Financial Viability		Rating
a)	Project cash flow breakeven point is greater than 10 years from the current risk assessment	0
b)	Project cash flow breakeven point is greater than 7 and up to 10 years from the current risk assessment	0
c)	Project cash flow breakeven point greater than 4 and up to 7 years from the current risk assessment	1
d)	Project cash flow breakeven point is 4 years or less from the current risk assessment	0
e)	Project has secured less than 15% of funding needed to cover the total cash out before the project reaches breakeven	0
f)	Project has secured 15% to less than 40% of funding needed to cover the total cash out required before the project reaches breakeven	0
g)	Project has secured 40% to less than 80% of funding needed to cover the total cash out required before the project reaches breakeven	1
h)	Project has secured 80% or more of funding needed to cover the total cash out before the project reaches breakeven	0
i)	Mitigation: Project has available as callable financial resources at least 50% of total cash out before project reaches breakeven	-2
Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)] Total may not be less than zero		0

Table 2A3. Opportunity Cost Risk

Opportunity Cost		Rating
a)	NPV from the most profitable alternative land use activity is expected to be at least 100% more than that associated with project activities; or where baseline activities are subsistence-driven, net positive community impacts are not demonstrated	0
b)	NPV from the most profitable alternative land use activity is expected to be between 50% and up to100% more than from project activities	0
c)	NPV from the most profitable alternative land use activity is expected to be between 20% and up to 50% more than from project activities	4
d)	NPV from the most profitable alternative land use activity is expected to be between 20% more than and up to 20% less than from project activities; or where baseline activities are subsistence-driven, net positive community impacts are demonstrated	0
e)	NPV from project activities is expected to be between 20% and up to 50% more profitable than the most profitable alternative land use activity	0
f)	NPV from project activities is expected to be at least 50% more profitable than the most profitable alternative land use activity	0
g)	Mitigation: Project proponent is a non-profit organization	0
h)	Mitigation: Project is protected by legally binding commitment (see Section 0) to continue management practices that protect the credited carbon stocks over the length of the project crediting period	-2
i)	Mitigation: Project is protected by legally binding commitment (see Section 0) to continue management practices that protect the credited carbon stocks over at least 100 years	0
Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g + h or i)] Total <u>may</u> be less than 0		2

Table 2A4. Project Longevity Risk

Project Longevity		Rating
a)	Without legal agreement or requirement to continue the management practice	= 24 - (project longevity/5)
b)	With legal agreement or requirement to continue the management practice	= 30 - (project longevity/2)
Total Project Longevity (PL) Total <u>may not</u> be less than zero		5

Table 2A5. Project Longevity Risk

Total Internal Risk	Rating
Total Internal Risk (PM + FV + OC + PL) Total may not be less than zero.	7

The overall internal risk is 7.

Table 2A6. Land Tenure and Resource Access/Impacts

Land Tenure and Resource Access/Impacts		Rating
a)	Ownership and resource access/use rights are held by same entity(s)	4
b)	Ownership and resource access/use rights are held by different entity(s) (e.g., land is government owned and the project proponent holds a lease or concession)	0
c)	In more than 5% of the project area, there exist disputes over land tenure or ownership	0
d)	There exist disputes over access/use rights (or overlapping rights)	0
e)	WRC projects unable to demonstrate that potential upstream and sea impacts that could undermine issued credits in the next 10 years are irrelevant or expected to be insignificant, or that there is a plan in place for effectively mitigating such impacts.	0
f)	Mitigation: Project area is protected by legally binding commitment (e.g., a conservation easement or protected area) to continue management practices that protect carbon stocks over the length of the project crediting period	-2
g)	Mitigation: Where disputes over land tenure, ownership or access/use rights exist, documented evidence is provided that projects have implemented activities to resolve the disputes or clarify overlapping claims	-2
Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e + f +g] Total may not be less than zero		0

Table 2A7. Land Tenure and Resource Access/Impacts

Community Engagement		Rating
a)	Less than 50 percent of households living within the project area who are reliant on the project area, have been consulted	0
b)	Less than 20 percent of households living within 20 km of the project boundary outside the project area, and who are reliant on the project area, have been consulted	5
c)	Mitigation: The project generates net positive impacts on the social and economic well-being of the local communities who derive livelihoods from the project area	-5
Total Community Engagement (CE) [where applicable, (a + b + c)] Total may be less than zero		0

