BIOCORREDOR MARTIN SAGRADO REDD+ PROJECT

Project Design Document

Reduced Emissions from Deforestation and Forest Degradation
San Martin Department, Peru

A Community Forestry Initiative for Carbon and Biodiversity Conservation and Poverty Reduction

Version 4.0 – December 2012

PROJECT DEVELOPER

TECHNICAL PARTNER FOR IMPLEMENTATION

PROJECT DESIGN DOCUMENT FOR REDUCING EMISSIONS FROM DEFORESTATION AND FOREST DEGRADATION (REDD)

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I. GENERAL INFORMATION

Location of the project

Country: Peru
Department: San Martin
Nearest City: Juan Jui, Provinces of Mariscal Caceres and Huallaga

Precise location of project activities: Located in the western part of San Martín Region of Peru, in the basin of Huayabamba river, the project area extends over 303 699 hectares, constituded by three land concessions with conservation purposes: Martin Sagrado, El Breo, Montecristo.
It is next to the Rio Abiseo National Park and Abiseo – Pajaten area.

Project Developer – Project Identification, Design, Monitoring, and Commercialization

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Pur Projet is the project proponent, at the initiative of the REDD+ project. Pur Projet has been present in San Martin region and in the project zone since 2008, starting with the development of community reforestation programs. Pur Projet started the REDD+ project in 2010.

Local Implementing Organization

FUNDACION AMAZONIA VIVA

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The Fundacion Amazonia Viva, created at Pur Projet's initiative, and constituted by the different community associations involved in the project, is responsible for the local project coordination and technical coordination of field activities. (Note: The Fundacion Amazonia Viva was first created as "San Martin Verde", both names can still be found in communication material)

Other Implementing Partners

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II. EXECUTIVE SUMMARY

Historical Context

Peru has the third largest extent of tropical rainforests in the world, after Brazil and the Democratic Republic of Congo. These forests are some of the richest in the world, both in terms of biological diversity and natural resources (timber, energy, mineral resources).

Peruvian forests are under great pressure. About half of Peru is forested. Of this, more than 80 percent is classified as primary forest, the most biodiverse and carbon-dense form of forest. The FAO estimates that the country loses around 269 000 hectares of forest per year, giving it an annual deforestation rate of 0.4 percent (1990-2000). An estimated 3.1% of its forest cover or around 2,164,000 ha has already been lost between 1990 and 2000[1].

Most of this deforestation is the result of subsistence agriculture, which can largely be attributed to the migration of farmers from the highlands taking advantage of Peru's land-tenure law which allows people to own land by occupying it for five years.

Deforestation and degradation are also increasingly the result of development activities, especially logging, commercial agriculture, mining, gas and oil operations, and infrastructure construction.

A growing number of organizations in the department have been trying to protect the remaining natural forests as community forestry areas, but they all lack of financial means. Project sites include large tracts of healthy closed-canopy forests, as well as degraded forests suitable for restoration and assisted natural management.

Table 1 : Peru Forest Figures

Forest area	
Total forest area, 2000	65,215,000 ha
% of land area	50.9%
Area per capita	2.6 ha
Forest plantations	640 000 ha
Forest cover change, 1990-2000	
Annual change in forest cover	-269 000 ha
Annual rate of change	-0.4%
Forest types, volumes and biomass	
Forest types (% of country's forest area)	Tropical 100%
Wood volume in forests	158 m3 / ha, i.e. 10 304 million m3 in total
Wood biomass in forests	245 tonnes / ha, i.e. 15 978 million tonnes in total

[1] FAO, State of the World's Forests, 2005

Number of tree species in IUCN	Red list
Number of native tree species	2,500
Critically endangered	33
Endangered	14
Vulnerable	54
International Conventions and	**Agreements**
Ratification as of 1 December 2004	CBD, UNFCCC, Kyoto Protocol, CCD, CITES, Ramsar Convention, World Heritage Convention

Source: State of the World's Forests, FAO, 2005

The "Biocorredor Martin Sagrado" REDD+ Project

The Biocorredor Martin Sagrado Project for Reducing Greenhouse Gas Emissions from Deforestation ("Biocorredor Martin Sagrado REDD+ Project") aims to address deforestation and its resulting emission of greenhouse gases (GHG) in an area of the Department of San Martin, which is under land use pressure.

The objectives of the Biocorredor Martin Sagrado Project are to protect forests with high conservation value. The project seeks to protect species in risk of extinction while also improving the quality of life of the families that live in these areas.

The Biocorredor Martin Sagrado project area encompasses 295 654 hectares of Amazonian forest located alongside the Huayabamba river. Its creation and effective implementation are from PUR PROJET and Fundacion Amazonia Viva initiatives, in the aim to create a financial mechanism for generating a financial compensation from activities reducing emissions from deforestation (REDD+). The project started in January 2010, as a complementary strategy to the Alto Huayabamba reforestation project, in which PUR PROJET and ACOPAGRO are committed (since 2008), with a plan to replant more than 2,000,000 trees by 2012.

This Martin Sagrado project supports indeed sustainable forest management, agro-forestry, non timber activities and livelihood development in the reserve by providing financing through carbon credits generated from forest protection and regeneration. The project creates a 80-year income stream that will directly enhance household livelihoods and natural resource management capacity.

The project seeks to maintain and increase carbon stocks in the area, enhancing the hydrology, as well as conserving biodiversity and endangered species. Carbon financing will be used to support rural communities to develop a range of livelihood activities including non-timber forest products (NTFP), improved agro-forestry activities and productivity intensification, community-based ecotourism infrastructure, micro-credit and communication walkways development as well as other economic, social, cultural and environmental activities.

The additional resources raised from the sale of these credits will permit to implement all of the measures necessary to control and monitor deforestation within the project site, enforce the law, and improve the welfare of local communities.

From the start of the project, mobilizing of the community to protect forests has demonstrated effectiveness in halting deforestation and degradation in community forestry areas. Community members

have expressed strong interests in developing activities to better preserve their land and avoid deforestation. They have listed the projected activities they are wishing to develop with the support of Pur Projet. These activities have been prioritized and discussed with Fundacion Amazonia Viva and Pur Projet during the visits of the area.

The Amazonia Viva Foundation

The Amazonia Viva Foundation is a Peruvian non-profit foundation created at Pur Projet's initiative. It is constituted by the associations and cooperatives involved in reforestation and forest conservation projects in San Martin region : ORO VERDE and ACOPAGRO cooperatives, and 4 local community associations : APAHUI (Asociacion de Productores Agropecuarios de Huicungo), APROBOC (Asociacion de Proteccion de Bosques Comunales Dos de Mayo), APAP (Asociaccion de Productores Agroforestales Pucallpillo), APAPMASAR (Asociacion de Productores Agropecuarios y Protectores del Medio Ambiante Santa Rosa). It is operated by an assembly of representatives from each member organization, and works with a management team responsible for planification of activities, daily coordination of activities, and management of funds.

Bringing together organizations and projects dedicated to the community preservation of forest in San Martin Region in Peru, the foundation has been created to support and coordinate the efforts of each organization, to reach a higher level of effectiveness and recognition. The Amazonia Viva Foundation is a way of increasing support from local, national and international authorities, and larger public or private funds to finance community activities for the preservation of the environment.

Within the scope of REDD+ project, the Fundacion Amazonia Viva coordinates project activities with member organizations, implements a global scheme for project management and a prioritization of activities, and manages the allocation of funds. The Fundacion Amazonia Viva is in charge of implicating communities in the project zone, through visits to communities with collection of data, feedback and suggestions, and organizations of regular general assemblies for all communities involved in the REDD+ project

Main objectives

- Preserve and protect the fragile ecosystems of the Peruvian Yungas in San Martin, on the watersheds and river basins, procurement sources for the local population and San Martin
- Protect wildlife, particularly vulnerable or endangered species
- Protect scenic or landscape heritage to promote economic activities, recreation and environmental education
- Preserve and ensure the continuous flow of environmental goods and services especially fixing greenhouse gases and water regulation

Secondary objectives

- Democratic participation of communities to the carbon credits sales, managing their community forests and creating conservation areas.
- Promote political cooperation at all levels of management: national government, regional and local to ensure adequate legal framework and the sustainability of long-term projects with economic results that encourage conservation and reforestation of the areas

Project activities

The project aims to prevent the deforestation through the implementation over 80 years of the following categories of activities:

1. Legal: Formalization of project area will be conducted through the attribution, registration, and maintenance of concessions for conservation at regional government level, as well as registration at higher international level. In combination, financing of legal actions will help to fight illegal intrusions, encroachment and logging in the area. The project will also help developing forest management plans in a collaborative fashion. The project will support the communities in developing land and water resource development plans in a participatory and democratic manner by making improvements in the existing monitoring system managed by the local communities and by making large investments in the work of the environmental protection infrastructure and staff and the land titling agencies.

2. Control & Surveillance: Construction and maintenance of control points, demarcation of area boundaries, improvement of walkways, and patrolling/forest guarding are essential elements to effectively prevent uncontrolled deforestation. Also, increasing legitimacy of patrol groups and strengthening relationships with the local Forestry Administration will help creating a unified group of stakeholders that can prevent further forest encroachment, illegal logging, uncontrolled migration and other threats to forest integrity.

3. Sensibilization and Communication: Sensibilization of communities on conservation stakes will be done through local promoters, communication material, and implication of communities in the activities. Visits of the area will be conducted to raise awareness on forest's richness and environmental services. Education centres will be constructed to train and transmit scientific information to local communities in conservation efforts as well as to provide opportunities for the training of professionals specializing in biology, forest management, environmental education, etc.

4. Non timber forest valuation: community organization and training will be combined to improve the local capacity in forest management and forest product extraction such as seeds or medicinal plants. Research and development of new technologies will allow for innovation in the quality and types of products local communities produce. Furthermore, market development activities such as eco-tourism will be undertaken to improve market access. This combination should also enhance the production of forest products from the local communities involved in the project.

5. Scientific and Inventory: Inventories of biodiversity and carbon stocks will be conducted to improve knowledge on high conservation values species, on environmental services rendered by the forest in the whole region. Inventories will also contribute to monitoring of deforestation and conservation impacts on species conservation. Alongside, other scientific studies will investigate onsite the relationships between forest and water, food resources and food sovereignty, living conditions, wellbeing.

6. Renewable Energy: Even minor contributor, the development of renewable energy and equipment to lower fuelwood is a key component to make people aware of the need to develop alternative sources of energy.

7. Reforestation: Development in the leakage belt, where community lives, of agroforestry programs to plant native timber trees in the farmers parcels. This reforestation activity aims at lowering the pressure of agriculture on surrounding forest (yield increase), provide alternative source of fuelwood an timber to the communities, as well as raising communities awareness on forests. The project will build upon Pur Projet's experience in reforestation programs in the region. The project will also conduct Assisted Natural Regeneration within the project area to re-enrich degraded areas with native species.

8. Expansion, training and empowerment of communities: Empowerment of the communities on conservation, sustainable agriculture, resources management, and coordination with other neighbouring communities is very important to secure the sustainability of the project and limit leakage and risks from outside of the project area. It will help also promote the project in the whole region of San Martin.

Each of these activities targets one or more of the identified deforestation drivers (section

Table 2 : ***Summary of Project Activities Categories and their effectiveness on each driver***

	Contribution DF (d)	Effectiveness (a,d) : Relative reduction in the impact of driver due to activities (%)							
Deforestation threats	Relative importance of driver to total deforestation (%)	Legal	Control & Surveillance	Sensibilization & communication	Non Timber forest valuation	Scientific & Inventory	Renewable Energy	Reforestation in agroforestry models	Coordination, Expansion & Transmission	Total
1. Conversion to croplands, pastures and housing	70%	15%	20%	20%	20%	5%		10%		**90%**
2. Conversion to settlements / infrastructure (Roads, water and electricity)	15%	15%	25%	20%		5%	5%		15%	**85%**
3. Selective logging of high-value species for commercial sales	10%		30%	20%	15%	5%		5%		**75%**
4. Timber harvesting for local use (housing and infrastructures)	1%			50%			10%	10%	20%	**90%**
5. Fuelwood gathering	1%			20%			30%	10%	10%	**70%**
6. Uncontrolled fires	2%		30%	40%					20%	**90%**
7. Intentional fires (Paths opening and fires for hunting)	1%		30%	15%	30%	5%			20%	**100%**
8. Mining and Hydrocarbon activities encroachment	0%	40%			40%				20%	**100%**
9. Economic land concession (timber and agriculture)	0%	50%			50%					**100%**
Effectiveness of activity on total deforestation		12,8%	21,7%	20,7%	15,8%	4,8%	1,2%	7,7%	3,2%	87,7%


GENERAL
SECTION

III. GENERAL SECTION

G1. Original Conditions at the Project Site

G1.1. Location of the Project and Basic Physical Parameters

G1.1.1 Location of the project

General location

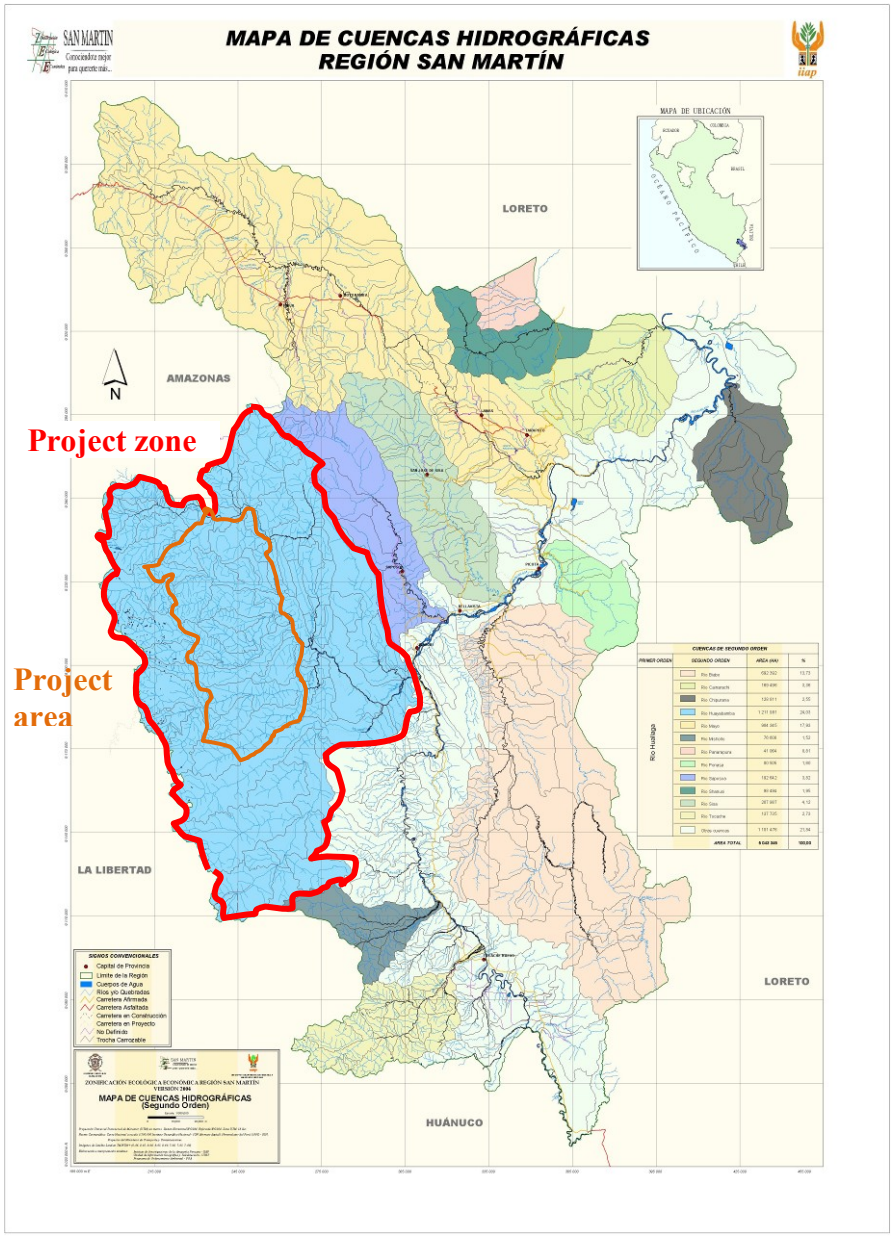
The project is located in Northern Peru, in the western part of the San Martin province. The province of San Martin is located in the Amazonean Andes, tropical region of Peru at the transition between the high Andes and the lower Amazon basin. The Martin Sagrado project zone can be reached by boat the town of Juanjui (3 hours).

Figure 1 : General location of the project

Project zone

The project zone is constituted by the river basin of the Huayabamba River, delimited on the Western and Northern side by the Andes and the frontier with Amazonas and La Libertad provinces, to the East by the hills chain between Huayabamba and Saposoa valleys, on the South East by the Huallaga river.

Figure 2 : Location of the project zone



Source : ZEE San Martin, 2005

Project area:

The project area is constituted by three concessions with conservation purposes: Martin Sagrado, El Breo, and Montecristo encompassing 303 699 hectares

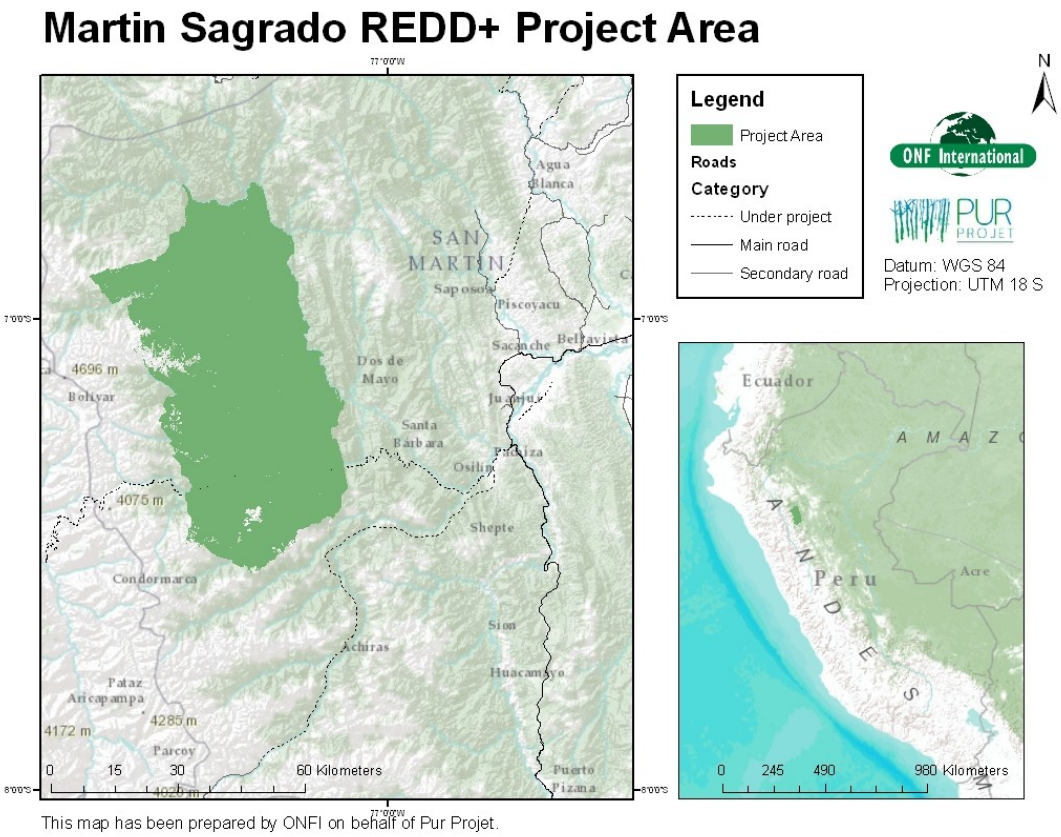
Boundaries are defined as follows:

Northern limit	Frontier with the Amazonas region, Rio Verde river
Southern limit	Frontier with National Park Rio Abiseo
Eastern limit	Huayabamba river
Western limit	Frontier with the concession Alto Huayabamba (Andes)

- The Association de Proteccion de bosques Comunales Dos de Mayo (APROBOC) owns the concession title of the concession El Breo.
- ACOPAGRO cooperative owns the concession title of the concession Martin Sagrado
- The Asociacion de Productores Agropecuarios de Huicungo (APAHUI) is in the process of obtention of the concession Monte Cristo.

Removing from the area of the 3 concessions the non-forested areas, we get the exact project area, which covers 295,654 hectares.

Figure 3 : Location of the project area



This map has been prepared by ONFI on behalf of Pur Projet.

G1.1.2 Climate

The proposed REDD project activity takes place in the Tropical Rainforest area (according to GPG LULUCF 2003, IPCC[2]). According to the Koppen Classification System[3], the climate of the region is of the type AM, that is to say tropical warm, season humid, characterized by presenting abundant rainfall and a short dry season, which has no significant influence on the development of the vegetation due to the abundance of rainfall during the rest of the year.

