RMDLT Portel - Pará REDD Project

PROJECT DESIGN DOCUMENT UNDER THE CLIMATE, COMMUNITY AND BIODIVERSITY ALLIANCE STANDARD (**CCBA**-PDD)

Version 6.0 – January 17th 2013

Project Developer and Implementation Entity:

Ecosystem Services LLC

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Acronyms list

AFOLU: Agriculture, Forestry and Other Land Uses

CCBS: Climate, Community and Biodiversity Standard

EMBRAPA: Brazilian Enterprise for Farming Research

ESLLC: Ecosystem Services LLC

FPIC: Free Prior Informed Consent

GHG: Greenhouse Gas

Gleba: individual parcel that is part of the Project's Boundary

Ha: Hectare

IBGE: Brazilian Institute of Geography and Statistics

IMAZON: Institute for the Man and Environment in the Amazon

INCRA: National Institute of Colonization and Agrarian Reform

INPE: National Institute of Spatial Research

IPCC: Intergovernmental Panel on Climate Change

ITERPA: Institute for Lands of Pará

IUCN: International Union for Conservation of Nature

LK: Project's Leakage Management Belt

LMA: Leakage Management Area

PA: Project Area

PB: Project Boundary

PDD: Project Design Document

PRA: Participatory Rural Appraisal

REDD: Reduced Emissions from Deforestation and Degradation

RRD: Reference Region for Deforestation

SA: Social Assessment

tCO2e: One tonne of Carbon Dioxide equivalent

UNFCCC: United Nations Framework Convention for Climate Change

VCS: Verified Carbon Standard

I. General Information

Project Location

Country	Brazil
State	Pará
Micro region	Portel
Municipalities	Portel
Nearest City	Portel

Project Area

Project Boundary	194,402.8 Ha
Project Area	177,899.5 Ha
Leakage belt	2,149,765 Ha
Leakage management area	3,415.8 Ha

Project Proponent

Organization	RMDLT Property Group Ltd
Responsible	Ron Dewhurst
Title	President
Address	1194 Sunnyside Road, Kelowna, BC V1Z 2N8
E-mail	ron@kabwayinc.com
Short Description	RMDLT Property Group Ltd. is an international business corporation formed on August 5, 2010 in the country of Belize, Central America. It is a privately held corporation registered under "The International Business Companies Act", Chapter 270 of the Laws of Belize. The purpose of RMDLT Property Group is to form a funding and operations company to engage in the development of international lands, either privately or governmental held for the monetization of carbon credits under the REDD using various industry accepted standards. Additionally, besides the monetization and sales under the carbon credits business unit, RMDLT will use the revenue derived for this activity to create sustainable and regenerative socially responsible business development in the REDD project areas. This activity will be oriented towards ensuring the preservation of ecological systems health for the bio-diversity and the forestry in the area.

Partner institution

Organization	ALLCOT Group AG
Responsible	Alexis L. Leroy
Address	Dammstrasse 19 CH-6301, Zug Switzerland
E-mail	all@allcot.com
Short Description	The ALLCOT Group is a vertically integrated carbon asset management company that develops, manages and trades in all sectors related with climate mitigation. The ALLCOT core strength lies in the compliance and VER markets where they are an active player, acting as a route to market for project developers, as well as, providing efficient sourcing and project development services.

Project Developer and Implementation Organization

Organization	Ecosystem Services
General Manager	Gonzalo Castro de la Mata
E-mail	gcastro@ecosystemservicesllc.com
Technical Director	Giancarlo Raschio
E-mail	graschio@ecosystemservicesllc.com
Forestry Expert	Leonel Mello
GIS / Modeling Expert	Christian Contreras
Address	1250 24th Street, NW Suite 300, Washington, DC, 20037
Short Description	Ecosystem Services LLC is a forestry, renewable energy, and Natural Resources Company specialized in the generation of internationally marketable environmental services. ES LLC was founded by leaders in the environmental field that share the belief that long-term conservation of the environment and unprecedented profits for investors are possible through sustainable ecosystem management, renewable energy development, and carbon markets.

II. Executive Summary

A. Historical Deforestation 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 result cannot be other but the depredation of natural resources in the benefit of few.

Pioneer agents open the path for deforestation agents who cut clear the forest as a measure of proving 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 front 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 easily accessible through navigable rivers and through logging roads (pioneer roads) connected to the road network of primary roads. These areas are considered to be of "free access" whenever the presence of the legal landowner is not made evident (i.e. through ongoing forest uses or/and monitoring and enforcement). In this front, landless people known as "riberinhos" slash and burn the forest to implement cassava plantations and pioneer agents such as loggers open penetration roads that allow squatters and ranchers to invade otherwise hard-to-access forest areas. Such penetration roads or "pioneer roads" not only allow access to natural resources but also connect the area to the network that leads to primary roads and main selling points for timber and meat. This connection allows for a faster transportation of products and opens the area to pioneer deforestation agents that thrive on land speculation , replicating the process that took place years ago in the consolidated frontier.

B. Brief Description of the Project Area

The Project Area comprises 17 privately owned parcels or "Glebas" adding up to a total of 194,402.8 Ha in the Melgaçao and Portel municipalities, located in the Portel micro region. Unplanned deforestation within the Project's Boundary is currently generated at a small

scale by landless settlers and squatters but the main agents of deforestation are expected to be cattle ranchers, as identified in the Reference Region for Deforestation.

The Marajó mesoregion constitutes 3 geographic micro regions (MRG): Araí, Furos de *Breves and Portel.* The first two comprises municipalities that are entirely included in the Marajó archipelago. The Portel MRG covers municipalities located in the continent, on the right margin of the Pará River. Even though Portel is geographically not part of the Marajó archipelago, because it is located on continental lands, it belongs to the mesoregion Marajó. It can be assured, therefore, that from a geopolitical standpoint, Portel municipality belongs to Marajó. It is located in the whole region, south / southwest from the archipelago, 278 Km from Belem, the state capital. The major access is by the Acuti-pereira River on the extreme east, Camarapi and Pacajá rivers on the central region and river Anapu on the north/northwest region.

The main transportation mean to arrive in Portel is by fluvial public transportation (20 hours from Belem) and then using a private boat to get into the Project Area. In the region of the Project transportation happens mostly by river although pioneer roads are already connected to the road network of the Transamazonica highway in the consolidated frontier thus providing increasing fast access to Project Area by road.

Forests in the area consist of large and productive trees connected to each other by lianas and parasites. The most important species according to size and value are: i) *Hevea brasiliensis* (seringueira); ii) *Castilla ulei* (caucho); iii) *Mauritia flexuosa* (Miritis); iv) *Euterpe oleracea* (Açaizeiros); v) *Ceiba pentandra* (Samaumeira); vi) *Cecropia sp.* (Embaubeiras) and vii) hardwoods.

Local population is comprised mainly of settlers known as *"Ribeirinhos",* who live along the rivers and along the *igarapés* (small streams). There are not indigenous communities located either in the Project Area, the Project's Leakage Management Area, Leakage Belt, the Project Zone or the Reference Region for Deforestation. Economic activities in the area are subsistence timber extraction and sale, fishing and subsistence agriculture.

C. **RMDLT Portel - Pará REDD Project**

The Project's main objective is to avoid and prevent unplanned deforestation in native forests thus avoiding the net emission of 44,662,429 tCO_2e through a period of 40 years of Project's crediting period. Such objective will be achieved by managing the land in the form of a "private conservation reserve" by developing and implementing a management plan. Such plan will include a rigorous monitoring and enforcement plan built up on the existing experience of ongoing surveillance activities in the area since 2008. Such scaled-up monitoring activities will actively count with the participation of local settlers living within the Project's Boundaries who will receive adequate training in forest management and monitoring techniques. Forest regeneration is considered a medium term goal, which will allow an increase of sequestered carbon, improve forest connectivity and recovery of local

ecosystem. The Project, in the sake of being conservative, will not claim carbon benefits from carbon sequestered through forest regeneration.

The Project will not develop or implement extractive activities or activities that cause significant reduction in carbon stocks. Also, the Project will not implement reforestation activities or introduce invasive species to the area.

The Project, in agreement with the landowner, will provide land tenure rights versus conservation results to villagers living within the Project's Boundaries but outside the Project Area[1]. To those living outside the Project Boundary in neighbor villages, the Project will provide knowledge to legally claim and secure land titles on unused public land. Geo-referenced information will be gathered and provided for villagers to know which areas can be claimed without incurring in private land encroaching.

Additionally, the Project will provide support to enhance community's organizational capabilities for a better management of local resources.

Finally, the Project will provide capacity building on agroforestry systems with native species[2] and on implementation of energy efficient cook stoves for cassava production to villagers within and nearby[3] the Project Boundary. At the same time, capacity building activities will be held with the main agents of deforestation to show them the benefits of pasture managements and intensified cattle ranching.

As for biodiversity, the Project will enhance ecosystem functionality by allowing regeneration of degraded forest thus eliminating ecosystem fragmentation.
Through its activities, the Project is expected to generate positive leakage[4] by addressing key underlying drivers of deforestation outside the Project Boundary. Negative leakage will be low as a result of the high levels of deforestation in the Project's Leakage Belt in the baseline scenario. The Project will not claim benefits from positive leakage (to be conservative) but will account reductions from negative leakage if such is identified by the first verification event.

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[1] According to VCS's definitions these areas are known as Leakage Management Areas and are non-forest areas thus are not included in the Project Area.

2 The Project's developer will 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 a particular specie.

[3] To those willing to participate in such activities.

[4] Positive Leakage is understood as an unintentional positive outcome on carbon stocks from conservation projects, for example when the activities of a project are adopted voluntarily outside project boundaries and more carbon sequestration and/or avoided GHG emissions are achieved Schwarze, R. N., J. and Olander, J. (2002). "Understanding and Managing Leakage in Forest-Based Greenhouse Gas Mitigation Projects." Nature conservancy.

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III. Basic Data

1) The title of the CCB Standards Project's activity:

RMDLT Portel - Pará REDD Project

2) The version number of the document:

Version 6.0

3) The date of the document:

January 17th 2013

IV.   General Section

G1 Original Conditions at Project Site

G1.1 Location of the project and basic physical parameters

1. Location of the Project

General Location

The Project is located in northwest of Brazil, in the State of Para, micro region of Portel, municipality of Portel. Main transportation mean to arrive in Portel is by boat. The trip takes approximately, 16 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.

Map 1: Project location
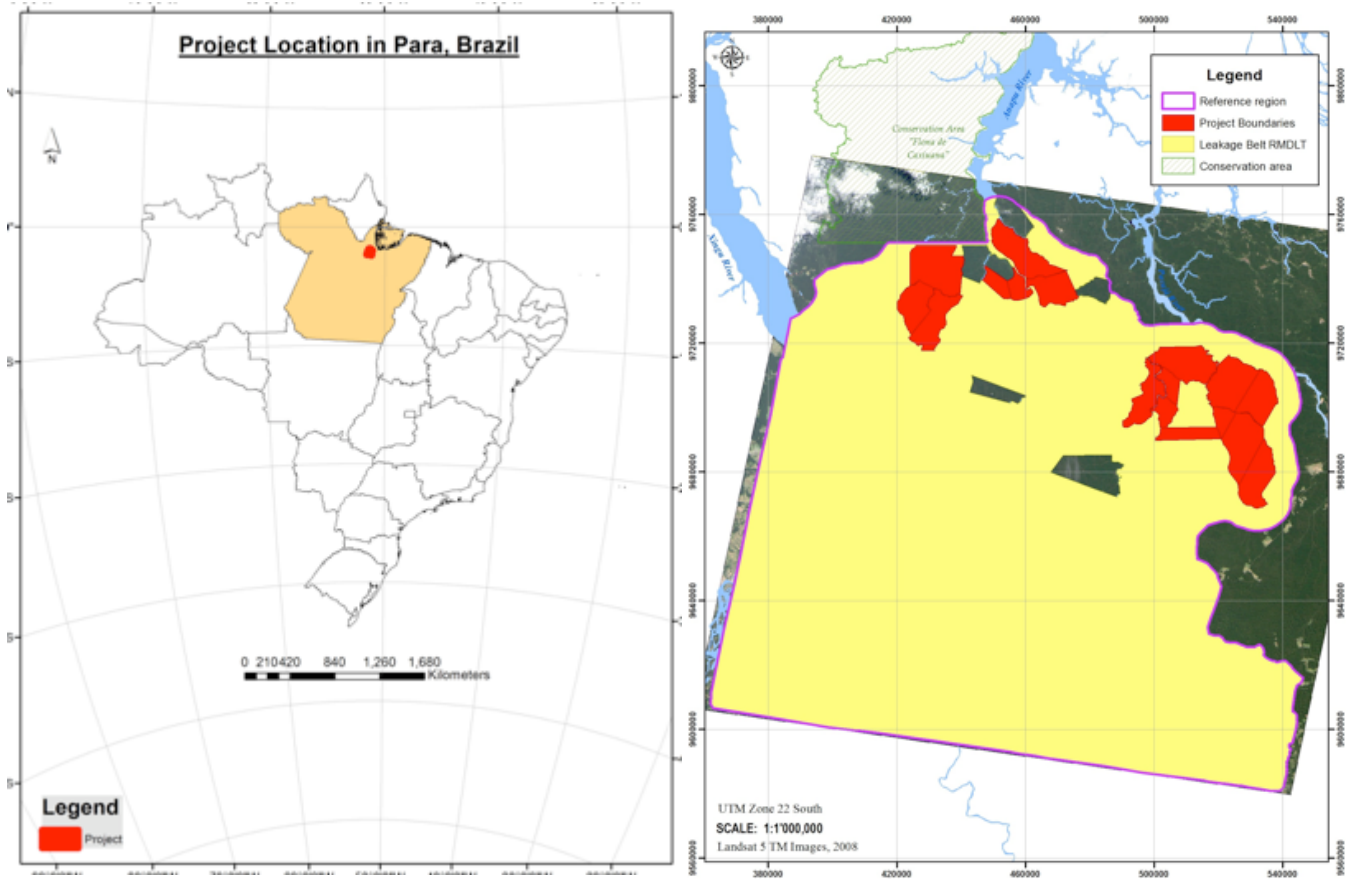
Map 2: Project physical boundaries
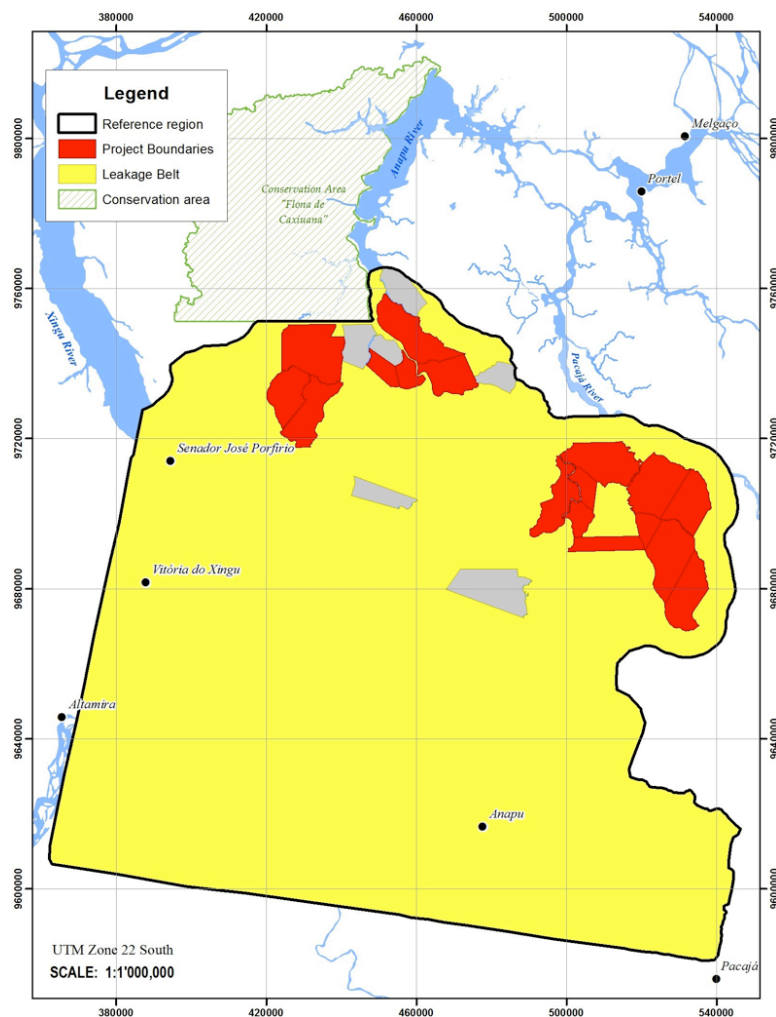
Project Area

The Project Boundary has an area of 194,402.8 ha and it is constituted by 17 individual *Glebas* or parcels that contain forest and non-forest land. The forested land within the Project's Boundary constitutes the Project Area[5] with an extension of 117,899.5 ha leaving 3,415.8 ha of unforested land that constitutes the Project's Leakage Management Area (LMA). The Project Boundary, leakage belt and Reference Region for Deforestation (RRD) are shown in Map 3.

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[5] According to VCS' vm0015 methodology the Project Area is only forested area that has remained unchanged through 10 years prior to the project start date. In our case, the Project Area is the forested area unchanged for the past 12 years (1996 through 2008).

Map 3: Project Area (red) and its physical boundaries
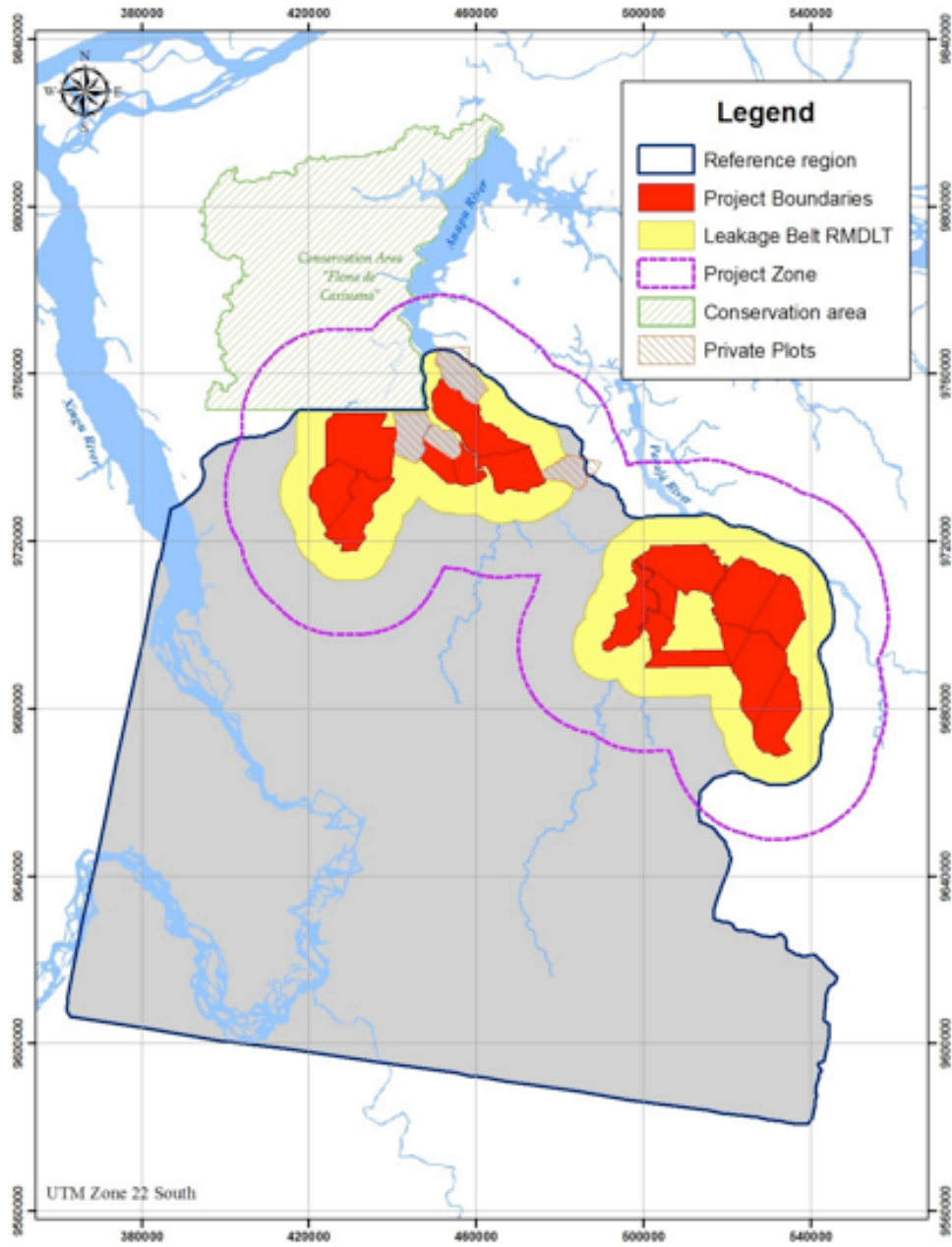
2. Basic Physical Parameters

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). Average annual temperature is 21° Celsius. Average insolation is 2,200 hours per year.

Map 4: Annual Precipitation
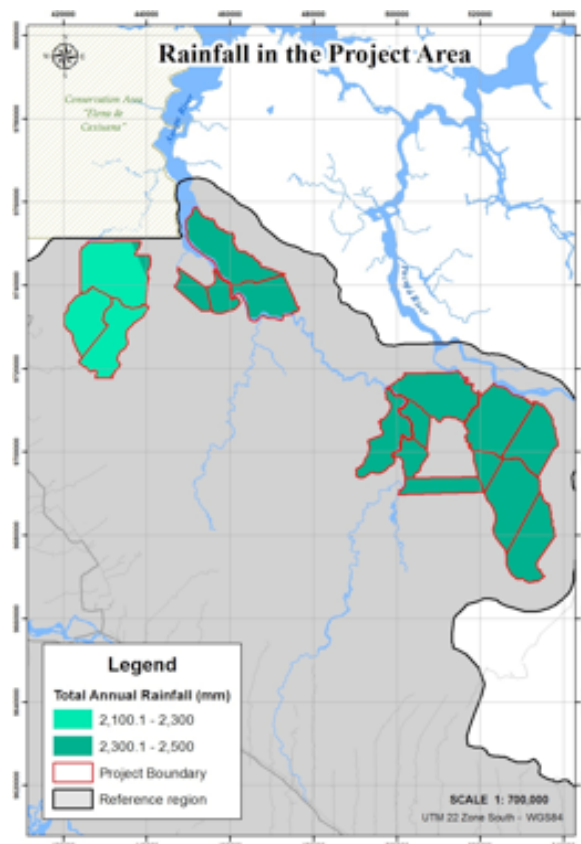
Hydrography

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 – Marinau river, Tueré river and the igarapés: – Itatira, Merapiranga, 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 5: Hydrography
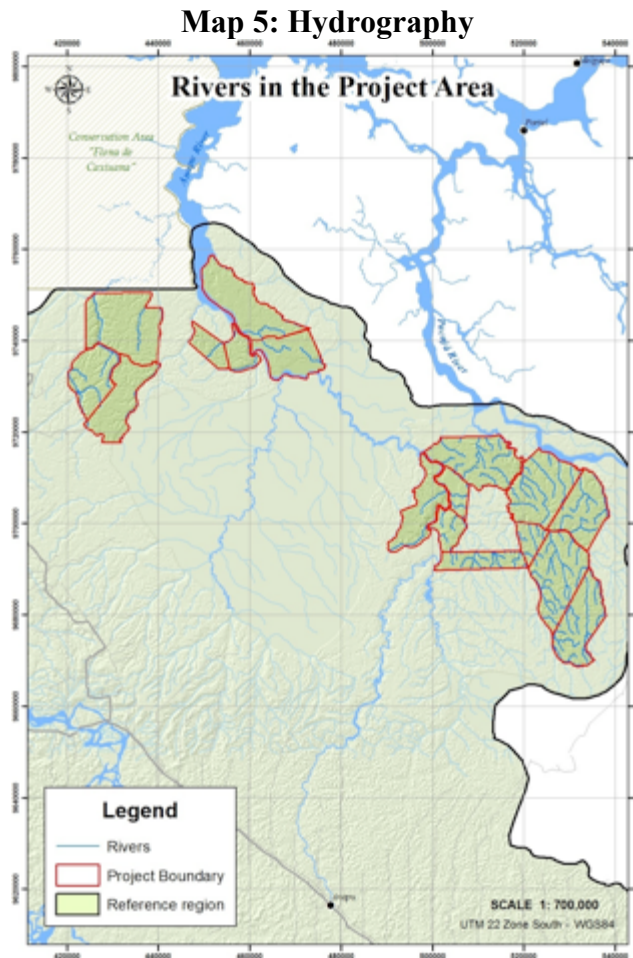
Soils

Soils in the Project Area appear to be mostly Latosol Amarelo, with some AgrisolAmarelo 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 6: Soils in the Project area
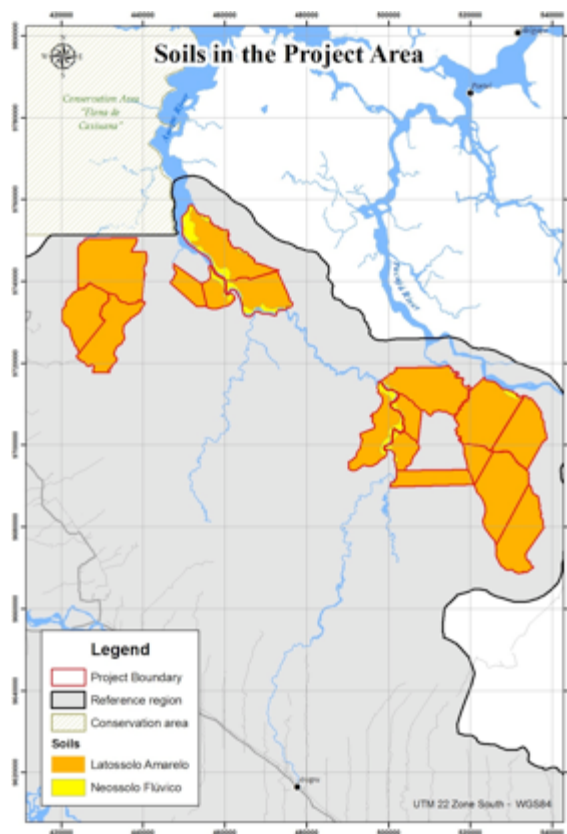
Geology

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 7: Geology in the Project area
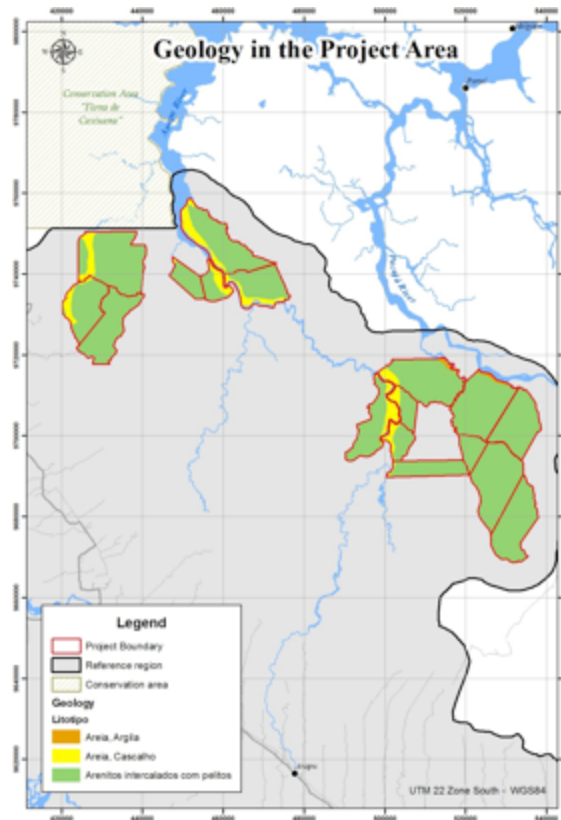
These source rocks of the sandy-argillic and argillic-sandy soils with concretions over which Yellow Latossolos, Argissolos amarelos and Plintossolos Petricos are developed. On these rocks predominate reliefs of ramps and hills.

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.

Land Use

Most of the project boundary is constituted by primary and secondary ombrophilous dense forest with very small patches of human activity. These small patches constitute small-scale cassava agriculture (conducted by *riberinhos*[6] using slash and burn technique) (ESLLC 2012). From a social assessment conducted by Ecosystem Services LLC in the months of December 2011 and January-February 2012, it is known that there were nearby areas under timber extraction within the past ten years. Timber extraction at large scale is not conducted in the project's vicinity anymore.

A more elaborated and detailed approach to land use can be found in the PDD under VCS' vm0015 (Land-Use, Land-Cover analysis) and attached together with this document. Land uses in the project area are shown below in Map 8:

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[6] Riberinhos are settlers that live along river shores and whos livelihoods depend entirely on temporal crops such as cassava.

Map 8: Land Use in the Project area

Land Use in the Project Area
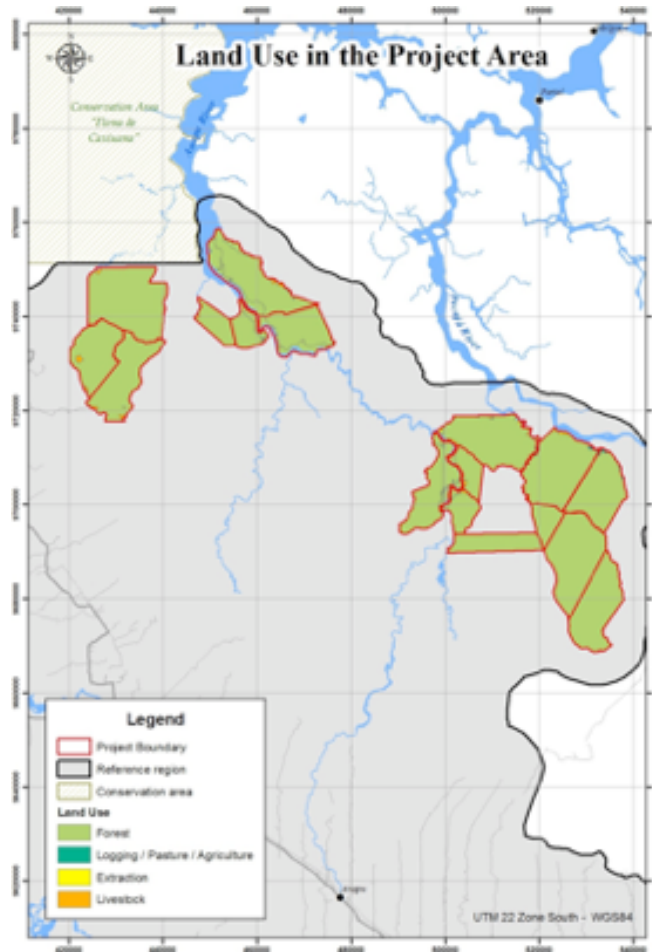
G1.2 Types and condition of vegetation at the project site

Through November 2011 to February 2012, and under contract and supervision from Ecosystem Services LLC, SETA Ambiental conducted a forest carbon inventory in an area of 1,019,346.27 ha that encompasses the Project Area, a potential buffer area of 15Km from the Project Area and a similar area southwards of the Project in order to better understand the carbon dynamics in the region (refer to the attached Carbon Inventory Report).