Table 2A8. Land Tenure and Resource Access/Impacts

Political Risk		Rating
a)	Governance score of less than -0.79	0
b)	Governance score of -0.79 to less than -0.32	4
c)	Governance score of -0.32 to less than 0.19	0
d)	Governance score of 0.19 to less than 0.82	0
e)	Governance score of 0.82 or higher	0
f)	Mitigation: Country is implementing REDD+ Readiness or other activities, as set out in this Section 2.3.3.	-2
Total Political (PC) [as applicable ((a, b, c, d or e) + f)] Total may not be less than zero		2

Table 2A9. Overall External Risk

External Risk	Rating
Total External Risk (LT + CE + PC) Total may not be less than zero	2

Table 2A10. Natural Risks

Natural Risks					
Significance	Likelihood				
	Less than every 10 years	Every 10 to less than 25 years	Every 25 to less than 50 years	Every 50 to less than 100 years	Once every 100 years or more, or risk is not applicable to the project area
Catastrophic (70% or more loss of carbon stocks)	FAIL	30	20	5	0
Devastating (50% to less than 70% loss of carbon stocks)	30	20	5	2	0
Major (25% to less than 50% loss of carbon stocks)	20	5	2	1	0
Minor (5% to less than 25% loss of carbon stocks)	5	2	1	1	0
Insignificant (less than 5% loss of carbon stocks) or transient (full recovery of lost carbon stocks expected within 10 years of any event)	2	1	1	0	0
No Loss	0	0	0	0	0
LS Score					
Mitigation					Rating
Prevention measures applicable to the risk factor are implemented					0.50
Project proponent has proven history of effectively containing natural risk					0.50
Both of the above					0.25
None of the above					1
Score for each natural risk applicable to the project (determined by (LS × M))					Rating
Fire (F)					0.5
Pest and Disease Outbreaks (PD)					0
Extreme Weather (W)					0.5
Geological Risk (G)					0
Other natural risk (ON)					0
Total Natural Risk (as applicable, F + PD + W + G + ON)					**1.00**

Table 2A11. Overall risk rating

Risk Category		Rating
a)	Internal Risk (from Table 5)	7
b)	External Risk (from Table 9)	2
c)	Natural Risk (from Table 10)	1
Overall risk rating (a + b + c)		10

Appendix 3: Special Sub-projects

Fifteen special sub-projects regarding climate, community and biodiversity will be carried out in the 413 Project, as shown in Figure 3A1. The specific activities, objectives, goals, and metrics of these sub-projects will be detailed after consultation to stakeholders.

Climate	Community	Biodiversity
• Climate and meteorological data analysis special research project • Climate resilient agriculture (low carbon) special project • Smart energy and water use special project • Waste management special project	• Climate friendly citizenship special project • Women body and mind health special project • Youth of the future special project • Sports to community special project • Learned lessons from elderly special project	• Brazilian giant nut research project • Brazilian rosewood research project • Black-faced black spider-monkey reseaech project • Belem curassow research project • Pirarucu giant Amazonian fish research project

Appendix 4: LSC Report

Brief description how comments by local stakeholders have been invited and compiled:

With reference to the VCS-CCB requirement to consult local stakeholders on the impacts of the proposed VCS-CCB project and address their comments on it, a virtual stakeholders meeting was held via Teams Platform on August 19th, 2021; where representatives from various organizations were invited

The objective of the meeting was to address the comments and inquiries of the local stakeholders on the proposed VCS-CCB project and ensure that their comments have been taken into consideration while preparing the PDD.

The list of invitees included representatives from the following organizations:

Governmental Organizations

- Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA)
- National Indigenous People Foundation (FUNAI)
- Amazonas State Environmental Protection Institute (IPAAM)
- Manicoré Municipal Prefecture (Town Hall)
- Novo Aripuanã Municipal Prefecture (Town Hall)
- Chico Mendes National Institute on Biodiversity (ICMBio)
- National Institute for Colonization and Agrarian Reform (INCRA)
- Public Ministry of the State of Amazonas (MPAM)

Consultants and Research Centers

- Brazilian Agricultural Research Company (Embrapa)
- National Institute for Amazon Research (INPA)
- Tropical Forest Institute (IFT)
- Institute of Man and the Amazon Environment (IMAZON)
- Federal Rural University of the Amazon (UFRA)
- Federal University of Amazonas (UFAM)
- Federal University of Acre (UFAC)