In general terms, it can be concluded that the climate in the studied area allows the development of agricultural activities and cattle raising without major limitations. On the other hand, the forestry sector is limited during the rainy season with respect to wood supply, which leaves a maximum of 5 months appropriate for the efficient use of this resource.

According to the Economic Ecological Zoning San Martín Region[4], the proposed area has the following types of weather:

Climate AB'4 Type: Corresponds to a super-humid climate (A) and semi-warm (B'4). It is located above 1200 to approximately 2000 m, especially on mountain slopes. It is estimated that every month excess moisture is present. It covers an area of approximately 15.67% of the proposed area.

Climate B1rA'a' type: corresponds to a slightly damp climate (B1) and Warm (A'), with no water deficit (r) and low heat concentration in the summer (a '). It is estimated that every month excess moisture is present. It covers an approximate area of 0.01% of the proposed area.

Climate B4B'2 Type: Corresponds to a very humid climate (B4) and cool temperate (B'2), which corresponds to the jungle, which is located above 3000 m, especially on the hillsides. It is estimated that every month excess moisture is present. It covers an approximate area representing 2.64% of the proposed area.

Climate B4B'3 Type: Corresponds to a very humid climate (B4) and warm temperate (B `3). It is located at altitude levels ranging between 1800 and 2800 meters. It is estimated that every month excess moisture is present. It covers an area representing approximately 50.74% of the proposed area.

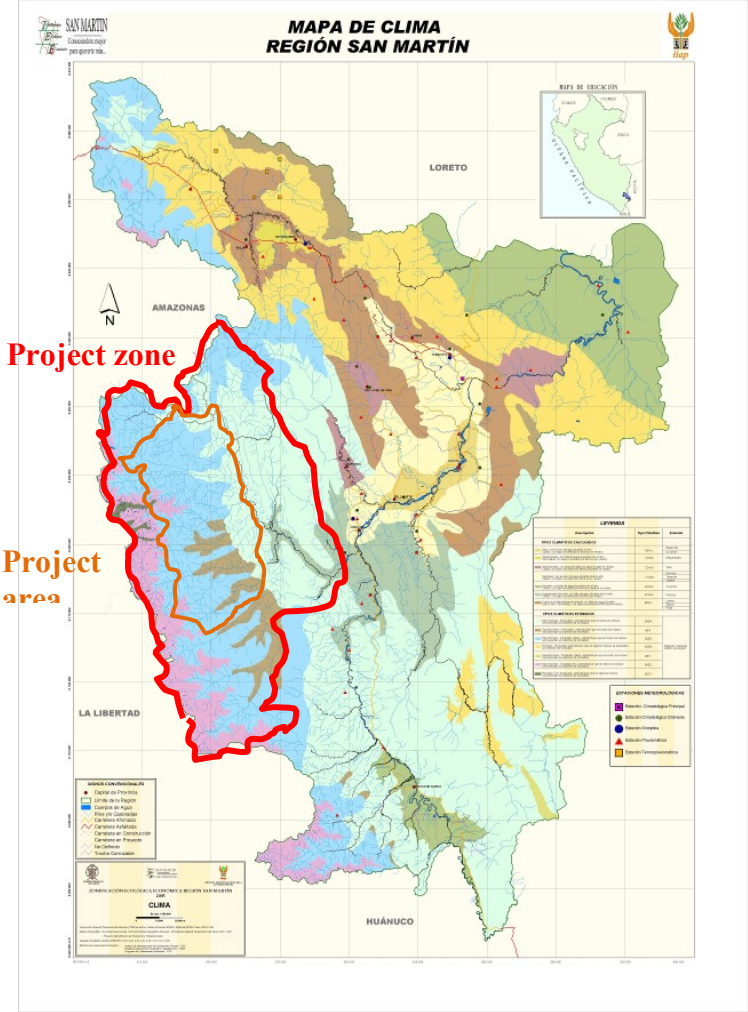
Climate B4B'4 Type: Corresponds to a very humid climate (B4) and semi-warm (B'4). It is located below 1200 m, especially on the slopes of mountains. It covers an area representing approximately 30.94% of the proposed area.

[2] IPCC, Good Practice Guidance for Land Use,Land-Use Change and Forestry, 2003

[3] Peel, M. C. and Finlayson, B. L. and McMahon, T. A., « Updated world map of the Köppen-Geiger climate classification [archive] », Hydrol. Earth Syst. Sci., 2007

[4] Zonificacion Ecologica Economica de la Region San Martin, Diciembre 2005

Figure 4 : Climate map of the project zone



Source : ZEE San Martin, 2005

G1.1.3 Geology

The geological units that form part of the Concession are the following

Intrusive San Martín (Ps-gr/gd): Its composition is represented mainly by granite and granodiorite whitish color (leucocratic). This unit is considered an intrusive complex, as it shelters different types of igneous rocks ranging from granites, granodiorites and subvolcanic bodies as quartz latite. It occupies an approximate area equivalent to 0.11% of the proposed area.

Yarahuango Formation (Py): Corresponds to a set of red lithology continental layers, which begins the continental sedimentation with minor interruptions of marine transgressions. It occupies an rea approximately equivalent to 0.19% of the proposed area.

Chonta Formation (Km-ch): Formed by limestone sequences as micritic limestones, bituminous marl, shale levels, pelitic as silty clays, gray-green. Silty clay presents gray-green laminar sequences, housing among drywall layers that are exposed in cross and parallel manner, and rectangular lenses of sandstone. Occupies approximately an area equivalent to 0.38% of the proposed area.

East Group (Ki-o): Includes white sandstone outcrops of medium-grained quartz. East Group sediments

have undergone depositional stages, ranging from those made in an epicontinental shallow sea, which ranged between stages of transgression and regression; to sediments deposited in a tidal environment (deep sea). It occupies an area approximately equivalent to 3.91% of the proposed area.

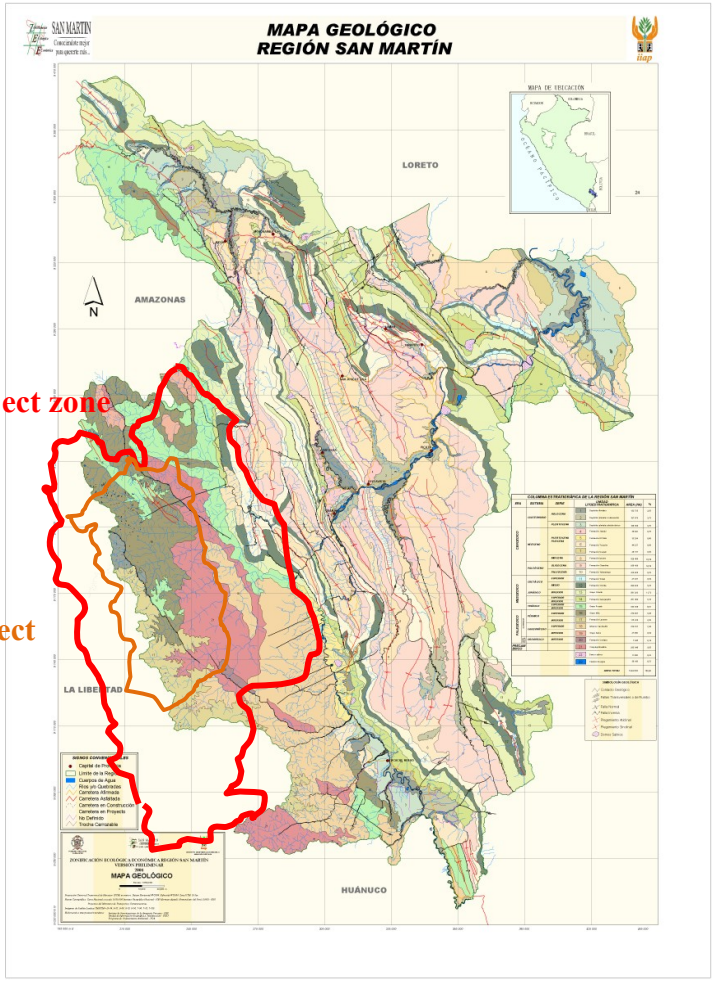
Ipururo Formation (Nm-i): Formed by reddish calcareous claystones grading to siltstone, sandstone interspersed with thin gray to greenish calcareous beds. Includes gray marl, reddish sandstone fine to medium grained, calcareous red claystones and volcanic sediments. It covers an area approximately equivalent to 7.09% of the proposed area.

Pucara Group (TsJi-p): Training Chambar, carbonate sequence consists of dark gray limestone interbedded with bituminous limestone and dolomitic limestone. As seen in the area where it floats Huicungo Huayabamba-gray limestone sequences, which occurs in thin to medium layers. It encompasses an area approximately equivalent to 26.18% of proposed area.

Mitu Group (Ps-m): Composed of a purely detrital molasse sequence alternating with volcanic material. These molasses are composed of conglomerates and sandstones interbedded with coarse-grained thin red shale levels. The clusters have the nature of shale, quartzite and granite, forming a sequence whose key feature is red. This group covers an area approximately equivalent to 29.01% of the proposed area.

Marañon Complex (PE-m): The representative lithology consists of greenish shales, gray gneiss, quartzite, slate, and metavolcanic. It occupies an area equivalent to 33.13% of the project area

Figure 5 : Geology map of the project zone



Source : ZEE San Martin, 2005

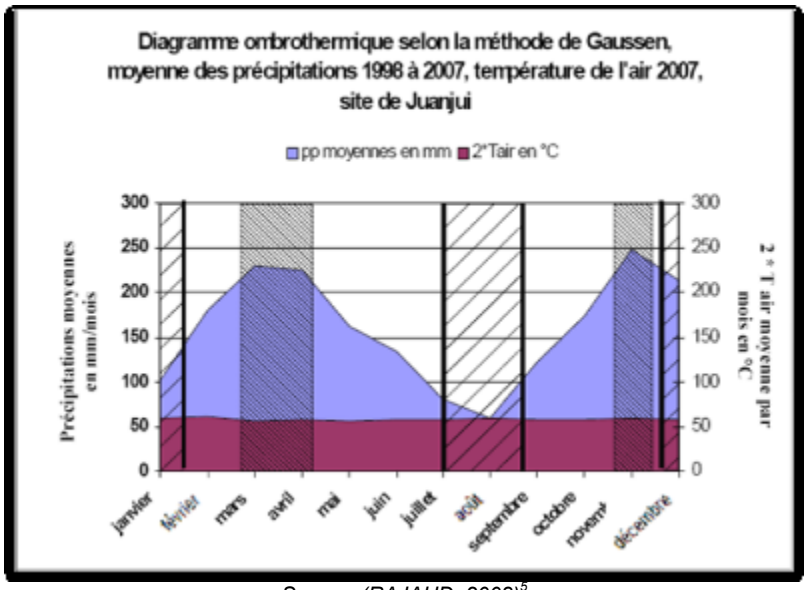
G1.1.4 Hydrology

From the mountain are going down numerous highly torrential streams, carrying products of erosion (sediments), flowing into the tributaries of the Huallaga River.

In general terms, the area is characterized by the presence of abundant rainfall during most part of the year, being able to differentiate a long season denominated “winter” from October to May and a short dry season denominated “summer” from June to August. This pattern does have a significant influence on the development of the vegetation in the area.

Based on the information obtained from the Juanjui, San Martin, airport meteorological station between 1998 and 2007, the total average annual rainfall is 1974 mm. It can be appreciated that rainfall has less intensity during the months of May to September, where 20 to 25% of the total annual rainfall occurs. However, the dry season is not so dry, and there’s no severe drought in the region. During the rainiest period, from October to April, 75 to 80% of the total annual rainfall occurs.

Figure 6 : Hydrology diagram in Juanjui (1998-2007)



Source: (RAJAUD, 2008)[5]

G1.1.5 Hydrography

Rivers and streams that make up the hydrographic network of the project zone are of the "clear water", which is characterized by the presence of crystalline water, allowing full transparency and clear observation of the channel bottom. This feature is that these water bodies are born and walk among the hills that present fairly consolidated geologic material. Many of them have moderate electrolyte content is

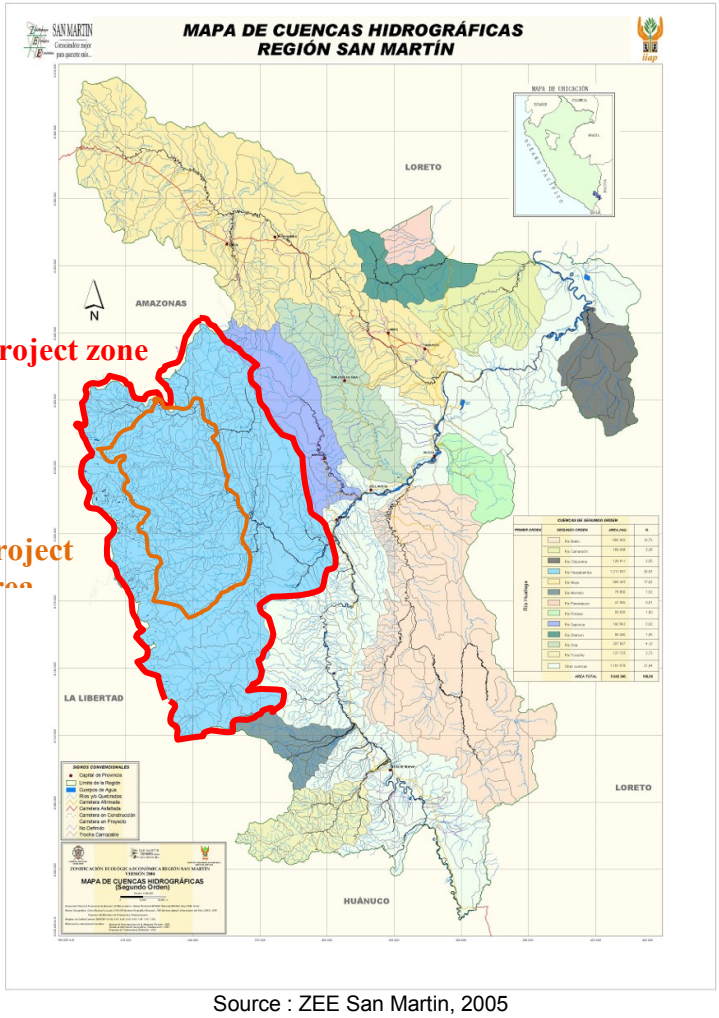
[5] RAJAUD A, 2008. Analyse-diagnostic d’une petite région agricole située dans l’aire d’influence de la coopérative cacaoyère Acopagro, région de San Martín, Pérou - *Mémoire de DAA Développement Agricole AgroParisTech.*

reflected in the moderate electrical conductivity values. It is characteristic observed in these bodies of water turbidity after the fall of rain in the area of its basin, a process that lasts a very short time, and the presence of rapids in the rivers certain sections due to steep slopes of the channel into sections very short. These sections are usually partially blocked by rocks or stones that obstruct water, gaining power faster.

In the concession EL Breo, there are two watersheds: the watershed of Condorcillo 70,237.63 ha (61.71%). And the watershed of Rio Breo, comprising 43,588.50 hectares that represents 38.29% of the area. These rivers are major tributaries Huayabamba, born in the foothills of the Cordillera Oriental (see Map No. 08 Basin).

Below the confluence of Jelache to the confluence of Abiseo, there are no major tributaries of the river Huayabamba, but only a series of short gorges (4-6km) on its right bank. In its lower reaches, the Huayabamba receives input from the Abiseo.

Figure 7 : Hydrography map of the project zone



Source : ZEE San Martin, 2005

G1.1.6 Physiography

Physiographic units that make up the surface area for project zone are described below:

Physiographic Province: Andean Cordillera
The Andes is generally characterized by presenting a varied topographical configuration from alluvial valleys and terraces to form hills and mountains, with very uneven relief. The project area has two units physiographic province weather: cold Land and Land perhumid warm to temperate.

G1.1.6 A) Unit warm to temperate climate Land:

Covers much of the project area. It covers an area approximately equivalent to 97% of the proposed area. With temperatures ranging from 14.5 º C - 25 º C, with annual rainfall of 500 to 4,000 mm and altitude from 500 to 3,500 meters. In the proposed area, this unit has two major climatic landscapes: mountainous (eastern range), mountainous terrain and hills (mountains subandina).

- Great mountainous landscape (Cordillera Oriental):

It is characterized by rugged topography with slopes ranging from 25 to 75%. It features a single landscape: High Mountain Landscape. It is formed by the elevations of land which have an altitude above 800 m. These categories are:

- High mountains of steep slopes:. Dissected relief Presents Protection Association of Communal Forest Dos de Mayo - Alto Huayabamba Technical Proposal that supports the creation of the Conservation concession for "The Breo '30 with slopes ranging from 25-50%, soils are very shallow due to contact lithology.

- High mountains of steep slopes:. Presents strongly dissected relief with slopes ranging from 50 to 75%. The soils are very shallow.

- High mountains extremely steep hillside: Presents strongly dissected relief with slopes greater than 75%. The soils are very shallow líctico by contact.

- Great Landscape mountainous terrain and hills (Sub-Andean Cordillera)

Exhibits from flat topography with slopes (0-4%) located in the valleys to very rough relief with slopes greater than 75%. It consists of a landscape that is described below: High Mountain Landscape. It consists of ground elevations have an altitude of over 800m. They have identified two sub landscapes according to its slope:

- High mountains steep slopes: Presents relief with slopes ranging from 25 to 50%. The soils are shallow.

- High mountains of steep slopes: Presents strongly dissected relief with slopes ranging from 50 to 75%. The soils are shallow to very shallow

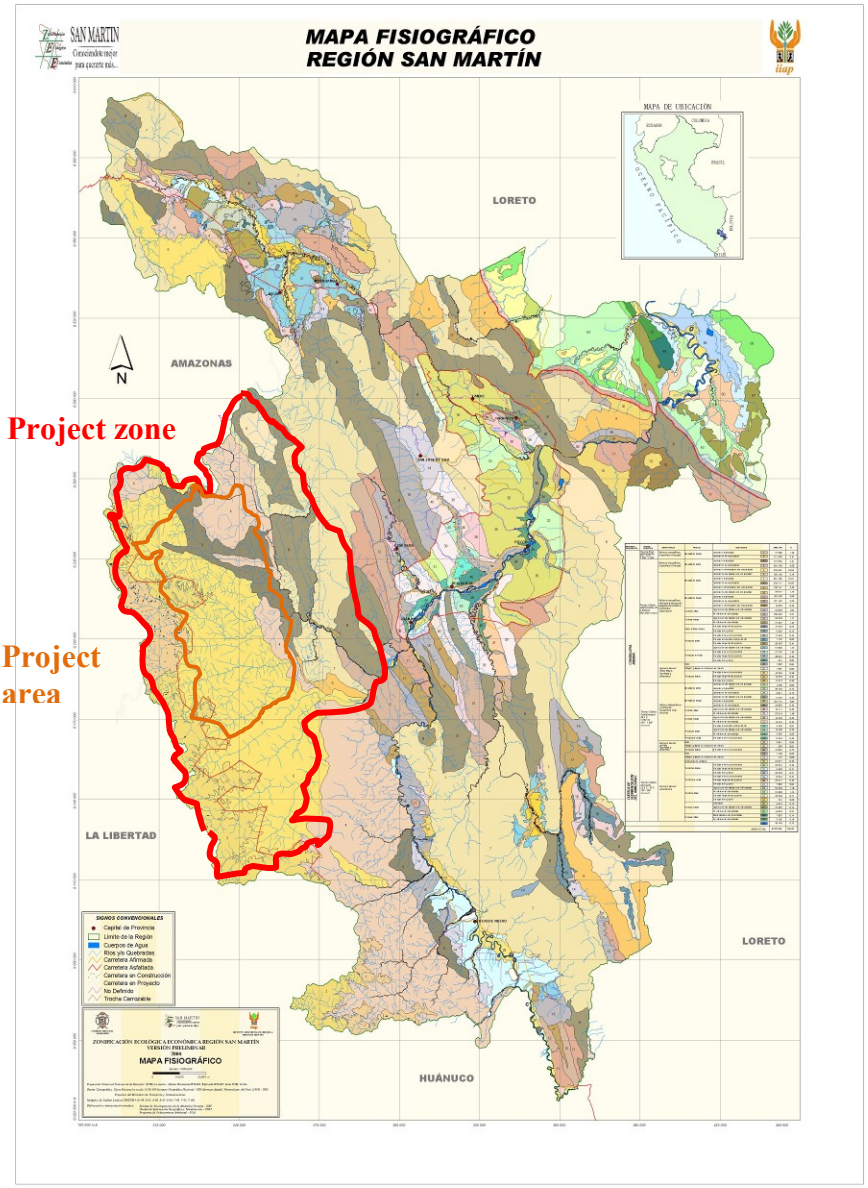
G1.1.6 B) Unit Climate: Cold Lands perhumid

It covers an approximate area of 3% of the project area. With temperatures ranging from 3 º to 6 º C, with average annual rainfall of 1,750 to 1,800 mm and 3.250 to 4.500 m altitude. This unit features a large landscape climate, mountainous relief (Cordillera Oriental), described below: Great Landscape: Mountainous Terrain (Cordillera Oriental), is characterized by rugged topography with slopes ranging from 25 to 75%. It features a single landscape: High Mountain Landscape. It is formed by the elevations of land which have an altitude of over eight hundred feet high. These categories are:

- High mountains steep slopes: Raised dissected with slopes ranging from 25 to 50%, soils are shallow to moderately deep, moist depressions in areas dominated soil organic in nature.