The main type of forest identified in the Project Area is dense ombrophilous Low-Land Forest[7]. Although forest in the Project Area is mainly dense forest, there are some areas with evidence of past selective logging, which are currently regenerating. Along river shores, Riberinhos apply slash and burn on 3 to 5 years old regenerated forests in preparation for agriculture. Vegetation is presented in Table 1.

From our forest carbon inventory the following species were identified in the sampled area:

Table 1: Tree species in the Project area and Project Zone

Common name	Scientific name	
Abiu / Guajara caramurim	*Pouteria oposita* (Ducke) T.D.Penn.	1
Abiu amarelo	*Pouteria decorticans Penn*	1
Abiu arrepiado/ Abiu casca fiana/ Abiu nambuquiça	*Pouteria decorticans Penn*	1
Abiu casca grossa	*Planchonella pachycarpa*	1
Abiu goiaba / Abiu Goiabinha	*Pouteria decorticans* Penn	1
Abiu vermelho	*Pouteria torta* (mart) Radlk subsp. Glabra Penn	1
Abiurana / Abiurana Vermelha	*Franchetella anibifolia*	1
Abiurana Branca	*Pouteria reticulata* (Engl.) Eyma subsp. reticulata	1
Abiurana Preta	*Pouteria krukovii*	1
Acapu	*Vouacapoua americana*	1
Acapurana	*Campisiandra laurifolia* bBenth.	1
Acariquara	*Minquartia guianensis*	1
Acariquarana/ Araruta	*Rinorea paniculata* (Mart.) Kuntze	1
Achua/ Axixá/ Capoteiro	*Sterculia speciosa* K. Schum.	1
Amapa / Amapa doce	*Brosimum potabile*	1
Amapa amargoso	*Parahancornia fasciculata* (Poir.) Benoist	1
Amaparana	*Batocarpus amazonicus* (Ducke)	1
Amarelao / Garapeira	*Apuleia leiocarpa*	1
Ananim	*Simphonia globulifera* L.	1
Andiroba	*Carapa guianensis*	1
Angelim	*Copaifera multijuga* Hayne	1
Angelim amargoso	*Vatairea sericea* Ducke	1
Angelim pedra	*Hymenolobium excelsum* Ducke	1
Angelim Rajado	*Zygia racemosa* (Ducke) Barneby & J.W.Grimes	1
Angelim vermelho	*Dinizia excelsa*	1
Anuera	*Anaueria brasiliensis* Kosterm	1

[7] Also accordingly to secondary information from SEMA 2010.

Arapari	*Macrolobium multijugum* (DC.) Benth. var. multijugum	1
Araracanga	*Aspidosperma araracanga* Marc.-Ferr	1
Arataciu	*Anomalocalyx uleanus* (Pax & K.Hoffm.) Ducke	1
Bacuri	*Platonia insignis* Mart.	1
Bacuri pari	*Rheedia macrophylla* (Mart) Planch. & Triana	1
Barbatimão	*Stryphnodendron pulcherrimum* (Willd.) Hochr.	1
Breu amescla / Amesclao	*Trattinnickia mensalis* Daly	1
Breu barrote	*Tetragastris panamensis*	1
Breu branco	*Protium palidum* Cuatrec.	1
Breu sucuruba	*Trattinickia rhoifolia*	1
Breu vermelho	*Tetragastris altissima* (Aubl.) Swart	1
Buiuçu / Olho de boi	*Ormosia coutinhoi* Ducke.	1
Burra Leiteira / Sorva	*Sapium marginatum* M. Arg	1
Cacauba	*Theobroma* sp.	1
Cacaui	*Theobroma sylvestre* Mart.	1
Caferana	*Pera eiteniorum* Bigio & Secco	1
Cajuaçu / Cajui	*Anacardium giganteum* W.Hancock ex Engl	1
Canela de jacamim	*Rinorea riana*	1
Canela de Velho / Muuba vermelha	Miconia sp. Embrapa	1
Caniceira	Pseudoxandra cuspidata Maas	1
Carapanauba	Aspidosperma carapanauba Pichon	1
Caripe	Licania octandra (Hoffmanns. Ex. Roem & Schult.) Kuntze	1
Cariperana	Licania apetala (E.Mex.) Fritsch	1
Cariperana	Licania apetala (E.Mex.) Fritsch	1
Casca seca	Sagotia brachysepala (Müll.Arg.) Secco	1
Castanha do Para / Castanheira	Bertholletia excelsa Bonpl	1
Catuaba / Limorana	Secondatia floribunda A.DC	1
Cedro vermelho	Cedrela odorata L	1
Cedrorana	Cedrelinga cateniformis (Ducke) Ducke	1
Ceru	Allantoma lineata (Mart. & O.	1
Cipo	Araujia sericifera Brot	1
	NI	1
Cipo apui / Atraca	Martinella obovata (Kunth) Bureau & K.Schum.	1
Cipo cebola Braba / Cebolao	Clusia grandiflora Spligz.	1
Cipo cravo	Tynanthus elegans Miers	1
Cipo de fogo	Doliocarpus dentatus	1
Cipo escada de jabuti	Bauhinia guianensis Aubl.	1
Cipo Macaco	Combretum fruticosum (Loefl.) Stuntz	1
Cipo mereteteca	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
Cumaru / Cumaru amarelo	Dipteryx odorata (Aubl.) Willd.	1
Cumaru preto	Dipteryx sp.	1
Cumaru vermelho	Dipteryx sp.	1
Cumaruí	Dipteryx sp.	1
Cupiuba	Goupia glabra Aubl	1
Cupui	Theobroma subicanum 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
Escorrega 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	Schizolobiun 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 brasilense 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 lecointei 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 crassifólia	1
Murupita	Sapium hippomane	1

Murure	Esenbeckia pilocarpoides Kunth	1
Mututi Branco / Igapó	Rhynchosia phaseoloides (Sw.) DC	1
Mututirana	Pterocarpus officinalis Jacq.	1
Não identificada	NI	1
NI 01	NI	1
Pacapeua	Swartzia racemosa Benth.	1
Palmeira bacaba / Bacabeira	Oenocarpus distichus	1
Palmeira caranã / Buritirana	Mauritia armata (Mart.) Burret	1
Palmeira Inaja / Anaja	Attalea maripa (Aubl.) Mart	1
Palmeira Maraja	Bactris marajá	1
Palmeira Mumbaca	Astrocaryum munbaca	1
Palmeira murunuru / Murumuru	Astrocaryum murumuru	1
Palmeira paxiuba	Dictyocaryum ptarianum (Steyerm.) H.E.Moore & Steyerm.	1
Palmeira paxiubarana	Socratea sp.	1
Palmeira Tucumã	Astrocaryum aculeatum G.Mey	1
Papo de Mutum	Lacunaria sp.	1
Parapara	Jacaranda copaia (Aubl.) D.Don	1
Parapara	Jacaranda copaia (Aubl.) D.Don	1
Paraparauba	NI	1
Parinari	Parinari coriaceum benth	1
Pau amarelo	Euxylophora paraensis Huber	1
Pau doce	Glycoxylon inophyllum (Mart. ex Miq.) Ducke	1
Pau jacare	Lecythis lúrida	1
Pau Pereira	Lindackeria paraensis Kuhlm.	1
Pau roxo	Croton sp.	1
Pau santo / Pau marfim	Zollernia paraensis Huber	1
Pau vermelho		1
	Haploclathra paniculata (Mart.) Benth.	
Pente de Macaco	Apeiba glabra Aubl.	1
Pente de Macaco	Apeiba glabra Aubl.	1
Pepino do mato	Ambelania acida Aubl.	1
Piqui da varzea	Caryocar microcarpum Ducke	1
Piquia	Caryocar villosum	1
Piquia	Caryocar villosum	1
Piquiarana	Caryocar pallidum A.C.Sm	1
Piriquiteira	Diospyros vestita Benoist	1
Pitaica	Swartzia acuminata Willd.ex Vogel	1
Pitomba	Citronella melliodora (Sleumer) R.A.Howard	1
Pracaxi	Pentaclethra macroloba (Willd.) Kuntze	1
Preguiceira	Pouteria sp.	1

Quaruba	Vochysia maxima Ducke	1
Quaruba cedro	Vochysia vismiifolia Spruce ex. Warm	1
Quaruba goiaba	Erisma uncinatum Warm	1
Quarubarana	Erisma 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 nítida	1
Sucupira amarela	Sweetia fruticosa Spreng	1
Sucupira babona / Pele de sapo / Sucupira tento	Diplotropis purpurea (Rich.) Amshoff	1
Sucupira Branca	Ormosia sp.	1
Sucupira preta	Diplotropis 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.Burtt & 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 atrovinosa Prance	1
Tauari branco	Couratari multiflora (Sm.) Eyma	1
Tento / Tento vermelho	Ormosia micrantha Ducke	1
Tento branco	Diplotropis 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**

The Amazon forest is recognized as a heterogeneous biome, composed by a mosaic of different habitats and approximately only 5% of its taxonomy and richness is known. Nevertheless, its physiognomy follows a pattern, usually composed by 4 main ecosystems:

- Dense Ombrophilous Forest
- Open Ombrophilous Forest
- Occasionally and Permanently Flooded Areas (Várzea and Igapó)
- Savannas (Campinarama and Capoeira)

Approximately 90% of the vegetation cover in Pará is original and considering the size of the state it is unlikely that the project zone hosts any invasive/non-native species.

The project zone region, including Caxiuanã Bay, Caxiuanã National Forest and the municipalities of Portel and Melgaço, is predominantly composed by Dense Ombrophilous Forest, with emerging canopy, approximately 80% of the vegetation cover.

The second most predominant ecosystem in the area is the Flood Forest, followed by Floodplain area (Igapó and Varzea) and the savanoid open areas (capoeira). The region and surrounding areas are mainly composed by Dense Ombrophilous Forest. Trees, lianas and palms, mainly compose the floristic composition in the area with great abundance of species per hectare.

Map 9: Vegetation in the Project area
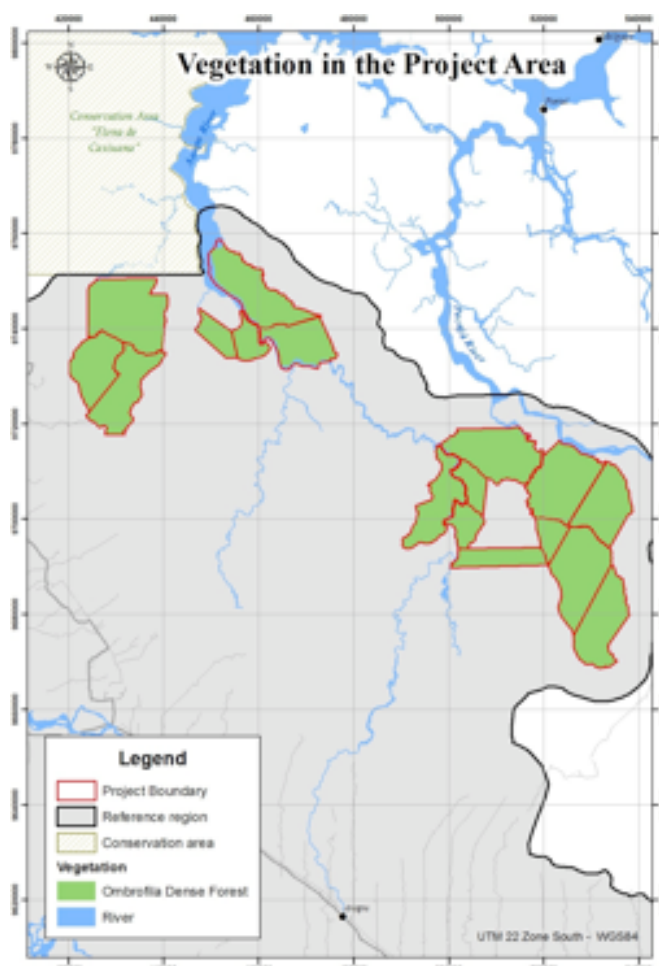
G1.3 Boundaries of the Project Area and Project Zone

The Project has the following physical boundaries defined according to the guidelines of the VCS vm0015 methodology and to the type of activity that will be implemented in each boundary.

Reference Region for Deforestation (RRD)
Is the analytic domain from which information about rates, agents, drivers, and patterns of land-use and land-cover change (LU/LC-change) will be obtained, projected into the future and monitored. On the West the RRD limits with the Caxiuanã Protected Forest but the latest is not inside the RRD.

Project Boundary (PB)
Refers to the total area under control of the Project Proponent and includes the Project Area and LMA (PA + LMA).

Project Area (PA)
Forested land where GHG emission reduction benefits will be accounted. All the forest monitoring and protection activities happen in this area.

The PA is composed only by forest that has been forest for the past 12 years[8]. Given the fast rotation of capoeiras[9] (3 to 4 years) it is not likely that active capoeiras will appear as forest. However, if during the census the Project's staff identifies areas that appear as forest but that are croplands at the time of the census, such areas will be deducted from the PA to avoid conflicts with local riberinhos if there are proofs that such capoeiras have been previously used during the historical period.

Leakage Management Area (LMA)
These are non-forest areas within the PB (thus on private land and under legal control of the landowner). It is currently in these areas that Riberinhos live and where social activities will take place such as agroforestry pilots and improve efficiency cookstoves. No emission reductions will be claimed from this area. A census will be undertaken to determine the exact number of people living in the LMA and to georeference all the houses and cassava plots.

Leakage Belt (LK)
Cumulative of areas that presents the highest risk of deforestation due to displacement of deforestation agents by the Project Activities. Such areas were calculated through a mobility analysis based on the characteristics of the deforestation agents.

Figure 1 illustrates the distribution of the aforementioned areas:

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[8] VCS vm0015 methodology states it has to be forest for at least 10 years prior to the project start date.
[9] Former agricultural plots that content young regenerated woody vegetation.

Figure 1: Distribution of the Project's physical boundaries
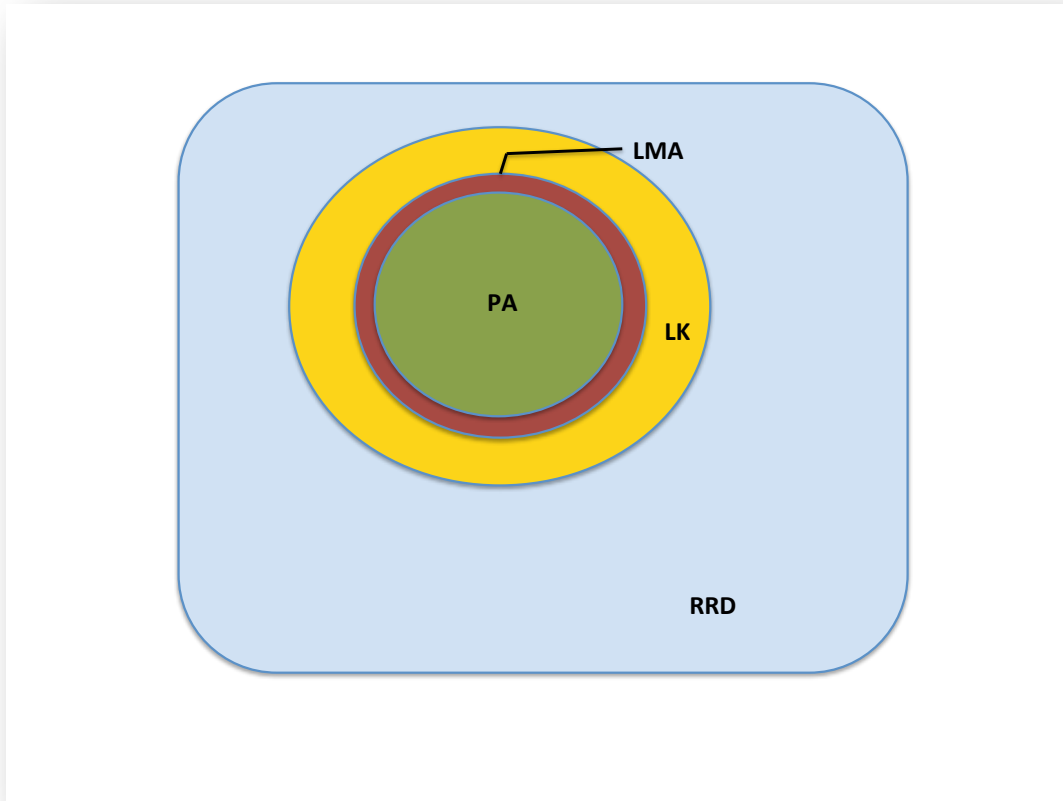
The Project Proponent has complete legal control over the Project Boundary and over the carbon contained in the Project Area. The Project's Boundaries encompasses the Project Area that is forested land that has remained forest for at least the past ten years before the Project's start date and the Leakage Management Area (LMA) that is all the remaining area that does not classify as forest[10].

The Project Zone includes the Project Area and a 20km buffers that encompasses other privately owned land[11], Government owned land and part of the rivers Anapu and Pacaja. It should be remarked that no indigenous or native communities are found within the Project Zone area.

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[10] The LMA contains forested areas that are not considered to be part of the Project Area because these area either do not comply with the Brazilian forest definition or because LULC has change in these areas within a 10-year period before the Project's start date.
[11] Some of such private land also belongs to the same land owner of the Project Boundaries.

Map 10 shows the Project physical boundaries:

Map 10: Project's physical boundaries
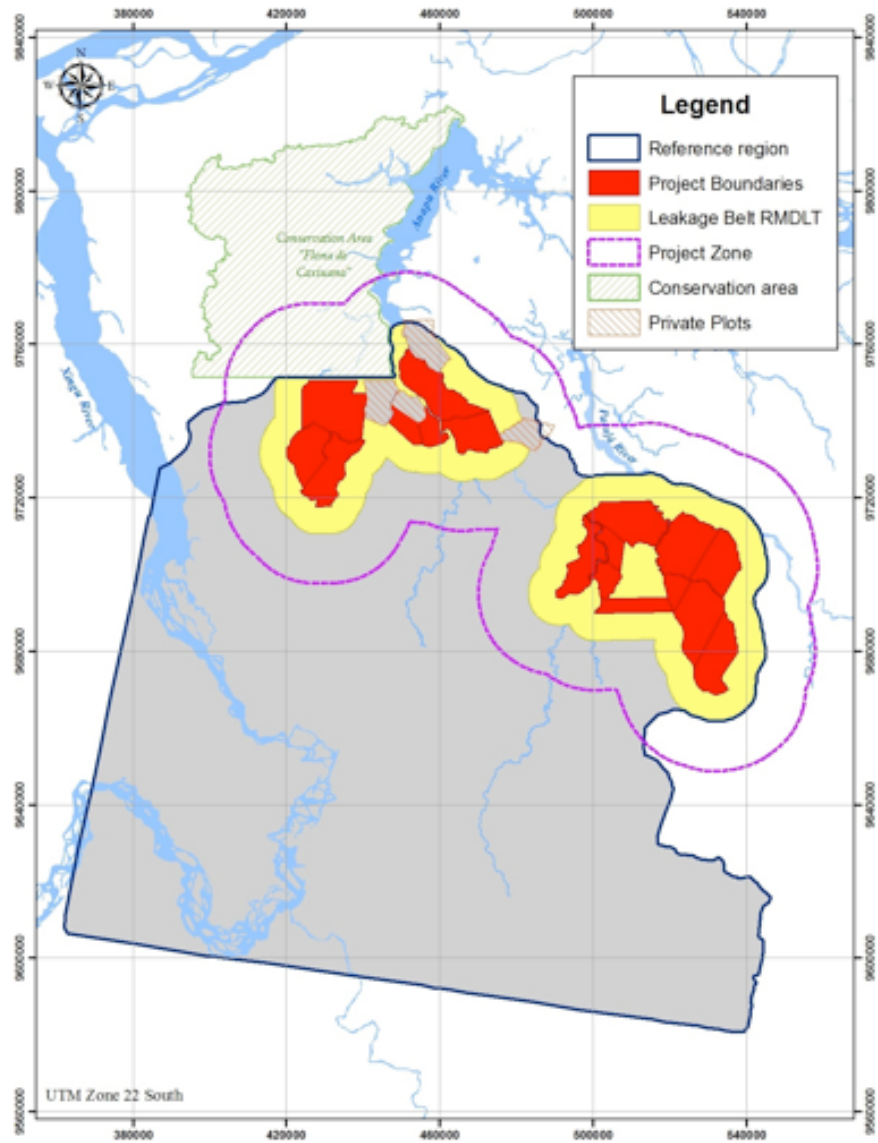
G1.4 Current carbon stocks at the project site

Land-cover in the RRD is defined by the presence or absence of forest cover according to Brazil's definition of forest[12]. It was not accurate to sub-divide further forest covers using Landsat TM images at the time so, in order to be conservative, carbon content per 1 ha of forest in the RRD, Project Area and Leakage Belt was calculated using a weighted average based on the results from our Forest Carbon Inventory as shown in Annex 5: Carbon Inventory Results and presented in Table 2.

The land-cover classes identified in the RRD are:

1. Ombrophilous Forest: This land-cover class comprises a single stratus (Ombrophilous Forests). Only for effects of calculating the most conservative carbon stock per hectare, this land-cover can be divided in two sub-classes[13] based on carbon density:

- Dense Forests (DF): forests without disturbances.

- Forest with signs of degradation (FsD): forests with evidence of degradation caused by logging exploration, less dense than Dense Forests and currently under advanced regeneration.

Table 2: Average carbon content in 1 ha of forest in the RRD

| | Above-ground Biomass | | | | | | | | | | | | | Below-ground Biomass |
| | Dense Forest | | | | | | Degraded Forest | | | | | | Total Area-weighted Above-ground Carbon Stock (tCO2e/ha) | Total Area-weighted Below-ground Carbon Stock (tCO2e/ha) |
	Litter	DHB< 3cm	3cm<DBH<9.9cm	Trees ≥10cm (Overman 1994)	Area-weighted Average (tdm/ha)	Area-weighted Average (tCO2e/ha)	Litter	DHB< 3cm	3cm<DBH<9.9 cm	Trees ≥10cm (Overman 1994)	Area-weighted Average (tdm/ha)	Area-weighted Average (tCO2e/ha)		
Original values	4.73	1.14	7.47	412.24	390.18	715.33	4.89	0.90	7.22	405.51	34.82	63.83	779.16	169.50
Corrected values with lower boundary of 90% CI	4.28	0.97	6.80	371.50	351.64	644.67	4.14	0.67	5.84	321.41	27.62	50.64	**695.31**	151.25

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[12] According to the UNFCCC, Brazil's definition for forest is 1 hectare with 30% crown cover and 5 meters tree height. http://cdm.unfccc.int/DNA/index.html

[13] The Carbon Inventory identifies 3 land-covers in the RRD. However, one of these (Regenerated Forest) includes former grasslands/croplands that are under regeneration. Because the VM0015 methodology requires to consider as Project Area only forest that has remain forest for at least the past 10 years and because of the short-rotational periods of cassava agriculture, this land-cover category was not included in the calculations for the weighted-average carbon stock of the initial forest cover.

G1.5 Community Information

From 2008 through 2012 the only activitiy implemented by the Project has been monitoring and enforcement to remove squatters and illegal loggers. Although some interaction with local villagers 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 Big Lands Brasil (who has been in charge of surveillance activities from 2008) the approximate number of villagers contacted is less than 10% of the total population in the area.

Given the fact that monitoring activities from 2008 until 2012 didn't involve or affect villagers, the Project has not conducted a Free, Prior, and Informed Consent (FPIC) process. It is only in 2012 that a initial Participatory Rural Appraisal (PRA) takes place when the Project contemplates the opportunity to implement activities with local villagers, to improve local livelihoods, and to scale-up forest surveillance. It is from the information of this PRA that the Project will conduct a census and a FPIC process, which will be completed before the first verification process.

During the months of December 2011 and January-February 2012, Participatory Rural Appraisals (PRAs) were conducted in the area constituted by the Project's Boundary and a 15km buffer 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 villages' 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 villages within the sampled area. As a result, surveyed villages do not represent an exhaustive list of those participating in the activities of the Project.

Upon validation, the Project will have access to available funds to cover most of the costs until it reaches a break-even point. This will allow the Project to conduct a thorough census in the Project's Boundary and Leakage Belt to identify all affected villagers and to georeference active and resting agricultural plots. This census will take place within the first six months after validation and gathered information will be used to develop a detailed social monitoring plan.

Proposal for Census Protocol

Intervention area:

The total area of the project has an extension of 177,899.5 ha located between the Anapú and Pacajá rivers in the municipality of Portel, State of Pará in Brazil.

The intervention area has settlements called "vilas" and the population is known as "riberinhos" for being placed in the riverbanks. 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.

General Objective

To develop a communitarian participatory census in the intervention area of the Project to obtain definite and total information about the reality of the territory and the populations settled in the zone 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 riberinhos the results of the PRA developed by Ecosystem Services LLC and the proposed Project's activities. Such information will be assessed and potential impacts and benefits to local livelihoods will be identified in a participatory approach with local villages. These participatory evaluations will constitute the base information for a Free, Prior, and Informed Consent assessment of the Project by local riberinhos 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. To obtain, update and systematize socioeconomic and organizational information of all the riparian population in the project area.
4. To obtain spatial information and map the natural resources extraction areas, crops and the settlers territories.

Methodological proposal

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

Ecosystem Services LLC will direct the execution of all the activities through its social specialists who will be 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 will have a team of social professionals with experience in conducting rural workshops and communitarian management. Ecosystem Services LLC, through its social teams, will be responsible for the effective development of field activities, establish contact and negotiation with local leaders, carry out interviews with key informer actors from each community and facilitate assemblies and informative workshops.

The social teams will include field technicians, who will be 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

Ecosystem Services LLC will constitute two social teams to simultaneously carry out the fieldwork throughout the Anapu and Pacajá rivers. Two anthropologists will be part of each team as well as four technicians. Additionally, a number of people from the zone (still to be defined) will work as guides according to the activities planned in the workshops with the population.

The work is expected to take five to six days for each locality depending of the location, the household distribution and the amount of settlers. The total time expected to complete this work is around 90 days. The activities for each locality will be 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 will inform 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.
Day 1, day 2 and day 3	Informative assembly to inform about the details of the project and PRA results.	One assembly with the population will be carried out in order to inform about the details of the project. A simplified and short version of the PDD in Portuguese will be distributed and explained for those who cannot read. Such version will be developed in a simplified languge

		without leaving out any important details.
	Participatory assessment of the project activities and the impacts in involved villages.	Project activities will be assessed jointly with the villages and a participatory evaluation will be carried out in order to know local perceptions. Comments will be collected and used to improve/adapt the activities to local expectations
	Request free, prior and informed consent to implement the project.	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.
	Workshop for planning of activities and the construction of social and environmental indicators	Once FPIC is obtained, one workshop will be carried out to detail and plan several activities ad also determine the participation of the population. The indicators to monitor the benefits of the projects will be 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 will be carried out.

Specific Objective 1.- Share with local riberinhos the results of the PRA developed by Ecosystem Services LLC and the proposed Project's activities. Such information will be assessed and potential impacts and benefits to local livelihoods will be identified in a participatory approach with local villages. Such participatory evaluation will constitute the base information for a Free, Prior, and Informed Consent assessment of the Project by local riberinhos living in the Leakage Management Area.

The communitarian representatives/leaders will be asked to support a communal assembly where the results of the Social Study and the Participatory Rural Diagnosis, carried out from November to December 2011 and January 2012, will be presented. For this purpose, a simplified version of the PDD will be distributed and explained for those who cannot read. This simplified version of the PDD as well as the presentation will be done in Portuguese, in a friendly format and in an easy-to-understand language. Also, flipcharts with didactic images will be used, always looking to account for the particularities of the local reality of each village.

Afterwards, the Project's activities will be presented and assessed in a participatory approach with the people of each village to identify potential impacts and options to mitigate them. All the feedback from these participatory workshops will be recorded in audio and the results will be included in an annex of the original PDD. If negative impacts are identified and such impacts are concrete and verifiable, the Project's management team will develop and implement appropriate mitigation activities, which will be constructed based on the feedback from the workshops.

The project will ask for the population conformity on the planned activities and their free, prior and informed consent to implement the project. All those that are willing to participate in the Project's activity will be kindly asked to sign a document that states that 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 will be invited to the workshop designed to plan the project activities and construct the social-environmental indicators for the social monitoring of the project.

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 will be 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 will work 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 will be included in the social monitoring plan.

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

The families or settlers participating of the activities in each "vila" will be identified with the authorities and local dwellers, generally associated to the mass, and several visits will be carried out in the totality of households in which the surveys will take place with the head of the family or and elder.

All the surveys applied will be organized and completed by the end of the work day in each locality and delivered to the person in charge of each team, who will take care of these documents.

The information will be uploaded in a database in SPSS by the end of the field work and will be systematized in a final report of the indicators that will 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 riberinhos.

The areas utilized by the population will be 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 will be 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 will be identified.

The settlers that will accompany the mapping activities carried out by the project specialists will be selected in a workshop in accordance to their knowledge over the territory. These people will be 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 will be identified for each dweller, will also be geo-referenced to the center of each parcel, data will be collected (according to local terminology and/or estimation in meters), cultivated species, agricultural technologies and productive timeframes.

The natural resources areas exploited by the riberinhos will be identified in the workshops and several spots in specific locations, or relevant to the project, will be taken if possible. Likewise, the communitarian territory, the area indicated to be occupied by the riberinhos will be mapped.

All the information collected in regards to villages, households and parcel location will be geo-referenced. Pioneer roads and pathways in the project zone will also be collected[14].

Isolated households

Isolated households, or the ones not participating or inserted in some "vila" and cannot participate in the workshop in the nearest community, will be informed about the project, its

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[14] This will be carried out when possible due to the timespan limits. It is known that these roads expand for several km and having a limited period and the extension of the area; it is not expected for the roads to be totally mapped. Digitalized information, based on Alos Palsar imagery taken in 2012, will be used to focus this activity in zones that have not been mapped due to very dense canopy coverage.

activities and benefits, directly. The survey will be carried out and the household, agricultural parcels and if possible the land occupied by them, will be geo-referenced as well.

