

CCB & VCS Project Description Template

This template is for the development of projects using both the CCB and VCS Programs. Projects not intending to complete VCS Program validation must use the CCB Project Description Template. Projects not intending to complete CCB Program validation must use the VCS Project Description Template.

Instructions for completing the project description:

TITLE PAGE: All items in the box on the title page must be completed using Arial 10pt, black, regular (non-italic) font. This box must appear on the title page of the final document. Project descriptions may also feature the project title and preparers' name, logo and contact information more prominently on the title page, using the format below (Arial 24pt and Arial 11pt, black, regular font).

PROJECT DESCRIPTION: Instructions for completing this template can be found under each section heading in grey or blue italicized text. The grey text represents guidance for the general, climate, community and biodiversity components of the project description that must follow CCB and VCS Program, rules and requirements. The blue text represents guidance for the carbon component of the project description that must follow VCS project-level requirements and the applied VCS methodology. Green text at the end of section headings is reference to specific sections of CCB Program documents from which the template heading corresponds and must not be removed from the document; unless otherwise noted, the references correspond to sections of the Climate, Community & Biodiversity Standards. References that begin with 'Rules' correspond to sections of the CCB Program Rules.

This template must be completed in accordance with both standards, and the preparer need to refer to the relevant VCS and CCB Program documents and the methodology in order to complete the template. It is also expected that relevant guidance, as it relates to the project and methodology, is followed. Note that the instructions in this template are intended to serve as a guide and do not necessarily represent an exhaustive list of the information the preparer must provide under each section of the template.

All sections must be completed using Arial 10pt, black, regular (non-italic) font, unless deviations are merited. Where a section is not applicable, same must be stated under the section (the section must not be deleted from the final document).

All instructions, including this introductory text, must be deleted from the final document.

RIO ANAPU-PACAJA REDD PROJECT

Document Prepared By Michael Greene

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Project Title	Rio Anapu-Pacaja REDD Project
Version	3.4
Date of Issue	21, June 2017
Project Location	Para, Brazil
Project Proponent(s)	Brazil Agfor LLC Michael Greene Michael@brazilagfor.com +55-11-3042-7805
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Validation Body	Dr. M.P Kanal / 4K Earth Science Pvt Ltda. kanal@4kearthscience.com / +91 80 4336 5728
Project Lifetime	1 January 2016 – 31 December 2055; 40 years
GHG Accounting Period	1 January 2016 – 31 December 2055; 40 years
History of CCB Status	First Validation/ First Verification
Gold Level Criteria	<i>List which Gold Level criteria are being used and provide a brief description of the activities planned and the expected results that enable the project to qualify for each relevant Gold Level</i>
Expected Verification Schedule	May 1 2020 to June 30, 2020

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1 SUMMARY OF PROJECT BENEFITS

The Anapu-Pacaja REDD Project in Portel, Para is protecting 165,707 hectares in a highly critical region of the Brazilian Amazon. The high levels of land grabbing, land conflict and instability in the region has allowed the project to strongly focus on bringing stability to all the areas that surround the project area by paying for and helping the local residents known as Riverine people to gain land tenure documents and eventually full freehold title deeds. The project to-date has surveyed, paid for and completed the paperwork on 127 family plots. The project also provided cook stoves to 50 families with the goal to help further families as carbon credit sales take place.

Brazil is not on the list of Least Developed Countries (LDC), due to the wealthy and prosperous south and the farm regions. This wealth causes the overall Gross Domestic Product Per Capita to be too high. However the region of Portel, Para and Melgaço, Para (the neighboring municipality) is the poorest region in all of Brazil without even basic sanitation in Melgaço, Para, making it in far more need of development than even some places in LDC African countries. Excluding the GDP created from illegal and legal loggers which have minimum positive impact in local economy, as most logs are removed from Portel and brought to Belem for processing. The region is living on less than 3 dollars per day per person, for those living in the Leakage Management Area of the Anapu-Pacaja project the living wage is less than 2 dollars per day.

This section highlights some of this project's important benefits. Section 1.1 (Unique Project Benefits) should be aligned with a project's causal model and is specific to this project. Section 1.2 (Standardized Benefit Metrics) is the same quantifiable information for all CCB projects. This section does not replace the development of a project-specific causal model or the monitoring and reporting of all associated project-specific impacts (positive and negative) that are described in Sections 2-5 of this document.

1.1 Unique Project Benefits

Insert two to five brief summaries of expected benefits of the project not captured by the standardized benefit metrics in Section 1.2, below. Progress toward achieving each benefit listed here may be reported on in project monitoring reports. These benefits shall relate to key project outcomes or impacts set out in the project's theory of change (Section 2.1.11). Estimations included below shall be substantiated in this document as denoted in the corresponding section reference.

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

Outcome or Impact Estimated by the End of Project Lifetime	Section Reference
1) The project brings and will bring further stability to the Project area by bringing stability to the region. As a proven method to bring stability the project pays for every family that directly borders the project area, and within several kilometers of the project area to gain title for their land. Land title in mass for the local population results in a stable region void of land grabber's ability to claim land, as with land title it shows the region is already taken.	2.1.1
2) The project has paid for in the 2016 to 2020 period all the Cadastrol Ambiental Rural (environmental Certificate) for all the families that live in areas of the Leakage Management Area. This certificate helps better monitor who is deforesting and who is not, thus allowing a form of virtual security and accountability within both the project area and the families living in the leakage management area. From 2016 to 2020 a total of 127 families gained this certificate via the project.	2.1.1
3) The project has already provided 50 eco-stoves to the families in the project area. A future goal is to provide financial support is to provide 50 new houses in the leakage management area for the families that are living in sub-humane conditions. In addition to this it is to provide a solar panel to the roofs of every existing house to help give more reliable electricity.	2.1.1
4) The project is to build up the local economy by focusing on Jatái medical grade honey production, which is a high dollar product that greatly improves the local economy without requiring deforestation. The project starting in 2020 will deliver bee keeping equipment.	2.1.1
5) The goal (as soon as possible) before the date of 2055 is that the project area will be stable and not face such huge land grabbing efforts and illegal logging activities.	2.1.1

1.2 Standardized Benefit Metrics

For each metric, provide an estimate of the net benefit the project aims to achieve during the project lifetime. Insert “not applicable” where the metric does not apply and “data not available” where the metric does apply but there are no means of quantification. Estimations included below shall be substantiated in this document as denoted in the corresponding section reference.

Table 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	4,359,748	
	Net estimated emission reductions in the project area, measured against the without-project scenario	40,154,304	
Forest ¹ cover	For REDD ² projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario	165,707 hectares	2.1.5
	For ARR ³ projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	NA	-
Improved land management	Number of hectares of existing production forest land in which IFM ⁴ practices are expected to occurred as a result of project activities, measured against the without-project scenario	NA	-
	Number of hectares of non-forest land in which improved land management practices are expected to occurred as a result of project activities, measured against the without-project scenario	5,000 hectares	4.4.1

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

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

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

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

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
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	50	2.2.1
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	50	2.2.1
Employment	Total number of people expected to be employed in project activities, ⁵ expressed as number of full-time employees ⁶	11	2.3.1 5
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	3	2.3.1 5
Livelihoods	Total number of people expected to have improved livelihoods ⁷ or income generated as a result of project activities	193	2.1.6
	Number of women expected to have improved livelihoods or income generated as a result of project activities	50	2.1.6
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	22	2.1.5
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	11	2.1.5

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

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

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

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
Education	Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	43	2.1.7
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	22	2.1.7
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	50	2.1.7
	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	50	2.1.7
Well-being	Total number of community members whose well-being ⁸ is expected to improve as a result of project activities	193	4.2.1
	Number of women whose well-being is expected to improve as a result of project activities	93	4.2.1
Biodiversity conservation	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation, ⁹ measured against the without-project scenario	165,707	5.2.4
	Expected number of globally Critically Endangered or Endangered species ¹⁰ benefiting from reduced threats as a result of project activities, ¹¹ measured against the without-project scenario	5	5.2.4

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

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

¹⁰ Per IUCN's Red List of Threatened Species

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

2 GENERAL

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (G1.2)

Climate Description Summary

The Climate objective of the Project is to avoid and prevent unplanned deforestation in native forests thus avoiding the net emission of 40,154,304 tCO₂e through a period of 40 years of Project's crediting period.

Such objective are achieved by managing the land in the form of a "private reserve" by monitoring and operating a pre-designed plan created between 2012 and 2016. This operation is ever changing as we learn new things about the forest, the riverine people community and adapt to government related policy changes. The operation includes rigorous enforcement, anthropologist professional, social workers, survey technicians, attorneys, satellite monitoring, and government database monitoring, to come together to maintain such a large area of property.

The long term hope is to change the mentality from this region from a lawless conflict region to a stable region where everyone has title and no one fears land grabbers or have to spend excessively on legal fees to remove landowners.

The medium term goal is to allow forest regeneration by reducing the area of cassava, by focusing on crops that are alternatives, and smaller foot print crops and result in higher profits. Thus increasing the amount of carbon sequestered in the forest²⁸.

Community Description summary

The community is a "traditional peoples" community known as Ribeirinhos, or in English Riverine people. This means River people. They are actually all related to each other, as the original families came in 1950's and have intermarried with each other.

The Project has provided the first stage of land tenure process to over 127 different households in the region (next to the project area), with all the households in the project area receiving what is known as the Cadastrol Ambiental Rural otherwise known as CAR. This is the Environmental Certificate that both demarcates the boundary of the area of their land and places the name of the owner in the government database showing who owns the property. This provides land tenure security to riverine households living within the Project Boundaries but outside the Project Area. For those living outside the Project Boundary, capacity building workshops on land titling have been held to provide clear information about which steps the project is taking to make sure the each house in the LMA gain title.

Further CAR documents are planned to be completed in the future outside the Leakage Management area, to further bring title stability to the region. Stability means investment, investment means more wealth and income, more wealthy and income means a better livelihood that is less likely to depend on extractive activities.

The Threat to the land is the land grabbers who enter the region and state: It is OK to land grab as this is a conflict region, thus they use the fact the riverine people don't have title as an excuse to call the region a conflict region and proceed with efforts to encroach. The common thought of the general population is that each riverine should have just a few hectares, which leaves them as 2nd class citizens, as illegal land grabbers can claim up to 1500 hectares per person (Source: ITERPAP)

Geo-referenced information has been gathered by the technicians for each household in the region. Additionally, the Project has already provided a basic new governance structure for a new association that the project has set up to coordinate activities, which helps enhance community's organizational capabilities for a better management of the social projects that have been conducted already and the social projects that are planned.

Finally, the Project has provided a one-on-one course for agroforestry systems and on implementation of energy efficient cook stoves for cooking and cassava production to households within and nearby the Project Boundary. The project took pictures at each time a cook stove was delivered of both the person receiving the cook, 50 cook stoves provided, with the cook stove present in the picture. In addition to this an additional 300 cook stoves are planned for June to December 2020 with the goal to provide cook stoves to all riverine people in the Project Area, Leakage Management Area and in select communities outside the Leakage Management area.

There have been community meetings at each household, but the real communication and the real training has been found to have been most successful during one-on-one communications. There are picture evidence of the community meetings taking place and pictures of one-on-one meetings. Interviews and discussions were carried out either by the technicians doing the survey work for the CAR, or anthropologist the project hired to have a better understanding of the customs of the riverine people. Thus as they are structured in households, the community is seen as a whole, as there is very little deviation between the wants and the needs of the households. The main difference found between households is organizational level within the household, where some households are very well organized and are well operated and others are very poor and have low education, but from a response and social interaction they all want the same results 95% of the time.

Provide a summary description of the project to enable an understanding of the nature of the project and its implementation, including the following (no more than one page):

- A summary description of the technologies/measures to be implemented by the project.*
- The location of the project.*
- An explanation of how the project is expected to generate GHG emission reductions or removals.*
- A brief description of the scenario existing prior to the implementation of the project.*
- An estimate of annual average and total GHG emission reductions and removals.*
- The project's climate, community and biodiversity objectives.*

2.1.2 Project Scale

Indicate the scale of the project (project or large project).

Project Scale	
Project	
Large project	X

2.1.3 Project Proponent (G1.1)

Provide contact information for the project proponent(s). A primary project proponent must be identified if there are multiple project proponents; this primary project proponent must match the project proponent listed on the title page of this template. Copy and paste the table as needed.

Organization name	Brazil Agfor LLC
Contact person	Michael Greene
Title	Director
Address	Rua Cabo Joao Teruel Fregoni 307 apt 124 Ponte Grande, Guarulhos, Sao Paulo CEP 07.032-000
Telephone	+55-11-3042-7805
Email	Michael@brazilagfor.com

2.1.4 Other Entities Involved in the Project

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

Organization name	Brazil Agfor L.L.C.
Contact person	Michael Greene
Title	Project Manager, Project Coordinator, Landowner
Address	Rua Cabo Joao Teruel Fregoni 307 apt 124 Ponte Grande, Guarulhos, Sao Paulo CEP 07.032-000
Telephone	+55-11-9-7020-3200
Email	Michael@brazilagfor.com

2.1.5 Physical Parameters (G1. 3)

1. Location of the Project

General Location

The Project is located in northwest of Brazil, in the State of Pará, micro region of Portel, municipality of Portel. Main transportation mean to arrive in Portel is by boat. The trip takes approximately, 12 hours from Belém. About 50% of Portel population is rural. Main source of income in the municipality is wood extraction and subsistence agriculture, specifically, cassava agriculture. Map 1 shows the location of the Project in Brazil and in Pará.

2°30'10.16"S 51° 3'2.35"W

2°42'20.84"S 50°53'31.76"W

2°11'16.43"S 51°17'49.24"W

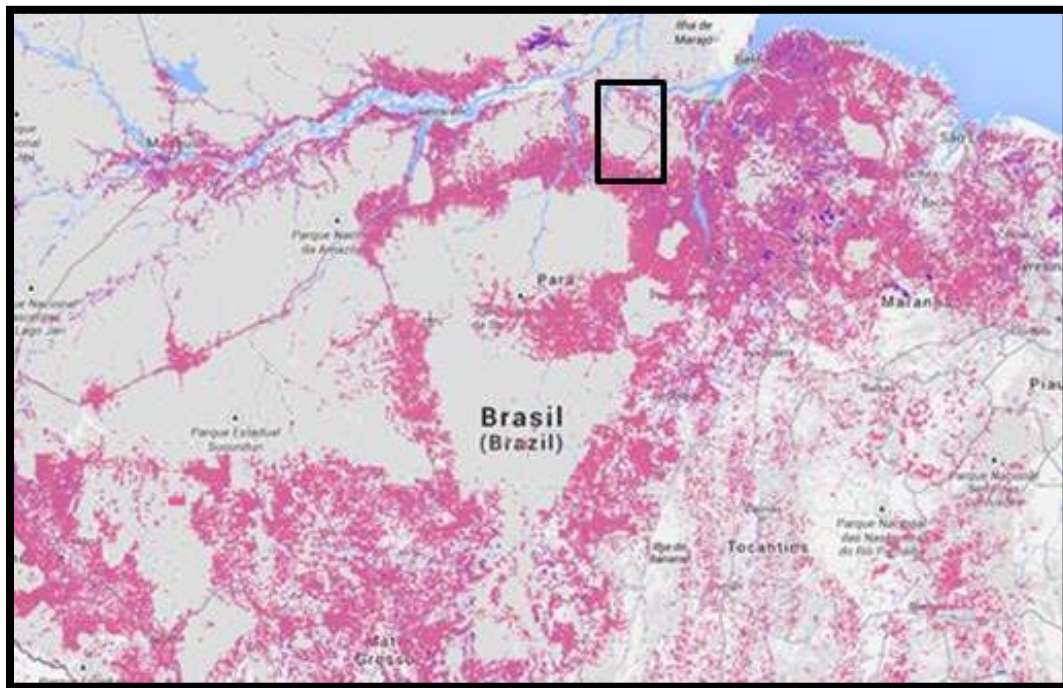
2° 0'43.77"S 51° 8'56.24"W

2°39'58.80"S 51°22'21.97"W

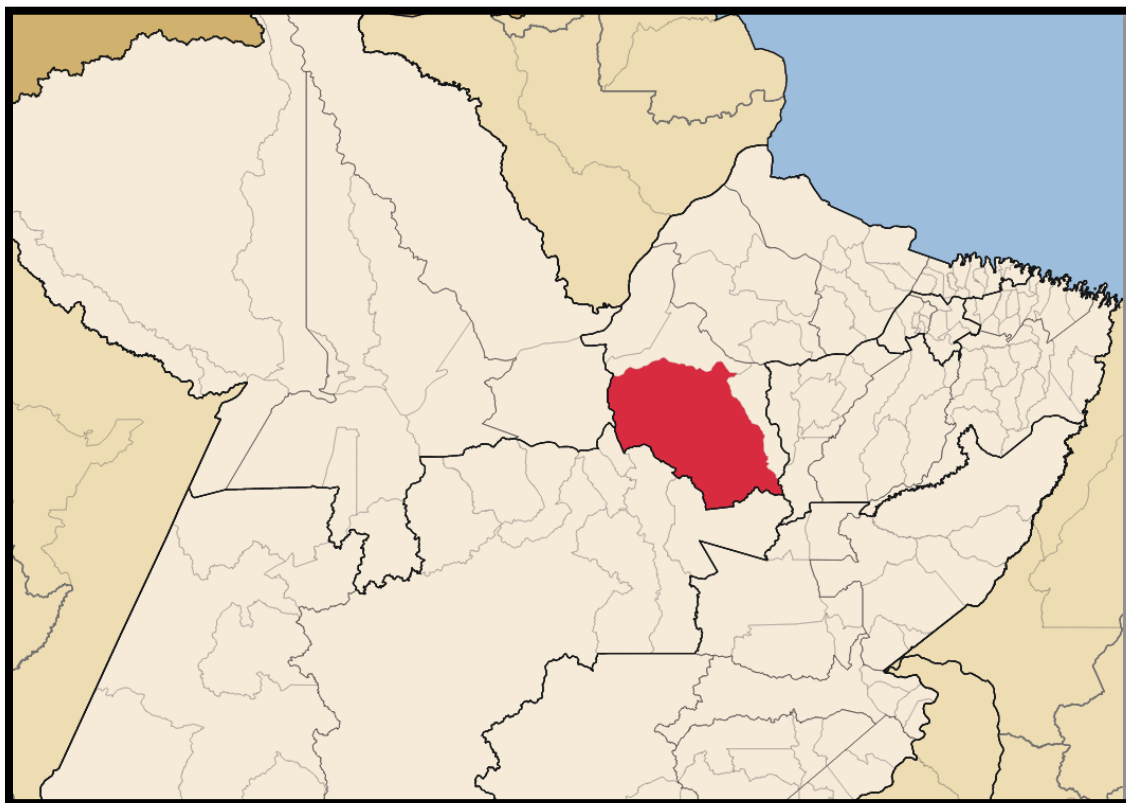
Map 1: Project location in Brazil



Map 2: Project Location in relation to General deforestation in the Amazon

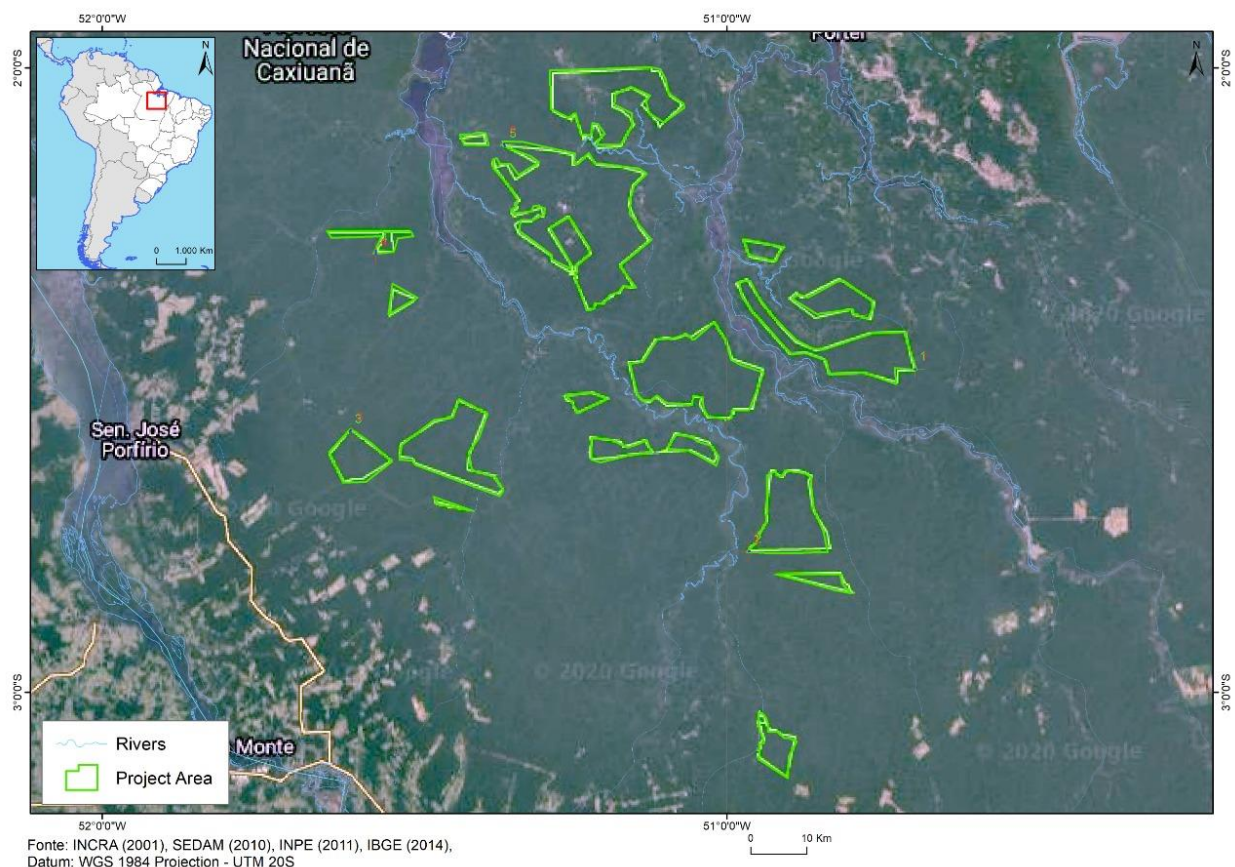


Map 3: The Municipality of the Project Location in the Amazon



Map 4: Project physical boundaries

165,707 hectares



Project Area

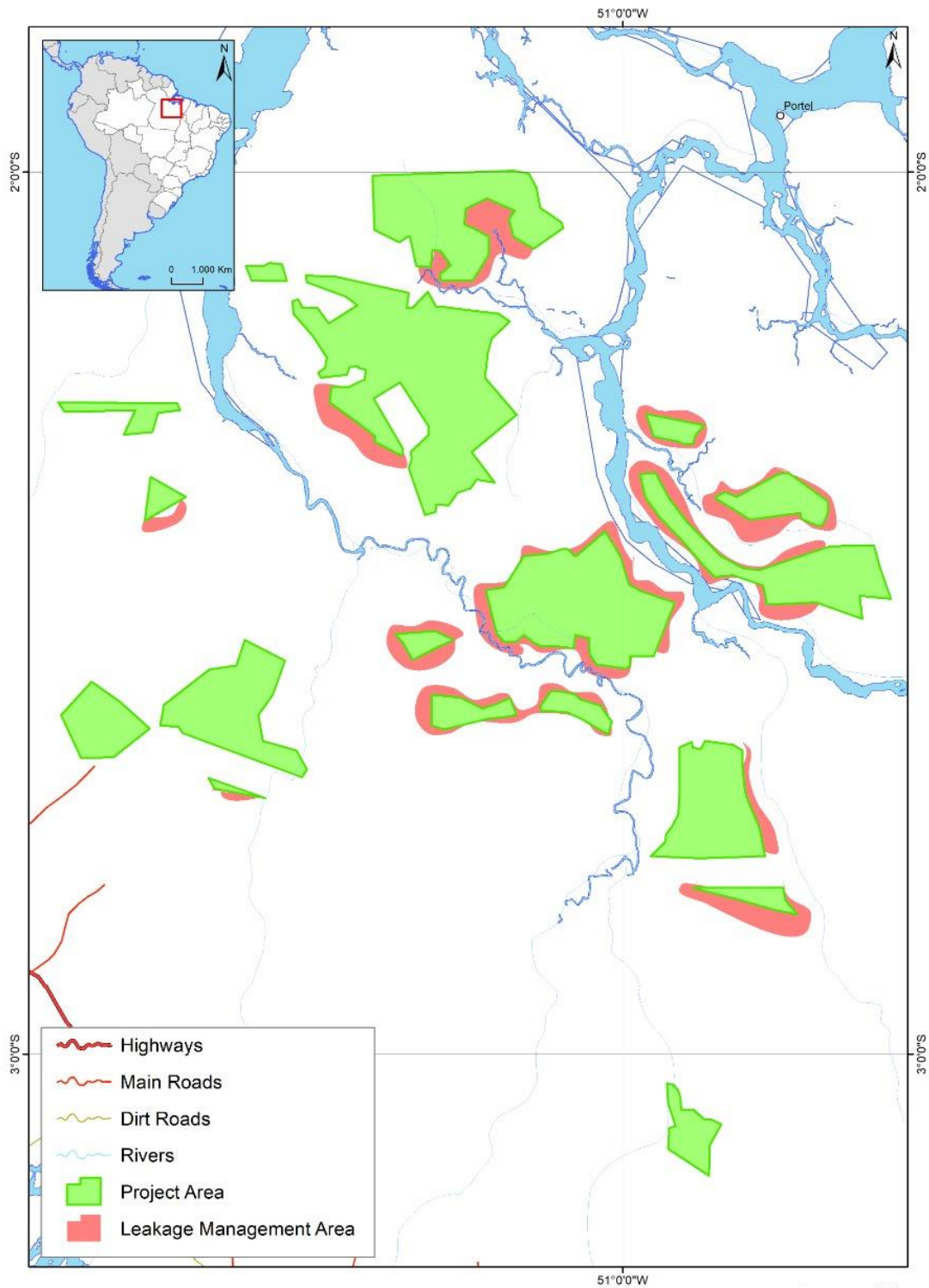
The Project Boundary has an area of 165,707 ha and it is constituted by 36 individual titled properties that contain forest and non-forest land. The forested land within the Project's Boundary constitutes the Project Area. With all the Riverine peoples properties identified as neighboring the project making up the Leakage Management Area (LMA), this results in 16,503 ha. The Project Boundary (Map 4), leakage belt (Map 5) and Reference Region for Deforestation (RRD) are shown in Map 6.

Leakage Management Area – 16,503 hectares in yellow, along the border of the project area.

The projects leakage management areas is based on non-owned properties occupied by Riverine people along the shore. The leakage management area is nearly size of the project,

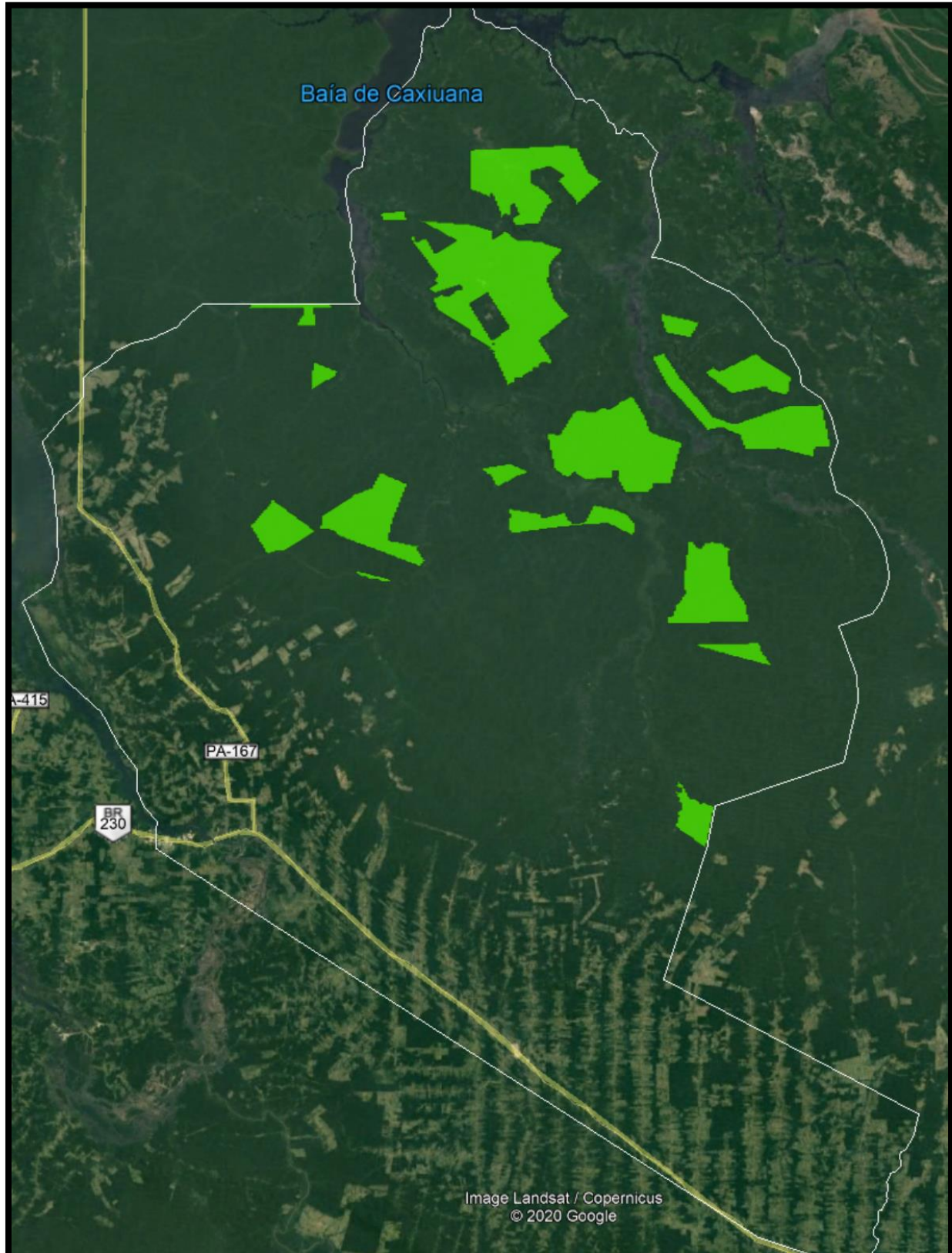
as the goal of the project is to bring stability to the region by bringing land tenure to the –non-owned land in the region. The hope is by 2021 all LMA will be titled for the riverine people.

Map 5: Project physical Boundary and Project Leakage Management Area



Fonte: INCRA (2001), SEDAM (2010), INPE (2011), IBGE (2014),
Datum: WGS 1984 Projection - UTM 20S

Map 6: Reference Region 1,991,227 ha

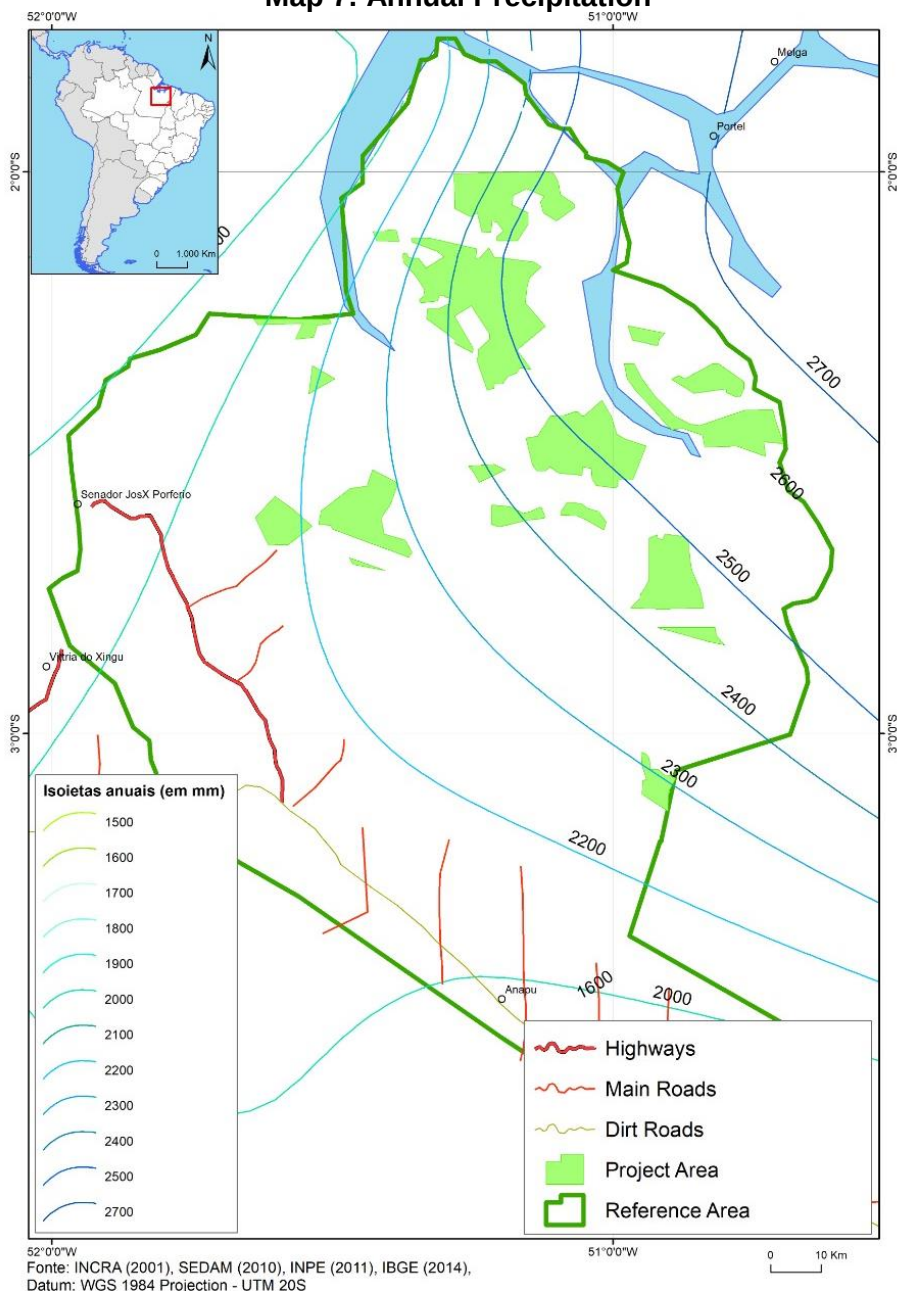


2. Basic Physical Parameters

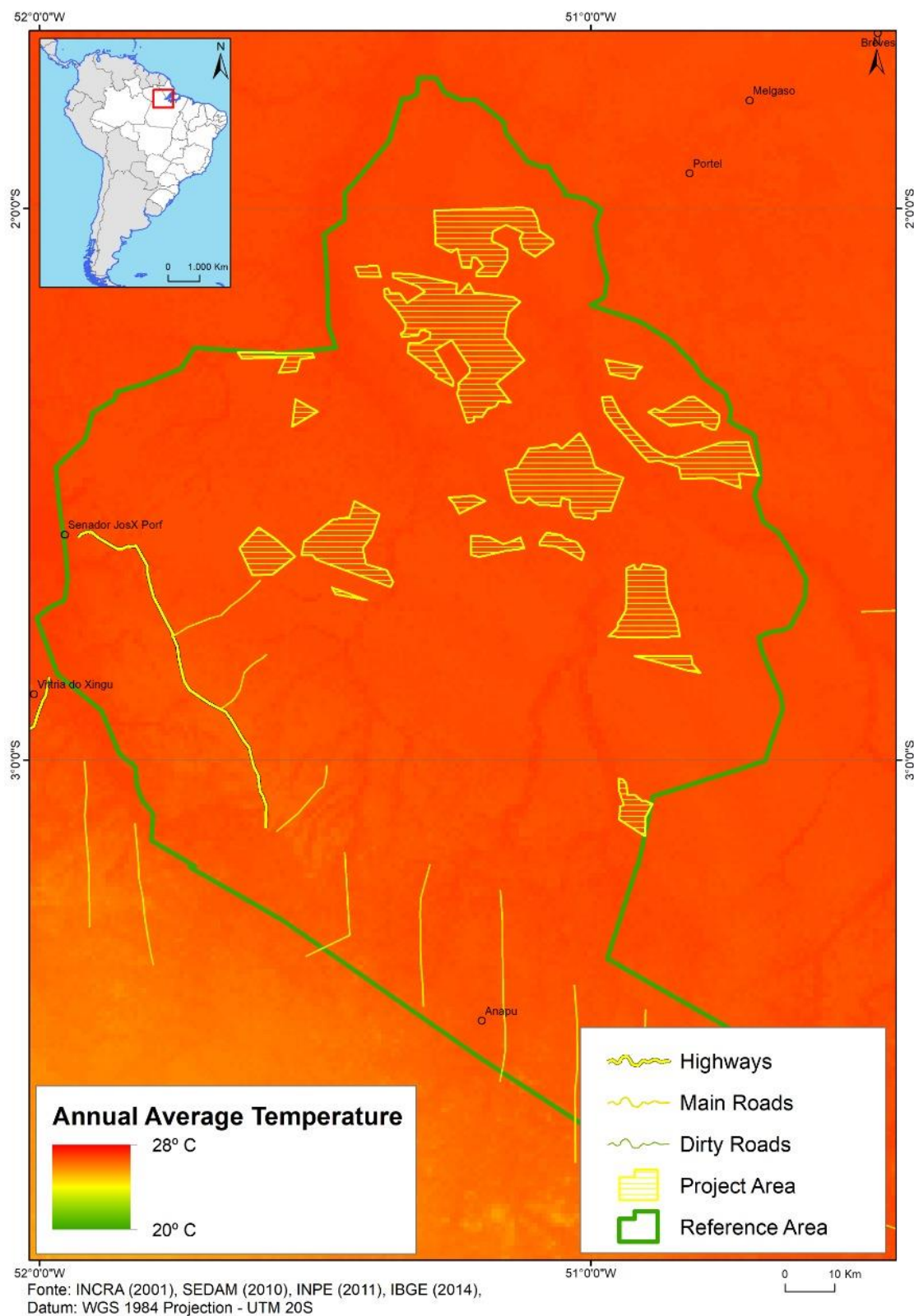
Climate

Climate in the Marajó region, as it is in the great Amazon region, is tropical rainy. The average annual temperature is never above 27 degrees Celsius and rainfall ranges between 2,800 and 3,400 mm with relative humidity 85%. Rain is concentrated during six months between January and June. The summer is dry with sparse rain from August to December. It is a humid tropical climate with 350mm of precipitation in April and 60mm in October. The rainiest season is between February and April while the driest months are August, September and October (annual precipitation 2.200mm).

Map 7: Annual Precipitation



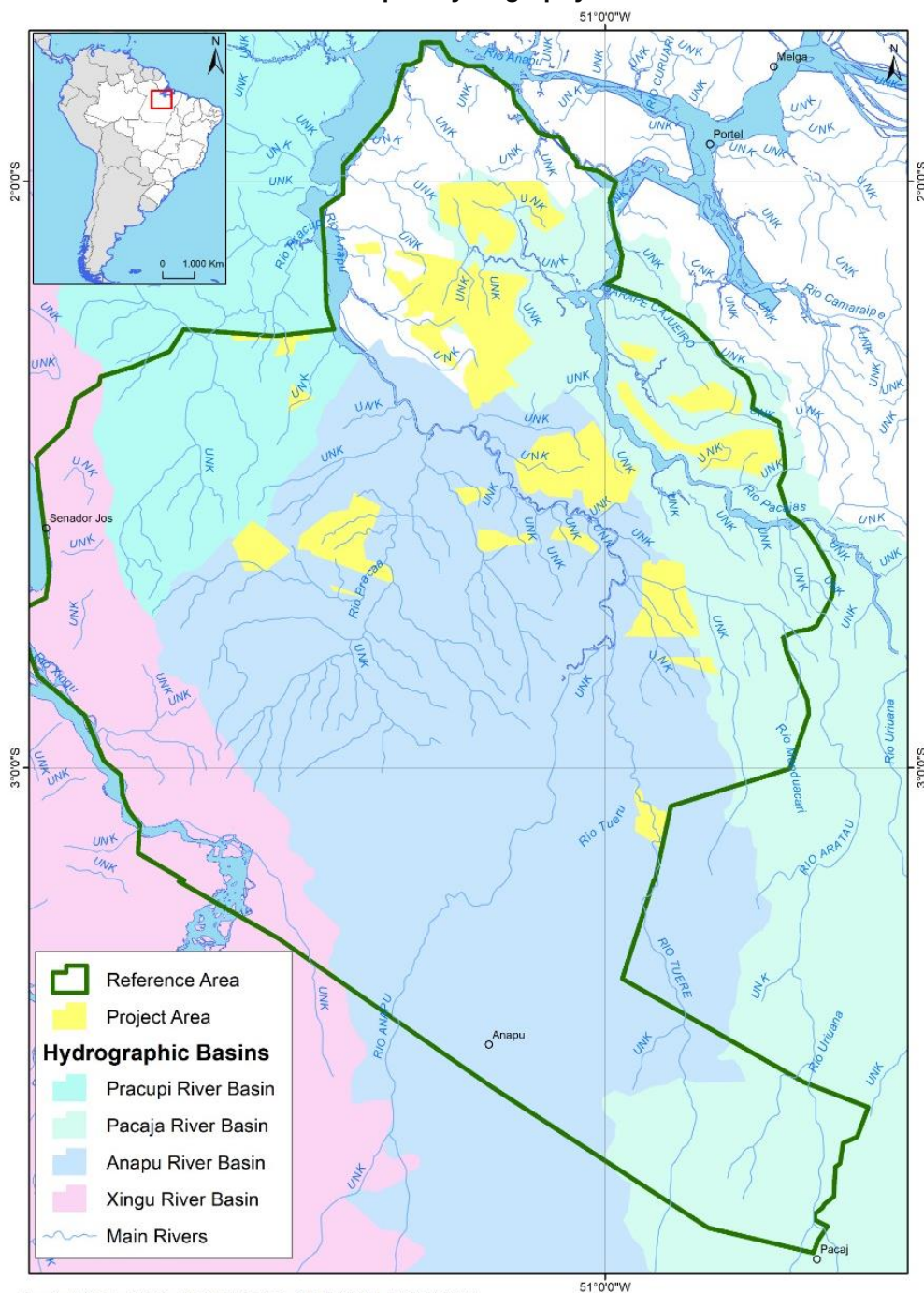
Map 8: Annual Temperature



Hydrography

This municipality has 3 big rivers that drain the entire region: Anapu River, Pacajá River, and Camairapiri River. They flow from south to north. The Anapu river flows to the Pracui bay and Caxiuana bay and the major tributaries are: from the right – Marinahu river, Tueré, Mapareua, Mandaquari, Jacaru Puru river and the igarapés: – Itatira, Muirapiranga, Janal, Umarizal, Marapua, Atua and Majua. From the left – Pracuruzinho river, Curio river and Pracupi river, and the igarapés: Carunbé, Itatinguinho, Tatingao, Cocoajá e Tapacú.

Map 9: Hydrography

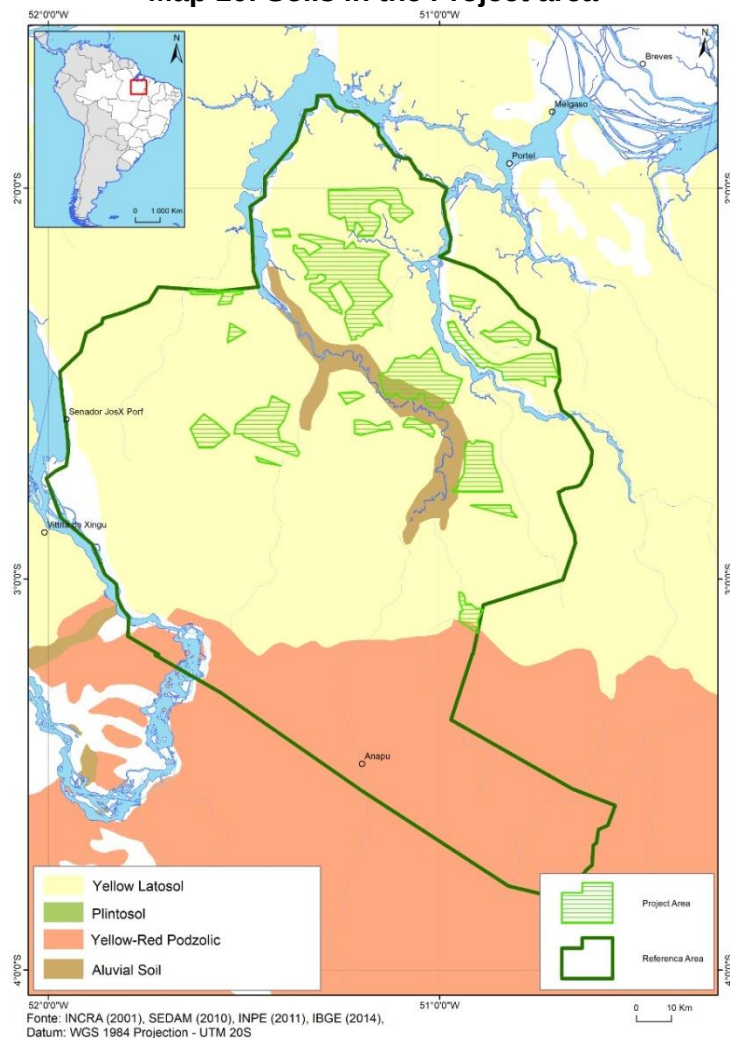


Fonte: INCRA (2001), SEDAM (2010), INPE (2011), IBGE (2014),
Datum: WGS 1984 Projection - UTM 20S

Soils

Soils in the Project Area appear to be mostly Latosol Amarelo, with some Agrisol Amarelo and some minor areas of Neosol Fluvico, according to the Brazilian System of Soil Classification (EMBRAPA 1998). Soils in the Project Area and its surroundings are showed in the map below. Latossolo Amarelos contain clay B-horizon with a range from 15% to over 60%. It is possible to define a sort of intermediate texture of the soil (15% to 35% of clay), clay (35% to 60% of clay) and other clay (more than 60% of clay). With reference to land use possibilities, Rodrigues et al. (2003) mentions that Oxisols, due to their chemical characteristics unfavorable for agricultural activities, requires correction, especially in relation to high acidity and high aluminum content. The application of lime and chemical and organic fertilizers easily correct these limiting characteristics in order to increase concentration and retention capacity of soil nutrients. Soils in the Project Area are showed below in Map 6.

Map 10: Soils in the Project area

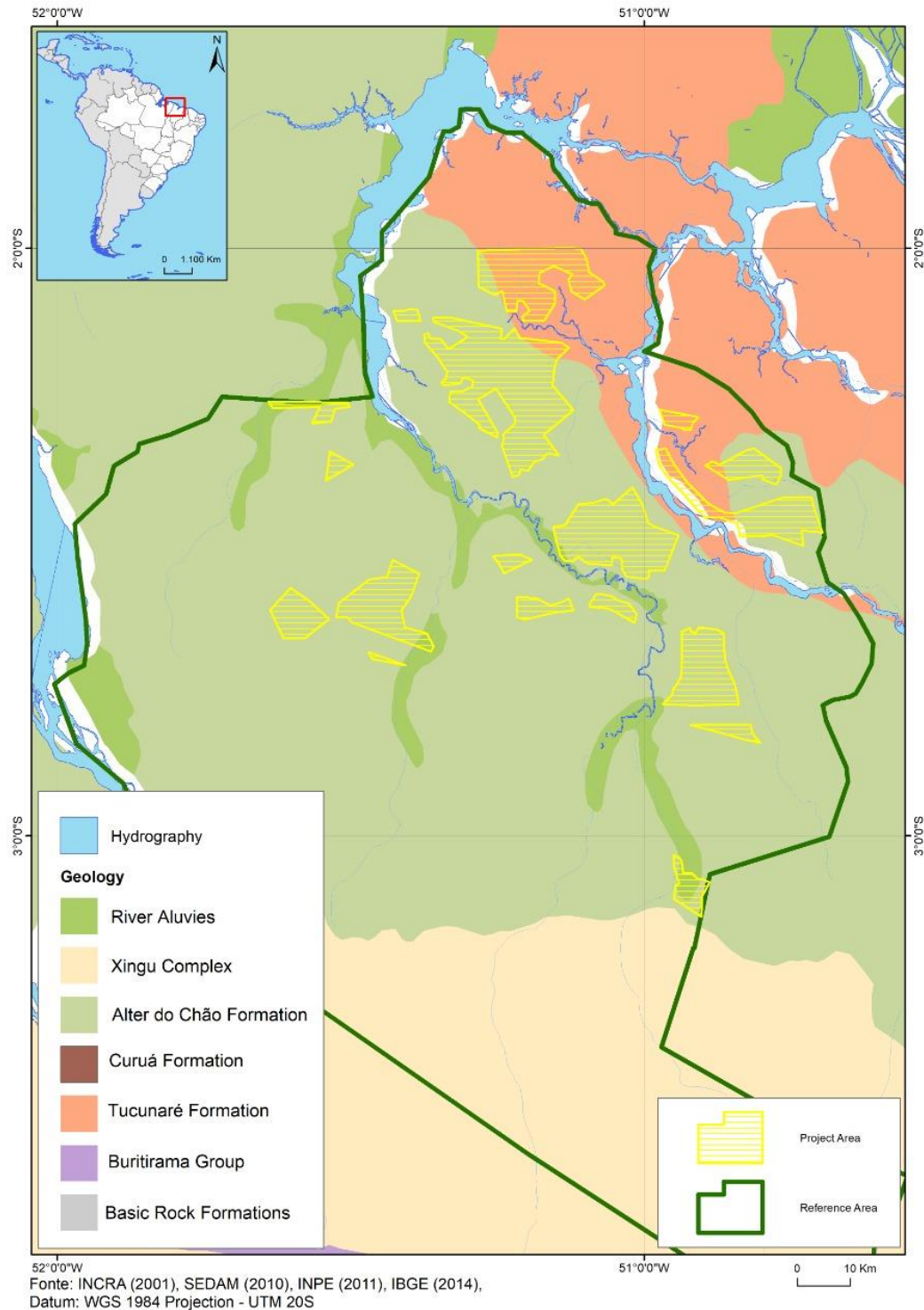


These source rocks of the sandy-argillic and argillic-sandy soils are with concretions over which Yellow Latossolos, Argissolos amarelos and Plintossolos Petricos are developed. On these rocks predominate reliefs of ramps and hills. Fluvial deposits, fluvio-lacustrine and estuarine: these Quaternary deposits are associated with the basin of the Tocantins River, whose deposition formed large alluvial subject to tidal action. These unconsolidated deposits consist of fine sand, silt, clay and gravel, which develop sandy-argillic soils.