- High mountains of steep slopes: located in the western part of the San Martin region, have strongly dissected relief with slopes ranging from 50 to 75%, the soils are shallow to very shallow.

Figure 8 : Physiography map of the project zone



Source : ZEE San Martin, 2005

G1.1.7 Soils

Generally soils are poor in nutrients, due to the nature of the lithology below, the strong chemical meteorization (caused by high temperatures and high humidity) and the washing of nutrients due to heavy rain during great part of the year. In these natural conditions, the fertility of the soil is linked to the organic cycle. Due to the abundant vegetative cover of the tropical forest there is a constant supply of organic matter, mainly as litter that afterwards is transformed into humus. Due to climatic conditions and the action of microorganisms, the decomposition of the organic matter is so fast that it only leaves a thin layer of humus relatively rich in nutrients. It is observed that most of the roots of the plants are found in this superficial layer to absorb the nutrients.

In the high plains, soils are generally well drained. Only in these not very dissected units, soils are poor and moderately drained. Soils in the high plains have low fertility and could develop toxic levels of aluminum for the plants.

Soils in low plains vary from poor to moderately well drained, depending on the grade of dissection. They have low to very low fertility and the aluminum saturation is very high.

In the highly dissected hills and in lower proportion, soils present a franca texture in the superficial layer and an accumulation of clay in the subsoil, consequently they are very susceptible to erosion.

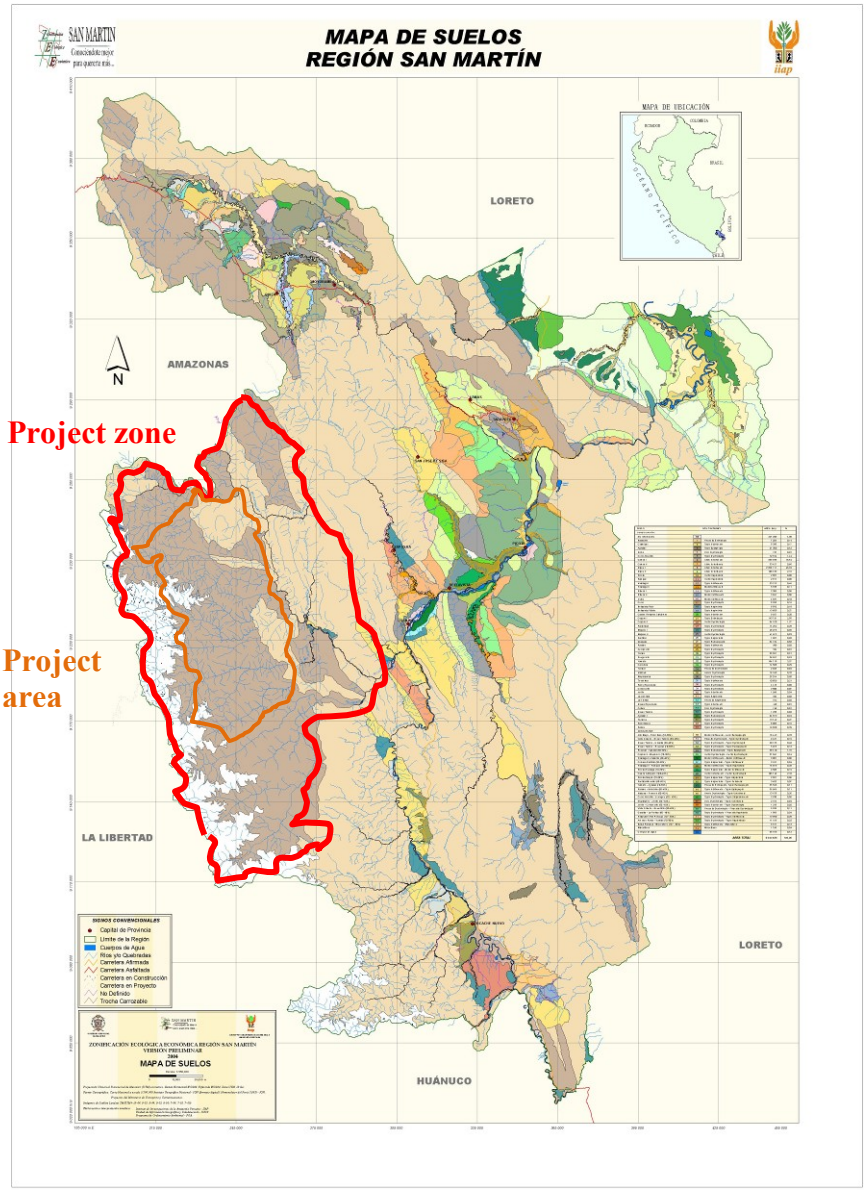
There are 5 soil series in the project zone, according to the “Zonificacion Ecologica Economica 2004”, made by the regional government of San Martin, following the US Soil Taxonomy (1990):

Calera Series I (Lithic Udorthents): Equivalent to 78% of the proposed area. Made up of soils derived from calcareous residual materials (shales and limestones). The soil is very superficial, with a weakly developed A horizon, thin layered (less than 40 cm), well drained, variable texture, granular structure and friable consistency. These soils have a neutral reaction (pH 6.6-7.3), high organic matter content (8.48%). Due to some limitations of slope and depth, these soils are targeted for protection purposes only.

Nippon Series I (Lithic Udorthents): Equivalent to 20% of the proposed area. Made up of soils derived from acidic waste materials (quartz sandstones). Located in areas of steep slopes of high hills and mountains. They are very shallow, well drained, coarse-textured, friable mass. When there is still a C horizon of limited thickness and gravel mixed with smaller gravel of different degrees of decomposition. Extremely acidic reaction (pH 4.5), high aluminum saturation and base saturation. Due to some limitations of slope and depth, the vocation of these soils is geared for protection purposes only.

In very small proportions, on the banks of Huaybamba river close to Dos de Mayo, Santa Rosa communities, there are 3 more soil types: **Belavista Palido (Typic Hapladalts), Copara I (Typic Eatradepts), and Moparo I (Typic Dystradepts).**

Figure 9 : Soil map of the project zone



Source : ZEE San Martin, 2005

G1.1.8 Soils Use capacity

The project zone includes lands that have no ecological or soil conditions required for the operation of crops, pasture or forest production and other lands, although they have natural forest vegetation. Its use is not economical and should be managed for watershed protection, wildlife, scenic values, recreational and other involving collective benefit or social interest. Within this group we have:

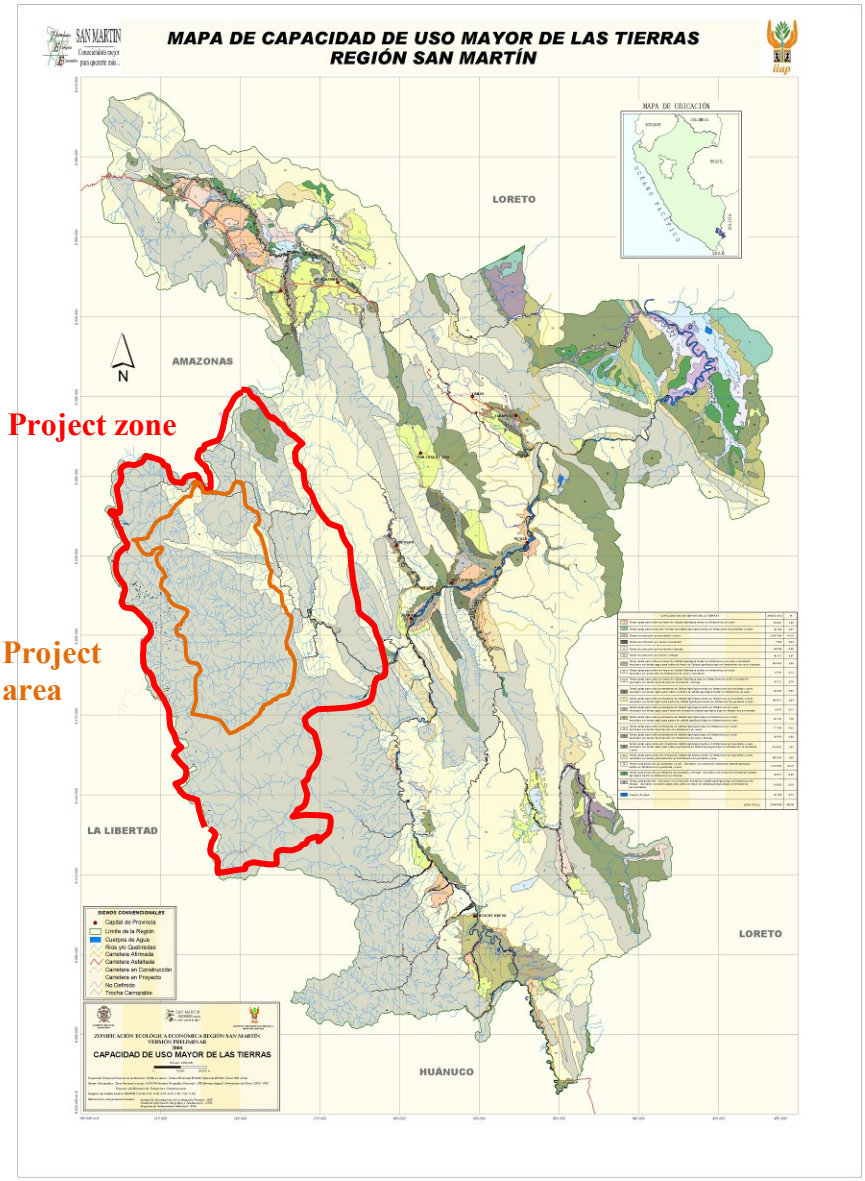
Simple: Xes: Includes an approximate area of 85%, includes surface soils, in areas of steep slopes, with

evidence of erosion. The limitations of use are related to soil and topographic factors, soil erosion.

Associated: Xes-F2es: Includes an approximate area of 15 %: association of soils for land protection with limitations concerning relief which is very steep, and land suitable for forest production, but with limitations concerning terrain, poor fertility and depth the ground.

At very small scale, on the banks of the Huayabamba river near the communities of Dos de Mayo and Santa Rosa, the project zone includes areas of land for permanent cultivation of average quality with limitations due to slopes and erosion, and land for forestry of average qulity with limitations due to slopes and erosion.

Figure 10 : ***Soil use capacity map of the project zone***



Source : ZEE San Martin, 2005

G1.2. Types and condition of vegetation within the project area

G1.2.1 Ecosystems

The project area completes a major role in the connectivity between the Abiseo River National Park and the "Bosque de Proteccion Alto Mayo", part of the Conservation Corridor for Abiseo - Condor - Kutukú, considered as high priority for conservation and nucleus of one of the centers of high diversity ("Biodiversity hotspots") in the Tropical Andes.

Part of the project area also has the status of being a buffer zone for the Abiseo River National Park.

Due to its hydrographic position and its topographic variations, the project area includes the following ecological floors: Tropical Wet Forest (bh T) and Subtropical Wet Forest (bh S/T) (in transition to a subtropical very wet forest).

Terrestrial Ecological Systems – SETs

The Data Center for Conservation – UNALM & TNC (2006)[6], using biophysical models from different inputs and different methods, identified and described the terrestrial ecological systems (SET) of the Peruvian Yungas. Applying the digital map material produced by superimposing the reference and the proposed area coverage using GIS software, 9 types of SETs were identified for the project zone, which are detailed below:

Pluviseasonal Andean shrub and high mountain grasslands:
They have a brush or grass-type cover, and xeric tropical or tropical pluviseasonal bioclimate. It is located in high mountain areas. Altitude 2900 m from the potential to over 3600msl.

High Mountain Rainforests:
Yunga hyper humid rain forest system, dominated and characterized by several species of evergreen trees and shrubs, and leaves lauroides sub-escleromorfas. Among species present in this well-preserved forests, the genera Podocarpus, Weinmannia, Oreopanax, Hesperomeles and Ilex. The forests are of low or medium height, canopy between 10 and 20 meters, featuring several levels or layers of undergrowth, large biomass of epiphytic non-vascular. It is located on high mountain slopes and ridges of mountains with frequent fog. Frequent Chusquea spp. and Ericaceae in the understory. Potential Altitude 3100 - 3200 msl to 3700 msl.

High Mountain Pluviseasonal forest:
Yunga forests in areas with humid pluviseasonal bioclimate. Existence of an period with marked decrease in annual rainfall. Crop conditions and human uses are also different from those in High Mountain rainforests, with a significant incidence of fire as an element or factor anthropic landscape transformation. It is located on high mountain slopes, soil deep, well drained. Potential Altitude 2900 - 3100 m to 4000 - 4200msl.

Medium Mountain Rainforests:
Set of associations of evergreen forests, of medium or high height, multi-layered and quite diverse. They have abundant epiphytes and common ferns. They thrive in areas with hyperhumid tropical bioclimate, on deep soils and well drained humus. Forests well preserved are generally dominated by species

[6] CDC-UNALM y TNC. 2006. Planificación para la Conservación Ecoregional de las Yungas Peruanas: Conservando la Diversidad Natural de la Selva Alta del Perú. Informe Final. Lima, Perú. 207 pp. + anexos.

Podocarpus, Weinmannia Prumnopitys. It is located on mountain slopes with well drained soils and frequent fog. Potential Altitude 1700 - 1900 m to 2900 - 3100 meters.

Medium Mountain Pluviseasonal forest:
Ecological system similar as the Medium Mountain Rainforests, but in areas of pluviseasonal tropical bioclimate, particularly in mountain areas with less steep slopes or in valleys with partial effect of orographic rain shadow. Associations of seasonal evergreen forests, developed in humid pluviseasonal areas. And, as in the previous case, well preserved rain forests are dominated by Podocarpaceae species or genera as Weinmannia, Clethra, Hesperomeles and Ilex. It is located on mountain slopes with well drained soils. Potential Altitude 1700 - 1900m to 2900 - 3100msl.

Lower Mountain Evergreen forests:
Ecological system of the thermotropical Yungas whose potential vegetation is evergreen high and middle-height forest (15 - 20 meters). Vegetation is quite diverse, but often has in common several species of Juglans Cinchonoideas (Cinchona, Ladenbergia). They thrive in moist soil very deep, well drained to excessively drained slopes of the sub-Andean mountains. Potential Altitude 1200 - 2200msl.

Lower Mountain rainforests and palm forest:
Ecological system with dense multilevel forest vegetation, often with abundant palms Andes (Dictyocaryum), developed in the higher elevations of the lower mountains, above about 1200 to 1400 meters, where it is preferably higher slopes and ridges or mountain ridges of the sub-Andean terrain well exposed to rain and fog. It develops on soils quite deep. The floristic composition is often characteristic of species of trees and shrubs Cinchonoideas (Ladenbergia, Cinchona). It is located on high mountain slopes and ridges dividing well-drained soils. Potential Altitude 900 - 1000 m to 1700 - 2000 meters.

Mountain forests and xeric shrublands of interAndes valleys:
Vegetation of semi-dry and dry valleys of the interandes floor of the Yungas, which shows a marked climatic effect of orographic rain shadow with dry xeric bioclimate. It is located on the mountain slopes of the montane well-drained soils to more or less degraded or eroded. Altitude 2300-3200m.

Transitional Rainforest of the foothills:
Forest is structurally high (20-30 meters), multi-layered, evergreen and with high floristic diversity, constituting one of the most complex ecological systems, diverse and less known. It is strongly threatened by recent human colonization, involving high annual rates of deforestation. Mountain slopes and foothills with well drained soils. 800 to 900 meters above sea level from 1700 to 2000 meters.

G1.2.2 Vegetation

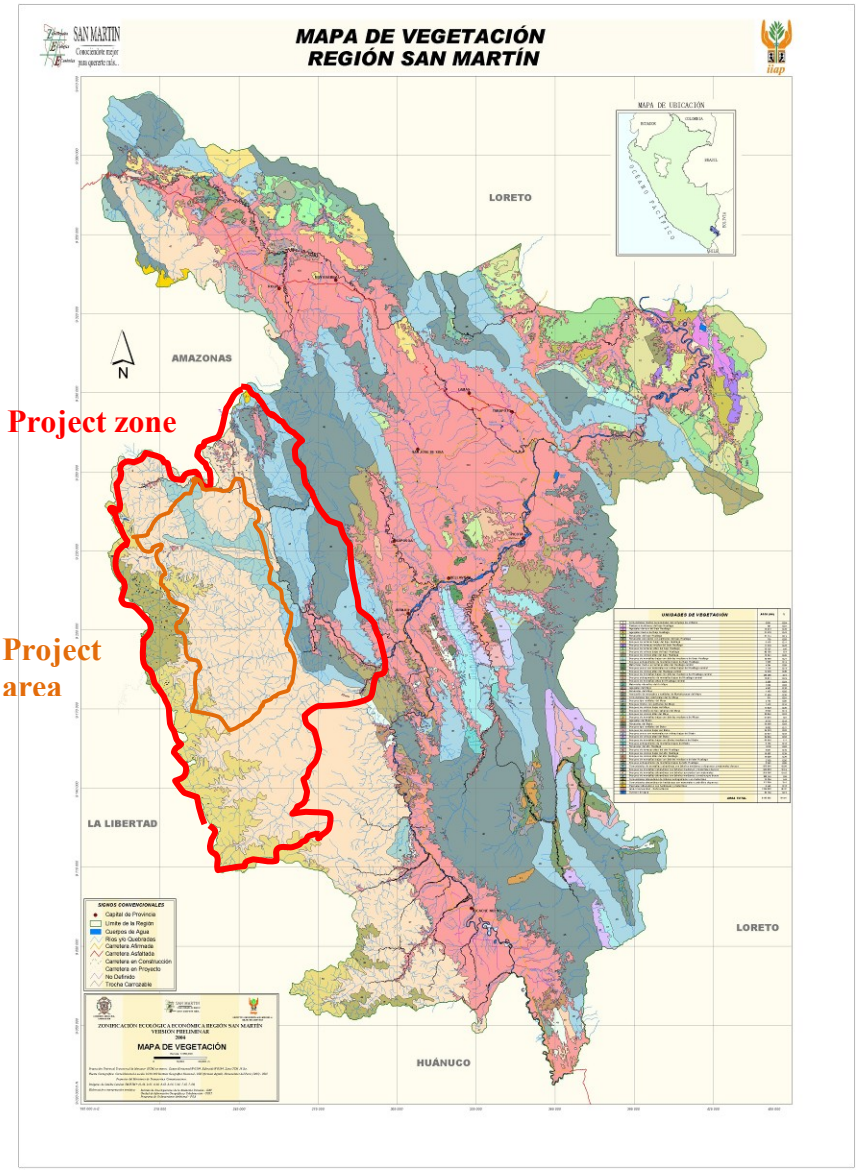
Based on the interpretation of LANDSAT TMS satellite images, the Technical Unit in charge of the Ecologic Economic Zoning of the San Martin Province carried out a classification of vegetation types. 53 vegetal formations have been identified of which 39 correspond to forests, totaling 2.8 million hectares in San Martin (Source: ZEE, 2005).

The presence of associations and subtypes of forests within the major identified vegetation types is caused by the heterogeneity that characterizes the tropical forests. Generally, the timber species are distributed within the whole area, varying in frequency and volume in each type of forest.

The proposed project zone ecompasses 5 vegetation types :
- Forests of higher Andean mountains with medium trees in associacion with “matorrales” (approximately 85% of th area)
- Forests of lower Andean mountains with medium trees and dense “matorrales” (~5%)
- Forests of higher Andean mountains with medium trees and dense “sotobosque” (~4%)
- Combination in higher Andes of herbaceous with bushes and smaller trees and “matorrales” dispersed
- Combination in lower Andes of medium and dispersed trees with dense “matorrales”

This Amazon Andean foothill forest is characterised pricinpally by the following species:
Aspidosperma rigidum, Astorcaryum murumur, Attalea phalerata, Brosimum acutfolium, B. lactescens, Cariniana estrellensis, Cedrela odorata, Celtis schippi, Cetrolobium ochtryxylum, Clarisia biflora, C.racemosa, Coussapoa ovalifoloa. C. villosa, Erythrina poeppigiana, Guarea macrophylla, Iriartea detoidea, Leonia glycicarpa, Porcelia steinbachii, P. ponderosa, Poulsenia armata, Pourouma cecropiifolia, Protium opacum, Pseudolmedia laevis, P. macrophylla, Ruizodendron ovale, Sloanea guianensis, Socratea exorhiza, Spaattosperma leucanthum, Swietenia macrophylla, Tabebuia serratifolia, Tapura acreana, Terminalia amazonica, T. oblonga, Trichilia pleeana, Thrihis caucana. (Navarro, 2002[7]).