It is important to remark that the definite census protocol will be difined after the validation of the project and will include an extense 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 will not involve or affect indigenous people.

Map 11: Indigenous Lands in the Project's Area and RRD according to official FUNAI database
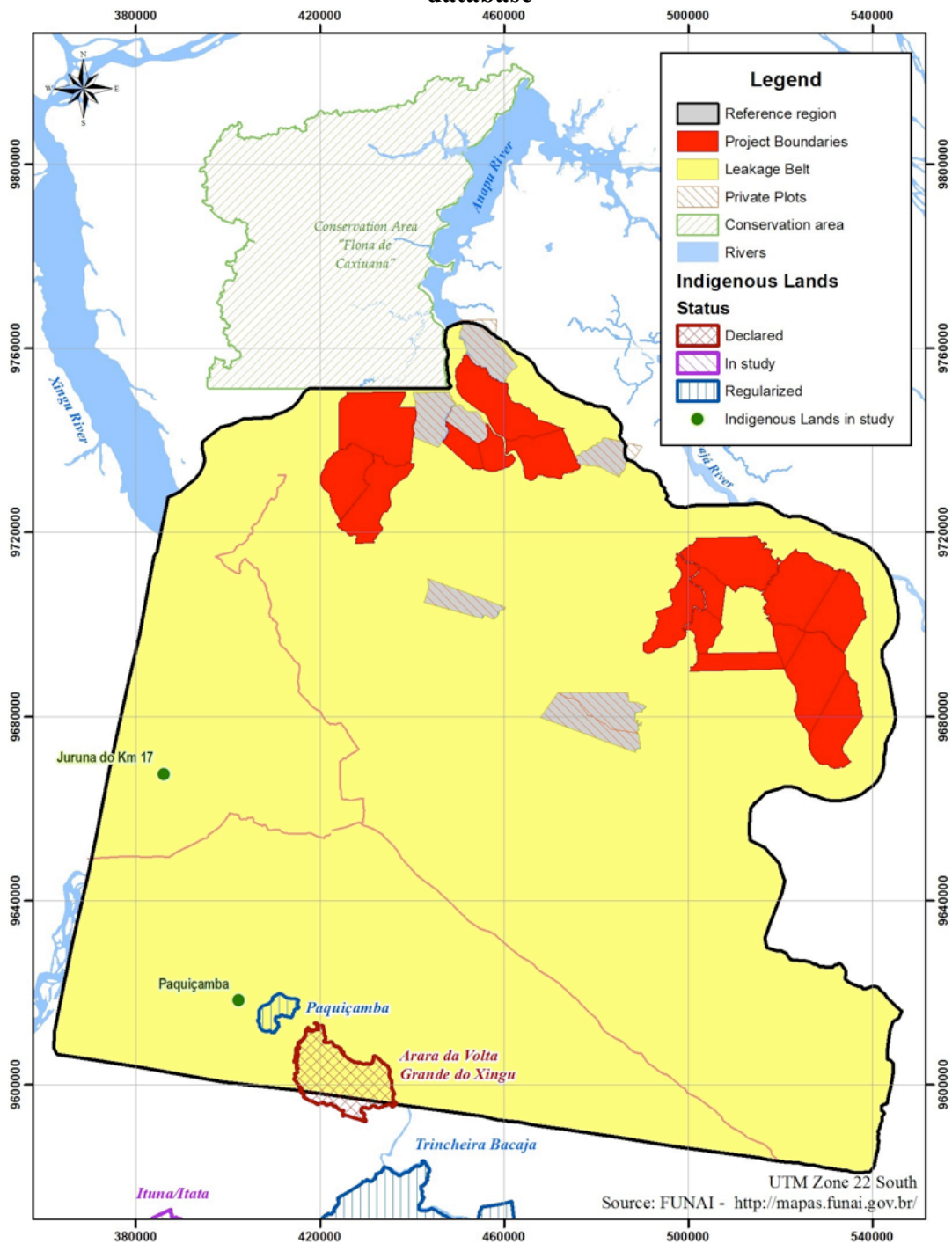
Generated by ESLLC based on official information from FUNAI available at http://mapas.funai.gov.br/

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).

Impacted population is distributed along Anapu and part of Pacaja rivers and its tributaries, thus receiving the definition of *riberinhos* (people who live along river shores).

Picture 1: Riberinhos villages

Villa Gloria	Villa Monte Horebe
Villa Menino Deus	Villa Monte Moriá

Stakeholders involved by the Project are those living in the LMA which is located around the Project Area, in a buffer of 3Km from river shores. Total population in this area is approximately 400 villagers having a demographic density of 1.5 person/Km^2 according to the latest demographic census at sectors level (IBGE 2011).

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 2: People by age groups

People by age groups- Census 2010/IBGE
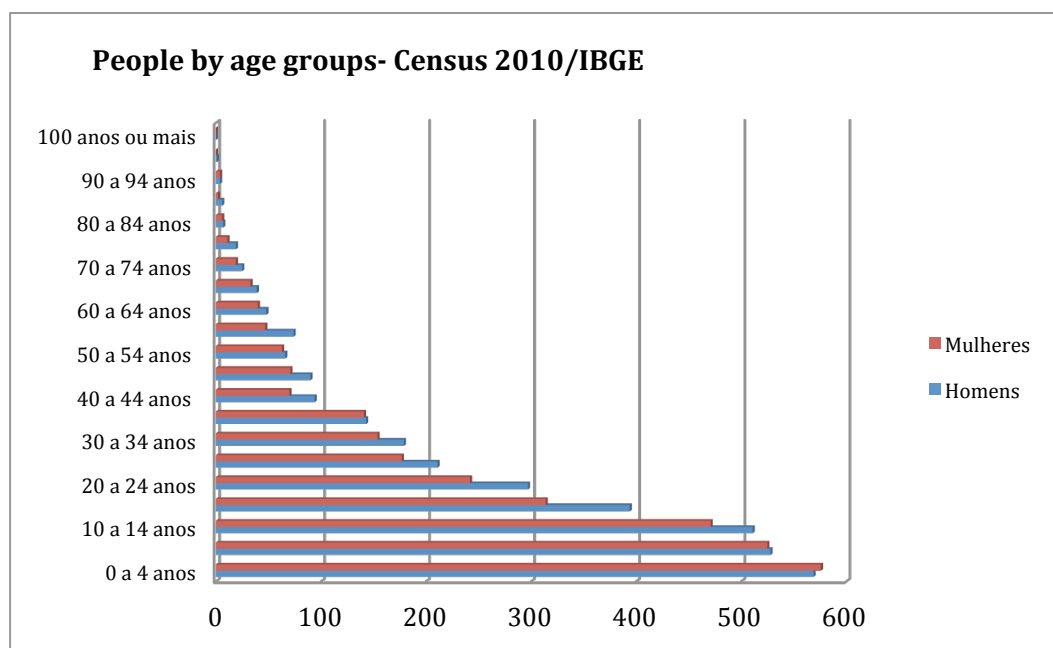
Generally speaking, villages are composed by few households (between 4 to 15 agglomerate houses) with an average of 6 people each. Villages are mostly large family groups that eventually allow for non-related people to settle in their village.

From the total population, it was decided to establish direct approaches with approximately 16 villages or *localities* because of inter-local relations, project impacts and accessibility[15].
In the project area, families are organized mostly in household of couples living together without formal arrangements such as marriage. From the total of surveyed households, 45.6% declared to live together with a partner without legal arrangements and 44.1% declared to be married. Then, 5.9% declared to be widow and 4.4% are divorced. Finally,

52.6% of the households have 4 children or more (43.4% has less than 4 children and 3.9% has none).

There is an increasing trend towards population growth because of immigration to the project area. Occupation of the project area by villagers or *riberinhos* 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 3: Year of migration to the area
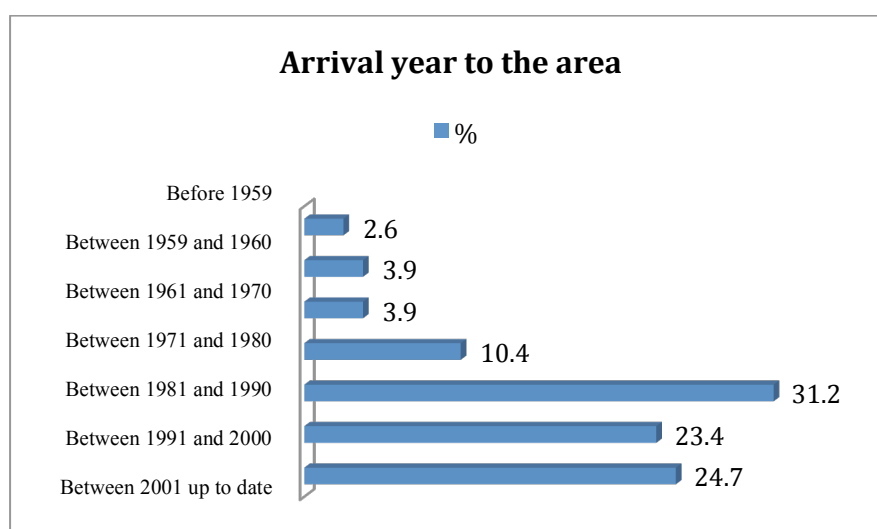
Local Economy

In the project area, the main economic activity is cassava growing. Cassava is processed and commercialized as *farinha* in Portel or with traders that come along travel along villages.

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 *Aposentado*[16] and 6.1% receives income

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[16]An Aposentado is a pensioner that receives a monthly payment. The received amount is correlated to how much a person contributed. In order to be an aposentado it's a requirement to be registered in the National Union of Pensioners Sub-Seat of Para (Sindicato Nacional Dos Aposentados Sub-Sede Pará. SINDNAP – PA).

from sporadic timber extraction and sale. It should be mentioned that some households receive money from the program *Bolsa Familia*[17].

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 2: Cassava plot (left) and Cassava (right)

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.

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[17]The Bolsa Familia program is a subsidy program designed to support poor families and established by the Fedaral Government of Brazil. This program has an office in Portel where households are registered and granted the subsidy.

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 tarefas "*tarefas*" (1 tarefa = 25 brazas x 25 brazas = 2500 to 3900 m^2).

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 fuelwood and each feixe contains approx. 8kg of fuelwood) which adds for a total of 48 Kg of fuelwood for one farinhada (the process of making farinha) Each farmer makes two farinhadas per week gathering fuelwood.

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

Picture 3: Household processing of farinha in the project leakage management belt

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 fuelwood. 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 sale farinha to traders that travel along the river and barter farinha for other goods. Other people sale farinha in their villages or barter it for rice, beans, coffee, sugar, oil, etc. All these products are obtained by villagers through barters.

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). Villagers 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 villagers 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 areareveals that 13% of the villagers 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 villages around 5 years ago. This is because of the presence of large timber extraction companies that would employ local villagers as workers to extract timber giving the lack of qualified work force in the area (ESLLC 2012).

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

Local villages 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. In the whole surveyed area, only one small convenience store was identified.

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 9ranging between 150 to 1,800 Reais). It should be pointed out that the aforementioned revenue values for farinha production do not include the benefits recovered through bartering.

The minimum legal salary in Brazil starting in 2012 is 620 Reais, thus local villagers are below the minimum salary line (except when wood sale happens).

Farming Activities

As mentioned before, villagers 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 *aceiros* or 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 villagers associate Cassava with Corn crops.

Picture 4: 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. Such land ownership rights come from old agreements with former landowners that later on sold their properties.

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, villagers do not conduct slash and burn. They would rather conduct slash and burn in the Capoeiras that are easier to slash. In Capoeiras villagers will not 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 villager has 3 plots, each one of approximately 1 **Tarefa**[18]. One Tarefa is about one quarter of a hectare used for agriculture.

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 villagers that although claiming to own land, do not cultivate anything.

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[18] A Tarefa is a local unit of measure for land area. 1 Tarefa = 25 x 25 Brazas
    1 Braza = between 2 to 2.5 meters. It's the height of a villager standing, raising his arm   and holding a machete.

Products to be sold in markets. The main commercialized product is farinha (44.2% of households) then cassava (29.9% of households), timber (5.2% of households) and corn (1.3% of households). Those who grow Cassava diversify and complement their production by growing banana, maize, black pepper, cane, rice and some fruits. Rice farming is not significant, being growth for self-consumption together with maize.

Many of the households complement their diet by growing other products in small flowerpots. Such products are cabbage, black pepper, pepper, chili, eggplant, tomatoes, chicory and basil. Villagers also use these flowerpots to grow medicinal plants such as aloe and mint.

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. They only raised animals by local households are some pigs and chicken that are fed with leftovers.

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.

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 villagers 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 Riberenhos 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 village (buyers are traveler merchants) and Portel.

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 a hunter covers up to 3Km from his village). However, the PRA indicates that nowadays villagers 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 village areas and 14.3% hunt in other villages. 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 villages.

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 villagers would not collect firewood from a source farther than 3Km from the river shore.

Figure 4: Wood species used for firewood

Wood species used for firewood

■ %

Species	%
Otros	14.4
Meraguati	2.3
Muirapitanga	7.6
Tapuru	3.8
Pacapoá	13.6
Pracaxi	4.5
Muruci	29.5
Lacre	6.8
Yngá	17.4
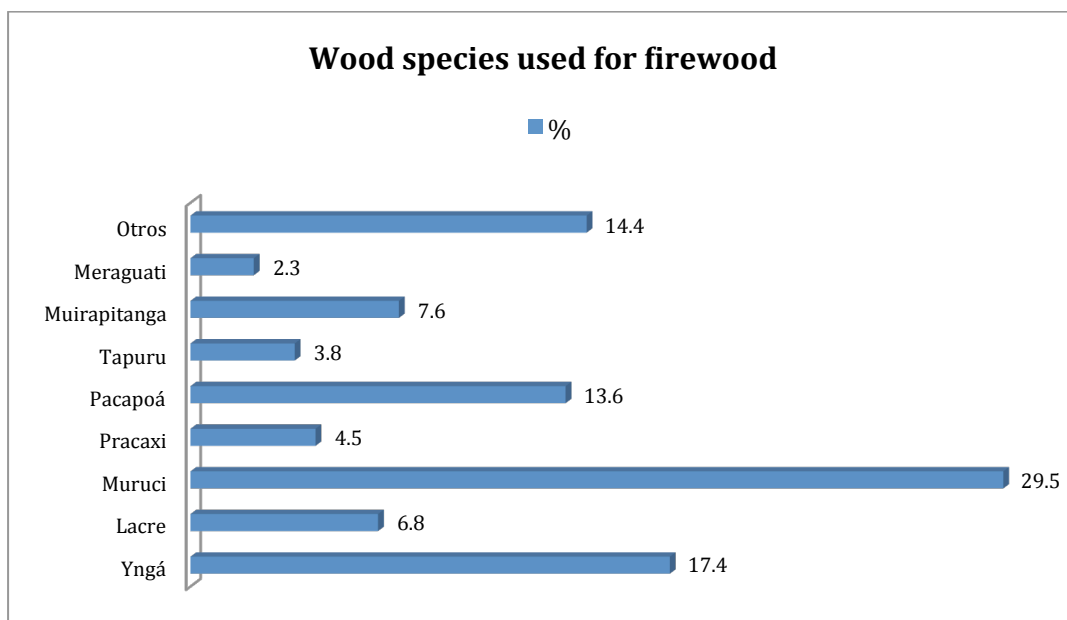
Social Organization and cultural identity

All villages are agglomerations of small families and are organized according to religious beliefs. Thus, some villages can be catholic and others evangelic (in the project area there are 6 catholic and 3 evangelic villages). According to the PRA 68.1% of the people in the project area are catholics, 30.4% evangelic and 1.5% didn't want to respond about their religion.

Churches are the meeting points for each village and it is there where –after mass- 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 Aposentados Union, the Fishing Associations and the Association of Riberinhos.

Infrastructure and services

Households in the LMA have the following characteristics: 83.8% of residents own their own house and 16.2% have a home transferred, leased or 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 for cooking, wood is used principally and almost exclusively for the preparation of farinha.

Regarding education. Educational services are highly demanded by local households. Most villages have schools only with elementary level education and only one village (Menino Deus) provides high-school level education covering only the first grade of high school. Once reached this level, young people that wish to continue studying must migrate to Portel.

Regarding health. Most villages in the project area have no health centers; villagers have to be assisted in the health center of Villa Monte Horebe and Santo Amaro. The most common serious diseases are malaria, diarrhea and vomiting in addition to snake bites.

G1.6 Current land use and land tenure at the project site

As mentioned before, apart from the capital city Portel, all other areas of the municipality of Portel are rural. In rural areas, only in some cases is possible to find established land rights (titles of ownership and use permits) on lands with agricultural and forestry potentials.

In the project area, the PRA points out a high degree of informality on land tenure. Very few people have forest licenses or authorizations granted by the Secretary of Patrimony of the Para State, the Lands Institute of Para – ITERPA as well as possession certificates issued and registered in INCRA. But in most cases, people do not have accreditation documents of the areas they manage, nor have they defined lands physical boundaries between properties. Also at the community level, farmers do not have recorded the measures or the boundaries of their villages.

When asked what kind of title the resident had, 52.0% reported not having any ownership title on lands they use, 45.5% reported having land title and 1.3% is a possetionary of the land and 1.3% held forestry permit. In addition, it was asked if the farmer considers himself as a legal landowner for the land he uses, having 53.3% declaring himself as owner and 46.7% non-proprietary.

Locally, for a settler to access land, it needs to be accepted by the village (in some cases settlers are granted a piece of land supposedly titled under the name of one of the village founders) first and then the local authority (the pastor or priest) would help such settler to register the land at INCRA in Portel. Local rights over an area are determined and decided by the priests or pastors.

Conflicts

Having stated that villas area organized around their religious representatives, it should be mentioned that such representatives are recognized, respected and accepted by the majority of villagers. In addition to this, there is the fact of land perceived as "free" to be used for agriculture. Therefore, we have not identified conflicts related to land tenure among villagers in the project area.

On the other hand, at the level of community and resources management, the PRA has identified problems that could generate conflict. Such problems are generated by the presence of foreign extraction of resources such as timber and fish. It is known from literature that insecure land tenure rights result in violent conflicts and expropriation procedures (Araujo, Bonjean et al. 2009) so unless land tenure for riberinhos is clear and legally approved, the chances of conflicts with illegal loggers and squatters are high and are not expected to diminish in the future. For this reason, the Project will address this issue under two activities namely #3 and #4. Under activity #3 the Project will provide Riberinhos

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in the LMA (that wish to participate in forest conservation activities) with legal land-use rights that will become official land titles at the end of the Project's lifetime. Under activity #4 the Project will aid Riberinhos living outside the LMA (thus outside the Project's Boundary and not within land under the control of the landowner) providing information and capacity building on how to achieve land tenure rights over public forest areas as long as these Riberinhos agree to continue their sustainable practices.

G1.7 Biodiversity Information

The project zone is inserted in an area of extreme importance for biodiversity conservation, according to the Brazilian Ministry of Environment. This area holds a great diversity and abundance of species, not only important for the maintenance of ecological relationships, but also of socio-economic importance such as Brazil nut trees and other noble tree species. All the species inventoried were gathered in current literature about Caxiuanã National Forest and Eastern Amazon fauna and flora.

Flora

The Phanerogams in the area are responsible for approximately 62% of the region's representativeness. The families presenting the biggest number of individuals are: Sapotaceae, Leguminosae, Chrysobalanaceae, Lecythidaceae, Burseraceae e Lauraceae. The most abundant and widely distributed species are: *Vouacapoua americana* Aubl. (Acapu), *Dinizia excelsa* Ducke (Angelim vermelho), *Eschweilera coriacea* (A.P. DC.) Mart. ex Berg (matá-matá preto), *Lecythis idatimon* Aubl. (jatereu), *Eschweilera grandiflora* (Aubl.) Sandw. (matá-matá), *Protium tenuifolium* (Engl.) Engl. (breu vermelho), *Licania octandra* (Hoff. Ex R. & P. Ktze.) *Licania egleri* Prance, *Pouteria cladantha* Sandw., *Pouteria jariensis* Pires & Pennington, *Pouteria decorticans* Penn. (abiu arrepiado), *Virola micheli* Heckel, *Virola calophylla* Warb., *Rinorea guianensis* Aubl., *Bertholetia excelsa* H.B.K. (castanha-do-pará), *Euxylophora paraensis* Ducke (pau amarelo), *Manilkara huberi*.(Ducke) Standley (maçaranduba), *Manilkara bidentata subsp surinamensis* Pennington. In the understory are described *Faramea cf. anisocalyx.*, *Phoebe cf. cinnamomifolia* (H.B.K.) Nees, *Pithecellobium unifoliolatum* Benth., and *Martiodendron excelsum* (Benth.) Gleason; species which can be considered rare for the Amazon (Silva *et al.* 2003). Of all the species mentioned above, the only one which status is vulnerable is Bertholletia excelsa (IUCN 2012).

The second most predominat forest is the permanently flooded forest (igapó). The most abundant species are: *Virola surinamensis* Warb (ucuuba), *Euterpe oleracea* Mart. (açaí), *Alantoma lineata* (Mart.ex Berg) Miers (ceru), *Xylopia emarginata* R. E. Fries (ioi do

igapó), *Symphonia globulifera* L. f. (anani) (this one also occurs in terra-firme), *Eperua bijuga* Mart., *Macrolobium bifolium* (Aubl.) Pers. and *Macrolobium pendulum* Vog. Are widely distributed throughout this ecosystem (Silva et al. 2003). All the species mentioned above also occur in the occasionally flooded forest (várzea). Only 3 species belong to this habitat exclusively: *Pentaclethra macroloba* (Willd.) Kuntze (pracaxi), *Mauritia flexuosa* L.f. (buriti), and *Campsiandra laurifolia* Benth. (acapucarana). The most abundant species are açaí, ucuuba and *Pachira aquatic* Aubl. (mamorana). In the understory it can be found abundantly *Bactris* sp. (marajá) (Silva et al. 2003).

Some patches of secondary vegetation (capoeira), which were used by the communities for subsistence agriculture, can be found. Its floristic composition varies depending of how long these areas were abandoned. The most representative species are: *Tapirira guianensis var guianensis* Aubl., *Trema micrantha* (L.) Blume, and many species of Cecropia sp. There is also the aquatic vegetation, which can be found by the *igarapés* margins. The families including the highest number of species are Cyperaceae and Araceae (Silva *et al.* 2003).

Regarding the Pteridophytes, it can be found 19 families in the area: Lycopodiaceae, Selaginellaceae, Salviniaceae, Marattiaceae, Marattiaceae, Schizaeaceae, Hymenophyllaceae, Cyatheaceae, Metaxyaceae, Thelypteridaceae, Aspleniaceae, Blechnaceae, Polypodiaceae, Dryopteridaceae, Pteridaceae, Oleandraceae, Lindsaeaceae, and Tectariaceae (Silva & Rosário 2008).

Within the group Bryophyta (latus sensu), it is described the presence of Marchantiophyta and Bryophyta, with the former having the highest number of species (35), and the latter containing the highest number of families (14) (Alvarenga & Lisboa 2009).

Fauna

Pará REDD project zone also holds innumerous species of animals, including mammals, birds, reptiles, amphibians and fish. Tables divided according to the taxa are presented in Annex A.

Mammals

The most threatened fauna is found within the mammalian group. In the Primates group, *Cebus kaapori* (Ka'apor Capuchin) and *Chiropotes satanas* (Black Bearded Saki) are critically endangered both by IUCN and IBAMA, and the latter considered the least sighted primate (Ferrari *et al.* 2007) in the region. In the Carnivores, *Leopardus tigrinus* (oncilla) is considered vulnerable (IUCN, IBAMA) and *Pteronura brasiliensis* (giant otter) endangered (IUCN). Other threatened mammals are: *Mymecophaga tridactyla* (giant anteater) and *Priodontes maximus* (giant armadillo), both considered vulnerable by IUCN (2012) and endangered by IBAMA (2012).

Chiroptera is the most dominant mammalian taxon throughout Amazon. Due to their sensitiveness to changes in the ecosystem, they respond easily and quickly to those changes, which makes them good bioindicators. The region of lower Xingu, including the project zone area, is very heterogeneous in terms of vegetation, which allows a wider range of bat species (Marques-Aguiar *et al.* 2003).

Birds
Regarding the birds group, all the species were found in literature about Eastern Amazon in general and other inventories in Eastern Amazon national forests (Silva *et al.* 1990, Henriques *et al.* 2003), due to the lack of literature on birds' species in Caxiuanã and Xingu-Tocantins interfluvium. According to MMA (2002), Caxiuanã region is a region that lacks bird data, and for that reason it is included in the criterium of extreme important site for birds' inventory. Of all species listed, the only one considered endangered is *Guaruba guarouba* (golden parakeet) (IUCN, IBAMA 2012). A total 126 species were grouped with this secondary data revision. Obvioulsy, due to the lack of birds' inventory in the region, monitoring strategies should be applied with this intent.

In the reptilian taxon, the snakes are the better known taxonomic group in the Pará REDD project zone. In an inventory performed by Santos-Costa & Prudente (2003), the families registered were: Leptotiphlopidae, Aniliidae, Boidae, and Colubridae, with the latter the most dominant group. This follows the patterns observed in the entire South America. In total, it was found 63 species. *Atractus major* (brown ground snake) presented the widest distribution, and *Bothrops atrox* (common lancehead) was the most abundant. Lizards also have wide distribution and diversity (Ribeiro-Júnior *et al.* 2011).

Amphibians
Amphibians are not widely known by specialists, considering the Eastern Amazon context. What is known is that 82% of the amphibians' species in the entire Legal Amazon are endemic (Ávila-Pires *et al.* 2010). There is not any record of vulnerability, threat nor endanger of any amphibians documented in Pará (IBAMA 2012). In a study performed by Ribeiro-Júnior *et al.* (2011) involving pitfall traps, it was elaborated a simple inventory of the amphibians collected (see Annex A).

Fish
The project zone contains three main rivers: the Anapu River, located on the north; to the west Alto Anapu River – including Caxiuanã Bay; and Pacajá River on the east. The physiognomy of this basin combined with the innumerous igarapés present on the region, makes the project zone a very diverse site in terms of fish fauna (Montag *et al.* 2008). Based on a study carried out inside Caxiuanã national forest and surroundings, an inventory of the fish fauna sampled between November 1999 and November 2004 (Montag *et al.* 2008). The inventory comprises species sampled in Caxiuanã Bay, Caxiuanã, Pracupi and lower Anapu

River. The entire region is classified as being part of a macro zone located between Xingu and Tocantins Rivers, composed by interlinked water bodies of similar physical-chemical composition – black water rivers (Montag *et al.* 2008). It allows us to infer that the species found inside Caxiuanã can also be found in the further surroundings rivers, i.e. Pacajá and Pacupi River.

Arthropds
Of all the groups listed on this baseline, the arthropods are probably the group that holds the highest number of publications in the project zone. As part of a multi-inventory taxonomic project, the museum Emilio Goeldi made available a list of the species found within the boundaries of the national forest. Apart from this inventory, there is plenty of academic literature about different families.

Arthropods are abundant in almost every terrestrial ecosystem and are extremely important in the process of litter nutrient cycle, interacting with other organisms and interfering in soil composition (Praxedes *et al.* 2003). Praxedes *et al.* (2003) report that during their sampling period (June and November 2001; April and July 2002), it was collected individuals belonging to the following Classes: Insecta, Arachnida, Diplopoda, Chilopoda e Malacostraca, with Insect being the most representative one, encompassing the following Orders: Collembola (38%), Hymenoptera (27%), Coleoptera (20%) and Diptera 5%. The least representative within Insect were Isoptera, Orthoptera, Thysanura, Thricoptera and Hemiptera, representing 10 % of the total of Insecta.

Other studies carried out in the area reported other taxa, such as Formicidae (Moura 2006) and Vespidae (Silva 2007). Moura (2006) points out the importance of Formicidae as a group that responds rapidly to disturbances, such as heat stress and opening in the canopy.

To conclude, the list presented is a result of all the data gathered about arthropods, which the most reprsentative group is Hymenoptera, followed by Diptera. All the Arthropods are not included in any list of vulnerability or least concern (IUCN, IBAMA 2012).

<div style="border:1px solid">

G1.8 IUCN Red List threatened species

</div>

Currently Pará state has been suffering losses on its vegetation cover due to the increasing economic changes in Brazil. The deforestation rates in Pará state (18%) where higher comparing to the total deforestation rates of the Legal Amazon (13,5 %) (IBGE 2007). Deforestation, fires, highways, illegal logging, pasture are more broadly included in a roll of threats to its biodiversity (WWF 2012). According to IMAZON (C. Souza Jr 2007), Pará state leads the deforestation rates detected in January 2012. Therefore the development of conservation and sustainable initiatives is essential, as Pará holds species of great economic

and biological value. Currently, protected areas in Pará sum 55% of its territory, including indigenous lands, areas of integral protection and sustainable use (Hayashi 2009) Although those areas are endeavored to become areas of sustainable use and/or protection, it was registered that those are the lands that most suffer with deforestation, and Caxiuanã was considered the second most affected FLONA in 2008 (Veríssimo *et al*. 2011).

G1.9 High Conservation Values (HCVs) and description of the qualifying attributes

G1.9.1. Globally, regionally or nationally significant concentrations of biodiversity values

G1.9.1 a. Protected areas

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.

The Caxiuana National Forest was created to allow the sustainable forest management and the exploration of other forest products. Activities of sustainable forest management must be authorized by the authorities through a forest concession, as explained the article 48 of the federal law number 11.284/2006.

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.

The management of the National Forest is conducted by Chico Mendes institute since 2007. It has 2 bases in the forest. There is an advisory council chaired by ICMBIO, and other representatives from public institutes, NGOs, and local communities.

The Museum Emilio Goeldi (MPEG) has a research base in the Caxiuana National Forest – The Ferreira Pena research base. Today there are 3 big research projects: The Tropical Ecology, Assessment and Monitoring Initiative, Program of Biodiversity Research, and the Large Scale Biosphere – Amazon Atmosphere.

G1.9.1 b. Threatened species

Mammals
The conservation status of the species found in the project area was obtained from the list of threaten species of Pará (Galatti and Hoogmoed, 2006), IBAMA (MMA, 2003), IUNC (2007), CITIES. None of them (mammals) are endemic to the project regions. With the great majority`s distribution spreading out to all over the amazon region, and some of them occurring at other ecosystems: Dasypus novemcinctus, Priodontes maximus, Cerdocyon thous, Speothos venaticus, Potus flavus, Galictis vittata, Eira Barbara, Leopardus wiedii, Leopardus pardalis, and many other.