Geology

Geologic formations for the project area belong almost entirely to one single class Formacao Alter do Chao with some areas with Tucunare formations and a little of Fluvial alluvium. Geologic formations in the project area are shown below in Map 7:

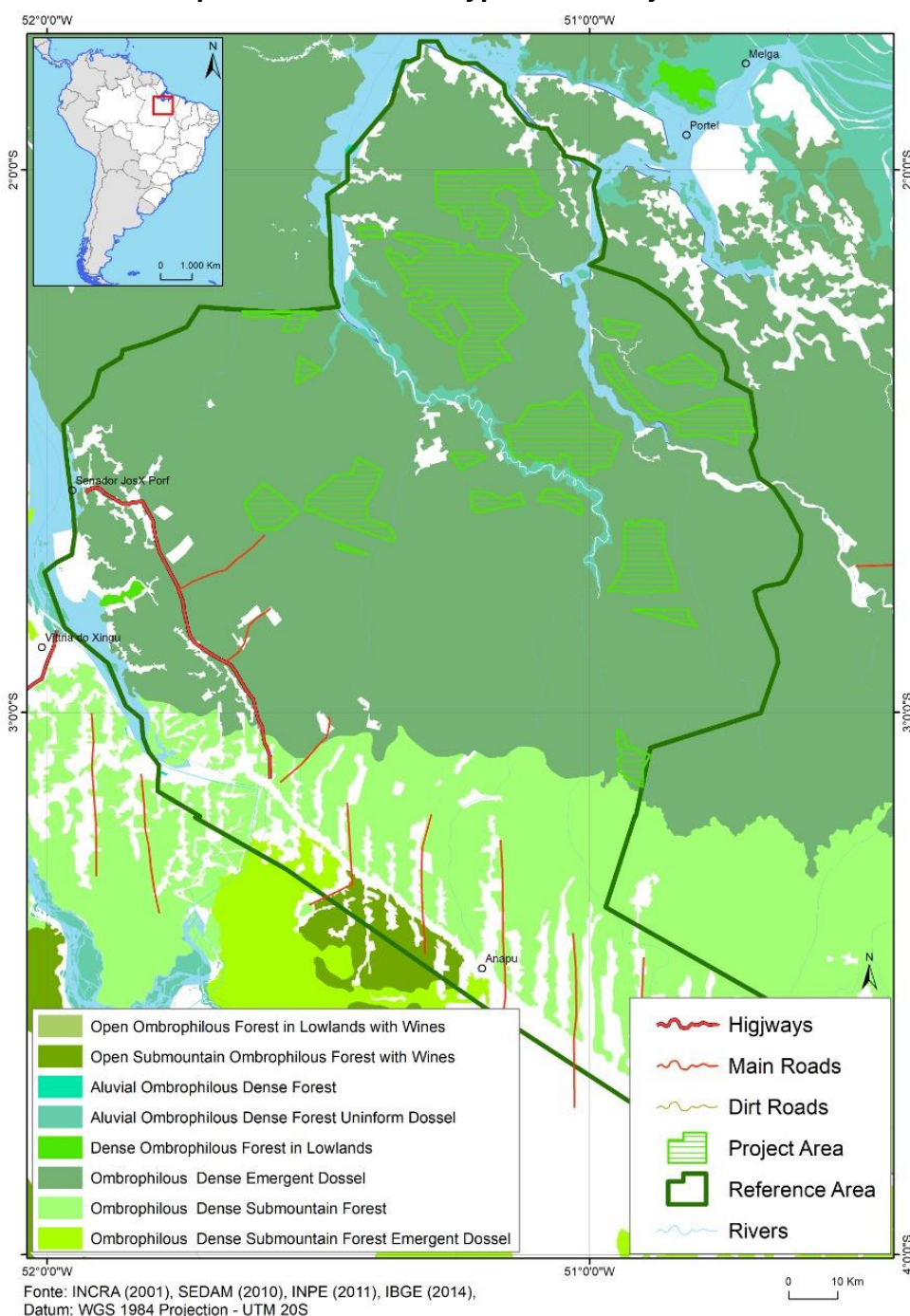
Map 11: Geology in the Project area



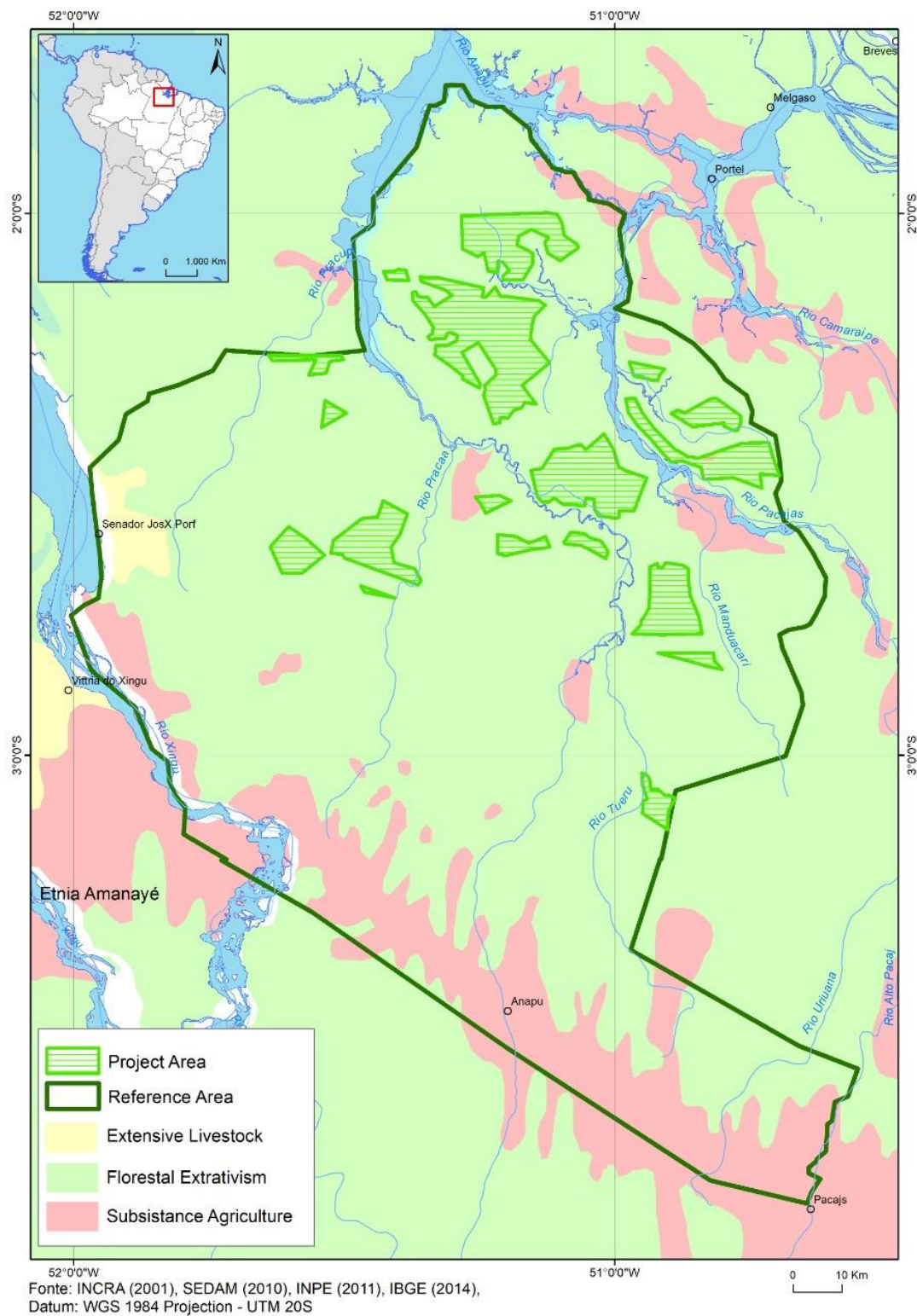
Land Use

Most of the project boundary is constituted by primary and secondary ombrofile dense forest with very small patches of human activity. These small patches constitute small-scale cassava agriculture (conducted by riverine people using slash and burn technique). From a social assessment conducted by Anapu-Pacaja there is now a conversion taking place with the current presidential administration to expand sustenance farming to higher use farming.

Map 12: Forest Cover Type in the Project Area



Map 13: Land Use in the Project area



Indicate the project location and geographic boundaries (if applicable) including a set of geodetic coordinates. Coordinates must also be submitted separately as a KML file.

Provide a summary description of the basic physical parameters of the project. These may include, but are not limited to, the following:

- *Topography (slope, aspect, geological features, etc.).*
- *Soil (mineral, organic, arable, upland, etc.).*
- *Climate (including temperature, rainfall and seasonality).*
- *Hydrology.*
- *Types of vegetation (providing, at minimum, estimates of the area of land under different management types).*

2.1.6 Social Parameters (G1.3)

From June 5, 2012 through January 2016 the only activity implemented by the Project has been monitoring and enforcement to remove squatters and illegal loggers. Although some interaction with local households took place, it was with the sole purpose of spreading the word about the Project's Boundary being private lands. According to the information provided by the landowner the approximate number of riverine people contacted in this pre-project time frame were only random contacts in order for security personal to stay at their houses while they did patrols.

Given the fact that monitoring activities from 2012 until 2016 didn't involve or affect households, the Project has not conducted a Free, Prior and Informed Consent (FPIC) process prior to January 2016. It is only in 2016 that an initial Participatory Rural Appraisal (PRA) takes place when the Project contemplates the opportunity to implement activities with local households, to improve local livelihoods, and to scale-up forest surveillance. It is from the information of this PRA that the Project conducted a census and a FPIC process, which was completed before the first verification process.

Prior to July 1, 2016, Participatory Rural Appraisals (PRAs) were conducted in the area constituted by the Project's Boundary and a 15 km buffer in populated area to gather socio-economic information. All the information presented in this section is derived from such study. It should be remarked that the Project couldn't find available official demographic and socio-economic information at the household level for the sampled area so it was necessary to conduct an exploratory fieldwork to gather as much information as possible from primary sources. It is worth mention that the Project's limited economic resources and time availability neither allowed to identify nor to perform a census of all the households within the sampled area. As a result, surveyed householders were resulted in 127 households visited with an additional 140 households that were contacted, and preliminary meetings and communication occurred with a planned follow on visit to gain specific data so the project can insert the CAR for each of these families.

The Project conducted a thorough census in the Project's Boundary and Leakage Belt to identify all affected households and to geo-reference active and resting agricultural plots. This census already took place by July 2016.

Census Protocol

Intervention area:

The total area of the project has an extension of 165,707 ha located between the Anapú and Pacajá rivers in the municipality of Portel, State of Pará in Brazil.

The intervention area has settlements called “riverine households” which are made up of 3 to 13 homes. Such population share common settlement characteristics, economic activities and livelihoods, fairly adapted to the existent conditions. The social baseline study has not identified indigenous peoples dwelling in the project area. Funai the federal indigenous agency has clarified there are no indigenous people in the area and no reserves in the area.

20 years ago the local Riverine people have confirmed that “homeless” indigenous peoples” have arrived in the region looking for a new home after their previous home was destroyed, but FUNAI removed the indigenous and placed them on a reserve.

General Achieved Objective

The project completed a census in the intervention area. The Project to obtain definite and total information about the reality of the territory and the populations settled in the LMA in order to implement the strategies and indicators to be followed in the monitoring plan, upon approval by the populations through a process of Free prior and informed consent (FPIC).

Specific Objectives

1. Share with local riverine the results of the PRA developed by Anapu-Pacaja and the proposed Project's activities. Such information has been assessed and potential impacts and benefits to local livelihoods have been identified in a participatory approach with local households. These participatory evaluations have constituted the base information for a Free, Prior, and Informed Consent assessment of the Project by local riverine living in the Leakage Management Area.
2. Participatory construction of social and environmental indicators for a Social Monitoring System of the impacts of the project in the quality of life of the population.
3. The project has obtained, update and systematize socio-economic and organizational information of all the riverine population in the project area.
4. The project has obtained spatial information and maps the natural resources extraction areas, crops and the settler's territories.

Methodological proposal

Selection of the technical and professional staff for the development of the activities

Anapu-Pacaja has directed the execution of all the activities through its local specialists who are in charge of the designing a definite methodological proposal for this work, selecting the technical staff, work functions distribution and the initial follow-up of the field work.

The project has a team of local professional technicians trained as survey engineers with experience in conducting rural workshops, land survey and communitarian management. The

PP, through its social teams, have completed social related field activities, establish contact and negotiation with local leaders, carry out interviews with key informal actors from the community and completed community meetings in each household.

The social teams included field technicians, who were properly trained for the collection of relevant information through surveys, obtaining geographical information and assist the personnel in the workshops and assemblies with the population.

Logistics and work distribution

The PP supervised one team of 6 technicians, 1 cook, 2 security personal and support staff on one large boat to complete the fieldwork throughout the Anapu and Pacajá rivers. Three anthropologists were on the team as well for 1 month as well as a support staff who was a non-professional photographer to record the operation and take a picture of each house with each family standing in front of the house in order to provide a photo so that future teams can properly identify a name with a face.

The work was 7 to 10 days (or when the fuel on the boat was running low) to visit for each locality depending of the location, the household distribution and the amount of households. The total time it took to complete workshops and follow up meetings was 90 days of field work, including back and forth time and re-supply times. The activities for each locality were distributed as follows (Table 3):

Table 3: Census activities

Day	Activity	Brief description
Day 0	Inform the communal authorities about the visit	Two days before the visits to each locality, one team formed with each team leaders has informed the communal authorities about the project activities and visits, ask for their consent to carry out the project and request the support to the planned activities from the dwellers in each locality. This is conducted by Sergio/ Camerao, who alert to the specific household that the team is coming.
Day 1, day 2 and day 3	Informative assembly to inform about the details of the project and PRA results. Participatory assessment of the project activities and the impacts in involved households.	One assembly with the population was carried out in order to inform about the details of the project. A simplified and short version of the PD in Portuguese was distributed and explained for those who cannot read. Such version was being developed in a simplified language without leaving out any important details. Project activities were assessed jointly with the

	Request free, prior and informed consent to implement the project. Workshop for planning of activities and the construction of social and environmental indicators	households and a participatory evaluation was carried out in order to know local perceptions. Comments were collected and used to improve/adapt the activities to local expectations The project has developed a Free prior and informed consent –FPIC (see section G.5.3.) protocol in order to promote awareness and participation in the decision-making processes and avoid future possible setbacks with the population. Once FPIC is obtained, one workshop was carried out to detail and plan several activities and also determine the participation of the population. The indicators to monitor the benefits of the projects were constructed in a participatory manner.
Day 4, day 5 and day 6	Community census and mapping	The census and surveys, agricultural parcels mapping, natural resources extractive areas and the community territory determination were carried out.

Specific Objective 1.- Share with local Riverine the results of the PRA developed by the PP and the proposed Project's activities. Such information has been assessed and potential impacts and benefits to local livelihoods have been identified in a participatory approach with local households. Such participatory evaluation has constituted the base information for a Free, Prior, and Informed Consent assessment of the Project by local riverine living in the Leakage Management Area.

The communitarian representatives/leaders have been asked to support a communal assembly where the results of the Social Study and the Participatory Rural Diagnosis, carried out prior to July 2016, were presented. For this purpose, a simplified version of the PD has been distributed and explained for those who cannot read. This simplified version of the PD as well as the presentation has been done in Portuguese, in a friendly format and in an easy-to-understand language. Also, flipcharts with didactic images have been used, always looking to account for the particularities of the local reality of each household.

Picture 1: Assembly Meeting



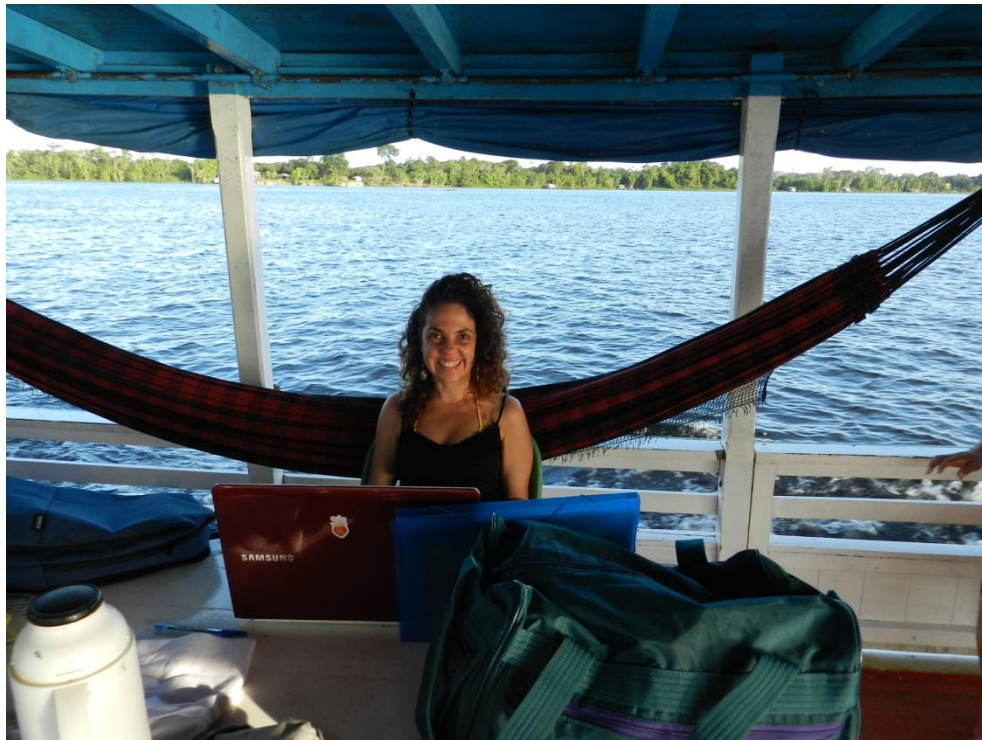
Picture 2: Assembly Meeting



Picture 3: Two Security, Two anthropologist and 3 of the Technicians and the local cook



Picture 4: Lead Anthropologist



Afterwards, the Project's activities have been presented and assessed in a participatory approach with each riverine person identifying the potential impacts and options to mitigate them. All the feedback from these participatory workshops has been recorded. There were no negative impacts discovered in the one-on-one meeting besides a concern by the households of actual follow-thru. As told by most households: NGO's show up and never come back again, thus making some community member skeptical of all outsiders. This concern was remedied by setting expectations low, thus any and all future benefits are better than the original expectation.

The project has asked for the population conformity on the planned activities and their free, prior and informed consent to implement the project. All those that participated in the Project's activity signed a document that states that they received all appropriate information about the Project and that they have participated in a participatory rural appraisal to identify impacts and mitigation activities.

Later, the representatives were invited to the workshop or one on one meeting designed to plan the project activities and construct the social-environmental indicators for the social monitoring of the project.

Picture 5: with Riverine person filling out the receipt



Specific Objective 2. - Participatory construction of social-environmental indicators for the social monitoring system of the impacts of the project over the quality of life of the population.

One workshop carried out to detail and plan the activities related to the participatory census and determine the participation modality of the settlers according to their level of specific knowledge in order to accompany the project technicians.

Afterwards, the Project team worked with the population on the construction of social environmental indicators that are easy to understand and manage to them, allowing an

assessment of the impacts of the project about the quality of life of the community and the establishment of a monitoring system to measure the benefits for the project. These indicators were included in the social monitoring plan.

Specific Objective 3. - Census, systematization and updating of the social-economic and organizational information.

Picture 6: The project's six primary technicians who consistently stay out in the project area. Starting in May 2020 the technicians increase to 8 technicians.



The households participating of the activities in each location were identified based on if they had a house or physical shelter in the LMA area, and several visits were carried out in the totality of households in which the surveys were taken place with the head of the family or and elder.

All the surveys applied were organized and completed by the end of the work day in each locality.

The information was uploaded in a database in SPSS by the end of the field work and was systematized in a final report of the indicators that did allow measuring the impacts of the project in the population during its implementation.

Specific Objective 4 - To collect spatial information and mapping agricultural parcels, relevant areas intervened by the population and the territories occupied by riverine.

The areas utilized by the population were identified in a workshop, based on the maps elaborated by PRA and/or satellite images provided by the project. Geo-reference activities of the total amount of agricultural parcels were carried out in order to know the areas being used, the ones being prepared and the lands that have been abandoned in the previous year. Likewise, the limits indicated in reference to the area utilized by each community and other relevant areas for the project and the population was identified.

The riverine people did accompany the mapping activities carried out by the project specialists were selected in a workshop in accordance to their knowledge over the territory.

These people were trained in the use of GPS technology and registration templates filling in order to support the technicians in the activities of geo-referencing relevant land spots.

Agricultural parcels were identified for each dweller, were also be geo-referenced to the center of each parcel, data were collected (according to local terminology and/or estimation in meters), cultivated species, agricultural technologies and productive timeframes.

The natural resources areas exploited by the riverine were identified in the workshops and several spots in specific locations, or relevant to the project, were taken if possible.

Likewise, the communitarian territory, the area indicated to be occupied by the riverine were mapped.

All the information collected in regards to households, households and parcel locations were geo-referenced. Pioneer roads and pathways in the project zone were collected.

Isolated households

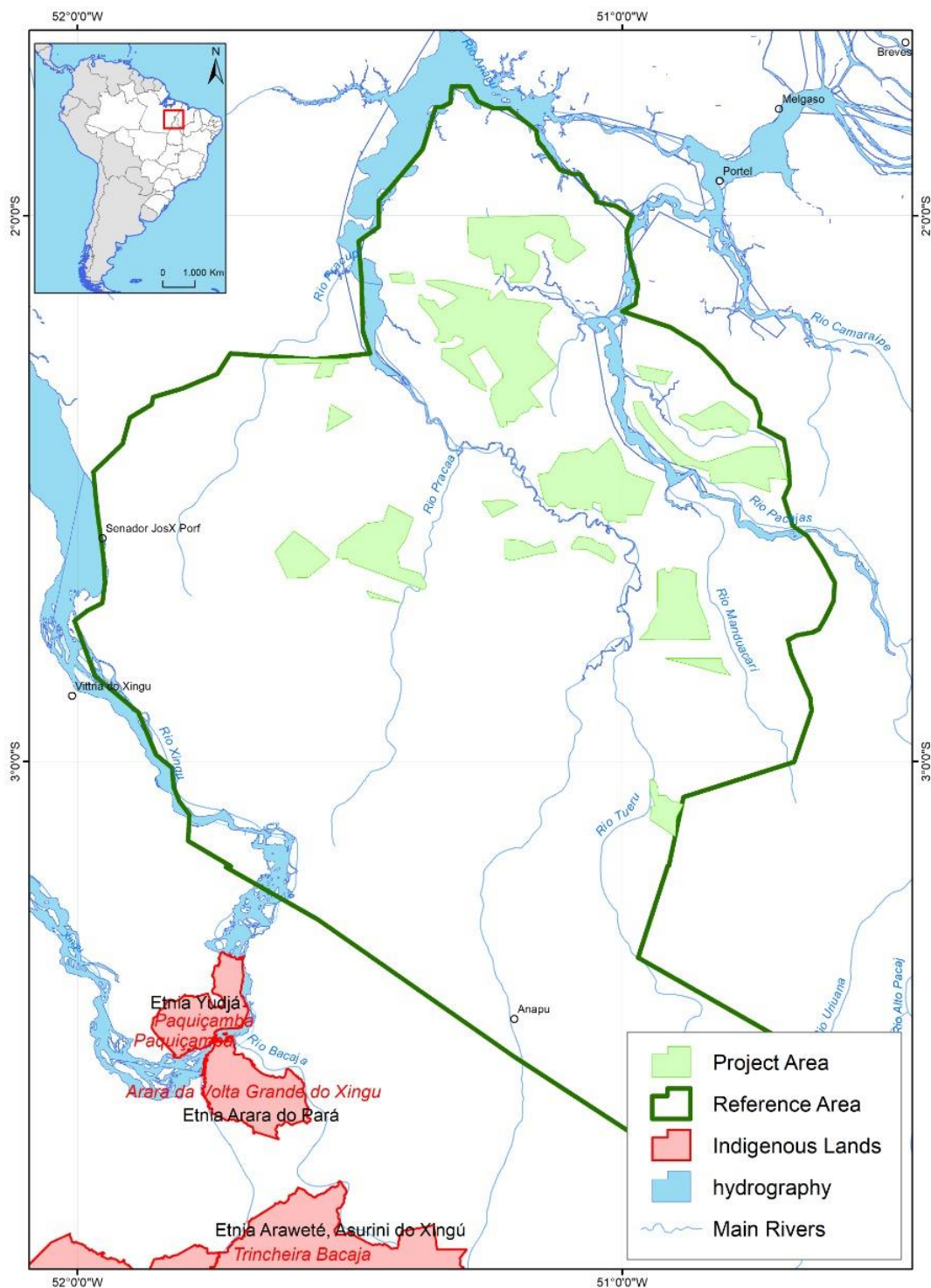
There were no isolated households as the project team went to each point, no matter how remote using a motorized canoe known as a rabeta.

It is important to remark that the definite census protocol were defined after the validation of the project and included an extensive development of each one of the activities, protocols, annexes, formats and tools to be used as well as the designation of the direct responsible people for the activities and results.

Indigenous People in the Project Area or LMA

As for indigenous groups, according to official information from FUNAI (FUNAI 2012) indigenous lands recognized by FUNAI are not present in the Project's Boundary or Leakage Belt (see Map 11). Therefore, the project did not involve or affect indigenous people.

Map 14: Indigenous Lands near the Project's Area and RRD according to official FUNAI database



Based on official information from FUNAI available at <http://mapas.funai.gov.br/>

The smallest administrative unit at which population information can be found is at sector scale, which is smaller than municipalities but still broad divisions of the territory. Sectors are smaller administrative units known by ID codes designated by IBGE.

Population in the project zone is completely rural (the only urban center is in Portel city, capital of the micro region of Portel). Population in the micro region of Portel is classified as belonging to sectors. Sectors have been defined as registry units by the 2010 census (IBGE 2011).

Figure 1 showing: IBGE as 52,172 family members for the municipality.

População

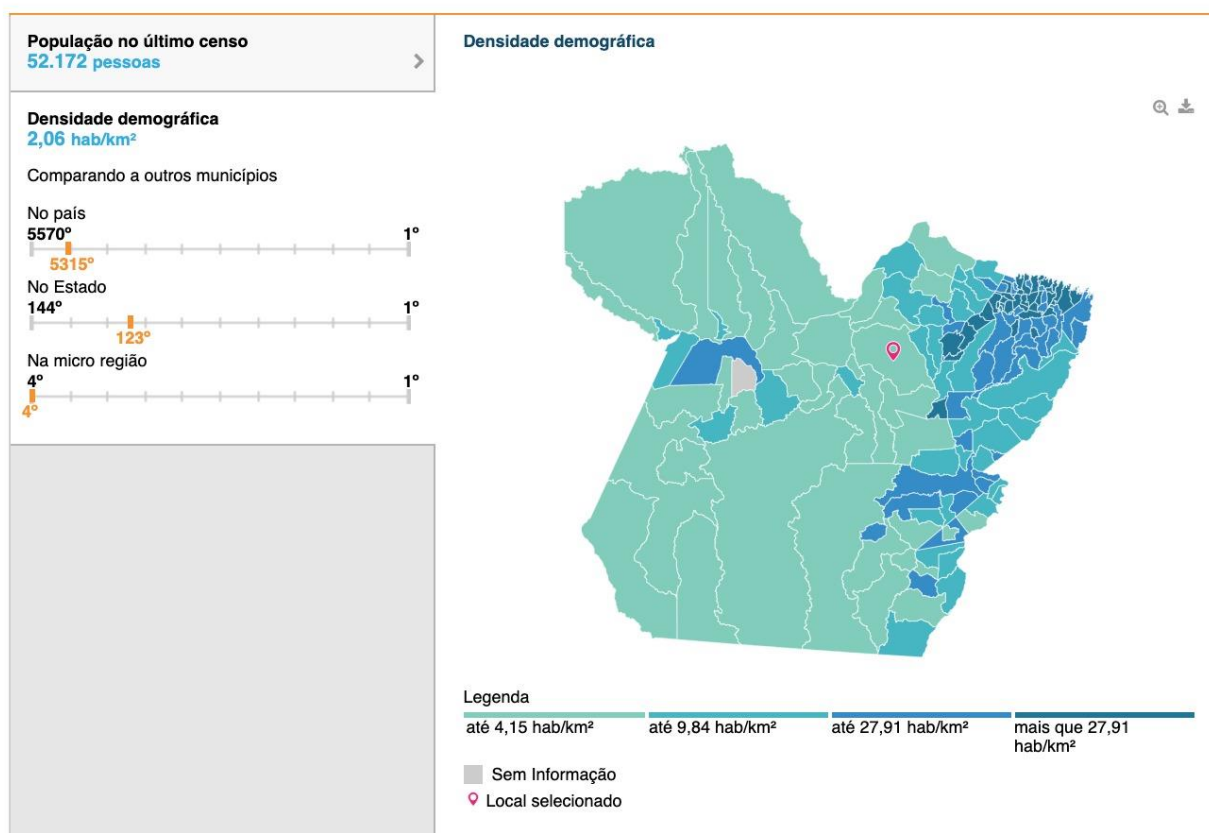
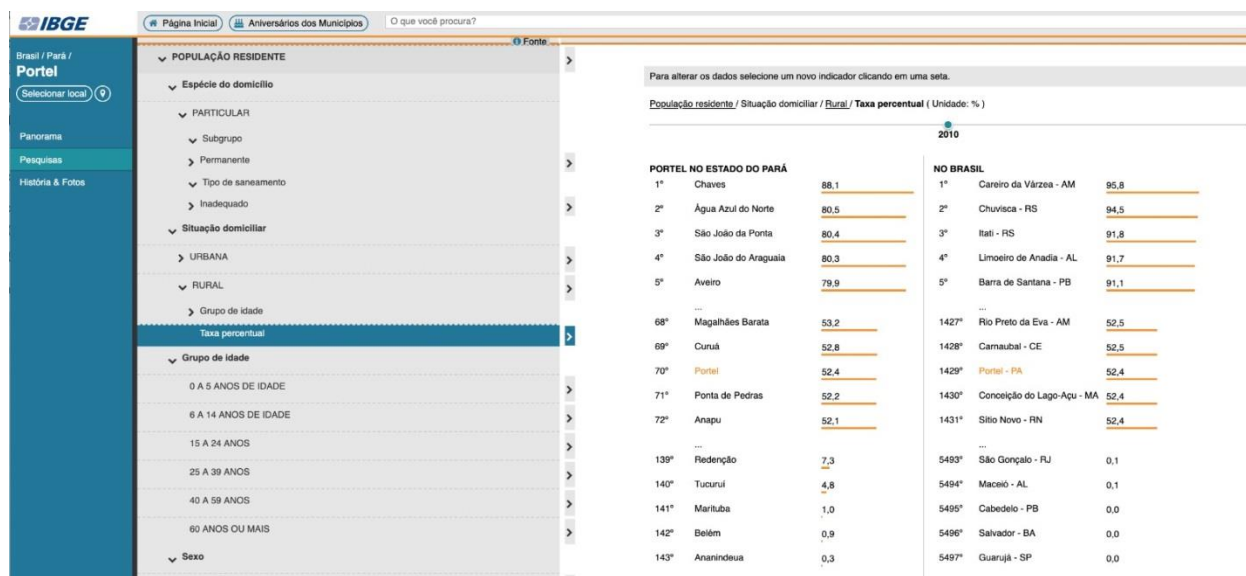


Figure 2: showing 52.5% of the population is rural population.



Population for the municipality is 27,320 for rural areas. The area of the project is further from the city, resulting in a lower average population, with approximate 127 families, resulting about 400 individuals living directly next to the project area,

Impacted population is distributed along Anapu and part of Pacaja rivers.

Picture 7: House Hold Structure of Riverine



Picture 8: Riverine House and family



Picture 9: Riverine House and Large family with 9 children



Picture 10: Riverine House

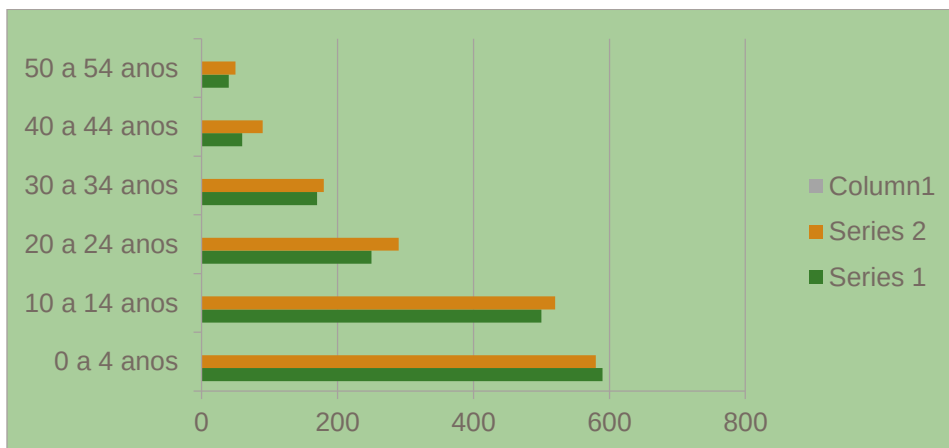


Stakeholders involved by the Project are those living in the LMA which is located around the Project Area, in an area that is between the river shore and the project area, which typically range from 1 to 3 km to the project area boundary. Total population in this area is approximately 400 people having a demographic density of 1.5 person/Km² according to the latest demographic census at sectors level (IBGE 2011). With 193 people targeted between 2016 and 2020 for initial cook stove and land tenure actives. All houses have been met with for one-on-one meetings.

Population by gender and age group. The gender distribution by sectors in the project area is 52.7% males and 47.3% females.

The population pyramid has a wide base (especially women). This is explained by an absence of young people caused by a migration from rural areas to urban centers to assist to school (mainly to Portel city).

Figure 3: People by age groups

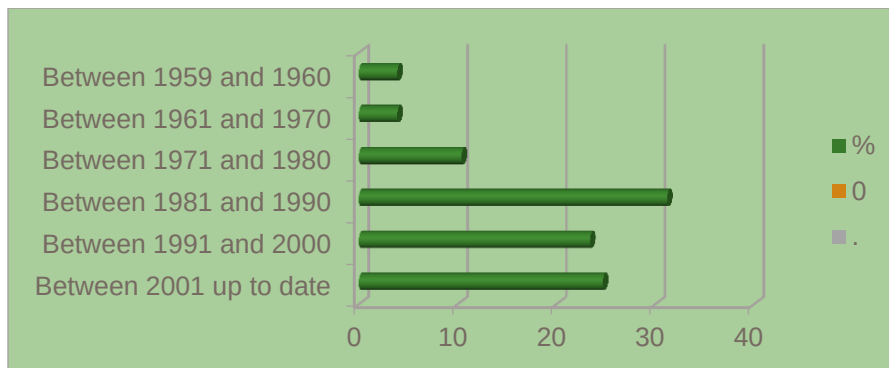


Generally speaking, households are composed by few households (between 1 to 13 agglomerate houses) with an average of 4 people each. With neighboring houses of the same family next door. Rarely is a neighboring house of non-family relations.

From the total population, it was decided to treat each household individually, in order to force the project to have closer relations to the specific family and to allow the project to better understand the needs of specific households instead of generalized activities.

There is an increasing trend towards population growth because of immigration to the project area. Occupation of the project area by riverine date from 1950, showing an increment in population from 1971 to 1980 (10.4%) and then increments in each decade from 1980 to 2010 of 31.2%, 23.4% y 24.7% respectively. When asked about emigrating, 81.2% will not do it and 18.8% will.

Figure 4: Year of migration to the area



Local Economy

In the project area, the main economic activity is cassava growing. Cassava is processed and commercialized as farinha in Portel, the price is 50% to 75% less expensive in Portel, than in Belem for the same product, thus commercialize this crop has not brought increases in living standards for the households.

Households perceive income from the following economic activities according to our PRA: 62.1% of households live mainly from agriculture, 18.2% has specialized in farinha production, 4.5% declares to receive money as an a retirement payments from the government and 6.1% receives income from sporadic timber extraction and sale. Lastly nearly all females receive some form of welfare check of approximately USD 100 dollars per month (equivalent)

Now, farinha is produced through a set of steps. These steps are:

a. Cassava growing: Cassava is an annual crop, the first clear cut activities happen in October and planting happens in December, and in some cases where re-planting is necessary, it happens in July. A single plot can be productive for one year or maximum two years, and then is

abandoned to let it rest for three to five years. All the members of a household participate in these activities.

Local stakeholders differentiate two main types of Cassava, the one commonly called Cassava (cultivated and processed to make farinha) and the other called Macaxeira, that is cultivated for direct self-consumption. All farmers surveyed indicate to grow these two species, which are complemented by corn, banana and cane.

Picture 11: Cassava plot processing



Cassava farming requires little investment, inputs and mechanization, which make this activity highly dependent of labor. Operations that require more labor are: planting, weed removal and harvesting. Cassava is a wild and resistant crop that can grow in low fertility soils. In one single plot is common to find Cassava that presents different growing cycles (short, medium and long growing cycles). As Yam, Cassava does not have a defined ripening period thus, after eight months; one can harvest it according to necessity.

Each farmer handles between 2 to 3 fields which are used according to the household labor capacity. Agricultural fields are measured in “brazas” (equivalent to the height of the farmer rising his arm holding a machete; a braza can measure between 2m and 2.5m) and areas are measured in trefas “tarefas” (1 tarefa = 25 brazas x 25 brazas = 2500 to 3900 m²).

b. Farinha processing. Farinha processing starts right after harvesting (farinha quality is strongly correlated to this fact). Processing starts by soaking or washing the Cassava (which is done on the river shores), followed by peeling and shredding it to turn it into starch (which is done in a specific place within the house). The next step is to press the starch to dehydrate it. Then, the dry starch is cooked in an open oven where it's hand-tossed until it reaches the desired point. The final step is packing, for which it's used an empty oilcan as a measurement unit that contains 30 Kg of farinha (Picture 3).

As for the energy required to prepare farinha, for each work day, 6 feixes are used (feixe is the local name for a package of fuel wood and each feixe contains approx. 8kg of fuel wood) which adds for a total of 48 Kg of fuel wood for one farinhada (the process of making farinha) Each farmer makes two farinhadas per week gathering fuel wood.

Most of the farmers collect fuel wood from their own lands without travelling more than 1 Km (31.6%) while others travel up to 3 Km to gather fuel wood (14%). Others (21%) just cover sort distances (150 meters on average). Fuel wood is collected mainly on forests perceived to be under control of the farmer.

Picture 12: Child processing of farinha in the project leakage management Belt



Picture 13: Riverine person processing farinha



According to Ramos (2001), each 1 kg of farinha produces 0,2 kg are coroeira (farinha process wastes that are fed to chickens and ducks) and requires burning 2Kg of fuel wood. In general, a family (4 members) can produce 40 Kg of farinha in one day (8 hours).

c. Farinha commercialization: Some local people in the project leakage management area sell farinha to traders that travel along the river. Other people bring the farinha to Portel, for sale in the local market.

The project brought anthropologists to the project area. A common belief in scientific papers and publications is that the riverine barter one product for another product they do not produce. This was determined to be false in the region of Portel, Para. All riverine grow cassava and thus no one is going to barter cassava for cassava.

The PRA indicates that the monthly income from farinha sale is about 600 Reais that come from selling 20 fardos (packages) of farinha per month (on average 5 fardos per week). Household sale each fardo of 30 kg for 30 Reais. These amounts are variable and depend on market prices and to family production/consumption of farinha.

The second economic activity in the project area is small scale extraction and sale of wood, where households can either work independently and sale wood to larger companies that visit the area or work directly for such companies. One survey carried out in the influence area reveals that 13% of the households incur in timber extraction as a second economic activity.

In the project area, timber extraction was an important activity that was undertaken in most of the households around 5 years ago. This is because of the presence of large timber extraction companies that would employ local households as workers to extract timber giving the lack of qualified work force in the area.

Past timber extraction can be verified in many households by the presence of unpaved roads (locally known as estradas).

Local households in the project area do not have local businesses such as restaurants, lodging facilities, drugstores, etc. The PRA shows that 70.0% of the households do not have a secondary business and that 27.7% of the households considers farinha sale as a lucrative business.

The PRA shows that average monthly income in the project area from agricultural activities is 269.7 Reais (ranging between 60 and 1000 Reais), the average revenue from farinha production is 434.3 Reais (ranging from 90 to 1,200 Reais), and the average revenue from timber extraction is 862.5 Reais ranging between 150 to 1,800 Reais).

The minimum legal salary in Brazil starting in 2020 is 1045 reais per month, thus local households are below the minimum salary line (except when wood sale happens).

The region of Portel is considered one of the poorest municipalities in Brazil. The neighboring municipality of Melgaço is the poorest in Brazil.

Farming Activities

As mentioned before, households in the project area have agriculture as main economic activity and the main crop is Cassava.

Plots are traditionally prepared by slash and burn technique having as final products Capoeiras (cleared lands ready for sowing). This technique includes making fire barriers to prevent uncontrolled forest fires. In order to sow beans, slashes happen in May and to sow Cassava slashed happen in June or July. Slash and burn happens in August and planting start in September. In the case of corn, planting happens in November and December. Many households associate Cassava with Corn crops.

Picture 14 & 15: Slash and burn in two agricultural fields



About agricultural land ownership, only 45.6% of all surveyed farmers indicate they somehow have rights of ownership on their lands. However after further review the rights are pieces of paper that correspond to no government database that the project could be found. All households requested “updated or correct” documents for their land.

Individual agricultural lands have an average extension of 2,923.1 m2, with a medium of

1,000 m². Each land has large extensions of forested areas. In these forests, households do not conduct slash and burn. They would rather conduct slash and burn in to open up small plots rather than sow perennial trees, as these lands are used and abandoned for a period of 4 to 5 years and then re-used.

On average each household has 3 plots, each one of approximately a quarter of a hectare; however in recent years the plots have been growing to be about 1 hectare.

From the total, 79.2% grows Cassava, 1.3 % Corn and 19.5% does not grow anything. This last percentage is related to those who claim to not own land, with a difference of 3.9% corresponding to households that although claiming to own land, do not cultivate anything.

Products to be sold in markets. Primarily Honey, Andiroba oil and Flour from Cassava. Rice is not currently grown in the region and is the main import crop. Thus the project has long term plans to provide equipment for rice growing to eliminate the need for the region to have a regional trade deficit.

Many of the households complement their diet by growing other products in small fenced in gardens. Such products are cabbage, black pepper, sesame seeds, pepper, chili, eggplant, tomatoes, chicory and basil.

It should be pointed out that not a single household in the project area undertakes cattle ranching activities as shown by the surveys and the PRA. The local rural workers syndicate has imposed a rule upon the local population to not have livestock of any type.

Forestry Activities

The PRA shows that most of the households (82.4%) do not claim to be owners of forested land although not owning such lands it does not mean they do not extract timber from it. Most of those who claimed to be owners of forested land do not have titles or any proofs for that matter to support ownership. However the project has paid for this and be doing much more in this regard.

Households in the project area extract timber mostly for self-consumption (raw materials for construction and one or two trees per household per year for sale). They extract timber in areas they claim are under their control or under communal control.

Even when local households do not extract timber at medium or large scales, they do have knowledge and experience on timber extraction, this because of the extractive history that these communities have. For this matter, only 17.6% of the households state they extract timber, being the most extracted species (in order of importance): Acapu, Macaranduba, Cupiuba, Itauba, Piquiá, Sucupira, Guariquara y Tarú (peca). Timber extraction by riverine is not significant at is happens at a subsistence level.

Those who sell timber state they do so out of necessity and their main selling points are the same household (buyers are illegal loggers who buy for cheap and basically rip off the local riverine person).

On the other side, although most of the households do not extract and profit from timber, they do extract and profit from other forest resources such as: Acai (66%) and Brazil nuts (57%) as main products followed by Abacaba (7.3%), Copuazú and Cipó (with 5.6% each) and other

resources (12.1%) such as oxi, piquiá, bacuri, abacaxi, andiroba, buriti, jamoba, miriti, fruits and medicinal plants.

Most of the households collect Brazil nuts for self-consumption (starts in December and ends in March) and for some sporadic sales in Portel. Despite the fact that this product has a good selling price (1 can has a price between 10 to 12 Reais), it is not very common to sell this product due to the high transportation cost to Portel and the lower production costs of bigger producers.

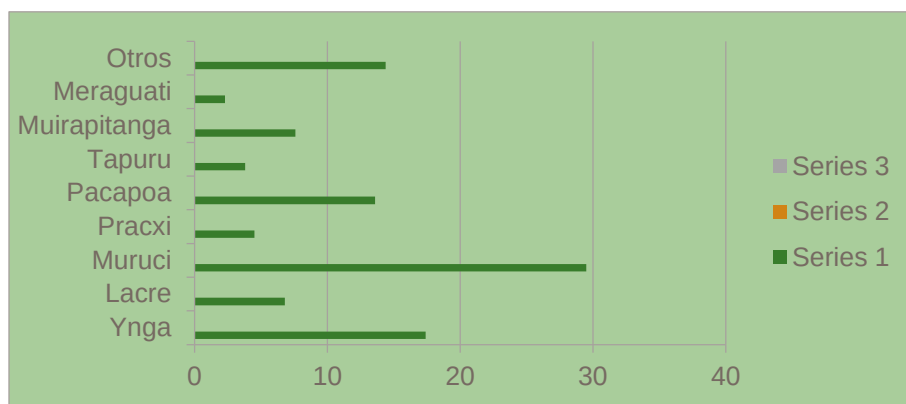
Hunting is an activity that happens intensively and frequently in the forest (on average hunter covers up to 3Km from his household). However, the PRA indicates that nowadays households hunt less because it's harder to find preys because of human intervention such as invasions and logging activities.

The PRA shows that 57% of the households have a high hunting frequency (every day 33.8%; each week 22.1%). About hunting places, those who hunt state that 28.6% hunt in forest of their property, 5.2% hunt in common household areas and 14.3% hunt in other households. All of those who hunt state that they do so only for self-consumption.

Among the hunted species can be found (from the most hunted to the least): tatu (armadillo), the paca (majaz), the venado (deer), the cutia (rodent), the jabuti (turtle) and the porco, catitu, guariba, anta, macaco, námbu, among others. No other species have been identified by the hunters, which may reflect the low availability of fauna in the areas nearby the households.

Firewood comes mainly from residues from the clear cut before applying fire to prepare agricultural plots. Householders only cut trees not related to slash and burn residues only when they run out of biomass to burn, but in general this does not happen. Firewood is used exclusively to produce farinha. According to the PRA firewood is collected by most householders in their agricultural plot (76.7%), in the standing forest in their agricultural land 5.8% and in other people's forested agricultural land 5.6%. It should be remarked that households would not collect firewood from a source farther than 3Km from the river shore.

Figure 5: Wood species used for firewood



Social Organization and cultural identity

All households are agglomerations of small families and are organized according to religious beliefs. Thus, some households can be catholic and others evangelic (in the project area there

are 6 catholic and 3 evangelical households). According to the PRA 80% of the people in the households are evangelical. A evangelica tidal wave has come over the region in the last 10 years, resulting in multiple evangelical churches/shacks being built in the project area, thus converting the local population by the fact there is a church near to their house.

Churches are the meeting points for each household and it is there where – interest topics for the community are discussed. In the case of each cult, the person that offers the mass acts as a local leader as well.

The church is an important system of support for the towns. From Portel, there are coordinators for rural sectors that support the formation and registry of the communities' affiliates. The leaders go first to the Church of Portel, from where they request support and soon they go to the municipal prefecture. This it is the reason by which, the settlers of the populated centers do not count on a variety of social organizations, to a certain extent because the system of communal organization based on the religion is moderately effective and efficient. In the zone of the project they were only mentioned the Retirees Union, the Fishing Associations and the Association of riverine.

Infrastructure and services

Households in the LMA have the following characteristics: 83.8% of residents own their own house and 16.2% are owned by relatives. Houses are mostly wooden planks constructions processed by chainsaw (not sawn).

Appliances in households: 37.7% of residents have radio, 42.0% of the local population has TV, 62.3% have a gas stove and 16.9% of residents have a refrigerator.

Drinking water. Local population uses water from rivers and streams as well as groundwater. In the project area 47.8% of the families mentioned that draws groundwater (through artesian wells) and 52.2% from streams and / or rivers. With regard to water quality, 73.9% of respondents mentioned that the water is clean, 15.9% said is muddy and 10.1% said it contains debris.

Drinking water is not treated, and in some towns several illnesses associated with consumption of contaminated water have been identified.

Urban wastewater is eliminated in the backyard and in the local creek or river. The sanitation system is negligible, only 10.1% of households have a silo at home and 89.9% make their hygienic needs in the field or forest.

Energy consumption. None of the families have public electricity service. Families get electricity by using a diesel-powered electric generator.

Food cooking, most families use gas stoves. Very few households use firewood forcooking, wood is used principally and almost exclusively for the preparation of farinha.

Regarding education. Good Educational services are highly demanded by local households. The city does provide a boat to pick up students and bring them to a nearby school, but the quality of teachers is of flow quality and commuting is a major issue.