Figure 11 : ***Vegetation map of the project zone***



Source : ZEE San Martin, 2005

[7] Navarro, 2002, Geografía Ecológica de Bolivia. Vegetación y Ambientes Acuáticos. Centro de Ecología Simón I. Patiño-Departament de Difusión. Cochabamba. 719

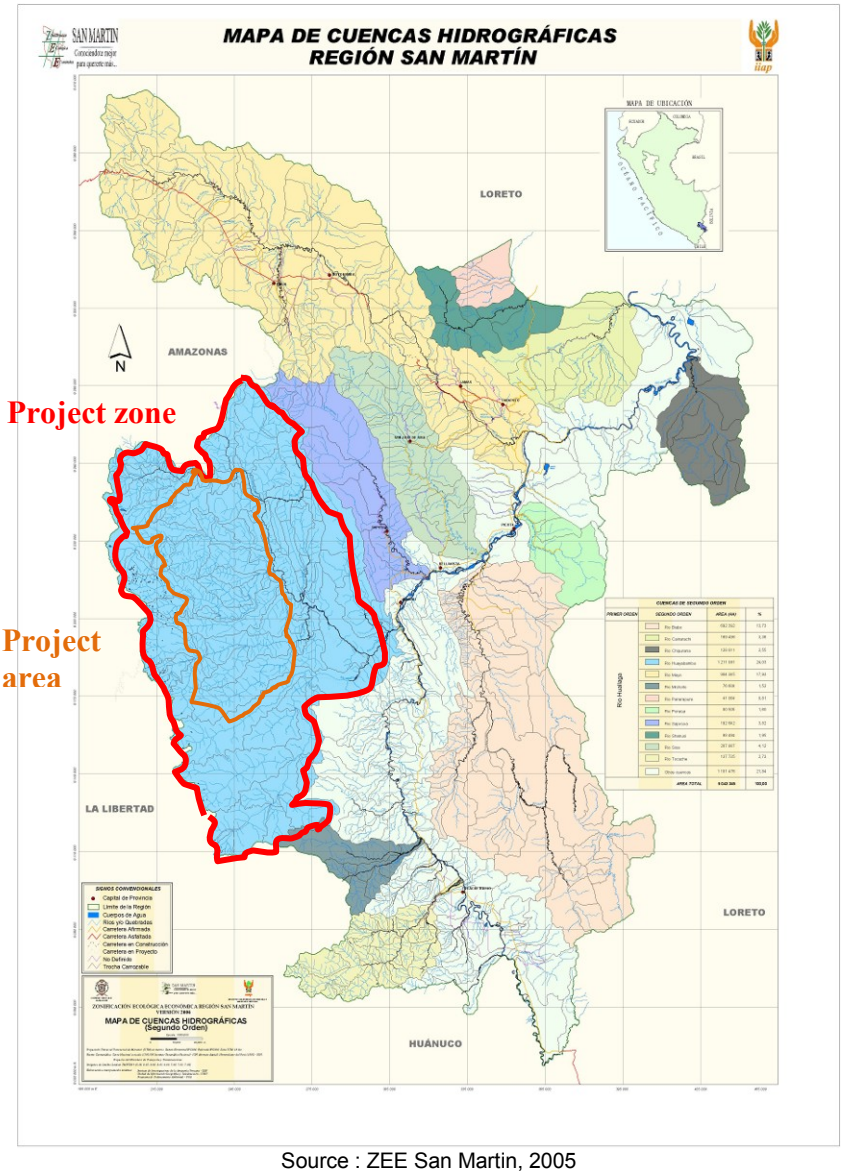
G1.3. Boundaries of the project area and the project zone

Project zone

The project zone is constituted by the river basin of the Huayabamba River, delimited on the western and northern side by the Andes and the frontier with Amazonas and La Libertad provinces, to the east by the hills chain between Huayabamba and Saposo valleys, to the South by the southern limit of National Park Rio Abiseo, and to the South East by the Huallaga river.

The kml file of project zone is available upon request.

Figure 12 : : Boundaries of the project zone



Source : ZEE San Martin, 2005

Project area:

The project area is constituted by three concessions with conservation purposes: Martin Sagrado, El Breo, and Montecristo encompassing 303 699 hectares

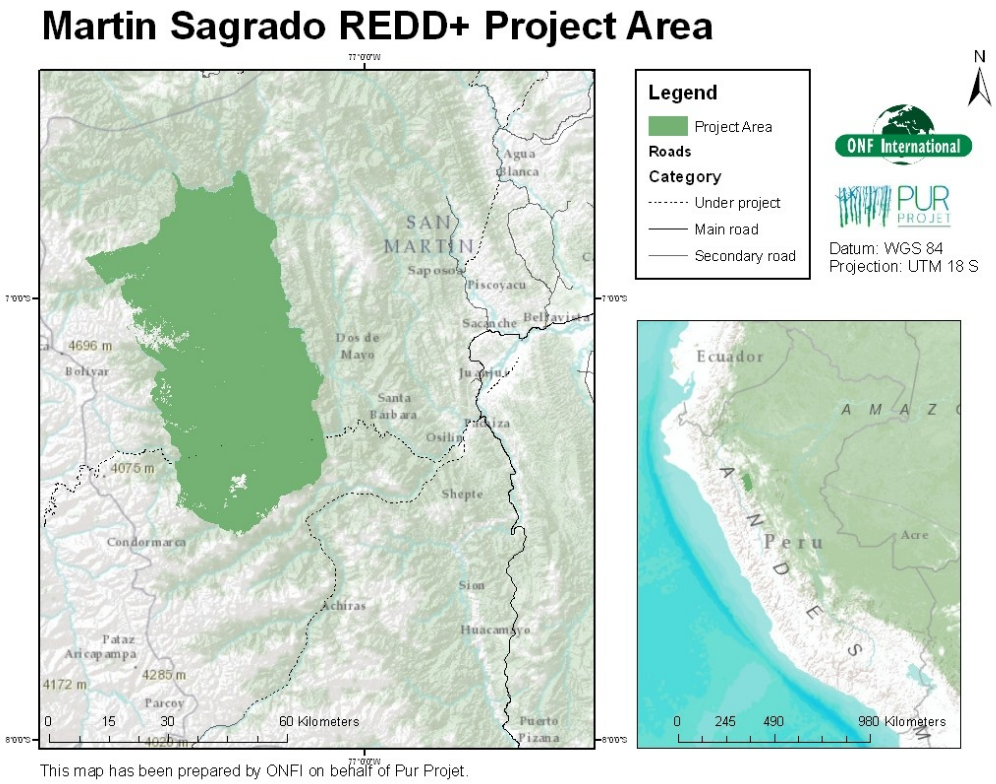
Boundaries are defined as follows:

Northern limit	Frontier with the Amazonas region, Rio Verde river
Southern limit	Frontier with National Park Rio Abiseo
Eastern limit	Huayabamba river
Western limit	Frontier with the concession Alto Huayabamba (Andes)

- The Association de Proteccion de bosques Comunales Dos de Mayo (APROBOC) owns the concession title of the concession El Breo.
- ACOPAGRO cooperative owns the concession title of the concession Martin Sagrado
- The Asociacion de Productores Agropecuarios de Huicungo (APAHUI) is in the process of obtention of the concession Monte Cristo.

Removing from the area of the 3 concessions the non-forested areas, we get the exact project area, which covers 295,654 hectares.

Figure 13 : ***Location of the project area***



G1.4. Current carbon stocks for each LULC class or forest stratum at project site

Forest classes

Estimation of carbon stocks per hectare in the three forest classes was completed through field measurements.

A stratified random sampling was implemented, using the stratification of forest classes as defined above (classification of NatureServe, Josse et al, 2007[8]).
Sample sites were located in the areas expected to be deforested to achieve maximum accuracy of the carbon stock estimates, and in these locations, random points were distributed with the help of a Geographic Information System.

The inventory was carried out following the guidance of appendix 3 of the applied methodology: "Methods to estimate carbon stocks". This work was divided in two phases,
- A pre-sampling was done in order to estimate sample size required to achieve an error maximum of 10% with a confidence level of 95%. 36 permanent sample plots were established and measured in this first phase.
- In a second phase, 42 sample plots were established and measured to achieve the required confidence level.

A total of **78 sampling plots** over the three classes were completed, allowing for a statistically reliable estimation with a **sampling error of 9,4%.**

Table 3 : Sample size calculations

Stratum	Area (ha)	Ncl	Wcl	Mean	Sl	Cl	ncl	n real
Amazon Moist Forest	59 018	1 180 370	20%	480	198,22	1	17	28
Andean Moist Forest	188 103	3 762 052	65%	374	169,08	1	47	42
Andean Dry Forest	40 860	817 196	14%	353	85,60	1	5	8
Total	**287 981**	**5 759 618**	**100%**		**453**	**7**	**69**	**78**

Sample plots are circulars with a size of 500 m2. Diameter of all trees above 5cm diameter (at breast height) were measured, height was measured for palm. Dead wood was not included (conservative approach) as field observations showed little dead wood on the ground.

For the estimation of carbon stocks, allometric equations method is used. Three local equations were identified and evaluated (Nogueira *et al*[9]. 2008, Higuchi *et al*. [10] 1998, Arévalo *et al*[11]. 2003). The three equations give similar result at tree level, which was also confirmed through an ANOVA (Analysis of Variance)

Finally, tree aboveground biomass has been estimated using the equation from Arévalo et al., which is a local allometric equation developed by the International Center for Research in Agroforestry (ICRAF) with data collected from different Peruvian Amazonia forest types, especially from Alto Amazonas region (Yurimaguas) and Ucayali Region (Pucallpa). See ICRAF, 1997. Several forest types were sampled for

[8] Josse, 2007. Ecological Systems of the Amazon basin of Peru and Bolivia: Classification and Mapping.

[9] Nogueira, E., Fearnside P., Nelson, B., Barbosa, R. and Keizer E. 2008. Forest Ecology and Management. 256 (1853-1867)

[10] Higuchi, et al 1998 Acta Amazonica 28(2): 153-166. 1998

[11] Arévalo L., Alegre J.C. & Palm C. 2003. Manual de reservas de carbono en diferentes Sistemas de uso de la tierra

this study: more than 40 years old primary forest with slight human interventions, 3.5 to 25 years old secondary forests in Yarimaguas, and 3 to 15 years old forests in Pucallpa. See Arévalo et al., 2003.

This equation has been recognized by the Peruvian Ministry of Environment as a suitable methodology to estimate carbon stocks in Peruvian forest ecosystems in a communication to UNFCCC (Ministerio del Ambiente, 2009[12]). Lapeyre et al. (2004) validated this equation in a study carried out in San Martin Region. In addition, it has been used in several studies, including:
- Guzmán, W. and Arévalo, L. 2003. Servicios ambientales de almacenamiento de carbono como activo para el desarrollo en la Amzonia Peruna: avances y retos
- Lapeyre,T., Alegre, J. and Arévalo 2004. Determinación de las reservas de carbono de la biomasa aérea, en diferentes sistemas de uso de la tierra en San Martín, Perú
- Yquise, A., Pocomucha, V. and Vargas, Y. 2008 Carbono almacenado en diferentes sistemas de uso de la tierra del distrito de José Crespo y Castillo, Huánuco, Perú. Tesis de grado, Universidad Agraria de la Selva).

For palm aboveground biomass, a local model has been used. It has been developed by Saldarriaga et al.[13] (1988) through the analysis of long term chronosequence of forest succession in the upper Rio Negro of Colombia and Venezuela.

Detailed protocol, assumptions, equations, and results are available in the Technical Appendix: Estimation of carbon stocks.

Non-Forest classes

In general, for the Amazon basin, a large amount of studies evaluating biomass stocks in vegetation is available, but most of them are specific to forest classes. Nevertheless, at local level, for San Martin Region, one carbon study (Lapeyre et al., 2004 [14]) covering different land uses was identified.

The study matches the eligibility criteria:
- Data is less than 10 years old;
- Data is derived from multiple measurement plots;
- All species above a minimum diameter are included in the inventories;
- The minimum diameter for trees included is 30 cm or less at breast height (DBH);
- Data is sampled from good coverage of the classes over which they will be extrapolated.

The main results of the study are the following:

Table 4 : Summarized results of literature carbon stocks, Lapeyre et al., 2004

[12] Ministerio del Ambiente, Segunda Comunicación Nacional del Perú a la CMNUCC, Identificación de Metodologías existentes para determinar stock de carbono en ecosistemas forestales, May 2009

[13] Saldarriaga et al., Long-Term Chronosequence of Forest Succession in the Upper Rio Negro of Colombia and Venezuela, 1988

[14] Lapeyre, T., Alegre,J and Arévalo, L. 2004. Determinación de las reservas de carbono de la biomasa aérea, en diferentes sistemas del uso de la tierra en san Martin, Perú. Ecología Aplicada. 3 (1,2)

Source	Date	LULC class	Carbon stocks						Observation
			TOTAL tC/ha	Viva tC/ha	Muerta en pie tC/ha	Muerta caida tC/ha	Sotobosque tC/ha	Chojarasqua tC/ha	
Lapeyre et al. [1]	2004	Primary Forest	485,6	184,5	63,1	233,1	0,0	4,9	Carbon in Above-ground biomass (living and dead), non-tree vegetation and litter
		Secondary Forest (50 years)	234,6	178,3	2,3	49,3	0,0	4,7	
		Secondary Forest (20 years)	62,1	49,1	5,6	3,1	0,6	3,7	
		Rice	1,7						
		Maize	4,4						
		Grassland	2,3						
		Coffee with shadow (Guaba trees)	19,3	15,2				4,1	
		Cacao with shadow	47,2	42,0				5,2	

This literature data was used to compute average carbon stocks for the 2 initial classes : “Bare Soils” and “ Non-Forest vegetation”.

- Class “Bare soils, annual croplands, settlements”: Literature values were available for Corn, Rice, and Pastures, which correctly represent the land-uses in the reference region that fall in that class. An average value of these three land-uses is used for the project.

- Class “Non-Forest Vegetation”: Literature values were available for crop systems Café-Guaba and Cacao, which are representative of a majority of land-uses in the class “Non-Forest Vegetation”. Additionally, we find in the reference region plantations of banana, cotton, or young fallows that fall in the “Non-Forest vegetation” class. However, carbon stocks in banana, cotton plantations or young fallows in 5-year rotation cycles are typically lower than carbon stocks in Cacao or coffee-guaba systems. It is indeed conservative to use the higher carbon stock values of Coffee-Guaba and Cacao to compute an average carbon stock value for “Non-Forest vegetation” class.

Detailed assumptions, source data used, are available in the Technical Appendix: “Carbon stocks”.

Summary of long-term average carbon stocks for each LU/LC class:

Table 5 : Average long-term carbon stocks for each LU/LC class

LU/LC class		Average carbon stock per hectare ± 90% CI										
		Above-ground Cab_{cl}		Below-Ground Cbb_{cl}		Dead wood Cdw_{cl}	Litter Cl_{cl}	Soil $Csoc_{cl}$	Harvested wood products Cwp_{cl}	Total $Ctot_{cl}$		Uncertainty
ID_{cl}	Name	stock $t\,CO_2\,e\,ha^{-1}$	± 90% CI $t\,CO_2\,e\,ha^{-1}$	stock $t\,CO_2\,e\,ha^{-1}$	± 90% CI $t\,CO_2\,e\,ha^{-1}$	stock $t\,CO_2\,e\,ha^{-1}$	stock $t\,CO_2\,e\,ha^{-1}$	stock $t\,CO_2\,e\,ha^{-1}$	stock $t\,CO_2\,e\,ha^{-1}$	stock $t\,CO_2\,e\,ha^{-1}$	± 90% CI $t\,CO_2\,e\,ha^{-1}$	
1Icl	Amazon Moist Forest	879,9	13%	211,2	13%	*Not included*	*Not included*	*Not included*	*Not included*	**1 091**	0	10,6%
2Icl	Andean Moist Forest	685,4	11%	164,5	11%	*Not included*	*Not included*	*Not included*	*Not included*	**850**	0	9,5%
3Icl	Andean Dry Forest	646,9	14%	174,7	14%	*Not included*	*Not included*	*Not included*	*Not included*	**822**	0	11,5%
3Fcl	Non-forest vegetation	121,9		51,2						**173**	52	30%
1Fcl	Bare Soil, Croplands and settle	10,3		16,2						**26**	8	30%
2Fcl	Water	-		-						-	-	

G1.5. Community information

In this chapter we develop the socioeconomic characteristics of the project zone (provinces of Mariscal Cáceres, Huallaga) through information collected by Fundacion Amazonia Viva, by the INEI (Instituto Nacional de Estadistica y Informatica), the district municipality, the municipal delegate of Dos de Mayo, the Human Development Report of UNDP and obtained from surveys conducted in the field in a universe of 122 people in 2008 (AMPA, 2008[15]) and 177 people in 2012 (Amazonia Viva with CREAR, 2012[16])
The survey conducted by Fundacion Amazonia Viva with CREAR in July 2012 is available in Appendix.

G1.5.1 Presentation of the participating communities

Communities within the project area

There are three communities living within the project area: La Morada, Canaan, and Anazco Pueblo. They mainly rely on livestock and coffee farming. As fuel they only use wood for cooking and mostly candles for light (70 to 95%) while solar energy is developing.

The three communities are typical examples of towns founded by a group of migrants, who originally came from the mountains to the jungle. The early years after establishment have been dedicated to the exploration of the environment, without interest for the protection of biodiversity. They slowly built up over 5 to 10 years some experience on the impact of mismanagement of resources.

They are located in the Eastern Andes, in the department of San Martin, on the slopes of the mountains oriented northeast above the river Huabayacu. Howevern they depend politically on Chuquibamba in the department Amazonas. There are no roads to the villages, only paths from the district of Chuquibamba (2 to 3 days), and from the province of Bolivar (2 days). There is a proposal for the construction of a road by the Regional Government of Cajamarca, in order to facilitate the transport of forest products from Saposoa in the province of Huallaga, department of San Martin to Celendín department of Cajamarca.

- **La Morada**

Gathering 80 families, there are 150 students in the village, a kindergarten, a primary and segundary school. La Morada activity is based on livestock with a herd of about 500 animals. Community health is ensured by a medical post, a nursery and medicinal plants.

- **Canaan**

There is a kindergarten, a primary and a segundary school, 130 families and as many students in this village, 3 days walk away from the closest town. Their main income depends on livestock and coffee with 100 hectares of cocoa cultures and 400 animals. Both coffee and livestock products are sold outside of the village. Community health is also ensured by a medical post, a nursery and medicinal plants.

- **Anazco Pueblo**

Smallest community of the area, Anazco Pueblo gathers 15 families, representing 70 people in total, 22 students and 1 professor. There is only a primary school. Also relying on cocoa cultures and livestock, their herd is smaller with 100 animals and 20 hectares for farming. Community health is ensured only by medicinal plants.

[15] AMPA, Propuesta Técnica que sustenta la creación de la Concesión para Conservación "El Breo", 2009

[16] CREAR, Informe de diagnóstico para la elaboración del plan operativo de difusión y sensibilización. biocorredor martín sagrado proyecto REDD, August 2012

Additional information on these 3 communities, collected during field trips to Chuquibamba, is available on request.

Communities within the project zone, in the provinces of Mariscal Cáceres and Huallaga

Major partners for REDD project:

- **Dos de Mayo** is the most populated village (898 inabitants). They are considred as a "minor populated center" and have a delegated mayor. 59% of the inahitants are men and 41% are women. 48% of the area (680 ha) are dedicated to cocoa production, with an average yearly production of 700kg/ha. The villagers also cultivate corn, plaintain, cotton and oranges and have around 100 cattle animals. 10.34% of the villagers are illiterated, 48.28% have a primary eduction, 34.48% have a secondary education and 6.9% have a higher education. There is a medical center in the village. A technical study is under process to evaluate the opportunity to implement a drinking water system. The Association de Proteccion de bosques Comunales Dos de Mayo owns the concession El Breo and is strongly involved in the REDD project since the beginning

- **Santa Rosa**: on the bank of the Huayabamba river, Santa Rosa is constituted by ~40 cocoa farmers, majority of the area is dedicated to cocoa production, with average yields of 1200 kg/ha. As part of the REDD project, they are developing a botanical garden to value floral biodiversity, and want to develop a guesthouse for visitors to come and visit the conservation area. Strongly involved in the project since the beginning, Santa Rosa is now sollicitating a concession for conservation of 10 000 ha.