Table 4: List of mmamals in the Project Area

MAMMALS					
Specie	Popular name	Pará	IBAMA	IUNC	CITES
ORDER CARNIVORA	**A.**				
Família Canidae	**B.**				
Cerdocyon thous (Linnaeus, 1766)	cachorro-do-mato			LR	
Speothos venaticus (Lund, 1842)			VU	VU	
	cachorro-do-mato-vinagre				
Famíly Procyonidae	**C.**			PR	
Nasua nasua (Linnaeus 1766)	quati			PR	
	mão-pelada				
Procyon cancrivorus (G. Cuvier, 1798)				PR	
Potus flavus (Schreber, 1774)	jupará				
Famíly Mustelidae					
Galictis vittata (Schreber, 1776)	Furão			LR	
Eira barbara (Linnaeus, 1758)	irara			LR	
Famíly Felidae	**D.**	**G.**			
Leopardus wiedii (Schinz, 1821)	gato-maracajá	**H.**	VU	PR	
		I.	VU	PR	Apendix 1
Leopardus pardalis (Linnaeus, 1758)	jaguatirica	**J.**			Apendix 1
	E.	**K.**		PR	**M.**
Herpailurus yagouarondi (Lacépède, 1809)	jaguarundi	**L.**	VU	PT	Apendix 1
	F.	VU	VU	PT	**N.**
Puma concolor (Linnaeus, 1771)	suçuarana	VU			Apendix 1
	onça-pintada				Apendix 1

Panthera onca (Linnaeus, 1758)					
ORDER CETACEA Famíly Deuphinidae *Sotalia fluviatilis (Gervais and devile, 1853)*	**O.** **P.** tucuxi			II	Apendix 1
ORDEM PERISSODACTYLA Family Tapiridae *Tapirus terrestris (Linnaeus 1758)*	Anta			VU	Apendix 2
ORDER ARTIODACTYLA Famíly Tayassuidae *Tayassu pecari* (Link, 1795) Famíly Cervidae *Mazama americana* (Erxleben, 1777)	Queixada veado			PR II	Apendix 2
ORDER RODENTIA Família Sciuridae *Sciurus* sp. Famíly Agoutidae *Cuniculus paca* (Linnaeus, 1758) **Q.**	**R.** **S.** Caxinguelê cutia			PR	
ORDEM DIDELPHIMORPHIA Famíly Didelphidae *Didelphis marsupialis* Linnaues, 1758	gambá, mucura			PR	
ORDEM XENARTHRA Famíly Dasypodidae *Dasypus novemcinctus* Linnaeus, 1758 *Dasypus* sp. *Priodontes maximus* (Kerr, 1792) *Euphractus sexcinctus* (Linnaeus, 1758) *Cabassous* sp.	**T.** **U.** tatu-galinha **V.** tatu tatu-canastra tatu-peba **W.** tatu-de-rabo-mole	VU	VU	PR VU PR	Apêndix I

ORDEM PRIMATES Famíly Callitrichidae *Saguinus niger* (É. Geoffroy, 1803) *Mico argentatus* (Linnaeus, 1766) Famíly Cebidae *Cebus* sp. Família Atelidae *Alouatta belzebul* (Linnaeus, 1766)	sauim-uma **X.** sauim-branco **Y.** macaco-prego **Z.** bugio, capelão			PR PR PR	Apêndix II Apêndix II Apêndix II Apêndix II

II – No suficient information; PR – low risk; probably threaten; VU – vulnerable;

Birds

Of the existing bird species that can be found in the project area 61 are highly sensible to human presence, 31 are considered rare or uncommon. Besides that, of the 160 threaten bird species listed by IBAMA (2003), and the maps of distribution of IBAMA, 3 species occur in the region: *Guarouba guarouba* (ararajuba), *Phlegopsis nigromaculata* (mãe-de-taoca), *Dendrocincla merula* (arapaçu-dataoca); *Anodorhynchus hyacinthinus* (Arara-azul-grande).

The *Guarouba guarouba* is considered "vulnerable" and the *Anodorhynchus hyacinthinus* threaten in IUNC's list (2004). The Harpia harpia is also considered "almost threatened" by IUNC.

The Project Area has an important role for the preservation of *Guaroupa guaroupa,* because the area of distribution of this specie lays on high deforestation rates areas. The fragmentation of its habitat is evident; therefore forest conservation projects will prevent the *Guaroupa guaroupa* to be extinguished.

G1.9.1 c. Distribution and occurrence of endemic species

There are more than 700 species that have been identified in literature (amphibians, reptiles, birds and mammals) whose unique characteristics (continuous distribution and conservation status) makes them worthy of being viewed as objects of conservation for the entire Marajo region.

G1.9.2. Threatened or rare ecosystems

G.1.9.2.a. Area with vulnerable soils

Soils that occur in the region are generally highly weathered, such as the oxisols neossol quatzarênicos and part of plinthosol that suffered an intense leaching process, generally on the plains. In the areas of relief in bay shape or plan, soils typically suffer a reduction processes that indicates permanent or temporary water logging, as gleysols, and part of fluvisols. Apart from the oxisoils, all other soil classes have limitations physical or chemical important that impair or prevent more intensive uses.

G.1.9.2.b. Rare ecosystems with conservation objectives

The Amazon forest ecosystem has the greatest biodiversity in the world, and the project area is located in one of the richest regions. And according to many publications the total of animal species identified is 1.103, and the number of plants, fungus and lichens is 2,400.

In the project region there are the typical Amazon ecosystems: mainland, patches of secondary forest and non-forest ecosystems similar to savannas. There are also flooded forests (varzae and igapó) and a vast water ecosystem with aquatic plants and animals. The research base of Caxiuana has identified the presence of new species not found in Pará until today. This area, with unique ecosystems, is the habitat for a wide range of species with very sensible interrelations with the environment and between themselves. Therefore, conservation strategies play a key role to preserve the biodiversity.

G.1.9.2.c. Conservation targets

The Amazon forest presents the greatest opportunities for tropical biodiversity conservation (Peres, 2005). In that sense, it is necessary conservation strategies to preserve the amazon watershed, and keep the important climate balance of the region (Soares-Filho et al 2006). According to federal law (normative instruction from minister of environment number 6, September 24th 2008) and state resolution COEMA 54/2007) the species under thread are:

- Castanheira-do-Pará (*Bertholletia excelsa*)
- Pau-amarelo (*Euxylophora paraensis*)
- Angelim-rajado (*Zygia racemosa antigo Pithecellobium racemosum*)
- Ucuúba (*Virola surinamensis*)
- Acapú (*Vouacapoa americana*)
- Cedro-vermelho (*Cedrela odorata*)
- Angelim-pedra (*Hymenolobium excelsum)*

- Maçaranduba (*Manilkara huberi*)
- Itaúba (*Mezilaurus itauba)*
- Ipê-roxo (Tabebuia impetiginosa)

Animals

- gato-maracajá (Leopardus wiedii)
- jaguatirica (Leopardus pardalis)
- jaguatirica (Herpailurus yagouarondi)
- suçuarana (Puma concolor)
- suçuarana (Panthera onca)

G1.9.3 Areas that provide critical ecosystem services

G.1.9.3.a. Regulation and water supply

Conservation of watersheds is a strategy that aims to protect environmental quality and consequently, water and terrestrial ecosystem. This approach is based on the fact that many environmental problems can be solved or reduced through actions on the watershed as a management unit (ANA National Agency of Water, 2006).

Two concepts have been discussed regarding water resources in the Marajo region: The sustainable development and the management of the watershed resources (IBAMA 2001). The latter has focused discussions on seeking management alternatives that adopt the watershed as a unit for environment planning in the region (IBAMA 2001).

There are 316 priority conservation areas, for sustainable use in the Brazilian amazon, 58 are included in the Para's watersheds. Therefore, these conservation units and the watersheds have an important role on management of ecosystems and biodiversity.

The project area provides the following ecosystem services:

- Carbon sequestration
- Rain patterns regulation
- Biodiversity habitats
- Extraction of oils, and other non timber products from the forest.

G.1.9.3.b. Erosion control and sediment retention

The project area soils are shallow and located in areas of flooded plans. This indicates that the associated vegetation is extremely fragile to changes of use. Deforestation can lead to irreversible processes of soil loss due to erosion by wind and rain would be faster than the soil formation processes. Therefore, the presence of vegetation in that area increases soil retention within the ecosystem, controlling the accumulation of sediment in lakes and wetlands downstream.

G.1.9.3.c. Carbon sequestration and regulation of the microclimate

At this point in the negotiations for an international REDD mechanism is undoubtedly the role of deforestation in the contribution of greenhouse gases. Keeping the primary forests of the lease has an undeniable advantage over other forms of land use due to high carbon stored. Thus, this project represents an opportunity to add to inventory forests that Brazil can offer as permanent stocks of forests (avoided deforestation). In addition to the benefits of carbon sequestration, forest area contributes to the regulation of local and regional temperature because in this area are the building blocks of cold air, having high density, lower to medium and low areas of the basins, mixing with the hot air produced in these zones and thus regulating temperature. Also, this airflow contributes to the regulation of rainfall and other climatic processes biologically mediated locally and regionally.

G.1.9.3.d. Habitat for fish reproduction

The Pacajá River and the Pacajaí River contain a great number of fish species. It was identified 80 fish species in a study (IPE 2008) developed in a nearby area: *Characidium* sp, *Bryconops* sp, *Hemigrammus* sp, *Knodus* sp, *Moenkhausia* sp, *Serrasalmus* sp, *Acestrorhynchus* sp, *Paravandellia* sp, *Trichomycterus* sp, *Imparfinis* sp, *Eigenmannia* sp1, *Eigenmannia* sp2, *Rivulus* sp1, *Rivulus* sp2, *Apistogramma* sp, *Heros* sp, *Geophagus* sp1, *Geophagus* sp2, *Aequidens* sp1 e *Aequidens*

There is a local consensus that commercial especially large fishing nets should prohibit fishing in these areas. These are sites that are depending on subsistence fisheries and trade conducted along the rivers.

G.1.9.4. Fundamental areas to satisfy the basic needs of the local communities

The Leakage Management Area (LMA) encompasses areas where the population carries out fundamental activities to cover their needs in relation to food, fuel, construction materials, and water services. These resources are particularly important for Riberinhos who have

limited access to benefits and have no other alternatives to access to other sources to cover certain needs.

According to PRA, obtaining construction materials and fuel occurs within an area of 3 kilometers around the villages considered inside the Leakage Management Area of the project. This 3Km area contains forested patches that are not considered as part of the Project Area because these either do not comply with the forest definition for Brazil or because the land-cover of such patches has changed from forest to other land-cover in the past ten-year period. As these patches are not included in the Project Area, Riberinhos are free to keep using them to fulfill their basic needs for construction materials and fuelwood.

It is important to mention that the spatial identification of the High Conservancy Value Areas (HCVA) will be improved together with the population as a part of the activities to be implemented during the participatory census that will take place within the first 6 after the project achieves VCS and CCB validation.

G.1.9.4.a Fundamental areas for food supply

The Project won't prevent local people from continuing their food-gathering activities in the Project Area, as long as such activities are carried-out to support local livelihoods but not to support commercial objectives. Local people harvest manioc in the LMA, which goes up to 3km from rivershores inwards mainland. As required by the VCS standard, the Project Area has been forest for at least the past 10 years and giving rotation periods for capoeiras (2-3 years) such areas are not included in the Project Area but remain as part of the LMA.

As identified by our PRA and witnessed by the audit team during on-site inspections, local people would not undertake agricultural activities farther than 3Km from rivershores because it is exhausting to cover greater distances by foot on a daily basis. Also, riberinhos' economic activity - farinha sale- depends on the river (washing, peeling, and drying cassava as well as cooking and selling farinha). Farinha is sold either at the rivershores to itinerary merchants or transported by boat to Portel. Therefore, covering large distances by foot does not make sense to them. For this reason, riberinhos do not claim land-use rights or livelihood activities farther than 3Km. The only time riberinhos go beyond 3Km is when they hunt and need to go into the forest, which is part of the Project Area.

Also, food-gathering activities will continue to happen in the Project Area as long as such do not involve timber extraction. Local people will be able to continue hunting and gathering food in the Project Area as long as they don't do so with commercial objectives. As mentioned above, cassava growing and harvesting happens no farther than 3Km from rivershores, which is the area comprised in the LMA. For this reason, cassava growing and farinha production will not only continue to happen in the LMA but will be also improved through agroforestry practices and energy efficient cookstoves, just as detailed in the activities of the Project.

Hunting areas
Hunting is a very frequent and intensive practice in the forestlands. PRA points out that the average covered distance to hunting is about 3 km but the settlers also can cover distances around 8 km inside the forestlands in search of their prey.

PRA shows that 67.6% of the homesteads present a high hunting frequency and that this is focused mainly to self-consumption. Nevertheless, the results obtained by PRA also indicate that currently the hunting activity has decreased due to the increasing difficulty to find the animals in the forest because of human intervention, such as invasions and forestry activities, that have frighten off the animals towards faraway places inside the forest.

Fruit collection areas
The project zone presents areas related to fruit production that are important to complement the diet of the local population. Among these areas there are:

Brazilian nut stands, are areas with wild Brazilian nut trees (also known as Castanha do Pará), this fruit is a very important food in the diet of the settlers in the zone since it contains a very high energetic value and provides proteins, vitamins and lipids.
The results of PRA show that 57% of the population collects Brazilian nuts and 25% out of this collection is destined to the market. Brazilian nut trees are distributed in the entire project zone in the high non-floodable lands.

The Açaizales, are areas populated by açaí palm trees. This fruit is consumed by the settlers in the region and is an essential complement in their meals, especially when combined with the farinha. This fruit contains a high energetic value and is rich in proteins, fiber, and lipids.
The results of PRA show that 66% of the population collects açaí berries and 15% out of this collection is destined to the market. These palm trees are also widely distributed throughout the entire project zone in the floodable areas (varzeas) along the rivers.

Fishing areas and water easement
Big rivers are not common places to fish for the local settlers. PRA collected information that showed that the presence of trawling-fishing boats practice indiscriminate extraction of the resources leaving practically nothing to fish for the population.

The project zone presents many streams (igarapes) and small lagoons that represent the main sources for fishing to the local community, since this activity is only carried out for self-consumption ends and no fishermen from the cities come inside. This water bodies are so important that 70% of the people pointed them as the main natural resource.

These streams are also fundamental since they provide water for human consumption along riparian populations. The information shows that 52.2% of the population consumes the water from the stream or rivers, though stream waters are mostly preferred due to their cleanliness in comparison to big rivers. It is important to mention that these rivers are found outside the boundaries of the project area and thus the ichthyological and water resouces will not be affected.

G.1.9.4.b Fundamental areas for the provision of fuel and construction materials

PRA indicates that 72.1% of the population utilizes gas as the fuel for cooking in the households, however almost all of the population that produces farinha uses fuel wood due to the better properties wood has in terms of heat and fire for a faster cooking.

Fuel wood is mainly obtained in the farming lands and in the forest where dry material is taken. Trees are only felled when the material collected after the slash and burn is fully used, but generally, the stock is enough. It is important to mention that fuel wood is not collected farther than 3 km from the shores where the population is settled, inside the LMA of the project. This 3km distance was identified during the PRA (refer to Annex 4 "Social Assessment" page 9). Also, Local villagers collect residual timber after applying slash and burn to capoeiras (regenerated plots formerly used for cassava crops) because such logs have a small diamete, are not very tall and are easy to transport given the lack of motorized ground vehicles in local villages. During the validation site visit it was verified in-situ that riberinhos don't have cassava plots farther than 3Km. Thus, firewood will not come from a distance greater than 3Km, which is also supported by the results of the PRA. The use of timber derived from capoeiras (small diameter trees) is made evident by the pictures included in Validation Evidence> CCB Specific_Validation>Evidence for firewood gathering> pictures of firewood sources.

Wood represents a fundamental material for the construction of the houses. PRA mentions that 100% of the houses have wood walls and flooring and that this is mostly obtained from trees inside the forests in the communal territories inside the LMA of the project.

Likewise, there is a 20.6% of the population, which utilizes palm leaves and hay for roof construction. These materials are also found in the surrounding forests and represent the resource used by the families with lesser economic resources and limited access to an alternative source for that matter.

G1.9.5 Critical área for traditional cultural identity of the communities

There are no indigenous people settlements[19] in the lands in the area of the project and the settlers do not represent a group with a historical common background. The population in the area is referred to as 'riberinhos' and even tough literature relates this word to the term 'cabloco' (mix between indigenous people, slaves and colonizers during the 'rubber fever' era by the end of the XIX century and the beginnings of the XX century) the 'riberinhos' in the area are from a much more newer settling process. PRA states that only 6.5% of the settler came to live to the zone between 50 and 70 years ago.

This population thus has no deep-rooted cultural or traditional religious binds to these territories, reason why they do not identify significant areas in those senses. Most of the settlers are declared catholic or evangelic which leads to determine chapels and cemeteries as the places with religious significance. These places are located in the Leakage Management Area thus will not be affected by the Project's activities.

G2 Baseline Projections

G.2.1 Land Use without the Project

2.1.1 Historical Background and Deforestation Dynamics

1. Historical Background

Cattle ranchers are the main deforestation agent in the area. Cattle ranchers can expand their activities by their own means (in the case of well-capitalized agents) or as part of a process that includes pioneer agents such as selective loggers and squatters (in the case of small and medium size ranchers). Interactions among these agents are the result of common drivers and underlying forces of deforestation that are based mostly on securing land ownership and also in economic profits.

Interaction between pioneer and final agents, looked from the standpoint of biological interaction, can be mutualistic[20] or at least a commensalistic[21]. For example, in the case of

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[19] Indigenous territories are defined by FUNAI as lands "inhabited permanently by indigenous, utilized for productive activities, essential for preservation of the environmental resources required for their well-bring and the necessary for their physical and cultural reproduction, according to use, costumes and traditions"

[20] A relationship where the two agents benefit from each other's actions.

[21] A relationship where at least one of the agents benefits from the other agent's actions but the last one is not affected.

loggers and ranchers, loggers can act independently from the existence of grazing activities. However, grazing activities take advantage of the network of penetration roads built by loggers and usually the revenues from timber extraction are used to finance the implementation of cattle (Margulis 2004).

Be as it may, intermediary agents with low opportunity costs (squatters) who precede cattle ranching, are probably the direct responsible for much of the deforestation (Margulis 2004). For most of the agents the main driver of deforestation in the area is land speculation (Kirby, Laurance et al. 2006), followed by generation of economic revenue (Barreto 2011). Land speculation arises from the expectation of a future re-sale of land. Such speculation is generated by widespread unclear land tenure, bizarre regulations that do not provide security for landowners (Araujo, Bonjean et al. 2009) and from known corruption and weak enforcement at local-level institutions (Larson 2008). Economic revenue is generated by the extraction and sale of timber, changes in land-use from forest to pasture (and implementation of grazing activities) and the sale of meat in the domestic rather than in the international market (Hecht 1993).

Land speculation and associated deforestation have their origin on economic incentives given the fact that a cleared area is worth 5 to 10 times more than the same forested area (Kirby, Laurance et al. 2006) and that squatters operate under the expectation of future land resale (Margulis 2004). At the same time, the Brazilian Constitution of 1988 incentivizes squatters to invade and clear forested land. Under this provision, squatters have the right to claim public or private land that is not under productive use[22]. The Constitution indicates that it is a legal activity to encroach private property if this is not under use, so a squatter can get land-use rights after one year of occupation and full-ownership after proving 5 years of continuous use, as long as the landowner does not manifest legal opposition (Araujo, Bonjean et al. 2009).

Land encroachment by squatters is facilitated by the use of the network of unplanned roads developed by illegal loggers that operate in the area (see Map 12). As confirmed by the analysis of the historical reference period using Landsat TM imagery, loggers will continue to build new roads as long as these provide access to profitable timber, moving the logging pressure far from primary roads into areas where the forest resources are abundant (Larson 2008) and regardless increasing distances to selling points (Pfaff 2009). Also, the historical reference period analysis shows that old pioneer roads linger over time and given the fact that any road will resist so much time in the forest without maintenance (Margulis 2004), it can be inferred that these roads are being used by pioneer agents.

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[22] A land with forest cover is assumed to be unused thus susceptible to be claimed or expropriated. For this reason, deforestation is the main way to prove that a land has an owner and that is currently under productive use (Araujo, Bonjean et al. 2009)

From the literature it is known that, although there is a time gap of 10 o more years between the implementation of logging activities and the development of cattle ranching, the use of the pioneer roads network by ranchers quickly consolidates a pioneer frontier and make it evolve (Mertens, Poccard-Chapuis et al. 2002), thus reducing the time the gap for the creation of a consolidated deforestation frontier (Margulis 2004).

Nowadays, these pioneer roads have begun to connect with the network of tertiary and secondary roads that lead to the Transamazonica highway, which has been verified by on-the ground testimonies, the results from the PRA and through the analysis of Alos Palsar imagery from 2012. By doing so, pioneer roads cannot longer be differentiated from tertiary roads thus becoming part of one single network.

Map 12: Primary and secondary roads (black) and tertiary and pioneer (red) at the start (left) and end (right) of the historical reference period.
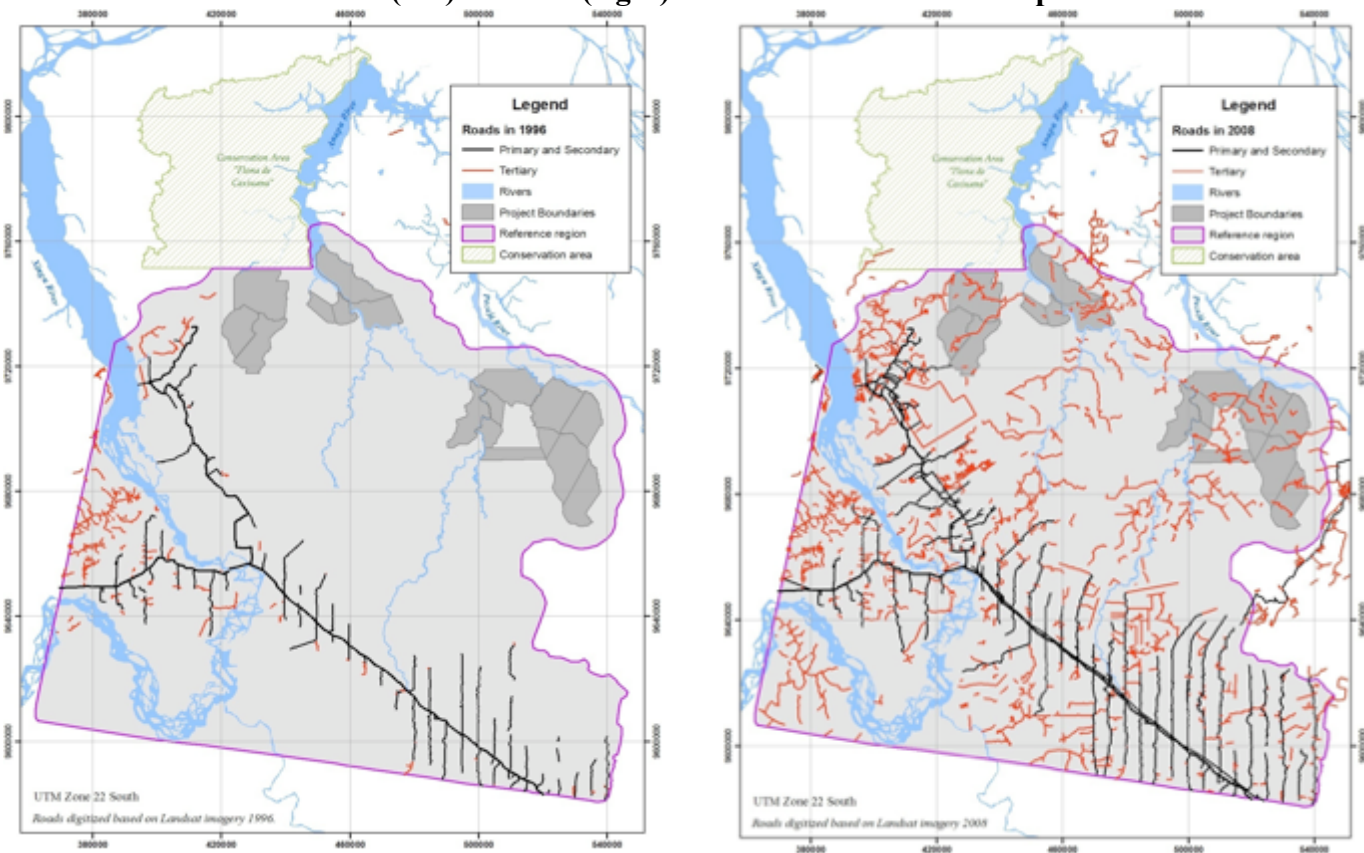
Now, keeping a cleared land in the Amazonia is a high-maintenance and costly activity. Cattle ranching is a very cheap and self-sustained mean to keep forest from re-growing, to prove land ownership and to generate revenues in the short and medium term. Therefore, although cattle ranching is a highly productive activity (mostly for large and well-capitalized agents) because of its low implementation/operational costs, the financial and tax benefits this activity receives and the growing demand of meat in the domestic market (Margulis 2004), it is an activity mostly implemented as an effective way to claim land ownership (Hecht 1993).

Therefore, depending on the scale of the agent, cattle ranching can be present at an area far from primary roads or "pioneer frontier" or in an area close to primary roads or "consolidated frontier" (Margulis 2004). In our case, the baseline scenario presents deforestation happening simultaneously in two fronts.

On one side, we have a consolidated frontier that moves northwards to the Project Area. This frontier is characterized by the presence of the Transamazonica highway[23] and the Senador Jose Porfirio highway[24] where the colonization process had been already started at the beginning of our historical reference period (1996). Colonization in this southern part of the RRD started by governmental incentives to logging and cattle ranching activities and aided by the fact that there was a high volume of cheap workforce that moved into the area looking to make a living (Walker, Moran et al. 2000; Margulis 2004). Over time deforestation started to consolidate in this area, giving birth to large-scale cattle ranching and expanding secondary roads and the associated deforestation towards north.

On the other side, we have the Project Boundaries and its immediate vicinity. In this northern part of the RRD, landless people or riberinhos colonize river shores and develop small villages; squatters (invaders) clear-cut patches of forest through slash and burn to prove land ownership and attempt a future land re-sale; illegal loggers establish operations on the shores of secondary rivers (they avoid main rivers to prevent calling attention on their operations) and open paths deep into the forest to selectively extract valuable timber species.

2. Deforestation Dynamics

The baseline scenario identifies two deforestation processes happening simultaneously in the RRD, related by a common but non-exclusive chain of events.

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 Riberinhos live alongside the shores of primary and secondary rivers within the Project Boundary. At the same time, squatters and

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[23] It is a federal highway known as BR-230.
[24] It is a state highway know as PA-167

illegal loggers encroach unprotected dense forests building pioneer roads from secondary rivers, away from primary rivers and the 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 medium size cattle ranchers expand secondary and tertiary roads, extract valuable timber species[25] and then deforest through slash and burn.

Pioneer Frontier

The pioneer frontier is the area of the Project Boundaries and its immediate vicinity. In this northern part of the RRD, landless people or riberinhos colonize river shores and develop small villages; illegal loggers open penetration roads to access valuable timber resources; squatters (invaders) clear-cut patches of forest through slash and burn to prove land ownership and attempt a future land re-sale.

Riberinhos –as showed in the Social Assessment – have as main economic activity cassava agriculture to produce and sale farinha. Riberinhos slash young trees in abandoned fallows[26], take the cut timber and then apply fire to clear the land and have it ready to plant cassava. This clearing process has a rotation of 3 to 4 years and often the plots are used twice without a resting period in between. As identified in the PRA, riberinhos won't set cassava fields any further than 3 Km away from the river shores. At the same time, small-scale timber extraction is limited to the gather of construction materials because as identified in the PRA, riberinhos perceive timber extraction as a difficult and dangerous activity that doesn't generate substantial revenues. The Social Assessment also shows that a household extracts between one or two trees per year.

Illegal loggers open pioneer roads that form an intricate network that connect with the network of roads that lead to the Transamazonica highway. Once connected to the Transamazonica network, pioneer roads function as tertiary roads in the network of the Transamazonica highway.

Squatters thrive on land speculation and use the network of tertiary roads to encroach the Project Area and clear it to claim ownership. Squatters will implement small-scale grazing to prevent the forest from regenerating and to prove that the land is under productive use, aiming at obtaining land ownership titles. Once ownership is granted, they sale they land to larger-scale ranchers.

Ranchers will expand pastures and grazing activities not only because it is a profitable activity but also to keep proving land ownership. The use of the network of tertiary roads allows ranchers to speed-up the consolidation process of the pioneer frontier.

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[25] Loggers, ranchers or both can undertake timber extraction.
[26] Known as *Capoerias* in the area.

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).

3. Conclusion

Therefore, in the RRD there are two well-defined fronts of deforestation that are linked by a common dynamic. Now, according to the Social Assessment study, riberinhos 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 riberinhos will engage in commercial logging activities, giving space to pastures to develop.

In a without project scenario it is likely that deforestation in the area will continue at a conservative rate of 1.7 % per year which can be used for baseline projections.

2.1.2 Agents and drivers of deforestation

Satellite imagery analysis, scientific reports, interviews and a participatory rural appraisal indicate the presence of 4 agents of deforestation listed in descending order of contribution to deforestation:

1. Cattle Ranchers
2. Illegal loggers
3. Squatters
4. Small-scale farmers (Riberinhos)

Main drivers of deforestation are (with no particular order as synergic interactions exist among each other):

- Perception that unused land is free or public land
- Speculation on land tenure
- Low opportunity costs of agents
- High demand for goods
- Easy accessibility to forested land through rivers
- Weak law enforcement

Main underlying causes of deforestation are:
- Weak or inexistent presence of the legal landowner of forested lands
- Demographic pressure on land and resources
- Corruption at land registry and environmental agencies

These agents and drivers represent those with the highest participation in the historical process of deforestation and are most likely to continue in the baseline scenario.

A thorough analysis of agents and drivers can be found in the attached PDD for VCS in Section 2.4.6 "Agents, Drivers and Underlying Causes of Deforestation".

From the historical reference period analysis cattle ranching appear to be responsible for 97.8% of LU/LC change while small-scale agriculture is responsible for only 2.2% as shown in Table 5:

Table 5: Contribution to deforestation in the historical reference period by LU/LC category

Category	Description	Contribution
1	Forest to Grassland	98%
2	Forest to Cropland	2%
Total		100%

G2.2 Documentation that project benefits would not happen in absence of project

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 will develop and implement activities not only for ecosystem protection but also to generate social benefits. The Participatory Rural Appraisal makes evident that such benefits will not be generated under a without project scenario.