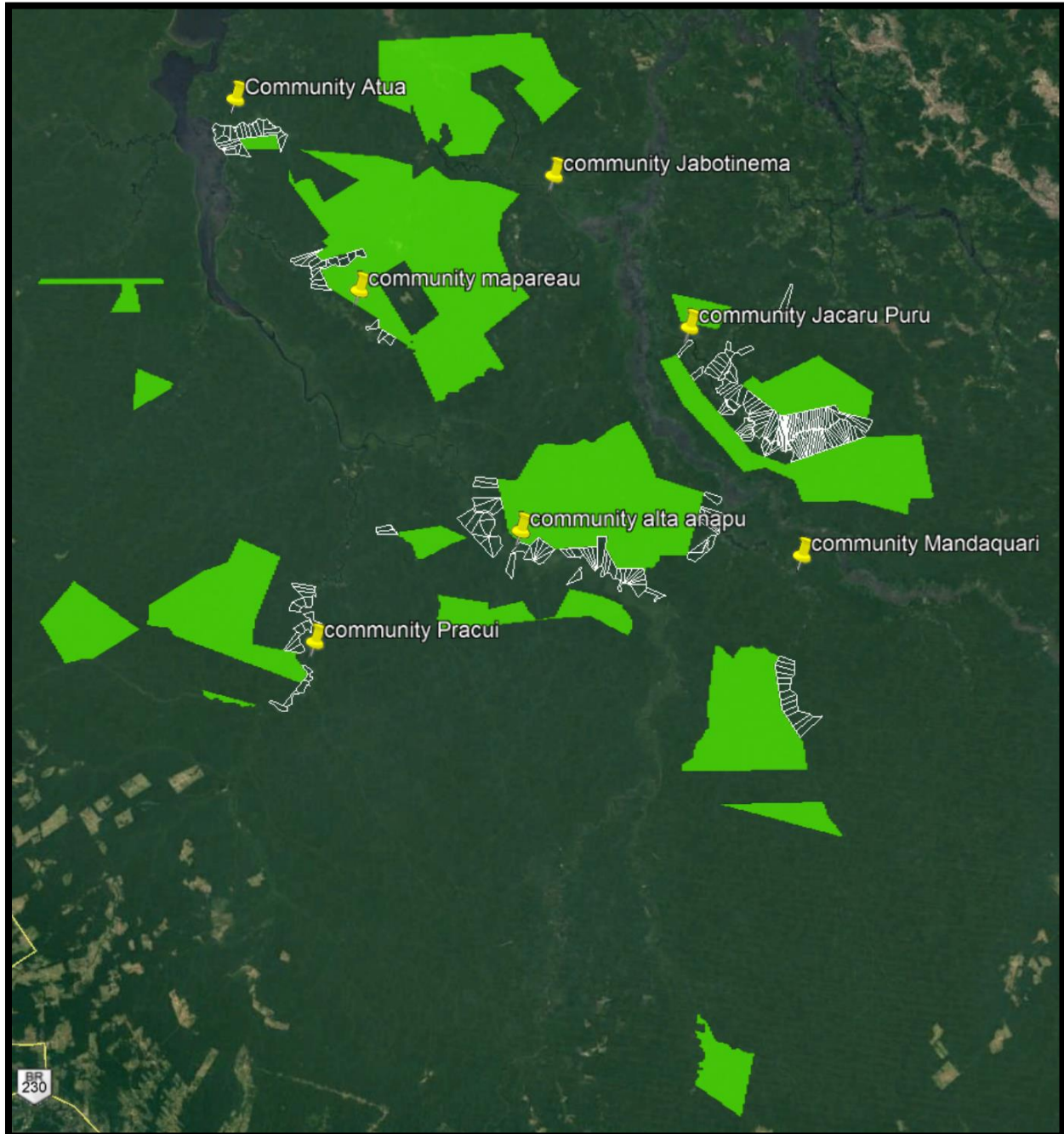
Regarding health. Most households in the project area have no health centers; households have to be assisted in the health center of Villa Monte Horebe and Santo Amaro. The only boat

public boat service to the city of Portel from the project region is from Santo Amaro and that is only on Sundays.

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

Map 15: Project Zone with Stake holder Plots

Each community demarcated by the white polygons representing the plots the project paid for each family to gain land tenure documents.



Provide a map of the project zone including:

- *Boundaries of the project zone, which is defined as the area encompassing the project area(s) in which project activities that directly affect land and associated resources, including activities such as those related to provision of alternate livelihoods and community development, are implemented.*
- *Location of communities (identified in Section 2.1.9).*
- *Boundaries of the project area(s), which is defined as the area(s) where project activities aim to generate net climate benefits.*
- *Any high conservation value (HCV) areas (identified in Sections 4.1.3 and 5.1.2).*
- *Areas where offsite climate impacts are predicted.*
- *Areas where other stakeholders impacted (Section 4.3).*
- *Areas where offsite biodiversity impacts are predicted (Section 5.3).*

For grouped projects, specify potential project areas and communities that may be included in the project at a future verification.

Geodetic coordinates must be provided to allow an unambiguous identification of boundaries of the project area(s), which may be submitted separately as a KML file.

2.1.8 Stakeholder Identification (G1.5)

The process to identify the stakeholders was completed by identifying everyone who lived within the project area and leakage management area via census work. All people identified can be quantified as riverine people. The riverine people are two groups, male and female with varying degrees of needs and outcomes from the project.

The riverine people are classified as a traditional people by the government. There are no other types of people within the project area, or leakage management area. The community group is all related to each other and is 1st, 2nd, 3rd, 4th cousins. They are, sisters, and brothers, and brother-in-law and sister-in-law's. It is a giant interconnected family in the project area, all classified as one community.

This committee is a proposal that emerged from the initial analysis of the involved stakeholders related to the project, the ones potentially interested and the actors that maintain a recognized influence in the zone. This committee was formed at the beginning of the FPIC process and would be in charge of the participatory and independent surveillance.

Its conformation were defined through a process to raise public awareness, dialogue and negotiation. This committee should also try to incorporate an even number of representatives from the civil society and governmental institutions. The committee must include representatives from:

- The National Environmental Authority, such as the Ministry of Environment and its entities involved in the Project
- Local and Provincial authorities: municipalities, council, government, police, church.

- Population settled within the limits of the project – the Riverine people
- Civil society organizations
- Organizations invited to contribute in the process: public programs and institutions.

The committee was a participative inter-sectorial consultative body that watched over an appropriate implementation of the project and its members and has the capacity to deliberate and decide over the affairs considered in their statutes and regulations.

The members of the committee did not receive any sort of economic retribution or recognition for their participation and assistance. The project did provide logistical support to these councils in order to complete their functions.

Explain the process of stakeholder identification and analysis, which should include an assessment of rights, interests and relevance to the project, used to identify communities, community groups within them, and other stakeholders.

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

As listed the stakeholders were identified as anyone who lives within the project area or leakage management area. They are described as traditional people in Brazil and are all characterized as Riverine People. There are two community groups female and male.

The females raise the children, cook the food and take care of the household, and are normally the leader of the family. While the men fish and tend to the Cassava patches of approximately 1 hectare per year. Thus two distinct community groups with mostly separate participatory roles in that group.

The relevance to the project is that they live next to the Project Area. They have a human rights situation that is dire and this dire situation brings a lack of stability to the preservation work, as the riverine people face displacement without the project providing land tenure for them; as the government, associations and illegal loggers don't want them to be secure. Thus this is why the project brought cook stoves, did training on other crops besides Casava and did the land tenure certificates known as the Cadastrol Ambiental Rural (environmental certificate) to demarcate their lands. The local population then acts as a human fence between the land invaders and the preserved area. With the local riverine people having their land rights then they are less likely to be displaced by the drivers of deforestation and illegal logging.

Riverine community are all interconnected for each river affluent, thus cousins, uncles, aunts, all have houses somewhere along the river. They have intermarried with each other. It was about 1 family per river branch that came to the region. They produced off-spring and that off-spring married the offspring of other riverine families in the same region, thus all the current families can be traced back to 15 original families that arrived to the region in the 1950's as former rubber tappers.

The PRA was developed through a series of field visits, observations, surveys, workshops and interviews to local leaders and experts whom were informed about the project idea, its activities, the potential benefits to the communities and their participation in the project. To complement field information, the team used secondary information from IBGE's 2010 Census.

Picture 16: Surveys and interviews one-on-one applied to leaders of households



Picture 16: Surveys and interviews one-on-one applied to leaders of households



Picture 17: Survey Technician in blue shirt with a riverine family



Carrying out meetings and one-one one discussions has been one element of great relevance for the design of the project in PRA. The households were informed about the project idea and the potential benefits for the communities and how their participation was throughout the entire process. Likewise, 'speaking maps' were constructed in a participatory manner in each one of the workshops which has allowed the households to face and describe their current life conditions identifying the main existing problems and the future conditions they would like to have in a situation where the project is being developed.

Picture 18: Workshops with community groups



The tool of elaborating a ‘current map’ and a ‘future desired map’ in each locality has allowed the population and Anapu-Pacaja to clarify the needs and expectations of the local community in comparative terms on how they are and how they picture their communities in the future.

The list of stake holders and beneficiaries of both cook stoves and land tenure documents in table 11.

Table 4: Heads of Households for 127 families who already received land tenure Certificates (CAR)

Adeir de Carvalho Bezerra	Janielson Pantoja de Carvelho
Adicilene Cordeiro dos Santos	Jardeane Tenorio Barbosa
Adiel de Carvalho Bezerra	Joabe da Silva Conceicao
Adilson de Michel Santos dos Santos	Joel Andrade Maia
Adim Bezerra	Jose Carlos Alves dos Santos
Adonias da Cruz dos Santos	Jose Nelido Barbosa Soares
Adrielmar Braga Freitas	Joselino Alves Braga
Ailton Melo Barbosa	Julia Braga e Braga
Aldamir de Freitas Braga	Juracy Braga Marinho
Aldici de Michelly Santos dos Santos	Jurandir dos Santos Rodrigues
Alentan Silva Santos	Kelma Silva Santos
Alessando da Costa Texeira	Levi da Silva Gomes
Ameky de Carvalho Bezerra	Lindomar Barbosa Serrao
Ana Ruth Primavera Braga	Lorencio Rodrigues da Silva

Anisia Fonseca Ferreira	Lourenco Rodrigues da Cunha
Antonio Alves Braga	Luciane Flores de Oliveira
Arielson Braga Serrao	Luiza Osmarina Primavera Braga
Beatriz Braga da Cruz	Magno Ribeiro de Jesus
Benedito Brazão de Freitas	Manoel Aguielo
Benevaldo de Jesus Valadares da Silva	Manoel Carneiro da Cunha
Beneveldo de Jesus da Silva	Marcelino Jardim
Bianca da Cruz Gomes	Marcos Rodrigues Araujo
Brazão de Freitas - comunidade	Marcos Rodrigues de Araujo
Carlos Primavera Braga	Maria Brasao de Freitas
Christiane Almeida Braga	Maria de Nazera Alves Braga
Cirilo Alves Valadares	Maria do Carmo Cardoso de Almeida
Cleomar Brandao	Maria Elza
Clodorico Braga da Cruz	Maria Francisca
Davi Valadares da Silva	Maria Jose da Silva Duarte
Deiziane Pinheiro Fonseca	Maria Jose de Lima Barbosa
Diana Marques Pacheco	Maria Leila Lopes Barboza
Diana Miranda da Silva	Maria Lucia Cordeiro dos Santos
Diego da Cruz Gomes	Maria Lucia Serrao de Freitas
Djalma de Freitas Braga	Maria Miguela da Silva Duarte
Edenilson de Freitas Braga	Maria Raimunda Ribeiro de Jesus
Eder Almeida de Freitas	Maria Regina Freitas da Silva
Edileuza Braga Texeira	Mauricio de Almeida Braga
Edimilton Braga Teixeira	Naliel da Silva Souza
Edlene Braga Teixeira	Natanael Mavigno do Carmo
Edson Braga Teixeira	Nazaré Brazão de Freitas
Edvania Goncalves Alves	Neosiane Brazão de Freitas
Elen de Jesus Gomes	Neusinete Rodrigues Brasao
Elias do Carmo Araujo	Odaia da Silva Rodrigues
Elizangela Sousa de Almeida	Oliveira Santos dos Anjos
Elza Silva Melo	Raimundo Rodrigues dos Santos
Elzo Machado Serrao	Raimundo WAlter Carneiro
Eralda da Silva Costa	Rasangela Maia Reis Macedo
Eraldo Rodrigues Brasao	Ricardo Rodrigues da Cunha
Eraldo Santos dos Anjos	Rosa da Silva Cunha
Erenildo Palheta de Melo	Rosa Moura Braga
Estorgio Rodrigues da Cunha	Roseane de Almeida Sousa
Farnanda Beatriz Aquino da Silva	Roseane Vilarinho da Cruz
Francisca Alves Pimentel	Rubens Brandao
Gabriela Vilarinho da Cruz	Severino Ferreira Pacheco
Gelson Braga Alves	Sidnei Primavera Braga
Geovane Brazão de Freitas	Sinair Vilarinho da Cruz
Geovane da Gama Lopes	Solomao de Sousa Silva
Geovane Fonseca Ferreira	Valdeir Felix Araujo

Hamilton de Freitas Braga
Ibette Braga Barbosa
Inael Goncalves de Carvalho
Izanildo Costa Pinheiro
Jadison Tenorio Barbosa
Jaiane Tenorio Barbosa

Vanessa Vilarinho da Cruz
Velton Braga Freitas
Verdilho Valadares da Silva
Vitor Vilarinho da Cruz
Wagner Silva Carvalho

Each head of each household participated in Cook stove Receipt, Land Tenure paperwork and survey process of the household property, as well as Agroforestry training.

Each household was surveyed one-on-one to determine the critical issues faced by that specific household.

In addition to this each household signed off with the Free and Prior Consent to want the carbon credit project. 5 households deemed to be in ideal locations for Fauna Monitoring were trained to be able to monitor the fauna.

To complete the survey the team had to request the ID document of the riverine person, as this was needed to enter the survey work into the government system for that person.

The information gathered in the field work through the tools mentioned before, especially the needs and problems pointed out by the leaders and local households, has been the basis upon which the proposal for the activities of the project has been developed. The project staff believes that it is better to reach the households with a clear open mind in order to understand local needs and later shape the activities based on the results of the PRA.

For this matter, project activities were conceived right after the social evaluation and not the other way around. Thus, local settlers not only have participated in the design of the project but have indeed provided inputs to Anapu-Pacaja staff for such design.

The following table shows the main problems, priorities and necessities identified by the *population in the workshops and interviews to the local leaders*.

Table 5: Main problems, priorities and necessities identified by the population

Main identified problems	Identified priorities
- Land Tenure issues and insecurity and instability - Low family income - Limited work opportunities - Increased difficulty to get resources from - hunting and fishing	- Funding and coordination to gain Land tenure document - Access to job opportunities - Agricultural production improvement - Access to communitarian transportation - means in order to facilitate access to

• Low training levels in relation to agricultural activities • Limited knowledge and training on productive activities alternative to farinha. • Low training levels in the organizations for communitarian management • Low levels of citizen participation in communitarian management • Unsafe water consumption • Limited access to health services • Limited access to education for children • Limited access to communication	Portel • New productive alternatives (fisheries and minor animal breeding) • Access to drinking water • Access to electricity • Access to health services • Access to communication • Access to education • Access to education.
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Stake Holder Locations in the Periphery of the Project:

The plots in white, the tiny white polygons around the green project area show the surveys entered into the government system. The project paid for the work to help the riverine traditional people gain land tenure. A total of 127 families have completed the Environmental Certificate process, with property line survey paid for by the project. The project is in process of completing 121 more. The project will start in June of 2020 a process to do 250 more for an approximate total goal by the end of 2020 of 500 for the Rio Anapu-Pacaja REDD project. In the map below the outline with polygons represents 250 that are either complete or in process.

Map 16: Individual Plots surveyed and demarcated by the project in the Jacare Puru River community of the project.



Picture 19: Team transporting cook stoves to the land.



Picture 20 : Team loading cement markers placed in the ground during property line surveys. Behind the cement markers 100 cookstoves double packed.



The proposal for the project activities has been designed based upon the problems and priorities identified and pointed out by the households.

The project knows that the activities do make an improvement in the quality of life of the local households in terms of strengthening their capacities and provide opportunities for the economic development of the families. Likewise, being aware that it is not the role of the project to cover and comply with the functions and competencies of the State, the project considers that the proposed activities related to organizational and communitarian managerial capacity building did provide enough skills for the community to manage their public services requirements before the correspondent authorities.

Additionally, the project has determined the creation of an additional fund to the budget to develop and implement project activities. The amount is 5% of the annual income from carbon credits to support the initiatives that arise from the capacities strengthening in the localities.

List all communities, community groups, and other stakeholders, including a description of how each stakeholder was identified and their relevance to project activities. For grouped projects, identify communities that may join the project. The Stakeholder Identification Table (see Appendix 1) may be used for this list if appropriate. Delete if not used.

2.1.10 Sectoral Scope and Project Type

Project Scope: Agriculture, Forestry and Other Land Use (AFOLU)

Project Category: Reducing Emissions from Deforestation and Degradation (REDD)

Type of Activity: Avoided Unplanned Deforestation & Degradation (AUDD)

Climate Community and Biodiversity (Version 3)

Reference of Methodology: Approved VCS Methodology for Avoided Unplanned Deforestation (VM0015) V1.1

Indicate the sectoral scope(s) applicable to the project, the AFOLU project category and activity type (if applicable), and whether the project is a grouped project.

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

Refer to Appendix 2 for description of theory of change

Provide a summary description of each project activity (including the technologies or measures employed) and the expected output, outcomes and impacts using a theory of change to explain how the activities achieve the project's predicted climate, community, and biodiversity benefits.

Provide a detailed description of the GHG emission reduction or removal activities, including:

- *For all measures listed, include information on any conservation, management or planting activities, including a description of how the various organizations, communities and other entities are involved.*
- *In the description of the project activity, state if the project is located within a jurisdiction covered by a jurisdictional REDD+ program.*

The Project Activities and Theory of Change Table (see Appendix 2: Project Activities and Theory of Change Table) may be used to describe how project activities lead to the desired outcomes, if appropriate. Delete if not used. A results chain may also be developed explaining how multiple activities are expected to lead to multiple outputs and outcomes to lead to specific project objectives.¹²

2.1.12 Sustainable Development

The GHG Crediting Period is 40 years (2016-2055) during which net revenues from carbon payments during this period were used to further develop and implement surveillance and social activities that did yield net positive impacts to the climate, communities and biodiversity of the area.

Describe how the project contributes to achieving any nationally stated sustainable development priorities, including any provisions for monitoring and reporting same.

2.1.13 Implementation Schedule (G1.9)

Identify key dates and milestones in the project's development and implementation, such as introductory meeting dates, start and end dates for each project activity, start and end dates for the GHG accounting period, monitoring schedule, verification schedule, etc. Add rows to the table below as necessary.

Date	Milestone(s) in the project's development and implementation
June 5, 2012	The Rio Anapu-Pacaja REDD Project contract was signed to place the land into a REDD carbon credit project.
2016	The community groups were contacted and one-on-one meetings took place to gain support for the project signature goal of inserting into the government database the necessary documentation to allow each family to gain land tenure documents.
2017	Eco-Stoves were delivered for 17 families Some land survey work was completed for each family.
2018	Eco-Stoves were delivered to 17 families in the project area

¹² For examples, see: Richards, M. and Panfil, S.N. 2011, *Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects: Part 1 – Core Guidance for Project Proponents*. Climate, Community & Biodiversity Alliance, Forest Trends, Fauna & Flora International and Rainforest Alliance. Washington, DC, 34 – 42.

2019	Eco-Stoves were delivered to 17 families. The first land tenure documents were inserted into the government database
2020	Additional land survey work for each family parcel is being completed so that the data can be submitted to the government for the final step in a long process to gain land title deeds for each Riverine family.

2.1.14 Project Start Date

January 1, 2016

The project contracts were signed in 2012 with the landowners.

The carbon market was not strong at the time, and thus nothing was done with substantial impact until 2016. Thus this is the start date.

The main aspect in 2016 was that a great deal of social work started in the project area, from census work to visits to the Riverine people.

Although, forest protection initiatives and activities were developed prior to 2016, setting a 2016 project start date was a conservative approach to make sure the project had enough monitoring and enforcement experience to start producing conservation results.

Indicate, and provide justification for, the date on which GHG reduction/removal project activities begin, specifying the day, month and year.

2.1.15 Benefits Assessment and Crediting Period (G1.9)

January 1, 2016 to December 31, 2055 a total of 40 years

Indicate the project crediting period, specifying the day, month and year for the start and end dates and the total number of years.

If different from the project crediting period, indicate the time period over which changes in climate change adaptive capacity and resilience, biodiversity and community well-being resulting from project activities are monitored.

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

No difference

Explain and justify any differences between the GHG emissions accounting, climate adaptive capacity and resilience, community, and/or biodiversity assessment and periods.

2.1.17 Estimated GHG Emission Reductions or Removals

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
------	--

2016	1,009,025
2017	1,009,025
2018	1,003,586
2019	1,003,586
2020	1,003,586
2021	1,003,586
2022	1,003,586
2023	1,003,586
2024	1,003,586
2025	1,003,586
2026	1,003,586
2027	1,003,586
2028	1,003,586
2029	1,003,586
2030	1,003,586
2031	1,003,586
2032	1,003,586
2033	1,003,586
2034	1,003,586
2035	1,003,586
2036	1,003,586
2037	1,003,586
2038	1,003,586
2039	1,003,586
2040	1,003,586
2041	1,003,586
2042	1,003,586
2043	1,003,586
2044	1,003,586
2045	1,003,586
2046	1,003,586
2047	1,003,586
2048	1,003,586
2049	1,003,586
2050	1,003,586
2051	1,003,586
2052	1,003,586
2053	1,003,586
2054	1,003,586
Total estimated ERs	40,154,304
Total number of	40

crediting years	
Average annual ERs	1,003,857

2.1.18 Risks to the Project (G1.10)

1. Communities lack of effectiveness to control the Conservation Forest area

The Project did provide permanent land use rights against results for conservation to those families living within the Project Boundary. Families were trained to monitor the area and to protect the forest.

With the completed census, and knowing who individually owns what, if a family breaks the Conservation Forest Area plan, it is easy to identify who this is and future benefits from the project will be curtailed if the behavior continues. The project will have no way to revoke title that has been provided the riverine people.

The process to complete the census is as follows:

The census work was completed in a separate section (normally one river branch was the focal point each year) of the project area between 2016 to 2020 due to lack of funding to do a full census in one go and due to the huge manpower and transportation needed it was impossible. Each year there was one branch of the river systems that crosses the project area targeted for review. Each arm had to have two census's complete as there is a normal case that 30% to 40% of the people were not home. Most were tending to their Casava plantations, and the project did not want to proceed to the work on Sundays as it could cause conflicts due to the highly evangelical nature of the riverine people.

In cases of this census work there was also a requirement to send a separate boat back to specific home site as the Identification Data previously provided was either incorrect when it was attempted to be entered into the Government Database to give each family a Environmental Certificate(CAR) for their land, or because the name was spelled wrong and did not match the CPF number (which is the tax ID number). This resulted 3 trips to every house just to gain an accurate situation of who lives in which house for the Census and insertion of the Environmental Certificate.

The project has done a financial feasibility assessment on how much it costs to visit a house and it is between 30 and 50 dollars (depending on the months total productivity) between team on the boat, staff salaries and overhead just to visit the house. The project is adding technicians to the boat, so more families can be visited in less team, which the project hopes will reduce the high visitation expense.

Upon the census work the data was taken back to Belem where Professor David Vale of the University Federal of Para state and his team of technicians would sort through the names along with the property line points and work to de-conflict a region that is known to be the most unstable in Brazil.

With this data it was then confirmed again a second time in the field where permanent cement marker were placed according to the de-conflicted map. With these permanent cement markers in the ground the Cadastrol Ambiental Rural (CAR) was submitted to the environmental ministry where each family was able to gain a CAR with their name on it and the demarcation of where their land is.

The process is not a process that can be completed in 1 month, 6 months or a year. Due to the various trips and funding the process took place from 2016 to present and is continuing.

The future process related to the land tenure is to request from the government to issue the final title deed. As much as the goal is to give title in exchange for preserving, it is also a human rights factor where we cannot skip even one household no matter if the person is bad or deforested, the stability brings preservation. The environmental certificate has helped monitor the persons activities and based on national statistics has had significant impact in stopping deforestation.

2. Population growth forces agricultural expansion in project area.

Although population is growing in the area, it is clear from the PRA and the LULC change analysis that small-scale agriculture is not a significant driver of deforestation in the area. Nevertheless, the Project includes capacity building on agroforestry techniques to help riverine to develop more efficient crop systems that require less area and longer rotation times, thus reducing the need of clearing forest patches under regeneration.

3. Loss of carbon stocks through fire, illegal felling, and land clearing

The Project has reduced the risk of leakage, illegal logging and fire by building strong partnerships with households in the Project Boundaries and it its vicinity thus preventing deforestation activities to start. This includes by giving out cook stoves and also paying for the riverine in these locations to gain title. Also, capacity building workshops were held with cattle ranchers that get in the vicinity of the project to show them the benefits of intensified pasture management, thus preventing further LULC change in the area.

Illegal logging risks were mitigated through a number of measures including demarcating boundaries and posting signage, blocking machinery access through trenching and other

methods, regular patrolling, and improved communications with local authorities in Portel through two-way radios and cell phones (where available).

Land grabbing were addressed in two ways. First Anapu-Pacaja 's local team have met with new migrants and neighboring households and leaders, as well as the municipal authorities to make sure the Project Boundaries are known and resolve any existing conflicts. Communities were encouraged to inform prospective migrants that the forests are protected and that there are no opportunities for new migrants to the area. Second, Anapu-Pacaja did demarcate boundaries with pillars and signage, maintain regular patrols, and call in the support of the local authorities and police.

Identify likely natural and human-induced risks to the expected climate, community, and biodiversity benefits during the project lifetime and outline measures needed and designed to mitigate these risks.

The Project Risks Table (see Appendix 3: Project risks table) may be used. Delete if not used.

2.1.19 Benefit Permanence (G1.11)

Community activities are designed to transform local economies over the life of the Project. In this regard, the focus of the Anapu-Pacaja developed local business and income-generating activities that are critical components of a long-term low carbon economy. Project activities that met this overarching objective focus on education, sustainable agriculture, community-based ecotourism and sustainable management of natural resources. These activities reduced the necessity of community members to deforest and degrade the Project Area. During the Project Lifetime, this will be achieved, for example, facilitating better education, through training farmers in sustainable agriculture.

The project focuses on three principal strategies to ensure the maintenance and enhancement of the project benefits beyond the project lifetime. For this monitoring period also the focus is the same.

1. Skill and capacity development.
2. Goal of permanent Land ownership
3. Health benefits

1. The skills are learnt by the communities throughout the projects lifetime. These relate to better land resource management. The project has initiated several awareness programmes for efficient use of land for agricultural practices and has also provided cook stoves which have the benefit of lessening the time for Farinha production and the overall cooking time. The protection of the forests itself ensure that due to lesser degradation there is greater potential to provide timber and non-timber forest products on a sustainable basis. The community has been made aware and trained in alternative crops of agroforestry such as black pepper, honey or andiroba oil. Around 200 community members have received training during this monitoring period.

2. The goal of permanent land ownership to the communities is one of the main initiatives of the project and this provides permanent ownership even beyond the project lifetime. This provides the community to implement the skills and learnings on their own land which is self-sustainable

and provides benefits beyond the projects lifetime. Around 220 CARs have been distributed during this monitoring period.

3. The health benefits to the women and to the overall community is expected to continue beyond the projects lifetime. In a 2002 report, WHO listed indoor smoke from solid fuels among the top 10 risks to human health. "Day in and day out, and for hours at a time, women and their small children breathe in amounts of smoke equivalent to consuming two packs of cigarettes per day," WHO reported in the 2006 report Fuel for Life: Household Energy and Health. As greenhouse gas emissions have increased, the smoke from kitchens in the developing world has escalated from a local to a worldwide threat. The average cooking fire produces about as much carbon dioxide as a car, and produces more soot, also known as black carbon. Reducing these emissions may be among the fastest, cheapest ways to fight global climate change. 50 women have received cook stoves which translates to improved livelihood during this monitoring period.

The permanence of the benefits associated with the project are captured during the feedback from the community during the periodic community meetings in which around 78% of them prefer to continue the good practices.

Describe the measures needed and designed to maintain and enhance the climate, community, and biodiversity benefits beyond the project lifetime.

2.1.20 Financial Sustainability (G1.12)

Funding for Project's activities is secured by funds committed by the Project Proponent from 2016 to the present. After 2020 the project is expected to generate enough revenues from carbon credit sale to cover Project costs. The Project financial analysis makes clear how important is the revenue generated through carbon credits to protect the Project Area and to implement the Project's activities.

The project proponent has made a financial statement to demonstrate their commitment to cover future costs until the project receives credits for the emissions achieved since the Project start date until validation date. For a detailed financial analysis refer to the attached Financial Evidence of this Project's VCS PDD.

Demonstrate that financial mechanisms adopted provide an adequate actual and projected flow of funds for project implementation and to achieve the project's climate, community and biodiversity benefits. Provide evidence of actual and/or projected revenues from GHG emissions reductions and/or removals and/or other sources.

2.2 Without-project Land Use Scenario and Additionality

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

The risks for the Project objectives originated by climate change and climate variability are limited to:

The land use scenario without the project clearly has a negative effect on the climate and creates severe climate variability. The project works extremely hard to preserve a project that is in a difficult region with high land invasion threats. Land invasion brings roads, and roads bring settlers and more land invaders.

To give an understanding of the Project Reference Region, we can simply look directly south, west and east of project area by only a few kilometres depending on the location in the project.

The project area is directly north of Anapu and Pacaja municipalities, two lawless areas with approximately 5000 small family farms that have been deforested from about 1995 to present. Each farm is typically between 100 to 500 hectares with most under 200 hectares. These people were told of free land by the location by the government. They were told they only need to go there and claim it.

The regions lawlessness has come with notoriety with the American nun Dorothy Stag murdered in the region by land grabbers and groups that promote deforestation.

As the years have passed since the first settlers in the region, and the lack of law, the children of these small scale cattle ranchers now seek out their own farm. They are constantly going into the large expanse of forest area just north of their farms and entering into the private property of Anapu-Pacaja project area.

Under Brazilian law private property can be claimed if it is deemed unused or abandoned. It is impossible to claim land that is public land as it is illegal to claim public land; thus large forest owners property are the target of these land invaders from the south.

They know if they are able to deforest with a fire 50 hectares, they are able to claim possession. The problem is that there are over 5000 families in Anapu and Pacaja with children now looking for their plot. This is their culture, they are taught to take their opportunities, and they must take to be successful.

This human nature both threatens the forest, but it is also threatening the way of life of the Riverine communities as they lack the money to fight off a person specifically funded to take land from others.

In the absence of the project this entire project area would be deforested the same way Anapu and Pacaja were deforested in such short order prior to this date.

If the project was not to exist then the land around the riverine communities are invaded, then the way of life for these traditional people is lost.

If the project was not to exist then it would be claimed and deforested in short order and be lost. By law the claimants (small plot holders under 200 hectares) could deforest up to 50% of the land, and this would have a severe consequence for the climate.

The current Brazilian Presidential Administration that is not even completed with its second year has greatly exacerbated the deforestation. The project is under a greater threat than any previous time. The region is under the greatest threat in its history, as people start fires with no care if they burn everything done in the neighbour's property.

Describe the conditions existing prior to project initiation and demonstrate that the project has not been implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction.

Where the baseline scenario is the same as the conditions existing prior to the project initiation, there is no need to repeat the description of the scenarios (rather, just state that this is the case and refer the reader to Section 3.1.4 (Baseline Scenario)).

Describe the range of potential land use scenarios and the associated drivers of land use changes most likely to occur within the project zone in the absence of the project.

2.2.2 Most-Likely Scenario Justification (G2.1)

The steps described below are in accordance with the “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities”

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

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

In 2010 a group that is a neighbor named Agropecuria e Industrial Rio Tuere Ltda which owns property between the project area and the municipality named Anapu. The group is owned by the Art-Therapy creator Mokiti Okada Association of Japan. Due to the world economic crisis of 2009 they removed their security on the land in 2010. By 2012 the land was 100% invaded by over 300 families each claiming 200 hectares. This land is already in 9 years 90% degraded and 20% deforested, due to small land claims. In the next 4 years due to the Bolsanaro government this land were 50% deforested.

In 2010 another neighbouring group named Megatown Trading Company that owns 76,230 hectares north of the municipality of Pacaja, Para. This is owned by an individual from Sao Paulo, that went broke in 2010 due to the world economic crisis. The land was completely invaded after the property keepers were removed in 2010 and within 2 years the entire property was invaded and today the land is about 30% degraded or deforested. The highest concentration of deforestation in the region is in the location of this property. In the next 4 years due to the Bolsanaro government this land were 50% deforested the legal limit for small parcels under 200 hectares.

In accordance to the justification of scenario, in the event that the security is removed from the project area, the children of these farmers south of the project area in Pacaja and Anapu will immediately move in and stake their claim to the land. It is already occurring and there is a constant push by the Riverine people in coordination with the project to have these invaders ejected before they can make a homestead.

Provide justification in the form of credible and well-documented analyses for the most likely of these land use scenarios.

Acceptable evidence includes, but is not limited to, poverty assessments, farming knowledge assessments, or remote sensing analysis. Where a published methodology or model is used to assess land use change and the drivers of land use change, provide a full reference and explain any variations from the published methodology.

2.2.3 Community and Biodiversity Additionality (G2.2)

No one is going to Portel, Para and handing out cook stoves and paying for riverine people to gain land title. The local politicians want these people to be weak so they can take-advantage of them for meagre profits. The project resolves both of these deficiencies by doing exactly what no one else will do.

As shown in the PDD for VCS in Section 2.5 “Additionality Assessment”, the main barrier for the implementation of the project is the financial barrier.

Even though the old and new version of the Brazilian Forestry Code indicates that 80% of the forest within a privately owned area should be preserved, it is well know from the literature and re-affirmed by our historical analysis with Landsat TM imagery and interviews with local experts that such regulations is weakly enforced.

Finally, the Project did develop and implement activities not only for ecosystem protection but also to generate social benefits. The Participatory Rural Appraisal makes evident that such benefits were not generated under a without project scenario.

Document that community, and biodiversity project benefits would not occur in the absence of the project. Explain how existing laws, regulations, and governance arrangements, or lack of laws and arrangements, would likely affect land use in the absence of the project. Demonstrate that project activities would not have been implemented under the without-project scenario due to significant financial, technological, institutional or capacity barriers. If project activities are required by law, demonstrate that pertinent laws are not being enforced.

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

Not Applicable

Identify any distinct community and biodiversity benefits intended to be used as offsets and specify how additionality is established for each benefit intended for this purpose.

This section should not include any information on climate benefits.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

All the documents/results are published in the project website and communicated in Portuguese in a simple language to the council of stakeholders for their awareness and free participation. The project CCB implementation from validation onwards is described in the relevant section in the MR.

Meetings were held with up to 5 households in 2016, but normally one on one meetings took place. The project, from previous experience in REDD projects, found that one on one was easier than having everyone come to a central location. Due to the fact not everyone comes, and families were missed.

Apart from the survey teams the main form of communication followed was one-to-one meetings with the community in which the feedback on the benefits provided were communicated which are periodic. Further during this period, the benefits were mainly related to Skill and capacity development, Goal of permanent Land ownership and improved land management practices which were categorised as both long term and short term benefits in the relevant sections of the MR. sample of the survey forms and attendance records of one to one meetings have been submitted to the VVB.

Describe how full project documentation, including project description documentation and monitoring reports, as they become available through the project lifetime, has been and made accessible to communities and other stakeholders.

2.3.2 Dissemination of Summary Project Documents (G3.1)

All the documents/results are published in the project website and communicated in Portuguese in a simple language to the council of stakeholders for their awareness and free participation.

Apart from the survey teams the main form of communication followed was one-to-one meetings with the community in which the feedback on the benefits provided were communicated which are periodic. Further during this period, the benefits were mainly related to Skill and capacity development, Goal of permanent Land ownership and improved land management practices which were categorised as both long term and short term benefits in the relevant sections of the MR. sample of the survey forms and attendance records of one to one meetings have been submitted to the VVB

Describe how summary project documentation, including information required for G1.1-9, has been actively disseminated to communities. Describe how summary information on monitoring results actively disseminated to communities.

2.3.3 Informational Meetings with Stakeholders (G3.1)

Good amount of information about the characteristics of the population in the Project zone was collected through PRA. The surveys applied to the local householders have allowed the project to know the main social and economic characteristics of the population, and the interviews held

with the local leaders have brought information about the characteristics regarding their organization, production, relation with state authorities and other institutions, main needs and concerns, among other.

Describe informational meetings with communities and local stakeholders and how they were publicized.

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

Information about Community Costs, Risks, and Benefits was exchanged and discussed during consultative meetings. The project has no costs to the communities, the team of technicians have always based the modus operandi as go-to-the point, thus the project team goes to the community, we don't request the community to come to the project team. The travel cost is the greatest burden for the community. It was discussed and explained during all meetings that the carbon credit project will not cost the community anything, it was explained that the project is 100% there to benefit the locals in a business-as-usual situation.

As explained in the community meetings and one-on-one discussions there is no risk to the community.

The benefits are explained to be cook stoves, land tenure documentation and survey work and training for a better sustainable living and improved livelihoods.

Explain how relevant and adequate information about potential costs, risks and benefits to communities – identified using a participatory and transparent process – has been provided to communities in a form they understand and in a timely manner prior to any decision they may be asked to make with respect to participation in the project.

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

The Project's executive summary, including project information and project benefits has been translated into Portuguese and is posted in public places in communities throughout the Project Zone.

During community meetings held by project staff as part of the project outreach process the monitoring and verification process was described.

A poster/notice in Portuguese advertising the Project's public comment period and the validation /verification field visit was posted in communities throughout the Project Zone.

Describe how communities and other stakeholders are informed of the process for CCB validation and verification. Specifically, address:

- *Measures taken.*
- *Communication methods used.*

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

The project Proponent actively has 6 technicians working in the field in constant contact with the local households. In the rare event that someone from the team is not in the field, there are two people in the city of Portel that are able to communicate with the riverine people.

The Project Proponent has actively communicated to community members and stakeholders about the start of the Public Comment Period and the methods with which they can submit comments on the Project as well as how to view full project documentation. This was accomplished by communicating the Project - Public Comment Period and Verification field visit dates to previously identified stakeholders, community leaders, leaders of the faith communities and public officials. They were then requested to pass that information onto their communities.

Six weeks prior to the site visit in March 2020, verbal communication was done, and it was requested that up to 1 person from all 50 families be prepared to answer questions of the auditor. One-on-one interviews were arranged.

Describe how communities and other stakeholders informed of the auditor's site visit in a timely manner before the site visit occurs, and how direct and independent communication between communities and other stakeholders or their representatives and the auditor facilitated.

2.3.7 Stakeholder Consultations (G3.4)

The Project designed its activities based on the results of the PRA. It was intended since the beginning to develop activities that were tuned with local livelihoods and the best way to do so was by first consulting with local stakeholders.

All Project activities are based fundamentally on local customs and needs. Such activities do not constitute dramatic changes on local ways of life or customs but only provide knowledge and finance to improve and make more efficient what is already happening on the ground.

The team was able to consult with the community originally prior to July 2016.

The technicians who go to the land stay in the houses of the riverine people while doing survey work, eat at their table and greatly support the project, this has greatly help build trust with the stakeholders. 50 households are involved.

Apart from the survey teams the main form of communication followed was one-to-one meetings with the community.

Describe how communities including all the community groups and other stakeholders have influenced project design. Document consultations and indicate if and how project design and has been affected by stakeholder input.

2.3.8 Continued Consultation and Adaptive Management (G3.4)

Two of the project team Sergio and Camerao live in Portel and have been with the project since the beginning. They were hired as they know each family in the project area their local knowledge facilitated the warm reception for the project. They are both the project guides and pilots for the technicians and team. They know first-hand everyone in the community and this

knowledge allows there to be seamless communication between the project team and the local communities. It may require a cell phone call to Camerao, who calls on the radio to the specific river to reach the family.

Throughout the lifetime of the project, we maintain a direct line of communication with community members, and relevant stakeholders. This establishes a commitment to communication and consultation to keep stakeholders informed of project activities including restoration, maintenance, monitoring and the CCB validation and verification process.

With-project scenario there is an increase to the socio-ecological resilience, reduce the vulnerability and improve the adaptation capacity through a better management of the natural resources, including adaptive management. In addition to this, forest protection in the project area does provide a healthy ecosystem with much greater adaptation potential to climate change, with a higher resistance and recovery capability to extreme meteorological phenomena and a wide range of benefits to the neighboring people.

Hence there is no change in the consultative and adaptive management system during this monitoring period.

Describe the plan developed to continue communication and consultation between the project proponent(s) and communities and other stakeholders about the project. Explain the processes the project use throughout the life of the project to consider this input and adapt management accordingly.

2.3.9 Stakeholder Consultation Channels (G3.5)

The technicians who go to the land stay in the houses of the riverine people while doing survey work, eat at their table and greatly support the project, this has greatly help build trust with the stakeholders.

Apart from the survey teams the main form of communication followed was one-to-one meetings with the community.

Demonstrate that all consultations and participatory processes have been undertaken directly with communities and other stakeholders or through their legitimate representatives. Provide justification that adequate levels of information sharing has occurred.

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

During this monitoring period, consultations have ensured to engage with both men and women, and more marginal stakeholder groups in culturally appropriate ways to ensure that the project can hear a wide range of perspectives. Apart from the survey teams the main form of communication followed was one-to-one meetings with the community.

Describe the measures needed and designed to enable the effective participation, as appropriate, of all communities. Demonstrate the culture- and gender-sensitivity of implementation of such measures.

2.3.11 Anti-Discrimination Assurance (G3.7)

Anapu-Pacaja has company policies to prevent discrimination and outline a course of action, should it occur, the human resource (HR) policy provides a clear statement on discrimination relating to gender, religion or sexual discrimination. Discrimination is considered a level A misconduct under the HR policy. Where discrimination occurs within the company, partner organisations or within project areas (project participants), actions are outlined in the grievance policy to ensure that any discrimination is dealt with by the senior management. All company employees and field partners sign a code of conduct with ES that includes anti-discrimination. No such related incidents have been reported for this monitoring period.

Describe the measures needed and designed to ensure that all entities involved in project design and implementation are not involved in, or complicit in, any form of discrimination (e.g., discrimination based on gender, race, religion, sexual orientation or other habits) or sexual harassment with respect to the project.

2.3.12 Feedback and Grievance Redress Procedure (G3.8)

The conflict resolution approach has been sequentially adopted and responds to the conformity or inconformity of the complainant to the proposed solution. The evaluator may also propose a specific approach for the resolution depending on the complexity of the case and the assessment of the same.

The present mechanism does not exclude the right of local people to present the case to any public entities estimated to be convenient. Actually, during the census, the Project's management team had informed local people of the creation of such committee and were informed of their right to present grievances directly to public entities, making a clear point that all claims and/or complaints were addressed equally *notwithstanding the line of grievance*. No such related incidents have been reported for this monitoring period.

The legal system in Brazil takes 5 to 10 years, if not longer to resolve issues, so this is only used in cases of land grabbers invading the project area. The court case for land grabbers takes years, but at least during these years the land grabber is unable to actually deforest and utilize the land until the judge makes a decision. Thus the goal of the project is to use the courts to stall land grabbers until Brazil takes climate change and preservation seriously, thus if a land grabber in 2020 can be stalled until 2030, in 2030, even if a decision is not favorable for the project, in 2030 the laws and regulations in Brazil should be more considerate to preservation, versus the current system of mass deforestation promoted by nearly all levels of government.

Document the project's grievance redress procedure. Demonstrate that the procedure includes:

- *A process for receiving, hearing, responding to and attempting to resolve grievances within a reasonable time period, which takes into account traditional conflict resolution methods.*
- *Three stages, each with reasonable time limits: attempt at resolution, mediation and arbitration or courts.*

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

There have been no grievances with the Riverine People related to the project, however in the event there is a grievance and their needs to be a re-dress procedure. In the event there is the grievance, the project will conduct one-on-one meetings to explain what the problem is and what the project is going to do to resolve it.

The goal is to prevent grievances from occurring. A future problem could be cook-stove failure. The cook stoves are painted metal, due to the budget the project focused on a cook stove that was lite, easy to transport to the project area. However in 5 years these cook stoves could rust in the high humid tropical environment, thus there certainly will be grievance. The goal at this moment is to plan for the 2023 timeframe to provide all new ceramic and brick cook stoves for each house prior to the future rusting that could taking place with the current cook stoves.

Describe how the feedback and grievance redress procedure is publicized and accessible, and how grievances and project responses are documented and made publicly available.

2.3.14 Worker Training (G3.9)

Project's activity #1 is designed to provide training to local community groups that will generate the required capabilities to undertake forest monitoring as well as monitoring for social and biodiversity variables.

The Project ensures that all members of the community groups have the same opportunity to attend capacity building workshops and participate in demonstrational activities, regardless of race, religion, sexual orientation, or gender. Although the opportunity to actively participate in all the activities of the Project, it is finally a decision of each stakeholder to participate with no pressure.

Special attention was given to under-represented groups (elder people, woman and children) are aware of the on-going training workshops and activities. The content and language of capacity training and demonstrational activities were adopted accordingly to each participating group. The Project considers developing and implementing workshops specifically designed for age classes groups to better transmit the information.

Capacity building is a relevant aspect in the implementation and operation of the project. In order to achieve the goals successfully the member of the community must be trained to have the skills and knowledge to effectively carry out the work.

50 community people have benefited from the training programs during this monitoring period.

Describe measures needed and designed to provide orientation and training for those employed through project activities and relevant people from the communities. The orientation and training must have an objective of building locally useful skills and knowledge to increase local participation in project implementation. Identify how local capacity is not lost through staff turnover.

2.3.15 Community Employment Opportunities (G3.10)

The Project has design employment opportunities to make sure underrepresented groups of local community have equal opportunities of finding employment in within the Project management and demonstrative activities.

Employment positions that require demanding physical work and a higher risk (i.e. on the ground monitoring of former logging trails, sampling biomass in forest plots, monitoring of Project Boundaries by boat to detect illegal logging activities, setting and revisiting biodiversity camera traps) were filled by persons between the age of 18 and 60 years and/or according to the experience and physical strength of a person, assessed on an individual basis.

Other employment opportunities that require less physical effort and by their nature are less risky set aside for elderly people or less physically apt people. Such activities can be but not limited to: social assessment surveying and monitoring, running demonstrative activities to other members of the local communities and to neighbor communities, actively participating in setting up demonstrative activities (i.e. home gardens, forest gardens, improved fallows, energy efficient cook stoves, etc.).

Around 11 people have been employed of which 3 are women for this monitoring period.

Demonstrate that people from the communities given an equal opportunity to fill all work positions (including management) if the job requirements are met. Explain how workers are selected for positions. Where relevant, describe the measures needed and designed to ensure community members, including women and vulnerable and/or marginalized people, are given a fair chance to fill positions for which they can be trained.

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

The local community has received clear and adequate information about the requirements of national and international regulations on workers' rights before entering in a contract agreement with Anapu-Pacaja .

Anapu-Pacaja makes sure to comply with the applicable national regulations on worker's rights. This is assured by yearly audits held by a third party that are identified in the census that was done. Such audits announced to the community and community leaders and they are encouraged to meet with audit entity. This way, local people can rest assure that all their complaints about worker's rights are known in a straightforward and clear way.

The following is a list of Brazil's all relevant laws and regulations covering worker's rights:

The Brazilian Constitution, Chapter II-Social Rights, Articles 7- 11 which addressed: o Minimum wage o Normal working hours on Guidance on vacation and weekly leave on Guidance on maternity and paternity leave o Recognition of collective bargaining o Prohibition of discrimination.

In addition to the Constitution, there are two additional decrees related to Brazilian labor laws. Consolidação das Leis do Trabalho (CLT): DECRETO-LEI N.º 5.452, DE 1º DE MAIO DE 1943 (Consolidate of Working Laws)³⁵. This decree gives more clarification on: the Hourly, daily, weekly and monthly work hours of Employment of minors and women o Establishes a minimum wage of Worker safety and safe working environments of Defines penalties for non-compliance

by employers establishes a judicial work-related process for addressing all worker related issues.

Estatui normas reguladoras do trabalho rural: LEI No 5.889, DE 8 DE JUNHO DE 1973 (Establishes Regular Norms for Rural Workers)³⁶. 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.

Hence it is stated that the project complies with relevant host country rules for this monitoring period as there have been no reported incidents to the contrary.

List of all relevant laws and regulations covering worker's rights in the host country and provide assurance that the project meets or exceeds each. Describe measures needed and designed to inform workers about their rights.

2.3.17 Occupational Safety Assessment (G3.12)

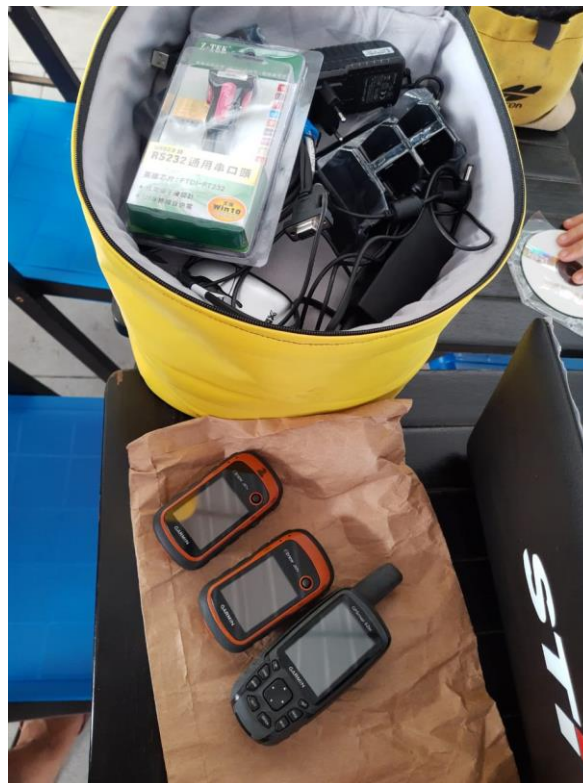
Project's activities do not hold risk besides those inherent to the day to day life in the forest. Project's activities do not require the use of heavy machinery or dangerous substances. Nevertheless, the Project management team has provided adequate protection equipment to employees working in forest monitoring activities. Also, monitoring staff are equipped with first aid kits. Protection equipment does include but is not be limited to:

- Hard hat
- Cap with the company's logo
- Reflective/fluorescent security vest with the company's logo
- Rubber boots
- Gloves
- Two-way radios
- GPS
- Camera
- Field backpack
- Camel pack
- LED Flashlight
- Whistle
- Machete
- First aid kit

Risks for each type of work are assessed and safety guidelines are developed help identifying and reducing such risks. Guidelines are written in clear and adequate language and distributed among workers. Additionally, workers receive safety instructions to make sure any doubts and suggestions are taken care of.

During this period such training was provided to 11 people who have been employed of which 3 are women.

Picture 21, 22, 23: Survey Equipment



Provide an assessment of substantial risks to worker safety that could arise due to project implementation. Describe measures needed and designed to inform workers of risks and how to minimize such risks. Show how risks minimized.

2.4 Management Capacity

2.4.1 Project Governance Structures (G4.1)

The Landowners, who own title, are responsible for stopping the drivers of deforestation.