- **Pucalpillo:** located a little more downstream on the bank of Huayabamba river, 30% of the area (60 ha) are dedicated to cocoa production, with an average yearly production of 800kg/ha. The villagers also cultivate corn, plaintain, cotton and oranges and have around 40 cattle animals. 56% of the inhabitants have a primary education, 36% have a secondary education, 6% are illiterate and 2% have a higher eduction (no university). There is no medical center in the village. Strongly involved in the project since the beginning, the asociacion of productores agropecuarios de Pucalpillo (APAP) is now solicitating a concession for conservation of 20 000ha.

- **Huicungo :** located on the banks of the Huayabamba river, only 10km before the junction with Huallaga river, it is a major populated centers, with a municipality. Major incomes come from cocoa production, with some farmers members of ACOPAGRO cooperative, while others (~130 farmers) are joining the newly created Asociacion de Prodcutores Agropecuarios de Huicungo (APAHUI), whose aim is to develop as a complete cocoa cooperative. APAHUI is the organization sollicitating the concession for conservation Monte Cristo, part of the project area.

Other communities of the project zone :

- **Marisol** is the last populated community upstream on the banks of the Huayabamba River, on the historical and natural path to the inner areas of the project area. They mostly rely on cocoa production. There is primary education in the village and use hydroelectrical (mainly) and solar power for electricity generation.

- **Pizarro:** 35% of the area (80 ha) are dedicated to cocoa production, with an average yearly production of 400kg/ha. The villagers also cultivate corn, plaintain, cotton and oranges and have around 60 cattle animals. 2% of the villagers are illiterated, 68% have a primary eduction, 24% have a secondary education and 6% have a higher education (no university). There is a medical center in the village.

- **Mojarras**: 32% of the area (70 ha) are dedicated to cocoa production, with an average yearly production of 400kg/ha. The villagers also cultivate corn, plaintain, cotton and oranges and have around 30 cattle animals. 84% of the villagers have a primary eduction (complete) and 16% have a higher education. There is no medical center in the village.

- **Santa Ines**: 29% of the area (70 ha) are dedicated to cocoa production, with an average yearly production of 400kg/ha. The villagers also cultivate corn, plaintain, cotton and oranges and have around 100 cattle animals. 2% of the villagers are illiterated, 76% have a primary eduction, 20% have a secondary education and 2% have a higher education. There is a medical center in the village.

- **Gran pajaten**: 25% of the area (10 ha) are dedicated to cocoa production, with an average yearly production of 400kg/ha. The villagers also cultivate corn, plaintain, and cotton and have around 20 cattle animals. 10.35% of the villagers are illiterated, 48.27% have a primary eduction, 34.48% have a secondary education and 6.90% have a higher education. There is no medical center in the village.

- **San Juan de Pajaten**: 7% of the villagers have a higher education, 73.33% have a primary eduction, 13.34% have a secondary education and 6.33% of the villagers are illiterated. There is no medical center in the village.

- **Nueva Esperanza**: 25% of the area (25 ha) are dedicated to cocoa production, with an average yearly production of 400kg/ha. The villagers also cultivate corn, plaintain, cotton and organges and have around 30 cattle animals. 7% of the villagers are illiterated, 73% have a primary eduction, and 20% have a secondary education, 6.67% of the villagers are illiterated. There is a medical center in the village.

- **Primavera**: 31% of the area (45 ha) are dedicated to cocoa production, with an average yearly production of 700kg/ha. The villagers also cultivate corn, plaintain, cotton and organges and have around 30 cattle animals. 4.08% of the villagers have a higher education, 81.64% have a primary eduction, and 14.28% have a secondary education. There is no medical center in the village.

- **Luz del Oriente:** located at the northern tip of Martin SAgrado concession, at the boarder with Amazonas region, Luz del Oriente is a community depending on Rodriguez de Mendoza in Amazonas region. It is accessible by dust road from Mendoza up to 10km from the community.

Communities outside the project zone, though related to the project

- **Chuquibamba,** municipilaty located in Amazonas region, in the Andes, is the access point and political center for the 3 communities located within the Martin SAgrado project area (Canaan, La Morada, Anazco Pueblo). As such, it is implicated in the conservation project. It is accessible by dust road coming along the Maranon river bed.

- **Comunidad Campesina de Leymebamba,** located in Leymebamba, Amazonas region, in the Andes. Leymebamba is another access point to the 3 communities located within the Martin SAgrado project area (Canaan, La Morada, Anazco Pueblo). Also, the Community has sollicitated a concession for conservation in Amazonas region whose demarcation goes up to Martin SAgrado project area. As such, coordination with this community is interesting for the sake of both conservation projects.

ACOPAGRO cooperative

On top of local communities and community associations of local producers, the project is developed with a strong partner, owner of the Martin Sagrado concession within the project area: the ACOPAGRO cooperative

ACOPAGRO cooperative was created in 1997, as part of a United Nations program to substitute coca plantations with cocoa and other alternative crops in the San Martin region. It now counts 2000 members, small-scale producers of cocoa and sugar cane having 5 hectares of land each, with an average 2.2 ha of cocoa fields. Most of the farmers were coca planters in the past.

The organization is FLO and Organic certified (standards EU et NOP) and is very successful, both on its commercials activities (ACOPAGRO has become in ten years Peru's first cocoa exporter) as well as towards its compliance to fair trade principles. ACOPAGRO can be considered as a model organization and has been certified under Alter Eco Gold Standards in 2009 by SGS.

3 000 hectares of cocoa fields have already been planted and are harvested, the equivalent of 3 millions cocoa trees. Cocoa trees need 40 % shade to give their best potential, hence producers are willing to plant native trees in combination with their cocoa trees. As well, the small scale producers dispose of many areas of degraded land and pastures, because of the former coca plantations or food crop plantations, that they are willing to reforest with native trees for forestry activities.

To help the farmers to achieve these objectives, ACOPAGRO and PUR PROJET set up a reforestation program in 2008 called Alto Huayabamba. The plantation started in April 2008 and the project is now fully operational with 1 million trees planted (Décember 2011) and was validated according to the VCS standard. The objective is to plant 2 million trees over 2300 hectares (depending on plantation of models between agro-forestry and forestry only plantations), of degraded land and cultivated land, practicing agro-forestry combining native trees species with cocoa trees and forestry plantations. The project is funded via the sales of environmental services (trees certificates) and of ex-ante carbon credits (VCUS).

Carbon offset is very complimentary with Fair Trade and organic production, the Internal Control System is already in place for organic production, and producers very well trained on traceability. The climatic conditions are very favourable for vegetation growth, hence for carbon offset. ACOPAGRO has already proved its capacity to plant and secure a sustainable plantation. The need of the area is very large, both for coca producers, and much as for the damaged environment of the region.

G1.5.2 Population

This particular region has been quite recently populated, with a significant growth of the population dating back to the 1940's. The participants in the project are the second or third generation, the majority of them discovered cacao farming recently. Their parents and grand-parents came in the region thanks to colonization programs. Consequently, the traditional love of the land that is obvious when it has been transmitted from generation to generation does not really exist.

It explains why it has been easier for the producers to slash and burn the land as they did not have the culture of protecting the land and the species. This is changing with the co-operative thanks to the agricultural trainings. This is also changing with the reforestation program and the understanding that biodiversity is an essential process.

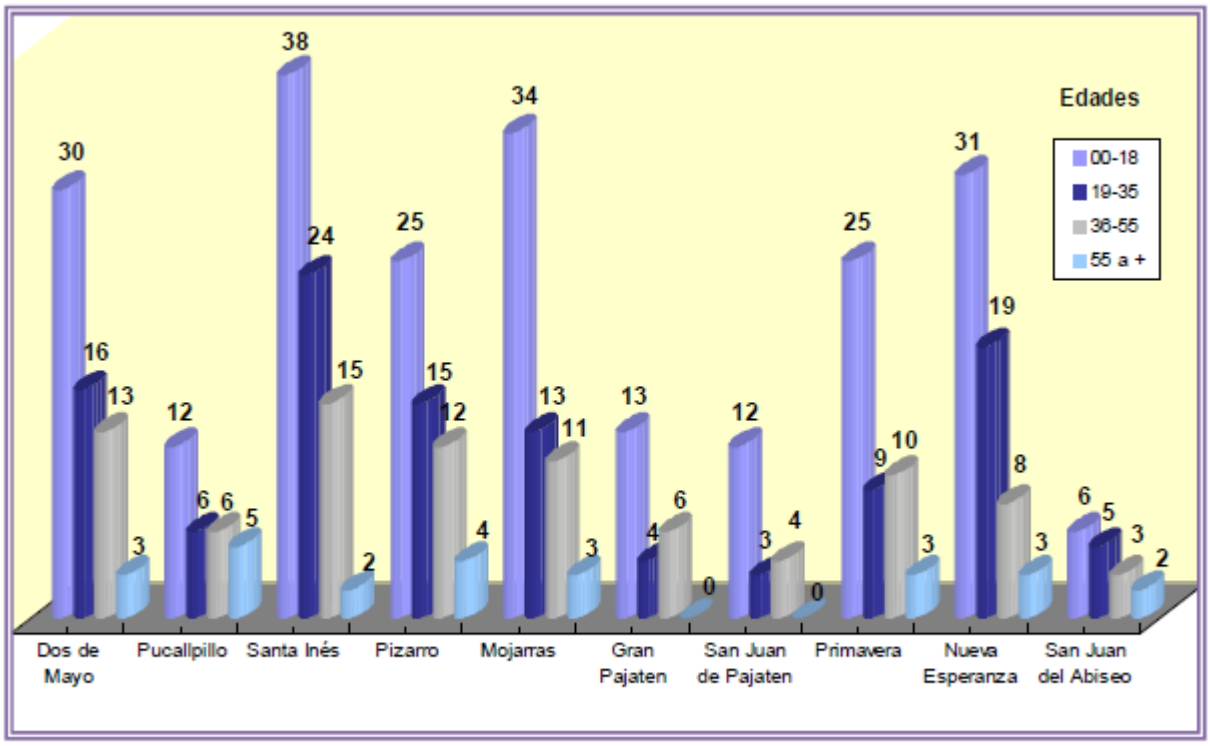
The producer's pride to be members of ACOPAGRO or other association of producers, the cohesion and solidarity, the strong will to integrate more producers in the development process, the awareness and understanding of the deforestation issue strengthen the organization and improve the results in terms of sustainable development.

Table 6 : Population distribution according to age group

Community	Age groups / Percentage								Sample (hab)
	00-18	%	19-35	%	36-55	%	55 a +	%	
Dos de Mayo	30	48.39	16	25.81	13	20.97	3	4.84	62
Pucallpillo	12	41.38	6	20.69	6	20.69	5	17.24	29
Santa Inés	38	48.10	24	30.38	15	18.99	2	2.53	79
Pizarro	25	44.64	15	26.79	12	21.43	4	7.14	56
Mojarras	34	55.74	13	21.31	11	18.03	3	4.92	61
Gran Pajaten	13	56.52	4	17.39	6	26.09	0	0.00	23
San Juan de Pajaten	12	41.38	3	10.34	4	13.79	0	0.00	19
Primavera	25	53.19	9	19.15	10	21.28	3	6.38	47
Nueva Esperanza	31	50.82	19	31.15	8	13.11	3	4.92	61
San Juan del Abiseo	6	37.50	5	31.25	3	18.75	2	12.50	16
Total	226		114		88		25		453

Source : AMPA. Encuesta socioeconomica. 2008.

Figure 14 : Population distribution according to age group



Fuente: AMPA. Encuesta socioeconómica. 2008.

G1.5.3 Housing, sewage, energy, subsistence

The majority of the families part of the Martin Sagrado project have houses and residences are generally made of wood with roofs made of palm thatch.

None of the communities except Huicungo has a basic sanitation system, potable water service or trash collection. Organic trash is deposited naturally on the ground surrounding the residences or in the fields and is incorporated into the soil. The non-organic trash is separated and burned.

The population has access to potable water resources directly from water sources such as Huayabamba river, the river Jelache and the river Abiseo, as well as the various creeks and tributaries in the zone. As for sewage, this service is also inexistant so it is common to find latrines built by the villagers themselves. On the other hand, the Dos de Mayo Town Center has a technical file which was developed by USAID / PDA, to install a water system. Currently, this record is being complemented sewer service for submission to the District Municipality of Huicungo.

Energy: Except for Huicungo, most of the communities along the Huayabamba river are not connected to the grid. The community of Dos de Mayo has established an alternative service using a generator that runs on gasoline. The municipality of this community provides this service to its population over 4 hours from 6pm. S/.25.00 is the monthly fee per family served. The community of Marisol relies on hydroelectrical power. Some families in other communities are slowly testing small solar panels to charge batteries. Most of the need for lighting is covered with candles and kerosene lamps. On the other hand, almost all of the population uses firewood for cooking, as well as the kitchens are rustic stone or clay.

All of the communities depend on subsistence agriculture (platanos and fruit production) and extractive activities, such as fruit collection, fishing and hunting to supplement their diets. Usually, subsistence practices are used when fishing and hunting, with fish providing the major source of protein in the communities.

G1.5.4 Education and health

It's the least supplied area, most of these people only have health promoters, with an incipient implementation. Only in Huicungo and in the communities of Dos de Mayo, Nueva Esperanza and Santa Inés are medical centers where residents come from other communities. However, the lack of resources and medical supplies to people forced to move to the city of Juanjui in emergencies and in the case of La Morada y Los Chilchos toward Bolívar or Leymebamba.

In Alto Huayabamaba, going to school may be hard (20 minutes walk from Santa Rosa, but some producers are further away along the river) because of the isolation of the area and the access only by boat. The good point about schooling is that many of the producers interviewed succeeded to send their children to university thanks to the cocoa revenues. This shows a great progress in the standard of living of producers and their family. Students of different levels compose the school classes, what makes the teacher's work more difficult, since she must teach all the students at the same time in the same classroom.

There is no organized system of health care provided by formally trained medics. Basic emergency assistance (first aid) is provided by community members and is based on traditional knowledge or training

provided by the local municipality. The most common health problems and illnesses are malaria, diarrhea, verminosis, malnutrition, flu and hypertension. The treatment of more serious problems requires transportation to the hospital in the city of Novo Aripuanã in “rabetas” (wooden canoes with small outboard motors).

Table 7 : Educative infrastructures in participating communities

comunidad	Infraestructura Educativa		Nº	Niveles		
	Si	No		I	P	S
Dos de Mayo	X		00420	X	X	X
Santa Inés	X		00639	X	X	
Pucallpillo	X		00462		X	
Mojarras	X		0002		X	
Nueva Esperanza	X		0004		X	
Gran Pajaten	X					
Pizarro	X		00421	X	X	X
Primavera	X		00005	X	X	
San Juan de Pajaten	X	X				
San Juan de Abiseo	X	X				
La Morada	X				X	X

Fuente: AMPA. Encuesta socioeconómica. 2008.

Table 8 : Population distribution according to educational level

Community	Instruction level			
	Primary	Secundary	Superior No University	Analphabet
Dos de Mayo	48.28%	34.48%	6.90%	10.34%
Santa Inés	76.00%	20.00%	2.00%	2.00%
Pucallpillo	56.00%	36.00%	2.00%	6.00%
Mojarras	84.00%	0.00%	16.00%	0.00%
Nueva Esperanza	73.33%	20.00%	0.00%	6.67%
Gran Pajaten	48.27%	34.48%	6.90%	10.35%
Pizarro	68.00%	24.00%	6.00%	2.00%
Primavera	81.64%	14.28%	4.08%	0.00%
San Juan de Pajaten	73.33%	13.34%	7.00%	6.33%
San Juan de Abiseo	66.50%	22.50%	5.00%	6.00%

Source: AMPA. Encuesta Socioeconomica. 2008.

G1.5.5 Gender issues

Majority of members are male but there are women as well. Women interviewed declared to be well accepted and felt like any other member. It is interesting to note that during all the meetings with producers, men requested women to participate, what they refuse to do most of the time, nevertheless requesting their participation is a start in the emancipation process.

There are also many women employees at the coop level as well, with very good spirit apparently at the offices and at the producer level and good integration of women, in Peru which is traditionally quite male dominant

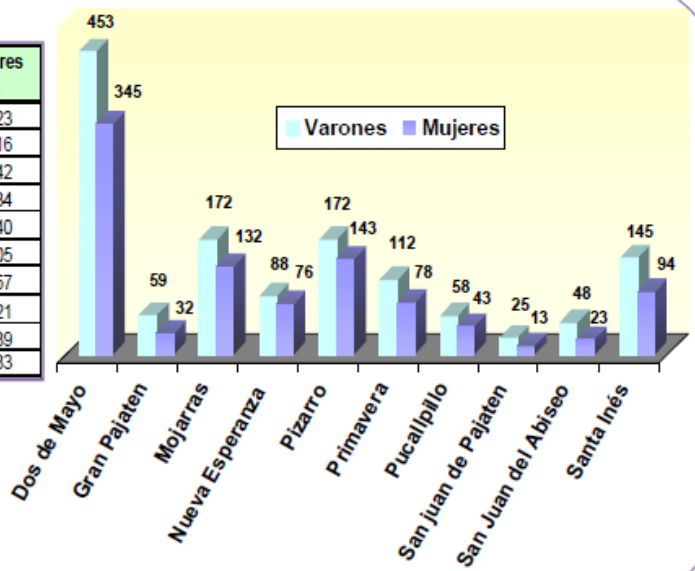
Table 9 : Homes, houses and population by gender

Comunidad/Anexo	Hogares	Viviendas	Varones	Mujeres	Total
Dos de Mayo	211	211	453	345	798
Arica	3	3	4	4	8
Atun rumi	10	10	20	14	34
Chilin	1	1	1	1	2
Chorro	3	3	3	4	7
Gran Pajaten	27	27	59	32	91
La Quinta	3	3	3	4	7
Llano	6	6	15	11	26
Mojarras	74	86	172	132	304
Monte Bravo	1	1	1	1	2
Nueva Esperanza	43	43	88	76	164
Oro Mina	1	1	2	1	3
Pizarro	91	92	172	143	315
Primavera	50	50	112	78	190
Pucallpillo	28	28	58	43	101
San Juan de Pajaten	13	13	25	13	38
San Juan del Abiseo	31	31	48	23	71
Santa Inés	64	64	145	94	239
La Morada - Chilchos	89	89	167	155	322
Total	**749**	**762**	**1548**	**1174**	**2722**

Source: District Municipality of Huicungo. 2008. & AMPA. 2008.

Figure 15 : Distribution of population by gender

Comunidad	Varones %	Mujeres %
Dos de Mayo	56.77	43.23
Gran Pajaten	64.84	35.16
Mojarras	56.58	43.42
Nueva Esperanza	53.66	46.34
Pizarro	54.60	45.40
Primavera	58.95	41.05
Pucallpillo	57.43	42.57
San juan de Pajaten	65.79	34.21
San Juan del Abiseo	67.61	32.39
Santa Inés	60.67	39.33



Elaboración AMPA. Fuente: Encuesta socioeconómica. 2008.

G1.5.6 Economy and Income

The participants are poor. Living conditions are acceptable, except regarding nutrition, education and health, and access to services. People have access to drinkable water and food from their fields. They own 2 to 5 hectares of land, of which 0,5 to 3 are planted with cocoa trees. They earn an average 1000 to 4000 Euros a year of sales.

The revenues of the producers have increased steadily and the ACOPAGRO Fair Trade project can be considered successful. All producers interviewed declared they were really happy with the project since they started. They used to be coca growers but now earn as much with cocoa

There is more land available to buy and convert from monoculture (coca, sugar cane,..) to consortium fields (cocoa + native forest). This gives producers the opportunity to develop their sales, the objective is to bring them from an average 1,5 hectares of cultivated cocoa trees to a minimum of 5 hectares, for them to reach a decent revenue and be in capacity to develop even more their farm. The area is quite isolated, especially for Alto Huayabamba accessible only by boat, but on the other hand, there is land there to buy and to plant.