G2.3 Calculation of estimated carbon stock changes in absence of project

2.3.1 Historical rate of deforestation

Historical deforestation rate in the Reference Region for Deforestation (RRD) was calculated between 1996 and 2008 and is shown in Map 13:

Map 13: Forest and non-forest classes at the start (left) and end (right) of the historical reference period
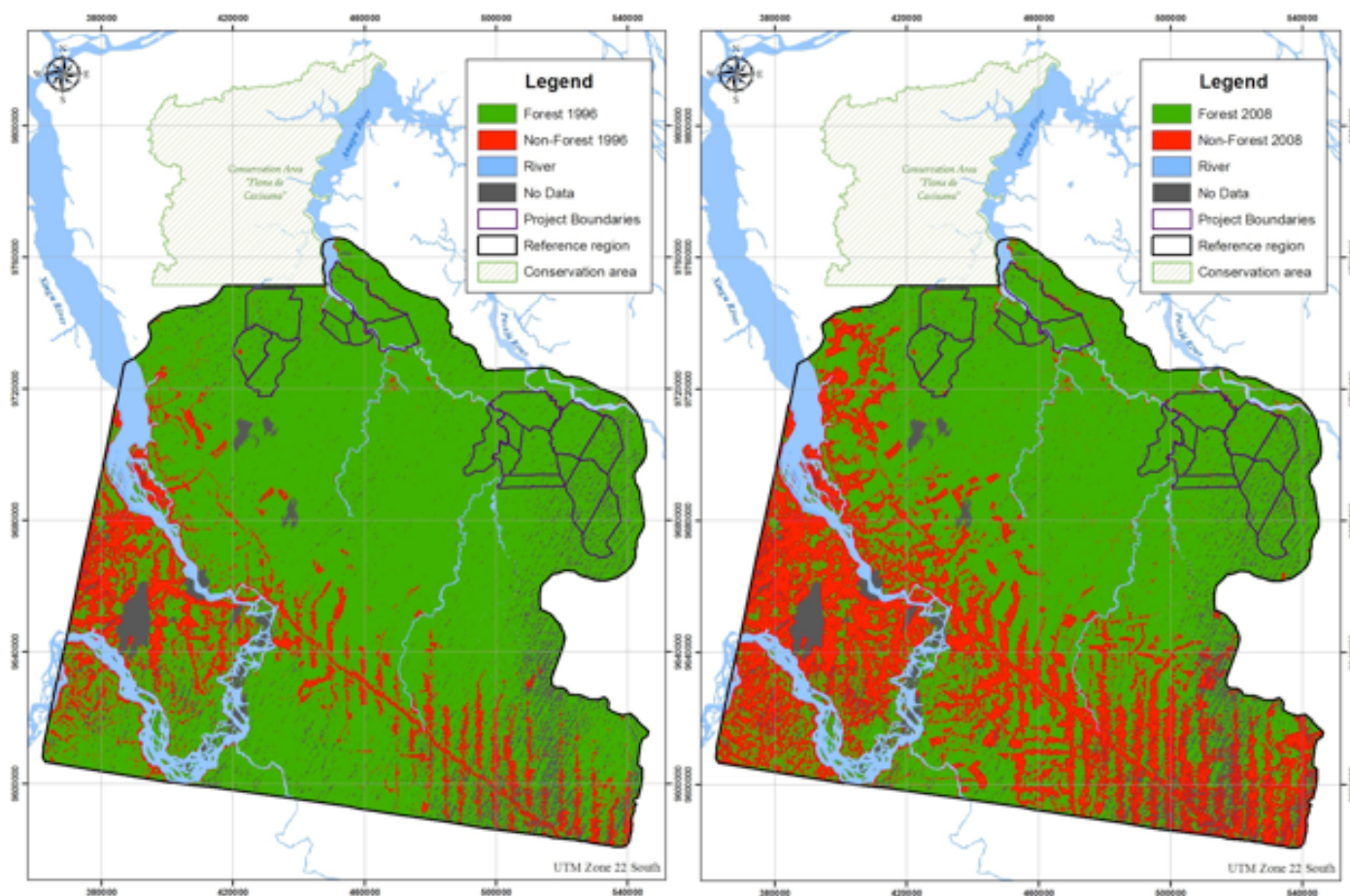
Change analysis results in the RRD are presented in Table 6:

Table 6: Change in Land Cover during the reference period

	Area in Ha	
	1996	**2008**
Forest	1,799,492.76	1,452,411.00
Non-Forest	257,463.36	604,545.12
Rivers	140,246.64	140,246.64

Over these twelve years the average deforestation rate per year is 1.7%.

2.3.2 Baseline deforestation rate

The Project calculated the historical deforestation rate and projected future location of deforestation using a IDRISI Selva, a peer reviewed software to estimate land-cover change (as required by approach "A" in the VCS' vm0015 methodology item 4.1.1 page 48). Although there is an increase in the deforestation rate there is no conclusive evidence from the analysis of agents and drivers explaining the increasing trend thus Approach A "Historical Average" will be used to calculate the quantitative projection of future deforestation.

Although the fact that deforestation in the Legal Amazon had been increasing since August 2010 possibly because of the provisions in the old Forest Code (May, Millikan et al. 2011) and the fact that there is a concern about an increase in deforestation if a new version of the Forest Code would reduce forest protection (Barreto 2011) these assumpltions are plausible but not conclusive.

Results from the deforestation modeling for the baseline scenario are shown in Map 14.

Map 14: Baseline deforestation results for the year 2048
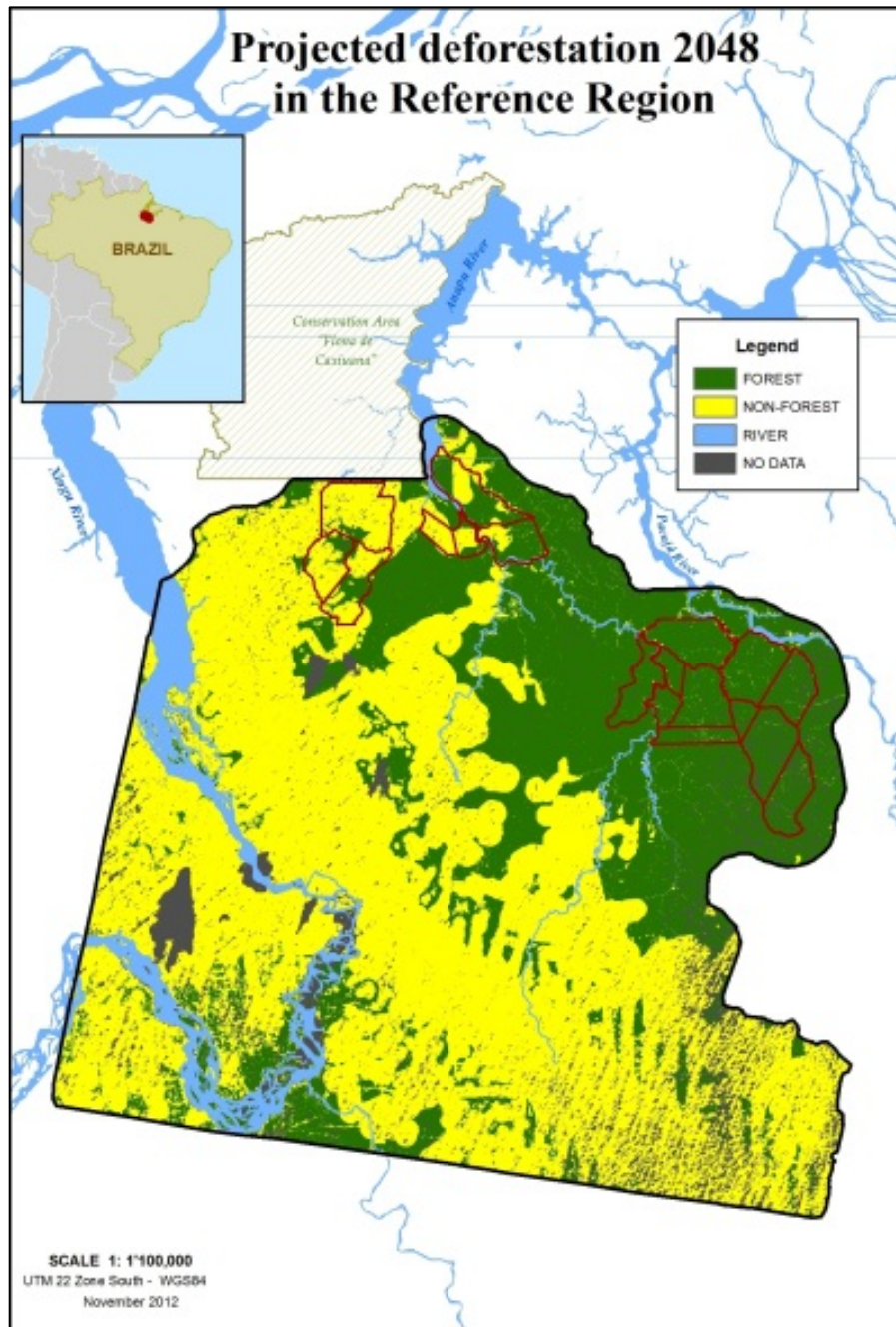
2.3.3 Impact on carbon stock changes

It is important to mention that net emission per hectare from LULC-change in the Project Area is 798.71 tCO2e/ha[27].

A LULC change analysis was performed using the last sub-period (2004-2008) of the historical reference period to identify the role of each LULC category in the deforestation within the RRD. Results are presented in Map 15:

Map 15: LULC classes at the last sub-period

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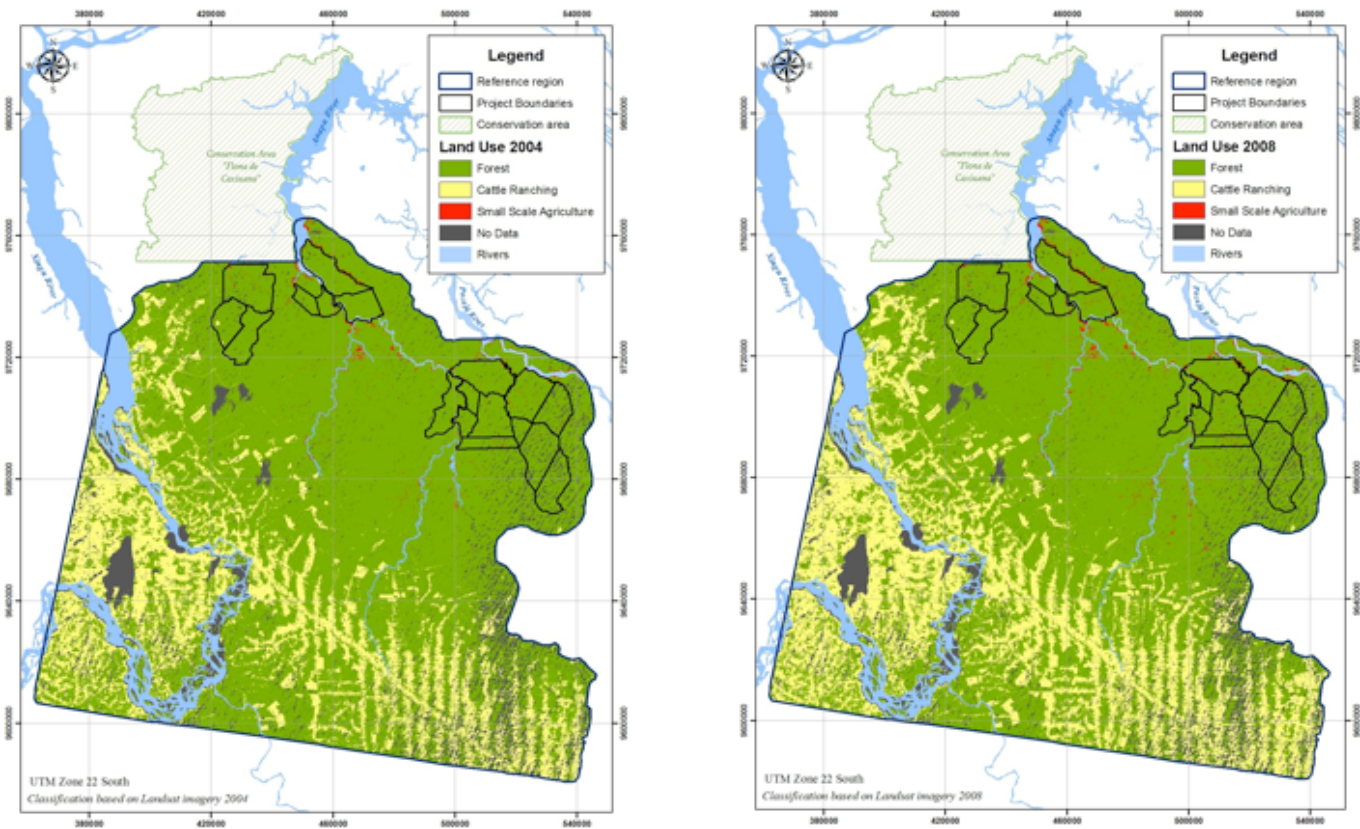
[27] Refer to Section 3.1.1 of this document for more information about this value.

When applying the deforestation rate for the baseline scenario, we get the following results of carbon stock change for the project area due to LULC changes (Table 8 and Table 9):

Table 8: Expected areas by LULC in the Project Area

Project year t	Stratum i of the reference region in the project area ABSLPA$_{i,t}$ ha	Total PA	
		annual ABSLPA$_t$ ha	cumulative ABSLPA ha
1	1,062	1,062	1,062
2	1,408	1,408	2,470
3	1,610	1,610	4,080
4	1,539	1,539	5,619
5	1,413	1,413	7,032
6	1,198	1,198	8,230
7	1,220	1,220	9,449
8	1,076	1,076	10,526
9	988	988	11,514
10	906	906	12,421
11	845	845	13,265
12	830	830	14,096
13	789	789	14,885
14	710	710	15,595
15	766	766	16,361
16	779	779	17,140
17	761	761	17,901
18	761	761	18,662
19	757	757	19,419
20	770	770	20,188
21	816	816	21,005
22	799	799	21,804
23	975	975	22,779
24	1,037	1,037	23,816
25	1,022	1,022	24,838
26	1,102	1,102	25,940
27	1,111	1,111	27,051
28	1,181	1,181	28,232
29	1,420	1,420	29,652
30	1,601	1,601	31,252
31	1,623	1,623	32,875
32	1,914	1,914	34,790
33	1,861	1,861	36,650
34	1,544	1,544	38,194
35	1,663	1,663	39,857
36	1,682	1,682	41,539
37	1,673	1,673	43,213
38	1,701	1,701	44,914
39	1,726	1,726	46,640
40	1,695	1,695	48,334

Table 9: Gross Annual carbon stock change due to LU/LC change

Project year t	*Ex ante* net athropogenic GHG emission reductions	
	annual $\Delta REDD_t$ tCO_2-e	cumulative $\Delta REDD$ tCO_2-e
0	-	-
1	748,339	748,339
2	1,005,809	1,754,148
3	1,166,718	2,920,866
4	1,137,310	4,058,176
5	1,068,165	5,126,340
6	935,166	6,061,507
7	966,071	7,027,578
8	880,811	7,908,389
9	832,513	8,740,902
10	787,640	9,528,542
11	740,510	10,269,052
12	736,122	11,005,174
13	714,797	11,719,971
14	670,669	12,390,640
15	721,082	13,111,722
16	743,251	13,854,973
17	739,880	14,594,853
18	751,805	15,346,658
19	760,643	16,107,301
20	780,191	16,887,492
21	824,146	17,711,638
22	822,359	18,533,997
23	957,727	19,491,724
24	1,014,865	20,506,588
25	1,017,183	21,523,771
26	1,086,724	22,610,496
27	1,106,960	23,717,456
28	1,170,982	24,888,437
29	1,354,691	26,243,129
30	1,500,168	27,743,297
31	1,536,165	29,279,462
32	1,762,338	31,041,800
33	1,746,844	32,788,644
34	1,546,819	34,335,463
35	1,650,906	35,986,368
36	1,684,942	37,671,310
37	1,700,301	39,371,611
38	1,740,323	41,111,933
39	1,776,534	42,888,467
40	1,773,962	44,662,429

G.2.4 Impacts on Community of the "without" Project scenario

The most likely land use scenario without the project has the following features, the same that have been projected by local households in the PRAs[8]. From these analyses we can come to the following conclusions about the without project scenario:

- Moderate increase in population settled in the project area.
- 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 of the future among villages.
- Increase in timber extraction in the core sections of the project areas, with a related diminishment of timber resources nearby the villages.
- 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 villagers.
- Degraded forest due to selective logging is sold to ranchers that implement pastures.

G.2.5 Impacts on Biodiversity of the "without" Project scenario

The Project zone is an area where its vegetation cover has remained almost intact in Eastern Amazon, despite of the fact that it has always been densely populated. This anthropogenic colonization is moving inwards remote areas in Eastern Amazon and already affecting biodiversity, especially mammals (Lopes & Ferrari 2000). The loss of habitat also interferes in species that need wide areas for home ranges and to maintain populations viable. The Carnivores group fits in these criteria (Noss 1999), and the Project Zone holds seven species considered vulnerable and endangered, as described in section G1.7.

Habitat loss also results in patchy ecosystems, interfering in population dynamics and structure, causing population decline and possible extinction (Fearnside 2006). If the "without project" scenario persists, the project zone is likely to suffer this habitat loss, influencing directly in the dynamics of the entire project zone, including Caxiuanã national forest. The consequences of this are: the edge effect in the national forest boundaries, affecting landscape connectivity and potential loss of biodiversity and alteration of vegetation cover. Therefore, the "without project" scenario may generate irremediable negative consequences for biodiversity as a whole.

Another risk is posed by the fact that the project area is very extensive thus is difficult to control illegal loggers getting inside the project area. For this reason, a monitoring and patrolling plan is currently under development.

G3 Project Design and Goals

G.3.1 Summary of Project's Major Climate, Community and Biodiversity Objectives

Climate Objectives

The Climate objective of the Project is to avoid and prevent unplanned deforestation in native forests thus avoiding the net emission of 44,662,429 tCO2e through a period of 40 years of Project's crediting period.

Such objective will be achieved by managing the land in the form of a "private reserve" by developing and implementing a management plan. Such plan will include a rigorous monitoring and enforcement plan built up on the existing experience of on going surveillance activities in the area since 2009. Such scaled-up monitoring activities will actively count with the participation of local villagers that will be trained in forest management and monitoring techniques.

The medium term goal is to allow forest regeneration thus increasing the amount of carbon sequestered in the forest[28].

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[28] The Project will not claim carbon sequestration benefits from forest regeneration.

Community Objectives

The Project will provide land tenure security to villagers living within the Project Boundaries but outside the Project Area[29]. For those living outside the Project Boundary, capacity building workshops on land titling will be held to provide clear information about which steps villagers need to take in order to legally claim use rights and if possible ownership over free lands.

Geo-referenced information will be gathered and provided for villagers to know which areas can be claimed without incurring in private land encroaching.

Additionally, the Project will provide support to enhance community's organizational capabilities for a better management of local resources.

Finally, the Project will provide capacity building on agroforestry systems and on implementation of energy efficient cook stoves for cassava production to villagers within and nearby the Project Boundary.

Biodiversity Objectives

The Project will manage the land as a private protected area, thus conserving local ecosystems through avoided unplanned deforestation and will enhance ecosystem functionality by allowing patched of deforestation to regenerate thus eliminating ecosystem fragmentation.

Local villagers that wish to participate in the monitoring program will receive training on biodiversity monitoring and identification, so they will be a fundamental component of the Project's activities.

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[29] According to VCS's definitions these areas are known as Leakage Management Areas and are non-forest areas.

1. **Provide training on forest and biodiversity monitoring and management and opportunities to work as a monitoring/enforcement staff**

The Project will have monitoring and enforcement brigades that are responsible for protecting sub-sectors of the Project Area, running demonstrational activities and performing biodiversity monitoring. Such brigades will be conformed by a leader that is a trained technician or park ranger and a group of local villagers from within or around the Project Boundary. Eventually, brigades' leaders will be local villagers that demonstrate exceptional capabilities and proved commitment to forest conservation.

Monitoring staff will communicate any sightseeing of illegal activities to the brigade leader who in turn will be in charge of communicating all events to a base office in Portel. The staff at the Portel office will make the appropriate reports to local authorities for them to go to the Project Area and deal with agents encroaching the Project Area.

Training for monitoring staff
Local villagers who wish to participate in the monitoring program will receive free training in methodologies and procedures to monitor the Project Area and to report any findings. Monitoring staff will be divided in groups dedicated to the surveillance of the Project Area, groups in charge of running demonstrational activities/social surveys and a group in charge of performing biodiversity monitoring.

In order to offer the same chances for all local villagers willing to engage in the monitoring activities, monitoring staff position will be rotational in the case that the supply of workforce is higher than the available jobs. The rotation period should be determined once Project's activities are implemented and the supply of work forced in adequately determined based on the census information. Figure 6 shows how brigades will be organized and Figure 7 shows the process to report illegal activities in the Project Area:

Figure 6: Local organization of monitoring tasks
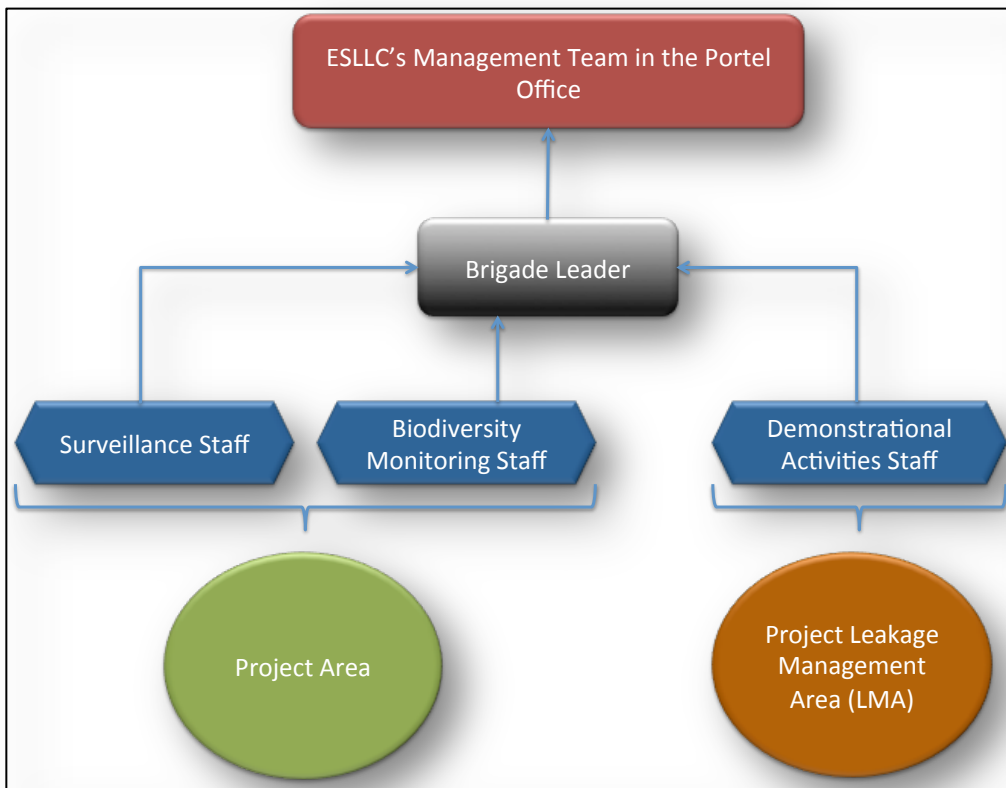
Figure 7: Reporting sequence for illegal activities in the Project Area
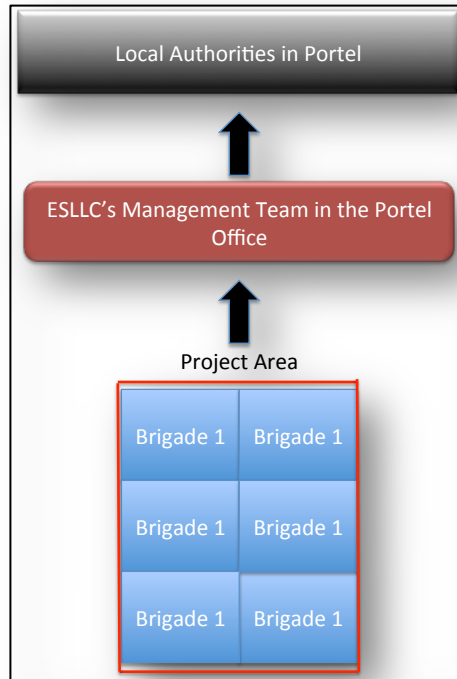
2. Enhance community's organizational capabilities

The Project management team will support local villages that wish to improve their level of organization and governance. To do this, the management team will engage local leaders to assess the best way on how to develop an organization system that works best given the particular needs and economic activities of the villagers.

As mentioned in Section G1.5 of this document, villagers in the area usually see local priests, either Christian or Evangelic, as leaders. Thus, developing and maintaining a good relation with local priests will be the first step to develop this proposed activity.

3. Provide legal land-ownership rights against results for conservation

The main objective of this activity is to create a sense of ownership and respect over the forest resource through an incentive as evidence shows that secured land tenure is a main factor to reduce deforestation (Fearnside 2001; Larson 2011).

The Project's Management Team, in cooperation with the landowner, have put forward a proposal to regularize land tenure status of those villagers living in the LMA. The

landowner has signed an agreement to provide official land-use rights to villagers in the LMA with the hopes that they will own these lands in 40 years. Requirements to participate in this activity will be clearly explained to local villagers through workshops as part of the FPIC process during the census.

As a requirement to receive a land title, each villager will have to sign a conservation agreement that will mainly state that granted lands cannot be sold, productive activities cannot expand into the Project Area and that the land-use of the land cannot change into minning or pasture implementation. Such conservation agreement will be drafted collaboratively with local villagers under several PRA workshops as part of the census process.

Villagers in the LMA will be offered the opportunity to receive legally recognized land-use rights against the provision of conservation services to the Project such as (but not limited to) surveillance of illegal activities in the area and the premise of not encroaching the Project Area. Such land-use rights will be renewed every year accordingly to effective conservation results. At the end of the Project' lifetime each villager actively and effectively engaged in the proposed activity will receive an official title over his/her land under the binding conditions of the conservation agreement.

4. Provide capacity building on steps to gain land use rights over Government owned forests

The Project cannot sign agreements as those explained in the aforementioned item number three with families living outside the Project Boundaries. However, the Project aims at providing guidance to these families on how to achieve land-use rights on lands that are not privately owned.

The idea is that the Project will provide capacity building in many areas not only to those families living within the LMA but also to those families in the proximities to help reduce the risk of leakage and to promote sustainable development in the area. So, it does not make any sense to provide all this training to families if they feel insecure about their rights over land thus moving somewhere else. The Project will invest resources in training all these families so it makes sense for them to stay and support the Project protecting the forest.

Although the Project cannot guarantee that all families living outside the LMA will achieve a land-use permit, the management team will make the best effort to engage local authorities in Portel and to coordinate with local leaders to develop the best approach to solve this issue.

5. Provide capacity building in agroforestry techniques and implement agroforestry pilots

The Project LMA will be used as a showcase for local families to receive capacity training and to participate on agroforestry techniques. The Project will provide economic support to train and to implement agroforestry schemes such as home gardens, improved fallows, forest gardening and forest farming.
Through agroforestry it can be possible to diversify crops and to enhance productivity. This in turn will reduce the amount of land required to practice agriculture, which in turn reduces the risk of deforestation due to small-scale agriculture. Also, through forest gardening and forest farming villagers will come to see how the forest can provide benefits other than timber.

Agroforestry systems can be very simple to implement and can require low-maintenance. Also, such systems help diversifying food production and increases food security in areas of low productivity such as the acidic soils of the Amazon.

The Project's developer will 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 a particular specie.

6. Provide capacity building on improved efficiency cook stoves and implement cook stove pilots

In order to reduce the amount of firewood needed to produce farinha, the Project LMA will be used as a showcase for local families to receive capacity training and to participate on demonstrative activities on how to implement an energy efficient cook stove. The Project will provide economic support to train and to build such efficient cook stoves to those families willing to participate in the activities both in and outside the LMA.

Different types and sizes of energy efficient cook stoves will be tested to find the one that fits best for the necessities of local families. With this learning curve it will be easier to replicate the experience among other conservation projects in the region.

7. Provide capacity building to develop small sustainable business

The Project Proponent will set a trust fund setting aside a percentage of the net income from the sale of carbon credits. Such fund will be additional to the budget envisioned for the Project's activities.

The Project will provide – in partnership with local NGOs[30]- capacity building to local families to develop and submit business plans (individually or in groups) to apply for funding to start small sustainable business that take advantage from non-timber products in the Project Area and LMA (i.e. based on agroforestry production, seed collection, etc.).

The idea is to replace their dependence on timber extraction and sale for sustainable activities that can provide the same or better level of annual income.

8. Provide capacity building to cattle ranchers that get to the Project Boundary.

Although is not possible to control de decisions of stakeholders in the area it is possible to influence them if the find some benefit in changing their business as usual behavior.

The Project cannot offset the opportunity cost of cattle ranchers so the best it can do is to prevent leakage by providing training on the benefits and techniques of improved pastures managements.

This way, it is expected that cattle ranchers will internalize the benefits of making their activities more efficient in terms of land use thus requiring less area and in turn reducing the risk of deforestation outside the Project Area.

G.3.3 Map Identifying Location of Project Areas, Activities and Leakage Areas

Leakage belt was identified through a mobility analysis where incentives and barriers for deforestation agents were assessed. Because of the presence of a neighbor REDD Project parties from both projects agreed on signing a Leakage Agreement that will enter in force once both projects are validated. Under such agreement the RMDLT project will absorb the common leakage belt areas.

In the scenario where the neighbor project does not get validated, the Leakage Agreement will not be valid.

Overlapping LKs and final LK are presented below (Map 16):

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[30] To be determined once the Project's activities start.