Michael Greene one of the landowners of the project is responsible for coordinator of all activities, projects and personal and reports to the other 2 landowners the pertinent events, milestones and updates. Michael Greene also liaisons with the VVB and prepares all the reports and documentation.

David Vale supervises the technicians in the field delivering cook stoves as well as oversees the technicians completing the surveys for each household. David also over sees two technicians in the city of Belem who fill out all the paperwork for each of the riverine households gaining land tenure documents.

All information if coordinated by Michael Greene. Michael Greene acting as the primary landowner of the project oversees all aspects.

Describe the project's governance structures, and roles and responsibilities of all entities involved in project design and implementation.

For grouped projects, identify any new entities included in the project since the last CCB validation or verification.

2.4.2 Required Technical Skills (G4.2)

The technicians are all trained survey technicians. A professor from the Federal University oversees all of survey work. The teams of technicians used are all certified.

The most important technical skills is first hand on the ground understanding of the various drivers of deforestation and how to avoid direct confrontations. The reason is these drivers are basically mafia-like organizations that are out to extort anything they can find to extort in the region. The various corrupted politicians that have one goal only and that is to make money on the side, anyway possible. An important skill is to be able to avoid these problems, risks and stresses.

Document key technical skills required to implement the project successfully, including community engagement, biodiversity assessment and carbon measurement and monitoring skills.

2.4.3 Management Team Experience (G4.2)

Michael Greene – Project Coordinator and landowner. Michael is currently responsible for the general coordination of the project activities. He has a Bachelor's degree in Industrial Engineering from Kettering University in Michigan. He has lived in Brazil for 10 years, consulting related to complex real estate situations. Michael's specialty is the coordination of the program plots for the poor. This is a program to help each family gain title. He oversees an engineer and geomancer team of 4 people in the field and 2 people in front of computers, categorizing each family and where their plots of land are located. He also directs the security boat patrols and is taking quotations from companies to build 30 security houses within the project area.

Professor David Vale - Technical Director, is currently responsible for coordinating, managing and implementing the social aspects of the project. David is professor of Geography at the Federal University in the state of Para. He has worked over the last 20 years in numerous projects involving land survey work, making him suitable for helping the Riverine people gain survey and land tenure documents. While this work is taking place, a huge amount of face-time occurs between the riverine people and the technicians, allowing for strong relationships to be built and making these moments ideal for agroforestry lessons and eco-cook stove distribution.

Document the management team's expertise and prior experience implementing land management and carbon projects at the scale of this project.

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

Dr. Evelise da Cruz Pires Greene – Project Coordinator and is responsible for assisting in coordinating social activities.

If relevant experience is lacking, demonstrate how other organizations are partnered with in order to support the project, or include a recruitment strategy by which the management team plans to fill any gaps.

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

The project is funded by the landowners. No outside investors are involved in the Anapu-Pacaja project.

For a detailed financial analysis refer to the attached Financial Evidence of this Project's VCS PD.

Document the financial health of the implementing organization(s) to ensure adequate financial support over the project lifetime.

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

As a collaborative effort, the Anapu-Pacaja team is committed to upholding a high level of integrity and professionalism throughout all aspects of project design and implementation. We have a zero-tolerance attitude towards corruption and unethical behavior, and are not involved in, or complicit in, any form of corruption such as bribery, embezzlement, fraud, extortion, and collusion.

Provide assurance that the project proponent and any 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)

There is no commercially sensitive information in this monitoring report document, itself. Supporting documents which include commercially sensitive information are not made publicly available include: the MOU; Contracts with Buyers and Service Providers; and documents related to project financials.

Indicate whether any commercially sensitive information has been excluded from the public version of the project description and briefly describe the items to which such information pertains.

Note - 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) cannot be considered to be commercially sensitive and must be provided in the public versions of the project documents.

2.5 Legal Status and Property Rights

2.5.1 Statutory and Customary Property Rights (G5.1)

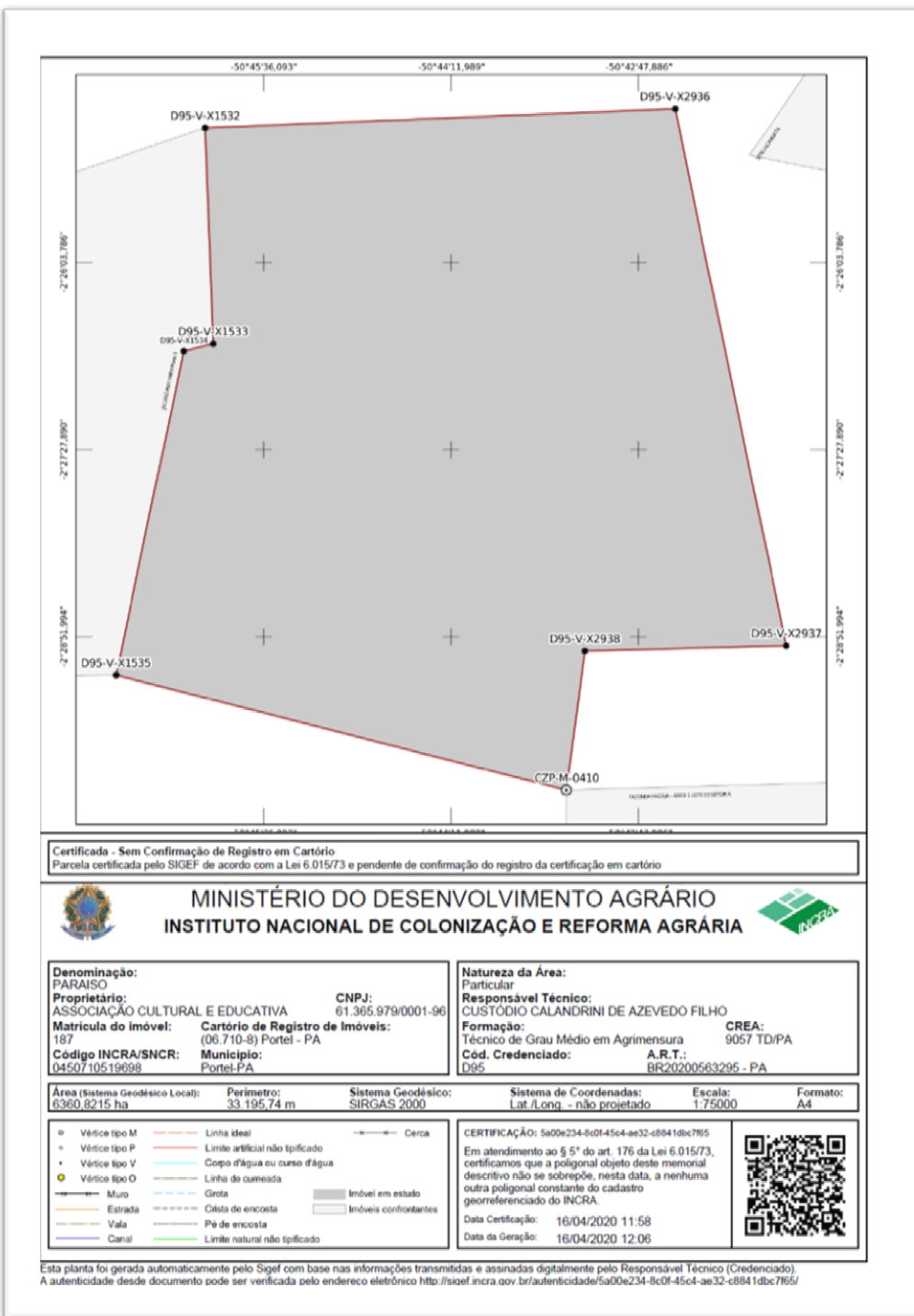
In Brazil over 3 million properties have no title, no registry. The basis of ownership is only the property tax receipt registered with the city where the property is located.

The Anapu-Pacaja Property has all possible documentation that is required for ownership, far more than the

- 1.) Freehold Title Deeds registered in the registry office (cartorio) of Portel, Para, Brazil.
- 2.) There are 36 different properties each with title deed in the registry office of Portel, Para
- 3.) Each property has taxes paid and an individual Tax ID number
- 4.) Each property has tax receipts available from 1990 to the present
- 5.) Each property has an INCRA Federal agency related to land: Rural Code ID number
- 6.) Each property has the INCRA CCIR certificate
- 7.) Each property has the a INCRA Location Description map (called in Portuguese Memorial Discritiva – issued by INCRA the Federal land agency)
- 9.) Each property has the INCRA Survey registered with INCRA
- 10.) Each property has the Cadastrol Ambiental Rural (Environmental Certificate)
- 11.) Each property has the name and date and index (indice) number for origination from the state.

The PROPERTIES in the project area have Certified Geo-Reference map with the FEDERAL Land Agency of INCRA. Only two properties don't have it, as listed below in section 2.5.6 explaining why they are not certified with the federal government.

Certificate 1: INCRA Certified Survey



Describe and map tenure, use, access and management rights to lands, territories and resources in the project zone.

2.5.2 Recognition of Property Rights (G5.1)

Name of the Law	Description	Project Compliance
Law number 4771, September 15th 1965 (D.O.U of September 16th 1965)	The Brazilian forest code of 1965 – Brazilian Forest Code – provides for example: II – area of permanent preservation: protected area in the terms of article 20 and 30 of this law, covered or not by native vegetation, with the role of protecting the water resources, landscape, geological stability, biodiversity, flux of genes of plants and animals, protect de soil and secure a good environment for the human population; III – Legal Reserve Areas: Area located in the property or “posse rural” excluding the areas of permanent preservation, for the sustainable use of the natural resources, conservation and restoration of the ecological process, biodiversity conservation and refugee and protection of native animals and plants; Art. 150 – It is prohibited under empirical form the exploration of primitive forest of the Amazon watershed, but only can be explored in accordance of technical management plans approved by act of Public authorities, to be issued in one year <i>term</i>.	All properties have legal reserve areas and APPs defined. In accordance with the CARs (Environment Rural Registry) at SEMA (Environment State Institute)
Normative Instruction number 003 of May 23th 2007 – Executive office of environment , science and technology - SECTAM	Regulatory of the Environmental Rural Registry -CAR in the state of Pará and providence of other requirements. Art 1 – establish criteria and procedures for implementation of the CAR – PA as an instrument for identification of the rural properties in the state of Pará that must be issued by SECTAM-PA in accordance with this Normative Instruction. Art 2 – It is necessary for all rural properties	Development of CAR in all lands in the Project Area

	in the state of Pará to be registered in the CAR-PA, even the properties that have no production activity. Art 3 – The issuance of the CAR-PA, as toll for identification of the property was done only once for each property. It has a registry number with a sequential number. This number is in all licenses, authorizations, and other documents issued for the environmental regularization of the rural property. This registry number is linked to the land, independent if the land is sold, transferred or taken possession by other person. Single paragraph – There are no concession of any license for the land that has no registry at CAR-PA. Art 4 – In the CAR-PA it is mentioned all the basic data of the rural property, Total area- AT, Area of permanent preservation – APP, legal reserve areas – ARL, and area of alternative use of the soil – AUAS , in addition the name and profession of the land owner, geographic coordinates and other information required by complementary laws	
Federal Decree number 5.975/2006	Art. 10 – Forest exploration and succession formations that require shallow harvest of the forest only are permitted under specific authorization for alternative land uses issued by SISNAMA. # 1o By alternative land use is understood any conversion of the forest to other land cover, such as settlements, agriculture, pasture, industry, energy generation, mining and transportation.	All properties have legal reserve areas and APPs defined. In accordance with the CARs (Environment Rural Registry) at SEMA (Environment State Institute)

Demonstrate that all property rights are recognized, respected, and supported. If applicable, describe measures needed, designed, and implemented by the project to help to secure statutory rights.

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

Free prior and informed consent (FPIC) is the principle that a community has the right to give or withhold its consent to proposed projects that may affect the lands they customarily own, occupy or otherwise use.

The project proposes conduct a process of FPIC to continue the informative process initiated with the PRA in order to promote a reasonable understanding about the project is and their activities, an equitable participation in decision-making processes and the involvement of the population in the implementation of the proposed project.

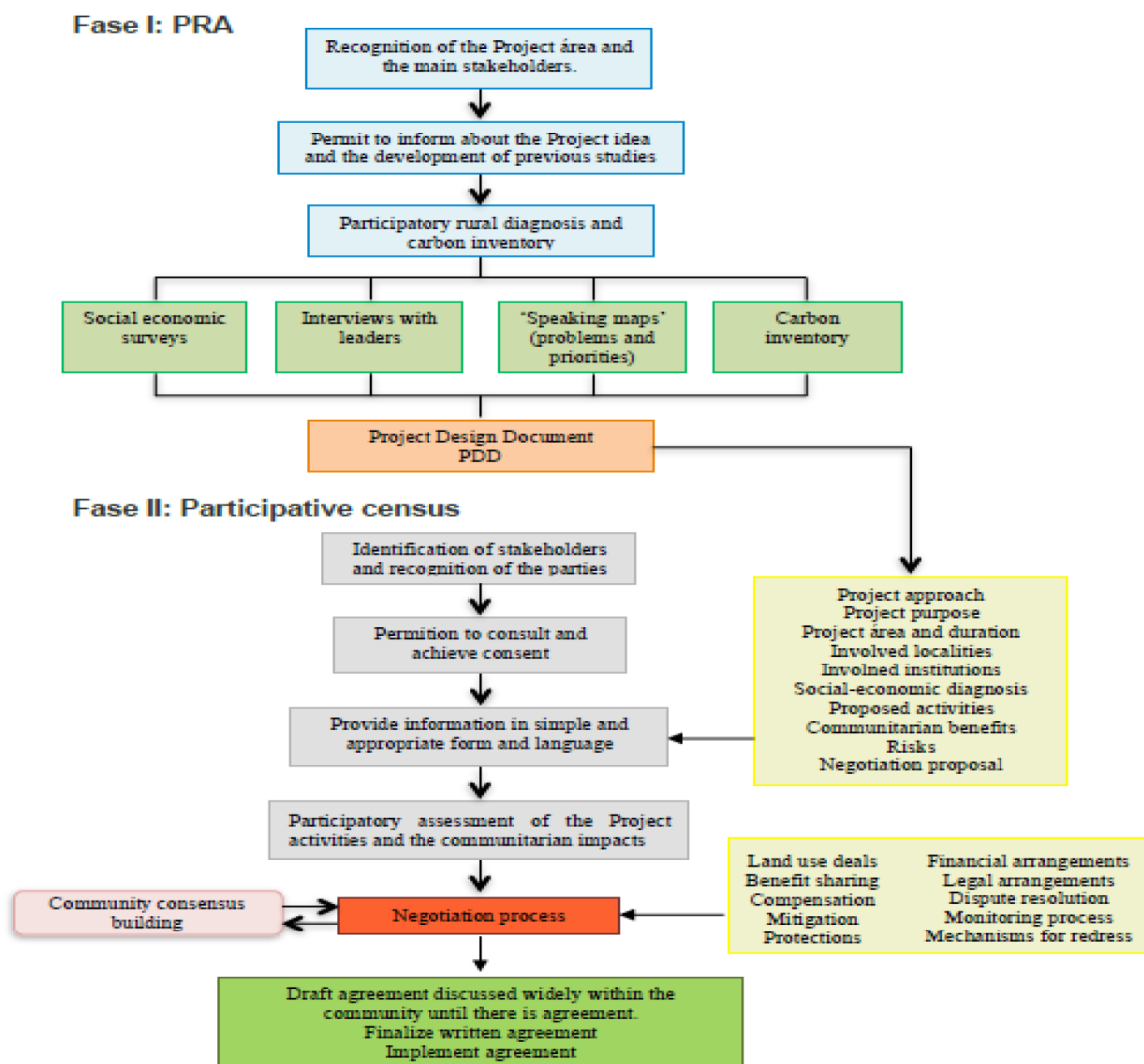
In this regard, we consider the following elements conductors for this process
Avoiding the exercise of coercion, intimidation or manipulation (FREE);

- *Consent is required in advance to any authorization or beginning of the activities (PRIOR);*
- *Providing information that covers the following information:*
 - a. The nature, importance, rhythm, reversibility and approach of the project and the proposed activities;
 - b. The purpose of the project and its activities;
 - c. The duration of the project;
 - d. The area where the project and its activities were developed, as well as the localities involved;
 - e. The results of the initial diagnosis of the economic, social, cultural and environmental situation, including possible risks and benefits;
 - f. The institutions and staff that intervene in the implementation project, and
 - g. The procedures the project may include (claims resolution mechanism);
- *The consultation must be carried out through the establishment of a frank dialogue within an atmosphere of mutual respect, good faith and full and equitable participation (CONSENT);*
- *The process must include genre perspective. Women participation is essential, as well as the involvement of children, young people and vulnerable groups.*

It is important to mention that the definite protocol for FPIC was produced and developed after experience from working on other REDD projects in the region. This experience allowed a duplication of the way that interviews were conducted with the local population.

The following flowchart intends to represent the protocol to be followed in order to comply and ensure the FPIC standards and criteria are implemented.

Figure 9: Flowchart for FPIC



Demonstrate with documented consultations and agreements that:

- *The project not encroach uninvited on private property, community property, or government property.*
- *The process by which free, prior, and informed consent or has been obtained of those whose property rights or are affected by the project.*
- *Appropriate restitution or compensation has been allocated to any parties whose lands have been or affected by the project.*

2.5.4 Property Rights Protection (G5.3)

Our project activities do not lead to involuntary removal or relocation of property rights holders from their lands or territories and does not force rights holders to relocate activities important to

their culture or livelihood. If in the future any relocation of activities needs to be undertaken, it will take place with a written agreement that demonstrates that the agreement was made with the free, prior, and informed consent of those concerned and includes provisions for just and fair compensation. However technically under Brazilian law the only way to remove a property owner is by buying their property from that person in an agreement – in a real estate transaction.

All residents even land grabbers are permitted to keep the land they have taken up to 100 hectares.

However land grabbing or other agro-business driven sources of deforestation, will not and have not been tolerated. These cases are aggressively pursued within the legal system of Brazil by the projects landowners.

Demonstrate that project activities do not lead to involuntary removal or relocation of property rights holders from their lands or territories, and does not force rights holders to relocate activities important to their culture or livelihood.

If any relocation of habitation or activities is undertaken within the terms of an agreement, demonstrate that the agreement was made with the free, prior, and informed consent of those concerned and includes provisions for just and fair compensation.

2.5.5 Illegal Activity Identification (G5.4)

Illegal activities in the area are constituted by unplanned timber extraction. Such logging operations are evidenced by the proliferation of pioneer roads as presented in Map 12. It is known from literature that extractive operations will take advantage from the fact that local farmers don't have land titles to displace them or to gain access to the forest resources nearby villages (Araujo, Bonjean et al. 2009). At the same time, illegal logging operations thrive whenever there are forested areas that seem to be under no-use and where the presence of the landowner is not made evident (Margulis 2004).

The Project has trained local community members to work as monitoring staff in the Project Area and the LMA. This is the main activity to identify, prevent and avoid illegal activities from taking place in the Project Area.

As support measures against illegal activities, the Project did provide land titles against conservation results to households living within the Project LMA Boundaries and did provide support to neighboring communities to achieve land tenure on unused public lands.

Stakeholders in neighboring communities were encouraged to report encroachers and illegal loggers trying to get into nearby forests. The Project did proceed to make the respective denounce to local authorities as just like the situation is occurring in the Project Area. Through this mechanism the project were generating positive leakage.

Identify any illegal activities that could affect the project's impacts. Describe measures needed and designed to reduce these activities so that project benefits are not derived from illegal activities.

2.5.6 Ongoing Disputes (G5.5)

There is an ongoing dispute in the project area.

Dispute:

15,936 hectares is affected by a settlement area, but is not invaded by any individual or group.

The government of President Bolsonaro has blocked all Settlement Areas in the Amazon. These typically were done by legal or government actions to expropriate land. In this case the previous government in 2010 placed a settlement area on part of the property. However the actually settling of this area is on hold at the moment, the land is not invaded by land grabbers either, at least for the time being there is no conflict. However if a different president in the future is in favor of settlement areas then the land is in further risk of deforestation.

Reports by international ONGs have blamed settlement areas in the Amazon for 2/3rds of all deforestation.

However currently the Amazon has no more land that is not already taken. Thus to do a settlement area, one needs to take private property.

15,936 hectares are affected by the settlement area. The land has the Cadastrol Ambiental Rural, however the land does not have a Certified INCRA Survey. The land does have title, as all the land for the project area have title deeds.

The project plan is to use the next 3 years during the President of Bolsonaro to start a negotiation with the Federal Government to cancel the settlement area on these 15,936 hectares.

A meeting was originally schedule with Carlos Luiz Nabhan for March 12th in Brasilia, however the team postponed it due to the Coronavirus issues. Mr. Nabhan is in charge of resolving the Foundation issues with land in Brazil, his department is "Assuntos Fundiaria"

The titles that are affected are: Title Matricula 278 and INCRA CCIR number 045.071.051.829-2 as well as Matricula 166 a total of 4,356 hectares for this property is affected by this dispute. The other land affected is Title Matricula 166 which has 045.071.051-900-00 a total of 11,580 hectares is affected from these titles which have a total of 21,780 hectares.

Identify any on-going or unresolved conflicts or disputes over rights to lands, territories and resources and also any disputes that were resolved during the last twenty years where such records exist, or at least during the last ten years.

Demonstrate that no activity is undertaken by the project that could prejudice the outcome of an unresolved dispute relevant to the project.

If applicable, describe measures needed and designed to resolve conflicts or disputes.

2.5.7 National and Local Laws (G5.6)

Even though there aren't any national law or regulations regarding REDD policies, there are some local initiatives to encourage REDD projects. The majority of these initiatives are at the municipality level. For example: Paragominas, a municipality located at about 400 km from the project area, has approved (July 26th 2011) a municipality environmental policy (Law number 765/2011) that includes REDD. With this it was created a municipal-level system for reduction of emissions from degradation and deforestation that will be linked to a potential national or state REDD system.

Submit a list of all national, regional and local laws, statutes and regulatory frameworks in the host country that are relevant to the project activities. Provide assurance that the project is complying with these and, where relevant, demonstrate how compliance is achieved.

2.5.8 Approvals (G5.7)

There are no current approval processes in Brazil for REDD carbon credit projects.

However the project is 100% on private property, has no indigenous or traditional people overlapping the project area, thus as Brazil permits, Brazilians are allowed to do any project on their land.

Document that the project has approval from appropriate authorities, including established formal and/or traditional authorities customarily required by the communities.

2.5.9 Project Ownership (G5.8)

The project is set up by the project land owners. As listed in the title deeds, the owners of the land have the right to set up the project.

Provide evidence of project ownership, in accordance with VCS specifications on project ownership.

2.5.10 Management of Double Counting Risk (G5.9)

The project has not nor does it intend to create non-VCS/CCB GHG emissions reductions or any another form of environmental credits or social credits for this monitoring period and a declaration to this effect is submitted to VVB. The publication of Law No. 12,651/2012 and also Decree No. 7,830/2012 and No. 8,235/2014 brings important advances in land use planning and is essential both for conservation and/or environmental preservation and rural property regularization in Brazil. These advances can be evidenced by the adhesions to the Rural Environmental Registry (CAR) and the Environmental Regularization Program (PRA), which clearly demonstrate the percentage of areas in rural properties conserved with native vegetation, a condition that contributes to the maintenance of many ecosystem services, including those related to the maintenance of aquifers and water resources. This is because CAR and PRA bring, in a parallel and permanent way, strategies for the management of rural enterprise, since adhesion to the Registry establishes the areas that can be occupied, the Areas of Permanent Preservation (APP) and the percentages of Legal Reserve recovery, conservation and/or compensation, as indicated in legislation. It is the set of actions or initiatives that must be developed by rural landowners and/or squatters to adapt and promote the environmental regularization of their properties, as established in Federal Decree No. 7,830 from October 17, 2012 and Federal Decree No. 8,235 from May 5, 2014

Brazil does not have a cap-and trade related to forest land. Brazil does partake in the Clean Development Mechanism (CDM) – however CDM does not include REDD.

Indicate whether the project seeks 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. Include all relevant information about the environmental or social credit, the related program and how double counting is avoided.

List all other programs under which the project is eligible to participate to create another form of environmental or social credit.

2.5.11 Emissions Trading Programs and Other Binding Limits

Following the Warsaw Framework for REDD-plus adopted at the UN Climate Change Conference COP19, Brazil is the first country to voluntarily submit and have a forest reference emission level technical assessed and also the first country to submit REDD-plus results in a technical annex to the Biennial Update Report (BUR) for technical analysis. A key component of Brazil's National Climate Change Policy is the voluntary reduction in greenhouse gas emissions. The Project is in compliance with this voluntary target because the Project is a Reducing Emissions from Deforestation and Degradation (REDD+) project. Furthermore, this compliance is demonstrated via periodic verifications of the Project.

Where applicable, demonstrate that GHG emission reductions and removals generated by the project not be used for compliance under such programs or mechanisms. Examples of appropriate evidence are provided in the VCS Standard.

2.5.12 Other Forms of Environmental Credit

The project is not involved in any other form of environmental credit.

Indicate whether the project has sought or received another form of GHG-related environmental credit, including renewable energy certificates. Include all relevant information about the GHG-related environmental credit and the related program.

List all other programs under which the project is eligible to participate (to create another form of GHG-related environmental credit).

2.5.13 Participation under Other GHG Programs

The project is not involved in other GHG programs.

Indicate whether the project has been registered, or is seeking registration under any other GHG programs. Where the project has been registered under any other GHG program, provide the registration number and details.

2.5.14 Projects Rejected by Other GHG Programs

The project has not submitted to any other GHG program

Indicate whether the project has been rejected by any other GHG programs. Where the project has been rejected, provide the relevant information, including the reason(s) for the rejection and justification of eligibility under the VCS Program.

2.5.15 Double Counting (G5.9)

Brazil has no compliance method and currently under the current presidency nothing is expected to be implemented until a new president enters in 2023.

Thus for the current validation and verification there is no risk of double counting.

Specify how double counting is avoided, particularly for credits sold as offsets sold on the voluntary market and generated in a country participating in a compliance mechanism.

3 CLIMATE

3.1 Application of Methodology

3.1.1 Title and Reference of Methodology

The project has been developed using the guidelines in VCS VM0015 REDD Methodology: Methodology for unplanned deforestation V1.1.

As part of the first verification the project has followed the following documents and tools:

- VCS Program Guide 3.3
- VCS Program Standard 3.3
- VCS AFOLU Requirements Version 3.3
- VCS Tool VT001 Version 3.0 – Tool for demonstration and Assessment of Additionality in AFOLU Project Activities.
- VCS AFOLU Non-Permanence Risk Tool Version 3.1

As part of the second verification the project follows and uses the following documents and tools:

- VCS Program Guide 3.3
- VCS Program Standard 3.3
- VCS AFOLU Requirements Version 3.3
- VCS Tool VT001 Version 3.0 – Tool for demonstration and Assessment of Additionality in AFOLU Project Activities.

Provide the title, reference and version number of the methodology or methodologies applied to the project. Include also the title and version number of any tools applied by the project.

3.1.2 Applicability of Methodology

Table 7 indicates the applicability conditions to the VM0015 methodology and explains how the Project

meets each criterion.

Applicability Conditions	Project Compliance to the methodology
Baseline activities may include planned or unplanned logging for timber, fuel-wood collection, charcoal production, agricultural and grazing activities as long as the category is unplanned deforestation according to the most recent VCS AFOLU requirements	The activities in the baseline are unplanned timber logging and grazing activities.
Project activities may include one or a combination of the eligible categories defined in the description of the scope of the methodology	The main Project activity is to protect the forest. As a secondary activity it is envisioned controlled logging activities to provide timber resources to local settlers.
The Project Area can include different types of forest, such as, but not limited to, old- growth forest, degraded forest, secondary forests, planted forests and agro-forestry systems meeting the definition of "forest".	The Project Area is more than 90% Dense Ombrofile Forest. Forests in the Project Area are primary, secondary and degraded forests all of them in compliance with Brazil's definition of forest ¹⁴ .
At Project commencement, the Project Area shall include only land qualifying as forest for a minimum of 10 years prior to the Project start date.	Landsat TM images from 12 years before the Project start date have been analyzed to identify only forested areas according to Brazil's definition of forest.
The Project Area can include forested wetlands (such as bottomland forests, floodplain forests, mangrove forests) as long as they do not grow on peat. Peat shall be defined as organic soils with at least 65% organic matter and a minimum thickness of 50 cm. If the Project Area includes a forested wetlands growing on peat (e.g. peat swamp forests), this methodology is not applicable.	The Project doesn't include forested wetlands.

Demonstrate and justify how the project activity(s) meets each of the applicability conditions of the methodology(s), and tools (where applicable) applied by the project. Address each applicability condition separately.

3.1.3 Project Boundary

Reference Region:

Area: 1,981,072.89 Ha

Historical deforestation rate: 1.91%

Vegetation: Dense Ombrofile Forest

Elevation range: 0-100m

Average slope: 6

Annual average precipitation: 2181mm

Agents and drivers of deforestation: main agents of deforestation are cattle ranchers (preceeded by illegal loggers and squatters) followed by small-scale farmers (Riverine).

Land Tenure: both public and private lands

Law enforcement on land tenure rights: weak.

Project Boundary:

Area: 332,967

Includes both the Leakage Management Area (LMA) and the Project Area (PA) and Social Outreach Area.

Project Area:

Area: 165,707 hectares

Vegetation: 100% forested Dense Ombrofile Forest

Human Density: No humans

Land Tenure: The Private Property placed into the project

Land tenure rights and law enforcement: Titled property recognized on the Federal level, but weak local enforcement of private property land rights.

Leakage Management area:

Area: 16,503 hectares

Vegetation: Mix between dense ombrofile forest, and riverine cassava plantations

Land Tenure: Small land grabber claims of less than 1000 hectares on top of public land and riverine plots which the project has already provided the Cadastrol Ambiental Rural for 50 of these plots. With the program to provide the Cadastrol Ambiental for the remaining area.

Law enforcement on land tenure rights: weak.

Project Goal: In the LMA bring stability here by helping the riverine clarify land rights will greatly bring stability to the area around the project.

Table 8: Gas inclusion or exclusion

Gas		Included?	Justification/Explanation
Baseline	CO ₂	Excluded	Registered as changes in carbon stocks
	CH ₄	Excluded	Considered insignificant, according to VCS Program updates, on May 24, 2010
	N ₂ O	Excluded	Considered insignificant, according to VCS Program updates, on May 24, 2010

Livestock Activities	CO ₂	Excluded	Not a significant source
	CH ₄	Excluded	The project does not include livestock activities, so it is conservative to exclude such emissions once they are present in the baseline scenario
	N ₂ O	Excluded	The project does not include livestock activities, so it is conservative to exclude such emissions once they are present in the baseline scenario

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

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

3.1.4 Baseline Scenario

The baseline scenario identifies two deforestation processes happening simultaneously in the RRD, related by a common but non-exclusive chain of events. Regardless of the process, eventually the most profitable final land-use is the one that will prevail.

Therefore, in the RRD there are two well-defined fronts of deforestation that are linked by a common dynamic, a Pioneer and a Consolidated Frontiers.

On one side, there is a Pioneer Frontier where Riverines live alongside the shores of primary and secondary rivers within the LMA. At the same time, squatters and illegal loggers encroach unprotected dense forests building pioneer roads from secondary rivers, away from primary rivers and out of sight of law enforcers and legal landowners. On the other side, there is a Consolidated Frontier, close to main roads like the Transamazonica highway (BR-230) and where deforestation is already wide spread. Here small and medium size cattle ranchers expand secondary and tertiary roads, extract valuable timber species¹⁷ and then deforest through slash and burn. In this region the non-taken lands have been exhausted, making the 7 large forest landowners just to the north of this region as prime target by these small and medium size cattle farmers.

Pioneer Frontier

From our Social Assessment we know that riverine have as main economic activity small-scale cassava agriculture to produce and sale farinha. Riverine slash young trees in abandoned fallows, take the cut timber and then apply fire to clear the land and have it ready to plant cassava. Should be remarked that from our study we know riverine won't set cassava fields any further than 3Km from the river shores. At the same time, riverine extract timber as a secondary economic activity. Although it is a secondary economic activity, timber extraction provides higher revenues that are used to pay for education and health care. From our Social Assessment study we know a household extracts between one or two tress per year.

Simultaneously, there are invaders (Squatters/ land grabbers), illegal selective loggers and cattle ranchers. These three agents form part of a single deforestation process. Squatters/land grabbers and illegal selective loggers conduct their activities in what is known as the “pioneer frontier” which is the area far from developed roads, deep into the forest. They have a low opportunity cost and they clear forested areas not only for the timber but also for the expectation of selling such land in the future (after getting some sort of land possession right, the same type of right the project pays for the riverine to gain). Usually illegal selective loggers share the land with small and medium scale cattle ranchers, who start growing pasture underneath the degraded forest. After a couple of years of logging, ranchers will buy the lands from loggers/ and land grabbers and perform slash and burn on the remaining trees. Under this approach, deforestation can appear from one year to the other.

The squatters / land grabbers from our study number in the thousands of potential violators. These potential land grabbers use the ambiguous ownership rights of the riverine to “claim” the region is a conflict region, thus their actions are acceptable due to the words they use as their justification for their actions. The region in reality is only a conflict region due to the existence of these land grabbers and the world conflict region is their justification.

Two other large landowners released security in 2010 due to the world financial crisis as their businesses broke and were 100% invaded in a matter of months. In some cases land grabber claims and squatter claims layered as many as 10 people claiming the same location. There was so much leakage due to these two landowners, that other large landowners had to multiply security on their land due to the “free-for-all” invasion. After nine years both of these properties have had all wood of value stripped and have hundreds of claims. The motivation of these land grabbers is simple: 1000 hectares claimed is worth 1 million dollars in a sale with a possession document. The motivation for the land grabbing is 100% based on financial incentive.

Consolidated Frontier

In the case of large-scale cattle ranchers, they operate in what is known as the “consolidated frontier” which is the area closer to the Transamazonica federal highway (BR-230) and the Senador Jose Porfirio state highway (PA-167). In this area, deforestation agents have developed over the years a complex network of secondary and tertiary roads from where deforestation expands. This road-expansion process was already in place at the start of the historical deforestation period and has increased over the years.

As with the Pioneer Frontier, this area started to be colonized by logging companies and other opportunistic agents that set the infrastructure for final land users (cattle ranchers) to buy the lands with degraded forest, apply slash and burn and develop pastures. This process was the norm at the beginning as cattle ranchers establishing in the area were colonizing the area taking advantage of the economic incentives generated by the government, and at the time they wouldn't have enough capital to cover the costs of timber extraction and transportation.

Nowadays the situation has changed. Thanks to subsidies, tax breaks and high demand for meat, cattle ranchers in this area have become well-capitalized agents that can undertake timber extraction and posterior deforestation if they need more areas to develop pastures. Therefore, these agents clean the forest directly, keeping valuable timber species for sale and applying fire to what is left thus pushing northwards the deforestation frontier (Fearnside 2001; Margulis 2004; May 2011).

Conclusion

Therefore, in the RRD there are two well-defined fronts of deforestation that are linked by a common dynamic. Now, according to our Social Assessment study, riverine have some experience on timber extraction thus once the deforestation of the consolidated frontier or that one of the pioneer frontier reaches them, it is most likely that riverine will engage in commercial logging activities, giving space to pastures to develop and causing the traditional way of life to go from a self-sufficient life to a more typical life with high poverty.

In a without project scenario it is likely that deforestation in the area will continue at a conservative rate of 1.91 % per year which can be used for baseline projections.

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

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

3.1.5 Additionality

A list of plausible land-use scenarios in the Project Area were identified and evaluated. It was determined the most feasible and credible scenarios that will develop in the absence of the Anapu-Pacaja REDD Project.

Then, were identified scenarios are evaluated taking into account investment barriers, historical context, cultural practices, and sector policies in Brazil. Such analysis aims to prove that the Project activity is not the most financially attractive or technically feasible land-use scenario to develop in the Project Area.

As per the addtionality analysis section, Project Proponents need to complete the following steps:

- a) STEP 1. Identification of alternative land-use scenarios to the AFOLU Project activity;
- b) 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
- c) STEP 3. Barriers analysis; and
- d) STEP 4. Common practice analysis.

2.5.1 STEP 1: Identification of alternative land-use scenarios to the AFOLU

Project activity

This step includes identifying the credible land-use scenarios for the Project Area and assessing the consistency of each scenario based on local regulations.

Identification of credible land-use scenarios

Land-use scenarios for this Project have been identified using primary and secondary sources of information. Primary sources include our social assessment activities undertaken on the Project Boundaries through the months of December 2011 and January-February 2012. . Secondary sources are interviews with SETA Ambiental, temporal analysis of Landsat TM images, research thesis from the Federal University of Para, peer-reviewed papers, and publication by official and private local institutions (i.e. Imazon, IBGE, IBAMA).

Using these sources of information, one baseline has been identified and listed together with the proposed Project activities. These scenarios are:

Forest encroachment by pioneer activities followed by deforestation to implement pastures

A broad picture of the process is explained in Section 2.4 of this document. Here it will be explained how each agent work to determine the expected unplanned deforestation in the Project Area.

Small-scale slash and burn subsistence agriculture along river shores is the current land-use within the Project Boundary, and has been occurring for at least the past 30 to 40 years (CITE Social Assessment). Such land-use scenario is identified by the Project's Social Assessment and is supported by evidentiary data from historic Landsat TM images analysis from 1996 to 2008. According to our Social Assessment study, ribeirinhos in the pioneer frontier have some experience on timber extraction and very low incomes, what makes them potential workers for logging and cattle ranching operations once they reach the Project Area.

Progressive unplanned timber extraction can be currently found in the vicinities of the Project Area. Such land-use occurs in what is defined as the "Pioneer Frontier" (Margulis 2004). This pioneer frontier goes deep into the forest starting from secondary rivers. Usually illegal selective loggers open such pioneer roads for exploration/extraction and then are followed by squatters who deforest patches of land as a proof of ownership. Squatter will then "clear" the titles over the land and finally re-sale land at very low prices (Margulis 2004; May 2011) given the low opportunity costs of these agents and the weak regulations enforcement in the area (Margulis 2004).

However it is not a strict process, and it can happen that loggers open the pioneer frontier simultaneously -but not necessarily together with- loggers. Usually illegal selective loggers share the land with small and medium scale cattle ranchers, who start growing pasture underneath the degraded forest. After a couple of years of logging, ranchers will buy the lands from loggers and perform slash and burn on the remaining trees. Under this approach, deforestation can appear from one year to the other (Fearnside 2001; Amacher, Merry et al. 2009; May 2011)

Post-timber extraction pastures implementation is the final land-use of the deforestation process present southwards within the Project's RRD in what is called "consolidated frontier" (Margulis 2004). This land-use usually takes advantage of progressive roads creation and forest degradation generated by loggers to expand pastures. Ranchers will also buy "legal" land from squatters at very low prices, particularly small landholders that wish to expand. Once loggers

have extracted all valuable timber species, small and medium-scale ranchers will apply slash and burn to the forest left and then develop pastures.

Larger cattle ranchers prefer to operate in the “consolidated frontier” which has already better access to well-established secondary and main roads. These agents are well capitalized and usually won’t wait for loggers to open new roads. Therefore, these agents deforest directly, keeping extracting and selling valuable timber species and burning what is left, pushing northwards the deforestation frontier (Walker, Moran et al. 2000; Margulis 2004; May 2011)

Demonstrate and assess the additionality of the project, in accordance with the applied methodology and any relevant tools, taking into account of the following:

- *Where a project method is applied to demonstrate additionality and the procedure in the applied methodology or tool involves several steps, describe how each step is applied and clearly document the outcome of each step. Indicate clearly the method selected to demonstrate additionality (e.g., investment analysis or barrier analysis in the case of the CDM Tool for the demonstration and assessment of additionality). Where barrier analysis, or equivalent, is used to demonstrate additionality, only include the most relevant barriers. Justify the credibility of the barriers with key facts and/or assumptions and the rationale. Provide all relevant references.*
- *Where a performance method is applied to demonstrate additionality, demonstrate that performance can be achieved to a level at least equivalent to the performance benchmark metric.*
- *Where the methodology applies an activity method for the demonstration of additionality, use this section to demonstrate regulatory surplus (only) and include a statement that notes that conformance with the positive list is demonstrated in the Applicability of Methodology section, above.*

Provide sufficient information (including all relevant data and parameters, with sources) so that a reader can reproduce the additionality analysis and obtain the same results.

3.1.6 Methodology Deviations

No Deviations

Describe and justify any methodology deviations. Include evidence to demonstrate the following:

- *The deviation not negatively impact the conservativeness of the quantification of GHG emission reductions or removals.*
- *The deviation relates only to the criteria and procedures for monitoring or measurement, and does not relate to any other part of the methodology.*

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

The List of all Land Use and Land Cover classes existing at the project start date within the reference region is provided in Annex A of the MR. (refer Table 6)

The Annual areas of baseline deforestation in the reference region is provided in Annex A of the MR. (refer Table 9 a)

Table 9.b: Annual areas of deforestation in the project area is provided in Annex A of the MR.

Table 9.c: Annual areas of deforestation in the leakage belt is provided in Annex A of the MR.

Table 11.a Annual areas deforested per forest class within the Reference region in the baseline case (activity data per forest class) is provided in Annex A of the MR.

Table 11.b: Annual areas deforested per forest class within the project area in the baseline case (activity data per forest class) is provided in Annex A of the MR.

Table 11.c: Annual areas deforested per forest class within the leakage belt in the baseline case (activity data per forest class) is provided in Annex A of the MR.

Table 12.a: Annual areas deforested in each zone within the reference region in the baseline case is provided in Annex A of the MR.

Table 12.b: Annual areas deforested in each zone within the project area in the baseline case is provided in Annex A of the MR.

Table 12.c: Annual areas deforested in each zone within the leakage belt in the baseline case is provided in Annex A of the MR.

Table 14. Average carbon stock per hectare of all land use and land cover classes present in the leakage belt and project area is provided in Annex A of the MR.

Table 17.b: Total net baseline carbon stock change in the project area is provided in Annex A of the MR.

Table 18. Parameters used to calculate non-CO2 emissions from forest fires is provided in Annex A of the MR.

Table 19. Baseline non-CO2 emissions from forest fires in the project area is provided in Annex A of the MR.

Describe the procedure for quantification of baseline emissions and/or removals in accordance with the applied methodology. Include all relevant equations, and explain and justify all relevant methodological choices (e.g., with respect to selection of emission factors and default values).

3.2.2 Project Emissions

Table 9.b: Ex-post annual areas of unavoided deforestation in the project area is provided in Annex A of the MR.

Table 9.c: Ex-post annual areas of baseline deforestation in leakage belt is provided in Annex A of the MR.

Table 11.b: Ex-post annual areas deforested per forest class within the project area (activity data per forest class) is provided in Annex A of the MR.

Table 11.c: Ex-post annual areas deforested per forest class within the leakage belt (activity data per forest class) is provided in Annex A of the MR.

Table 12.b: Ex-post annual deforestation areas within the project area is provided in Annex A of the MR.

Table 12.c: Ex-post annual deforestation within the leakage belt is provided in Annex A of the MR.

Table 17.b Ex-post carbon stock change in the project area (above-ground, below-ground and litter biomass) is provided in Annex A of the MR.

Table 19: Ex-post non-CO₂ emissions from forest fires from the project area is provided in Annex A of the MR.

Table 22. Ex-ante estimated net carbon stock change in the project area is provided in Annex A of the MR. is provided in Annex A of the MR.

Table 24. Total ex-post estimated actual net carbon stock changes and emissions from non-CO₂ gasses in the project area is provided in Annex A of the MR.

Describe the procedure for quantification of project emissions and/or removals in accordance with the applied methodology. Include all relevant equations, and explain and justify all relevant methodological choices (e.g., with respect to selection of emission factors and default values).

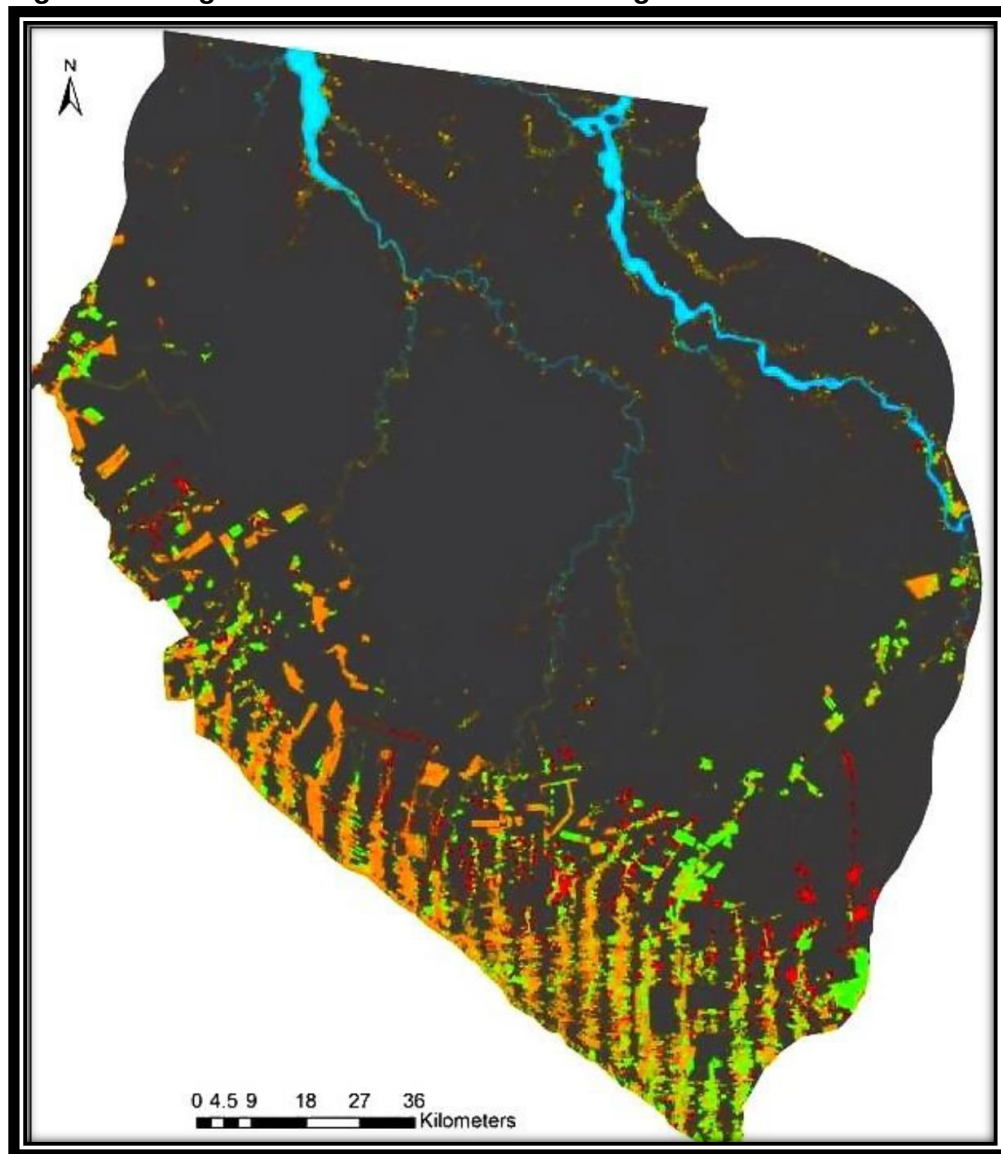
3.2.3 Leakage

Table 29.a: Baseline carbon stock change in pre-deforestation (forest) classes is provided in Annex A of the MR.

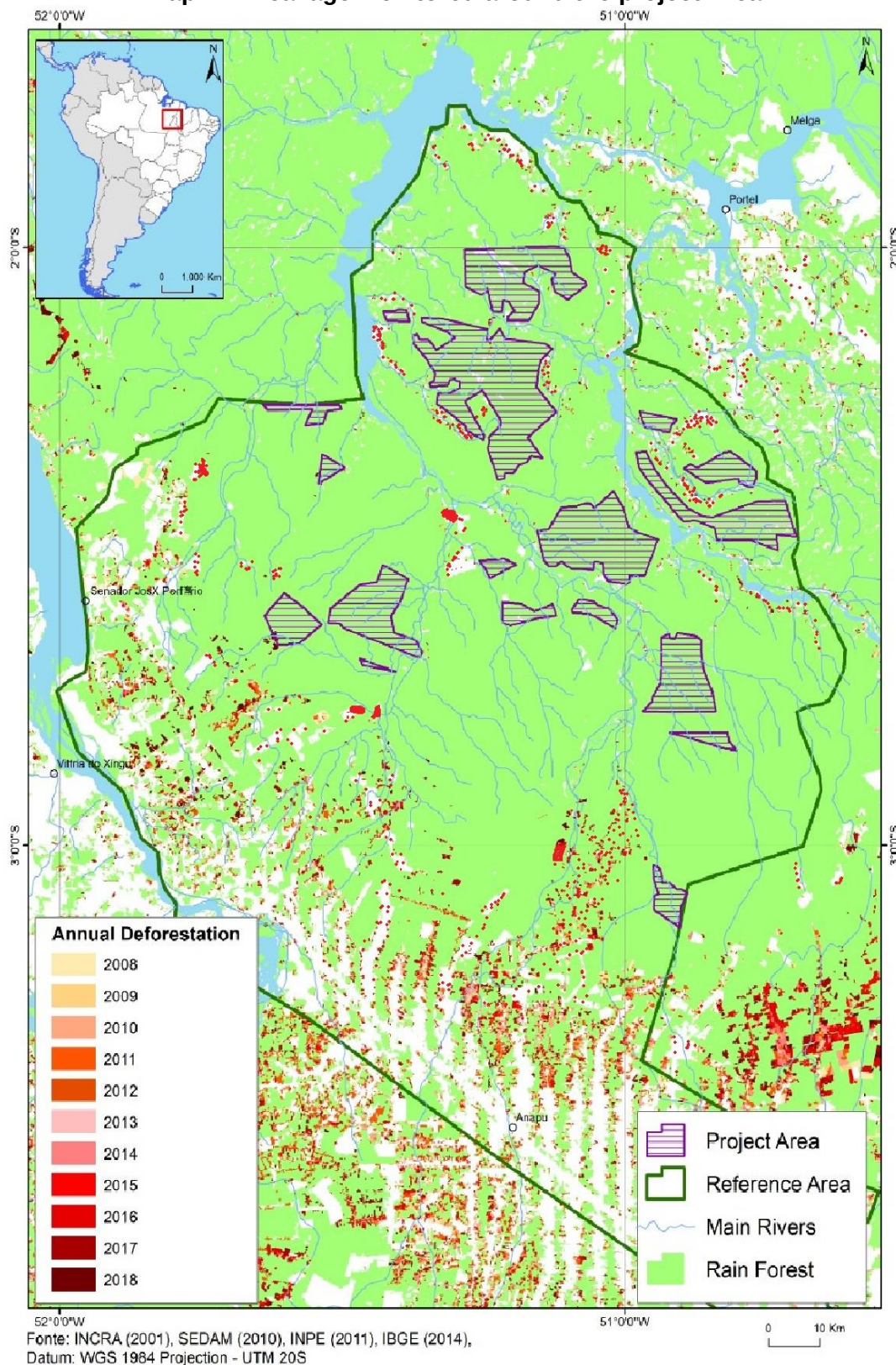
Table 29.b: Carbon stock change in post-deforestation (forest) classes is provided in Annex A of the MR.