Others

- RDS Rio Madeira communities´ associations
- RDS Juma communities´ associations
- Flona Aripuanã communities´ associations
- APA Campos de Manicoré communities´associations
- Pinatuba Indigenous Reserve
- Rio Manicoré Indigenous Reserve
- Sepoti Indigenous Reserve

- Setemã Indigenous Reserve
- Rebio Manicoré
- Sustainable Amazon Fund (FAS)
- Socio-environmental Institute (ISA)

Consultation Approach and Methodology:

Ecosecurities sent private invitations to the aforementioned concerned parties (as shown in Annex). The meeting was held via Teams Platform, on the 19th of August 2021. The meeting was kicked by initiation of the recording of the meeting and a formal presentation of all the participants. Afterwards, a representative from Ecosecurities, presented the following points during the meeting through a presentation:

- Project Description
- Project Information
- Location
- Baseline
- GEE Emissions Reductions
- Stakeholders
- Climate Change
- Climate Change Adaptation Benefits
- Community
- Community Benefits
- Biodiversity
- Biodiversity Benefits

The consultant stressed on the importance of stakeholders meeting to take the comments and inquiries of stakeholders into consideration, which is important for the success of the project.

After the presentation, a discussion session was held to address the inquiries of the attendees.

List of Attendees

The following concerned parties have attended stakeholder's engagement meeting.

Table 4A1. List os Attendees

Organization	Attendee	E-mail
FUNAI	Weber Braz	copam@funai.gov.br

Summary of the comments received

The following table summarizes the list of participants who provided their comments on the project, after the presentation.

Table 4A2. List of Persons Providing Comments

Name	Organization	Position
Weber Braz	FUNAI	Environmental Policies Coordinator

The attendee stated that FUNAI has a commitment with ethnodevelopment of the indigenous communities. The organizations understands that the carbon issue is intimately connected to the activities of the indigenous communities, affirming that the communities have an important part to play. Therefore, they are open to analyzing the PDDs and have an internal sector which focuses on preliminary and feasibility studies on the implementation of this type of project and project activities in the indigenous reserves. The attendee stated that this project would bring forth new information and opportunities. In the end, the attendee solicited the PDD for further information and analyzing.

Report on how due account was taken of any comments received:

The PDD was translated from English to Portuguese and sent to the attendee, as solicited. Also, we made clear that even after the end of the consultation, we would be open to dialogue about the projects, accepting any type of comment, question, feedback etc.

Email Invites:

Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>
Fri 13/08/2021 10:22

To: ouvidoria@mpam.mp.br <ouvidoria@mpam.mp.br>; protocolo@mpam.mp.br <protocolo@mpam.mp.br>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

Prezado(a),

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- Descrição Geral do Projeto
- Benefícios Climáticos
- Benefícios às Comunidades
- Benefícios à Biodiversidade

Apresentação do Projeto	10:00 - 10:30
Discussão, dúvidas e esclarecimentos	10:30 - 11:30
Encerramento e encaminhamentos	11:30 - 12:00

Após o recebimento deste e-mail, gostaríamos de solicitar a confirmação da sua participação ou ausência na consulta.

27/08/2021 Email - Rebeca Blucher - Outlook

Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>
Fri 13/08/2021 10:17

To: geral@ift.org.br <geral@ift.org.br>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

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https://outlook.office.com/mail/sentitems/id/AAQkADY1MWQyZjk1LWEwZjYtNDZiNi1iYTIzLTcxNGU0Y2Y3ZTJmMAAQADXCEDwtXlBNjkboSScK... 1/2

27/08/2021 Email - Rebeca Blucher - Outlook

Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>
Fri 13/08/2021 10:22

To: ouvidoria@mpam.mp.br <ouvidoria@mpam.mp.br>; protocolo@mpam.mp.br <protocolo@mpam.mp.br>
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Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>

Fri 13/08/2021 10:14

To: direx@ufam.edu.br <direx@ufam.edu.br>; gabinete@ufam.edu.br <gabinete@ufam.edu.br>; ascom@ufam.edu.br <ascom@ufam.edu.br>; arii@ufam.edu.br <arii@ufam.edu.br>; arii.ufam@gmail.com <arii.ufam@gmail.com>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

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Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>

Fri 13/08/2021 10:13

To: reitoria@ufra.edu.br <reitoria@ufra.edu.br>; ouvidoria@ufra.edu.br <ouvidoria@ufra.edu.br>; proex@ufra.edu.br <proex@ufra.edu.br>; propladi@ufra.edu.br <propladi@ufra.edu.br>; proped@ufra.edu.br <proped@ufra.edu.br>; ascom@ufra.edu.br <ascom@ufra.edu.br>; proaf@ufra.edu.br <proaf@ufra.edu.br>; progep@ufra.edu.br <progep@ufra.edu.br>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