Map 16: Project's physical boundaries
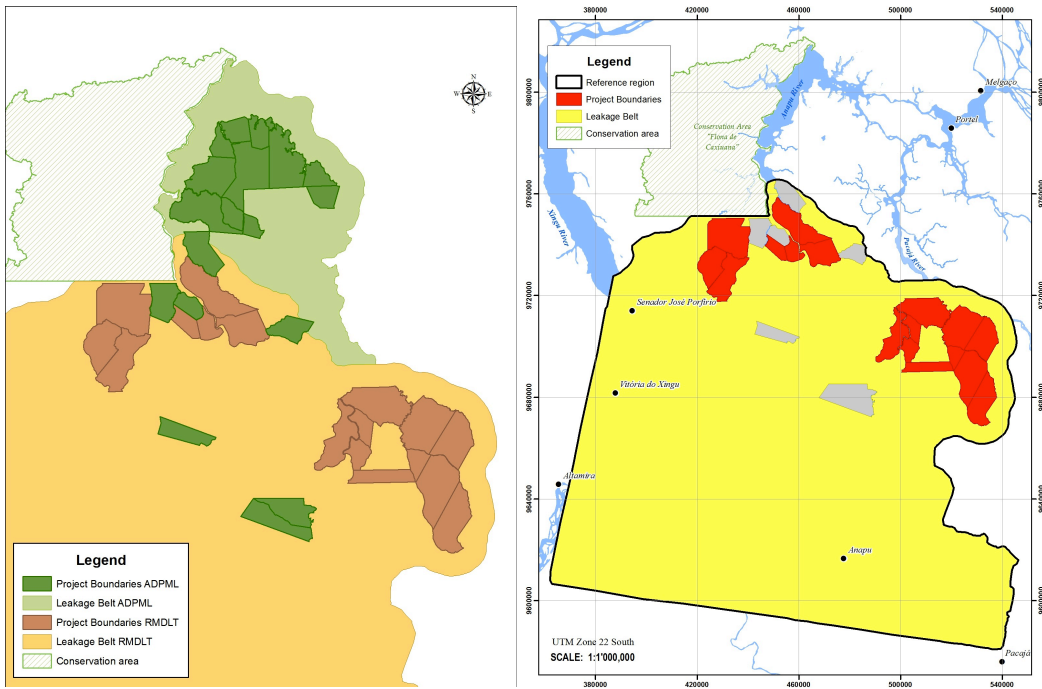
The exact location of each one of the Gleba constituting the Project's Boundary are presented in Table 10 and Map 17 below:

Table 10: Centroids and boundary coordinates for each Gleba of the Project

ID	Gleba	Group	X	Y
1	Alvorado I	1	432566	9743366
2	Gurupá	1	425679	9732048
3	Miritizal	1	431641	9727033
4	Engascado	2	458729	9748041
5	Santo Antonio 3	2	451282	9738524
6	Santo Antonio 1	2	457915	9737318
7	Gleba Pontinha	2	468883	9736858
8	Alvorado II	3	497623	9703171
9	Santa Cruz	3	503554	9698880
10	Diniz	3	505027	9707154
11	Jutahycica	3	510100	9713896
12	Ajará	3	523797	9707565
13	Sao Pedro 1	3	532921	9702824
14	Boca do Aru	3	521478	9696470
15	Porto de fortuna	3	527506	9688819
16	Aru	3	532262	9678288
17	Terra Alta	3	510801	9691908

Group	Point ID	X	Y
1	1-1	425813	9750488
1	1-2	438560	9750513
1	1-3	439729	9735060
1	1-4	435642	9726424
1	1-5	431575	9717524
1	1-6	424408	9722627
1	1-7	419966	9732748
2	2-1	451514	9758663
2	2-2	472337	9742921
2	2-3	476517	9733820
2	2-4	466104	9731037
2	2-5	462179	9737202
2	2-6	456052	9733640
2	2-7	446735	9739589
2	2-8	447418	9744266
2	2-9	454351	9739389
2	2-10	456156	9743760
3	3-1	500004	9689737
3	3-2	499656	9698391
3	3-3	490882	9694149
3	3-4	495999	9707610
3	3-5	501843	9718985
3	3.6	514565	9719510
3	3.7	532760	9711740
3	3-8	538240	9701131
3	3-9	534212	9693916
3	3-10	537999	9679970
3	3-11	535198	9670001
3	3-12	523107	9681112
3	3-13	520798	9690148

Map 17: Coordinates for each Gleba in the Project
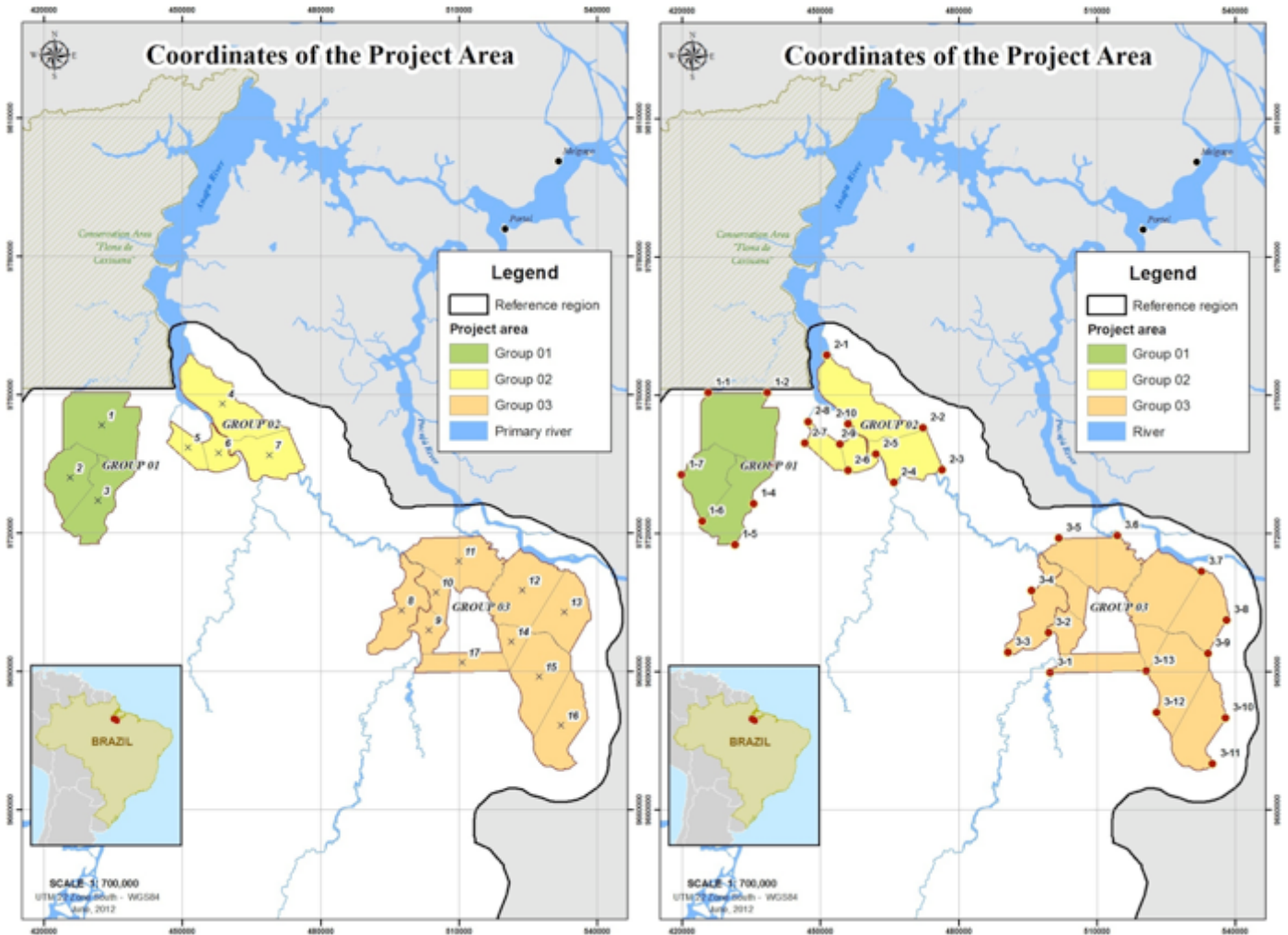
G.3.4 Definition of Project's lifetime and GHG Accounting Period

Project's lifetime

The Project's lifetime is 41 years with a start date January 1st 2008. The project started when the landowner implemented on the ground activities to monitor, identify and remove land grabbers and illegal logging operations. Such activities include on the ground surveillance and reporting to local authorities to proceed with the removal of invaders.

Although the project started in 2008, due to a lack of economic resources, the only activity developed so far is monitoring and enforcement by a specialized team provided by the Project Proponent. This is expected to change once the Project is granted carbon credits for the GHG emissions reductions that has been and still is generating.

GHG Accounting Period

The GHG Crediting Period is 40 years (2009-2048) during which net revenues from carbon payments during this period will be used to further develop and implement surveillance and social activities that will yield net positive impacts to the climate, communities and biodiversity of the area.

G3.5 Identification of Natural and Human-Induced Risks and Mitigation Strategies

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

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

Every 6 months an assessment will be carried out to determine if the families are complying with their side of the agreement. Once results are proved, the land use rights are automatically renewed for another 6 months. At the end of the 40 years of the project duration, families within the Project Boundary will receive final and legal land use titles.

It is expected that riberinhos holding land use rights will be inclined to protect the forest after the Project is over.

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 riberinhos 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 will reduce the risk of leakage, illegal logging and fire by building strong partnerships with villagers in the Project Boundaries and it its vicinity thus preventing deforestation activities to start. Also, capacity building workshops will be 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 will be mitigated through a number of measures including demarcating boundaries and posting signage, blocking machinery access through trenching and other methods, regular patrolling, development of a network of patrol huts to facilitate rapid movement, rapid response and confiscation of chainsaws and other equipment, and improved communications with local authorities in Portel through two-way radios and cell phones (where available).

Land grabbing will be addressed in two ways. First ESLLC's local team will meet with new migrants and neighboring villages and leaders, as well as the municipal authorities to make sure the Project Boundaries are know and resolve any existing conflicts. Communities will be encouraged to inform prospective migrants that the forests are protected and that there are no opportunities for new migrants to the area. Second, ESLLC will demarcate boundaries with pillars and signage, maintain regular patrols, and call in the support of the local authorities and police.

G3.6 Measures to Ensure the Maintenance or Enhancement of High Conservation Values consistent with precautionary principle

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 1st 2008. 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.

G3.7 Description of Measures that Will Be Taken to Maintain and Enhance Benefits beyond Project's lifetime

The Project will create a sense of ownership within local villagers through land titling within the Project Boundary and through capacity building in and around the Project Boundary.

The project strongly believes that once villagers understand the importance and the opportunities that arise from protecting the forest they will be willing to continue forest protection.

Also, the Project Proponent has signed a Conservation Easement to ensure that the land use of the Project Area continues to be purely forest conservation where extraction activities are not allowed.

To ensure that financial aspects are not a barrier for future forest conservation, the Project will create a trust fund were 5% of annual revenues from carbon credits sale[31] is committed to support local initiatives that may arise as a direct result of the capacity building activities of the Project.

G3.8 Involvement of Communities in Project Design and Provisions for Stakeholder Consultation During Project Implementation

Ecosystem Services LLC developed a Participatory Rural Appraisal (PRA) with the villages located in the project areas and within a 15 Km buffer from the project areas. The PRA was designed and implemented by a team of experienced anthropologists and lead by a senior specialist on PRA for REDD projects.

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.

Participation in the Project design.

Good amount of information about the characteristics of the population in the Project zone was collected through PRA. The surveys applied to the local villagers have allowed knowing 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, mains needs and concerns, among other. The results for this information are resumed in the section G1. Original conditions in the project area.

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[31] Such trust fund is completely additional to the budget designated to develop and implement the Project's activities.

Picture 5: Surveys and interviews applied to villagers and local leaders

Vila Monte Horebe	Vila Menino Deus
Vila Nsa. Senhora de Nazare	**Vila São Benedicto**

Carrying out workshops has been one element of great relevance for the design of the project in PRA. The villagers were informed about the project idea and the potential benefits for the communities and how their participation will be throughout the entire process. Likewise, 'speaking maps' were constructed in a participatory manner in each one of the workshops which has allowed the villagers 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 6: Workshops with villagers

Vila São Sebastião
Vila Santo Amaro

The tool of elaborating a 'current map' and a 'future desired map' in each locality has allowed the population and ESLLC to clarify the needs and expectations of the local villagers in comparative terms on how they are and how they picture their communities in the future.

Picture 7: Desired future maps in the localities

Vila Gloria	Vila Sobradinho

The activities held under the PRA are presented in Table 11 and were held as follow:

Table 11: Communities engaged in the Participatory Rural Appraisal (PRA)

Item	Village name	Number of households	Number of surveys	People interviewed	Workshops participants	Number of maps
1	Santo Agostinho	7	3	0	19	2
2	Monte Horebe	4	4	0	0	0
3	São Jose	8	6	2	17	2
4	Menino Deus	11	6	1	13	2
5	São Benedito (Igarape Anijo)	11	5	0	0	0
6	São Benedito (Engasgado - Río Anapú)	11	8	3	25	2
7	São Sebastião	12	9	3	16	2
8	Santo Amaro	15	9	4	23	2
9	Nossa Senhora de Nazaré (Prainha)	11	8	2		
10	Gloria	11	6	2	10	2
11	Sobradinho	6	5	2	15	2
	Total	**107**	**69**	**19**	**138**	**16**

The information gathered in the field work through the tools mentioned before, especially the needs and problems pointed out by the leaders and local villagers, 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 villages 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 ESLLC staff for such design.[32]

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

Table 12: Main problems, priorities and necessities identified by the population

Main identified problems	Identified priorities
• Low family income • Limited work opportunities • Increased difficulty to get resources from hunting and fishing • 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 • Land tenure uncertainty and insecurity • Unsafe water consumption • Limited access to health services • Limited access to education for children • Limited access to communication	• Access to job opportunities • Agricultural production improvement • Access to communitarian transportation means in order to facilitate access to 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 • Land tenure resolution • Acceso a la educación media.

The proposal for the project activities has been designed based upon the problems and priorities identified and pointed out by the villagers. These activities are detailed in section G3. Project design and goals.

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[32] The excerpts from the interviews carried out to local leaders and the images for the 'speaking maps' are included in the annexes.

The project believes that the proposed activities will conduct an improvement in the quality of life of the local villagers 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 will 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.

Stakeholders committee

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 will be formed at the beginning of the FPIC process and would be in charge of the participatory and independent surveillance.

Its conformation will be 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
- Civil society organizations
- Organizations invited to contribute in the process: public programs and institutions.

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

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

The following chart shows the initial identification of the main actors carried out during the PRA:

Table 13: Involved actors in the project

N	Institution / Organization	Instance	Relation to Project activities	Level of relation	Impact
	Local municipalities				
	Portel municipality	Prefect and y councilor	Coordination and agreements to participate in the management of social, economic and environmental projects that will support the REDD project	Involved	Neutral
	Municipal secretariat SETRAS , SES, SEDE, SEMED and SEMAP,	Public projects in the sector: Work and social assistance; health: economic development; education and aquaculture and fishing	Participation and contribution to economic and environmental projects that will support the REDD project	Involved	Positive
	State and federal programs				
	Estate secretariat: SEMA, SESPA, SEDUC, SAGRI, SECTI, SETER, SEDIP, SEAS	Public projects in the sector: Environment, public health; education; agriculture; science, technology and innovation; work, business and income; economic development and production incentives and, social assistance.	Participation and contribution to economic and environmental projects that will support the REDD project	Involved	Positive
	INCRA Regional superintendence	Land management area	Agreement, support to delimitation of the Project zone	Involved	Positive
		Development area	Social-economic projects alliances	Involved	Positive
	Paraense Emilio Goeldi Museum	Ferreira scientific Station Penna en FLONA Caxiuana	Alliance for the development of monitoring and research activities.	Involved	Positive
	Saberes da tierra	Educational program for the development of technical capacities	Training activities alliances	Neutral	Positive
	IBAMA	Environmental protection department	Coordination and agreement to participate in operations of environmental prosecution and monitoring	Involved	Positive
		Department of sustainable use of biodiversity and forest	Coordination and agreement to participate in operations of resource management and monitoring	Involved	Positive
	SOCIAL ORGANIZATIONS AND INSTITUTIONS				
	Riparian settlers association	Portel headquarters	None	None	Neutral
	Catholic church	Portel office	Spiritual assistance to local actors – very influential	Involved	Neutral
	Evangelical church	Portel office	Spiritual assistance to local actors – very influential	Involved	Neutral
	Rural cooperative Cooperative	Portel headquarters	None	None	Neutral

PRIVATE INSTITUTIONS					
Land holders in the Project area	Private landholders in the project area	REDD implementers	Actor	Positive
Ecosystem Services	Private company – REDD technical assistance	REDD project proponents Pará	Actor	Positive
Fishermen	Particular entrepreneurs	None	None	Neutral
Timber extractors	Illegal entrepreneurs	Their access to the project area will be controlled and limited	Involved	Negative
'Regatones'	Entrepreneurs, traders, storekeepers.	None	None	Neutral
Y LOCAL ACTORS AND ORGANIZATIONS					
Communitarian organizations from the 'Vilas'	Communities representatives	Coordination for communitarian management and planning for the REDD project	Actor	Positive
Fishermen association	Villages affiliates	None	None	Neutral
Farmers	Non-associated interest groups	Coordination and participation in agroforestry economic projects	Actor	Positive
School teachers	Individual actor	Register of indicators	Involved	Positive
Health posts technicians	Individual actor	Register of indicators	Involved	Positive
'Fariñeros'	Non-associated specialized interest groups	Communitarian relationship and support	Actor	Positive

The committee must define the correspondent functions and competencies. The project proposes the following relation between the functions and competencies to be considered:

- To have an internal code of ethics.
- To know and approve the annual plan of the project
- To supervise the activities of the project
- To collaborate and participate in the monitoring, supervision and social control of the forest and biodiversity.
- To approve the annual report about the developed activities and the results obtained by the project
- To present recommendations to the project according to the social economic and environmental reality of the involved communities
- To analyze, approve and prioritize the communitarian projects presented to the competitive funds provided by the project
- To supervise the use of the funds provided by the project
- To propose and implement actions or projects oriented to improve forest management and the development of the local population
- To express their opinion about the reconsideration requests for the claims presented by the actors
- To comply with the arbitrator functions as a third party in reference to the unresolved claims presented by the actors towards the project
- To favor the solution and mediation of the conflicts that can appear within the limits of the project
- To promote the active participation of the population in the project activities

- To have an updated register of the communal and social organizations.

G3.9 Procedure to publicize Public Comment Period

The PDD for CCB will be published in English on CCBA's website for the 30-day comment period. Once the Project's PDD is approved the Project's management team will conduct a Census to identify and address every single village living within the LMA. During this census the management team will provide simplified version of the PDD in Portuguese, which will include the following items:

- Name of the Project
- Objectives (on climate, communities and biodiversity)
- Activities and expected results
- Timeline

This simplified PDD will be complemented by participatory workshops that will introduce the Project to the new villages and will refresh it to those villages already addressed. Both the simplified PDD and the participatory workshops will constitute the cornerstone elements preceding the participatory impact assessment workshops from where information will be collected to improve the Project's activities.

With all these information at hand, the Project's management team will conduct a Free Prior Informed Consent process with each village, assuring the participation of women and underrepresented groups. From this FPIC process it is expected to generate signed agreements with each villager that is willing to participate in the Project's activities.

Once the census and FPIC process are completed, all comments and complaints arisen from local villagers will be translated into English and added to the CCB PDD as an annex and made available for the first verification event.

G3.10 Process for Handling Unresolved Conflicts

The project proposes a claiming mechanism with multiple local approaches in order to resolve complaints[33]; this mechanism plans to provide the social actors the facilities and alternatives for the presentation of complaints, their follow-up, and their influence in the decision-making process for a consent and satisfactory resolution of the complaint.

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[33] Based on the Claim mechanism design and implementation Guide for development projects from CAO (The Compliance Advisor/Ombudsman office) Independent position that directly reports to the President of the World Bank Group.

Likewise, the proposed resolution approaches intend to ensure a quick solution by the 'early resolution' of the complaints presented and a proposal by the project, but also consider the negotiated resolution and the resolution reached through traditional practices with the intermediation of leaders or local authorities, or the intervention of a stakeholder committee[34] as an arbitrator between the parties.

The conflict resolution approach will be sequentially adopted and will respond to the conformity or inconformity of the complainer 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 will inform local people of the creation of such committee and will be informed of their right to present grievances directly to public entities, making a clear point that all claims and/or complaints will be addressed equally notwithstanding the line of grievance.

Due to the difficulty to access the area, the existing distances towards the project zone, the lack of presence from formal state authorities and other public or private institutions in the project zone able to comply and address the demands of the management of this mechanism without incurring in over costs and excessive delays, the project proposes to manage this mechanism through an claims service office located in Portel. This office will centralize all the claims and/or complaints received by the leaders of each brigade. It will also be in charge of registering the claims and all the resolution process of the same. All the results will be 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 will receive and process all the complaints and conflicts in a timely and effective manner through a comprehensive process presented in Table N°14 and in Figure N°8. In order to ensure the knowledge and adequate management of this mechanism, several informational and training workshops for the local settlers will be developed, ensuring rights safeguards, property, and dignity of the actors.

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[34] (see section G.3.8) The stakeholders committee will be created during the process of stakeholders' identification and recognition of the parties for the process of obtaining FPIC. This committee will be formed by population representatives, religious institutions (catholic and evangelical churches), representatives from estate organizations and municipalities in the region (IBAMA, SEMA, etc). The number of members will be decided after the identification of all the actors and involved parties, and its agreed conformation.

Table 14: Complaints management mechanism

STEPS	COMPONENT	DESCRIPTION	DEADLINE
1	**Receive and register a claim**	**Multiple channels for receiving complaints:** Community liaison, project operator, community organization, claims service office. **Presenting a claim:** Letter, use of official form, orally (face-to-face, telephone or radio), confidential (suggestion box). **Registration:** It is registered locally by the community liaison and is transmitted to the Claims Service Office for registration in the central file and publication.	Inmediate
2	**Examine and determine eligibility of the claim**	**Examine the claim:** The Claims Service Office examines the complaint and determines whether it is meritorious according to eligibility criteria: • The complaint is related to the project. • Issues mentioned in the complaint fall within the themes that the grievance mechanism is allowed to attend. • The claimant is positioned to present it. **Notice of Decision:** In case of an ineligible claim, it must be established a dialogue with the claimant for more details of the complaint and ensure that no implications or connections with the project or if there is any other means to resolve the complaint.	To be attended at the latest on the 7th day after the claim presentation
3	**Decide, communicate decisions, solve early**	**Reject claim:** In case of failure to find support elements of the claim and ensure there is no connection with the project, claimant must be informed of the decision, clearly explaining the decision and the reasons for the rejection of his claim. The conformity with the decision will be asked and if the response is unsatisfactory, the case revision by the stakeholders committee will be required. **Indicate as appropriate** If eligible the claim, the claimant is notified and informed about the process for solving it. **Early resolution of the claim:** If the case is not complex and if possible, resolve the matter of the complaint locally and satisfactory to the complainant using the direct and clear dialogue. When the claim is solved the agreed solution is recorded and filed, otherwise the process keeps its course.	To be attended at the latest on the 10th day after the claim presentation
4	**Evaluation of the claim**	Determine who will conduct the evaluation, collect information about the case, identify stakeholders, and classify a complaint according to its severity (high, medium or low). The claimant must be involved throughout the evaluation process and influence the conflict resolution process.	To be attended at the latest on the 20th day after the claim presentation
5	**Formulating a response**	Determine who communicates and how. Special attention should be paid to the standpoint of the claimant in the process of evaluation and possible solution of the claim.	To be attended at the latest on the 25th day

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		Formulate a specific solution or approach to resolve the claim.	after the claim presentation
6	**Approaches to resolving complaints**	1. The company proposes a solution. 2. The claimant and the company discuss the proposed solution (negotiation). 3. The company and the community use traditional practices (intermediation of local leaders) 4. The company and the claiman require a third party (stakeholder council) to decide (arbitration).	According to the complexity and approach, to be attended at the latest on the 45th day after the claim presentation
7	**Monitoring, documentation and feedback**	Claims must be tracked and monitored, recording the whole process, settlement mechanism and results of each stage.	Permanent

Figure 8: Flowchart of the claim-solving process

RECEPTION, REGISTERING AND PUBLICATION OF THE CLAIM

EXAMINE ELIGIBILITY

Processes directed by the Project with claimant´s participation

Processes with the participation of third parties

Alternative flux

DECIDE AND COMMUNICATE DECISION

Ineligibl

Eligibl

Consent:

INFORMED CLAIM REJECTION

Ineligible

COMMITTEE REVISION

Eligible

Resolved

EARLY RESOLUTION

Not

EVALUATE THE CLAIM

Formulate response, elect or re-plan solution

1: PROPOSED SOLUTI

2: NEGOTIATED SOLUTI

3: INTER MEDIATION

4: ARBITRATION

Resolved

FEEDBACK AND LEARNING

G3.11 Demonstration that Financial Mechanisms are Adequate for Project Implementation

Funding for Project's activities is secured by funds committed by the Project Proponent until the end of 2013. After 2013 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.

G4 Management Capacity and Best Practices

G.4.1 Identification and Roles of Project Proponents

RMDLT

RMDLT Property Group Ltd ("RMDLT") is the Project Proponent and the entity that provides funding to develop, implement and run the Project. RMDLT sole activity is that of carrying out a carbon credit generation scheme REDD+ in the state of Para, Brazil

Ecosystem Services LLC (ESLLC)

Project Developer, implementing and management entity. ESLLC has been in charge of managing and overseeing field activities and desk analysis to develop the PDD. Ecosystem Services LLC will hold all responsibilities during the implementation of the Project at least until the end of the first fixed-baseline period (first ten years of project management). Monitoring activities and data management will be in charge of ESLLC who will gather, prepare and analyze all required information to re-assess the baseline after the first fixed-baseline period. Activities and training will be implemented either directly by ESLLC or by a local partner under the supervision of ESLLC.

ESLLC will also implement the Project's activities, overseeing the Project from and office in Belem and an operation station in Portel. As an implementation entity, ESLLC will oversee the technical training of all local employees.

ESLLC, in representation of the Proponent of the Project, will be the entity in charge of making agreements with local villagers and with local partners that can bring significant experience to enhance the positive impacts of the Project's activities.

SETA Ambiental

SETA Ambiental is a technical partner that provided logistic support during the field activities for the carbon inventory and social assessment as well as for the data analysis of carbon content in forest biomas. SETA Ambiental will be sub-contracted by ESLLC in case-by-case approach according to the logistic requirements of the Project. Activities of SETA Ambiental will include travel logistics, networking with local specialists and provision of experise to conduct forestry-related activities.

G4.2 Identification of key skills and Experience of Management Team

Ecosystem Services LLC

Ecosystem Services LLC (ES LLC) is the principal technical and monetization advisor to the project, as well as the main project implementer. ESLLC is a forestry and natural resources company specialized in the generation of internationally marketable environmental services through sound ecosystem management and clean energy development. The company was founded by leaders in the environmental field that share a belief that long-term, sustainable economic growth can only be achieved through the development of robust markets for environmental services. ES LLC has substantial experience developing REDD and other forestry carbon projects, and has already obtained "Gold" Level certification under the CCB for one of its projects. ESLLC's core management team will be composed by:

Gonzalo Castro de la Mata V., Ph.D., Chairman and CEO

Gonzalo Castro de la Mata V, Chairman and co-founder of Ecosystem Services LLC, is a recognized international figure in the environmental field with senior experience leading international organizations and scientific and environmental business.

Until 2008 he was the Managing Director for the Americas with SFM Ltd., where he was responsible for seminal investments that generated some of the earliest carbon offsets from plantations and REDD anywhere in the world. Before, he was the Head of Biodiversity at

the GEF, the largest multilateral environmental fund globally where he was ultimately responsible for a portfolio of over 500 projects with a combined value of US $4 billion in 150 countries. Previously, he was the Principal Environmental Specialist at the World Bank, a key player in the establishment of the Critical Ecosystems Partnership Found, the US$ 150 million initiative to protect the earth's ecological hotspots, Director of WWF's Latin Americas, Research Associate at Colorado State University, and an Assistant Professor of Biology at Cayetano Heredia University in Lima, Peru.

Ph. D. in Ecology (University of Pennsylvania), Executive Management for Non-Profits (Harvard), M.Sc. in Biophysics (Cayetano Heredia University), B.SC. (Cayetano Heredia University).

He is the Director of several companies in Peru and the US and a Member of the Steering Committee for Agriculture, Forestry, and Land Use (AFOLU) of the VCS.

Giancarlo Raschio, Program Director

Giancarlo Raschio has expertise on environmental impact assessment, carbon project cycle as well as corporate sustainability strategies. Giancarlo recently served as an advisor for the Peruvian Mission at the United Nations on climate change and sustainable development issues. He has practical experience on technical and social aspects or REDD+ (Reducing Emissions from Deforestation and Degradation) initiatives at national and project level in South America and Africa.

As a researcher, he identified and assessed potential obstacles and bottlenecks at community, governmental and private levels for REDD+ projects in Ghana and Peru. He also proposed policy recommendations to improve the development of the R-PPs (REDD+ Readiness Preparation Proposals), and to enhance their implementation efficiency in both countries.

Giancarlo holds an M.SC. in Environmental Management from Yale University in USA, then a second M.SC. in Environmental Sciences from the Universidad Nacional Agraria La Molina of Peru, and a B.Sc. in Environmental Engineering from the Universidad Nacional Agraria La Molina in Peru.

Christian Contreras, Senior Program Coordinator

Christian Contreras has professional experience in spatial analysis, digital image processing, Web mapping, fieldwork, GIS activities and deforestation modeling for forestry projects. He has broad expertise as a Geographic Information System (GIS) and Remote Sensing Analyst for natural resources management, environmental and social assessments, land cover, landscape dynamics, urban planning, and demographics.

He has worked as a GIS consultant in the private sector with several environmental projects in different parts of Peru, concerning industries like conservation, mining, climate change, environmental impact assessments, wetlands, forestry, watersheds, and gas utilities. Christian has recently worked for DEVIDA, a Peruvian public agency that is concerned with the fight against drugs. There, he has been in charge of the supervision of the alternative crops monitoring in the Peruvian Amazon, a project funded with International Cooperation funds.

Christian Contreras holds a M. Sc. in Environmental Sciences from the Universidad Nacional Agraria La Molina of Peru, a M. Sc. in Social Policy from the Universidad Nacional Mayor de San Marcos of Peru, and a B. Sc. in Geographical Engineering from the Universidad Nacional Federico Villarreal of Peru. He is also an Assistant Professor of Environmental Geomatics and Geography courses in the graduate program of Environmental Science at the Universidad Nacional Agraria La Molina of Peru.