Table 29.c: Total net carbon stock change in the leakage belt is provided in Annex A of the MR

Figure: Leakage monitored with LandSat images.



Map 17: Leakage Monitored around the project Area



Describe the procedure for quantification of leakage emissions in accordance with the applied methodology. Include all relevant equations, and explain and justify all relevant methodological choices (e.g., with respect to selection of emission factors and default values).

3.2.4 Net GHG Emission Reductions and Removals

The project has generated a total of **4,025,220** Tradable VCUs for the period of 01-January-2016 to 30-April-2020. The project will generate over the life of the project: **40,154,304** Tradable VCUs for the period January 1, 2016 to December 31st, 2055.

Table 34. Ex-ante estimated net anthropogenic GHG emission reductions (DREDDt) and Voluntary Carbon Units (VCUs)

Table 9: Estimated Baseline Emissions, Estimated GHG emission Reduction or Removals

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
2016	825	660	132	1,009,025
2017	825	413	83	1,009,025
2018	825	413	83	1,003,586
2019	825	413	83	1,003,586
2020	825	413	83	1,003,586
2021	825	413	83	1,003,586
2022	825	413	83	1,003,586
2023	825	413	83	1,003,586
2024	825	413	83	1,003,586
2025	825	413	83	1,003,586
2026	825	413	83	1,003,586
2027	825	413	83	1,003,586
2028	825	413	83	1,003,586
2029	825	413	83	1,003,586
2030	825	413	83	1,003,586
2031	825	413	83	1,003,586

2032	825	413	83	1,003,586
2033	825	413	83	1,003,586
2034	825	413	83	1,003,586
2035	825	413	83	1,003,586
2036	825	413	83	1,003,586
2037	825	413	83	1,003,586
2038	825	413	83	1,003,586
2039	825	413	83	1,003,586
2040	825	413	83	1,003,586
2041	825	413	83	1,003,586
2042	825	413	83	1,003,586
2043	825	413	83	1,003,586
2044	825	413	83	1,003,586
2045	825	413	83	1,003,586
2046	825	413	83	1,003,586
2047	825	413	83	1,003,586
2048	825	413	83	1,003,586
2049	825	413	83	1,003,586
2050	825	413	83	1,003,586
2051	825	413	83	1,003,586
2052	825	413	83	1,003,586
2053	825	413	83	1,003,586
2054	825	413	83	1,003,586
2055	825	413	83	1,003,586

3.3 Monitoring

3.3.1 Data and Parameters Available at Validation

Complete the table below for all data and parameters that are determined or available at validation, and remain fixed throughout the project crediting period (copy the table as necessary for each data/parameter). Data and parameters monitored during the operation of the project are included in Section 3.3.2 (Data and Parameters Monitored) below.

Data / Parameter	RRD Forest / Non-Forest Cover Benchmark Map
Data unit	Ha
Description	Map showing LULC class forest and non-forest at Project start date

Source of data	Landsat imagery from 1996, 2004, 2008 and 2012 obtained from INPES website
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	The data is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	Project Area Forest Cover Benchmark Map
Data unit	Ha
Description	Map that shows the stratification and location of LULC class forest in the project area at the project start date (100% forest cover)
Source of data	Landsat imagery from 1996, 2004, 2008, 2012, 2015, and 2020 obtained from INPES website
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	The data is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	Leakage Belt Forest Cover Benchmark Map
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Data unit	Ha
Description	Map that shows the stratification and location of LULC class forest in the Leakage belt at the project start date (100% forest cover)
Source of data	Landsat imagery from 1996, 2004, 2008, 2012, 2015, and 2020 obtained from INPES website
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	The data is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	ABSLRR_t
Data unit	Ha
Description	Annual area of baseline deforestation in the reference region at year t
Source of data	Calculated based on results from future deforestation model using peer-reviewed software IDRISI Selva
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	Variables and procedures to calculate baseline deforestation are thoroughly explained in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	ABSLP_t
Data unit	Ha
Description	Annual area of baseline deforestation in the reference region at year t
Source of data	Calculated based on results from future deforestation model using peer-reviewed software IDRISI Selva
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	Variables and procedures to calculate baseline deforestation are thoroughly explained in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	ABSL_LK_t
Data unit	Ha
Description	Annual area of baseline deforestation in the reference region at year t
Source of data	Calculated based on results from future deforestation model using peer-reviewed software IDRISI Selva
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	Variables and procedures to calculate baseline deforestation are thoroughly explained in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	Ctot_{fcl}
Data unit	tCO ₂ -e ha-1
Description	Average carbon stock of all accounted carbon pools in forest class fc/
Source of data	IPCC 2003 Good Practice Guidance for Land Use – Table 3.3.8
Value applied	51.65
Justification of choice of data or description of measurement methods and procedures applied	Data is a default value for land converted to grassland in Tropical-Moist & Wet Climate Zones.
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	CF
Data unit	tCt-1d.m
Description	Carbon fraction of dry matter
Source of data	IPCC 2003 Good Practice Guidance for Land Use, Chapter 3.2 Forest Land, page 3.25
Value applied	0.5
Justification of choice of data or description of measurement methods and procedures applied	The value chosen is an IPCC default value as recommended by VM0015 methodology
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	CF_j
Data unit	tCt-1d.m
Description	Carbon fraction for tree specie j
Source of data	IPCC Good Practice Guidance for Land Use, Chapter 3.2, Forest Land, page 3.25
Value applied	0.5
Justification of choice of data or description of measurement methods and procedures applied	The value chosen is an IPCC default value as recommended by the VM0015 methodology
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	f_j(DBH)_{ab}
Data unit	t.d.m. tree-1
Description	Allometric equation for species j linking DBH to aboveground biomass of living trees, expressed as t.d.m. tree-1
Source of data	Overman's 1994 equation Overman, Witte, et al (1994) corrected for biomass moisture content (Araujo, Higuchi, et al. 1999)
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	Above-ground biomass for a DBH ≥ 10 cm was calculated using Overman's equation (Overman, Witte, et al. 1994) corrected for biomass moisture content (Araujo, Higuchi, et al. 1999). Araujo tested Overman's equation in a location 250 kms from Belem in Para (close to the project area under the same forest type), obtaining predicted results within ±0.6% of the weight determined in the field through destructive sampling.
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only)

	- Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	LULC Change
Data unit	%
Description	Percentage of forest that change to non-forest final classes during the historical reference period
Source of data	Landsat imagery from 1996, 2004 and 2008 obtained from INPES website. SEMA (2010) Economic ecological zoning information for the northern area of Para.
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	Landsat imagery is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB. SEMA's data is available to the public and is the most up to date and scale adequate official data for the Project Area.
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	F_{burnt}^{icl}
Data unit	%
Description	Proportion of forest area burned during the historical reference period in the forest class <i>icl</i>
Source of data	Percentage of biomass that is left to burn after timber for wood products is extracted
Value applied	96%
Justification of choice of data or description of measurement methods and procedures applied	Data is derived from the assessment of durable wood products

Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	ERCH4
Data unit	Dimensionless
Description	Emission ratio for CH ₄ (IPCC default value = 0.012)
Source of data	VM0015 methodology
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	Default value indicated by VM0015 methodology
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	P_{burnt}_{p,icl}
Data unit	%
Description	Average proportion of mass burnt in carbon pool <i>p</i> in the forest class <i>icl</i>
Source of data	Percentage of biomass that is left to burn after timber for wood products is extracted
Value applied	96%
Justification of choice of data or description of measurement methods and procedures applied	Data is derived from the assessment of durable wood products

Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	C_{p,icl,t}
Data unit	tCO ₂ -e ha ⁻¹
Description	Average carbon stock per hectare in the carbon pool p burnt at year t in the forest class icl
Source of data	Determined by using data from carbon inventory developed by Vale Survey Company Data from IPCC Good Practice Guidance for Land Use Table 3.3.8
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	The inventory was carried out in 79 plots of forest comprising two classes namely dense forest and degraded forest, within an area that encompasses the project area and leakage belt. A detailed report can be found in Annex but as a summary the following are the highlights of the report: - Sampling plots were randomly located in forest stratum - DBH (Diameter at Breast Height) was measured for all the trees in a plot - Tree biomass was determined using Overman et al. 1994 equation, which was successfully tested nearby the project area by a different study. Data is a default value for land converted to grassland in Tropical-Moist & Wet Climate zones.
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	CE_{p,icl}
Data unit	Dimensionless
Description	Average combustion efficiency of the carbon pool p in the

	forest class <i>ic/</i>
Source of data	VM0015 methodology
Value applied	0.5
Justification of choice of data or description of measurement methods and procedures applied	Presented by VM0015 methodology ·
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	GWP_{CH4}
Data unit	Dimensionless
Description	Global warming potential for CH4 (IPCC default value = 21 for the first commitment period)
Source of data	VM0015 methodology
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	Presented by the VM0015 methodology
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	DLF
Data unit	%
Description	Displacement leakage factor

Source of data	VM0015 Methodology
Value applied	0
Justification of choice of data or description of measurement methods and procedures applied	Presented in the VM0015 methodology. The value is an ex-ante estimation.
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	LKB
Data unit	%
Description	Percentage of the overlapping leakage belts area to be assigned to project, A,B,...N
Source of data	Map of distance to selective logging from tertiary roads Map of distance to rivers Project area forest cover benchmark map
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	The data was generated using Landsat Imagery that is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB. Relevance of the variable is recognized in the literature
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	RF_t
Data unit	%
Description	Risk factor used to calculate VCS buffer credits

Source of data	AFOLU Non-Permanence Risk Tool V3.1
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	The value was calculated as a result of applying the guidelines in the aforementioned tool
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	R_j
Data unit	Dimensionless
Description	Root-shoot ratio appropriate for species, group of species of forest type j
Source of data	IPCC Good Practice Guidance for Land Use Table 3.3.8
Value applied	0.22
Justification of choice of data or description of measurement methods and procedures applied	Is the lowest value presented in the document for Tropical Wet forests in the IPCC's tables.
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	Cwp
Data unit	tCO ₂ -e ha ⁻¹
Description	Average carbon stock per hectare in the harvested wood products carbon pool

Source of data	Logging intensity Co-efficient of Volumetric efficiency Carbon Stock Change Factor Carbon Fraction for tree specie j Basic Wood density in specie j
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	Logging intensity was used as a default for Para as presented by Putz et al. 2008 Coefficient of Volumetric equation is an official default from CONOMA Wood density is a default value from IPCC 2003 Carbon Stock change factor was calculated using the lowest boundary of the 90% CI
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	$\Delta C_{tot,ct,t}$
Data unit	tCO ₂ -e ha ⁻¹
Description	Carbon stock change factor (also called emission factor) for all accounted carbon pools in category <i>ct</i> at time <i>t</i>
Source of data	Calculated
Value applied	798.02
Justification of choice of data or description of measurement methods and procedures applied	Value calculated based on the corrected values of carbon density for each pool at the lowest boundary of the 90% CI
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Data / Parameter	Map of distance to selective logging from tertiary roads
Data unit	Kms

Description	Average distance from tertiary roads to areas presenting selective logging
Source of data	Landsat imagery from 1996, 2004, 2008, 2012, 2015, and 2020 obtained from INPES website
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	The data is available to the public free of charge. Details about data pre and post-processing can be found in the excel sheet submitted to VVB. Relevance of the variable is recognized in the literature
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	Map of distance to rivers
Data unit	Kms
Description	Raster map of distances from navigable rivers in the RRD
Source of data	Landsat imagery from 1996, 2004, 2008, 2012, 2015, and 2020 obtained from INPES website
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	The data is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	Map of distance to roads
------------------	---------------------------------

Data unit	Kms
Description	Raster map of distances from navigable rivers in the RRD
Source of data	Landsat imagery from 1996, 2004, 2008, 2012, 2015, and 2020 obtained from INPES website
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	The data is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	Map of distance to non-forest
Data unit	Kms
Description	Raster map of distances from all roads in the RRD
Source of data	Landsat imagery from 1996, 2004, 2008, 2012, 2015, and 2020 obtained from INPES website
Value applied	<i>Provide the value applied</i>
Justification of choice of data or description of measurement methods and procedures applied	The data is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	Logging intensity
Data unit	m3/ha
Description	Volume of commercial timber extracted per hectare in Para
Source of data	Putz et al. 2008
Value applied	30
Justification of choice of data or description of measurement methods and procedures applied	Data comes a peer reviewed publication
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	Coefficient of Volumetric Efficiency
Data unit	NA
Description	Proportion of wood that actually makes it all the way to durable wood products
Source of data	CONAMA 2009
Value applied	0.45
Justification of choice of data or description of measurement methods and procedures applied	Data comes from an official source
Purpose of the data	<i>Indicate one of the following:</i> • Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A

Data / Parameter	EI
Data unit	%
Description	Ex-ante estimated effectiveness index
Source of data	Calculated
Value applied	??
Justification of choice of data or description of measurement methods and procedures applied	Based on results from ongoing on-site monitoring activities since 2008
Purpose of the data	<i>Indicate one of the following:</i> - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	N/A

Table 10: Notations and Descriptions

Notation	Description	Unit	Equation	Observation
A	Area of error due to observed change predicted as persistence	Ha	13	Was not used / Does not apply
Average _i	Area of “average” forest land suitable for conversion to non-forest land within stratum	Ha	5.b, 6.b, 10	Was not used / Does not apply
Average _{i,t1}	Area with forest cover in stratum <i>i</i> on “average” areas at time <i>t1</i>	Ha	6.b	Was not used / Does not apply
Average _{i,t2}	Area with forest cover in stratum <i>i</i> on “average” areas at time <i>t2</i>	Ha	6.b	Was not used / Does not apply
ABSLL _{fcl,t}	Area of final (post-deforestation) non-forest class <i>fcl</i> deforested at time <i>t</i> within the leakage belt in the baseline case	Ha	14	Was not used / Does not apply
ABSLL _{Kct,t}	Area of category <i>ct</i> deforested at time <i>t</i> within the leakage belt in the baseline case	Ha	15	Was not used / Does not apply
ABSLL _{Kicl,t}	Area of initial (pre-deforestation) forest class <i>icl</i>	Ha	14	Was not used / Does not apply

	deforested at time t within the leakage belt in the baseline case			
$ABSLP_{Act,t}$	Area of category ct forest deforested at time t within the project area in the baseline case	Ha	15	Was not used / Does not apply
$ABSLP_{fct,t}$	Area of final (post-deforestation) non-forest class fcl deforested at time t within the project area in the baseline case	Ha	14	Was not used / Does not apply
$ABSLP_{icl,t}$	Area of initial (pre-deforestation) forest class icl deforested at time t within the project area in the baseline case	Ha	14	Was not used / Does not apply
$ABSLRR_{opt_hrpi}$	Average area deforested in $Average_i$ during the historical reference period	Ha	5.a	Was not used / Does not apply
$ABSLRR_{fcl,t}$	Area of final (post-deforestation) non-forest class fcl deforested at time t within the reference region in the baseline case	Ha	14	Was not used / Does not apply
$ABSLRR_{i,t}$	Annual area of baseline deforestation in stratum i with the reference region at year t	Ha	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Was not used / Does not apply
$ABSLRR_{i,taverage}$	Annual area of baseline deforestation in stratum i with the reference region at year $taverage_i$	Ha	11	Was not used / Does not apply
$ABSLRR_{icl,t}$	Area of initial (pre-deforestation) forest class icl deforested at time t within the reference region in the baseline case	Ha	14	Was not used / Does not apply
$ABSLRR_{opt_hrpi}$	Average area deforested in $A_{optimali}$ during the historical reference period	Ha	5.b	Was not used / Does not apply
$ABSLRR_{opt_hrpi}$	Average area deforested in $A_{suboptimali}$ during the historical reference period	Ha	5.c	Was not used / Does not apply
$ABSLRR_{i,taverage}$	Annual area of baseline deforestation in stratum i with the reference region at a year $taverage_i$	Ha yr-1	11	Was not used / Does not apply
$A_{optimali}$	Area of "optimal" forest land suitable for conversion to non-forest land within stratum i	Ha	3, 7	Was not used / Does not apply

<i>Aoptimali,t1</i>	Area of forest cover in stratum <i>i</i> on optimal areas at time <i>t1</i>	Ha	6.a	Was not used / Does not apply
<i>Aoptimali,t2</i>	Area of forest cover in stratum <i>i</i> on optimal areas at time <i>t2</i>	Ha	6.a	Was not used / Does not apply
AP	Plot Area	m2	A3-13	Was not used / Does not apply
APDPAicl,t	Areas of planned deforestation in forest class <i>icl</i> at year <i>t</i> in the project area	Ha		Was not used / Does not apply
APFicl,t	Annual area of planned fuel-wood and charcoal activities in forest-class <i>icl</i> at year <i>t</i> in the project area	Ha		Was not used / Does not apply
APLPAicl,t	Areas of planned logging activities in forest class <i>icl</i> at year <i>t</i> in the project area	Ha		Was not used / Does not apply
APNiPAicl,t	Annual area of forest class <i>icl</i> with increasing carbon stock without harvest at year <i>t</i> in the project area	Ha		Was not used / Does not apply
ARRaveragei,t1	Area with forest cover in stratum <i>i</i> on average and sub-optimal areas at time <i>t1</i>	Ha	4.b	Was not used / Does not apply
ARRaveragei,t2	Area with forest cover in stratum <i>i</i> on average and sub-optimal areas at time <i>t2</i>	Ha	4.b	Was not used / Does not apply
ARRi	Total forest area in stratum <i>i</i> within the reference region at the project start date	Ha	6, 11	Was not used / Does not apply
ARRi,t-1	Area with forest cover in stratum <i>i</i> within the reference region a year <i>t-1</i>	Ha	3	Was not used / Does not apply
ARRoptimali,t1	Area with forest cover in stratum <i>i</i> on optimal areas at time <i>t1</i>	Ha	4.a	Was not used / Does not apply
ARRoptimali,t2	Area with forest cover in stratum <i>i</i> on optimal areas at time <i>t2</i>	Ha	4.a	Was not used / Does not apply
ARRsub-optimali,t1	Area with forest cover in stratum <i>i</i> on sub-optimal areas at time <i>t1</i>	Ha	4.c	Was not used / Does not apply
ARRsub-optimali,t2	Area with forest cover in stratum <i>i</i> on sub-optimal areas at time <i>t2</i>	Ha	4.c	Was not used / Does not apply
Asub-optimali,t1	Area with forest cover in stratum <i>i</i> on "sub-optimal" areas at time <i>t1</i>	Ha	6.c	Was not used / Does not apply
Asub-optimali,t2	Area with forest cover in stratum <i>i</i> on "sub-optimal" areas at time <i>t2</i>	Ha	6.c	Was not used / Does not apply
B	Area correct due to observed change predicted as change	Ha	13	Was not used / Does not apply
BCEF	Biomass conversion and expansion factor for	Dimensionless	A3-9, A3-36	Was not used / Does not apply

	conversion of merchantable volume of total aboveground tree biomass			
BEFpl	Biomass expansion factor for converting volumes of extracted round wood to total above-ground biomass (including bark), applicable to tree tr, in plot pl	Dimensionless	A3-21	Was not used / Does not apply
Cabcl	Average carbon stock per hectare in above-ground biomass carbon pool of LU/LC class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-6, A3-14, A3-36	Was not used / Does not apply
<i>Cabntcl</i>	Average carbon stock per hectare in the above-ground non-tree biomass carbon pool of LU/LC class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-7, A3-24	Was not used / Does not apply
<i>Cabtcl</i>	Average carbon stock per hectare in the above-ground tree biomass carbon pool of LU/LC class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-7	Was not used / Does not apply
<i>Cbbcl</i>	Average carbon stock per hectare below-ground biomass carbon pool of LU/LC class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-6, A3-17	Was not used / Does not apply
<i>Cbbntcl</i>	Average carbon stock per hectare below-ground non-tree biomass carbon pool of LU/LC Class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-8	Was not used / Does not apply
<i>Cbbtcl</i>	Average carbon stock per hectare below-ground tree biomass carbon pool of LU/LC class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-8	Was not used / Does not apply
<i>Cdwcl</i>	Average carbon stock per hectare in the dead wood biomass carbon pool of LU/LC class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-6, A3-25	Was not used / Does not apply
CFdc	Carbon fraction of the density class <i>dc</i>	Tonnes C (tonne d.m.) ⁻¹	A3-30	Was not used / Does not apply
<i>cl</i>	1,2,3,... <i>cl</i> LU/LC Classes	Dimensionless	A3-3	Was not used / Does not apply
<i>Clcl</i>	Average carbon stock per hectare in the litter carbon pool of LU/LC class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-6	Was not used / Does not apply
<i>Cldwcl</i>	Average carbon stock per hectare in lying dead wood carbon pool of LU/LC class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-25, A3-30	Was not used / Does not apply
<i>Csdwcl</i>	Average carbon stock per hectare in standing dead wood carbon pool of LU/LC class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-25	Was not used / Does not apply
<i>Csoccl</i>	Average carbon stock per hectare in soil organic carbon pool of LU/LC class <i>cl</i>	tCO ₂ -e ha ⁻¹	A3-6, A3-33	Was not used / Does not apply
<i>Csocpl</i>	Carbon stock per hectare in	tCO ₂ -e ha ⁻¹	A3-33	Was not used /

	the soil organic carbon pool estimated for the plot <i>p</i> /	1		Does not apply
<i>ct</i>	1,2,3,... CT categories of LU/LC change	Dimensionless	15	Was not used / Does not apply
<i>CXB_{w,icl,t}</i>	Mean carbon stock per hectare of extracted biomass carbon by class of wood product <i>w</i> for forest class <i>icl</i> at time <i>t</i>	tCO ₂ -e ha ⁻¹	A3-35, A3-37	Was not used / Does not apply
<i>d1, d2, ..., dn</i>	Diameters of intersecting pieces of dead wood	cm	A3-29	Was not used / Does not apply
<i>DBI</i>	Daily biomass intake	kg d.m. head ⁻¹ day ⁻¹	A4-2	Was not used / Does not apply
<i>dc</i>	1,2,3, dead wood density classes	Dimensionless	A3-30	Was not used / Does not apply
<i>DC</i>	Total number of density classes (3)	Dimensionless	A3-30	Was not used / Does not apply
☐ CBSLPAt	Total baseline carbon stock change within the project area at year <i>t</i>	t CO ₂ -e	14, 25	Was not used / Does not apply
☐ Cdwct	Average carbon stock change factor in the dead wood biomass carbon pool of category <i>ct</i>	tCO ₂ -e ha ⁻¹		Was not used / Does not apply
☐ CFCdPA _t	Total decrease in carbon stock due to forest fires and catastrophic events at year <i>t</i> in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CFCiPA _t	Total increase in carbon stock due to forest fires and catastrophic events at year <i>t</i> in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CLK _t	Total decrease in carbon stocks within the leakage belt at year <i>t</i>	tCO ₂ -e		Was not used / Does not apply
☐ CPAdPA _t	Total decrease in carbon stock due to planned activities at year <i>t</i> in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CPAiPA _t	Total increase in carbon stock due to planned activities at year <i>t</i> in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CPDdPA _t	Total decrease in carbon stock due to planned deforestation at year <i>t</i> in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CPFdPA _t	Total decrease in carbon stock due to planned fuel-wood and charcoal activities at year <i>t</i> in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CPFiPA _t	Total increase in carbon stock due to planned fuel-wood and charcoal activities at year <i>t</i> in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CPLdPA _t	Total decrease in carbon stock due to planned logging	tCO ₂ -e		Was not used / Does not apply

	activities at year t in the project area			
☐ CPLiPat	Total increase in carbon stock due to planned logging activities at year t in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CPNiPat	Total increase in carbon stock due to planned protection of growing forest classes in the project area at year t	tCO ₂ -e		Was not used / Does not apply
☐ CPSPat	Total project carbon stock change within the project area at year t	tCO ₂ -e	25	Was not used / Does not apply
☐ Csocct	Average carbon stock change factor in the soil organic carbon pool of category ct	tCO ₂ -e ha ⁻¹		Was not used / Does not apply
☐ CUCdPat	Total decrease in carbon stock due to catastrophic events at year t in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CUCiPat	Total increase in carbon stock due to catastrophic events at year t in the project area	tCO ₂ -e		Was not used / Does not apply
yiuyers	Total actual carbon stock change due to unavoided unplanned deforestation at year t in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CUFdPat	Total decrease in carbon stock due to unplanned (and planned – where applicable) forest fires at year t in the project area	tCO ₂ -e		Was not used / Does not apply
☐ CUFiPat	Total increase in carbon stock in areas affected by forest fires (after such events) at year t in the project area	tCO ₂ -e		Was not used / Does not apply
☐ Cwpct	Average carbon stock change factor in harvested wood products carbon pool (stock remaining in wood products after 100 years) of category ct	tCO ₂ -e ha ⁻¹		Was not used / Does not apply
<i>Ddc</i>	Dead wood density of class dc	tonnes d.m. m ⁻³	A3-30	Was not used / Does not apply
<i>Dm</i>	Deadwood density	g cm ⁻³	A3-28	Was not used / Does not apply
<i>DMpl</i>	Dry mass of sample pl	tonnes of d.m.	A3-24	Was not used / Does not apply
<i>EBBBSLPat</i>	Sum of (or total) baseline non-CO ₂ emissions from forest fire at year t in the project area	tCO ₂ -e		Was not used / Does not apply
<i>EBBCO2icl</i>	Per hectare CO ₂ emissions from biomass burning in slash and burn in forest class icl	tCO ₂ -e ha ⁻¹	17, 18, 19	Was not used / Does not apply

<i>EBBN2Oicl</i>	N2O emissions from biomass burning in forest class <i>icl</i>	tCO2-e	16, 17	Was not used / Does not apply
<i>EBBPSPAt</i>	Sum of (or total) actual non-CO2 emissions from forest fire at year <i>t</i> in the project area	tCO2-e		Was not used / Does not apply
<i>EBBtoticl</i>	Total GHG emissions from biomass burning in forest class <i>icl</i>	tCO2-e	16	Was not used / Does not apply
<i>ECH4fermt</i>	CH4 emissions from enteric fermentation at year <i>t</i>	tCO2-e	A4-1	Was not used / Does not apply
<i>ECH4mant</i>	CH4 emissions from manure management at year <i>t</i>	tCO2-e	A4-3	Was not used / Does not apply
<i>EdirN2Omant</i>	Direct N2O emissions from manure management at year <i>t</i>	tCO2-e	A4-4, A4-5	Was not used / Does not apply
<i>EF1</i>	Enteric CH4 emission factor for the livestock group	Kg CH4 head-1 yr-1	A4-1	Was not used / Does not apply
<i>EF1</i>	Emission factor for emissions from N inputs	tN2O tN-1		Was not used / Does not apply
<i>EF2</i>	Manure management CH4 emission factor for the livestock group	Kg CH4 head-1 yr-1	A4-3	Was not used / Does not apply
<i>EF3</i>	Emission factor for N2O emissions from manure management for the livestock group	Kg N2O-N (kg N-1) head-1 yr-1	A4-5	Was not used / Does not apply
<i>EF4</i>	Emission factor for N2O emissions from atmospheric deposition of forage-sourced nitrogen on soils and water surfaces	Kg N2O-N (kg NH3-N and NOx-N emitted)-1 head-1 yr-1	A4-6	Was not used / Does not apply
<i>EgLKt</i>	Emissions from grazing animals in leakage management areas at year <i>t</i>	t CO2-e	23	Was not used / Does not apply
<i>EindNOMant</i>	Indirect N2O emissions from manure management at year <i>t</i>	t CO2-e	A4-4, A4-5	Was not used / Does not apply
<i>ELKt</i>	Sum of ex-ante estimated leakage emission at year <i>t</i>	t CO2-e	23	Was not used / Does not apply
<i>EN2Omant</i>	N2O emissions from manure management at year <i>t</i>	t CO2-e	A4-4	Was not used / Does not apply
<i>ERN2O</i>	Emission factor for N2O (IPCC default value = 0.007)	Dimensionless	17	Was not used / Does not apply
<i>fcl</i>	1,2,3,...fcl final (post-deforestation) non-forest classes	Dimensionless	14	Was not used / Does not apply
<i>GWPN2O</i>	Global warming potential for N2O (IPCC default value = 310 for the first commitment period)	Dimensionless	17	Was not used / Does not apply
<i>H</i>	Height of the tree	Meters	A3-27	Was not used / Does not apply
<i>i</i>	1,2,3,...IRRA Stratum within the reference region	Dimensionless	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Was not used / Does not apply
<i>icl</i>	1,2,3,...icl initial (pre-	Dimensionless	14	Was not used /

	deforestation) forest classes	ess		Does not apply
<i>j</i>	Number of organic fertilizer classes	Dimensionless		Was not used / Does not apply
<i>L</i>	Length of the line	m	A3-29	Was not used / Does not apply
<i>NCR</i>	Nitrogen/Carbon ratio (IPCC default value = 0.01)	Dimensionless	17	Was not used / Does not apply
<i>Nex</i>	Annual average N excretion per livestock head	kg N head-1 yr-1	A4-6	Was not used / Does not apply
<i>OFW</i>	Fraction of wood products that will be emitted to the atmosphere between 5 and 100 years of timber harvest	Dimensionless	A3-35, A3-37	Was not used / Does not apply
<i>p</i>	Carbon pool that could burn (above-ground biomass, deadwood and litter)	Dimensionless	19	Was not used / Does not apply
<i>PCabpl</i>	Carbon stock in above-ground biomass in plot <i>p</i>	tC ha-1	A3-13	Was not used / Does not apply
<i>PCbbpl</i>	Carbon stock in below-ground biomass in plot <i>p</i>	tC ha-1	A3-16	Was not used / Does not apply
<i>Pcomicl</i>	Commercial volume as a percent of total aboveground volume in initial forest class <i>icl</i>	Dimensionless	A3-36	Was not used / Does not apply
<i>PCxi</i>	Average in situ production costs for one ton of product <i>Px</i> in stratum <i>i</i>	\$/t	1	Was not used / Does not apply
<i>Pforaget</i>	Production of forage at year <i>t</i>	kg d. m. yr-1	A4-2	Was not used / Does not apply
<i>pl</i>	1,2,3,... <i>PLcl</i> plots in LU/LC class <i>cl</i>	Dimensionless	A3-14, A3-17, A3-24, A3-33	Was not used / Does not apply
<i>PLcl</i>	Total number of plots in LU/LC class <i>cl</i>	Dimensionless	A3-14, A3-17, A3-24, A3-34	Was not used / Does not apply
<i>Po</i>	Anhydrous weight of sample	g	A3-28	Was not used / Does not apply
<i>Populationt</i>	Equivalent number of forage-fed livestock at year <i>t</i>	number of heads	A4-1	Was not used / Does not apply
<i>PPi,t</i>	Proportion of stratum <i>i</i> that is within the project area at time <i>t</i>	%	12	Was not used / Does not apply
<i>PPxi</i>	Potential profitability of product <i>Px</i> at the location <i>i</i> (pixel or polygon)	\$/t	1	Was not used / Does not apply
<i>Ps</i>	Saturated weight of sample	g	A3-28	Was not used / Does not apply
<i>Px</i>	Product <i>x</i> produced in the reference region	Dimensionless	1	Was not used / Does not apply
<i>r1</i>	Radius at the base of the tree	meters	A3-27	Was not used / Does not apply
<i>r2</i>	Radius at the top of the tree	meters	A3-27	Was not used / Does not apply
<i>RBSLRR_avgi,t</i>	Deforestation rate applicable to stratum <i>i</i> within the reference region at year <i>t</i> after <i>Toptimali</i> years and during <i>Taveragei</i> years	%	4.b	Was not used / Does not apply
<i>RBSLRR_opti,t</i>	Deforestation rate applicable	%	4.a	Was not used /

	to stratum i within the reference region at year t during the first $T_{optimali}$ years			Does not apply
$RBSLRR_{sopti,t}$	Deforestation rate applicable to stratum i within the reference region at year t after $T_{optimali} + T_{averagei}$ and during $T_{sub-optimali}$ years	%	4.c	Was not used / Does not apply
$RBSLRR_{i,t}$	Percentage of remaining forest area at year $t-1$ in stratum i to be deforested at year t	%	11	Was not used / Does not apply
$R_{j,pl,tr}$	Root-shoot ratio, applicable to tree tr of species j in plot pl	Dimensionless	A3-22	Was not used / Does not apply
$S\$x$	Selling price of product P_x	\$/t	1	Was not used / Does not apply
$SLFw$	Fraction of wood products that will be emitted to the atmosphere within 5 years of timber harvest	Dimensionless	A3-35, A3-37	Was not used / Does not apply
$SPxI$	Selling point I of product P_x	map	1	Was not used / Does not apply
t	1,2,3,... T a year of the proposed crediting period	Dimensionless	Almost all equations	Was not used / Does not apply
t^*	The year at which the area $ABSLPA_{fcl,t}$ is deforested in the baseline scenario	Dimensionless	A3-34	Was not used / Does not apply
$T_{averagei}$	Number of years in which $A_{averagei}$ is deforested in the baseline case	yr	5	Was not used / Does not apply
$t_{averagei}$	Year at which $T_{averagei}$ ends	yr	9, 11	Was not used / Does not apply
T_{Babj}	Above-ground biomass of a tree of species, or species group, or forest type j	kg tree ⁻¹ or t tree ⁻¹	A3-10	Was not used / Does not apply
T_{Babtr}	Above-ground biomass of tree tr	kg tree ⁻¹ or t tree ⁻¹	A3-11, A3-13, A3-21	Was not used / Does not apply
T_{Cabtr}	Carbon stock in above-ground biomass of tree tr	kg tree ⁻¹ or t tree ⁻¹	A3-11, A3-21	Was not used / Does not apply
T_{Cbbtr}	Carbon stock in below-ground biomass of tree tr	kg C tree ⁻¹	A3-16, A3-22	Was not used / Does not apply
TC_v	Average transport cost per kilometer for one ton of product P_x on land, river or road of type v	\$/t/km	1	Was not used / Does not apply
TD_v	Transport distance on land, river or road of type v	\$/t/km	1	Was not used / Does not apply
$Thrp$	Duration of the historical reference period	yr	2	Was not used / Does not apply
$T_{optimali}$	Number of years since the start of the AUFDP project activity in which $A_{optimali}$ in stratum i is deforested in the baseline case	yr	5	Was not used / Does not apply

<i>toptimali</i>	Year at which <i>Toptimali</i> ends	yr	7, 8, 9	Was not used / Does not apply
<i>tr</i>	1,2,3,... TRpl number of trees in plot <i>pl</i>	Dimensionless	A3-13	Was not used / Does not apply
<i>Tsub-optimali</i>	Number of years in which <i>Asub-optimali</i> is deforested in the baseline case	yr	5	Was not used / Does not apply
<i>v</i>	1,2,3,... V type of surface on which transport occurs	Dimensionless	1	Was not used / Does not apply
<i>V1i,t;V2i,t;...;Vni,t</i>	Variables included in a deforestation model		11	Was not used / Does not apply
<i>VBCt</i>	Number of Voluntary Buffer Credits deposited in the VCS Buffer at time <i>t</i>	t CO ₂ -e	24, 25	Was not used / Does not apply
<i>VCUt</i>	Number of Voluntary Carbon Units (VCUs) to be made available for trade at time <i>t</i>	t CO ₂ -e	24	Was not used / Does not apply
<i>VEF</i>	Volume Expansion Factor	Dimensionless	A3-9	Was not used / Does not apply
<i>VEXw,j,fcl,t</i>	Volume of timber for product class <i>w</i> , of species <i>j</i> , extracted from within forest class <i>fcl</i> , at time <i>t</i>	m ³	A3-34	Was not used / Does not apply
<i>VOB10</i>	Volume over bark above 10cm DBH	m ³	A3-9	Was not used / Does not apply
<i>VOB30</i>	Volume over bark above 30cm DBH	m ³	A3-9	Was not used / Does not apply
<i>Volumedc</i>	Volume of lying dead wood in the density class <i>dc</i>	m ³	A3-30	Was not used / Does not apply
<i>Vpl</i>	Commercial volume of plot <i>pl</i>	m ³ plot-1	A3-19	Was not used / Does not apply
<i>Vtr</i>	Commercial volume of tree <i>tr</i>	m ³	A3-18, A3-21	Was not used / Does not apply
<i>w</i>	1,2,3,... W wood product class (sawn-wood, wood-based panels, other industrial round-wood, paper and paper board, and other)	Dimensionless	A3-34	Was not used / Does not apply
<i>WWw</i>	Wood waste for wood product class <i>w</i> . the fraction immediately emitted through mill inefficiency	Dimensionless	A3-35, A3-37	Was not used / Does not apply
<i>XF</i>	Plot expansion factor form per plot values to per hectare values	Dimensionless	A3-12, A3-13, A3-16, A3-19, A3-20, A3-24	Was not used / Does not apply

3.3.2 Data and Parameters Monitored

Complete the table below for all data and parameters that monitored during the project crediting period (copy the table as necessary for each data/parameter). Data and parameters determined or available at validation are included in Section 3.3.1 (Data and Parameters Available at Validation) above.

Data / Parameter	RRD Forest / Non-Forest cover benchmark Map
Data unit	Ha
Description	Map showing LULC class forest and non-forest at project start date
Source of data	Landsat imagery from 1996, 2004, 2008, 2012, 2015, and 2020 obtained from INPES website
Description of measurement methods and procedures to be applied	The data is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB.
Frequency of monitoring/recording	At the start of every fixed baseline period
Value monitored	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.</i>
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions.</i> <i>Calculation of project emissions.</i> <i>Calculation of leakage.</i>
Calculation method	<i>Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	N/A

Data / Parameter	Project area forest cover benchmark map
Data unit	Ha
Description	Map that shows the stratification and location of

	LULC class forest in the project area at the project start date (100% forest cover)
Source of data	Landsat imagery from 1996, 2004, 2008, 2012, 2015, and 2020 obtained from INPES website
Description of measurement methods and procedures to be applied	The data is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB.
Frequency of monitoring/recording	At the start of every fixed baseline period
Value monitored	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.</i>
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions.</i> <i>Calculation of project emissions.</i> <i>Calculation of leakage.</i>
Calculation method	<i>Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	N/A

Data / Parameter	Leakage belt forest cover benchmark map
Data unit	Ha
Description	Map that shows the stratification and location of LULC class forest in the leakage belt at the project start date (100% forest cover)
Source of data	Landsat imagery from 1996, 2004, 2008, 2012, 2015, and 2020 obtained from INPES website
Description of measurement methods and procedures to be applied	The data is available to the public free of charge. Details about data pre and post processing can be found in the excel sheet submitted to VVB.
Frequency of monitoring/recording	At the start of every fixed baseline period
Value monitored	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of</i>

	<i>equipment, as appropriate.</i>
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions.</i> <i>Calculation of project emissions.</i> <i>Calculation of leakage.</i>
Calculation method	<i>Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	N/A

Data / Parameter	ABSLRR_t
Data unit	Ha
Description	Annual area of baseline deforestation in the reference region at year <i>t</i>
Source of data	Calculated based on the results from future deforestation model using peer-reviewed software IDRISI Selva
Description of measurement methods and procedures to be applied	Variables and procedures to calculate baseline deforestation are thoroughly explained in the excel sheet submitted to VVB.
Frequency of monitoring/recording	Each renewal of fixed baseline period
Value monitored	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.</i>
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions.</i> <i>Calculation of project emissions.</i> <i>Calculation of leakage.</i>
Calculation method	<i>Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	N/A

Data / Parameter	ABSLPAt
Data unit	Ha
Description	Annual area of baseline deforestation in the project area at year t
Source of data	Calculated based on the results from future deforestation model using peer-reviewed software IDRISI Selva
Description of measurement methods and procedures to be applied	Variables and procedures to calculate baseline deforestation are thoroughly explained in the excel sheet submitted to VVB. .
Frequency of monitoring/recording	Each renewal of fixed baseline period
Value monitored	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.</i>
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions.</i> <i>Calculation of project emissions.</i> <i>Calculation of leakage.</i>
Calculation method	<i>Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	N/A

Data / Parameter	ABSLLKt
Data unit	Ha
Description	Annual area of baseline deforestation in the leakage belt at year t
Source of data	Calculated based on the results from future deforestation model using peer-reviewed software IDRISI Selva
Description of measurement methods and procedures to be applied	Variables and procedures to calculate baseline deforestation are thoroughly explained in the excel sheet submitted to VVB.
Frequency of	Each renewal of fixed baseline period

monitoring/recording	
Value monitored	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.</i>
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions.</i> <i>Calculation of project emissions.</i> <i>Calculation of leakage.</i>
Calculation method	<i>Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	N/A

Data / Parameter	LULC Change
Data unit	%
Description	Percentage of forest that change to non-forest final classes during the historical reference period
Source of data	Landsat imagery from 1996, 2004, 2008, 2012, 2015, and 2020 obtained from INPES website. SEMA (2010) Economic-ecological zoning information for the northern area of Para
Description of measurement methods and procedures to be applied	Landsat imagery is available to the public free of charge. Details about data pre and post-processing can be found in the excel sheet submitted to VVB. SEMA's data is available to the public and is the most up to date and scale adequate official data for the project area
Frequency of monitoring/recording	At project start
Value monitored	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.</i>
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.

Purpose of the data	Indicate one of the following: - Calculation of baseline emissions. - Calculation of project emissions. - Calculation of leakage.
Calculation method	Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.
Comments	N/A

Data / Parameter	DLF
Data unit	%
Description	Displacement Leakage factor
Source of data	VM0015 methodology
Description of measurement methods and procedures to be applied	Presented in the VM0015 methodology. The value is an ex-ante estimation
Frequency of monitoring/recording	Each renewal of fixed baseline period
Value monitored	0
Monitoring equipment	Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.
Purpose of the data	Indicate one of the following: - Calculation of baseline emissions. - Calculation of project emissions. - Calculation of leakage.
Calculation method	Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.
Comments	N/A

Data / Parameter	%LKB
Data unit	%
Description	Percentage of the overlapping leakage belts area to be assigned to project A,B,...N
Source of data	Map of distance to selective logging from tertiary

	roads Map of distance to rivers Project area forest cover benchmark map
Description of measurement methods and procedures to be applied	The data was generated using Landsat imagery that is available to the public free of charge. Details about pre and post-processing can be found in the excel sheet submitted to VVB. Relevance of the variable is recognized in the literature
Frequency of monitoring/recording	At project start and at each verification
Value monitored	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.</i>
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions.</i> <i>Calculation of project emissions.</i> <i>Calculation of leakage.</i>
Calculation method	<i>Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	N/A

Data / Parameter	RFt
Data unit	%
Description	Risk factor used to calculate VCS buffer credits
Source of data	A
Description of measurement methods and procedures to be applied	The value was calculated as a result of applying the guidelines in the aforementioned tool
Frequency of monitoring/recording	Each renewal of fixed baseline period
Value monitored	
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of</i>

	<i>equipment, as appropriate.</i>
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions.</i> <i>Calculation of project emissions.</i> <i>Calculation of leakage.</i>
Calculation method	<i>Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	N/A

Data / Parameter	EI
Data unit	%
Description	Ex ante estimated effectiveness index
Source of data	Calculated
Description of measurement methods and procedures to be applied	Based on results from ongoing on-site monitoring activities since 2008
Frequency of monitoring/recording	At project start and annually
Value monitored	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.</i>
QA/QC procedures to be applied	Through accuracy assessment in the excel sheet submitted to VVB.
Purpose of the data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions.</i> <i>Calculation of project emissions.</i> <i>Calculation of leakage.</i>
Calculation method	<i>Where relevnt, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	N/A

Data / Parameter	
Data unit	<i>Indicate the unit of measure</i>
Description	<i>Provide a brief description of the data/parameter</i>
Source of data	<i>Indicate the source(s) of data</i>
Description of measurement methods and procedures to be applied	<i>Specify the measurement methods and procedures, any standards or protocols to be followed, and the person/entity responsible for the measurement. Include any relevant information regarding the accuracy of the measurements (e.g., accuracy associated with meter equipment or laboratory tests).</i>
Frequency of monitoring/recording	<i>Specify measurement and recording frequency</i>
Value applied	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.</i>
QA/QC procedures to be applied	<i>Describe the quality assurance and quality control (QA/QC) procedures to be applied, including the calibration procedures where applicable.</i>
Purpose of data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions</i> <i>Calculation of project emissions</i> <i>Calculation of leakage</i>
Calculation method	<i>Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	<i>Provide any additional comments</i>

3.3.3 Monitoring Plan

The justification for the selection of the carbon pools is presented below (see Table 20). Selection of carbon pools followed the guidelines of VCS VM0015 methodology. *Refer to validated VCS PD for details*

Table 11: Carbon Pools

Carbon pools	Included / TBD/Excluded	Justification / Explanation of choice
Above-ground	Included	Carbon stock change in this pool

		is always significant
Below-ground	Included	Included to account for all the Trees biomass.
Dead wood	Excluded	This pool is less present in the Baseline scenario than in the Project scenario, thus is conservatively excluded.
Harvested wood products	Excluded	This pool didn't pass 5% significance test.
Litter	Included	This pool should be excluded according to VCS vm0015 methodology.
Soil organic carbon	Excluded	Not to be measure when forest is Converted to pastures according To VCS vm0015 methodology.

Quality control and quality assurance procedures:

As monitoring is conducted mainly by using remote sensing imagery in a GIS environment, quality management procedures are related with GIS data quality. When working with geographical information, positional accuracy is often synonymous with data quality. Data compilation from several different sources often requires very good data quality. Quality procedures must be employed to ensure that data are properly collected, handled, processed, used and maintained throughout the data lifecycle while performing monitoring activities.

For Satellite Images, GIS and GPS data:

Quality Management Procedures before data collection:

- Monitoring has been done by trained project personnel, understanding the importance of accurate data collecting.
- Format: Satellite Images were collected in TIFF raster digital format. Vector files were collected in shape file GIS format. GPS was also be collected in digital format.
- Spatial Reference: Data was always use the Projected UTM System, South 22 Zone, and Datum WGS84.
- Imagery: Landsat LCDM (Landsat 8) is the type of image selected for permanent monitoring.
- Source: Imagery was downloaded from the US Geologic Survey website

(Currently <http://glovis.usgs.gov/>).

- Responsibility for quality assurance was assigned to a person with adequate background suitable to the task.
- References on GPS and satellite images calibration are described in this document in the section "Equipment calibration".
- Metadata: Metadata was created for the data to be collected.
- GPS accuracy: To obtain accuracies such as those reported, the GPS Receiver must be located in an area that is free from overhead obstructions and reflective surfaces and have a good field of view to the horizon (for example, they do not work very well under a heavy forest canopy). Data coordinates was collected in meters using the spatial reference units noted above.
- The staff member for monitoring evaluates the data gathering team to identify errors in field techniques, verify measurements processes and correct any identified problems before measurements are carried out.

Quality Management Procedures during data entry:

- Protocols and Guides: Data in digital formats must be treated according to protocols on data management. Methodology to process and classify satellite images must be carried out according to the annexed section on "Classification and Accuracy Assessment".
- Design an efficient storage system for the data: Data was stored in a computerized database for use with specialized software (GPS, GIS, Remote sensing) for processing it. One person should be in charge of managing this dataset.
- All modifications to the dataset shall be documented.

Quality Management Procedures after data entry:

- Regular backup of data helps ensure consistent quality levels.
- Data integrity: Data should not be altered or destroyed in an unauthorized manner, or should not be accidentally or maliciously modified.
- Data integration: Geographical datasets are difficult to integrate when there are inconsistencies between them, which may involve both the spatial and attributes characteristics of the data.
- Given the timeframe of the project, and the pace of production of updated versions of software and new hardware for storing data, electronic copies of data and reports were periodically updated or converted to a format that can be assessed by any future software applications.

All activities included in the Monitoring Plan are documented, as guides or protocols to be used permanently. It is required a data quality testing in each phase of data capture, including validation of GPS coordinates measured in the field (at a level community scale), choice of relevant data from a relevant source, positional accuracy of satellite images and GIS data, using automated GIS software tools and accuracy assessment of classified images.

Positional accuracy in satellite images.

It is very important to ensure that remote sensing images in a time series overlay properly to each other and to other GIS maps used in the analysis. To geometrically correct the acquired images, it is necessary to have at least one other rectified image to use as a reference image, and to undertake a process called geo-referencing.

Images were geometrically corrected to the projection UTM Zone 22 South datum WGS 1984 using another rectified image by collecting manually selected control points in both images. Among the features to be identified as control point locations we have road or stream intersections, the mouth of a stream, the corner of an established plot, or roads corners. The second-order polynomial transformation and the nearest neighbor resampling technique could be used to correct images. RMS errors of less than one pixel obtained from the geometric correction process were acceptable.

Accuracy of the baseline deforestation

Accuracy assessment has followed the guidelines of the document „Methodology Procedures Used in Processing, Classification, and Accuracy Assessment of Remotely Sensed Data” included the excel sheet submitted to VVB.

GHG emissions calculations

The tables to calculate GHG emission benefits from the project have been reviewed during the verification process and errors have been corrected. A cell by cell review was performed to follow the formulas and values to make sure all were correct.

TASK 1: Monitoring changes in carbon stocks and GHG emissions for periodic verification

- 1.1 Monitoring actual changes in carbon stocks and GHG emissions in the project area;
- 1.2 Monitoring leakage;
- 1.3 Ex-post calculation of GHG emission reductions.
- 1.4 Monitoring the impacts of natural disturbances and other catastrophic events.

1.1 Monitoring actual changes in carbon stocks and GHG emissions in the project area

1.1.1 Monitor the Implementation of the project

This task of developing the monitoring report was the responsibility of the landowners. The landowner was in charge of sending patrol to the project area to identify loggers and squatters. The monitoring activities are done by STA solutions located in Belem.