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Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>

Fri 13/08/2021 10:04

To: ascom@inpa.gov.br <ascom@inpa.gov.br>; coadi@inpa.gov.br <coadi@inpa.gov.br>; coatl@inpa.gov.br <coatl@inpa.gov.br>; elen@inpa.gov.br <elen@inpa.gov.br>; cogpe@inpa.gov.br <cogpe@inpa.gov.br>; dser@inpa.gov.br <dser@inpa.gov.br>; ruben@inpa.gov.br <ruben@inpa.gov.br>; coaes@inpa.gov.br <coaes@inpa.gov.br>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

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Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>

Fri 13/08/2021 10:01

To: joão.jornada@mns.incra.gov.br <joão.jornada@mns.incra.gov.br>; adailson.ayres@mns.incra.gov.br <adailson.ayres@mns.incra.gov.br>; edilson.silva@mns.incra.gov.br <edilson.silva@mns.incra.gov.br>; giovani.silva@mns.incra.gov.br <giovani.silva@mns.incra.gov.br>; rafael.reis@mns.incra.gov.br <rafael.reis@mns.incra.gov.br>; jeam.brito@mns.incra.gov.br <jeam.brito@mns.incra.gov.br>
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Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>
Fri 13/08/2021 09:57

To: isamao@socioambiental.org <isamao@socioambiental.org>; isarn@socioambiental.org <isarn@socioambiental.org>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

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- Benefícios Climáticos
- Benefícios às Comunidades
- Benefícios à Biodiversidade

Apresentação do Projeto	10:00 - 10:30
Discussão, dúvidas e esclarecimentos	10:30 - 11:30
Encerramento e encaminhamentos	11:30 - 12:00

Após o recebimento deste e-mail, gostaríamos de solicitar a confirmação da sua participação ou ausência na consulta.

Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>
Fri 13/08/2021 09:55

To: fas@fas-amazonas.org <fas@fas-amazonas.org>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

Prezado(a),

Nós, da Ecosecurities, estamos desenvolvendo dois projetos (413 e Zero Carbon) de crédito de carbono, no âmbito de Redução de Emissões Provenientes de Desmatamento e Degradação Florestal (REDD+), para a empresa 413 Environmental, LLC.

Os projetos 413 e Zero Carbon consistem em reduzir emissões por meio do desmatamento planejado evitado, dentro de 3 propriedades, localizadas nos municípios de Manicoré e Novo Aripuanã (Amazonas).

No decorrer da formulação e desenvolvimento do projeto, identificamos a sua organização (FAS) como um stakeholder.

Dessa forma, vimos por meio deste email, convidá-lo a participar de uma consulta virtual aos stakeholders, a fim de divulgar e discutir os detalhes do projeto.

A consulta irá ocorrer nos dias: 19 (quinta-feira) e 20 (sexta-feira) de agosto, das 10:00 às 12:00 (fuso horário de São Paulo), por meio da plataforma Teams. No dia 19 será discutido o projeto 413 e no dia 20 será abordado o projeto Zero Carbon.

Consulta Projeto 413 (19/08): https://teams.microsoft.com/l/meetup-join/19%3ameeting_ZjRjNDNiODgtODhjZS00NGVkLTgwNWEtYjMzNTVmZWYxODRk%40thread.v2/0?context=%7b%22Tid%22%3a%227be1e4f5-adcb-4cc2-9c09-c81e722b66c5%22%2c%22Oid%22%3a%22606bccbd-c2a9-46ed-887b-c74ffa57270e%22%7d

Consulta Projeto Zero Carbon (20/08): https://teams.microsoft.com/l/meetup-join/19%3ameeting_MmIwMDhmYjAtOTA3ZC00MTIzLWJmMWEtODJlYmY5ZmMzNDZl%40thread.v2/0?context=%7b%22Tid%22%3a%227be1e4f5-adcb-4cc2-9c09-c81e722b66c5%22%2c%22Oid%22%3a%22606bccbd-c2a9-46ed-887b-c74ffa57270e%22%7d

Segue abaixo a agenda da consulta e os principais pontos a serem discutidos:

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Consulta - Projeto - REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>
Fri 13/08/2021 09:53

To: pmmanicore@gmail.com <pmmanicore@gmail.com>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

Prezado(a),

Nós, da Ecosecurities, estamos desenvolvendo dois projetos (413 e Zero Carbon) de crédito de carbono, no âmbito de Redução de Emissões Provenientes de Desmatamento e Degradação Florestal (REDD+), para a empresa 413 Environmental, LLC.