Erasmo Otarola, Principal Forestry Advisor and Team Leader

Mr. Otarola has more than 17 years of professional experience dedicated to the design and implementation of development and environmental project. A professional focused in biodiversity conservation, tropical forestry management, environmental services (carbon and hydrological services), and participatory research in Peru and Costa Rica. Mr. Otarola has been in charge of pioneering research efforts on carbon capture and storage of various Amazonian ecosystems, and has led the design and implementation of the REDD baselines for the Departments of San Martin and the central Amazonian region of Peru.

He has substantial experience leading international cooperation projects from various sources including ITTO, USAID, the European Union, and the Belgian cooperation. He has been environmental project coordinator of the European Union in Peru. He designed and led the REDD and Forestry programs of WWF in Peru.

Mr. Otarola has degrees in environmental engineering at the Universidad Nacional Agraria La Molina; a M.Sc. in integrated Natural Resources Management at the Centro Agronomico de Investigacion y Ensenaza (CATIE) in Costa Rica, and is a PhD. Candidate in Environmental Sciences and Ecosystem Services at the Universidad de Trujillo (Peru).

Leonel Mello, Senior Policy Advisor, Carbon and Forests

Until recently Mr. Mello was responsible for origination of new business, consultancy, and project development of carbon forestry (PDD) for Ecosecurities in Brazil. Mr. Mello has experience in climate change, agriculture and AFOLU, and has skills for leadership of multidisciplinary groups. Mr. Mello has expertise in Brazilian climate issues related to

AFOLU and REDD, existing and emerging carbon markets (compliance and voluntary), emissions trading schemes, and forestry carbon feasibility assessments. Mr. Mello has also been active in structuring partnerships, and has designed project finance structures in order to make projects capable to be accomplished.

Mr. Mello has been project manager of a variety of projects, and has acquired experience to deal with multi-stakeholders interests. He has worked with small community reforestation projects, where an education component was developed in partnership with public schools. Also working in large-scale agricultural areas where international corporations operate, Mr. Mello has managing projects to implement ARR and REDD carbon projects. It includes activities from feasibility assessment, origination, implementation and commercialization.

Mr. Mello is fluent in English and Portuguese, and has working knowledge of Spanish. He is pursuing a PhD in Environmental Planning at Federal University of Rio de Janeiro – UFRJ, has a M.Sc. degree from La Trobe University in Australia and one from the Federal University of Parana (Brazil), and a B.Sc. from Santa Ursula University (Brazil).

Pablo Castro, Social Component Specialist

Pablo Castro, is a professional with experience in social studies, elaboration of socio-economic and cultural diagnosis, design of social baselines, monitoring of social projects, planning and management in local governments. He has extensive experience performing and managing social surveys and Participatory Rural Appraisals (PRA) with rural populations and indigenous peoples in the Amazon.
Mr. Castro is currently working as a social specialist consultant for both the private and public sectors in projects related to clean energy, health, and the environment. He has participated as a communitarian specialist in the construction of social monitoring system for extractive activities in indigenous communities in the buffer zone in the Cordillera Azul National Park in Peru and has directed a social study in the design of a hydro electrical project – HAPSA in the Ancash Region, also in Peru.

Recently, he has been working as a Regional Social Supervisor for PRONASAR Program from the Ministry of Housing, construction and land tenure of Peru financed by the World Bank in the San Martin (Amazon) and Lima Regions.

Pablo Castro has a bachelor degree in social sciences, a degree in Anthropology in the Universidad Nacional Mayor de San Marcos and a post-graduate degree on formulation, evaluation and management of social productive public projects in the Universidad Nacional Mayor de San Marcos.

G4.3 Plan to Provide Orientation and Training to the Project's Employees

Project's activity #1 is designed to provide training to local villagers that will generate the required capabilities to undertake forest monitoring as well as monitoring for social and biodiversity variables. Please refer to Section G.3.2 item 1 and section CM4.2 for more details in regards to how these capacity building efforts will target a wide range of people in the communities.

As mentioned in section G.3.2 item 1, local villagers who wish to participate in the monitoring program will receive free training in methodologies and procedures to monitor the Project Area and to report any findings. This will be carried out by ´learning by doing´ practices where the staff will be divided in groups in charge of running demonstrational activities.

It is planned and expected to have a rotational workforce for two reasons mainly: a) to offer the same chances for all local villagers willing to engage in the monitoring activities and b) to ensure the capacity building for a bigger number of settlers. In this way, the project ensures that local capacity will not be lost.

The Project will make sure that all members of local villages 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 and the managerial team will not try to put any sort of pressing to involve villagers.

Special attention will be put to make sure that 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 will be adapted 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.

A number of specific capacity building programs, researched by project proponents as potentially applicable to Project Zone community needs, are presented below . However, the final programs will be designed in collaboration with the communities to ensure that they address current community concerns and prioritize community needs for capacity building.

Major Programs:
- Forest monitoring and surveillance
- Organization and governance
- Agro-forestry and ecosystem restoration
- Wildlife monitoring
- Small business development

Training and knowledge transfer process comprehends a number of steps. The following table shows the strategy the project plans to implement in order to ensure the capacities of the communities within the project area.

Table 15: Knowledge transfer strategies

Strategy	*When to use / What to do*
Mentoring and Apprenticeships Formal arrangements where an experienced person (firstly from project staff and latter someone from the community) works directly with a less experienced person to pass along knowledge and skills.	Start since the beginning of the project and when planned by the project staff and villagers
	Program training spaces (workshops)
	Collect the information and training needs desired by the local villagers
	Identify the right people suitable and capable enough to transfer knowledge and skills (project staff, third parties, local villagers)
Collaborative Work Spaces (Discussion Forums, Communities of Practice, interviews, etc.) Groups of individuals share knowledge over time about a common work practice or subject area.	Have people actively participating in the transfer process
	Where unstructured knowledge meets the need (Community knowledge is typically in parts and pieces and requires the learner to draw out specific 'how to')
	Involve as many stakeholders as possible (including under-represented groups)
	Focus on small work groups and specific learning approaches when unarticulated knowledge is held by one or two key people and/or knowledge is deep, complex and not easy to articulate
	When the organization has limited resources but wants to move forward with knowledge capture and knowledge transfer activities.

	Where discussion and dynamic knowledge exchange is part of the culture
Job Aids/Work Instruction Structured tools/methodologies that help people perform tasks accurately (checklists, flow diagrams, reference tables, decision tree diagrams, etc)	Prepare, design and collect reference materials that accompany more substantial learning programs and tools
	Methodologies can include classroom instruction, simulations, role-plays, computer or web-based instruction, and small and large group exercises
	Work Profiling, since it provides a structure for employees to self-document critical information about their job in a much more dynamic and actionable.
	Include local population in the preparation of the material
Lessons Learned Debriefings Tools like After Action Reviews provide a structure for reflecting upon an event and identifying what worked and what didn't work, then capturing these lessons learned so that others can also learn from the experience.	For collecting knowledge after a relevant event (field work)
	Collection and analysis of the activities, reports and other events to generate further knowledge
	Recognize mistakes or setbacks as opportunities to learn, grow and improve.
	Systematize and register the experiences in order to generate a date base that can be evaluated and improved to guarantee the quality of future training material
On-the-Job Training This can be a flexible unstructured, learn-as-you-go / Learning-by-doing process or a more structured program with written training materials, schedules and measures according to the actual needs.	When the focus is steady-state operations.
	When there is specific knowledge, competencies and skills need to be directly transferred to local villagers
	When relevant field activities take place
Workshops, training modules, On-the-Job Assesment This activity will allow the project staff/local villagers to evaluate if the trainings (workshops, learn-as-you-go / Learning-by-doing processes) have worked and it is evident that the knowledge has been effectively transferred	Prepare the evaluation templates and criteria for each case
	Evaluate the performance, capacity, and demonstrated skills after each event takes place
	Analyze the results and propose further training activities if required

G4.4 Equal Opportunity of Local Community Members for Employment

The Project will design employment opportunities to make sure underrepresented groups of local villages 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) will be 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 and individual basis.

Other employment opportunities that require less physical effort and by their nature are less risky will be kept 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 village and to neighbor villages, actively participating in setting up demonstrative activities (i.e. home gardens, forest gardens, improved fallows, energy efficient cook stoves, etc.).

G4.5 Compliance with Regulations Covering Worker Rights and Plan to Communicate Regulations

Local villages will receive clear and adequate information about the requirements of national and international regulations on workers rights before entering in a contract agreement with ESLLC.

ESLLC will make sure to comply with the applicable national regulations on workers rights. This will be assured by yearly audits held by a third party that will be identified once the project starts its census in the area. Such audits will be announced to local authorities and villagers and they will be encouraged to meet with audit entity. This way, local people can rest assure that all their complaints about workers 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 o Guidance on vacation and weekly leave o 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: o Hourly, daily, weekly and monthly work hours o Employment of minors and women o Establishes a minimum wage o Worker safety and safe working environments o Defines penalties for non-compliance by employers o 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.

G4.6 Assessment of Risk to Worker's Safety and Plan to Communicate and Minimize Risk

Project's activities do not hold risk besides those inherent to the day a day life in the forest. Project's activities do not require the use of heavy machinery or dangerous substances.

Nevertheless, the Project management team will provide adequate protection equipment to employees working in forest monitoring activities. Also, monitoring staff will be equipped with first aid kits. Protection equipment will include but will no be limited to:

- Hard hat
- Cap with the company's logo
- Reflective/fluorescente security vest with the company's logo
- Rubber boots
- Gloves
- Fast-dry uniforms with the company's logo
- Two-way rádios
- GPS
- Digital camera

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[35] Presidency of the Republic, "DECRETO-LEI N.o 5.452, DE 1o DE MAIO DE 1943, Available: http://www.planalto.gov.br/ccivil_03/decreto-lei/Del5452.htm
[36] Presidency of the Republic. "LEI No 5.889, DE 8 DE JUNHO DE 1973," Available: http://www.planalto.gov.br/ccivil_03/leis/L5889.htm

- Field backpack
- Camelpack
- LED Flashlight
- Whistle
- Machete
- Pocket knife
- First aid kid

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

G4.7 Financial Health of Implementing Organization

Funding for Project's activities is secured by funds committed by the Project Proponent until the end of 2013. After 2013 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.

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

G5 Legal Status and Property Rights

G.5.1 List of Relevant Laws and Assurance Compliance

Currently there aren't any laws or regulations related to REDD projects in Para or Brazil (Santos et al. 2012). Nevertheless, the following area the regulations that apply to conservation activities in privately owned land such as the case of this Project:

- The Principles and rules established in the Federal Constitution.

- The compromises of the Brazilian government to the United Nations Framework Convention on Climate Change (UNFCCC) ratified by the Legislative Decree n° 1 on February 3rd 1994
- Federal Law n° 12.187 from 2009 (which institutes the National Policy on Climate Change), the Federal Decree n° 7390 from 2010 (which regulates the National Policy on Climate Change) as well as all the legislation related with the aforementioned legal instruments.
- Federal Law n° 6.938 from 1981 about the National Environmental Policy.

Specific regulations affecting the Project are described in Table 16:

Table 16: Relevant Laws and Regulations Applicable to the Project

Name of the Law	Description	Project Compliance
Law number 4771, September 15th 1965 (D.0.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 2^0 and 3^0 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 term.	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 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 will be done only once for each property. It will be a registry number with a sequential number. This number will be in all licenses, authorizations, and other documents issued for the	Development of CAR in all lands in the Project Area

	environmental regularization of the rural property. This registry number will be linked to the land, independent if the land is sold, transferred or taken possession by other person. Single paragraph – There will be no concession of any license for the land that has no registry at CAR-PA. Art 4 – In the CAR-PA it will be 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 will be 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)

G5.2 Document that the project has approval from the appropriate authorities, including the established formal and/or traditional authorities customarily required by the communities.

The Project is developed on privately owned land and complies with all the required laws and regulations regarding forest protection in private lands. Given the fact that in Brazil there are not regulations regarding REDD projects and the fact that the Project will not undertake extractive activities but will preserve 100% of its Project Area, permits are not required from municipal, state or federal authorities.

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.

The REDD initiative in Paragominas is a precedent created that will encourage new REDD projects and strengthen the existing ones towards a solid and robust system in Para. For this reason the Project –although not required to do so yet- will make arrangements to inform about its activities to local institutions at state and federal level.

To this end, the Project will design a strategy to properly identify and approach institutions that most likely will have key roles in a potential REDD framework in Para or in Portel.

During the preliminary social evaluation, the informed consent about the development of activities for the study, the design of the project and its latter implementation[37] was obtained from 19 leaders and local authorities.

The population has also been adequately informed and has actively participated in the elaboration of a diagnosis through the participatory workshops carried out in 5 localities and in which 56 settlers[38] have participated and have expressed their main needs and local priorities. During these activities the population was consulted about the implementation of the project being studied and has manifested much interest in participating in it.

In addition to this, it has been planned to carry out a participatory census in the entire project zone in order to have a complete and appropriate participation before the beginning of the social activities of the project. During this census, several meetings will take place with the local leaders from all the communities involved in the project area boundaries. Assemblies with the population will also be developed in order to inform the details of the activities of the project and the PRA results will be shared.

By the end of each participatory workshop, the free and informed consent for the project implementation from each village will be requested. Such free and informed consent will be registered through and act with the signature of each village. This document will be filed in an electronic version as well as a hard copy by the time of the first verification.

G5.3 Demonstrate that the project will not encroach uninvited on private property, community property, or government property

The Project is being developed in privately owned lands as demonstrated by the land titles and other land ownership documents presented as annexes of the Project's VCS PD. There are not settlers living within the Project Area, which is the extension of forested land where avoided deforestation activities will take place.

From the information gathered in the preliminary social assessment it is known that riberinhos live in areas that have change their land-cover in the past 10-year period so such are not considered within the limits of the Project Area. Such areas are part of the Leakage Management Area (that is also privately owned land under the control of the Project's Proponent) and in most of the cases constitute a buffer of 3Km from the river shores inward main land.

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[37] Informed consent documents related to the activities for the study and the design of the Project signed by the leaders and local authorities are included in the Annex section.

[38] The list of villagers that participated in the workshops is included in the Annex section.

The Project will conduct a Census to geo-reference and identify all the areas occupied by riberinhos within the Leakage Management Area. Then, as part of one of its activities, the Project will grant annual-renewable land-use rights to Riberinhos who want to participate in conservation activities. Those riberinhos that do participate and prove conservation results will receive legal land titles at the end of the Project's lifetime.

Although the Project is being developed on private land where there are not villages living in, the Proponents do recognize the need of conducting a Free, Prior, and Informed Consent (FPIC) process to clearly explain what is the Project about and count with the approval of local villages living in the Leakage Management Area.

Free, Prior ,and Informed Consent Protocol

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, a equitable participation in decision-making processes and the involvement of the population in the implementation of the proposed project.

In this regard, we will consider the following elements conductors for this process[39].

- 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 will be 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 probably will intervene in the implementation of the proposed project, and

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[39] Based on the document entitled 'Free, Prior, and Informed Consent in REDD+ - Principles and Approaches for Policy and Project Development' elaborated by GIZ, NORAD and RECOFTC – The Center for People and Forests (2011)

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 will be produced after the validation of the project and will include a extense and detailed development of each one of the activities, protocols, annexes, formats and tools that will de utilized.

The following flowchart[40] intends to represent the protocol to be followed in order to comply and ensure the FPIC standards and criteria are implemented:

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[40] Based on the document entitled 'Free, Prior, and Informed Consent in REDD+ - Principles and Approaches for Policy and Project Development' elaborated by GIZ, NORAD and RECOFTC – The Center for People and Forests (2011)

Figure 9: Flowchart for FPIC

Fase I: PRA

Recognition of the Project área and the main stakeholders.

↓

Permit to inform about the Project idea and the development of previous studies

↓

Participatory rural diagnosis and carbon inventory

| Social economic surveys | Interviews with leaders | 'Speaking maps' (problems and priorities) | Carbon inventory |

Project Design Document PDD

Fase II: Participative census

Identification of stakeholders and recognition of the parties

↓

Permition to consult and achieve consent

↓

Provide information in simple and appropriate form and language ←

Project approach
Project purpose
Project área and duration
Involved localities
Involned institutions
Social-economic diagnosis
Proposed activities
Communitarian benefits
Risks
Negotiation proposal

↓

Participatory assessment of the Project activities and the communitarian impacts

↓

Community consensus building ⇄ Negotiation process ←

Land use deals   Financial arrangements
Benefit sharing   Legal arrangements
Compensation   Dispute resolution
Mitigation   Monitoring process
Protections   Mechanisms for redress

↓

Draft agreement discussed widely within the community until there is agreement.
Finalize written agreement
Implement agreement

G5.4 Demonstrate that the project does not require the involuntary relocation of people or of the activities important for the livelihoods and culture of the communities

The Project occurs within the boundaries of legally recognized private land. Despite this, historical occupied lands of local riberinhos will be recognized and properly demarcated as part of one of the Project's activities. There will not be involuntary relocation of people or communities.

Project's activities will not only aid local villagers to improve their local social organization but will also provide -as agreed and in cooperation with the landowner- secured land tenure to villagers living within the Project Boundary. Even more, the Project will provide capacity building to neighbor villagers for them to get land tenure rights on unused public lands. This will not only increase villagers perception of forest value (thus reducing deforestation) (Alston 1996) but will also give them better access to credit lines and will be the most helpful weapon against squatters and invaders (thus avoiding conflicts) (Alston 1996).

As for local livelihoods and culture, Project's activities will build new capabilities to enhance and diversify crops production and more energy efficient technologies to produce farinha. In all capacity building activities local customs, knowledge and perceptions will be key factors to develop such workshops and to choose which technologies and techniques fit best the requirements of local villagers.

Income generated by sporadic timber extraction in the Project Boundary (which is a secondary and not common activity in local villages according to our Social Assessment) will be replaced by the income generated by employment in monitoring, training and demonstrative activities.

G5.5 Identification and Mitigation of Illegal Activities

Illegal activities in the area are constituted by unplanned timber extraction. Such logging operations are evidentiated 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 whenevere 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 will train local villagers 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 will provide land titles against conservation results to villagers living within the Project Boundaries and will provide support to neighbor villagers to achieve land tenure on unused public lands.

Stakeholders in neighbor villages will be encouraged to report encroachers and illegal loggers trying to get into nearby forests. The Project will 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 will be generating positive leakage.

G5.6 Demonstration of Land Tenure Status and Title to Carbon Rights

All the Project Boundary is privately owned land under complete control of the Project Proponent.

The Cadeia Dominial is a certificate provided by the registry office where the land's deed and title are registered. This certificate is used to show the history of the property and the owners. This document will show any updates on the property.

Also, a law firm was hired by the landowner to perform a due diligence process to verify that there were no claims on his lands.

Finally, the landowner provided copies of the original land titles for each one of the Glebas that constitute the Project Boundary.

Proofs of ownership and land titles are considered sensitive information and will only be shown to the validation team upon request.

V. Climate Section

CL1. Net Positive Climate Impacts

CL1.1 Net Change in Carbon Stocks due to Project's activities

The Project will prevent and avoid unplanned deforestation mainly through monitoring activities. The Project aims at avoiding a net baseline release of 44,662,429[41] tCO2e at the end of its 40-year crediting period as shown in Table 17:

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[41] After discount for non-permanence buffer

Table 17: Net avoided GHG emissions due to Project's activities

Project year t	Ex ante VCUs tradable	
	annual VCU_t tCO$_2$-e	cumulative VCU tCO$_2$-e
0	-	-
1	649,742	649,742
2	873,210	1,522,952
3	1,012,814	2,535,766
4	987,161	3,522,927
5	927,012	4,449,939
6	811,432	5,261,370
7	838,175	6,099,545
8	764,058	6,863,603
9	722,044	7,585,647
10	683,009	8,268,656
11	642,110	8,910,767
12	638,267	9,549,033
13	619,707	10,168,740
14	581,328	10,750,068
15	625,036	11,375,104
16	644,209	12,019,313
17	641,226	12,660,539
18	651,511	13,312,050
19	659,121	13,971,171
20	676,030	14,647,202
21	714,132	15,361,334
22	712,518	16,073,852
23	829,988	16,903,840
24	879,519	17,783,358
25	881,459	18,664,817
26	941,763	19,606,581
27	959,249	20,565,830
28	1,014,753	21,580,583
29	1,174,170	22,754,753
30	1,300,376	24,055,129
31	1,331,514	25,386,643
32	1,527,766	26,914,410
33	1,514,186	28,428,596
34	1,340,382	29,768,978
35	1,430,639	31,199,617
36	1,460,074	32,659,691
37	1,473,285	34,132,976
38	1,507,915	35,640,891
39	1,539,249	37,180,140
40	1,536,903	38,717,044

The Project activities will avoid the release of CH$_4$ emissions that are released through fires used to clear the fores cover when slash and burn is used to deforest. For this reason, non-CO2 avoided emissions are counted towards the positive climate impacts of the Project.

CH$_4$ emissions have been calculated based on the equation presented in the VCS vm0015 methodology Section 6.2.

$$EBBCH4_{icl,t} = EBBCO2_{icl,t} * 12/44 * ER_{CH4}*16/12*GWP_{CH4}$$

Net non-CO2 emissions per year are presented in Table 18:

Table 18: Net non-CO2 emissions

Project year t	Emissions of non-CO$_2$ gasses from baseline forest fires $ID_{icl} = 1$		Total baseline non-CO2 emissions from forest fires in the project area	
	$ABSLPA_{icl,t}$	$EBBBSLtol_{icl}$	annual $EBBBSLPA_t$	cumulative $EBBBSLPA$
	ha	tCO$_2$-e ha^{-1}	tCO$_2$-e	tCO$_2$-e
1	1,062	(29)	(31,269)	(31,269)
2	1,408	(29)	(41,454)	(72,723)
3	1,610	(29)	(47,417)	(120,139)
4	1,539	(29)	(45,318)	(165,457)
5	1,413	(29)	(41,597)	(207,054)
6	1,198	(29)	(35,276)	(242,330)
7	1,220	(29)	(35,920)	(278,250)
8	1,076	(29)	(31,698)	(309,949)
9	988	(29)	(29,099)	(339,047)
10	906	(29)	(26,690)	(365,737)
11	845	(29)	(24,877)	(390,614)
12	830	(29)	(24,448)	(415,062)
13	789	(29)	(23,231)	(438,293)
14	710	(29)	(20,918)	(459,211)
15	766	(29)	(22,563)	(481,774)
16	779	(29)	(22,945)	(504,719)
17	761	(29)	(22,396)	(527,116)
18	761	(29)	(22,396)	(549,512)
19	757	(29)	(22,301)	(571,813)
20	770	(29)	(22,659)	(594,472)
21	816	(29)	(24,042)	(618,514)
22	799	(29)	(23,517)	(642,031)
23	975	(29)	(28,717)	(670,749)
24	1,037	(29)	(30,530)	(701,278)
25	1,022	(29)	(30,100)	(731,379)
26	1,102	(29)	(32,462)	(763,841)
27	1,111	(29)	(32,700)	(796,541)
28	1,181	(29)	(34,775)	(831,316)
29	1,420	(29)	(41,811)	(873,128)
30	1,601	(29)	(47,130)	(920,258)
31	1,623	(29)	(47,798)	(968,056)
32	1,914	(29)	(56,361)	(1,024,417)
33	1,861	(29)	(54,787)	(1,079,203)
34	1,544	(29)	(45,461)	(1,124,664)
35	1,663	(29)	(48,967)	(1,173,631)
36	1,682	(29)	(49,539)	(1,223,170)
37	1,673	(29)	(49,277)	(1,272,447)
38	1,701	(29)	(50,088)	(1,322,535)
39	1,726	(29)	(50,827)	(1,373,363)
40	1,695	(29)	(49,897)	(1,423,260)

CL1.3 Other GHG Emissions from Project's activities

The Project activities will not generate non-CO_2 emissions because the Project's activities will not require fuel combustion, biomass burning or the use of synthetic fertilizers. Although one of the Project's activites is designed to develop agroforestry practices with local villagers, given the low population density and the small-scale of the agricultural practices in the area (2% of the historical deforestation in the RRD), the use and decomposition of N-fixing species is not expected to be significant (more than 5% of the total GHG emission benefits of the Project)[42].

CL1.4 Net Climate Impact of the Project

The net climate impact of the Project is positive, as the only activity happening in the Project Area is forest conservation.

Activities happening in the LMA, by their nature, will not generate GHG emissions.

Net climate impacts of the Project are presented in Table 19 below:

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[42] According to the significance criteria established by the VCS VM0015 methodology which states that a source should only be considered if it accounts for more than 5% of the total GHG emission benefits generated from a project.

Table 19: Net climate impacts of the Project

Project year t	Baseline carbon stock changes annual $\Delta CBSLPA_t$ tCO$_2$-e	cumulative $\Delta CBSLPA$ tCO$_2$-e	Baseline GHG emissions annual $EBBBSLPA_t$ tCO$_2$-e	cumulative $EBBBSLPA$ tCO$_2$-e	*Ex ante* project carbon stock changes annual $\Delta CPSPA_t$ tCO$_2$-e	cumulative $\Delta CPSPA$ tCO$_2$-e	*Ex ante* project GHG emissions annual $EBBPSPA_t$ tCO$_2$-e	cumulative $EBBPSPA$ tCO$_2$-e	*Ex ante* leakage carbon stock changes annual ΔCLK_t tCO$_2$-e	cumulative ΔCLK tCO$_2$-e	*Ex ante* leakage GHG emissions annual ELK_t tCO$_2$-e	cumulative ELK tCO$_2$-e	*Ex ante* net anthropogenic GHG emission reductions annual $\Delta REDD_t$ tCO$_2$-e	cumulative $\Delta REDD$ tCO$_2$-e	*Ex ante* VCUs tradable annual VCU_t tCO$_2$-e	cumulative VCU tCO$_2$-e	*Ex ante* buffer credits annual VBC_t tCO$_2$-e	cumulative VBC tCO$_2$-e
0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	(756,456)	(756,456)	(31,269.16)	(31,269.16)	(37,823)	(37,823)	(1,563)	(1,563)	-	-	-	-	748,339	748,339	649,742	649,742	98,597	98,597
2	(1,017,293)	(1,773,749)	(41,453.70)	(72,722.86)	(50,865)	(88,687)	(2,073)	(3,636)	-	-	-	-	1,005,809	1,754,148	873,210	1,522,952	132,599	231,196
3	(1,180,708)	(2,954,456)	(47,416.55)	(120,139.41)	(59,035)	(147,723)	(2,371)	(6,007)	-	-	-	-	1,166,718	2,920,866	1,012,814	2,535,766	153,904	385,100
4	(1,151,851)	(4,106,307)	(45,317.63)	(165,457.04)	(57,593)	(205,315)	(2,266)	(8,273)	-	-	-	-	1,137,310	4,058,176	987,161	3,522,927	150,149	535,249
5	(1,082,787)	(5,189,094)	(41,596.81)	(207,053.85)	(54,139)	(259,455)	(2,080)	(10,353)	-	-	-	-	1,068,165	5,126,340	927,012	4,449,939	141,153	676,402
6	(949,110)	(6,138,204)	(35,276.19)	(242,330.04)	(47,455)	(306,910)	(1,764)	(12,117)	-	-	-	-	935,166	6,061,507	811,432	5,261,370	123,735	800,137
7	(980,996)	(7,119,200)	(35,920.18)	(278,250.22)	(49,050)	(355,960)	(1,796)	(13,913)	-	-	-	-	966,071	7,027,578	838,175	6,099,545	127,896	928,033
8	(895,471)	(8,014,671)	(31,698.49)	(309,948.71)	(44,774)	(400,734)	(1,585)	(15,497)	-	-	-	-	880,811	7,908,389	764,058	6,863,603	116,753	1,044,785
9	(847,231)	(8,861,902)	(29,098.69)	(339,047.39)	(42,362)	(443,095)	(1,455)	(16,952)	-	-	-	-	832,513	8,740,902	722,044	7,585,647	110,469	1,155,255
10	(802,405)	(9,664,307)	(26,689.70)	(365,737.09)	(40,120)	(483,215)	(1,334)	(18,287)	-	-	-	-	787,640	9,528,542	683,009	8,268,656	104,631	1,259,886
11	(754,607)	(10,418,914)	(24,876.99)	(390,614.08)	(37,730)	(520,946)	(1,244)	(19,531)	-	-	-	-	740,510	10,269,052	642,110	8,910,767	98,400	1,358,285
12	(750,418)	(11,169,332)	(24,447.67)	(415,061.75)	(37,521)	(558,467)	(1,222)	(20,753)	-	-	-	-	736,122	11,005,174	638,267	9,549,033	97,855	1,456,140
13	(729,187)	(11,898,519)	(23,231.25)	(438,292.99)	(36,459)	(594,926)	(1,162)	(21,915)	-	-	-	-	714,797	11,719,971	619,707	10,168,740	95,090	1,551,231
14	(685,049)	(12,583,568)	(20,917.66)	(459,210.66)	(34,252)	(629,178)	(1,046)	(22,961)	-	-	-	-	670,669	12,390,640	581,328	10,750,068	89,341	1,640,572
15	(736,470)	(13,320,038)	(22,563.41)	(481,774.06)	(36,824)	(666,002)	(1,128)	(24,089)	-	-	-	-	721,082	13,111,722	625,036	11,375,104	96,046	1,736,618
16	(759,424)	(14,079,463)	(22,945.03)	(504,719.09)	(37,971)	(703,973)	(1,147)	(25,236)	-	-	-	-	743,251	13,854,973	644,209	12,019,313	99,042	1,835,660
17	(756,425)	(14,835,888)	(22,396.45)	(527,115.54)	(37,821)	(741,794)	(1,120)	(26,356)	-	-	-	-	739,880	14,594,853	641,226	12,660,539	98,654	1,934,314
18	(768,977)	(15,604,865)	(22,396.45)	(549,511.99)	(38,449)	(780,243)	(1,120)	(27,476)	-	-	-	-	751,805	15,346,658	651,511	13,312,050	100,294	2,034,608
19	(778,376)	(16,383,241)	(22,301.04)	(571,813.03)	(38,919)	(819,162)	(1,115)	(28,591)	-	-	-	-	760,643	16,107,301	659,121	13,971,171	101,522	2,136,130
20	(798,595)	(17,181,836)	(22,658.81)	(594,471.84)	(39,930)	(859,092)	(1,133)	(29,724)	-	-	-	-	780,191	16,887,492	676,030	14,647,202	104,161	2,240,290
21	(843,480)	(18,025,316)	(24,042.19)	(618,514.04)	(42,174)	(901,266)	(1,202)	(30,926)	-	-	-	-	824,146	17,711,638	714,132	15,361,334	110,014	2,350,305
22	(842,124)	(18,867,439)	(23,517.46)	(642,031.50)	(42,106)	(943,372)	(1,176)	(32,102)	-	-	-	-	822,359	18,533,997	712,518	16,073,852	109,841	2,460,145
23	(979,416)	(19,846,855)	(28,717.06)	(670,748.56)	(48,971)	(992,343)	(1,436)	(33,537)	-	-	-	-	957,727	19,491,724	829,988	16,903,840	127,739	2,587,884
24	(1,037,749)	(20,884,604)	(30,529.77)	(701,278.33)	(51,887)	(1,044,230)	(1,526)	(35,064)	-	-	-	-	1,014,865	20,506,588	879,519	17,783,358	135,346	2,723,230
25	(1,040,619)	(21,925,223)	(30,100.44)	(731,378.78)	(52,031)	(1,096,261)	(1,505)	(36,569)	-	-	-	-	1,017,183	21,523,771	881,459	18,664,817	135,724	2,858,954
26	(1,111,459)	(23,036,681)	(32,461.73)	(763,840.51)	(55,573)	(1,151,834)	(1,623)	(38,192)	-	-	-	-	1,086,724	22,610,496	941,763	19,606,581	144,961	3,003,915
27	(1,132,521)	(24,169,202)	(32,700.24)	(796,540.75)	(56,626)	(1,208,460)	(1,635)	(39,827)	-	-	-	-	1,106,960	23,717,456	959,249	20,565,830	147,711	3,151,626
28	(1,197,837)	(25,367,039)	(34,775.31)	(831,316.07)	(59,892)	(1,268,352)	(1,739)	(41,566)	-	-	-	-	1,170,982	24,888,437	1,014,753	21,580,583	156,228	3,307,854
29	(1,384,179)	(26,751,218)	(41,811.47)	(873,127.54)	(69,209)	(1,337,561)	(2,091)	(43,656)	-	-	-	-	1,354,691	26,243,129	1,174,170	22,754,753	180,521	3,488,375
30	(1,531,994)	(28,283,213)	(47,130.33)	(920,257.87)	(76,600)	(1,414,161)	(2,357)	(46,013)	-	-	-	-	1,500,168	27,743,297	1,300,376	24,055,129	199,793	3,688,168
31	(1,569,217)	(29,852,430)	(47,798.17)	(968,056.04)	(78,461)	(1,492,622)	(2,390)	(48,403)	-	-	-	-	1,536,165	29,279,462	1,331,514	25,386,643	204,650	3,892,818
32	(1,798,732)	(31,651,162)	(56,360.82)	(1,024,416.85)	(89,937)	(1,582,558)	(2,818)	(51,221)	-	-	-	-	1,762,338	31,041,800	1,527,766	26,914,410	234,572	4,127,390
33	(1,783,996)	(33,435,159)	(54,786.62)	(1,079,203.48)	(89,200)	(1,671,758)	(2,739)	(53,960)	-	-	-	-	1,746,844	32,788,644	1,514,186	28,428,596	232,658	4,360,048
34	(1,582,770)	(35,017,928)	(45,460.73)	(1,124,664.21)	(79,138)	(1,750,896)	(2,273)	(56,233)	-	-	-	-	1,546,819	34,335,463	1,340,382	29,768,978	206,437	4,566,485
35	(1,688,829)	(36,706,757)	(48,966.89)	(1,173,631.10)	(84,441)	(1,835,338)	(2,448)	(58,682)	-	-	-	-	1,650,906	35,986,368	1,430,639	31,199,617	220,267	4,786,751
36	(1,724,084)	(38,430,840)	(49,539.32)	(1,223,170.42)	(86,204)	(1,921,542)	(2,477)	(61,159)	-	-	-	-	1,684,942	37,671,310	1,460,074	32,659,691	224,868	5,011,619
37	(1,740,513)	(40,171,353)	(49,276.96)	(1,272,447.37)	(87,026)	(2,008,568)	(2,464)	(63,622)	-	-	-	-	1,700,301	39,371,611	1,473,285	34,132,976	227,016	5,238,635
38	(1,781,831)	(41,953,184)	(50,087.90)	(1,322,535.28)	(89,092)	(2,097,659)	(2,504)	(66,127)	-	-	-	-	1,740,323	41,111,933	1,507,915	35,640,891	232,407	5,471,042
39	(1,819,208)	(43,772,392)	(50,827.29)	(1,373,362.57)	(90,960)	(2,188,620)	(2,541)	(68,668)	-	-	-	-	1,776,534	42,888,467	1,539,249	37,180,140	237,285	5,708,327
40	(1,817,432)	(45,589,824)	(49,897.09)	(1,423,259.66)	(90,872)	(2,279,491)	(2,495)	(71,163)	-	-	-	-	1,773,962	44,662,429	1,536,903	38,717,044	237,059	5,945,386