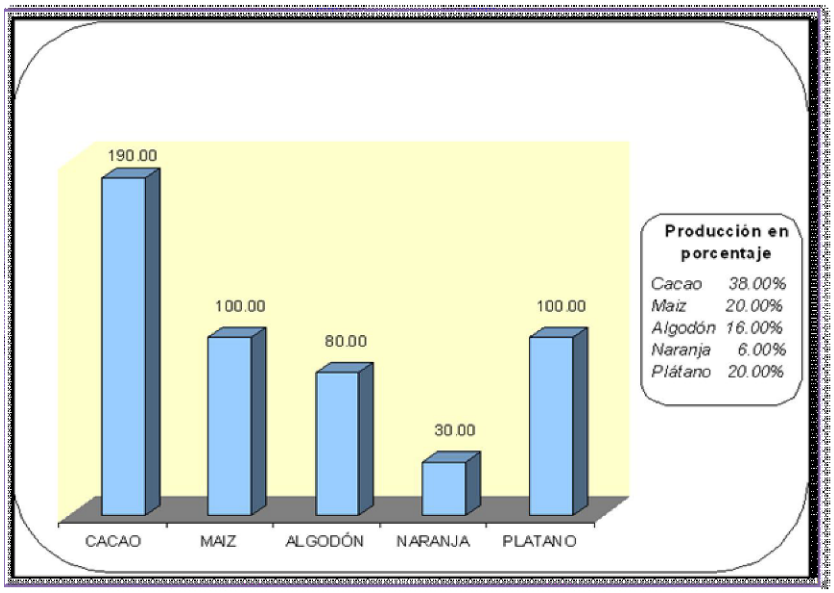
The most important economic activities are the cultivatation and sale of cocoa and sugar cane. Most of the families raise chickens for domestic consumption and others raise cows on a small scale.

According to the data provided by the Agricultural Cooperative Cocoa - ACOPAGRO, agricultural production is estimated by community, is as follows:

Dos de Mayo: 38% (190ha) is cocoa, with an average production of 400kg/ha year and the sale price is S /. 6.4 kg. 20% (100ha) corresponds to a maize and banana cultures, respectively. The average maize production is 2000 kg / ha and the sale price is S/.0.70kg. The average production of banana is 10 MT / ha and the price is S/.0.50 kg. The 16% is cotton, is 80 ha, with an average production of 1200 kg /

ha.year and the sale price is S/.1.20kg. The 6% corresponds to the orange crop, ie 30 ha with average yield of 40TM/ha. The sale price is S/.0.20kg. In the Commonwealth of Dos de Mayo, there are approximately 100 head of cattle, being the selling price per head S/.700.00.

Figure 16 : ***Estimated agricultural production - Dos de Mayo Community***



Pucallpillo: 30% (60 ha) is cocoa, with an average production of 400 kg / ha year and selling price per kilogram of S /. 6.4. 22.5% (45 ha) is corn. The average production is 2000 kg / ha and the sale price is S/.0.70kg. 20% (40 ha) is made of cotton and banana crops. The average production is 1200 kg / ha and the price is S/.1.20kg. The average production of banana is 10 MT / ha and the sale price is S/.0.50 kg. 7.5% (15 h) corresponds to the orange crop, with production and 40TM/ha average selling price per kilogram of S/.0.20. Also, there are approximately 40 head of cattle. The selling price per head is S/.700.0

Gran Pajaten: In this community, each culture is represented by 25% each, ie 10 ha are used for the production of cocoa, 10 ha for maize, 10 ha to 10 ha for cotton and bananas. The sales prices per kg are: Cocoa S / 6.4; S/0.70 Corn, Cotton and Banana S/.1.2 S/0.50. The production amounts to 4TM cocoa 20TM corn, 12 tons of cotton and banana 100TM. Also in this community there are approximately 20 head of cattle. The selling price per head is S/.700.00.

Mojarras: The 31.82% is cocoa (70ha), with an average production of 400 kg / ha year and the sale price is S /. 6.4 kg. The 22.73% is maize (50 ha), with an average production of 2000 kg / ha. The sale price of corn is S/.0.70kg. The 18.18% (40 ha) is made of cotton and banana crops, respectively. The average production of cotton is 1200 kg / ha and the price is S/.1.20kg. The average production of banana is 10 MT / ha and the sale price is S/.0.50 kg. The 9.09% (20 ha) is orange crop, with production averaging 40TM/ha. The sale price is S/.0.20kg. Also, there are about 30 head of cattle.

Nueva Esperanza: The 25% is cocoa and corn (25ha), respectively. The average production of cocoa is 400 kg / ha year and the sale price is S /. 6.4 kg. The average maize production is 2000 kg / ha and the sale price is S/.0.70kg. The 20% is cotton and banana (20 ha), respectively. The average production of cotton is 1200 kg / ha and the sale price is S/.1.20kg. The average production of banana is 10TM/ha and the sale price is S/.0.50 kg. 10% corresponds to the cultivation of orange (10 ha), which on average produce 40TM/ha. The sale price is S/.0.20kg. In this community there are approximately 30 head of cattle and selling price per head is S/.700.00.

Pizarro: The 34.78% (80 ha) is cocoa, with an average production of 400 kg / ha year and selling price per kilogram of S /. 6.4. The 17.39% (40 ha) is maize and banana cultures, respectively. The average maize production is 2000 kg / ha and the sale price is S/.0.70kg. The average production of banana is 10 MT / ha and the sale price is S/.0.50 kg. The 21.74% (50 ha) is cotton. The average production is 1200 kg / ha and the price is S/.1.20kg. The 8.70% (20 ha) is orange crop, with production averaging 40TM/ha. The sale price is S/.0.20kg. Also, there are approximately 60 head of cattle, whose selling price per head is S/.700.00.

Primavera: The 31.03% (45 ha) is cocoa, with an average production of 400 kg / ha year and selling price per kilogram of S /. 6.4. The 20.69% (30 ha) is corn and banana cultures, respectively. The average maize production is 2000 kg / ha and the sale price is S/.0.70kg. The average production of banana is 10 MT / ha and the sale price is S/.0.50 kg. The 17.24% (25 ha) is cotton. The average production is 1200 kg / ha and the price is S/.1.20kg. The 10.34% (15 ha) is orange crop, with production averaging 40TM/ha. The sale price is S/.0.20kg. Also, there are approximately 30 head of cattle.

San Juan de Pajaten: 25% (10 ha) is cocoa, corn, cotton and banana, respectively. The average production of cocoa is 400 kg / ha year and selling price per kilogram of S /. 6.4. The average maize production is 2000 kg / ha and the sale price is S/.0.70kg. The average production of banana is 10 MT / ha and the sale price is S/.0.50 kg. The orange is not a cash crop in this community. In San Juan del Abiseo, there are approximately 20 head of cattle.

San Juan del Abiseo: 40% (80 ha) is cocoa, with an average production of 400 kg / ha year and selling price per kilogram of S /. 6.4. The 17.78% (40 ha) is growing corn, cotton and banana cultures, respectively. The average maize production is 2000 kg / ha and the sale price is S/.0.70kg. The average production of cotton is 1200 kg / ha and the price is S/.1.20kg. The average production of banana is 10 MT / ha and the sale price is S/.0.50 kg. The 6.67% (15 ha) is orange crop, with production averaging 40TM/ha. The sale price is S/.0.20kg. In this community there is no cattle.

Santa Ines: The 29.17% (70 ha) is cocoa, with an average production of 400 kg / ha year and selling price per kilogram of S /. 6.4. The 20.83% (50 ha) is growing corn, cotton and banana cultures, respectively. The average maize production is 2000 kg / ha and the sale price is S/.0.70kg. The average production of cotton is 1200 kg / ha and the price is S/.1.20kg. The average production of banana is 10 MT / ha and the sale price is S/.0.50 kg. The 8.33% (20 ha) is orange crop, with production averaging 40TM/ha. The sale price is S/.0.20kg. Also, there are approximately 100 head of cattle.

G1.5.7 Remoteness and accessibility

Juanjui is 2 to 3 hours drive away from Tarapoto city and airport. Tarapoto is already in an isolated area of Peru, not easily accessible by road (20 to 30 hours drive from Lima). Alto Huayabamba producers are even more remote and only accessible by boat, 3 to 8 hours boat drive from Juanjui. This means transport has to be by boat to Juanjui.

During heavy rain season, Alto Huayabamba area is hardly accessible by boat as rough waters make it hard to go upstream. Producers are widespread along the river, each quite isolated on his field and without any motorized boat. To reach Juanjui, producers wait for the “taxi-boats” to take them and their cocoa.

Producers bring their goods and cocoa to the Juanjui market by "taxi-boat"

The taxi-boat cost 20 soles from Juanjui to Santa Rosa (when the average income in the communities in the region is approximately 450 soles per month), it stops at every village three times a day. The more isolated producers have to reach those meeting points first.

To go downstream, the common use is to take rafts or rubber rings. It takes nine hours in raft to go from Santa Rosa to Juanjui where the main office of the cooperative and services are located. This is a regular trip for the communities' representatives.

G1.6. Description of the current land use, property rights

G.1.6.1. General land use and property rights conditions in project zone

For centuries the San Martin Province was a lightly populated, densely forested region with small patches of subsistence rain-fed agriculture and forest hunting and gathering. The province became a coca production stronghold from the 1980s through the mid-1990s due to its isolation, leading to migrants' invasions and massive deforestation.

A vast part of the land in San Martin Province has never been titled nor have boundaries been well-demarcated. Ownership has remained unclear, though this situation is changing as stakeholders struggle to claim the provinces forests. Under the Forestry Law, the vast majority of land in Peru is considered part of the National Forest Estate and under the management of the Forestry Administration. Forest Estate Demarcation, while a national priority, has only recently been undertaken.

Over the past 15 years, part of the forests have been cleared by coca producers, poorly managed forest concessions, oil exploitation companies, economic land concessions (ELCs), migrant settlers, and local communities working for land speculators. ELCs are a component of the government development strategy to attract private investment for the development of underutilized state public lands. In San Martin Province, ELCs are currently being mechanically cleared for rice, corn, papaya and sugarcane production. Local interviews indicated that Oil concessions and ELCs are often managed by a partnership of foreign and Peruvian businessmen.

In the last years, the regional government of San Martin has undertaken a program of progressive land titling for the farmers who do not own any legal land title (~40% in the case of ACOPAGRO members). Pur Projet helped ACOPAGRO to sign a contract with the regional government authority in charge of land

titling to prioritize titling of producers involved in both reforestation and REDD projects in the Huayabamba river basin. The goal is to have all ACOPAGRO members legally titled by end of 2012.

In 2011, the regional governement also decided to suspend all attributions of oil and mining concessions in the region, switching to a more environmental philosophy of land dedication to conservation purposes.

G.1.6.2. Land tenure in the project area

The project area is constituted by 3 concessions for conservation (Martin Sagrado, El Breo, Montecristo), sollicitated respectively by ACOPAGRO, Asociacion Dos De Mayo, and APAHUI.

These are concessions given upon solicitation by the regional government for a period of 40 years (renewable), with the sole purpose of conservation. The concessionaires must sollicitate the concession first, building a technical file describing the area, the conservation stakes, and are given the concession after a public comment period of 3 months where communities can contest the concession. Once obtained, the concessionaires must submit within 3 years a detailed management plan for the concession, and the conservation activities will be monitored every 5 years by the government, which can reclaim back the concession in case of non-respect of the conditions.

The Asociacion Dos de Mayo already has the concession El Breo, and is in currently building the management plan for complete attribution of the concession.

ACOPAGRO has the concession Martin Sagrado, and is in currently building the management plan for complete attribution of the concession.

APAHUI is in the process of sollicitating the Montecristo concession, and the concession is now under publication.

It is part of the REDD project activities (even the first priorities) to help the communities and organizations in the process of securing land tenure over the project area.

Once the concessions have been attributed, there are no longer possibilities for disputes within the San Martin Region

G1.7. Biodiversity information

G1.7.1 Terrestrial Ecological Systems – SETs

The Data Center for Conservation - UNALM & TNC (2006), using biophysical models from different inputs and different methods, identifies and describes the terrestrial ecological systems (SET) of the Peruvian Yungas.

At coarse filter level (ecosystem level), within the Peruvian Yungas Ecoregion, the CDC-UNALM identified 18 SETs as conservation targets (CDC-UNALM and TNC, 2006[17]). The SETs are defined as "groups of plant communities that tend to co-occur in the landscape due to its relationship with common factors and determinants and ecological processes, substrates and / or environmental gradients" (Josse et al., 2007:11). The use of SETs to evaluate the effectiveness of conservation has many advantages because it combines in one system: ecological, dominant vegetation and landforms.

[17] CDC-UNALM y TNC. 2006. Planificación para la Conservación Ecoregional de las Yungas Peruanas: Conservando la Diversidad Natural de la Selva Alta del Perú. Informe Final. Lima, Perú. 207 pp. + anexos.

Applying the digital map material produced by superimposing the reference and the proposed area coverage, **09 types of SETs** have been identified as priority conservation targets for the project area, which are detailed in the General information G1.2 “The types and condition of vegetation within the project area”.

These units synergistically complement those already included in the Abiseo River National Park and the Concession for Conservation "Alto Huayabamba," forming a more robust and resilient block to global climate changes to come.

G1.7.2 Flora inventory in the reference project area

Table 10 : List of species of flora listed in the inventory

FLORA		
Angiospermae	**Families**	**Species**
DYCOTYLED-ONEAE	PROTEACEAE	*Oreocallis grandiflora* (Lam.) R. Brown “saltaperico”, “cucharilla”
	OLACACEAE	*Heisteria acuminata* (H.B.K.) Engler “chuchuhuasi”
	SANTALACEAE	*Cervantesia tomentosa* R. & P.
	POLYGONACEAE	*Muehlenbeckia volcanica* (Benth.) Endlicher “mullaca”
		M. tamnifolia (H.B.K.) Meiss “bejuco”
		Polygonum aviculare L. “pica pica”
		P. hydropiperoides Michaux “pica pica”
		Rumex acetocella L. “lengua de vaca”
		R. crispus L. “lengua de vaca”
		R. conglomeratus Murray “lengua de vaca”
		R. obtusifolius L. “lengua de vaca”
		Triplaris peruviana Fisch. & Meyer ex C.A. Meyer
	CHENOPODIACEAE	*Chenopodium ambrosioides* L. “paico”
		C. murale L. “hierba gallinazo”
		C. pallidicaule Aellen “cañigua”
		C. quinoa Willd. “quinua”
	AMARANTHACEAE	*Alternanthera elongata* (Willd. ex Roem. & Schultes) Schinz “hierba
		A. macbridei Standley “yahuar milckay”
		A. porrigens (Jacq.) Kuntze “moradilla”
		Amaranthus caudatus L. “kiwicha”
		Guilleminea densa (Willd.) Moq.
		Iresine difusa H.B.K. ex Willd.
	ANNONACEAE	*Unonopsis guatterioirdes* (A.DC.) R.E. Fries
	MONIMIACEAE	*Siparuna pyricarpa* (R. & P.) Perkins
		S. weberbaueri Perkins “limoncillo”
		Endlicheria bracteata Mez “canela moena”

	LAURACEAE	*Nectandra cissiflora* Nees “muina”
		Ocotea balanocarpa Mez. “muena”
		Persea caerulea (R. & P.) Mez.
		Pleurothyrium cuneifolium Nees “canela muena”
	PIPERACEAE	*Peperomia ferreyrae* Yuncker “peperomia”
		P. galioides H.B.K. “peperomia”
		P. hilli Trelease “peperomia”
		P. obtusifolia (L.) A. Dietrich “peperomia”
		Piper aduncum L. “matico”
		P. corpunya R & P. “matico”
		P. moho moho C. DC. “matico”
		Y otras especies de Piper y Peperomia probablemente nuevas para la
D I C O T	PAPAVERACEAE	*Bocconia integrifolia* H & B. “pincullo”
		Bocconia pearcei Hutchison “pincullo”
	BRASSICACEAE	*Rorippa nasturtium-aquaticum* (L.) Hayek “berro”
	ROSACEAE	*Rubus roseus* Poir “zarzamoras”
		R. acanthophyllus Focke “fresas”
	FABACEAE	*Amburana cearensis* (Allem & Atilde) A.S. Smith “ishpingo”
		Astragalus garbancillo Cav. “garbancillo”
		Cedrelinga cateniformis Ducke “tornillo”
		Caesalpinia sepiaria Roxb “caesalpinia”
		Dalea cilíndrica Hook. “dalea”
		Desmodium limense Hook “pie de perro”
		Erythrina peruviana Krukoff “pajuro”
		Indigofera tephrosioides Kunth “añil”
		Medicago lupulina L. “alfalfilla”
		M. polymorpha L. “alfalfilla”
		Melilotus indica (L.) All. “alfalfilla”
		Otholobium glandulosum (L.) J.W. “culén”
		O. mexicanum Grimes “culén”
		Senna birostris (Dombey ex J. Vogel) Irwin & Barneby
		Trifolium amabile Kunth “chijape”, “trébol”
		Vicia andicola Kunth “alberjilla”
	GERANIACEAE	*Erodium cicutarium* (L.) L’Herit ex Aiton “alfiler”
		E. malacoides (L.) L’Herit & Eacute “alfiler”
		E. moschatum (L.) L’Herit & Eacute ex Aiton “alfiler”
		Geranium sessiliflorum Cav. “ojotilla”
	ERYTHROXYLACEAE	*Erythroxylum coca* Lam. “coca”
	EUPHORBIACEAE	*Chriropetalum ruizianus* (muell. Arg.) Pax & Hoffm.
		Croton alnifolius Lam. “crotón”
		C. lechlerii Muell. Arg. “sangre de grado”
		C. palanostigma Klotzsch “sangre de grado”

		C. ruizianus Muell. Arg “cabra cabra”
		Dalechampia aristolochiaefolia Kunth
		Euphorbia huachanhana (Klotzsch & Grarcke) Boiss
		Hura crepitans L. “habilla”
		Sebastiania obtusifolia (H.B.K.) Pax & Hoffm.
	MELIACEAE	*Cedrela odorata* L. “cedro”
		Swietenia macrophylla “ caoba”
	MALVACEAE	*Malva parviflora* L. “malva”
		Sida rhombifolia L. “sida”
		Urocarpidum macrocerpum Krap. “malva”
	BOMBACACEAE	*Ceiba insignis* (Kunth) Gibas & Semir “ barrigón”
	PASSIFLORACEAE	*Passiflora huamachucoensis* L.K. Escobar
		P. ligularis Juss. “granadilla”
		P. peduncularis Cav. “cholgame”
		P. tripartita var. *mollisima* (Kunth) Hola. Nielse & Jorgense “poro poro”
	CARICACEAE	*Vasconcellea candicans* (Gray) A. DC. “papaya”
		V. heterophylla (Gray) DC. “papaya”
	BEGONIACEAE	*Begonia hirtella* Link “begonias”
		B. acerifolia Kunth “begonias”
		B. octopetala L’Herit. “begonias”
		Y probables especies nuevas para la ciencia.
	MELASTOMATACEAE	Existen varias especies por determinar, posiblemente nuevas para la ciencia.
	RUBIACEAE	*Arcytophyllum tymifolium* (R. & P.) Standl.
		Cinchona pubescens M. Vahl. “cascarilla”
		C. micrantha R. & P. “cascarilla”
		Galium aparine L.
		Manettia peruviana Standl.
		Palicourea macrobotrys (R. & P.) Roem & Schult (otras especies más)
		Psychotria caerulea R. & P. (otras especies más)
		Randia obovata R & P.
		R. killippi Standl.
	VERBENACEAE	*Aloysia tripilla* (L’Herit) Britton “cedrón”
		Cytharexylum flexuosum R. & P.) D. Don
		Duranta membranacea
		Lantana armata Schauer “lantana”
		L. camara L. “lantana”
		L. reptans Hayek “lantana”
		Stachytarpheta cayennensis (Rich) M. Vahl
		Verbena cuneifolia R. & P. “verbena”
		V. litorales Kunth “verbena”

		V. fasciculata Benth "verbena"
	SOLANACEAE	*Acnistus arborescens* (L.) Schltdl. "chimulala"
		A. umbellatus
		Browalia americana L. " flor de mayo"
		Brugmansia arborea (L.) Lagerth "floripondio blanco"
		B. sanguinea (R.&P.) D.Don "puca campanilla", "floripondio rojo"
		Cestrum auriculatum L'Herit "hierba santa"
		C. strigilatum R. & P. "hierba hedionda"
		Cyphomandra betacea (Cav.) Sendtn "berengena"
		Dunalia spinosa (Mey.) Dammer "espino"
		D. umbellata (Dunal) J.F. Macbr.
		Iochroma calycinum
D Y C O T	SOLANACEAE	*I. grandiflorum* Benth "campanilla"
		I. umbellatum (R.&P.) Hunziker ex D'Arcy "shirac"
		Jaltomata biflora (R.& P.) Benitez , y otras especies más
		Larnax género con varias especies
		Nicandra physalodes (L.) Gaertn "capulí cimarrón"
		Nicotiana glauca Graham "tabaco silvestre"
		N. glutinosa L. "tabaco silvestre"
		N. paniculata L. "tabaco cimarrón"
		Physalis peruviana L. "tomate silvestre", ""aguaymantu"
		Salpichroa ramosissima Miers. "cuytulumbo"
		S. tristris Miers.
		Solanum abitaguense S. Knapp "papa de zorro"
		S. bukasovii Rybin "papa de zorro"
		S. jalcae Ochoa "papa de zorro"
		S. trinitense Ochoa "papa de zorro"
		S. sesile R. & P. "papa de zorro"
		Streptosolem jamesonii (Benth) Miers.
	PLANTAGINACEAE	*Plantago lanceolata* L. "llantén"
		P. limensis Pers "llantén"
		P.rigida Kunth "llantén"
	CAPRIFOLIACEAE	*Sambucus peruviana* Kunth "saúco
		Viburnum ayavacense H.B.K.
		V. triphyllum Benth
	VALERIANACEAE	*Phyllactis rigida* (R. & P.) Pers. "valeriana estrella"
		Valeriana candolleana Gardner "valeriana"
		V. clematitis H.B.K. "valeriana"
		V. decussata R. & P. "polo polo"
		V. mirophylla Kunth "valeriana"
		V. pinnatifida.R. & P. "alberjilla"