Os projetos 413 e Zero Carbon consistem em reduzir emissões por meio do desmatamento planejado evitado, dentro de 3 propriedades, localizadas nos municípios de Manicoré e Novo Aripuanã (Amazonas).

No decorrer da formulação e desenvolvimento do projeto, identificamos a sua organização (Prefeitura Municipal de Manicoré) como um stakeholder.

Dessa forma, vimos por meio deste email, convidá-lo a participar de uma consulta virtual aos stakeholders, a fim de divulgar e discutir os detalhes do projeto.

A consulta irá ocorrer nos dias: 19 (quinta-feira) e 20 (sexta-feira) de agosto, das 10:00 às 12:00 (fuso horário de São Paulo), por meio da plataforma Teams. No dia 19 será discutido o projeto 413 e no dia 20 será abordado o projeto Zero Carbon.

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Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>
Fri 13/08/2021 09:52

To: gabinete@ipaam.am.gov.br <gabinete@ipaam.am.gov.br>; atendimento@ipaam.am.gov.br <atendimento@ipaam.am.gov.br>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

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Dessa forma, vimos por meio deste email, convidá-lo a participar de uma consulta virtual aos stakeholders, a fim de divulgar e discutir os detalhes do projeto.

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Consulta Projeto Zero Carbon (20/08): https://teams.microsoft.com/l/meetup-join/19%3ameeting_MmIwMDhmYjAtOTA3ZC00MTIzLWJmMWEtODJlYmY5ZmMzNDZl%40thread.v2/0?context=%7b%22Tid%22%3a%227be1e4f5-adcb-4cc2-9c09-c81e722b66c5%22%2c%22Oid%22%3a%22606bccbd-c2a9-46ed-887b-c74ffa57270e%22%7d

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27/08/2021 Email - Rebeca Blucher - Outlook

Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>

Fri 13/08/2021 09:49

To: dages@funai.gov.br <dages@funai.gov.br>; cgtic@funai.gov.br <cgtic@funai.gov.br>; cgge@funai.gov.br <cgge@funai.gov.br>; cggp@funai.gov.br <cggp@funai.gov.br>; cgrl@funai.gov.br <cgrl@funai.gov.br>; cgof@funai.gov.br <cgof@funai.gov.br>; presidencia@funai.gov.br <presidencia@funai.gov.br>; agenda@funai.gov.br <agenda@funai.gov.br>; comunicacao@funai.gov.br <comunicacao@funai.gov.br>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

Prezado(a),

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No decorrer da formulação e desenvolvimento do projeto, identificamos a sua organização (FUNAI) como um stakeholder.

Dessa forma, vimos por meio deste email, convidá-lo a participar de uma consulta virtual aos stakeholders, a fim de divulgar e discutir os detalhes do projeto.

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https://outlook.office.com/mail/sentitems/id/AAQkADY1MWQyZjk1LWEwZjY1NDZiNi1iYTIzLTcxNGU0Y2Y3ZTJmMAAQALdEDc2ynDxCmHh0%2... 1/2

27/08/2021 Email - Rebeca Blucher - Outlook

Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>
Fri 13/08/2021 09:47

To: supes.am@ibama.gov.br <supes.am@ibama.gov.br>; gabinete.am@ibama.gov.br <gabinete.am@ibama.gov.br>; ditec.am@ibama.gov.br <ditec.am@ibama.gov.br>; diaf.am@ibama.gov.br <diaf.am@ibama.gov.br>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

Prezado(a),

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No decorrer da formulação e desenvolvimento do projeto, identificamos a sua organização (IBAMA) como um stakeholder.

Dessa forma, vimos por meio deste email, convidá-lo a participar de uma consulta virtual aos stakeholders, a fim de divulgar e discutir os detalhes do projeto.

A consulta irá ocorrer nos dias: 19 (quinta-feira) e 20 (sexta-feira) de agosto, das 10:00 às 12:00 (fuso horário de São Paulo), por meio da plataforma Teams. No dia 19 será discutido o projeto 413 e no dia 20 será abordado o projeto Zero Carbon.