Monitoring waste conducted mainly by using remote sensing imagery. Remotely sensed data have been widely used as a cost effective tool in the mapping and monitoring of large areas (e.g. Danaher et al. 1998; Gould 2000; Mayaux et al. 2000; Freeman et al. 2002). Satellite optical or radar images could be used depending on the availability of the scenes, cloud cover and related acquisition and processing costs. Satellite images need be calibrated (pre-processing procedures) before performing the principal analysis. These preprocessing operations could include (1) radiometric preprocessing to adjust digital values for effects of a hazy atmosphere and/or (2) geometric preprocessing to bring an image into registration with a map or another image (Campbell and Wynne, 2011).

At the same time, monitoring patrols composed by local people have patrolled the Project Area to dissuade any invasion or illegal logging attempt. Fieldwork was done using a ground-based GPS approach to register the geographical position of any activity that need to be reported.

The Project Area was divided in patrols to better manage the extent of the Project Area and LMA and assure an effective on the ground monitoring. Patrol leaders oversee the activities, compile, and analyze the results from monitoring patrols³ (Figure 2). Patrol leaders report to the office in Belem. These two offices were responsible of informing local authorities about illegal activities happening in the Project Area and to follow up the enforcement of the required measures to remove invaders (Figure 3).

EQUIPMENT CALIBRATION

GPS

Besides any operational considerations when using a GPS receiver in the field, this equipment need not be calibrated for this monitoring. Average positional accuracy of most GPS receivers (15 meters) is enough to register monitoring activities in the field (i.e. location of loggers or squatters in the Project Area). GPS coordinates were used 'for information only' and its accuracy is considered appropriate to clearly show in maps where any feature or activity in the Project Area is located.

Satellite Images

Monitoring was conducted mainly by using remote sensing imagery. Before processing the image data to produce land cover maps, satellite imagery need be calibrated, this is, some preprocessing procedures must be applied to the imagery. These procedures enhance the quality of the image data by reducing or eliminating various radiometric and geometric errors caused by internal and external conditions.

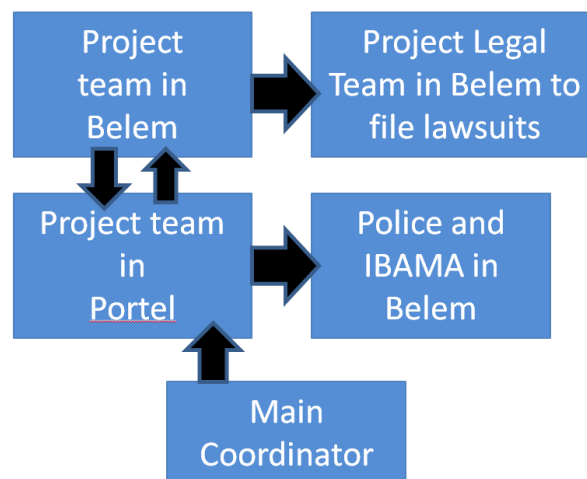
a. Geometric correction procedures address errors in the relative position of pixels due to factors such as variation in altitude, attitude and velocity of the sensor platform, Earth curvature, panoramic distortion, relief displacement and non-linearities in the sweep of a sensor (Lillesand and Kiefer 1994). It is very important to ensure that images in a time series overlay properly to each other and to other GIS maps used in the analysis. To geometrically correct the images, it is necessary to have a spread of Ground Control Points (GCPs) located either on a 1:100,000 official topography or another rectified image, to undertake a process called georeferencing. For all resampling operations, we have used the Nearest Neighbor algorithm to maintain radiometric integrity of the image.

b. Radiometric correction procedures account for errors that affect the brightness value of pixels due to both a sensor system detector error and an environmental attenuation error (e.g. changes in scene illumination, atmospheric conditions and viewing geometry [Lillesand and Kiefer 1994]). One of these procedures involved conversion of the measured multi-spectral brightness values to top of atmosphere reflectance units. This normalization procedure is crucial when creating multi-temporal and/or multi-spatial mosaics as it largely removes variations between these images due to sensor differences, Earth-sun distance and solar zenith angle (caused by different scene dates, overpass time and latitude differences)(Bruce and Hilbert, 2004).

Figure 2: Activities management in the Project area



Figure 3: Activities to inform local authorities about illegal activities in the Project area



The activities of the Project and their monitoring can be grouped as follows:

1. Forest monitoring:

Monitoring of forest cover was be done mainly by remote sensing imagery. The choice of imagery depended on the availability of scenes, cloud cover, and related acquisition and

processing costs. Remote sensing imagery could be either satellite (i.e. Landsat) or radar (i.e. Alos Palsar) or a combination of both.

LULC-change analysis using remote sensing imagery could be conducted annually or by periods depending on the availability of scenes. Therefore, verification event could occur annually or by periods.

The fixed degradation frontier map was updated at each verification event to account for areas that may have changed their carbon stocks due to un-avoided illegal logging activities. The fixed degradation frontier was assessed based on the availability of scenes, cloud cover, and related acquisition and processing costs. Remote sensing imagery could be either satellite (i.e. Landsat) or radar (i.e. Alos Palsar) or a combination of both.

From June 2012 to the present the landowner conducted monitoring by sending patrols to the Project Area. These patrols would generate a hand-written report in Portuguese and then a law firm hired by the landowner would clean the reports and translate these to English. During this period no GPS points were taken to identify the exact location of deforestation activities. All original hand-written reports and the official translations are available in digital formats.

Starting in 2015, patrolling activities were scaled-up by hiring local people as forest monitoring patrols. They were responsible for each monitoring patrol who generate monthly reports unless illegal activities are spotted, in which case a report should be submitted immediately as described in the next section.

Of particular importance is the implementation of the surveillance system that allow continuous monitoring of the Project Area to prevent the entry of squatters and illegal loggers. The objective of forest patrolling is to make evident the presence of the landowner and dissuade pioneer agents (i.e. loggers, squatters) from encroaching in the Project Area. This activity functions as a complement of remote sensing-based monitoring but does not replace it. Furthermore, the generation of carbon credits for avoided emissions do not rely on the results of patrolling,

The Project Area has been divided in patrols, based on river affluents, to facilitate monitoring such a large area. Each Patrol leader compile the information from patrolling reports into adequate digital format, all the information from the reports to keep track of the areas that are being patrolled each week and what are the findings of each patrol. Digital reports were sent to the office in Belem to be organized and stored.

Patrols identify illegal activities (invasions and timber extraction) and report them the patrol leader. If illegal activities are spotted, patrols should geo-reference the finding and make a short description of what was found. Patrols should approach squatters or loggers to let them know – in good terms- that this is private land, they cannot undertake such activities there and they should leave immediately.

With the information supplied by each patrol, patrol leaders fill-up a monitoring report that include at least the coordinates where the illegal activities are taking place, the date and a brief report of what was identified. Finally, each patrol leader submitted this information to the local police in Portel and to IBAMA in Portel and in Belem.

Monitoring reports should be numbered, filed appropriately, and be scanned to have digital copies in an archive as backup.

Once every two months, patrol leaders perform random site visits to verify that monitoring patrols are covering the assigned area and that each patrol is wearing the adequate field equipment. Patrol leaders should fill up a report that was submitted to office in Belem. A monitoring patrol that does not wear adequate field equipment or does not cover the designed monitoring route, will receive a warning. We have had no issues as these are good paying jobs in a very poor region, thus no one will risk job loss.

Maps, reports and records are available to validators at each verification event.

2. Biodiversity monitoring: monitoring will follow the guidelines described in section “B3. Biodiversity Impact Monitoring” of the associate CCB PDD.

Biodiversity activities and their indicators will be:

1. Biodiversity protection is directly related with ecosystem health, which is in turn linked to forest cover. Positive impacts on biodiversity will be estimated indirectly through remote analysis of forest cover. Preserving forest cover through avoided deforestation and degradation will allow implying that net positive impacts on biodiversity are being generated.
2. Biodiversity spotting by local people. Local people participating in the biodiversity component of the project will be in charge of reporting animal spotting at the boundaries of the LMA and the PA. Spotting frequency and animal species identified will indirectly assess net positive impacts on ecosystem health.
3. Active biodiversity monitoring. Local people will be hired to monitor ants, bats and bryophytes. Results are a good indirect indicator of ecosystem health.

All information should be properly reported following the protocols developed by Anapu-Pacaja after the fieldwork . Reports should provide geo-referenced information about biodiversity spotting and data as determined by the protocols. All data from the reports should be input into electronic format prior to the analysis. Maps, reports and records will be available to validators at each verification event.

3. Social Monitoring: will be undertaken by social monitoring squads. There will be a responsible for each monitoring squad who will generate monthly activities reports. Each squad will be in charge of specific villages and will use approved questionnaires to gather socio-economic data about the impacts of the activities of the Project. Questionnaires will also include a section for comments to include information that is not contained in the template.

Monthly reports will be submitted to the brigade leader who will input the information into electronic format to analyze it. The results from this analysis will be used to assess the impact of each activity and to identify villages that require particular attention.

The Project management teams in Protel and Belem will held bimonthly meetings to assess the effectiveness of the activities in local villages. Based on the information supplied by the brigade leaders, the management teams will improve the proposed activities. Maps, reports and records will be available to validators at each verification event.

1.1.2 Monitoring change and land use within the project area.

This task will be the responsibility of Anapu-Pacaja . According to the categories presented in Table 35 of the VM0015 methodology (Table 2), the Project will implement MRV to identify and assess LULC-changes within the Project Area.

Table 12: Categories that require MRV (refer to Table 35 – VM0015 methodology)

ID	Type	Conditions under which monitoring is mandatory	Explanations	Applicability to the Project
I	Area of forest land converted to non-forest land	Mandatory in all AUD project activities		Applicable
II	Area of forest land undergoing carbon stock decrease	Mandatory only for AUD project activities having planned logging, fuel-wood collection and charcoal production activities above the baseline	Change in carbon stock must be significant according to ex-ante assessment, otherwise monitoring is not required	Does not apply because none of the Project"s activities involve planned logging, fuel-wood collection and charcoal production
III	Area of forest land undergoing carbon stock increase	Mandatory only for AUD project activities wishing to claim carbon credits for carbon stock increase	Increase must be significant according to ex-ante assessment and can only be accounted on areas that will be deforested in the baseline case	Does not apply because the project will not claim carbon credits from carbon stock increase.

Monitoring of forest cover will be done mainly by remote sensing imagery. The choice of imagery will depend on the availability of scenes, cloud cover, and related acquisition and processing costs.

Remote sensing imagery could be either satellite (i.e Landsat) or radar (i.e Alos Palsar) or a combination of both.

LULC-change analysis using remote sensing imagery could be conducted annually or by periods depending on the availability of scenes. Therefore, verification event could occur annually or by periods.

LULC-change analysis will be done for the the Reference Region, Project Area and Leakage Belt using the protocol described in detail in the excel sheet submitted to VVB.. This imagery classification analysis will result in forest and non-forest classes that should be compared with the results from the deforestation model for the date of a specific verification event. The results from such analysis will be reported using the appropriate VCS" tables and formats.

1.1.3 Monitoring of carbon stock changes and non-CO2 emissions from forest fires

None of the cases presented in Section 1.1.3 of the VM0015 methodology apply to the Project (Table 3). So, the Project is not required to set sampling plots to measure carbon stocks in either the project area or leakage belt.

Table 13: Applicability criteria for monitoring non-CO2 gasses

	ID	Type	Applicability to the Project
	Within the Project Area		
Mandatory monitoring of the carbon stocks	I	Areas subject to significant carbon stock decrease in the project scenario according to ex-ante assessment	Does not apply
	II	Areas subject to unplanned and significant carbon stock decrease e.g., due to uncontrolled forest fires and other catastrophic events	Does not apply
	III	Area of forest land undergoing carbon stock increase	Does not apply
	Within Leakage Management Area		
	IV	Areas subject to planned and significant carbon stock decrease in the project scenario according to ex-ante assessment	Does not apply
Option	Within the Project Area		

monitoring of carbon stocks	V	Areas subject to carbon stock increase after planned harvest activities	Does not apply
	VI	Areas recovering after disturbances	Does not apply
	Within Leakage Management Areas		
	VII	Areas subject to carbon stock increase due to leakage prevention measures	Does not apply
	Within Leakage Belt		
	VIII	Areas undergoing significant changes in carbon stock	Does not apply

1.1.4 Monitoring of the impacts of natural disturbances and other catastrophic events

Catastrophic events are not expected in the Project Area or Leakage Belt. Nevertheless, if by any chance a catastrophic event presents during the Project's lifetime, such events will be evaluated and reported if significant. Monitoring will follow VM0015 Tables 20.f, 20.g, 21.f and 21.g to report reductions by catastrophic events.

1.1.5 Total ex post estimated actual net carbon stock changes and GHG emissions in the project area

All ex post estimations in the Project Area will be summarized using the format of Table 24 of the VM0015 methodology.

1. 2 Monitoring of leakage

The Project is not expected to generate any type of leakage. Even so, as mentioned in item 1.1.2 of this Monitoring Plan, monitoring of forest cover will be done mainly by remote sensing imagery. The choice of imagery will depend on the availability of scenes, cloud cover, and related acquisition and processing costs. Remote sensing imagery could be either satellite (i.e Landsat) or radar (i.e Alos Palsar) or a combination of both.

LULC-change analysis using remote sensing imagery could be conducted annually or by periods depending on the availability of scenes. Therefore, verification event could occur annually or by periods.

Any deforestation above the deforestation baseline found outside the Project's Boundaries will be considered to be leakage as described in the VCS" vm0015 methodology.

Carbon stocks in pre and post-deforestation classes are assumed to remain constant, as there are not significant decreases or increases of carbon stocks in the leakage belt.

1.2.1 Monitoring of carbon stock changes and GHG emissions associated to leakage prevention activities

The activities of the project won't generate GHG emissions.

1.2.2 Monitoring of carbon stock decreases and increases in GHG emissions due to activity shifting leakage.

It is not expected for the Project to generate any kind of leakage. Even so, LULC-change will be monitored periodically (annual or multi-annual depending on the frequency of the verification events) using the protocol described in detail in Annex submitted as part of the monitoring activities described in Section 1.1.2 of this monitoring plan.

For the case of the leakage belt, LULC-change analysis will be focused on assessing deforestation above baseline levels. If such deforestation is identified results will be reported in Tables 29.a, 29.b and 29.c.

If deforestation above the baseline levels occurs in the leakage belt during the project lifetime, the exceeding carbon stock loss will be accounted for, and will be deducted from the non-permanence buffer.

Monitoring of increases in GHG emissions

The parameter values used to estimate emissions will be the same used for estimating forest fires in the baseline (table 18 of VM0015 methodology), except for the initial carbon stocks (Cab, Cdw) which shall be those of the initial forest classes burned in the leakage belt area.

The results will be reported using the same table formats (Table 18 and 19 of the VM0015 methodology) used in the ex ante assessment of baseline GHG emissions from forest fires in the project area.

TASK 2 - Revisiting the projected baseline at fixed periods.

2.1 Update information on agents, drivers and underlying causes of deforestation.

Anapu-Pacaja will be responsible for monitoring these variables. The biophysical variables, agents, vectors, and the underlying causes of deforestation (Step 3). used to project future deforestation from the Reference Region will be reviewed at least every 10 years (fixed baseline period) but they can also be reviewed earlier depending on the requirements of the Project.

2.2 Adjust the component of use and land-use change of the baseline.

Anapu-Pacaja will be responsible for carrying out this part of the monitoring.

Step 4 of Part 2 of the methodology VM0015 will be repeated to consider at least the following 10-year period in the Reference Region (2018-2028). However, the baseline can be modified to consider earlier 10-year periods. Such changes in the baseline must be approved by Anapu-Pacaja and will require undergoing a verification process before they can be implemented.

Updating the baseline scenario will take place both in the modeling component of the system dynamics (which defines the amount of change) and the spatial component that defines the

distribution of deforestation. Key variables that will be used to recalculate the baseline in the second 10-year period of the project are:

- Socio-economic information retrieved from the Project's monitoring activities
- Distance to new roads
- Average distance to selective logging activities from pioneer roads
- Distance to non-forest
- Planned infrastructure in the region

To collect this information, field visits, surveys and workshops will be held and forest cover dynamics will be assessed using available satellite and/or radar imagery.

2.3 Adjusting the carbon component of the baseline.

According to Section 1.1.3 of this monitoring plan, it will not be necessary to adjust the carbon component of the baseline.

Describe the process and schedule for obtaining, recording, compiling and analyzing the monitored data and parameters set out in Section 3.3.2 (Data and Parameters Monitored) above. Include details on the following:

- *The methods for measuring, recording, storing, aggregating, collating and reporting data and parameters. Where relevant, include the procedures for calibrating monitoring equipment.*
- *The organizational structure, responsibilities and competencies of the personnel that carrying out monitoring activities.*
- *The policies for oversight and accountability of monitoring activities.*
- *The procedures for internal auditing and QA/QC.*
- *The procedures for handling non-conformances with the validated monitoring plan.*
- *Any sampling approaches used, including target precision levels, sample sizes, sample site locations, stratification, frequency of measurement and QA/QC procedures.*

Where appropriate, include line diagrams to display the GHG data collection and management system.

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

All the documents/results are published in the project website and communicated in Portuguese in a simple language to the council of stakeholders for their awareness and free participation.

Apart from the survey teams the main form of communication followed was one-to-one meetings with the community in which the feedback on the benefits provided were communicated which are periodic. Further during this period, the benefits were mainly related to Skill and capacity development, Goal of permanent Land ownership and improved land management practices which were categorized as both long term and short term benefits in the relevant sections of the

MR. sample of the survey forms and attendance records of one to one meetings have been submitted to the VVB

Describe how the monitoring plan, and any results of monitoring undertaken in accordance with the monitoring plan, disseminated and made publicly available on the internet. Describe the means by which summaries (at minimum) of the monitoring plan and results communicated to the communities and other stakeholders.

3.4 Optional Criterion: Climate Change Adaptation Benefits

Complete this section (3.4) if the project seeks to be validated to the Gold Level for climate change adaptation benefits. If not applicable, state so and leave this section blank.

3.4.1 Regional Climate Change Scenarios (GL1.1)

The risks for the Project objectives originated by climate change and climate variability are limited to:

- Increased area for cropland as a result of a decrease in food security by affected agricultural fields due to higher temperatures and the change in rainfall frequency.

Subsistence agriculture represents the basis of the rural localities way of life and it is also their main source of economic support and can be affected by the factors previously mentioned. The increase in the temperature, seasonality variations and the foreseeable extreme events can affect the production of the main self-consumption products of the population (e.g. beans, corn and rice). Likewise, rainfall reduction during critical months in the dry season can provoke the increase in the evapotranspiration and the emergence of pests and diseases that can negatively affect the crops.

In order to mitigate these risks, the project has several proposals for training activities directed to the population with aims at diversifying the crops with appropriate and adaptive agroforestry practices contributing to guarantee food security in the intervention area.

Moreover, it is foreseen to maintain a better water table level and the precipitations patterns in a microclimate environment by maintaining a forest coverage, which at the same time provides protection to extreme events, reducing the impact of heavy rain erosion and level the air temperature.

- Increased area for cropland driven by the greed of the land grabber to be able to become financially wealthy by having his or her own large farm.

Agro-business is Brazil's largest economic sector. People become wealthy farmers by buying a farm or land grabbing and making a farm. The cost to land grab is riskier, but it is 10 percent of the expense versus buying a farm.

One hectare of soybean land costs R\$15,000 reais in Brazil. Thus 1 hectare of stolen land in the forest and the cost to deforest it is R\$1,500 reais. Thus land grabbers are driving the industrial deforestation.

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

3.4.2 Climate Change Impacts (GL1.2)

The aforementioned evidence show that the Amazon forest is being already disturbed. This is attributed to two main factors. The first is the natural phenomena of El Niño (and la Niña) which affect great regions of South America. Such phenomena could have its effects and frequency enhanced due to the influence of global warming. The second is the increasing deforestation in very vast areas causing sudden and strong changes in the rainfall patterns regarding amount and frequency.

In a non-project scenario, the foreseen changes impact the people in the Project area due to their high vulnerability, widespread poverty, and the scarce individual or communal organizational capacity to face the changes and adapt to them, and the lack of adequate infrastructure. These impacts are compiled in the “Climatic and environmental changes and their effect on health: Scenarios and uncertainties for Brazil” report; developed by the *Health ministry of Brazil and the Pan American Health Organization*.

On the other hand, the with-project scenario increases the socio-ecological resilience, reduce the vulnerability and improve the adaptation capacity through a better management of the natural resources, including adaptive management. In addition to this, forest protection in the project area provide a healthy ecosystem with much greater adaptation potential to climate change, with a higher resistance and recovery capability to extreme meteorological phenomena and a wide range of benefits to the neighbouring people. The possible future impacts is summarised below:

Table 14: Possible future Scenarios in the Brazilian Amazon

Climate changes	• In the pessimistic scenario (A2): it is expected to have a temperature increase between 4° and 8°, and a reduction in the precipitation between 15% to 20% • In the optimistic scenario (B2): it is expected to have a temperature increase between 3° and 5°, and a reduction in the precipitation between 5% to 15% • Increase of extreme precipitations in the west amazon and consecutive dry days in the east • Possible more frequent and intense droughts from 2050 on
Possible impacts	• Ecosystems, biodiversity and forests environmental services losses in the amazon • Lower river flows that will affect transportation and energy generation. • Greater dryness in the air and favorable conditions for fires. • Risk of savannah development in the Amazon. • Impacts in human health, agriculture, migration and commerce. • Negative effects on the transportation of atmospheric humidity to the southwest part of South America.

Source: Derived from model analysis from IPCC AR4 and from the Climate report from INPE for the high (A2) and low (B2) emissions scenarios, as well as its impacts in a regional level (Marengo, 2007).

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

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

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

In the with-project scenario increase the socio-ecological resilience, reduce the vulnerability and improve the adaptation capacity through a better management of the natural resources, including adaptive management. In addition to this, forest protection in the project area provide a healthy ecosystem with much greater adaptation potential to climate change, with a higher resistance and recovery capability to extreme meteorological phenomena and a wide range of benefits to the neighbouring people.

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

4 COMMUNITY

4.1 Without-Project Community Scenario

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

The most likely land use scenario without the project has the following features, the same that have been projected by local households. From these analyses we can come to the following conclusions about the without project scenario:

The following points were both visualized and discovered in the community meetings with the local Riverine population. These are from discussions that the project has had and are information provided to the project by the Riverine and are based on what the Riverine people have told the project. The Riverine people did not provide evidence to their thoughts, but the following are rational and logical based on what an outsider would expect from the region:

- As listed the people in the project area are Riverine people, or “river people”, they live along the banks of the river and are typically descendants of Europeans that worked as rubber tappers, and when the rubber tapping economy ended they decided to stay in the forest. They are considered a traditional people in Brazil.
- The communities at the start of the project were more remote, they have no real communication, no internet it had not yet arrived into this region at this time, the only time they communicated with the outside world is when they travelled to the city, which was very expensive at the time as there is only one government funded boat per week and that still had a fee.
- The environment ten years ago was much more tree cover in the region, as poverty increased the communities have had to increase Cassava production to chase after miniscule profits.
- The social economic situation was still at less than 1 dollar a day, and resulted in each community opening up a few hectares each year, as they believe that the most fertile soil is right after a fire clearing a few hectares.
- The spiritual situation in the region is that everyone is devote evangelical, nearly every community has a church and the churches may only have 4 or 5 houses that belong to the church. Most churches are made the same way as their houses, but some communities may have a church that cost more than all the housed combined.
- Of the various households in the LMA, they all have the basic beliefs: The best way to survive is to grow Cassava, that no one wants to buy our products we produce as we are too remote, that God is supreme, and that trading between the other households is pointless, because if they can grow a product, we can as well.
- A few households have been able to have better conditions, they own a boat and are able to catch fish and sell in the city.
- Life was definitely better at one time, there are old satellite TV antennas on properties that are probably left over from when Georgia Pacific had a large

- laminated operation in the region and the entire region had thousands of employees directly and indirectly associated with this business.
- The communities ten years ago were completely sustained on the Brazilian welfare system, but today with the new president welfare has been cut by half, thus making the communities more dependent on the success of the carbon credit project.
 - Women are the head of the household, while the men are the head of land ownership. This is still the same, but it is interesting to know that women control the family.
 - The local communities are made into two primary groups, male and female, with separate benefits for the males and females.
 - Each household refers to itself as a Villa or Village with a name, but in reality it is a house, or a collection of houses all from the same family. Thus for purposes of the project we refer to each household as a household, as it is more logical for outsiders to understand. As a village sounds as if it is a collection of houses of various families, but that is not the case here. A household in the LMA is simply a house and other houses for the grown children. Typically not more than 13 houses in total for the region, but in the case of Anapu-Pacaja, the houses are typically 1 to 3 houses.
 - The community is not treated well by politicians or other groups in the region, they have restrictions on if they are allowed or not allowed to have livestock for personal use.
 - The local politicians use and abuse the locals by convincing them to sign up to cutting programs, and then taking all the money for themselves.
 - They have been told by local groups not to gain title and even have been told they are not allowed when clearly the law states differently.
 - The illegal loggers make promises of help bring them a better life, in exchange for the right to gain access to the land behind their house. They are paid pittance and millions of dollars of wood are basically taken.
 - The local population uses open fire cooking scenario with their pot of rice or beans sitting on two logs with the fire in between.
 - Some houses have gas stoves, but they have no money to buy gas.
 - Increase in agricultural areas used to grow mainly cassava. Thereby, it is projected substantial increase in the forest areas affected by slash and burn. Incursion of illegal loggers and illegal activities (invasions) seeking areas to extract timber. It should be remarked that this is the most common perception of the future among households.
 - Increase in timber extraction in the core sections of the project areas, with a related diminishment of timber resources nearby the households.
 - Decline of fish stocks in rivers and water bodies due to over-fishing by large companies coming from Portel and Breves.

Describe the communities at the start of the project and any significant community changes in the past. Include the following:

- *Well-being information: people's experience of the quality of their lives; this may include environmental, social, economic, psychological, spiritual, and medical dimensions.*

- *Community characteristics: these include shared language, mythology, history, culture, livelihood systems, traditional authority structures, institutions, practices, values, relationships with specific sites of historical, cultural or spiritual significance, relationships with natural resources, or the customary institutions and rules governing the use of resources and sites.*
- *Diversity within the community: social, economic and cultural diversity, including at least wealth, gender, age and ethnicity.*

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

There are two community groups, male and female. The households make up that one (2) community groups. There are no sub-groups, other groups that live in the land. All the people present are Riverine people.

They are so intertwined with each other they all are related and are 1st, 2nd, 3rd, 4th cousins with each other. They are all brothers, or sisters, or sister in laws or brother in laws.

It is rarely and outsider moves to the region and marries into a riverine community, but in the event this happened, they would enter into area that is more remote.

The interactions between the project and the community group was a well-received interaction, they were very pleased to hear about the project. They are very much desperate for everything or anything they can gain from. In all questionnaires, there is always a 93% to 97% acceptance rate, with normally the 3% to 7% believing that they already have something we are offering.

In the case of offering land title 3% thought they already had title, but when we investigated in the government databases they did not.

Describe interactions at the start of the project between the communities and community groups described in Section 4.1.1, above.

4.1.3 High Conservation Values (CM1.2)

Complete the table below for each of the following HCVs related to community well-being in the project zone:

- *Areas that provide critical ecosystem services.*
- *Areas that are fundamental for the livelihoods of communities.*
- *Areas that are critical for the traditional cultural identity of communities.*

Table 15: High Conservation Areas

High Conservation Value	Caxiuana National Forest
Qualifying Attribute	The Caxiuana National Forest is considered the oldest in the Amazon region and the second in Brazil. It is amongst the most known conservation units in north of Brazil, and it has the presence of many important researchers from Brazil and abroad
Focal Area	On the northern border of the reference region there is a national conservation unit called National Forest Caxiuanã. It was created in 1961 and today it has an area of 322,694.34 hectares. The Conservation Units are types of conservation areas that were created to allow sustainable use of the forest and its natural resources

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

1. Historical Area Characteristics, Context and Dynamics.

The project is located in a fast-changing region characterized by forests rich in valuable timber species, illegal logging, unclear land tenure laws, widespread land speculation, overall weak law enforcement and severe poverty. With these variables combined the results are no less than deforestation and destruction.

Pioneer agents open the path for deforestation agents who cut clear the forest as a measure of providing land ownership and implementing low-cost and practically self-sustained productive activities.

The predominant final land-use in the area is deforestation by cattle ranchers to implement pastures, which occurs simultaneously in two deforestation fronts.

The first is known as “consolidated frontier”, which is the area close to primary roads (federal and state highways) and already occupied mainly by cattle ranching. This frontier continues to expand due to the creation and expansion of secondary and tertiary roads that allow deforestation agents to deforest by using slash and burn.

The second front, known as a “pioneer frontier”, refers to forested areas with low deforestation but with high degradation located far from primary roads, but easily accessible through navigable rivers. These areas are considered to be of “free access” whenever the presence of the legal landowner is not made.

The most likely land use scenario without the project has the following features, the same that have been projected by local households. From these analyses we can come to the following conclusions about the without project scenario:

- Drastic increase in people who would be settled in the project area within 5 years. The project has helped demarcate the Riverine plots and this has given each family 100 hectares, this also has prevented settlers from taking this land. Either the project did this for the Riverine people or a land grabber would do it for themselves. The land grabber would have one goal and that is to deforest the land, while the riverine would preserve 95% of the area.
 - Two evidences represent why the Anapu-Pacaja project would be completely invaded within 3 years if the project was to seize its security and land tenure operations: Megatown Trading Ltda. a Brazilian company owned by a person from Sao Paulo had 76,230 hectares in Portel, Para, just north of the thousands of farms in Pacaja, Para. They removed their security in 2010 and within 2 years the land was completely claimed by new farmers and now the lands are being completely dismantled.
 - A second case is a group named: Agropecuaria e Industrial Rio Tuere Ltda. This is owned by a Japanese group and they have 69,696 hectares in Portel, Para, slightly south of the project area between Anapu, Para and Pacaja, Para. In 2010 they removed their security and lost all their land to invasion in 3 years. Now the land of these two entities is lost to the title holders and over 500 land claims have been made on these properties. The properties are severely dismantled in the last 9 years and thus these are the predecessor examples to the Anapu-Pacaja project. The evidence is an evidence of two example landowners that were decimated in the direct vicinity and neighbour to Anapu-Pacaja. This is the only region in Brazil that faces such aggressive land grabbing.
- Local population with no plans or hopes for other economic factors such as black pepper or honey production. Black Pepper is an expensive investment at over 15,000 dollars per hectare. There is no financing at the bank for this type of project, thus without the Anapu-Pacaja project this would never even been considered – so without the project this is not happening.
- The local Riverine population would not have access to markets for their projects as well. The project is building up a supply chain – that is in the discussion and planning stages – that has the goal to help bring the products to the market at market prices.
- The local Riverine population would not have cook stoves and thus would be cutting more wood to make the large open fire cooking scenario, causing there to be more forest degradation. As seen in the site visits the situation with their previous cook stoves was inhumane. The project brought 50 cook stoves in the PA and the LMA and is

bringing 300 more cook stoves to the area outside the project area to the LMA and the Reference Region.

- Increase in agricultural areas use to grow mainly cassava. Thereby, it is projected substantial increase in the forest areas affected by slash and burn.
- Incursion of illegal loggers and illegal activities (invasions) seeking areas to extract timber. It should be remarked that this is the most common perception in each household.
- Increase in timber extraction in the core sections of the project areas, with a related diminishment of timber resources nearby the household.
- Decline of fish stocks in rivers and water bodies due to over-fishing by large companies coming from Portel and Breves.

According to the land use scenarios projected by local households, we summarized the Information in two possible outcomes:

- Cassava farming is incentivized thus occupying more and larger areas.
- The increment of Cassava plots pushes the agricultural frontier towards forest covered areas thus generating deforestation.
- Forested areas area degraded due to the dynamics of illegal logging activities.
- Fauna is even harder to find thus reducing the food options for local households
- Degraded forest due to selective logging is sold to ranchers that implement pastures.

Describe the expected changes in the well-being conditions and other characteristics of communities and community groups under the without-project land use scenario.

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CM2.1)

Complete the table below for each community group to describe the anticipated impacts resulting from project activities under the with-project scenario. Explain and justify key assumptions, rationale and methodological choices. Explain how the affected groups have participated in the evaluation of impacts. Provide all relevant references. Copy and paste the table as needed.

Community Group	• Riverine Community • The entire community is all the riverine in the project area. • The community is broken into 50 different households.
Impact(s)	• Number of riverine people participating in the monitoring • Improved livelihood • monitoring activities each month • One person from each house hold or 50 people • Team of technicians completing the survey work for each family are trained to biodiversity monitor and report back any unique events.

Type of Benefit/Cost/Risk	- Actual benefit. - Capacity building related to the monitoring and management of the forest and biodiversity. - Very little cost, as the monitoring is done via cell phone camera when there is a unique event, such as a large carnivore enters the vicinity of the households. - Job Opportunities
Change in Well-being	Improved livelihood – more aware of the fauna and flora.

Community Group	- Riverine Community 5 community leaders have been trained, one for each river affluent where the project is located: <i>The following rivers:</i> Rio Mapareau Rio Jacare Puru Rio Mandaquari Rio Anapu Rio Pacaja
Impact(s)	- Better governance - They are trained to be the point person for the project to improve their level of organization, management and democratic governability - An association was set up to help the governability it is called: - Associacao de Ribeirinhos e Moradores de Portel, Para Ltda. which was set up by the landowners to facility the social activities of the carbon credit project. - The goal is eventually to have this person to be the organization head of the project in this river affluent and the person to head up large scale socio economic activity.
Type of Benefit/Cost/Risk	- Actual benefit - overall satisfaction of community
Change in Well-being	Better governance

Community Group	Riverine Community
Impact(s)	- Over 50 people in 50 different households. - Number of people trained in agroforestry techniques

	• Number of implemented agroforestry pilot projects • Capacity building • Improved agricultural practices
Type of Benefit/Cost/Risk	• Predicted benefit • overall satisfaction and food security of community
Change in Well-being	• Improvement in overall understanding that Casava, just because it is comfortable, is not the only option. • In all meetings and interviews and discussions it was informed way that cassava was not the best option from and economic standpoint. • At least 220 people.

Community Group	• Riverine Community • 50 households that are within the leakage management area have received land tenure documents. • Each land title results in a commitment to the project.
Impact(s)	• 50 received land tenure document known as CAR • Providing land ownership legal rights
Type of Benefit/Cost/Risk	• The land title undermines the illegal loggers • The land title brings stability to the local community. • It prevents land invasion by land invaders.
Change in Well-being	• Improvement in overall satisfaction and security of community

Community Group	• Women of the community are seen as vulnerable group
Impact	• 50 women were trained on the efficient cook stoves. • 50 cook stoves have been provided to the riverine people. • Number of improved cooking stoves pilots implemented in local families • Capacity building related to efficient and improved cooking stoves • improvement in health
Type of Benefit/Cost/Risk	• Actual benefit • overall satisfaction and health of community
Change in Well-being	• Improvement in overall satisfaction and health of community

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4.2.2 Negative Community Impact Mitigation (CM2.2)

There are no negative community impacts and hence there is no need for mitigation.

Describe measures needed and designed to mitigate any negative well-being impacts on community groups and for maintenance or enhancement of HCV attributes related to community well-being. Explain how such measures are consistent with the precautionary principle.

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

Net Positive community impacts are expected to be:

- A point of contact in each household for the project to be able to liaison to allow better communication for the project. Better reporting of events.
- Governance and an association were set up to help coordinate the giving and coordinate better interactions in the community. A better collective group to defend off illegal loggers and drivers of deforestation(land grabbers)
- Cook stoves to replace what appeared to be open fires, making cooking more efficient and easier.
- Land tenure inside the community group for each family.
- Land title to bring stability in the area outside the project area in the leakage belt has already helped bring a critical mass of de-conflicted land tenure.

Demonstrate that the anticipated net well-being impacts of the project are predicted to be positive for all identified community groups compared with their anticipated well-being conditions under the without-project land use scenario.

If the project intends to meet the Gold Level for climate change adaptation benefits, demonstrate how the project activities assist communities to adapt to the probable impacts of climate change.

4.2.4 High Conservation Values Protected (CM2.4)

The HCVs related to community well-being are not negatively affected by the project; on the contrary, only positive impacts are expected

Demonstrate that none of the HCVs related to community well-being negatively affected by the project.

4.3 Other Stakeholder Impacts

4.3.1 Impacts on Other Stakeholders (CM3.1)

The Project is designed to generate only positive impacts to the stakeholders living in the LMA and it won't generate impacts to those living outside the 3Km buffer identified during the PRA. No other stakeholders have been identified to use or depend from the resources in the Project's Area or LMA.

Identify any potential positive and negative impacts that the project activities are likely to cause on the well-being of other stakeholders.

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

Not Applicable

4.3.3 Net Impacts on Other Stakeholders (CM3.3)

Not Applicable

4.4 Community Impact Monitoring

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

The project proponents have designed a Social Impacts Monitoring Plan in accordance to the results obtained in the rural participatory diagnosis developed in the project area and initially considering the indicators for the products of the proposed activities based on the identification of the necessities indicated by the population and the strategies foreseen to accomplish the project goals.

The following Table (Table 21) shows a non-comprehensive list of activities and indicators that were considered during monitoring. A full and detailed list was presented in the monitoring plan that was developed and submitted within the first six months after validation.

Table 16: Some activities and indicators of the social monitoring during this monitoring period.

Activity	Product Indicator
1. Capacity building related to the monitoring and management of the forest and biodiversity. Opportunities to work as control/supervision staff.	• 50 heads of households have been trained on monitoring. • They were taught to identify fauna that entered the vicinity to their home • Technicians completing survey work in the project area and staying in the forest for long period of time are able to monitor biodiversity. Over the period 2015 to 2020 the project was focusing on a detailed census in each arm of each river, focusing on about 50 households per year for both census, training and delivering of cook stoves where needed.
2. Improving organizational Capacities of each community.	• 5 people one in each section of the project was trained on better organizational capacity. • Number of local associations/organizations strengthened by the project activities such as Association of Ribeirinhos e Moradores

	Portel Ltda.
3. Providing land ownership legal rights versus conservation results	• 50 families living inside LMA and its proximities • 50 of people registered in the program to become legal land owners (inside and outside project area and LMA) • 50 of people that meet the forest conservation <i>agreement</i>.
4. Providing assistance to obtain land use rights over the forest owned by the private property landowners	• 50 people (Over 5,000 hectares) registered in the program to obtain the <i>use from land that was titled as private property as par to the project and is shifted over to the riverine people to be their land.</i> <i>These 5,000 hectares will have far better management when the Riverine know it belongs to them.</i> The CAR documents can be found in the government website for the Environmental Ministry for the state of Para – all 50 are there. This is the evidence The reason we know 50 were done is because the project did this, reviewing each CAR, one by one, as listed above the process is tedious with visit after visit to the same location, with locations very far from the town of Portel.
5. Providing assistance and training in agroforestry Techniques and implementing <i>pilot cases</i> .	• Around 50 people have been given lessons and training in alternative crops of agroforestry such as black pepper, Acai, Cocoa, Cupuacu, Honey
6. Capacity building related to efficient and improved cooking stoves and implementation of <i>pilot demonstrative cases</i>	• 50 cook stoves distributed 50 people trained in the use of efficient improved cooking stoves • 50 of improved cooking stoves pilots implemented <i>in local Families</i>
7. Capacity building on the development of small <i>communitarian enterprises</i> .	• 5 people from the community group, trained in the development and management of a small scale enterprise. Mostly focused on better marketing and advertising of the existing products such as cassava flour.

A Participatory Census was carried out previously to the design of the definite Monitoring Plan in the Project area. This collected information about the unsatisfied basic needs, health, education, family economy, communal organization, etc., which gave the project baseline and also represent the social indicators to be monitored throughout the project's execution.

Likewise, in order to develop de social-environmental indicators for the results, several communitarian workshops took place as a fundamental part of the Social Communitarian Monitoring System that facilitate the follow-up and evaluation of the benefits of the project to improve the quality of life of the communities.

This system will eventually have communitarian monitors that continuously carry out the follow up activities evaluating the commitments, project activities and communities every 3 to 6 months. Also, the Communitarian Impacts Monitoring Plan carry out an exhaustive annual assessment of the indicators. Until the communication monitors are in place and

competent the project has been sending technicians to the land on long term assignments to make sure the project is properly being conducted.

The Social Impacts Monitoring Plan aims at creating an association and mutual responsibility sense between the project and local communities in the management of social environmental impacts, as well as improving the perception of the social responsibility adopted by the project. Anapu-Pacaja is committed to develop a complete Social Impacts Monitoring Plan with the characteristics here mentioned in the first year from validation.

Present a monitoring plan that identifies communities, community groups and other stakeholders to be monitored, variables to be monitored, types of measurements and sampling methods, and the frequency of monitoring and reporting for each type and method.

The monitoring plan must:

- Be based on variables directly linked to the project's objectives for communities and community groups and to predicted outputs, outcomes and impacts identified in the project's causal model related to the well-being of communities.*
- Assess differentiated impacts for each of the community groups and include an evaluation by the affected community groups.*
- Assess the effectiveness of measures taken to maintain or enhance all identified HCVs related to community well-being.*

If the project intends to meet the Gold Level for climate change adaptation benefits (GL1), the community monitoring plan must also include indicators for adaptation benefits for communities.

If the project intends to meet the Gold Level for exceptional community benefits (GL2), it must also include the following:

- Indicators of well-being impacts and risks for smallholder/community members.*
- Indicators of impacts on women.*

4.4.2 Monitoring Plan Dissemination (CM4.3)

All the documents/results are published in the project website and communicated in Portuguese in a simple language to the council of stakeholders for their awareness and free participation.

Apart from the survey teams the main form of communication followed was one-to-one meetings with the community in which the feedback on the benefits provided were communicated which are periodic. Further during this period, the benefits were mainly related to Skill and capacity development, Goal of permanent Land ownership and improved land management practices which were categorized as both long term and short term benefits in the relevant sections of the MR. sample of the survey forms and attendance records of one to one meetings have been submitted to the VVB

The plan was provided to local access via the project webpage and they have this.

In addition to this the technicians who travel to the land are required to carry all the most up-to-date documents and go through them with the communities at their request.

The head of each household were shown a hard copy of the results and a discussion took place to make sure that this person understood it.

Describe how the monitoring plan, and any results of monitoring undertaken in accordance with the monitoring plan, disseminated and made publicly available on the internet. Describe the means by which summaries (at minimum) of the monitoring plan and results communicated to the communities and other stakeholders.

4.5 Optional Criterion: Exceptional Community Benefits

The project has implemented a number of long term and short term benefits over this monitoring period which qualifies under the gold level criteria of exceptional community benefits. The benefits are summarized in the sections below.

Complete this section (4.5) if the project seeks to be validated to the Gold Level for exceptional community benefits. If not applicable, state so and leave this section blank.

4.5.1 Exceptional Community Criteria (GL2.1)

The project has identified the vulnerable and marginalised riverine community as the only community in the project area. In spite of having the strongest economy in Latin America, Brazil still has extremely high levels of poverty and inequality (Ferreira *et al.* 2006). According to Brazil's Institute for Applied Economic Research (IPEA), 21.4% of the population live below the poverty line and, as of 2009, the country ranked among the most unequal in the world (IPEA 2010). At the national level, however, poverty is spatially concentrated with significantly higher levels in the Northeast and North.

While in the Northeast both poverty and inequality are high, in the North there are high levels of poverty but relatively low levels of income inequality. This is partially explained by a relatively high prevalence of smallholders in the rural areas (Aldrich *et al.* 2006; Brondizio *et al.* 2009) and the unique quality of Amazonian urbanization where city dwellers maintain a strong link to rural areas (Godfrey and Browder 1996; Padoch *et al.* 2008). Government sponsored Amazonian settlement projects and various types rural development programs designed to foster family-based agriculture have had limited impact in reducing poverty.

Hence the location of the project itself in the north east part of Brazil, in the Portel in the State of Para assumes significance in the context of exceptional community benefits. Often, conflicts over land and forest resources with large capital enterprises and cattle ranchers have threatened the viability of smallholder agriculture (Walker *et al.* 2000; Aldrich *et al.* 2006). In some cases a lack of technical assistance combined with a disregard for rural infrastructure further add to the hardship of rural populations (Brondizio and Moran 2008; Ludewigs *et al.* 2009; Brondizio *et al.* 2009). At the local level, rural households react to these pressures by:

(1) Selling farm lots and migrating to marginal lands or new settlements (Walker *et al.* 2000),
(2) Moving to urban areas or commuting to urban centers in search of off-farm employment (Murphy 2001), and/or
(3) Adapting their portfolio of economic activities to benefit from changing market opportunities (Brondízio and Moran 2008). For instance, smallholders contribute a significant share of the food commercialized and consumed in regional urban centers. While suffering from poor infrastructure and limited access to market and social services, rural small-holders do benefit from a rich natural capital in forest and water resources which can reduce their dependence on the cash economy (Murphy 2001; Perz 2005). As in other parts of the world, the ability of smallholders to adjust their livelihood strategies continues to be a key element in their long-term survival (Sherbinin *et al.* 2008).

According to results from analysis of “Poverty and Inequality in the Rural Brazilian Amazon: A Multidimensional Approach” by Gilvan R. Guedes ET. Al., the state of Pará was considered the poorest among the Legal Brazilian Amazonian states in 1997 (excluding Maranhão, which has only a part of its territory included), with 50% of its population classified as living below the poverty line. In 2005, the Head Count (HC) ratio dropped to 44%, representing a proportional reduction of 12% in 8 years. Among the extreme poor, the HC ratio dropped from 21% to 16% (a relative decrease of 24%). Over the same period, the percentage of poor individuals in Brazil dropped from 35% to 31% (a relative reduction of 11%), while the percentage of extremely poor dropped from 16% to 11% (a relative decline of 31%). In spite of this decline, income poverty in Pará continues to be widespread as per the below table:

Headcount ratio (HC) in Pará and Brazil - 1997 and 2005

Geographic unit	Population group	1997	2005	Δ (%)
		HC (Caloric Consumption Insufficiency)		
Pará	Poor	50.00	44.00	-12.00
	Extremely Poor	21.00	16.00	-23.81
Brazil	Poor	35.00	31.00	-11.43
	Extremely Poor	16.00	11.00	-31.25

[IPEADATA \(2008\)](#); PNAD (1997, 2005)

Hence the identification of the riverine community categorizes as pro-poor and qualifies for the criteria under gold level: exceptional community benefits.

Demonstrate at least one of the following:

- *Smallholders/community members or communities either own or have management rights to land in the project area and rights to claim that their activities generate or cause the project's climate, community and biodiversity benefits.*

OR

- *The project zone is in a low human development country OR in an administrative area of a medium or high human development country in which at least 50% of the households within the communities are below the national poverty line.*

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

Some of the short term benefits, which are estimated to occur during the project lifetime, are summarized below:

1. Cook Stoves: The project has implemented distribution of energy efficient cook stoves for farinha production for the community members. A number of people have been trained in the use of efficient improved cooking stoves and the number of improved cooking stoves pilots implemented in local families is part of the monitoring plan and theory of change. This ensures capacity building related to efficient and improved cooking stoves, improvement in health and Improvement in overall satisfaction and health of community. Also this reduces the firewood consumption as cook stoves are more efficient compared to open stoves traditionally used. This results in long term community benefits. 50 cook stoves were distributed during this period.

2. Land Tenure: The 2016 to 2020 period worked as fast as possible to interview, meet, and explain the process to gain title. It was a trust building exercise as the project was seeking to convince the locals to allow the project to pay for something. The community group is highly cautious as most people who promise them something are only present to steal their land or wood. All people interviewed are very eager to gain this data.

3. Better land resource management. The project has initiated several awareness programs for efficient use of land for agricultural practices and has also provided cook stoves which have the benefit of lessening the time for Farinha (flour) production and the overall cooking time. The community has been made aware and trained in alternative crops of agroforestry such as black pepper, honey or andiroba oil. The increment of traditional Cassava plots pushes the agricultural frontier towards forest covered areas thus generating deforestation. Hence the alternative techniques of agroforestry help the community to make farming sustainable. This qualifies under both short term and long term benefits. 50 Community members trained in improved agroforestry techniques.

The project focuses on three principal strategies to ensure the maintenance and enhancement of the project benefits beyond the project lifetime which categorize as long term benefits.

1. Skill and capacity development.
2. Goal of permanent Land ownership
3. Health benefits

1. The skills are learnt by the communities throughout the projects lifetime. These relate to better land resource management. The project has initiated several awareness programs for efficient use of land for agricultural practices and has also provided cook stoves which have the benefit of lessening the time for Farinha production and the overall cooking time. The protection of the forests itself ensure that due to lesser degradation there is greater potential to provide timber and non-timber forest products on a sustainable basis. The community has been made aware and trained in alternative crops of agroforestry such as black pepper, honey or andiroba

oil. The increment of traditional Cassava plots pushes the agricultural frontier towards forest covered areas thus generating deforestation. Hence the alternative techniques of agroforestry help the community to make farming sustainable. 50 Community members have been trained in improved agroforestry techniques

2. The goal of permanent land ownership to the communities is one of the main initiatives of the project and this provides permanent ownership even beyond the project lifetime. This provides the community to implement the skills and learning on their own land which is self-sustainable and provides benefits beyond the projects lifetime. 50 certificates of Cadastrol Ambiental Rural (CAR) were registered during this period

3. The health benefits to the women and to the overall community are expected to continue beyond the projects lifetime. In a 2002 report, WHO listed indoor smoke from solid fuels among the top 10 risks to human health? "Day in and day out, and for hours at a time, women and their small children breathe in amounts of smoke equivalent to consuming two packs of cigarettes per day," WHO reported in the 2006 report Fuel for Life: Household Energy and Health. As greenhouse gas emissions have increased, the smoke from kitchens in the developing world has escalated from a local to a worldwide threat. The average cooking fire produces about as much carbon dioxide as a car, and produces more soot, also known as black carbon. Reducing these emissions may be among the fastest, cheapest ways to fight global climate change. Around 50 cook stoves were distributed during this period.

The permanence of the overall short term and long term benefits associated with the project are captured during the feedback from the community during the periodic community meetings in which the majority of them prefer to continue the good practices. More than 87% of the community responded positively on these aspects in the one to one meetings.

Piture 24 and 25: Cook Stoves provided specifically to woman





Demonstrate that the project generate short-term and long-term net positive well-being benefits for smallholders/community members.