	ASTERACEAE	*Achyrocline alata* (H.B.K.) DC. "espingo de oro", "huira huira"
		Ageratina azangaroensis (Schultz-Bip ex Wedd.) King & H. Rob. "huarmi huarmi"
		Bidens andicola H.B.K. "amor seco"
		B. pilosa L. "amor seco"
	BROMELIACEAE	*Aechmea mertensii* (Mey) Schult. f
		Bromelia varias especies
		Guzmania strobilanthes (R. & P.) Mez
		G. monostachia (L.) Rugby ex Mez
		Greigia macbrideana L.B.Sm.
		Pitcairnia ferreyrae L.B. Sm.
		P. paniculata (R. & P.) R & P.
		Puya fulgens L. B. Sm. Y varias especies más
DYCOTYLE DONEAE	BROMELIACEAE	*Tillandsia capillaris* R. & P.
		T. latifolia Mey
	BROMELIACEAE	*T. sagasteguii* L.B. Sm.
		T. seemannii (Baker) Mez
		T. tectorum E. Rorren
		Y otras especies más.
	ARECACEAE	*Ceroxylon crispus* Burret
		Wettinia augusta Poepp & Endl.
		Prestoea acuminata (Willd.) Moore
	CYCLANTHACEAE	*Carludovica palmata* R. & P. "bombonaje", "
		Cyclanthus bipartitus Poit. "sangapilla"
	ARACEAE	*Anthurium soukupii* (con varias especies más)
		Colocasia esculenta (L.)Schott "pituca"
		Phylodendron con varias especies más
	MUSACEAE	*Heliconia* con varias especies más
	ORCHIDACEAE	Muchos géneros y especies (algunos muy novedosos)

Details on tree species

Peru is the third largest extent of tropical forest in the World, after Brazil and the Republic of Congo. It counts 2500 species of native tree species of which 33 are critically endangered, 14 endangered and 54 vulnerable. (Mongabay.com, 2010)

Hereunder, a brief description of the most important timber species present in the area, and their characteristics from plantation to maturity (Universidad La Molina, Peru)

a) Swietenia macrophylla - Mahogany





Habitat: sites with high rates and persistent rainfall; despite being intolerant to long term droughts, it also happens in areas with a remarkable dry season. Specie usually developed in light, loamy to sandy soils with good fertility conditions, well drained and medium stoned. Fructification: usually near to the end of the year. Seed dispersion: by means of the wind; medium distances of 32 to 36m and a maximum of 95 up to 100m. Germination: 54 to 95% of germination for fresh seeds on average environmental conditions. Said rate is reduced to 30% within 60 days on average environmental conditions. Growing conditions: seedlings are planted every 3m (3m x 3m) up to 7m x 4m. The recommended rotation is of 35-40 years. In well-fertilized alluvial soils, very fast growths were reported, reaching at the age of 3 years diameters of 15-20cm. Growing/Mortality rate: 1.8m of height is reached by the trees since their plantation up to their first year; diameters of 6-27cm in 6-12 years respectively and 15-20m of height in 7-12 years respectively.

b) Cedrela odorata – Cedar




Habitat: sites with high rates and persistent rainfall but also in areas with a remarkable dry season. Specie usually developed in clayey to sandy soils with normal fertility conditions, well drained and sometimes highly stoned. Fructification: near to the end of the dry season, but also during the whole year. Seed dispersion: by means of the wind. Germination: 60-70% of germination for fresh seeds on average environmental conditions. Seeds should be sowed directly in nursery beds with a mixed substrate of sand and soil, at half shadow.

Growing conditions: seedlings with their substrate are transplanted to the field, considering a 4m distance between one plant and the other. Plantation areas are of alluvial soils, loam-sandy to clayey, flat or with low slopes. Growing/Mortality rate: 2-4cm/year is the average growing rate; reaching 4-5m of height in 7-11 years respectively. This specie has showed a good survival rate in the in-field tests carried out by the concessions (70%).

c) Manilkara bidentata – Quinilla

Habitat: sites with high rates and persistent rainfall. Specie usually developed in clayey to slimy soils, mainly acid, well drained and medium stoned. Fructification: since the end of the dry season up to the start of the rainy one, between September and January. Seed dispersion: by means of fauna species: monkeys and bats. Some rodents also disperse seeds of fallen fruits.


Germination: on the one hand this specie has a good germination rate, but on the other hand it germination power is low, reaching only a 20% and loosing it in 1 or 2 months. Growing conditions: seedlings with their substrate are transplanted to the field. The area of plantation is a high terrace with alluvial soils, loam-sandy and mainly flat.

Growing/Mortality rate: the average annual diametric growth is of 6-10 at the 7-10th years of plantation respectively and the average height reached in the same period of time is of 6-7m. The survival rate is high, 70-90% without any maintenance activities. A thinning-out was tested in the 7th year of plantation with good results on the faster diametric increase of the individuals.

d) Dipteryx spp. – Shihuahuaco

Habitat: sites with high rates and persistent rainfall, but also in areas with a remarkable dry season. Specie usually developed in clayey to slimy soils, well drained, with good fertility conditions and medium stoned. Fructification: at the end of the dry season. Seed dispersion: mainly by means of bat species (*Artibeus jamaicensis, Artibeus lituratus and Carollia spp.)*, which get and then take the fruits to safe places to eat them quietly. Some monkey species (*Ateles spp.*) and large rodents (*Dasyprocta spp. and Myoprocta spp.)* could also act eventually as seed spreaders.

Germination: getting 79-80% of germination power. Growing conditions: good initial growth in alluvial, well-drained soils. Growing/Mortality rate: an average annual increase of 1m of height in a 3 year plantation was registered, on alluvial and well-drained soils. On the other hand, average annual increases of 0.57m of height in an 8 year plantation were registered in a Forest Reserve in Ducke, Manaus, Brazil.

e) Amburana cearensis – Ishpingo

Habitat: sites with high rates and persistent rainfall, but also in areas with a remarkable dry season. Specie usually developed in clayey to slimy soils, well drained and medium stoned. Fructification: during the dry season, between July and August. Germination: good rate. Growing/Mortality rate: despite the growing rate is apparently slow, in a 3 year plantation established in the Pucallpa height growths of 1.5-1.6m were registered.

f) Eschweilera coriacea – Misa

Habitat: sites with high rates and persistent rainfall. Specie usually developed in clayey soils, mainly acid, well drained, sometimes with poor fertility conditions and low stoned. Fructification: during the rainy season, between January and March. Germination: good rate. Growing conditions: not tested yet. Plantation should be made with bare root and also by no till plantation.

Growing/Mortality rate: slow growing rate; volumetric increases of about 1000m3/ha/year.

g) Apuleia leiocarpa – Ana caspi

Habitat: sites with high rates and persistent rainfall, but also in areas with a remarkable dry season. Specie highly adaptable to different textures and fertility conditions of soils, well-drained and medium stoned. Fructification: during the rainy season, between November and March. Germination: good rate in seeds with a pre-germination treatment, reaching 90% of germination power. In fresh seeds without treatment the percentage is lower, around 20%.

h) Aspidosperma parvifolium – Quillobordón

Habitat: sites with high rates and persistent rainfall. Specie usually developed in clayey to slimy soils, well drained and medium stoned. Fructification: at the start of the rainy season, between November and December. Seed dispersion: by means of the wind, winged seeds. Germination: seed propagation is successful. Growing conditions: the area of plantation is a high terrace with alluvial, loam-sandy soils, flat or with a light slope.

Growing/Mortality rate: the average annual diametric increase is of 8-11cm in plantations of 10-14 years respectively. The average height reached at the age of 14 is 10m. The survival rate is low, around 20%.

i) Brosimum lactescens – Manchinga

Habitat: sites with high rates and persistent rainfall. Specie usually developed in clayey to slimy soils, slightly acid, well drained and medium stoned. Fructification: at the end of the dry season, in October. Seed dispersion: by means of bird and mammal species, which eat the fallen fruits. Among them, it should be highlighted *Mozama Americana* (Venado), *Tayassu spp.* (Pecaríes) and some rodents. Germination: reaching 98% of germination power for fresh seeds, but only 25% for seeds that had been collected 15 days before. Growing conditions: seedlings with their substrate are transplanted to the field, with 2m distance between one plant and the other (2mx2m). The areas of plantation are high terrace, mostly flat and of loam-sandy to loam-silty soils. Growing/Mortality rate: the survival rate is medium, around 52% in-field and 55-73% under shadow.

j) Ruagea insignis – Requia

Habitat: sites with high rates and persistent rainfall but also in areas with a remarkable dry season. Specie highly adapted to a varied range of soils in terms of texture, acidity and fertility conditions; sometimes temporarily flooded areas and also next to the rivers.
Fructification: there are flowers and fruits during the whole year, but it seems to be more fructification at the end of the rainy season, between March and April. Seed dispersion: by means of bird species, which are attracted by the intense red color of the seeds. Also some monkey specie and maquisapas *(Ateles spp.)* eat said fruits and therefore participate in the seed dispersion. Germination: reaching 40-58% of germination power in fresh seeds.

k) Terminalia oblonga – Yacushapana

Habitat: sites with high rates and persistent rainfall but also in areas with a remarkable dry season. Specie usually developed in loam to loam-sandy soils, neutral to acid, well drained and sometimes highly stoned. Fructification: during the dry season up to the start of the rainy one, between May and December. Seed dispersion: by means of the wind. Germination: reaching 80% of germination power in fresh seeds. Growing conditions: seedlings with their substrate are transplanted to the field after 8-12 months of plantation. Root pruning and the removal of some foliage is recommended before the in-field planting. Growing/Mortality rate: Costa Rica registers state a

diametric increase of 13cm and a height increase of 12m in a 14 year plantation of Yacushapana.

l) Copaifera reticulate – Copaiba

Habitat: sites with high rates and persistent rainfall. Specie usually developed in clayey to slimy soils with good fertility conditions, well drained and medium stoned. Fructification: since the end of the dry season up to the start of the rainy one, between September to January. Germination: reaching 31-78% of germination power in fresh seeds. Growing/Mortality rate: registers made in Brazil for a congenus specie *Copaifera langsdorfii* show slow growth rates, with diameters of 9-11cm in average reached in 14-25 years and heights of 9-12m in the same period. The survival rate is very high, around 90%.

m) Myroxylon balsamum – Estoraque

Habitat: sites with high rates and persistent rainfall but also in areas with a remarkable dry season. Specie developed in primary forests, on clayey to slimy soils with good fertility conditions, well drained and variably stoned. Fructification: next to the end of the dry season, but also during the whole year. Seed dispersion: by means of the wind; fruits are samaras. Additionally, some parrot species could also participate in the seed dispersion. Germination: reaching 60-75% of germination power in fresh seeds.

Growing conditions: characteristic specie in primary forests, mainly on high terrace or low hills zones and on rich and well-drained soils. Growing/Mortality rate: registers made in Brazil for a congenus specie *Myroxylon peruiferum* show slow growth rates, with diameters of 6-7cm in 14 years and heights of 6-7m in the same period. The survival rate is very high, around 90%.

G.1.7.3 Fauna within the project zone

Diverse species of mammals, birds, reptiles and amphibians are observed, as well as numerous species of invertebrates. Within the project zone over 160 mammal species, 324 bird species, 26 butterfly species, 106 reptile species, 123 amphibian species exist, as well as many other species of invertebrates have been identified

Among the most representative species present in the surroundings the following should be highlighted:

Sachavaca (*Tapirus terrestres*), venado colorado (*Mazama americana*), majaz (*Agouti paca*), añuje (*Dasyprocta variegata*), conejo silvestre (*Sylvilagus brasilensis*), oso hormiguero (*Myrmecophaga tridactyla*), armadillo gigante (*Priodontes maximus*), carachupa (*Dasypus novemcinctus*), puma (*Felis concolor*), otorongo (*Pantera onca*), mancos (*Eira barbara*), perro de monte (*Atelocynus microtis*), mono leoncito (*Cebuella pygmaea*), pichico de barriga naranjada (*Saguinus labiatus),* musmuqui (*Aotus nancymaae),* maquisapa (*Ateles paniscus),* as well as dangerous reptiles as shushupe (*Lachesis muta*), naca naca (*Micrurus sp*), mantona (*Boa constrictor*) and “quelónidos” as the motelo (Geochelone denticulada), taricaya (*Podonemis sp*), birds as the harpia (*Harpia harpia*), Cóndor de la selva

(*Sarcoramphus papa*), Guacamayo (*Ara macao*), Paujil (*Mitu tuberosa*), Tucan (*Ramphastos cuvieri*), Paguana (*Crypturellus undulatus*), pucacunga (*Penelope jacquacu*) and manacaraco (*Ortalis guttata*).

G1.7.4 Threats to biodiversity

The threats to biodiversity in the project area are linked to the disparition of natural habitatsfor fauna and flora due to deforestation, and to contamination of the ecosystems, especially waters streams with potential mining and oil activities upstream of the project area.

The threats to biodiversity are the same threats as for deforestation, described in details further down in section G2.1.2. The analysis of deforestation agents and drivers is based on local assessments, interviews, participatory rural appraisals and surveys.

A project specific-modeling of deforestation in the "without project "scenario was conducted that shows future deforestation in the project zone, across the different SETs identified, impacting natural habitats of species.

G1.8. High Conservation Values (HCVs) and description of the qualifying attributes

The World Wild Fund for Nature has delineated three yungas ecoregions along the eastern side of the Andes. San Martin Region is located in the northernmost one (Peruvian Yungas). These yungas ecoregions are transitional zones between the Andean highlands and the eastern forests. The yungas forests are extremely diverse, ranging from moist lowland forest to evergreen montane forest and cloud forests. The terrain is extremely rugged and varied, contributing to the ecological diversity and richness. A complex mosaic of habitats occurs with changing latitude as well as elevation. There are high levels of biodiversity and species endemism throughout the yungas regions. Many of the forests are evergreen, and the South Andean Yungas contains what may be the last evergreen forests resulting from Quaternary glaciations.

Within the different forest types listed above there are areas of High Conservation Value (HCV), divided into areas of biological and cultural significance. Biological HCV areas include the primary forest of the project area, composed primarily of evergreen forest. Due to the presence of several IUCN listed threatened species in the project area (see previous section), the project area can be designated as a biological HCV area.

Hereunder, a summary of the existent biodiversity conditions within Martin Sagrado project area at the starting date of the REDD Project, as well as the conditions in its immediate surroundings defined by the leakage belt determined in the present REDD Project.

It is based on the results of a series of studies related to the biophysical and biodiversity conditions of the area as well as communities observations and feed-back. Said documents represent a joint effort made by the communities and their partners with the aim to achieve the sustainable management of their forests, using the accumulated knowledge of the biodiversity component of the project.

G1.8.1. Globally, regionally or nationally significant concentrations of biodiversity values

G1.8.1 a. Protected areas

The National Park Rio Abiseo is the major protected area in the project zone. It encompasses 274 520 hectares of rainforest. The National Park was established in 1983; UNESCO pronounced it as Natural and

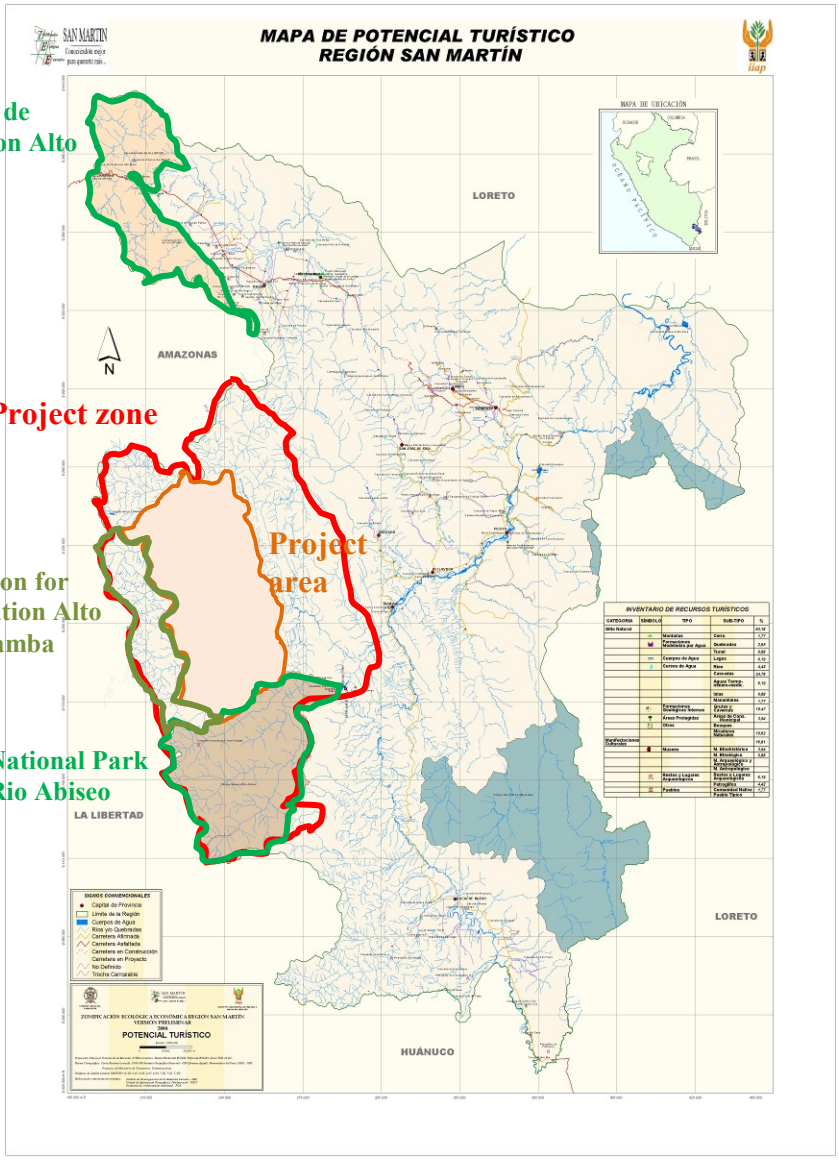
Cultural Heritage of Humanity (World Heritage Site) in 1990. The park is home to a large number of species of flora and fauna, as well as the location of over 30 pre-Columbian archaeological sites. Since 1986, the park has not been open to tourism due to the fragile nature of both the natural and archaeological environment.

Other conservation areas include the Concession for Conservation Alto Huayabamba, attributed to the NGO AMPA in 2006. Located on the most western part of San Martin Region, in the highest part of the Andes, it encompasses 143 928 hectares of mostly high Andean ecosystems.

Just outside the project zone, to the north of San Martin region, across the boarder with Amazonas region is the “Bosque de protection Alto Mayo”, a forest conservation area created in 1987, encompassing 182 000 hectares of forest.

The project area completes a major role in the connectivity between the Abiseo River National Park and the “Bosque de Proteccion Alto Mayo”, and as part of the more global Conservation Corridor for Abiseo - Condor - Kutukú, considered as high priority for conservation and nucleus of one of the centers of high diversity ("Biodiversity hotspots") in the Tropical Andes

Figure 17 : Map of protected areas and conservation corridor



G1.8.1 b. Threatened species

Based on current legislation and lists of endangered species worldwide (IUCN)) the following species have been registered and have a high probability of occurrence in the project area (CDC-UNALM and TNC, 2006[18]). They are displayed here according to their threat level according to INRENA, IUCN and CITES.