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Consulta Projeto Zero Carbon (20/08): https://teams.microsoft.com/l/meetup-join/19%3ameeting_MmIwMDhmYjAtOTA3ZC00MTIzLWJmMWEtODJlYmY5ZmMzNDZl%40thread.v2/0?context=%7b%22Tid%22%3a%227be1e4f5-adcb-4cc2-9c09-c81e722b66c5%22%2c%22Oid%22%3a%22606bccbd-c2a9-46ed-887b-c74ffa57270e%22%7d

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https://outlook.office.com/mail/sentitems/id/AAQkADY1MWQyZjk1LWEwZjYtNDZiNi1iYTIzLTcxNGU0Y2Y3ZTJmMAAQAGbSnj%2FeCZJOpPTOe... 1/2

27/08/2021 Email - Rebeca Blucher - Outlook

Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>

Fri 13/08/2021 09:41

To: ricardo.soavinski@icmbio.gov.br <ricardo.soavinski@icmbio.gov.br>; marcelo.cavallini@icmbio.gov.br <marcelo.cavallini@icmbio.gov.br>; sergio-henrique.carvalho@icmbio.gov.br <sergio-henrique.carvalho@icmbio.gov.br>; denise.carvalho@icmbio.gov.br <denise.carvalho@icmbio.gov.br>; paulo.carneiro@icmbio.gov.br <paulo.carneiro@icmbio.gov.br>; flavia.oliveira@icmbio.gov.br <flavia.oliveira@icmbio.gov.br>; roberta.souza@icmbio.gov.br <roberta.souza@icmbio.gov.br>; maria.bampi@icmbio.gov.br <maria.bampi@icmbio.gov.br>; dayse.correa@icmbio.gov.br <dayse.correa@icmbio.gov.br>; sandra.gomes@icmbio.gov.br <sandra.gomes@icmbio.gov.br>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

Prezado(a),

Nós, da Ecosecurities, estamos desenvolvendo dois projetos (413 e Zero Carbon) de crédito de carbono, no âmbito de Redução de Emissões Provenientes de Desmatamento e Degradação Florestal (REDD+), para a empresa 413 Environmental, LLC.

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No decorrer da formulação e desenvolvimento do projeto, identificamos a sua organização (ICMBio) como um stakeholder.

Dessa forma, vimos por meio deste email, convidá-lo a participar de uma consulta virtual aos stakeholders, a fim de divulgar e discutir os detalhes do projeto.

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Consulta Projeto Zero Carbon (20/08): https://teams.microsoft.com/l/meetup-join/19%3ameeting_MmIwMDhmYjAtOTA3ZC00MTIzLWJmMWEtODJlYmY5ZmMzNDZl%40thread.v2/0?context=%7b%22Tid%22%3a%227be1e4f5-adcb-4cc2-9c09-c81e722b66c5%22%2c%22Oid%22%3a%22606bccbd-c2a9-46ed-887b-c74ffa57270e%22%7d

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27/08/2021 Email - Rebeca Blucher - Outlook

Consulta - Projeto REDD

Rebeca Blucher <rebeca.blucher@ecosecurities.com>
Fri 13/08/2021 09:35

To: ceuc@ceuc.sds.am.gov.br <ceuc@ceuc.sds.am.gov.br>
Cc: Magno Botelho Branco <magno.cb@ecosecurities.com>

Prezado(a),

Nós, da Ecosecurities, estamos desenvolvendo dois projetos (413 e Zero Carbon) de crédito de carbono, no âmbito de Redução de Emissões Provenientes de Desmatamento e Degradação Florestal (REDD+), para a empresa 413 Environmental, LLC.

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No decorrer da formulação e desenvolvimento do projeto, identificamos a sua organização (Centro Estadual de Unidades de Conservação) como um stakeholder.

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Consulta Projeto Zero Carbon (20/08): https://teams.microsoft.com/l/meetup-join/19%3ameeting_MmIwMDhmYjAtOTA3ZC00MTIzLWJmMWEtODJlYmY5ZmMzNDZl%40thread.v2/0?context=%7b%22Tid%22%3a%227be1e4f5-adcb-4cc2-9c09-c81e722b66c5%22%2c%22Oid%22%3a%22606bccbd-c2a9-46ed-887b-c74ffa57270e%22%7d

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https://outlook.office.com/mail/sentitems/id/AAQkADY1MWQyZjk1LWEwZjYtNDZiNi1iYTIzLTcxNGU0Y2Y3ZTJmMAAQACqHYCpyepVKpEqrdihl... 1/2

Appendix 5: References

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