CL1.5 Specification How Double Counting is Avoided

The carbon credits generated from the project will be registered under the Verified Carbon Standard and sold under that mechanism. Credits from the project will not be registered or sold under any current regulatory scheme, as these schemes currently do not allow REDD credits to be sold. If and when the credits become eligible under a regulatory scheme, the proper procedures will be taken to ensure that credits are not sold twice.

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CL2 Offsite Climate Impacts ("Leakage")

CL2.1 Determination of Leakage Type and Extent

The Project's activities won't generate GHG emissions thus there won't be GHG emissions from leakage prevention activities.

GHG emissions by activity displacement could only be considered as leakage if such emissions are located within the leakage belt (LK) and happen above baseline projections[43]. A mobility analysis was used to calculate the extent of the leakage betl of the Project and results from this analysis are presented in Section 2.3.1 of the Project's VCS PDD.

Also, the vm0015 methodology indicates that the amount of leakage will depend on the Leakage Displacement Factor (LDF) which is equal to the proportion of agents of deforestation that do not participate in the Project's activities[44].

Following these guidelines, the Project will not generate displacement leakage as the Project's activities are designed to provide all the deforestation agents that arrive to the Project's Boundary with the opportunity to participate.

CL2.2 Documentation and Quantification of How Leakage will be Mitigated

The Project main climate objective is to manage the Project Area in the form of a "private reserve" by developing and implementing a management plan. Such plan will include a rigorous monitoring and enforcement plan built up on the existing experience of on going surveillance activities in the area since 2008. Such scaled-up monitoring activities will actively count with the participation of local villagers that will be trained in forest management and monitoring techniques.

The Project will also address cattle ranchers, which are the main agents of deforestation that arrive to the Project Boundary. The objective is to provide them with training to understand

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[43] Taken from the definition of "leakage belt" in the vm0015 methodology page 10.
[44] As indicated in the footnote in page 101 of the VCS vm0015 methodology "*If deforestation agents do not participate in leakage prevention activities and project activities, the Displacement Factor shall be 100%. Where leakage prevention activities are implemented the factor shall be equal to the proportion of the baseline agents estimated to be given the opportunity to participate in leakage prevention activities and project activities*" thus if all the agents are given the opportunity to participate in the activities of the Project, then the LDF should be cero.

the benefits of better managing their pastures with the expected result of enhanced pastures productivity and lower deforestation.

CL2.3 Subtracting Project related Leakage from Carbon Benefits

The Project's activities won't generate GHG emissions thus there won't be GHG emissions from leakage prevention activities.

GHG emissions by activity displacement could only be considered as leakage if such emissions are located within the leakage belt (LK) and happen above baseline projections[45]. A mobility analysis was used to calculate the extent of the leakage betl of the Project and results from this analysis are presented in Section 2.3.1 of theVCS PDD for this project.

Also, the vm0015 methodology indicates that the amount of leakage will depend on the Leakage Displacement Factor (LDF) which is equal to the proportion of agents of deforestation that do not participate in the Project's activities[46].

Following these guidelines, the Project will not generate displacement leakage as the Project's activities are designed to provide all the deforestation agents that arrive to the Project's Boundary with the opportunity to participate.

CL2.4 Inclusion of Non-CO$_2$ Gases in Calculations

The Project activities will avoid the release of CH$_4$ emissions that are released through fires used to clear the fores cover when slash and burn is used to deforest. For this reason, non-CO2 avoided emissions are counted towards the positive climate impacts of the Project.

CH$_4$ emissions have been calculated based on the equation below presented in the VCS vm0015 methodology Section 6.2.

$$EBBCH4_{icl,t} = EBBCO2_{icl,t} * 12/44 * ER_{CH4}*16/12*GWP_{CH4}$$

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[45] Taken from the definition of "leakage belt" in the vm0015 methodology page 10.
[46] As indicated in the footnote in page 101 of the VCS vm0015 methodology *"If deforestation agents do not participate in leakage prevention activities and project activities, the Displacement Factor shall be 100%. Where leakage prevention activities are implemented the factor shall be equal to the proportion of the baseline agents estimated to be given the opportunity to participate in leakage prevention activities and project activities"* thus if all the agents are given the opportunity to participate in the activities of the Project, then the LDF should be cero.

CL3 Climate Impact Monitoring

CL3.1 Plan for Selecting and Monitoring Carbon Pools

The justification for the selection of the carbon pools is presented below (see Table 20). Sellection of carbon pools followed the guidelines of VCS vm0015 methodology.

Table 20: Carbon pools considered by the Project

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 the 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.

CL3.2 Development of a Full Monitoring Plan

A monitoring plan for climate benefits can be found in Section 4 of the attached VCS PDD.

VI. Community Section

CM1 Net Positive Community Impacts

CM1.1 Methodologies to Estimate Impacts on Communities

Net Positive Community Impact Methods

The Project's activities were designed based on the information gathered during the PRA so they are based on the needs and expectations of local villagers. As mentioned and describer in Section G.1.5 of this document, a census will take place once the Project gets validated

and activities are implemented. During this census participatory impact assessment workshops will take place to assess the suitability of the activities and to identify those villagers that will voluntarily participate.

As the activities are designed based on feedback from local villages, are aimed at generating economic benefits and food diversification, only net positive impacts are expected on local people.

Positive Community Impacts
Positive community impacts are expected to be:

- Secured land tenure
- 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.
- Better understanding of the importance of protecting the forest and how forest conservation will benefit their livelihoods.
- Opportunity to develop local businesses through an external fund.

The project intends to elaborate a Monitoring & Evaluation Plan considering social indicators as a main part of the intervention and as a relevant aspect to achieve goals once the participatory census is carried out. As mentioned in the 'Specific objectives' section, the communal representatives will be invited to a workshop designed to plan the project activities and construct the social-environmental indicators for the social monitoring of the project.

The monitoring system will be focused on the indicators in order to measure the progress of the intervention. It is oriented to have a mechanism that ensures the Project to have data in a organized, timely and appropriate manner.

The project will base this system on:

- Reference documents
  These documents will be elaborated in a participarory manner with the main key actors in order to have an agreement on the idicators to measure impacts. These documents are:
    a) Logical framework
    b) Follow-up matrix
    c) Data collection forms and templates

d) Indexes (instruments to measure progress at a general level)
e) Documentation (primary and secondary)

- Responsible staff (development and implementation of the monitoring system)
  The roles and responsible people will also be determined acroding to the situation and needs of the local villagers and the obkectives and activities programed by the project.

- Monitoring secuence
  a) Collection (carried out by the responsible people to organize it and later be systematized)
  b) Systematization (processing the data to register the versions and ensure the quality and totality of the information)
  c) Verification (this step allows to certify the accuracy and transparency of the information)
  d) Analysis (this processes will determine the value and quality of the work and in this way measure the impacts and progress, and thus define new strategies or adjust the intervention)
  e) Reporting (quality information will be available to all relevant parties)

It is important to mention that the process of elaborating and defining the parameters, elements and criteria, such as identifying and generating the indicators, will be carried out together with the population in order to have a pln that fulfills the expectations and cover the needs of the main stakeholders.

There are some key elements that will be taken into account in this plan and process in order to have comprehensive mechanism that involves and represents the actual situation in the project intervention area. These are as follows:

- Baseline (socio-economic conditions before the Project starts)
- Identification of main stakeholders and their roles (Participatory Rural Appraisal methods, surveys, community maps, secondary data, wealth or well-being ranking, and stakeholder analysis)
- Objectives and projection of social conditions and impacts
- Analysis of possible negative social impacts and cost-effective mitigation measures
- Participatory impact assessment
- Identification of monitoring indicators to measure progress in achieving the desired social outcome & objectives in participatory manner

- Design of materials and specific methodologies as well as identifying and determining key actors to carry out the monitoring activities
- Training necessities and specific topics.

CM1.2 Demonstration that no HCV Areas are Negatively Affected

The Project is designed to protect biodiversity and to reduce ecosystem fragmentation thus there are no expected negative effects on HCV areas.

CM2 Offsite Stakeholder Impacts

CM2.1 Identification of Negative Offsite Stakeholder Community Impacts

Information from the PRA indicates that local riberinhos won't establish cassava plots or extract construction materials beyond 3Km from the river shores. Offsite stakeholders will follow the same distance pattern.

Therefore, the Project won't affect stakeholders beyond 3Km from rivershores and those within that buffer are included in the LMA. Now, the activities of the Project are meant to expand beyond the Project 'Boundaries to generate net positive impacts on the livelihood of nearby villages that whish to participate in the capacity building workshops and to apply to the funding program of the Project. This is what is known as positive leakage[47] (Schwarze 2002).

CM2.2 Offsite Impact Mitigation Strategies

As mentioned in the previous item, there area not expected negative offsite impacts thus no mitigation strategies are required.

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[47] Positive Leakage is understood as an unintentional positive outcome on carbon stocks from conservation projects, for example when the activities of a project are adopted voluntarily outside project boundaries and more carbon sequestration and/or avoided GHG emissions are achieved.

CM2.3 Demonstration that Well-being of Other Stakeholder Groups has not been Negatively Impacted

The Project is design 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 stakeholdes have been identified to use or depend from the resources in the Project's Area or LMA.

CM3 Community Impact Monitoring

CM3.1 Selecting Community Variables to be Monitored

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 will be considered during monitoring. A full and detailed list will be presented in the monitoring plan that will be developed and submitted within the first six months after validation.

Table 21: Some activities and indicators of the Social monitoring

Activity	Product Indicator
1. Capacity building related to the monitoring and management of the forest and biodiversity. Opportunities to work as control/supervision staff.	• Number of trained people in biodiversity and forest monitoring. • Number of people participating in the monitoring activities each month. • Number of people returning to the monitoring work positions after one rotation
2. Improving organizational capacities of each community.	• Number of community leaders trained to improve their level of organization, management and democratic governability • Number of local leaders participating in the development of an organization system

	• Number of local associations/organizations strengthened by the project activities
3. Providing land ownership legal rights versus conservation results	• Number of people living inside LMA and its proximities • Number of people registered in the program to become legal land owners • Number of people that meet the forest conservation agreement.
4. Providing assistance to obtain land use rights over the forest owned by the government.	• Number of people registered in the program to obtain the use rights over the government land.
5. Providing assistance and training in agroforestry techniques and implementing pilot cases.	• Number of people trained in agroforestry techniques • Number of implemented agroforestry pilot projects
6. Capacity building related to efficient and improved cooking stoves and implementation of pilot demonstrative cases	• Number of people trained in the use of efficient improved cooking stoves • Number of improved cooking stoves pilots implemented in local families
7. Providing assistance and training on sustainable small-scale timber extraction in the LMA.	• Number of people trained in the sustainable small scale timber extraction
8. Capacity building on the development of small communitarian enterprises.	• Number of people trained in the development and management of a small scale enterprise • Number of small scale enterprises developed in the project area

A Participatory Census will be carried out previously to the design of the definite Monitoring Plan in the Project area. This intends to collect information about the unsatisfied basic needs, health, education, family economy, communal organization, etc., which will become 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 will take place as a fundamental part of the Social Communitarian Monitoring System that will facilitate the follow-up and evaluation of the benefits of the project to improve the quality of life of the communities.

This system will have trained communitarian monitors that will 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 will carry out an exhaustive annual assessment of the indicators.

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.

ESLLC is committed to develop a complete Social Impacts Monitoring Plan with the characteristics here mentioned in the first year from validation.

CM3.2 Assessing Effectiveness of High Conservation Value Monitoring

Special attention will be given to High Conservation Value (HCV) areas specific to meeting community needs, such as areas with high concentrations of medicinal trees, trees for seedlings or other important non-timber forest products, along with traditional spirit forests and areas where rare or threatened wildlife have been sighted

CM3.3 Community Impact Monitoring Timeline

Ecosystem Services LLC will develop a full monitoring plan within six months of validation of the project.

CM4 Capacity Building

CM4.1 Accommodate with the needs of the communities

As mentioned in Section 3.8 of this document, Project's activities were developed based on the needs of local villagers identified through the PRA.

Also, all the activities will be reviewed together with local villagers living within the LMA in participatory workshops as part of the census that will take place once the Project gets validated.

CM4.2 Wide range of groups

The Project will make sure that all members of local villages have the same opportunity to attend capacity building workshops and participate in demonstrational activities. Although the opportunity to actively participate in all the activities of the Project, it is finally a decision of each stakeholder to participate and the managerial team will not try to put any sort of pressing to involve villagers.

Special attention will be put to make sure that 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 will be adapted accordingly to each participating group. The Project considers developing and implementing workshops specifically designed for age classes groups to better transmit the information.

CM4.3 Women participation

The management plans developed does not differentiate between women and men regarding their participation in decision-making, development and implementation of plans and activities, as well as in capacity building efforts.

Equal rights and opportunities will be provided to local people without consideration of their gender. If during the process of implementing the project a need to promote gender equality is identified, then appropriate programs will be developed and implemented.

CM4.4 Knowledge transfer strategy

As mentioned in section G4.3 'Plan to Provide Orientation and Training to the Project's Employees', the project plans to provide the local villagers the same chances to be trained and ensure that the knowledge is transferres in an efficient and systematized manner to ensure that local capacity will not be lost and the activities of the project can be carried out without having major setbacks.

A number of specific capacity building programs, researched by project proponents as potentially applicable to Project Zone community needs, are presented below . However, the final programs will be designed in collaboration with the communities to ensure

that they address current community concerns and prioritize community needs for capacity building.

The Project staff as well as external consultants in order to transfer skills and share results of work will carry out these programs. It is important to mention that the staff turnover and transfer of skills will also be addressed in the human resource manual.

Knowledge transfer focuses on the passing ideas, tools, methodologies, research results and skills between actors. The training activities in relation to this are presented in section G4.3. and specifically in Table N°13.

CM4.5 Community participation in project implementation

The implementation of the Project requires active participation of local people for a proper implementation. The activities of the Project will require local people participation in:

• **Paid monitoring jobs:** villagers will have the opportunity to work in paid monitoring positions in a rotational basis in order to give an opportunity to all the members of the community that whish to participate.

• **Social monitoring and demonstrative activities**: local people will have the opportunity to work in paid social monitoring positions to gather data that will be used to evaluate the performance of the activities of the Project. Also, local people will have the change to perform as teachers in the demonstrative activities of the proposed activities.

• **Forest Management:** It is crucial for project success that good practices in Forest Management are developed with the community. Some material will be distributed, and workshops will be planned in order to provide sufficient knowledge so that the community people can continue their forestry activities, without damaging the natural resources.

• **Biodiversity and Natural Resource Use Monitoring Program:** This program will train community members to participate and collaborate in natural resource monitoring activities.

This program will generate information about the status of biodiversity, its uses and threats. The duties of these monitors are as follows:
- Census monitor – performs a weekly collection of information about natural resource use.
- Fishing monitor – collects data about the production, marketing and selling of fish at the major docks in the municipality.
- Boat monitors – collects data on the transit of boats at strategic points in the protected area.

- Fauna monitor – monitors the presence and quantity of animals in the forest
- Road Monitor – monitors the road traffic and types of goods transported

CM5 Best Practices in Community Involvement

CM5.1 Knowledge of local customs

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 will not constitute dramatic changes on local ways of life or customs but will only provide knowledge and finance to improve and make more efficient what is already happening on the ground.

CM5.2 Employment positions

The Project expects to provide employment (rotational or fixed term employment depending on the number of villagers on each LMA) to all stakeholders in the LMA. If not enough villagers live within a specific part of a LMA then neighbor villagers will be offered the opportunity to receive training and work in monitoring or demonstrative activities.

CM5.3 International rules on worker rights

The Project will comply with the principles stated in the ILO Declaration on Fundamental Principles and Rights at Work adopted in 1998 and reviewed in 2010.

CM5.4 Substantial risk to worker safety

Project's activities do not hold substantial risk besides those inherent to the day a day life in the forest. Project's activities do not require the use of heavy machinery or dangerous substances.

Nevertheless, the Project management team will provide adequate protection equipment to employees working in forest monitoring activities. Also, monitoring staff will be equipped with first aid kits. Protection equipment will include but will no be limited to:

- Hard hat
- Cap with the company's logo
- Reflective/fluorescente security vest with the company's logo
- Rubber boots
- Gloves
- Fast-dry uniforms with the company's logo
- Two-way rádios
- GPS
- Digital camera
- Field backpack
- Camelpack
- LED Flashlight
- Whistle
- Machete
- Pocket knife
- First aid kid

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

CM.5.5 Minimize working risks

To minimize working risks, the use of appropriate safety equipment will be encouraged and enforced. Also, safety inductions will be held regularly to make sure there are not doubts about safety guidelines and to ensure that all the staff is well-aware of the potential risks of their jobs.

VII. Biodiversity Section

B1 Net Positive Biodiversity Impacts

B.1.1 Biodiversity Impacts

"Without Project" Scenario

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).

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).

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.

"With Project" Scenario

The Project zone is recognized as an extreme priority site for biodiversity, especially for birds and invertebrates' conservation (MMA 2002). It holds preserved biodiversity and a very low demographic density, counting with a research station (Scientific Station Ferreira Penna), which allows research and monitoring of flora and fauna.

Within the project zone there is a significant concentration of igarapés draining two main rivers: Xingu and Tocantins. Due to this, flooded forests (Igapós and Várzeas) are abundant and provide invertebrates and fish with feeding, breeding and protection areas (Montag et al. 2008), enhancing therefore High Conservation Values already identified in the area.

The Project will avoid ecosystems fragmentation and loss due to deforestation. Consequently, the "with project" scenario will benefit the area in numerous ways. Firstly, the implementation of the project will guarantee the conservation of the area as whole. It can be inferred that the vegetation cover will remain intact and will continue to host important species of great biodiversity and socio-economic value. None of the Project's activities include reforestation thus invasive species will not be introduce under the forest recovery process.

Another positive net impact of the project is the biodiversity monitoring itself. Currently, the monitoring in the Amazon forest is still incipient and fragmented (Marengo 2007) and the Project will add up another area of monitoring to the Amazon as a whole, and, consequently gather accurate information about the local biodiversity and ecological processes.

None of the Project's activities will introduce invasive species or genetically modified organisms. The Project's developer will 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 a particular specie.

B2 Offsite Biodiversity Impacts

B.2.1 Offsite Project's Impacts

The Project will not generate negative offsite impacts to biodiversity. On the contrary, the Project is expected to generate positive leakage on biodiversity by avoiding ecosystem fragmentation through voluntary engagement of neighbor communities in the Project's activities.

B.2.2 Mitigation Plans

The conservation itself as the aim of the project is already a mitigation strategy. The entire area will benefit from it 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 will 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 will maintain microclimate, avoiding wildfires (Soares-Filho 2006).

B.2.3 Net Effect of the Project on Biodiversity

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 will assure that any minimal offsite negative effect will be 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.

B3 Biodiversity Impact Monitoring

The monitoring of the project zone will follow scientific inventories, monitoring species richness, presence and absence of flora and fauna, and the correspondent interactions. The systematic follow-up of the status of each monitoring target species is fundamental to assess the impact of the conservation actions (The Nature Conservancy 2011).

It is important to choose groups that own different life histories in order to map different responses to habitat losses (Noss 1999).
The monitoring will encompass the following strategies:
- Monitor area-limited species: species that require large patches to maintain viable populations, such as large carnivores. That will indicate potential habitat losses and prey availability (Noss 1999).

Data Variable	Source	Data Unit	Frequency	Reporting
Species abundance	Observations	Carnivores*	Every month	Every month

*Implemented also for HCV

- Monitor resource-limited species: species requiring specific resources, such as frugivorous species, nectar species, snags etc. (Noss 1999). 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 (Marques-Aguiar et al. 2003).

Data Variable	Source	Data Unit	Frequency	Reporting
Species abundance/population size	Collection	Bats	Every month	Every month

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- Monitor process-limited species: species limited to spatial characteristics, such as flooding, and transport of sediments (Noss 1999). The areas containing the flooding forests (igapós and várzeas) constitute an important site of feeding, protection and breeding of fish, amphibians, and invertebrates.

Data Variable	Source	Data Unit	Frequency	Reporting
Vegetation structural analysis	Observations	Igapó/Várzea vegetation*	Every two months	Every two months

* Implemented also for HCV

- Monitor invertebrates groups, such as ants: ants have been widely used in Brazil as a powerful tool to monitor environmental impacts, as it has widespread distribution, high abundance, ecosystem functioning importance, ease of sampling, and well-known taxonomy and ecology (Ribas et al. 2012).

Data Variable	Source	Data Unit	Frequency	Reporting
Ants	Observation /Collection	Vegetation structural analysis	Every two months	Every two months

- Monitor "special interest" species, critically endangered species, endangered species, and threatened species (IUCN, IBAMA).

Data Variable	Source	Data Unit	Frequency	Reporting
Presence/Absence /Abundance	Observation	Species names	Every month	Every month

*Implemented also for HCV

- Monitor bryophytes to assess environmental quality, such as soil, air and water quality (Gentil & Menezes 2011).

Data Variable	Source	Data Unit	Frequency	Reporting
Environment	Collection	Bryophytes	Every two	Every two

Data Variable	Source	Data Unit	Frequency	Reporting
al quality			months	months

- Monitor land use and changes in vegetation cover

Data Variable	Source	Data Unit	Frequency	Reporting
Forest fragmentation	Observation	Species names/location	Every week	Every month

The monitoring strategies will involve the participation of the Scientific Station Ferreira Penna (ECFPn) in Caxiuanã national forest and local community through participatory methods.

The project is committed to develop a full monitoring plan within six months of the project validation and all data gathered from the monitoring strategies will be part of a bigger database. The knowledge of the status of threatened species within the boundaries will be enhanced with the monitoring strategies.

Moreover, the communities and stakeholder will be not only communicated about the monitoring reports, but also included in some of the strategies.

VIII.Gold Level Section

GL1 Climate Change Adaptation Benefits

GL1.1 Identifying possible regional scenarios and impacts in regards to climate change and climate variability, utilizing available information and identifying potential variations in the local land use change scenario due to these climate change scenarios in absence of the project.

The IPCC, created by the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP), has pointed in several documents the regional impacts of climate change and the vulnerability in ecosystems, water resources, human health and production.

The IPCC especial report: regional impacts of climate change (1997), states that:

> *"It is expected that climate change will affect great extensions of forests and grasslands; mountain ecosystems and transition zones between diverse types of vegetation will be particularly vulnerable. Climate change could aggravate the adverse effects of continued deforestation of the amazon rain forests. This impact could cause biodiversity loss and the reduction of rain and run-off inside, as well as outside the basin (by having a reduced recycling amount of precipitation by evapotranspiration), affecting the worldwide carbon cycle" (p. 11)*

The Ministry of environment of Brazil, along with the National Institute for Spatial Research, is developing the project entitled "Climate characterization in the XX century and the climate scenarios for Brazil and South America for the XXI century derived from Climate Global Models from IPCC" and has elaborated several reports that point out the changes in the climate for Brazil until the end of the XXI century and its impacts. The changes expected for the Brazilian amazon and the possible impacts are shown below (Table 22):

Table 22: 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).

GL1.2 Identify likely regional climate change and climate variability scenarios and impacts, using available studies, and identify potential changes in the local land-use scenario due to these climate change scenarios in the absence of the project.

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.

GL 1.3 Demonstrate that current or anticipated climate changes are having or are likely to have an impact on the well-being of communities and/or the conservation status of biodiversity in the project zone and surrounding regions.

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 will impact the people in the Project area due to their high vulnerability, widespread poverty, 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 will 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 will 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.

GL3 BIODIVERSITY EXCEPTIONAL BENEFITS

GL3.1 Vulnerability

GL3.1.1 Critically Endangered (CR) and Endangered (EN) species – presence of at least one individual.

Project area spans throughout the territories of species categorized by the IUCN as Critically Endangered (CR) and Endangered (EN), as shown below (Table 23):

Table 23: Critically Endangered (CR) and Endangered (EN) species in the project area.

Scientific name	Common name	Category (UICN 2012.1)
Vouacapoua americana	Acapú	CR
Pteronura brasiliensis	Ariranha	EN
Chiropotes utahickae	Cuxiú	EN
Anodorhynchus hyacinthinus	Arara azul grande	EN
Guaruba guarouba	Ararajuba	EN
Calycorectes duarteanus	No common name	EN
Psophia viridis	Jacamin de costas verdes	EN
Aniba rosaeodora	Pau-rosa	EN
Trichilia discolor	No common name	EN

Source: Prepared by the author based on the list of threatened species in Pará (IBAMA) and the UICN Red List of Threatened species 2012.1

GL3.1.2 Vulnerable (VU) species – presence of at least 30 individuals or 10 couples

Project area spans throughout the territories of species categorized by the IUCN as Vulnerable (VU), as shown below (Table 24):

Table 24: Vulnerable (VU) species in the project area.

Scientific name	Common name	Category (UICN 2012.1)
Pyrrhura lepida lepida	Tiriba Pérola	VU
Alouatta belzebul	Guariba-de-mãos-vermelhas	VU
Alouatta discolor	Guariba-de-mãos-ruivos	VU
Saguinus niger	Sagüi	VU
Myrmecophaga tridactyla	Tamanduá-bandeira	VU
Leopardus tigrinus	Gato do mato	VU
Priodontes maximus	Tatu camastra	VU
Bertholletia excelsa	Castanha-do-pará	VU
Couratari guianensis	Maú	VU
Couratari tauari	Tauari	VU
Dicypellium caryophyllaceum	Cravo do maranhao ou casca-preciosa	VU
Ficus pakkensis	Figueira-de-pakka	VU
Guarea trunciflora	No common name	VU
Guarea velutina	No common name	VU
Inga microcalyx	No common name	VU
Inga santaremnensis	No common name	VU
Manilkara cavalcantei	No common name	VU
Pouteria brevensis	No common name	VU
Pouteria oppositifolia	No common name	VU
Pouteria petiolata	No common name	VU
Pradosia subverticillata	No common name	VU
Trichilia areolata	No common name	VU

Source: Prepared by the author based on the list of threatened species in Pará (IBAMA) and the UICN Red List of Threatened species 2012.1

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