4.5.3 Community Participation Risks (GL2.3)

There are a few risks associated with the participation in the project Anapu-Pacaja .

The acceptance of the CAR by the community faced several cultural barriers which are associated with the animosity generated towards the scheme by the illegal loggers. Hence the one on one meetings mitigated this risk by explaining that that CAR is the first step is a bureaucratic process to gain title, but CAR does allow bank financing, it does allow the map of the farm to be seen, etc.

Due to the patriarchal system in the riverine community the risk was that women were excluded from participating in some activities due to cultural barriers and existing gender imbalances. The project endeavors to minimise this risk by providing more opportunities for women to express their views during the community meetings.

Identify, through a participatory process, risks for the smallholders/community members to participate in the project. Explain how the project is designed to avoid such trade-offs and the measures taken to manage the identified risks.

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

Use the table below to identify each of the marginalized and/or vulnerable community groups that the project is engaging with and how the communities gain net positive benefits. Copy and paste the table as needed.

Community group 1	Riverine community which are categorised as poor
Net positive impacts	With improvement in livelihood, the riverine community experiences the net benefits associated with the project at both short term and long term levels.
Benefit access	The short term and long term benefits ensure a better safety, security and sustainable living. Also the door to door meetings ensure that the project calibrates itself to meet the expectations of the benefit programmes implemented.
Negative impacts	The project has a role to facilitate feedback from the poorest members of the community. This process of regular interaction prevents negative impacts on community members.

Community group 2	Women in riverine community
Net positive impacts	Improved livelihood of the women is expected to occur from the health benefits of using improved cook stoves for cooking. Also the lesser time it takes for farinha productions means they can spend more time involving in other activities such as agroforestry which ensures overall better livelihood.
Benefit access	The short term and long term benefits for women ensure a better safety, security and sustainable living. Also the door to door meetings ensure that the project calibrates itself to meet the expectations of the benefit programmes implemented.
Negative impacts	The project has a role to facilitate feedback from the most vulnerable and marginalized members of the community. This process of regular interaction prevents negative impacts on community members.

4.5.5 Net Impacts on Women (GL2.5)

Cook Stoves: The net impacts on women trained in use of energy efficient cook stoves is positive as it saves time and there is a general improvement in the health due to improvement of indoor air quality. The health benefit to the women and to the overall community is expected to continue beyond the projects lifetime. In a 2002 report, WHO listed indoor smoke from solid fuels among the top 10 risks to human health. "Day in and day out, and for hours at a time, women and their small children breathe in amounts of smoke equivalent to consuming two packs of cigarettes per day," WHO reported in the 2006 report Fuel for Life: Household Energy and Health. As greenhouse gas emissions have increased, the smoke from kitchens in the developing world has escalated from a local to a worldwide threat. The average cooking fire produces about as much carbon dioxide as a car, and produces more soot, also known as black carbon. Reducing these emissions may be among the fastest, cheapest ways to fight global climate change.

Also the lesser time it takes for Farinha productions means they can spend more time involving in other activities such as agroforestry which ensures overall better livelihood.

Women risk being excluded due to illiteracy and lack of time to attend meetings. The project addresses this issue by relying on door-to-door meetings.

Demonstrate that the project generate net positive impacts on the well-being of women and that women participate in or influence decision making.

4.5.6 Benefit Sharing Mechanisms (GL2.6)

The "Association of Ribeirinhos and Moradors of Portel, Para Ltda. This association provides the social benefits to the local population.

- The focus of the project is to eventually give out a quarterly financial contribution to each family, but the project has not had the financial wherewithal to do that, as well as implementation of the social aspects.
- It is to set up a governance structure operated by the locals throughout the community.
- It is to counter other syndicates in the region that are set up and backed by the illegal logging syndicates. These other syndicates have no clear governance structure on what their actual goal for the people is. Such as granting them title, providing cook stoves, or education, etc. The other syndicates were behind the campaigns telling the riverine people not to do the government required CAR certificates – which resulted in the project doing it for everyone.
- To pay for the boat, the team, the survey work, and the work related to the land tenure has resulted in a cost of over USD 500,000 dollars and this has been the focus as of this time. This land tenure is the first step, this is the CAR.
- The 50 cook stoves cost about USD 50 dollars, each but delivery to the region is an additional USD 100 dollars including freight, staff salaries.
- The cost of anthropologist and the staff and security has been a large overall factor taking up expenses. The anthropologists have been used to better address the social wants and needs of the population.

- 100% of the funds from credit sales have gone toward operational and benefit sharing expenses. The project has not reached a point of break even at the current time and will not yet.

Future benefit sharing mechanism is the following:

- 300 additional cook stoves inside the LMA and outside the LMA
- Additional survey work which will cost about USD 1 million dollars to finalize the full implementation of land tenure of all the land surrounding the project area. This is in relation to gaining the Final Title, completing the process for every family.
- A future key project is, the first trial boxes of 300 boxes have already been ordered. The Bee boxes for 50 families with each family that agrees to participate in the program gain in 30 bee boxes to spread out around their property and hang from trees.

Describe the design and implementation of the project's benefit sharing mechanism(s), demonstrating that smallholders/community members have fully and effectively participated in defining the decision-making process and the distribution mechanism for benefit sharing. Specify how the benefit sharing mechanism provides transparency with regard to project funding and costs as well as benefit distribution.

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

Benefits to the community are listed in sections 4.5.2 and 4.5.6 above. Both short term and long term benefits result in net benefits to the community.

There is no cost borne by the community due to project implementation. The project staff bears the expense for the survey and travel.

There are no major perceived risks to the community due to the project implementation. However during the one to one meetings, the feedback of risks if any is received and appropriate mitigation steps are implemented. One of the examples of this is educating the community on the many benefits of obtaining CAR. The other examples include promoting the shift of interest towards sustainable agroforestry techniques.

The inherent risk associated with the project such as the failure to be able to sell the carbon credits at an acceptable price is beyond the control of the PP, though these were informed to the community.

Explain how relevant and adequate information about predicted and actual benefits, costs and risks has been communicated to smallholders/community members and provide evidence that the information is understood.

4.5.8 Governance and Implementation Structures (GL2.8)

- The project has hired Anthropologists who specialize in traditional people to complete an analysis in order to confirm that the assumptions made by the project proponent were correct about the Riverine people. The anthropologist and their ability to analyze the people helped improve on communication and implementation of the needs for the technicians.

- Association of Ribeirinhos and Moradores of Portel, Para Ltda. works as the defacto coordinating entity that helps locally have governance and structure.
- The project governance is set up to work through the boat pilot who is the point of communication for the project, when the team is not on the ground. He relays all communication back to the operational team; he does surveys of the people when the operational team needs information. He has been involved in the project since 2009, and knows every person in the project area, making ease of communication very good.
- The project works at one household at a time. It focuses on individual explanation and one-on-one discussions. It was very difficult to explain what “carbon” is or “credit” is and the word carbon credit is even more foreign to them. Carbon they don’t know what it is thus individual discussions has been key. However based on the questions that took place in 2016 everyone accepted the project and wants to do the project. They see any benefit better than no benefit in a region that is considered an “old west” region of Brazil.
- Most discussions revolve around what they are comfortable with working on versus what we want them to do. Some more complex agriculture projects have been deemed uncomfortable and they prefer to focus on projects that have already been proven to work by someone else in the region. In other words: “no re-inventing the wheel”
- The governance is not designed to make broad and general decisions, it is to focus on each group of houses and their goals. Thus if one group of houses wants to do honey as a way to improve their economy then we don’t try to force this onto another group. We do what the other group of houses wants to complete.

Describe the project’s governance and implementation structures, and any relevant self-governance or other structures used for aggregation of smallholders/community members, and demonstrate that they enable full and effective participation of smallholders/community members in project decision-making and implementation.

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

The project has been working with the Professor of Geography at the University of Para named David Vale. He has been advising and coordinating the aspect of land Tenure for the rural population within the project area. The University of Para is not directly affiliated with the project, but as Professor David brings a major expertise to the programs and procedures related to fulfilling the more complex land tenure questions within the project area. Professor David and his team of interns and technicians have been successfully working to implement these land tenure aspects and explain to the local community that benefits from this.

The Association of Ribeirinhos and Moradores of Portel, Para Ltda. is working to become the representative body for the local population, by helping defending their rights against illegal loggers in the region, to help coordinate a formal security presence and to help represent them legally from illegal land invasion threats that are still ever present.

The Association of Ribeirinhos and Moradores of Portel, Para Ltda. is also acting as a custodian for those landowners who do not possess a Birth Certificate, tax ID number or ID number. Those people need to gain these documents before they are able to own the land the project is arranging for them. So the association holds the title as a custodian, where the title can only be transferred at the time that they possess this. Once all the paperwork is complete the project will pay for the people to gain these documents, in this case the main cost is transportation as the local notary. The notary is obliged by law to provide these ID type documents for free.

Demonstrate how the project developing the capacity of smallholders/community members, and relevant local organizations or institutions, to participate effectively and actively in project design, implementation and management.

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (B1.1)

The Eastern Amazon, where the project is inserted, is an area that holds the biggest concentration of the timber industries (74% of timber production in Pará comes from the Eastern Amazon). The logging industry is responsible not only for feeding illegal logging schemes, but also cleaning the forest to build roads. Specifically these roads built by the loggers are determining a new pattern of occupation inside public lands (IBGE 2007). Non-authorized logging is more concentrated in the extreme east of Pará, but it is moving *towards the Xingu-Tocantins interfluvium (Veríssimo et al. 2011)*.

As part from the “without project” scenario it is likely that the deforestation drivers continue to push forward, and human occupation follows this movement. Eastern Amazon is the most populated region of the Brazilian Amazon and anthropogenic actions, such as forest cleaning, are one of the many aspects affecting local biodiversity, especially mammalian diversity rates (Lopes & Ferrari 2000).

It is likely that “without project” we would at a minimum have 100% land claims on all aspects of the land within 2 to 5 years, with massive small plots opened up to make claims within this period of time as well, and 50% deforestation within 15 to 20 years. (As seen with the cases of both Agropecuaria e Industrial Rio Tuere Ltda. and the company Megatown Trading Ltda. – when they removed their security they had complete invasion in 2 years)

Highway paving is not only intrinsically connected with anthropogenic actions but also with either the expansion of the soybean industry or cattle raising activities. These commodities have experienced a considerable growth in 2005 and the constant market demands indicate that this growth tends to continue (Nepstad et al. 2006). Under the “without the project” scenario it can be inferred that this area might be affected by this expansion, causing *biodiversity losses and soil degradation*.

Describe the biodiversity within the project zone at the start of the project and threats to that biodiversity. Explain and justify key assumptions, rationale and methodological choices. Provide all references.

5.1.2 High Conservation Values (B1.2)

Complete the table below identifying HCVs related to biodiversity in the project zone. HCVs can be categorized based on the following attributes:

- Globally, regionally or nationally significant concentrations of biodiversity values, protected areas, threatened species, endemic species and/or areas that support significant concentrations of a species during any time in their lifecycle.
- Globally, regionally or nationally significant large landscape-level areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.
- Threatened or rare ecosystems.

Table 17: High Conservation Value

High Conservation Value	Caxiuana National Forest
Qualifying Attribute	The Caxiuana National Forest is considered the oldest in the Amazon region and the second in Brazil. It is amongst the most known conservation units in north of Brazil, and it has the presence of many important researchers from Brazil and abroad
Focal Area	On the northern border of the reference region there is a national conservation unit called National Forest Caxiuana. It was created in 1961 and today it has an area of 322,694.34 hectares. The Conservation Units are types of conservation areas that were created to allow sustainable use of the forest and its natural resources

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

Another element that encourages anthropogenic actions along with deforestation in the area is road construction and paving (Nepstad et al. 2001). Within a distance of approximately 60km of the project zone boundaries, is the municipality of Senador José Porfírio, which possesses an interconnection with the Transamazônica Road (BR-230) through the road PA-167. Considering that more than two-thirds of the Brazilian Amazon deforestation has taken place within 50km of major highways, deforestation close or in the project zone is likely to happen under the “without project” scenario, especially with Brazilian Federal Governmental Development Plan (Soares-Filho et al. 2004).

Describe how the without-project land use scenario would affect biodiversity conditions in the project zone.

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (B2.1)

As described in **B2.1**, the project focus exclusively on conservation measures within the project boundaries and its buffer, which makes negative offsite effects unlikely to happen. Besides, monitoring of flora and fauna it is assured that any minimal offsite negative effect was taken care of immediately. Also, as mentioned on G3.2, the Project's activities do not involve the introduction of non-native species and the engagement of local community contributes for the socio-environmental safeguarding activities.

It is also very unlikely that the Project's activities within its boundaries (implementation of agroforestry techniques, energy efficient cook stoves for farinha production, and tenure rights) have any offsite impact. Therefore, considering these activities and "with project" scenario, the effects of the project on biodiversity is positive.

Biodiversity Element	Monitor vegetation cover / land use patterns via satellites from both Google Earth, and the Brazilian Space Agency which has more up to date maps and fire situations. Monitor INCRA the federal land agency and ITERPA the state land agency for land claims in the project area which may show in very short order where someone plans to enter and start deforesting. http://terrabrasilis.dpi.inpe.br/app/map/deforestation?hl=pt-br <i>This shows all the deforestation in the area, with the project area are able to contain most deforestation to very small "planned plots". So most tree cover and animal corridors stay intact. Just south of the project area is pure destruction in the same time period.</i>
Estimated Change	Maintenance or improvement of carbon stocks
Justification of Change	Periodic analysis of satellite imagery and GIS analysis

Biodiversity Element	Monitor area-limited species: species that require large patches to maintain viable populations, such as large carnivores. That have indicated potential habitat losses and prey availability
Estimated Change	Increase in number of specific category species noted by sightings during regular patrolling

Justification of Change	Increase in number of specific category species as the project area is not disturbed by agents of deforestation. This is noted by sightings during regular patrolling
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Biodiversity Element	Monitor resource-limited species: species requiring specific resources, such as frugivorous species, nectar species, snags etc. Bats can be great bio indicators as they have different feeding habits, such as insects, fruits, nectar/pollen, blood etc. They are also abundant through the region and its taxonomy has been well documented
Estimated Change	Increase in number of specific category species noted by sightings during regular patrolling
Justification of Change	Increase in number of specific category species as the project area is not disturbed by agents of deforestation. This is noted by sightings during regular patrolling

Biodiversity Element	Monitor “special interest” species, critically endangered species, endangered species, and threatened species (IUCN, IBAMA) The local riverine people all have cell phones that they use primarily for pictures and since 2016 have been requested to monitor all animals of interest and take pictures of those animals. 20 MP cameras are planned to be handed out to 5 locations that have high instances of bio-diversity so that the 5 designated monitors can take pictures. In addition to this all security personal have cameras.
Estimated Change	Increase in number of specific category species noted by sightings during regular patrolling
Justification of Change	Increase in number of specific category species as the project area is not disturbed by agents of deforestation. This is noted by sightings during regular patrolling

Complete the table below to describe the anticipated changes in biodiversity resulting from project activities under the with-project scenario in the project zone and over the project lifetime. Explain and

justify key assumptions, rationale and methodological choices. Provide all relevant references. Copy and paste the table as needed.

5.2.2 Mitigation Measures (B2.3)

Although the Project activities are not fully implemented, monitoring and reporting activities to prevent and remove land grabbers and illegal logging activities (thus stopping the first stages of the deforestation process) have been happening on the ground since January 2nd 2009. These activities help ensuring that local biodiversity is protected and that their ecosystems are not fragmented even when we still do not have an implemented *biodiversity inventory*.

Describe measures needed and designed to mitigate negative impacts on biodiversity and any measures needed and designed for maintenance or enhancement of the HCV attributes. Explain how such measures are consistent with the precautionary principle.

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

Net impacts on biodiversity resulting from the project activity are expected to be positive, as outlined in the baseline scenario. Net positive impacts on biodiversity were demonstrated over time through periodic monitoring and reporting of biodiversity indicators as per the Biodiversity Monitoring Plan.

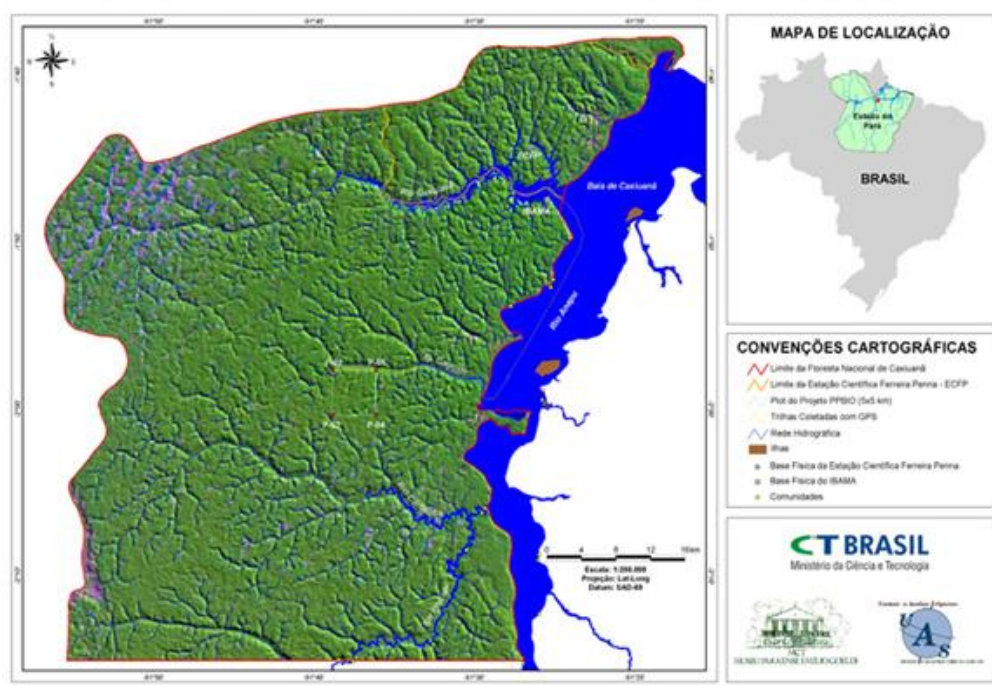
Demonstrate that the project's anticipated net impacts on biodiversity in the project zone positive compared with conditions under the without-project land use scenario.

If the project intends to meet the Gold Level for climate change adaptation benefits, demonstrate how the project activities assist the biodiversity to adapt to the probable impacts of climate change.

5.2.4 High Conservation Values Protected (B2.4)

The project area is 36 partially non-contiguous sections. A small section of a few thousand hectares borders the Reserve Caxiuna, thus with the connection of the reserve and the project area, an animal corridor is created. This is a high bio-diversity impact next to the project area.

Map: 12: Caxiuna Reserve



High Conservation Value	Caxiuna National Forest
Qualifying Attribute	The Caxiuna National Forest is considered the oldest in the Amazon region and the second in Brazil. It is amongst the most known conservation units in north of Brazil, and it has the presence of many important researchers from Brazil and abroad
Focal Area	On the northern border of the reference region there is a national conservation unit called National Forest Caxiuanã. It was created in 1961 and today it has an area of 322,694.34 hectares. The Conservation Units are types of conservation areas that were created to allow sustainable use of the forest and its natural resources

Demonstrate that no HCVs related to biodiversity are negatively affected by the project.

5.2.5 Species Used (B2.5)

Refer Appendix 3 of this report Tree species in the Project area and Project Zone

List all species used by the project.

5.2.6 Invasive Species (B2.5)

None of the Project's activities introduce invasive species or genetically modified organisms. The Project's developer only approve agroforestry activities that use native species commonly known to occur in the Para region and are not in the Global Invasive Species Database before approving the utilization of particular species.

Demonstrate that no known invasive species introduced into any area affected by the project.

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

Not applicable

5.2.8 GMO Exclusion (B2.7)

Not applicable

5.2.9 Inputs Justification (B2.8)

Not applicable

5.2.10 Waste Products (B2.9)

Not applicable

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Measures (B3.2)

The conservation itself as the aim of the project is already a mitigation strategy. The entire area benefits since there is no activity involving any kind of human disturbance. Furthermore, conservation of the project area increases landscape integrity and adaptation, avoiding edge effect, as described in the "with project" scenario, benefiting biodiversity (Wunder 2008).

A representative conservation area in which biodiversity can persist guarantees the maintenance of ecological processes and contributes to avoid fragmentation of the ecosystem, both through timber extraction and agricultural activities. The project help landscapes enhancing its ecological health, including its adaptability to climate change and consequently reducing offsite greenhouse gas emissions (Wunder 2008). Moreover, the conservation of this area maintain microclimate, avoiding wildfires (Soares-Filho 2006).

Hence as there are no offsite negative biodiversity impacts, there are no planned mitigation measures.

5.3.2 Net Offsite Biodiversity Benefits (B3.3)

The Project is expected to generate positive leakage on biodiversity by avoiding ecosystem fragmentation through voluntary engagement of neighbour communities in the Project's activities. As described above, the project focus exclusively on conservation measures within the project boundaries and its buffer, which makes negative offsite effects unlikely to happen. Besides, monitoring of flora and fauna assures that any minimal offsite negative effect was taken care of immediately. Also, as mentioned on **G3.2**, the Project's activities do not involve the introduction of non-native species. Therefore, considering these activities and "with project" scenario, the effects of the project on biodiversity is positive

Evaluate potential unmitigated negative impacts on biodiversity outside the project zone and compare them with the project's potential biodiversity benefits within the project zone. Justify and demonstrate that the net effect of the project on biodiversity is positive.

5.4 Biodiversity Impact Monitoring

5.4.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

Biodiversity Element	Monitor vegetation cover / land use patterns
Estimated Change	Maintenance or improvement of carbon stocks
Justification of Change	Periodic analysis of satellite imagery and GIS analysis

Biodiversity Element	Monitor area-limited species: species that require large patches to maintain viable populations, such as large carnivores. That indicate potential habitat losses and prey availability
Estimated Change	Increase in number of specific category species noted by sightings during regular patrolling
Justification of Change	Increase in number of specific category species as the project area is not disturbed by agents of deforestation. This is noted by sightings during regular patrolling

Biodiversity Element	Monitor resource-limited species: species requiring specific resources, such as frugivorous species, nectar species, snags etc. Bats can be great bio indicators as they have different feeding habits, such as insects, fruits, nectar/pollen, blood etc. They are also abundant through the region and its taxonomy has been well documented
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Estimated Change	Increase in number of specific category species noted by sightings during regular patrolling
Justification of Change	Increase in number of specific category species as the project area is not disturbed by agents of deforestation. This is noted by sightings during regular patrolling

Biodiversity Element	Monitor “special interest” species, critically endangered species, endangered species, and threatened species (IUCN, IBAMA)
Estimated Change	Increase in number of specific category species noted by sightings during regular patrolling
Justification of Change	Increase in number of specific category species as the project area is not disturbed by agents of deforestation. This is noted by sightings during regular patrolling

•

Present a monitoring plan that:

- *Identifies biodiversity variables to be monitored, which should be directly linked to the project’s biodiversity objectives and to predicted outputs, outcomes and impacts identified in the project’s causal model related to biodiversity.*
- *Identifies the areas to be monitored.*
- *Identifies the types of measurements, the sampling methods, and the frequency of monitoring and reporting to be used.*
- *Assesses the effectiveness of measures taken to maintain or enhance all identified HCVs related to globally, regionally or nationally significant biodiversity present in the project zone.*

If the project intends to meet the Gold Level for climate change adaptation benefits (GL1), the community monitoring plan must also include indicators for adaptation benefits for biodiversity.

If the project intends to meet the Gold Level for exceptional biodiversity benefits (GL3), it must also include indicators of the population trend of each trigger species and/or the threats to such species.

5.4.2 Biodiversity Monitoring Plan Dissemination (B4.3)

All the documents/results are published in the project website and communicated in Portuguese in a simple language to the council of stakeholders for their awareness and free participation.

Apart from the survey teams the main form of communication followed was one-to-one meetings with the community in which the feedback on the benefits provided were communicated which are periodic. Further during this period, the benefits were mainly related to Skill and capacity development, Goal of permanent Land ownership and improved land management practices which were categorized as both long term and short term benefits in the relevant sections of the MR. sample of the survey forms and attendance records of one to one meetings have been submitted to the VVB

In addition to this the technicians who travel to the land are required to carry all the most up-to-date documents and go through them with the communities at their request.

Describe how the monitoring plan, and any results of monitoring undertaken in accordance with the monitoring plan, disseminated and made publicly available on the internet. Describe the means by which summaries (at least) of the monitoring plan and results communicated to the communities and other stakeholders.

5.5 Optional Criterion: Exceptional Biodiversity Benefits

5.5.1 High Biodiversity Conservation Priority Status (GL3.1)

Not applicable as this gold level biodiversity criteria is not claimed due to insufficient data

5.5.2 Trigger Species Population Trends (GL3.2, GL3.3)

Not applicable as this gold level biodiversity criteria is not claimed due to insufficient data

APPENDICES

The following appendices may be used if appropriate. Delete the instruction and heading if not used.

Appendix 1: Stakeholder Identification Table

Use this appendix, if necessary, to identify stakeholders and fulfil the requirements of Section 2.1.8 above. Modify the table, if necessary, to suit the project activities, or delete if not used.

Stakeholder <i>Identify communities and any community groups within them, any cross-cutting community groups, and list other stakeholders</i>	Rights, Interest and Overall Relevance to the Project
Local Villages Individual houses outside of villages	Right to 100 hectares per family, limited by government regulations. These communities are old communities that are along the river. They complete small cassava plantations. They have an interest in direct benefits from the project, such as the cook stoves they have, the agro-education about black pepper plantations – which is a much better economic activity.
Four Private Property Landowners	Titled land of 177,000 hectares. Some land was divided out and set aside for the local villagers, so the area of land owned has transferred to the people who need it more.
Local villages outside of Project Area.	Right to 100 hectares per family. These families that live near the project area, and are not in the project area, but the project also sees it necessary to help them gain title to their land of 100 hectares per family. The reason is that all the local inhabitants inside and outside the project area that were able to gain title will also be able to bring stability because they were less reliant on the illegal loggers and operators in the region.

Appendix 2: Project Activities and Theory of Change Table

Use this appendix, if applicable, to identify project activities and fulfill the requirements of Section 2.1.11 above. This is an example of just one method of representing the theory of change. Results chains/flow diagrams are another effective way to represent the theory of change. Modify the table, if necessary, to suit the project activities, or delete if not used.

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
Capacity building	Secured land tenure Better understanding of the importance of protecting the forest and how forest conservation benefits their livelihoods. Opportunity to develop local businesses through an external fund.	In own land illegal activity is minimized and protection is enhanced	Forest is protected Illegal activities are minimized	Improved forest management practices with community participation
Improve local livelihoods for households	Diversification of food through agroforestry practices thus an improvement in local nutrition More efficient technologies to produce farinha therefore less time is consume in this activity. Generation of income from monitoring activities.	Improvement in agricultural practices and promotion of income from other activities	Food security is increased Positive impact on average income	Improvement of livelihoods by capacity building
	Survey conducted in	Identification of	Implementation of mitigation	Positive effect on

Participatory Rural Appraisal	area constituted by the Project's Boundary and a 15km buffer to gather socio-economic information	deforestation drivers and agents by means of survey	measures to reduce impact by drivers of deforestation	maintenance of carbon stocks
Improvement of health	Distribution of improve cook stoves to households	Better air quality is ensured in households	Longer life expectancy	Improvement of livelihoods

Appendix 3: Project Risks Table

Use this appendix, if necessary, to identify project risks and fulfill the requirements of Section 2.1.18 above. Modify the table, if necessary, to suit the project activities, or delete if not used.

Tree Species:

<i>Common name</i>	<i>Scientific name</i>	
Abiu / Guajara caramurim	<i>Pouteria opposita</i> (Ducke) T.D.Penn.	1
Abiu amarelo	<i>Pouteria decorticans</i> Penn	1
Abiu arrepiado/ Abiu casca fiana/ Abiu nambuquica	<i>Pouteria decorticans</i> Penn	1
Abiu casca grossa	<i>Planchonella pachycarpa</i>	1
Abiu goiaba / Abiu Goiabinha	<i>Pouteria decorticans</i> Penn	1
Abiu vermelho	<i>Pouteria torta</i> (mart) Radlk subsp. Glabra Penn	1
Abiurana / Abiurana Vermelha	<i>Franchetella anibifolia</i>	1
Abiurana Branca	<i>Pouteria reticulata</i> (Engl.) Eyma subsp. reticulata	1
Abiurana Preta	<i>Pouteria krukovi</i>	1
Acapu	<i>Vouacapoua americana</i>	1
Acapurana	<i>Campisiandra laurifolia</i> bBenth.	1
Acariquara	<i>Minquartia guianensis</i>	1
Acariquarana/ Araruta	<i>Rinorea paniculata</i> (Mart.) Kuntze	1
Achua/ Axixá/ Capoteiro	<i>Sterculia speciosa</i> K. Schum.	1
Amapa / Amapa doce	<i>Brosimum potabile</i>	1
Amapa amargoso	<i>Parahancornia fasciculata</i> (Poir.) Benoist	1
Amaparana	<i>Batocarpus amazonicus</i> (Ducke)	1
Amarelao / Garapeira	<i>Apuleia leiocarpa</i>	1
Ananim	<i>Simphonia globulifera</i> L.	1
Andiroba	<i>Carapa guianensis</i>	1
Angelim	<i>Copaifera multijuga</i> Hayne	1
Angelim amargoso	<i>Vatairea sericea</i> Ducke	1
Angelim pedra	<i>Hymenolobium excelsum</i> Ducke	1
Angelim Rajado	<i>Zygia racemosa</i> (Ducke) Barneby & J.W.Grimes	1
Angelim vermelho	<i>Dinizia excelsa</i>	1
Anuera	<i>Anaueria brasiliensis</i> Kosterm	1

Arapari	<i>Macrolobium multijugum</i> (DC.) Benth. var. multijugum	1
Araracanga	<i>Aspidosperma araracanga</i> Marc.-Ferr	1
Arataciú	<i>Anomalocalyx uleanus</i> (Pax & K.Hoffm.) Ducke	1
Bacuri	<i>Platonia insignis</i> Mart.	1
Bacuri pari	<i>Rheedia macrophylla</i> (Mart) Planch. & Triana	1
Barbatimão	<i>Stryphnodendron pulcherrimum</i> (Willd.) Hochr.	1
Breu amescla / Amesclao	<i>Trattinnickia mensalis</i> Daly	1
Breu barrote	<i>Tetragastris panamensis</i>	1
Breu branco	<i>Protium palidum</i> Cuatrec.	1
Breu sucuruba	<i>Trattinnickia rhoifolia</i>	1
Breu vermelho	<i>Tetragastris altissima</i> (Aubl.) Swart	1
Buiúçu / Olho de boi	<i>Ormosia coutinhoi</i> Ducke.	1
Burra Leiteira / Sorva	<i>Sapium marginatum</i> M. Arg	1
Cacauba	<i>Theobroma</i> sp.	1
Cacaui	<i>Theobroma sylvestre</i> Mart.	1
Caferana	<i>Pera eiteniorum</i> Bigio & Secco	1
Cajuaçu / Cajui	<i>Anacardium giganteum</i> W.Hancock ex Engl	1
Canela de jacamim	<i>Rinorea riana</i>	1
Canela de Velho / Muuba vermelha	<i>Miconia</i> sp. Embrapa	1
Caniceira	<i>Pseudoxandra cuspidata</i> Maas	1
Carapanauba	<i>Aspidosperma carapanauba</i> Pichon	1
Caripe	<i>Licania octandra</i> (Hoffmanns. Ex. Roem & Schult.) Kuntze	1
Cariperana	<i>Licania apetala</i> (E.Mex.) Fritsch	1
Cariperana	<i>Licania apetala</i> (E.Mex.) Fritsch	1
Casca seca	<i>Sagotia brachysepala</i> (Müll.Arg.) Secco	1
Castanha do Para / Castanheira	<i>Bertholletia excelsa</i> Bonpl	1
Catuaba / Limorana	<i>Secundatia floribunda</i> A.DC	1
Cedro vermelho	<i>Cedrela odorata</i> L.	1
Cedrorana	<i>Cedrelinga cateniformis</i> (Ducke) Ducke	1
Ceru	<i>Allantoma lineata</i> (Mart. & O.	1
Cipo	<i>Araujia sericifera</i> Brot	1
	NI	1
Cipo apui / Atraca	<i>Martinella obovata</i> (Kunth) Bureau & K.Schum.	1
Cipo cebola Braba / Cebolao	<i>Clusia grandiflora</i> Spligz.	1
Cipo cravo	<i>Tynanthus elegans</i> Miers	1
Cipo de fogo	<i>Doliocarpus dentatus</i>	1
Cipo escada de jabuti	<i>Bauhinia guianensis</i> Aubl.	1
Cipo Macaco	<i>Combretum fruticosum</i> (Loefl.) Stuntz	1
Cipo meretetea	NI	1

Cipo unha de gato	NI	1
Cipo vermelho	Combretum mellifluum Eichler	1
Coco pau	Couepia robusta	1
Copaiba	Copaifera duckei Dwyer	1
	Copaifera multijuga Hayne,	1
Coração de Negro	Swartzia	1
Cumarú / Cumaru amarelo	Dipteryx odorata (Aubl.) Willd.	1
Cumarú preto	Dipteryx sp.	1
Cumarú vermelho	Dipteryx sp.	1
Cumarú	Dipteryx sp.	1
Cupiuba	Goupia glabra Aubl	1
Cupui	Theobroma subcanum Mart.	1
Curupixa	Micropholis acutangula (Ducke)	1
Embauba / Embauba branca	Cecropiapalmata	1
Embauba vermelha	Cecropia glaziovii Snethl	1
Embaubão / Embaubarana / Torém.	Cecropia sciadophylla Mart	1
Envira	Annona sp.	1
Envira amarela	Duguetia echinophora R.E.Fr	1
Envira branca	Duguetia quitarensis Benth	1
Envira preta / conduru	Annona exsucca DC	1
Envira quiabo	NI	1
Envira taia	Annona ambotay Aubl.	1
Envirão	Onychopetalum amazonicum	1
Esconrega macaco	Peltogyne panicula	1
Fava amarela	Vatairea guianensis Aubl.	1
Fava amargosa / Impingenta	Vataireopsis speciosa Ducke	1
Fava atana	Parkia gigantocarpa Ducke	1
Fava bolacha	Vatairea guianensis Aubl	1
Fava Bolota / Visgueiro	Parkia pendula (Willd.) Walp.	1
Fava Branca	Parkia paraensis Ducke	1
Fava carocinho	NI	1
Fava core	Parkia oppositifolia	1
Fava japu	NI	1
Fava orelha de macaco	Enterolobium schomburgkii Benth.	1
Fava paramaça	NI	1
Fava paricá/ paricá	Schizolobium Amazonico	1
Fava tamanquare	NI	1
Fava tamboril	Enterolobium maximum Ducke	1
Fava timborana	Pseudopiptadenia suaveolans	1
Faveira Branca	Parkia multijuga Benth.	1
Freijo branco	Cordia bicolor A.DC.	1

Freijo cinza/ Freijo	Cordia Goeldiana	1
Goiaba da Mata / Goiabinha / Goiaba de anta / Muuba	Bellucia grossularioides (L.) Triana	1
Goiabão	Pouteria pachycarpa	1
Guajara	Chrysophyllum sp.	1
Guajara Bolacha	Syzygiopsis oppositifolia Ducke	1
Guajara cinza	Chrysophyllum sp.	1
Guajara de leite / Branco	Pouteria ambelaniifolia (Sandwith)	1
Guajara pedra	Neoxythece elegans (A.DC.) Aubret	1
Guajara preto	NI	1
Guariuba / Oiticica	Clarisia racemosa Ruiz & Pav.	1
Inga	Inga alba (Sw.) Willd	1
Inga	Inga alba (Sw.) Willd	1
Inga branco	Inga capitata Desv	1
	Inga gracifolia Ducke.	1
Inga peludo	Inga edulis	1
Inga vermelho	Inga calantha Ducke	1
Inga Xixica	Inga sellowiana Benth	1
Ingarana	Abarema jupumba (Willd.) Briton & Killip var. Jupumba.	1
Inhare	Brosimum guianensis	1
Ioizeiro	Xylopia nitida Dunal	1
Ipe	Tabebuia sp.	1
Ipe	Tabebuia sp.	1
Ipê Amarelo	Tabebuia serratifolia (Vahl) Nicols,	1
Ipeuba / ipé vermelho	Macrolobium bifolium (Aubl) Pers.	1
Itauba / Itauba amarela	Mezilaurus itauba (Meissn.)Taubert ex Mez.	1
Itauba Branca	Mezilaurus sp.	1
Itaubarana	Guarea cinnamomea Harms	1
	Mezilaurus sp.	1
Jacareuba	Calophyllum brasiliense Cambess	1
Jarana	Lecythis lurida (Miers) S.A.Mori	1
Jarana branca	Lecythis sp.	1
Jarana vermelha	Lecythis sp.	1
Jatoba	Hymenaea courbaril L.	1
João mole	Neea floribunda	1
Jutai	Hymenaea Parviflora Huber.	1
Jutai miri / Pororoca	Hymenaea sp.	1
Lacre / Lacre vermelho	Visnia latifolia	1
Louro	Ocotea sp.	1
Louro abacate	Aniba williamsii O. C. Schmidt	1

Louro canela	Ocotea fragrantissima Ducke	1
Louro cuminho	Ocotea longifolia H.B.K.	1
Louro faia	Euplassa pinnata (Lam.) I.M. Johnst.	1
Louro jandauba	Aiouea sp	1
Louro pimento	Mezilaurus synandra (Mez) Kosterm	1
Louro preto	Ocotea sp.	1
Louro Rosa	Aniba terminalis Ducke.	1
Louro tamanquare / Tanaquare	Caraipa grandifolia Mart.	1
Louro Vermelho	Nectandra rubra	1
Macacauba	Platymiscium trinitatis Benth	1
Maçaranduba	Manilkara huberi	1
Macucu/ Macucu de sangue	Couepia elata Ducke	1
Mamorana / Manguirana	Eriotheca globosa (Aubl.) A.Robyns	1
Mamorana vermelha	Eriotheca sp.	1
Mamui	Jacaratia sp.	1
Mandioqueira / Mandioqueiro liso	Pouteria decorticans Penn	1
	Qualea paraensis Ducke.	1
Manexico	NI	1
Maparajuba	Manilkara Bidentada (A.DC) A.Chev.	1
Marapuama	Ptychopetalum olacoides Benth.	1
Maria Preta	Terminalia glabrescens Mart	1
Marupa	Simarouba amara Aubl.	1
Maruparana	Zanthoxylum huberi P.G.Waterman	1
Matamata branco	Eschweilera grandiflora (Aubl.) Sandwith	1
Matamata preto	Eschweilera blanchetiana	1
	Eschweilera coriacea (DC.) S.A Mori	1
Matamata vermelho / Jibóia	Eschweilera sp.	1
Melancieira	Alexa grandiflora	1
Meraquati	NI	1
Merauba	Mouriri callocarpa Ducke	1
Miri / Umiri	Humiria balsamifera (Aubl.) St. Hill	1
Molongo	Molongum laxum (Benth.) Pichon	1
Morototo	Schefflera morototoni	1
Morta	NI	1
Muiracatiara	Astronium lecontei Ducke	1
Muirapinima	NI	1
Muiratinga	Naucleopsis glabra Spruce ex Pittier	1
Mundurucu	NI	1
Murtinha / Murta	Pouteria cuspidata (A. DC.) Baehni	1
Muruci/ Murici da mata	Byrsonima crassifolia	1
Murupita	Sapium hippomane	1

Quaruba	Vochysia maxima Ducke	1
Quaruba cedro	Vochysia vismiifolia Spruce ex. Warm	1
Quaruba goiaba	Erismia uncinatum Warm	1
Quarubarana	Erismia uncinatum Warm	1
Quarubatinga	Vochysia guianensis Aubl	1
Quinarana	Geissospermum sericeum Benth. & Hook. f. ex Miers	1
Rajadinho	NI	1
Sapucaia	Lecythis ollaria	1
Seringa Preta	Hevea sp.	1
Seringarana / Seringa vermelha	Hevea guianensis Aubl	1
Seringueira / Seringa branca / Seringa amarela	Hevea brasiliensis (Willd. ex A.Juss.) Müll.Arg	1
Sororoca erva	Stromanthe stromanthoides (J.F.Macbr.) L.Andersson	1
Sucupira	Bowdichia nitida	1
Sucupira amarela	Sweetia fruticosa Spreng	1
Sucupira babona / Pele de sapo / Sucupira tento	Diploptropis purpurea (Rich.) Amshoff	1
Sucupira Branca	Ormosia sp.	1
Sucupira preta	Diploptropis peruviana J.F.Macbr	1
Sucuuba	Himatanthus articulatus (Vahl) Woodson	1
Sumauma	Eriotheca longitubulosa A.Robyns	1
Tachi branco	Macrosamanea pubiramea (Steud.) Barneby & J.W.Grimes	1
Tachi preto	Tachigalia paniculata	1
Tachi vermelho	Tachigali myrmecophila (Ducke) Ducke	1
Tamanqueira	Stryphnodendron pulcherrimum (Willd.) Hochr	1
Tanibuca / Tanibuca amarela / Cinzeiro	Buchenavia grandis Ducke	1
	Buchenavia parvifolia Ducke	1
Tanibuca branca	Buchenavia sp.	1
Tapereba / Cajá	Antrocaryon amazonicum (Ducke) B.L.Burt & A.W.Hill	1
Taperebarana	Touroulia guianensis Aubl	1
Taquari	Alchornea discolor Poepp	1
Taquarirana	Mabea piriri Aubl	1
Tatajuba	Maclura tinctoria (L.) D.Don ex Steud. subsp. tinctoria	1
Tatapiririca	Tapirira guianensis Aubl.	1
Tauari	Couratari atrovirens Prance	1
Tauari branco	Couratari multiflora (Sm.) Eyma	1
Tento / Tento vermelho	Ormosia micrantha Ducke	1
Tento branco	Diploptropis nitida Benth.	1

Tento preto	Ormosia sp.	1
Tinteiro	Avicennia germinans (L.) L	1
Tucandedeira	NI	1
Uchirana / Tachirana	Vantanea parviflora	1
Ucubarana / Ucuuba do gapó	Iryanthera laevis Markgr	1
Ucuuba	Virola surinamensis	1
Ucuuba da terra firme	Iryanthera juruensis Warb	1
Urucurana	Bixa excelsa Gleason & Krukoff	1
Urucurana	Bixa excelsa Gleason & Krukoff	1
Uxi / Uchizeiro	Endopleura uchi	1
Virola / Virola terra firme / Casca de vidro	Virola albidiflora Ducke	1
Virola branca / Varzea / Igapó	Iryanthera ulei Warb.	1
Virola vermelha	Virola sebifera Aubl.	1
Total		274

Appendix 4: Additional Information

Use appendices for supporting information. Delete this appendix (title and instructions) where no appendix is required.

Table 6. List of all land use and land cover classes existing at the project start date within the reference region

Class Identifier		Braod Class	Trend in Carbon stock ¹	Presence in ²	Baseline activity ³			Description (including criteria for unambiguous boundary definition)
ID _{cl}	Name				LG	FW	CP	
001	Dense Ombrofile Forest	Forest Land	constant	RR	yes	no	no	
002	Degraded Ombrofile Forest	Forest Land	constant	RR	yes	no	no	
003	Grassland	Grassland	constant	RR	no	no	no	
004	Cropland	Crop Land	constant	RR	no	no	no	
005	Dense Ombrofile Forest	Forest Land	constant	PA	yes	no	no	
006	Degraded Ombrofile Forest	Forest Land	constant	PA	yes	no	no	
007	Grassland	Grassland	constant	PA	no	no	no	
008	Cropland	Crop Land	constant	PA	no	no	no	
009	Dense Ombrofile Forest	Forest Land	constant	LK	yes	no	no	
010	Degraded Ombrofile Forest	Forest Land	constant	LK	yes	no	no	
011	Grassland	Grassland	constant	LK	no	no	no	
012	Cropland	Crop Land	constant	LK	no	no	no	

RR = Reference Region, LK = Leakage Belt, LM = Leakage Management Areas, PA = Project Area

ANNEX A. Calculations

Table 9.a Annual areas of baseline deforestation in the reference region using historical average approach with no constraints

Project year	Stratum <i>i</i> in the reference region				Total	
	1	2	...	<i>I_{RR}</i>	annual	cumulative

	ABSLRR _{i,t} ha	ABSLRR _{i,t} ha	ABSLRR _{i,t} ha	ABSLRR _{i,t} ha	ABSLRR _t ha	ABSLRR ha
1	18,788				18,788	18,788
2	18,788				18,788	37,576
3	18,788				18,788	56,364
4	18,788				18,788	75,152
5	18,788				18,788	93,940
6	18,788				18,788	112,728
7	18,788				18,788	131,516
8	18,788				18,788	150,304
9	18,788				18,788	169,092
10	18,788				18,788	187,880
11	18,788				18,788	206,668
12	18,788				18,788	225,456
13	18,788				18,788	244,244
14	18,788				18,788	263,032
15	18,788				18,788	281,820
16	18,788				18,788	300,608
17	18,788				18,788	319,396
18	18,788				18,788	338,184
19	18,788				18,788	356,972
20	18,788				18,788	375,760
21	18,788				18,788	394,548
22	18,788				18,788	413,336
23	18,788				18,788	432,124
24	18,788				18,788	450,912
25	18,788				18,788	469,700
26	18,788				18,788	488,488
27	18,788				18,788	507,276
28	18,788				18,788	526,064
29	18,788				18,788	544,852
30	18,788				18,788	563,640
31	18,788				18,788	582,428
32	18,788				18,788	601,216
33	18,788				18,788	620,004
34	18,788				18,788	638,792
35	18,788				18,788	657,580
36	18,788				18,788	676,368
37	18,788				18,788	695,156
38	18,788				18,788	713,944
39	18,788				18,788	732,732
40	18,788				18,788	751,520

Table 9.b Annual areas of baseline deforestation in the project area

Project year	Stratum <i>i</i> of the reference region in the project area				Total	
	Omrophile Dense	Omrophile Degraded	...	I_{RR}	annual	cumulative
	$ABSLPA_{i,t}$ ha	$ABSLPA_{i,t}$ ha	$ABSLPA_{i,t}$ ha	$ABSLPA_{i,t}$ ha	$ABSLPA_t$ ha	$ABSLPA$ ha
1	40.0	0			40	40
2	40.0	0			40	80
3	40.0	0			40	120
4	40.0	0			40	160
5	40.0	0			40	200
6	40.0	0			40	240
7	40.0	0			40	280
8	40.0	0			40	320
9	40.0	0			40	360
10	40.0	0			40	400
11	40.0	0			40	440
12	40.0	0			40	320
13	40.0	0			40	360
14	40.0	0			40	480
15	40.0	0			40	360
16	40.0	0			40	400
17	40.0	0			40	520
18	40.0	0			40	400
19	40.0	0			40	440
20	40.0	0			40	560
21	40.0	0			40	440
22	40.0	0			40	480
23	40.0	0			40	600
24	40.0	0			40	480
25	40.0	0			40	520
26	40.0	0			40	640
27	40.0	0			40	520
28	40.0	0			40	560
29	40.0	0			40	680
30	40.0	0			40	560
31	40.0	0			40	600
32	40.0	0			40	720
33	40.0	0			40	600
34	40.0	0			40	640
35	40.0	0			40	760
36	40.0	0			40	640
37	40.0	0			40	680
38	40.0	0			40	800
39	40.0	0			40	680
40	40.0	0			40	720

Table 9.c Annual areas of baseline deforestation in the leakage belt

Project year	Stratum <i>i</i> of the reference region in the leakage belt				Total	
	Omrophile Dense	Omrophile Degraded	...	I_{RR}	annual	cumulative
	$ABSLLK_{i,t}$ ha	$ABSLLK_{i,t}$ ha	$ABSLLK_{i,t}$ ha	$ABSLLK_{i,t}$ ha	$ABSLLK_t$ ha	$ABSLLK$ ha
1	10,809	0			10,809	10,809
2	10,809				10,809	21,618
3	10,809				10,809	32,427
4	10,809				10,809	43,236
5	10,809				10,809	54,045
6	10,809				10,809	64,854
7	10,809				10,809	75,663
8	10,809				10,809	86,472
9	10,809				10,809	97,281
10	10,809				10,809	86,472
11	10,809				10,809	97,281
12	10,809				10,809	108,090
13	10,809				10,809	118,899
14	10,809				10,809	129,708
15	10,809				10,809	140,517
16	10,809				10,809	151,326
17	10,809				10,809	162,135
18	10,809				10,809	172,944
19	10,809				10,809	183,753
20	10,809				10,809	194,562
21	10,809				10,809	205,371
22	10,809				10,809	216,180
23	10,809				10,809	226,989
24	10,809				10,809	237,798
25	10,809				10,809	248,607
26	10,809				10,809	259,416
27	10,809				10,809	270,225
28	10,809				10,809	281,034
29	10,809				10,809	291,843
30	10,809				10,809	302,652
31	10,809				10,809	313,461
32	10,809				10,809	324,270
33	10,809				10,809	335,079
34	10,809				10,809	345,888
35	10,809				10,809	356,697
36	10,809				10,809	367,506
37	10,809				10,809	378,315
38	10,809				10,809	389,124

39	10,809				10,809	399,933
40	10,809				10,809	410,742

Table

11.a:

Annual areas deforested per forest class icl within the reference region in the baseline case (baseline activity data per forest class)

* Areas are areas of change since the project start date only. All changes are reported as positive values, yet changes are losses for the "for" class and gains for the "to" class.

Area deforested per forest class <i>fc</i> / within the reference region					Total baseline deforestation in the project area	
$ABSLRR_{icl,t} >$	Omrophile Dense	Omrophile Degraded	...	<i>icl</i>		
Name >	Forest				$ABSLRR_t$ annual	$ABSLRR$ cumulative
Project year t	ha	ha	ha	ha	ha	ha
1	18,788				18,788	18,788
2	18,788				18,788	37,576
3	18,788				18,788	56,364
4	18,788				18,788	75,152
5	18,788				18,788	93,940
6	18,788				18,788	112,728
7	18,788				18,788	131,516
8	18,788				18,788	150,304
9	18,788				18,788	169,092
10	18,788				18,788	187,880
11	18,788				18,788	206,668
12	18,788				18,788	225,456
13	18,788				18,788	244,244
14	18,788				18,788	263,032
15	18,788				18,788	281,820
16	18,788				18,788	300,608
17	18,788				18,788	319,396
18	18,788				18,788	338,184
19	18,788				18,788	356,972
20	18,788				18,788	375,760
21	18,788				18,788	394,548
22	18,788				18,788	413,336
23	18,788				18,788	432,124
24	18,788				18,788	450,912
25	18,788				18,788	469,700
26	18,788				18,788	488,488

27	18,788				18,788	507,276
28	18,788				18,788	526,064
29	18,788				18,788	544,852
30	18,788				18,788	563,640
31	18,788				18,788	582,428
32	18,788				18,788	601,216
33	18,788				18,788	620,004
34	18,788				18,788	638,792
35	18,788				18,788	657,580
36	18,788				18,788	676,368
37	18,788				18,788	695,156
38	18,788				18,788	713,944
39	18,788				18,788	732,732
40	18,788				18,788	751,520

Table 11.b: Annual areas deforested per forest class icl within the project area in the baseline case (baseline activity data per forest class)

Area deforested per forest class fc/ within the project area					Total baseline deforestation in the project area	
$ABSLPA_{icl,t} >$	Omrophile Dense	Omrophile Degraded	...	icl		
Name >	Forest				$ABSLPA_t$ annual	$ABSLPA$ cumulative
Project year t	ha	ha	ha	ha	ha	ha
1	34.0	5.7			40	40
2	34.0	5.7			40	80
3	34.0	5.7			40	120
4	34.0	5.7			40	160
5	34.0	5.7			40	200
6	34.0	5.7			40	240
7	34.0	5.7			40	280
8	34.0	5.7			40	320
9	34.0	5.7			40	360
10	34.0	5.7			40	400
11	34.0	5.7			40	440
12	34.0	5.7			40	480
13	34.0	5.7			40	520
14	34.0	5.7			40	560
15	34.0	5.7			40	600
16	34.0	5.7			40	640
17	34.0	5.7			40	680
18	34.0	5.7			40	720

19	34.0	5.7			40	760
20	34.0	5.7			40	800
21	34.0	5.7			40	840
22	34.0	5.7			40	880
23	34.0	5.7			40	920
24	34.0	5.7			40	960
25	34.0	5.7			40	1,000
26	34.0	5.7			40	1,040
27	34.0	5.7			40	1,080
28	34.0	5.7			40	1,120
30	34.0	5.7			40	1,160
30	34.0	5.7			40	1,200
31	34.0	5.7			40	1,240
32	34.0	5.7			40	1,280
33	34.0	5.7			40	1,320
34	34.0	5.7			40	1,360
35	34.0	5.7			40	1,400
36	34.0	5.7			40	1,440
37	34.0	5.7			40	1,480
38	34.0	5.7			40	1,520
39	34.0	5.7			40	1,560
40	34.0	5.7			40	1,600

Table 11.c: Annual areas deforested per forest class *icl* within the leakage belt in the baseline case (baseline activity data per forest class)

Area deforested per forest class <i>fc</i> within the leakage belt					Total baseline deforestation in the project area	
$ABSLLK_{icl,t} >$	Omrophile Dense	Omrophile Degraded	...	<i>icl</i>		
Name >	Forest				$ABSLLK_t$ annual	$ABSLLK$ cumulative
Project year <i>t</i>	ha	ha	ha	ha	ha	ha
1	10,809				10,809	10,809
2	10,809				10,809	21,618
3	10,809				10,809	32,427
4	10,809				10,809	43,236
5	10,809				10,809	54,045
6	10,809				10,809	64,854
7	10,809				10,809	75,663
8	10,809				10,809	86,472
9	10,809				10,809	97,281

10	10,809				10,809	108,090
11	10,809				10,809	118,899
12	10,809				10,809	129,708
13	10,809				10,809	140,517
14	10,809				10,809	151,326
15	10,809				10,809	162,135
16	10,809				10,809	172,944
17	10,809				10,809	183,753
18	10,809				10,809	194,562
19	10,809				10,809	205,371
20	10,809				10,809	216,180
21	10,809				10,809	226,989
22	10,809				10,809	237,798
23	10,809				10,809	248,607
24	10,809				10,809	259,416
25	10,809				10,809	270,225
26	10,809				10,809	281,034
27	10,809				10,809	291,843
28	10,809				10,809	302,652
29	10,809				10,809	313,461
30	10,809				10,809	324,270
31	10,809				10,809	335,079
32	10,809				10,809	345,888
33	10,809				10,809	356,697
34	10,809				10,809	367,506
35	10,809				10,809	378,315
36	10,809				10,809	389,124
37	10,809				10,809	399,933
38	10,809				10,809	410,742
39	10,809				10,809	421,551
40	10,809				10,809	432,360

Table 12.a:

Annual areas of post-deforestation classes fcl within the reference region in the baseline case (baseline activity data per non-forest class)

Area established after deforestation per class fcl within the reference region					Total baseline deforestation in the reference region	
$ABSLRR_{fcl,t}$	Omrophile Dense	Omrophile Degraded	...	Fcl	$ABSLRR_t$ annual ha	$ABSLRR$ cumulative ha
Name >	Non-forest					
Project year v	ha	ha	ha	ha		
1	18,788				18,788	18,788

2	18,788				18,788	37,576
3	18,788				18,788	56,364
4	18,788				18,788	75,152
5	18,788				18,788	93,940
6	18,788				18,788	112,728
7	18,788				18,788	131,516
8	18,788				18,788	150,304
9	18,788				18,788	169,092
10	18,788				18,788	187,880
11	18,788				18,788	206,668
12	18,788				18,788	225,456
13	18,788				18,788	244,244
14	18,788				18,788	263,032
15	18,788				18,788	281,820
16	18,788				18,788	300,608
17	18,788				18,788	319,396
18	18,788				18,788	338,184
19	18,788				18,788	356,972
20	18,788				18,788	375,760
21	18,788				18,788	394,548
22	18,788				18,788	413,336
23	18,788				18,788	432,124
24	18,788				18,788	450,912
25	18,788				18,788	469,700
26	18,788				18,788	488,488
27	18,788				18,788	507,276
28	18,788				18,788	526,064
29	18,788				18,788	544,852
30	18,788				18,788	563,640
31	18,788				18,788	582,428
32	18,788				18,788	601,216
33	18,788				18,788	620,004
34	18,788				18,788	638,792
35	18,788				18,788	657,580
36	18,788				18,788	676,368
37	18,788				18,788	695,156
38	18,788				18,788	713,944
39	18,788				18,788	732,732
40	18,788				18,788	751,520

Table 12.b: Annual areas of post-deforestation classes fcl within the project area in the baseline case (baseline activity data per non-forest class)

Area established after deforestation per class fcl within the project area					Total baseline deforestation in the project area	
$ABSLPA_{fcl,t}$	Omrophile Dense	Omrophile Degraded	...	Fcl	$ABSLPA_t$	$ABSLPA$
Name >					annual	cumulative
Project year v	ha	ha	ha	ha	ha	ha
1	34.0	5.7			40	40
2	34.0	5.7			40	80
3	34.0	5.7			40	120
4	34.0	5.7			40	160
5	34.0	5.7			40	200
6	34.0	5.7			40	240
7	34.0	5.7			40	280
8	34.0	5.7			40	320
9	34.0	5.7			40	360
10	34.0	5.7			40	400
11	34.0	5.7			40	440
12	34.0	5.7			40	480
13	34.0	5.7			40	520
14	34.0	5.7			40	560
15	34.0	5.7			40	600
16	34.0	5.7			40	640
17	34.0	5.7			40	680
18	34.0	5.7			40	720
19	34.0	5.7			40	760
20	34.0	5.7			40	800
21	34.0	5.7			40	840
22	34.0	5.7			40	880
23	34.0	5.7			40	920
24	34.0	5.7			40	960
25	34.0	5.7			40	1,000
26	34.0	5.7			40	1,040
27	34.0	5.7			40	1,080
28	34.0	5.7			40	1,120
29	34.0	5.7			40	1,160
30	34.0	5.7			40	1,200
31	34.0	5.7			40	1,240
32	34.0	5.7			40	1,280
33	34.0	5.7			40	1,320
34	34.0	5.7			40	1,360
35	34.0	5.7			40	1,400
36	34.0	5.7			40	1,440
37	34.0	5.7			40	1,480

38	34.0	5.7			40	1,520
39	34.0	5.7			40	1,560
40	34.0	5.7			40	1,600

Table 12.c: Annual areas of post-deforestation classes fcl within the leakage belt in the baseline case (baseline activity data per non-forest class)

Area established after deforestation per class fcl within the leakage belt					Total baseline deforestation in the leakage belt	
$ABSLLK_{fcl,t}$	Omrophile Dense	Omrophile Degraded	...	Fcl	$ABSLLK_t$ annual	$ABSLLK$ cumulative
Name >	Non-forest					
Project year v	ha	ha	ha	ha	ha	ha
1	10,809				10,809	10,809
2	10,809				10,809	21,618
3	10,809				10,809	32,427
4	10,809				10,809	43,236
5	10,809				10,809	54,045
6	10,809				10,809	64,854
7	10,809				10,809	75,663
8	10,809				10,809	86,472
9	10,809				10,809	97,281
10	10,809				10,809	108,090
11	10,809				10,809	118,899
12	10,809				10,809	129,708
13	10,809				10,809	140,517
14	10,809				10,809	151,326
15	10,809				10,809	162,135
16	10,809				10,809	172,944
17	10,809				10,809	183,753
18	10,809				10,809	194,562
19	10,809				10,809	205,371
20	10,809				10,809	216,180
21	10,809				10,809	226,989
22	10,809				10,809	237,798
23	10,809				10,809	248,607
24	10,809				10,809	259,416
25	10,809				10,809	270,225
26	10,809				10,809	281,034
27	10,809				10,809	291,843
28	10,809				10,809	302,652
29	10,809				10,809	313,461

30	10,809				10,809	324,270
31	10,809				10,809	335,079
32	10,809				10,809	345,888
33	10,809				10,809	356,697
34	10,809				10,809	367,506
35	10,809				10,809	378,315
36	10,809				10,809	389,124
37	10,809				10,809	399,933
38	10,809				10,809	410,742
39	10,809				10,809	421,551
40	10,809				10,809	432,360

Table 14. Average carbon stock per hectare of all land use and land cover classes present in the leakage belt and project area

LU/LC class		Average carbon stock per hectare $\pm$ 90% CI							
		Cab_{cl}		Cbb_{cl}		Cl_{cl}		$Ctot_{cl}$	
		average stock	$\pm$ 90% CI	average stock	$\pm$ 90% CI	average stock	$\pm$ 90% CI	average stock	$\pm$ 90% CI
ID_c	Name	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹
1	Omrophile Dense	469.6	46.7	105.2	10.5	8.68	0.8	583.5	58.0
2	Omrophile Degraded	461.2	95.5	103.4	21.3	8.96	1.36	573.6	118.1

Table 17.b Total net baseline carbon stock change in the project area

Project year	Activity data per category x Carbon stock change factor								Total baseline carbon stock change	
	$ID_{ct} = 1$		$ID_{ct} = 2$		$ID_{ct} = \dots$		$ID_{ct} = lct$		annual	cumulative
	ABSLPA _{ct,t} ha	$\square Ctot_{ct,t}$ tCO ₂ -e ha ⁻¹	ABSLPA _{ct,t} ha	$\square Ctot_{ct,t}$ tCO ₂ -e ha ⁻¹	ABSLPA _{ct,t} ha	$\square Ctot_{ct,t}$ tCO ₂ -e ha ⁻¹	ABSLPA _{ct,t} ha	$\square Ctot_{ct,t}$ tCO ₂ -e ha ⁻¹	$\square CBSLP A_t$ tCO ₂ -e	$\square CBSLPA$ tCO ₂ -e
1	40	578							22,959	22,959
2	40	578							22,959	45,918

3	40	578							22,959	68,877
4	40	578							22,959	91,836
5	40	578							22,959	114,795
6	40	578							22,959	137,754
7	40	578							22,959	160,713
8	40	578							22,959	183,672
9	40	578							22,959	206,631
10	40	578							22,959	229,590
11	40	578							22,959	252,549
12	40	578							22,959	275,508
13	40	578							22,959	298,467
14	40	578							22,959	321,426
15	40	578							22,959	344,385
16	40	578							22,959	367,344
17	40	578							22,959	390,303
18	40	578							22,959	413,262
19	40	578							22,959	436,221
20	40	578							22,959	459,180
21	40	578							22,959	482,139
22	40	578							22,959	505,098
23	40	578							22,959	528,057
24	40	578							22,959	551,016
25	40	578							22,959	573,975
26	40	578							22,959	596,934
27	40	578							22,959	619,893
28	40	578							22,959	642,852
29	40	578							22,959	665,811
30	40	578							22,959	688,770
31	40	578							22,959	711,729
32	40	578							22,959	734,688
33	40	578							22,959	757,647
34	40	578							22,959	780,606
35	40	578							22,959	803,565
36	40	578							22,959	826,524
37	40	578							22,959	849,483
38	40	578							22,959	872,442
39	40	578							22,959	895,401
40	40	578							22,959	918,360

Table 18. Parameters used to calculate non-CO2 emissions from forest fires

Initial Forest Class	Parameters	B _{nf}	N ₂	BC	H ₄	EB	B _{to}	t _{co}
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IDcl	Name	$F_{burnt_{icl}}$ %	Cab tCO ₂ e ha ⁻¹	Cdw tCO ₂ e ha ⁻¹	Cf tCO ₂ e ha ⁻¹	$P_{burnt_{ab,icl}}$ %	$P_{burnt_{i,icl}}$ %	$CE_{ab,icl}$ %	$CE_{i,icl}$ %	$ECO2-ab_{icl}$ tCO ₂ e ha ⁻¹	$ECO2-i_{icl}$ tCO ₂ e ha ⁻¹	$EBBCO2-tot_{icl}$ tCO ₂ e ha ⁻¹	$F_{burnt_{icl}}$ tCO ₂ e ha ⁻¹	Cab tCO ₂ e ha ⁻¹	Cdw tCO ₂ e ha ⁻¹
1	Omrophile Dense	96	469.6	0.0	8.7	96	100	0.5	0.5	225.4	4.2	229.6	0.0	21.0	21.0
2	Omrophile Degraded	96	461.2	0.0	9.0	96	100	0.5	0.5	221.4	4.3	225.7	1.3	20.7	19.3

Table 19. Baseline non-CO2 emissions from forest fires in the project area

Project year	Emissions of non-CO ₂ gasses from baseline forest fires								Total baseline non-CO ₂ emissions from forest fires in the project area	
	$ID_{ic} = 1$		$ID_{ic} = 2$		$ID_{ic} = \dots$		$ID_{ic} = Icl$		annual $EBBBSLP_{A_t}$ tCO ₂ -e	cumulative $EBBBSLPA$ tCO ₂ -e
	$ABSLPA_{icl,t}$ ha	$EBBBSL_{tot_{icl}}$ tCO ₂ -e ha ⁻¹	$ABSLPA_{icl,t}$ ha	$EBBBSL_{tot_{icl}}$ tCO ₂ -e ha ⁻¹	$ABSLPA_{icl,t}$ ha	$EBBBSL_{tot_{icl}}$ tCO ₂ -e ha ⁻¹	$ABSLPA_{icl,t}$ ha	$EBBBSL_{tot_{icl}}$ tCO ₂ -e ha ⁻¹		
1	34	21	6	19.3					825	825
2	34	21	6	19.3					825	1,650
3	34	21	6	19.3					825	2,475
4	34	21	6	19.3					825	3,300
5	34	21	6	19.3					825	4,125
6	34	21	6	19.3					825	4,950
7	34	21	6	19.3					825	5,775
8	34	21	6	19.3					825	6,600
9	34	21	6	19.3					825	7,425
10	34	21	6	19.3					825	8,250
11	34	21	6	19.3					825	9,075
12	34	21	6	19.3					825	9,900
13	34	21	6	19.3					825	10,725
14	34	21	6	19.3					825	11,550
15	34	21	6	19.3					825	12,375
16	34	21	6	19.3					825	13,200
17	34	21	6	19.3					825	14,025
18	34	21	6	19.3					825	14,850
19	34	21	6	19.3					825	15,675
20	34	21	6	19.3					825	16,500
21	34	21	6	19.3					825	17,325

22	34	21	6	19.3					825	18,150
23	34	21	6	19.3					825	18,975
24	34	21	6	19.3					825	19,800
25	34	21	6	19.3					825	20,625
26	34	21	6	19.3					825	21,450
27	34	21	6	19.3					825	22,275
28	34	21	6	19.3					825	23,100
29	34	21	6	19.3					825	23,925
30	34	21	6	19.3					825	24,750
31	34	21	6	19.3					825	25,575
32	34	21	6	19.3					825	26,400
33	34	21	6	19.3					825	27,225
34	34	21	6	19.3					825	28,050
35	34	21	6	19.3					825	28,875
36	34	21	6	19.3					825	29,700
37	34	21	6	19.3					825	30,525
38	34	21	6	19.3					825	31,350
39	34	21	6	19.3					825	32,175
40	34	21	6	19.3					825	33,000

PROJECT EMISSIONS

Table 9 Ex-post annual areas of unavoided deforested in the project area.

Project year	Stratum <i>i</i> of the reference region in the project area				Total	
	Omrophile Dense	Omrophile Degraded	...	I_{RR}	annual	cumulative
	$ABSLPA_{i,t}$ ha	$ABSLPA_{i,t}$ ha	$ABSLPA_{i,t}$ ha	$ABSLPA_{i,t}$ ha	$ABSLPA_t$ ha	$ABSLPA$ ha
1	40.0	0			40	40
2	40.0	0			40	80
3	40.0	0			40	120
4	40.0	0			40	160
5	40.0	0			40	200
6	40.0	0			40	240
7	40.0	0			40	280
8	40.0	0			40	320
9	40.0	0			40	360
10	40.0	0			40	400
11	40.0	0			40	440
12	40.0	0			40	320
13	40.0	0			40	360

14	40.0	0			40	480
15	40.0	0			40	360
16	40.0	0			40	400
17	40.0	0			40	520
18	40.0	0			40	400
19	40.0	0			40	440
20	40.0	0			40	560
21	40.0	0			40	440
22	40.0	0			40	480
23	40.0	0			40	600
24	40.0	0			40	480
25	40.0	0			40	520
26	40.0	0			40	640
27	40.0	0			40	520
28	40.0	0			40	560
29	40.0	0			40	680
30	40.0	0			40	560
31	40.0	0			40	600
32	40.0	0			40	720
33	40.0	0			40	600
34	40.0	0			40	640
35	40.0	0			40	760
36	40.0	0			40	640
37	40.0	0			40	680
38	40.0	0			40	800
39	40.0	0			40	680
40	40.0	0			40	720

Table
9.c Ex-post annual areas of baseline deforestation in leakage belt.

Project year	Stratum <i>i</i> of the reference region in the leakage belt				Total	
	Omrophile Dense	Omrophile Degraded	...	I_{RR}	annual	cumulative
	$ABSLLK_{i,t}$ ha	$ABSLLK_{i,t}$ ha	$ABSLLK_{i,t}$ ha	$ABSLLK_{i,t}$ ha	$ABSLLK_t$ ha	$ABSLLK$ ha
1	10,809	0			10,809	10,809
2	10,809				10,809	21,618
3	10,809				10,809	32,427
4	10,809				10,809	43,236
5	10,809				10,809	54,045
6	10,809				10,809	64,854
7	10,809				10,809	75,663
8	10,809				10,809	86,472
9	10,809				10,809	97,281

10	10,809				10,809	86,472
11	10,809				10,809	97,281
12	10,809				10,809	108,090
13	10,809				10,809	118,899
14	10,809				10,809	129,708
15	10,809				10,809	140,517
16	10,809				10,809	151,326
17	10,809				10,809	162,135
18	10,809				10,809	172,944
19	10,809				10,809	183,753
20	10,809				10,809	194,562
21	10,809				10,809	205,371
22	10,809				10,809	216,180
23	10,809				10,809	226,989
24	10,809				10,809	237,798
25	10,809				10,809	248,607
26	10,809				10,809	259,416
27	10,809				10,809	270,225
28	10,809				10,809	281,034
29	10,809				10,809	291,843
30	10,809				10,809	302,652
31	10,809				10,809	313,461
32	10,809				10,809	324,270
33	10,809				10,809	335,079
34	10,809				10,809	345,888
35	10,809				10,809	356,697
36	10,809				10,809	367,506
37	10,809				10,809	378,315
38	10,809				10,809	389,124
39	10,809				10,809	399,933
40	10,809				10,809	410,742

Table 11.b: Ex-post annual areas deforested per forest class within the project area (activity data per forest class)

Area deforested per forest class fc / within the project area					Total baseline deforestation in the project area	
$ABSLPA_{ic,t} >$	Omrophile Dense	Omrophile Degraded	...	$ c $		
Name >	Forest				$ABSLPA_t$ annual	$ABSLPA$ cumulative

Project year <i>t</i>	ha	ha	ha	ha	ha	ha
1	34.0	5.7			40	40
2	34.0	5.7			40	80
3	34.0	5.7			40	120
4	34.0	5.7			40	160
5	34.0	5.7			40	200
6	34.0	5.7			40	240
7	34.0	5.7			40	280
8	34.0	5.7			40	320
9	34.0	5.7			40	360
10	34.0	5.7			40	400
11	34.0	5.7			40	440
12	34.0	5.7			40	480
13	34.0	5.7			40	520
14	34.0	5.7			40	560
15	34.0	5.7			40	600
16	34.0	5.7			40	640
17	34.0	5.7			40	680
18	34.0	5.7			40	720
19	34.0	5.7			40	760
20	34.0	5.7			40	800
21	34.0	5.7			40	840
22	34.0	5.7			40	880
23	34.0	5.7			40	920
24	34.0	5.7			40	960
25	34.0	5.7			40	1,000
26	34.0	5.7			40	1,040
27	34.0	5.7			40	1,080
28	34.0	5.7			40	1,120
30	34.0	5.7			40	1,160
30	34.0	5.7			40	1,200
31	34.0	5.7			40	1,240
32	34.0	5.7			40	1,280
33	34.0	5.7			40	1,320
34	34.0	5.7			40	1,360
35	34.0	5.7			40	1,400
36	34.0	5.7			40	1,440
37	34.0	5.7			40	1,480
38	34.0	5.7			40	1,520
39	34.0	5.7			40	1,560
40	34.0	5.7			40	1,600

Table 11.c: Ex-post annual areas deforested per forest class within the leakage belt (activity data per forest class)

Area deforested per forest class <i>fc</i> / within the leakage belt					Total baseline deforestation in the project area	
<i>ABSLLK_{icl,t}</i> >	Omrophile Dense	Omrophile Degraded	...	<i>lcl</i>		
Name >	Forest				<i>ABSLLK_t</i> annual	<i>ABSLLK</i> cumulative
Project year <i>t</i>	ha	ha	ha	ha	ha	ha
1	0				0	0
2	10,809				10,809	10,809
3	10,809				10,809	21,618
4	10,809				10,809	32,427
5	10,809				10,809	43,236
6	10,809				10,809	54,045
7	10,809				10,809	64,854
8	10,809				10,809	75,663
9	10,809				10,809	86,472
10	10,809				10,809	97,281
11	10,809				10,809	108,090
12	10,809				10,809	118,899
13	10,809				10,809	129,708
14	10,809				10,809	140,517
15	10,809				10,809	151,326
16	10,809				10,809	162,135
17	10,809				10,809	172,944
18	10,809				10,809	183,753
19	10,809				10,809	194,562
20	10,809				10,809	205,371
21	10,809				10,809	216,180
22	10,809				10,809	226,989
23	10,809				10,809	237,798
24	10,809				10,809	248,607
25	10,809				10,809	259,416
26	10,809				10,809	270,225
27	10,809				10,809	281,034
28	10,809				10,809	291,843
29	10,809				10,809	302,652
30	10,809				10,809	313,461
31	10,809				10,809	324,270
32	10,809				10,809	335,079
33	10,809				10,809	345,888
34	10,809				10,809	356,697

35	10,809				10,809	367,506
36	10,809				10,809	378,315
37	10,809				10,809	389,124
38	10,809				10,809	399,933
39	10,809				10,809	410,742
40	10,809				10,809	421,551

Table 12.b: Ex-post annual deforestation areas within the project area

Area established after deforestation per class fcl within the project area					Total baseline deforestation in the project area	
$ABSLPA_{fcl,t}$	Omrophile Dense	Omrophile Degraded	...	Fcl	$ABSLPA_t$	$ABSLPA$
Name >					annual	cumulative
Project year v	ha	ha	ha	ha	ha	ha
1	34.0	5.7			40	40
2	34.0	5.7			40	80
3	34.0	5.7			40	120
4	34.0	5.7			40	160
5	34.0	5.7			40	200
6	34.0	5.7			40	240
7	34.0	5.7			40	280
8	34.0	5.7			40	320
9	34.0	5.7			40	360
10	34.0	5.7			40	400
11	34.0	5.7			40	440
12	34.0	5.7			40	480
13	34.0	5.7			40	520
14	34.0	5.7			40	560
15	34.0	5.7			40	600
16	34.0	5.7			40	640
17	34.0	5.7			40	680
18	34.0	5.7			40	720
19	34.0	5.7			40	760
20	34.0	5.7			40	800
21	34.0	5.7			40	840
22	34.0	5.7			40	880
23	34.0	5.7			40	920
24	34.0	5.7			40	960
25	34.0	5.7			40	1,000
26	34.0	5.7			40	1,040

27	34.0	5.7			40	1,080
28	34.0	5.7			40	1,120
29	34.0	5.7			40	1,160
30	34.0	5.7			40	1,200
31	34.0	5.7			40	1,240
32	34.0	5.7			40	1,280
33	34.0	5.7			40	1,320
34	34.0	5.7			40	1,360
35	34.0	5.7			40	1,400
36	34.0	5.7			40	1,440
37	34.0	5.7			40	1,480
38	34.0	5.7			40	1,520
39	34.0	5.7			40	1,560
40	34	5.7			40	1,600

Table 12.c: Ex-post annual deforestation within the leakage belt

Area established after deforestation per class <i>fc</i> / within the leakage belt					Total baseline deforestation in the leakage belt	
<i>ABSLLK_{fcl,t}</i>	Omrophile Dense	Omrophile Degraded	...	<i>Fcl</i>		
Name >	Non-forest				<i>ABSLLK_t</i> annual	<i>ABSLLK</i> cumulative
Project year v	ha	ha	ha	ha	ha	ha
1	10,809				10,809	10,809
2	10,809				10,809	21,618
3	10,809				10,809	32,427
4	10,809				10,809	43,236
5	10,809				10,809	54,045
6	10,809				10,809	64,854
7	10,809				10,809	75,663
8	10,809				10,809	86,472
9	10,809				10,809	97,281
10	10,809				10,809	108,090
11	10,809				10,809	118,899
12	10,809				10,809	129,708
13	10,809				10,809	140,517
14	10,809				10,809	151,326
15	10,809				10,809	162,135
16	10,809				10,809	172,944
17	10,809				10,809	183,753
18	10,809				10,809	194,562

19	10,809				10,809	205,371
20	10,809				10,809	216,180
21	10,809				10,809	226,989
22	10,809				10,809	237,798
23	10,809				10,809	248,607
24	10,809				10,809	259,416
25	10,809				10,809	270,225
26	10,809				10,809	281,034
27	10,809				10,809	291,843
28	10,809				10,809	302,652
29	10,809				10,809	313,461
30	10,809				10,809	324,270
31	10,809				10,809	335,079
32	10,809				10,809	345,888
33	10,809				10,809	356,697
34	10,809				10,809	367,506
35	10,809				10,809	378,315
36	10,809				10,809	389,124
37	10,809				10,809	399,933
38	10,809				10,809	410,742
39	10,809				10,809	421,551
40	10,809				10,809	432,360

Table
17.b

Ex-post carbon stock change in the project area (above-ground, below-ground and litter biomass)

Project year	Activity data per category x Carbon stock change factor								Total baseline carbon stock change	
	$ID_{ct} = 1$		$ID_{ct} = 2$		$ID_{ct} = \dots$		$ID_{ct} = lct$		annual	cumulative
	$ABSLPA_{ct,t}$ ha	$\square C_{tot}_{ct,t}$ tCO ₂ -e ha ⁻¹	$ABSLPA_{ct,t}$ ha	$\square C_{tot}_{ct,t}$ tCO ₂ -e ha ⁻¹	$ABSLPA_{ct,t}$ ha	$\square C_{tot}_{ct,t}$ tCO ₂ -e ha ⁻¹	$ABSLPA_{ct,t}$ ha	$\square C_{tot}_{ct,t}$ tCO ₂ -e ha ⁻¹	$\square CBSLP_{A_t}$ tCO ₂ -e	$\square CBSLPA$ tCO ₂ -e
1	40	578							22,959	22,959
2	40	578							22,959	45,918
3	40	578							22,959	68,877
4	40	578							22,959	91,836
5	40	578							22,959	114,795
6	40	578							22,959	137,754
7	40	578							22,959	160,713
8	40	578							22,959	183,672
9	40	578							22,959	206,631
10	40	578							22,959	229,590

11	40	578							22,959	252,549
12	40	578							22,959	275,508
13	40	578							22,959	298,467
14	40	578							22,959	321,426
15	40	578							22,959	344,385
16	40	578							22,959	367,344
17	40	578							22,959	390,303
18	40	578							22,959	413,262
19	40	578							22,959	436,221
20	40	578							22,959	459,180
21	40	578							22,959	482,139
22	40	578							22,959	505,098
23	40	578							22,959	528,057
24	40	578							22,959	551,016
25	40	578							22,959	573,975
26	40	578							22,959	596,934
27	40	578							22,959	619,893
28	40	578							22,959	642,852
29	40	578							22,959	665,811
30	40	578							22,959	688,770
31	40	578							22,959	711,729
32	40	578							22,959	734,688
33	40	578							22,959	757,647
34	40	578							22,959	780,606
35	40	578							22,959	803,565
36	40	578							22,959	826,524
37	40	578							22,959	849,483
38	40	578							22,959	872,442
39	40	578							22,959	895,401
40	40	578							22,959	918,360

Table 19. Ex-post non-CO₂ emissions from forest fires from the project area

Project year	Emissions of non-CO ₂ gasses from baseline forest fires								Total baseline non-CO ₂ emissions from forest fires in the project area	
	$ID_{ic} = 1$		$ID_{ic} = 2$		$ID_{ic} = \dots$		$ID_{ic} = Icl$		annual $EBBBSLP$ A_t tCO ₂ -e	cumulative $EBBBSLPA$ tCO ₂ -e
	$ABSLPA_{ic,t}$	$EBBBSL_{tot_{ic,t}}$	$ABSLPA_{ic,t}$	$EBBBSL_{tot_{ic,t}}$	$ABSLPA_{ic,t}$	$EBBBSL_{tot_{ic,t}}$	$ABSLPA_{ic,t}$	$EBBBSL_{tot_{ic,t}}$		
	ha	tCO ₂ -e ha ⁻¹	ha	tCO ₂ -e ha ⁻¹	ha	tCO ₂ -e ha ⁻¹	ha	tCO ₂ -e ha ⁻¹		

1	34	21	6	19.3					825	825
2	34	21	6	19.3					825	1,650
3	34	21	6	19.3					825	2,475
4	34	21	6	19.3					825	3,300
5	34	21	6	19.3					825	4,125
6	34	21	6	19.3					825	4,950
7	34	21	6	19.3					825	5,775
8	34	21	6	19.3					825	6,600
9	34	21	6	19.3					825	7,425
10	34	21	6	19.3					825	8,250
11	34	21	6	19.3					825	9,075
12	34	21	6	19.3					825	9,900
13	34	21	6	19.3					825	10,725
14	34	21	6	19.3					825	11,550
15	34	21	6	19.3					825	12,375
16	34	21	6	19.3					825	13,200
17	34	21	6	19.3					825	14,025
18	34	21	6	19.3					825	14,850
19	34	21	6	19.3					825	15,675
20	34	21	6	19.3					825	16,500
21	34	21	6	19.3					825	17,325
22	34	21	6	19.3					825	18,150
23	34	21	6	19.3					825	18,975
24	34	21	6	19.3					825	19,800
25	34	21	6	19.3					825	20,625
26	34	21	6	19.3					825	21,450
27	34	21	6	19.3					825	22,275
28	34	21	6	19.3					825	23,100
29	34	21	6	19.3					825	23,925
30	34	21	6	19.3					825	24,750
31	34	21	6	19.3					825	25,575
32	34	21	6	19.3					825	26,400
33	34	21	6	19.3					825	27,225
34	34	21	6	19.3					825	28,050
35	34	21	6	19.3					825	28,875
36	34	21	6	19.3					825	29,700
37	34	21	6	19.3					825	30,525
38	34	21	6	19.3					825	31,350
39	34	21	6	19.3					825	32,175
40	34	21	6	19.3					825	33,000

Table

22. Ex ante estimated net carbon stock change in the project area under the project scenario

Project year	Total carbon stock decrease due to planned activities		Total carbon stock increase due to planned activities		Total carbon stock decrease due to unavoided unplanned deforestation		Total carbon stock change in the project case	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	$\square CPA_{AdPA,t}$ tCO ₂ -e	$\square CPA_{AdPA}$ tCO ₂ -e	$\square CPA_{AiPA,t}$ tCO ₂ -e	$\square CPA_{AiPA}$ tCO ₂ -e	$\square CUD_{dPA,t}$ tCO ₂ -e	$\square CUD_{dPA}$ tCO ₂ -e	$\square CPS_{PA,t}$ tCO ₂ -e	$\square CPS_{PA}$ tCO ₂ -e
1	0	0	0	0	-16,177	-16,177	-16,177	-16,177
2	0	0	0	0	-16,177	-32,354	-16,177	-32,354
3	0	0	0	0	-16,177	-48,531	-16,177	-48,531
4	0	0	0	0	-10,110	-58,641	-10,110	-58,641
5	0	0	0	0	-10,110	-68,751	-10,110	-68,751
6	0	0	0	0	-10,110	-78,861	-10,110	-78,861
7	0	0	0	0	-10,110	-88,971	-10,110	-88,971
8	0	0	0	0	-10,110	-99,081	-10,110	-99,081
9	0	0	0	0	-10,110	-109,191	-10,110	-109,191
10	0	0	0	0	-10,110	-119,301	-10,110	-119,301
11	0	0	0	0	-4,043	-123,344	-4,043	-123,344
12	0	0	0	0	-4,043	-127,387	-4,043	-127,387
13	0	0	0	0	-4,043	-131,430	-4,043	-131,430
14	0	0	0	0	-4,043	-135,473	-4,043	-135,473
15	0	0	0	0	-4,043	-139,516	-4,043	-139,516
16	0	0	0	0	-4,043	-143,559	-4,043	-143,559
17	0	0	0	0	-4,043	-147,602	-4,043	-147,602
18	0	0	0	0	-4,043	-151,645	-4,043	-151,645
19	0	0	0	0	-4,043	-155,688	-4,043	-155,688
20	0	0	0	0	-4,043	-159,731	-4,043	-159,731
21	0	0	0	0	-4,043	-163,774	-4,043	-163,774
22	0	0	0	0	-4,043	-167,817	-4,043	-167,817
23	0	0	0	0	-4,043	-171,860	-4,043	-171,860
24	0	0	0	0	-4,043	-175,903	-4,043	-175,903
25	0	0	0	0	-4,043	-179,946	-4,043	-179,946
26	0	0	0	0	-4,043	-183,989	-4,043	-183,989
27	0	0	0	0	-4,043	-188,032	-4,043	-188,032
28	0	0	0	0	-4,043	-192,075	-4,043	-192,075
29	0	0	0	0	-4,043	-196,118	-4,043	-196,118
30	0	0	0	0	-4,043	-200,161	-4,043	-200,161
31	0	0	0	0	-4,043	-204,204	-4,043	-204,204
32	0	0	0	0	-4,043	-208,247	-4,043	-208,247
33	0	0	0	0	-4,043	-212,290	-4,043	-212,290
34	0	0	0	0	-4,043	-216,333	-4,043	-216,333
35	0	0	0	0	-4,043	-220,376	-4,043	-220,376
36	0	0	0	0	-4,043	-224,419	-4,043	-224,419
37	0	0	0	0	-4,043	-228,462	-4,043	-228,462

38	0	0	0	0	-4,043	-232,505	-4,043	-232,505
39	0	0	0	0	-4,043	-236,548	-4,043	-236,548
40	0	0	0	0	-4,043	-240,591	-4,043	-240,591

Table

24. Total ex-post estimated actual net carbon stock changes and emissions from non-CO₂ gasses in the project area

Project year	Total ex ante carbon stock decrease due to planned activities		Total ex ante carbon stock increase due to planned activities		Total ex ante carbon stock decrease due to unavoided unplanned deforestation		Total ex ante net carbon stock change		Total ex ante estimated actual non-CO ₂ emissions from forest fires in the project area	
	annual □CPAdPA _t tCO ₂ -e	cumulative □CPAdPA tCO ₂ -e	annual □CPAiPA _t tCO ₂ -e	cumulative □CPAiPA tCO ₂ -e	annual □CUDdPA _t tCO ₂ -e	cumulative □CUDdPA tCO ₂ -e	annual □CPSPA _t tCO ₂ -e	cumulative □CPSPA tCO ₂ -e	annual EBBPSPA _t tCO ₂ -e	cumulative EBBPSPA tCO ₂ -e
1	0	0	0	0	-16177	-16177	-16177	-16177	660	660
2	0	0	0	0	-16177	- 32,354	-16177	-32354	660	1320
3	0	0	0	0	-16177	- 48,531	-16177	-48531	660	1980
4	0	0	0	0	-10,110	- 58,641	-10,110	-58641	413	2393
5	0	0	0	0	-10,110	- 68,751	-10,110	-68751	413	2806
6	0	0	0	0	-10,110	- 78,861	-10,110	-78861	413	3219
7	0	0	0	0	-10,110	- 88,971	-10,110	-88971	413	3632
8	0	0	0	0	-10,110	- 99,081	-10,110	-99081	413	4045
9	0	0	0	0	-10,110	- 109,191	-10,110	-109191	413	4458
10	0	0	0	0	-10,110	- 119,301	-10,110	-119301	413	4871
11	0	0	0	0	-4,043	- 123,344	-4,043	-123344	165	5036
12	0	0	0	0	-4,043	- 127,387	-4,043	-127387	165	5201
13	0	0	0	0	-4,043	- 131,430	-4,043	-131430	165	5366
14	0	0	0	0	-4,043	- 135,473	-4,043	-135473	165	5531
15	0	0	0	0	-4,043	- 139,516	-4,043	-139516	165	5696
16	0	0	0	0	-4,043	- 143,559	-4,043	-143559	165	5861
17	0	0	0	0	-4,043	- 147,602	-4,043	-147602	165	6026
18	0	0	0	0	-4,043	- 151,645	-4,043	-151645	165	6191
19	0	0	0	0	-4,043	- 155,688	-4,043	-155688	165	6356
20	0	0	0	0	-4,043	- 159,731	-4,043	-159731	165	6521
21	0	0	0	0	-4,043	- 163,774	-4,043	-163774	165	6686
22	0	0	0	0	-4,043	- 167,817	-4,043	-167817	165	6851
23	0	0	0	0	-4,043	- 171,860	-4,043	-171860	165	7016
24	0	0	0	0	-4,043	- 175,903	-4,043	-175903	165	7181
25	0	0	0	0	-4,043	- 179,946	-4,043	-179946	165	7346
26	0	0	0	0	-4,043	- 183,989	-4,043	-183989	165	7511
27	0	0	0	0	-4,043	- 188,032	-4,043	-188032	165	7676
28	0	0	0	0	-4,043	- 192,075	-4,043	-192075	165	7841

29	0	0	0	0	-4,043	- 196,118	-4,043	-196118	165	8000
30	0	0	0	0	-4,043	- 200,161	-4,043	-200161	165	8170
31	0	0	0	0	-4,043	- 204,204	-4,043	-204204	165	8330
32	0	0	0	0	-4,043	- 208,247	-4,043	-208247	165	8500
33	0	0	0	0	-4,043	- 212,290	-4,043	-212290	165	8660
34	0	0	0	0	-4,043	- 216,333	-4,043	-216333	165	8830
35	0	0	0	0	-4,043	- 220,376	-4,043	-220376	165	8990
36	0	0	0	0	-4,043	- 224,419	-4,043	-224419	165	9160
37	0	0	0	0	-4,043	- 228,462	-4,043	-228462	165	9320
38	0	0	0	0	-4,043	- 232,505	-4,043	-232505	165	9490
39	0	0	0	0	-4,043	- 236,548	-4,043	-236548	165	9650
40	0	0	0	0	-4,043	- 240,591	-4,043	-240591	165	9820

LEAKAGE EMISSIONS

Table

29.a

Baseline carbon stock change in pre-deforestation (forest) classes

Project year	Carbon stock changes in initial (pre-deforestation) forest classes								Total C stock change in initial forest classes	
	$ID_{icl} = 1$		$ID_{icl} = 2$		$ID_{icl} = \dots$		$ID_{icl} = Icl$		annual	cumulative
	$ABSLLK_{icl,t}$	$Ctot_{icl,t}$	$ABSLLK_{icl,t}$	$Ctot_{icl,t}$	$ABSLLK_{icl,t}$	$Ctot_{icl,t}$	$ABSLLK_{icl,t}$	$Ctot_{icl,t}$	$\square CBSLLKi_t$	$\square CBSLLKi$
	ha	tCO ₂ -e ha ⁻¹	ha	tCO ₂ -e ha ⁻¹	ha	tCO ₂ -e ha ⁻¹	ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
	0	0								0
1	10,909	97							1,009,025	1,009,025
2	10,809	97							1,009,025	2,018,050
3	10,809	97							1,003,586	3,021,636
4	10,809	97							1,003,586	4,025,222
5	10,809	97							1,003,586	5,028,808
6	10,809	97							1,003,586	6,032,394
7	10,809	97							1,003,586	7,035,980
8	10,809	97							1,003,586	8,039,566
9	10,809	97							1,003,586	9,043,152
10	10,809	97							1,003,586	10,046,738
11	10,809	97							1,003,586	11,050,324
12	10,809	97							1,003,586	12,053,910
13	10,809	97							1,003,586	13,057,496
14	10,809	97							1,003,586	14,061,082
15	10,809	97							1,003,586	15,064,668
16	10,809	97							1,003,586	16,068,254

17	10,809	97							1,003,586	17,071,840
18	10,809	97							1,003,586	18,075,426
19	10,809	97							1,003,586	19,079,012
20	10,809	97							1,003,586	20,082,598
21	10,809	97							1,003,586	21,086,184
22	10,809	97							1,003,586	22,089,770
23	10,809	97							1,003,586	23,093,356
24	10,809	97							1,003,586	24,096,942
25	10,809	97							1,003,586	25,100,528
26	10,809	97							1,003,586	26,104,114
27	10,809	97							1,003,586	27,107,700
28	10,809	97							1,003,586	28,111,286
29	10,809	97							1,003,586	29,114,872
30	10,809	97							1,003,586	30,118,458
31	10,809	97							1,003,586	31,122,044
32	10,809	97							1,003,586	32,125,630
33	10,809	97							1,003,586	33,129,216
34	10,809	97							1,003,586	34,132,802
35	10,809	97							1,003,586	35,136,388
36	10,809	97							1,003,586	36,139,974
37	10,809	97							1,003,586	37,143,560
38	10,809	97							1,003,586	38,147,146
39	10,809	97							1,003,586	39,150,732
40	10,809	97							1,003,586	40,154,318

Table
29.b Carbon stock change in post-deforestation (forest) classes

Project year	Carbon stock changes in final (post-deforestation) non-forest classes								Total C stock change in final non-forest classes	
	$ID_{fcl} = 1$		$ID_{fcl} = 2$		$ID_{fcl} = \dots$		$ID_{fcl} = Fcl$		annual	cumulative
	$ABSLLK_{fcl,t}$	$Ctot_{fcl,t}$	$ABSLLK_{fcl,t}$	$Ctot_{fcl,t}$	$ABSLLK_{fcl,t}$	$Ctot_{fcl,t}$	$ABSLLK_{fcl,t}$	$Ctot_{fcl,t}$	$\square CBSLLK_f$	$\square CBSLLK_f$
	ha	tCO ₂ -e ha ⁻¹	ha	tCO ₂ -e ha ⁻¹	ha	tCO ₂ -e ha ⁻¹	ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
1	10,809	692							7,458,950	7,458,950
2	10,809	692							7,458,950	14,917,901
3	10,809	692							7,458,950	22,376,851
4	10,809	692							7,458,674	29,835,525
5	10,809	692							7,458,674	37,294,199
6	10,809	692							7,458,674	44,752,873
7	10,809	692							7,458,674	52,211,547

8	10,809	692							7,458,674	59,670,221
9	10,809	692							7,458,674	67,128,895
10	10,809	692							7,458,674	74,587,569
11	10,809	692							7,458,674	82,046,243
12	10,809	692							7,458,674	89,504,917
13	10,809	692							7,458,674	96,963,591
14	10,809	692							7,458,674	104,422,265
15	10,809	692							7,458,674	111,880,939
16	10,809	692							7,458,674	119,339,613
17	10,809	692							7,458,674	126,798,287
18	10,809	692							7,458,674	134,256,961
19	10,809	692							7,458,674	141,715,635
20	10,809	692							7,458,674	149,174,309
21	10,809	692							7,458,674	156,632,983
22	10,809	692							7,458,674	164,091,657
23	10,809	692							7,458,674	171,550,331
24	10,809	692							7,458,674	179,009,005
25	10,809	692							7,458,674	186,467,679
26	10,809	692							7,458,674	193,926,353
27	10,809	692							7,458,674	201,385,027
28	10,809	692							7,458,674	208,843,701
29	10,809	692							7,458,674	216,302,375
30	10,809	692							7,458,674	223,761,049
31	10,809	692							7,458,674	231,219,723
32	10,809	692							7,458,674	238,678,397
33	10,809	692							7,458,674	246,137,071
34	10,809	692							7,458,674	253,595,745
35	10,809	692							7,458,674	261,054,419
36	10,809	692							7,458,674	268,513,093
37	10,809	692							7,458,674	275,971,767
38	10,809	692							7,458,674	283,430,441
39	10,809	692							7,458,674	290,889,115
40	10,809	692							7,458,674	298,347,789

Table 29.c Total net carbon stock change in the leakage belt

Project year	Total C stock change in initial forest classes		Total C stock change in final non-forest classes		Total baseline carbon stock change	
	annual	cumulative	annual	cumulative	annual	cumulative
	$DCBSLLK_t$ tCO ₂ -e	$DCBSLLK_i$ tCO ₂ -e	$DCBSLLK_f$ tCO ₂ -e	$DCBSLLK_f$ tCO ₂ -e	$DCBSLLK_t$ tCO ₂ -e	$DCBSLLK$ tCO ₂ -e
1	0	0	7,458,950	7,458,950	-7,458,950	-7,458,950

2	1,009,025	1,009,025	7,458,950	14,917,901	-6,449,925	-13,908,875
3	1,009,025	2,018,050	7,458,950	22,376,851	-6,449,925	-20,358,800
4	1,003,586	3,021,636	7,458,674	29,835,525	-6,455,088	-26,813,888
5	1,003,586	4,025,222	7,458,674	37,294,199	-6,455,088	-33,268,976
6	1,003,586	5,028,808	7,458,674	44,752,873	-6,455,088	-39,724,064
7	1,003,586	6,032,394	7,458,674	52,211,547	-6,455,088	-46,179,152
8	1,003,586	7,035,980	7,458,674	59,670,221	-6,455,088	-52,634,240
9	1,003,586	8,039,566	7,458,674	67,128,895	-6,455,088	-59,089,328
10	1,003,586	9,043,152	7,458,674	74,587,569	-6,455,088	-65,544,416
11	1,003,586	10,046,738	7,458,674	82,046,243	-6,455,088	-71,999,504
12	1,003,586	11,050,324	7,458,674	89,504,917	-6,455,088	-78,454,592
13	1,003,586	12,053,910	7,458,674	96,963,591	-6,455,088	-84,909,680
14	1,003,586	13,057,496	7,458,674	104,422,265	-6,455,088	-91,364,768
15	1,003,586	14,061,082	7,458,674	111,880,939	-6,455,088	-97,819,856
16	1,003,586	15,064,668	7,458,674	119,339,613	-6,455,088	-104,274,944
17	1,003,586	16,068,254	7,458,674	126,798,287	-6,455,088	-110,730,032
18	1,003,586	17,071,840	7,458,674	134,256,961	-6,455,088	-117,185,120
19	1,003,586	18,075,426	7,458,674	141,715,635	-6,455,088	-123,640,208
20	1,003,586	19,079,012	7,458,674	149,174,309	-6,455,088	-130,095,296
21	1,003,586	20,082,598	7,458,674	156,632,983	-6,455,088	-136,550,384
22	1,003,586	21,086,184	7,458,674	164,091,657	-6,455,088	-143,005,472
23	1,003,586	22,089,770	7,458,674	171,550,331	-6,455,088	-149,460,560
24	1,003,586	23,093,356	7,458,674	179,009,005	-6,455,088	-155,915,648
25	1,003,586	24,096,942	7,458,674	186,467,679	-6,455,088	-162,370,736
26	1,003,586	25,100,528	7,458,674	193,926,353	-6,455,088	-168,825,824
27	1,003,586	26,104,114	7,458,674	201,385,027	-6,455,088	-175,280,912
28	1,003,586	27,107,700	7,458,674	208,843,701	-6,455,088	-181,736,000
29	1,003,586	28,111,286	7,458,674	216,302,375	-6,455,088	-188,191,088
30	1,003,586	29,114,872	7,458,674	223,761,049	-6,455,088	-194,646,176
31	1,003,586	30,118,458	7,458,674	231,219,723	-6,455,088	-201,101,264
32	1,003,586	31,122,044	7,458,674	238,678,397	-6,455,088	-207,556,352
33	1,003,586	32,125,630	7,458,674	246,137,071	-6,455,088	-214,011,440
34	1,003,586	33,129,216	7,458,674	253,595,745	-6,455,088	-220,466,528
35	1,003,586	34,132,802	7,458,674	261,054,419	-6,455,088	-226,921,616
36	1,003,586	35,136,388	7,458,674	268,513,093	-6,455,088	-233,376,704
37	1,003,586	36,139,974	7,458,674	275,971,767	-6,455,088	-239,831,792
38	1,003,586	37,143,560	7,458,674	283,430,441	-6,455,088	-246,286,880
39	1,003,586	38,147,146	7,458,674	290,889,115	-6,455,088	-252,741,968
40	1,003,586	39,150,732	7,458,674	298,347,789	-6,455,088	-259,197,056