[18] CDC-UNALM; TNC. 2006. Planificación para la conservación ecorregional de las Yungas Peruanas: Conservando la Diversidad Natural de la Selva Alta del Perú. Informe Final

Table 11 : Endangered species in the proposed project zone

ESPECIES	GRADO DE AMENAZA		
	PERU	UICN	CITES
FLORA			
Cyathea spp. "helecho arbóreo"	--	--	II
Podocarpus oleifolius "saucecillo"	CR	LC	--
Ceroxylon crispum "palma de cera"	VU--	--	--
Cedrela odorata "cedro"	VU	VU	III
Cedrela montana "cedro"	VU--	--	--
Cedrela lilloi "atoc cedro"	EN	EN	--
Swietenia macrophylla "caoba"	VU	VU	II
Polylepis multijuga "quinoa"	EN	VU	--
Juglans neotropica "nogal"	NT	EN	--
FAUNA			
Aves			
Aulacorhynchus huallagae "tucancito semiamarillo"	EN	EN	--
Aburria aburri "pava negra"	NT	NT	--
Hemispingus rufosuperciliaris "hemispingo cejirufo"	VU	VU	--
Leptosittaca branickii "loro de mejillas doradas"	VU	VU	II
Thripophaga berlepschi "rabiblando bermejo"	EN	VU	--
Mamíferos			
Oreonax flavicauda "mono choro de cola amarilla"	EN	CR	I
Aotus miconax "mono nocturno"	EN	VU	II
Callicebus oenanthe "mono tocon andino"	VU	EN	II
Pudu mephistophiles "sachacabra"	EN	VU	II
Tremarctos ornatus "oso de anteojos	EN	VU	I
Panthera onca *"otorongo"*	-	VU	I
Tapirus terrestris *"sachavaca"*	-	-	II

Source: IUCN 2008, CITES, PERU 2004 y 2006.

The International Union for Conservation of Nature (IUCN), brings together a diverse panel of experts who evaluated and ranked based on species extinction. The categories used are: Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LR), Data Deficient (DD) and Not Evaluated (NE). The species listed in categories CR, EN and VU are considered threatened.

Consistent with the model used by the IUCN, nationally, equivalent categories are used to this international system. Thus, the categorization for threatened fauna in Peru is under the aegis of Supreme Decree N º 034-2004-AG, which defines threat categories as follows: Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT). In the case of plants, the categorization comes under Supreme Decree No. 043-2006-AG, which employs categories equal to the categories of animals indicated above. The CITES (Convention on International Trade in Endangered Species) includes

in its appendices to those species that have undergone some drastic changes or decrease in abundance due to excessive hunting or trade of their products, such as skins, teeth and bones. CITES Appendix considers three categories:

- Appendix I includes all species of animals and plants who bear an increased risk of extinction, CITES generally prohibits the international trade in specimens of these species. However, trade may be permitted in exceptional circumstances the same, eg for scientific research.

- Appendix II includes species not necessarily threatened with extinction but could become, unless strictly controlled trade, international trade in specimens of these species may be authorized to grant an export permit or re-export certificate, not must have an import permit.

- Appendix III includes species included at the request of a country that already regulates trade in the species and requires the cooperation of other countries to prevent unsustainable or illegal exploitation of the same, including species regulated for conservation purposes by individual countries.

In the project area, we have a list of 21 species found in any of the lists of threatened species nationally and internationally, or are listed in the Appendices to CITES. Undoubtedly, this list highlights the endemic monkeys Oreonax flavicauda (yellow-tailed woolly monkey) and miconax Aotus (night monkey), and endemic birds Aulacorhynchus huallagae (Toucanet semiamarillo) Thripophaga berlepschi (rabiblando vermilion) and Hemispingus rufosuperciliaris (hemispingo cejirufo). On the other hand, in terms of flora highlight what we believe are the populations of mahogany mountains and the rare saucecillo (Podocarpus oleifolius). Although, these species have some level of protection in places like the Rio Abiseo National Park, has always been calling for the extension of the protection zones of these endemic species (CDC-UNALM and TNC, 2006). We believe the project addresses this need for expansion of habitat for these species are endemic.

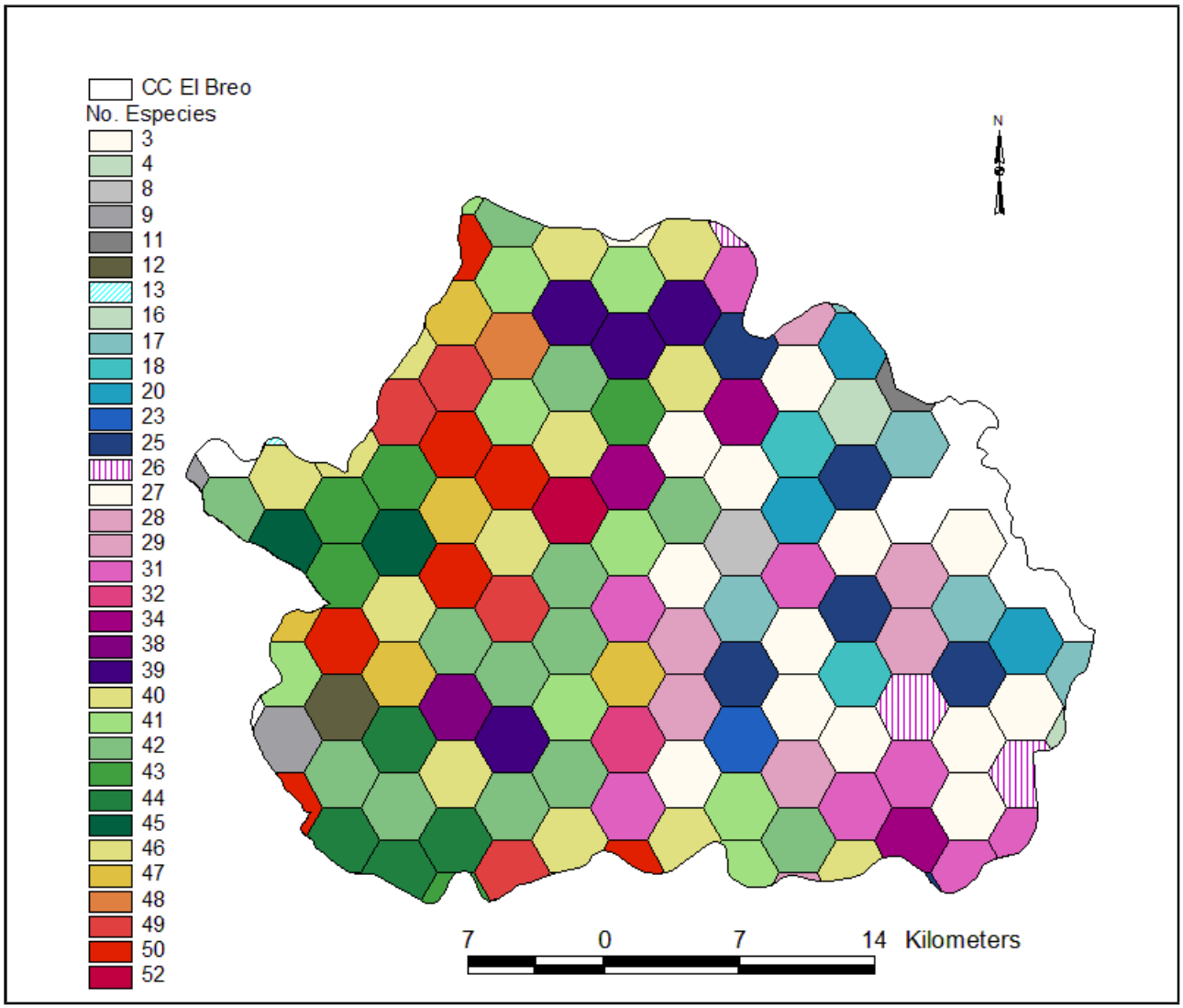
G1.8.1 c. Distribution and occurrence of endemic species

Diverse species of mammals, birds, reptiles and amphibians are observed, as well as numerous species of invertebrates. Within Martin Sagrado reserve over 160 mammal species, 324 bird species, 26 butterfly species, 106 reptile species, 123 amphibian species exist, as well as many other species of invertebrates.

As mentioned earlier in the fauna inventory (section G.1.7.3) more than 700 species have been identified (amphibians, reptiles, birds and mammals) whose unique characteristics (endemism, continuous distribution and conservation status) makes them worthy of being viewed as objects of conservation for the entire Peruvian Yungas ecoregion. In the area of the concession El Breo, the theoretical spatial distribution of these species (fundamental niche) has been projected onto hexagons (10 ha approx.) which indicate the total number of species they contain. The map obtained shows the areas with the greatest concentration of species, and the maximum record of occurrence obtained for a polygon within the Peruvian Yungas is 52 species.

Map information based on that we have developed a distribution map of these sites for the requested area. There we can see that our proposal includes a high concentration of sites with high richness of species, including an hexagon with an occurrence of 51 species.

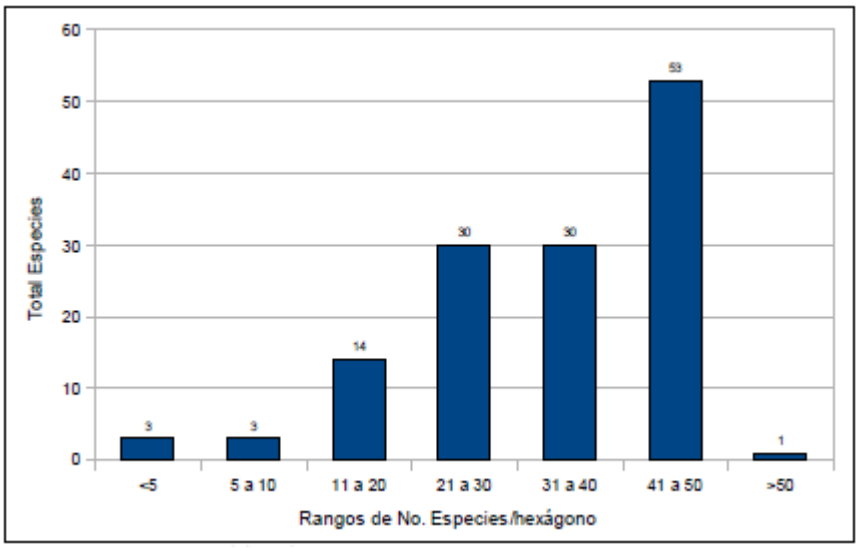
Figure 18 : ***Spatial distribution of species considered as objects of conservation***



Source: CDC-UNALM y TNC, 2006

Similarly, around this hexagon occurs exceptional concentration of sites with high species richness (> 40 species per hexagon) to the west side of the area. A distribution histogram of the number of species per polygon reveals a bias toward hexagons with high wealth. About 60% of these sites display more than 31 species unique to the Peruvian Yungas.

Figure 19 : ***Distribution of hexagons / Richness of species for the conservation of the Yungas***



Source: CDC-UNALM y TNC, 2006

G1.8.3. Threatened or rare ecosystems

G.1.8.3.a. Area with vulnerable soils

According to the Economic Ecological Zoning of St. Martin (2005[19]), the proposed project area is within the protection zones for soil and slope conditions, with a smaller area corresponding to an association of slope protection zones and soils associated with timber potential forest production fair to poor. Thus, we are facing very fragile areas unsuitable for agriculture. It is recommended to their protection from migration trends that lead to disordered occupation of the territory of the basin, it does not take into account the natural ability of soils.

This classification as protected areas comprises those lands that have no ecological or soil conditions required for the operation of crops, pasture or forest production and other lands that have natural vegetation forest but its use is not economical and should be handled with for watershed protection, wildlife, scenic values, recreational and other benefits involving collective or social interest.

G.1.8.3.b. Rare ecosystems with conservation objectives

The Data Center for Conservation - UNALM & TNC (2006), using biophysical models from different inputs and different methods, identifies and describes the terrestrial ecological systems (SET) of the Peruvian Yungas.

At coarse filter level (ecosystem level), within the Peruvian Yungas Ecoregion, the CDC-UNALM identified 18 SETs as conservation targets (CDC-UNALM and TNC, 2006). The SETs are defined as "groups of

[19] Zonificacion Ecologica Economica de la Region San Martin, 2005

plant communities that tend to co-occur in the landscape due to its relationship with common factors and determinants and ecological processes, substrates and / or environmental gradients" (Josse et al., 2007:11). The use of SETs to evaluate the effectiveness of conservation has many advantages because it combines in one system: ecological, dominant vegetation and landforms. 09 types of SETs have been identified as priority conservation targets for the project area, which are detailed in the General information G1.2 “The types and condition of vegetation within the project area”.

These units synergistically complement those already included in the Abiseo River National Park and the Concession for Conservation "Alto Huayabamba," forming a more robust and resilient block to global climate changes to come.

G.1.8.3.c. Conservation targets

The Data Center for Conservation (CDC-UNALM) & TNC have identified two major Peruvian Yungas blocks that are of high priority because they encompass a large number of species and key ecosystems and still maintain a high level of integrity (low human intervention, high connectivity). One of these blocks is the San Martín Yunga - that stretches from Huánuco northern Monsoon Valley to the headwaters of Alto Mayo (CDC-UNALM and TNC, 2006).

The following conservation targets (species level) have been selected by the organizations mentioned above:

Mammals	1. Mono choro de cola amarilla - *Oreonax flavicauda* 2. Oso de Anteojos - *Tremarctos ornatus*
Birds	3. Gallito de las rocas - *Rupicola peruviana* 4. Loro mejillas doradas - *Leptosittaca branickii*
Quina o Cascarilla Tree	5. Cinchona officinalis y Cinchona pubescens

Also, based on information about range, habitat preference and distribution of forest types, we project that would be found within the area as well: the night monkey (Aotus miconax), the Andean stump monkey (Callicebus oenanthe) and three palm trees Andean (Ceroxylon crispum, and Prestoea maynensis Wettinia acuminata). All these elements have also been selected as conservation targets of the Yungas de San Martin and NorthEast Huanuco.

Mamíferos	6. Mono nocturno - *Aotus miconax* 7. Mono tocón andino - *Callicebus oenanthe*
Palmeras Andinas	8. *Ceroxylon crispum, Wettinia maynensis* y *Prestoea acuminata*

The identification of species conservation objectives was done by incorporating the criteria used by the CDC-UNALM , which are:

a) Species known to society, especially local communities (cock of the rock, spectacled bear, the cinchona tree).
b) Species of great scientific and endemic (endemic primates such as yellowtail woolly monkey, monkey Andean night monkey Andean stump, rare birds such as parrots and golden cheeks spectacled bear).
c) Species of scientific and social importance (Andean palms).

d) Endangered species (primates, spectacled bear, parrot golden cheeks)

Furthermore, the prioritization of species as conservation targets are made taking into account the sensitivity of these to changes in the environment (eg primates, spectacled bear, parrot golden cheeks). The same shall take into account the availability of scientific information on the species (habitat requirements and conservation status). Below is the most outstanding characteristics (description) of the species listed as conservation targets in the project area, indicating its importance (CDC-UNALM & TNC, 2006).

Figure 20 : Description of species considered as conservation targets

Palmeras Andinas

Ceroxylon crispum, Wettinia maynensis y *Prestoea acuminata*

Distribución: *Ceroxylon crispum* en Huánuco, endémico y San Martín; *Wettinia maynensis* en Huánuco, San Martín y Loreto; *Prestoea acuminata* en Cajamarca-San Martín y Huánuco-Junín.)

(Fotos: Archivo de AMPA. C.Flores. 2008

Hábitat: *Ceroxylon crispum* en bosque natural montano, entre 2500 y 3000 msnm; *Wettinia maynensis* en bosque natural montano, entre 160 y 1700 msnm; *Prestoea acuminata* en bosque de neblina a 1650 – 2500 msnm.

Rol Ecológico: Las palmeras andinas son fuente de alimento (frutos aceitosos, inflorescencias) para muchas especies de fauna silvestre de montaña.

Amenazas: *Ceroxylon crispum* es usada como material de construcción regularmente comercializado en mercados de la región, por lo que actualmente se le considera vulnerable, además destrucción de bosques donde existe para abrir campos agrícolas y para pastizales.

Árbol de la Quina o Cascarilla

Cinchona officinalis y *Cinchona pubescens*

Archivo AMPA. K.Pinasco 2007

Aspectos generales: *Cinchona officinalis* es un árbol de 11 – 15 m de alto con fuste cilíndrico (diámetro 30 – 40 cm), ramificación simpodial y copa globosa irregular. *Cinchona pubescens* es un árbol de 8 – 12 m de alto con fuste cilíndrico irregular (diámetro 18 – 28 cm), ramificación simpodial y copa globosa.

Distribución: *Cinchona officinalis* es una especie de amplia distribución, encontrándose en ambas vertientes de la Cordillera de los Andes, en Colombia, Ecuador, Perú y Bolivia; en Perú se distribuye desde Amazonas hasta Puno. *Cinchona pubescens* se distribuye desde Costa Rica hasta Bolivia; en Perú se distribuye desde Piura y Amazonas hasta Puno.

Hábitat: *Cinchona officinalis* se encuentra tanto es bosques naturales como en áreas disturbadas, entre los 1000 y 3150 msnm. *Cinchona pubescens* también en bosques naturales y áreas disturbadas, entre 400 y 3250 msnm.

Rol Ecológico: Desconocido, solo se tiene reportes que *Cinchona pubescens* puede comportarse como una agresiva especie invasiva en las áreas donde se introduce como exótica.

Amenazas: Para ambas especies de cascarilla existe presión por parte de la población para ampliación de las áreas agrícolas y la extracción de los recursos del bosque.

Mono Choro Cola Amarilla

Oreonax flavicauda

University of Wisconsin

Aspectos Generales: Es uno de los primates de mayor peso en el Perú: 8 a 10 kilos. Longitud de cabeza y cuerpo: 51 – 53 cm. Cola: 56 – 61 cm. Se caracteriza por tener el escroto y base de la cola prensil con pelos de coloración rojo-amarillenta y el hocico color amarillo pálido marcadamente contrastado con la coloración oscura del resto de la cabeza y cuerpo. Reciente se ha propuesto restablecer el nombre científico original: *Oreonax flavicauda*.

Distribución: Endémico del Perú, se distribuye exclusivamente en los departamentos de San Martín y Amazonas.

Hábitat: Especie exclusiva de bosques húmedos montanos y premontanos con fisiografía muy accidentada; bosques de neblina, entre 500 y 2700 msnm.

Rol Ecológico: Herbívoro arborícola diurno. Se alimenta de frutos, flores, raíces y pseudobulbos de epífitas, líquenes y peciolos de hojas.

Amenazas: Caza de subsistencia en áreas cercanas a caseríos, pérdida de cobertura forestal para establecimiento de agricultura y ganadería de vacunos y captura de individuos jóvenes como mascotas. La Unión Mundial para la Naturaleza considera una población de menos de 250 individuos en su área de distribución natural.

Mono Tocón Andino

Callicebus oenanthe

Aspectos Generales: Pesa aproximadamente 1 kg. Longitud de cabeza y cuerpo: 29 - 36 cm, cola (no prensil): 33 – 48 cm. El cráneo y piel del holotipo (macho adulto), colectado por L. Rutter en 1924 se encuentra depositado en el British Museum of Natural History de Londres.

Distribución: Endémico del Perú (localidad tipo: Moyobamba, San Martín, Perú 840 msnm). Solo en el norte del departamento de San Martín.

Hábitat: Bosques de neblina. Rango altitudinal conocido: 750 – 950 msnm.

Rol ecológico: Arborícola diurno. Probablemente se alimenta de hojas y frutos, ya que es reconocido que varios representantes del género Callicebus se encuentran entre los primates folívoros más pequeños.

Amenazas: Raramente es cazado para subsistencia debido a su escaso peso corporal, pero está perdiendo hábitat debido al establecimiento de agricultura y vacunos.

Oso de Anteojos

Tremarctos ornatus

Aspectos Generales: Oso de tamaño mediano, el largo de la cabeza y cuerpo varían entre 1.20 y 2.20 m, el largo de la cola es 7 cm. Tiene un peso variable entre 90 y 175 kg, siendo los machos más grandes y pesados que las hembras. El oso de anteojos presenta el cuerpo entero de color negro o marrón oscuro, a excepción de los grandes círculos o semicírculos blanco-amarillentos alrededor de los ojos que generalmente tiene – de ahí el nombre común de la especie – cuyas líneas se pueden prolongar hacia el pecho (estas líneas o manchas claras son particulares para cada individuo).

ecoportal.net

Distribución: El oso de anteojos es el único representante de la familia Ursidae en América del Sur, se distribuye desde Yuracay – Cordillera de Mérida, en Venezuela, hasta la provincia de Porta en Bolivia, comprendiendo así Venezuela, Colombia, Ecuador, Perú y Bolivia, encontrándose las mayores poblaciones en las laderas inaccesibles del este de la cordillera de los Andes en Ecuador y Perú.

Hábitat: En el Perú, ocupa una gran variedad de hábitat en las cordilleras Occidental, Central y Oriental de los Andes, encontrando a las mayores poblaciones en la cordillera Oriental: es decir, en las Yungas Peruanas. Los osos prefieren como hábitat los bosques húmedos entre los 1900 y los 2350 msnm y los bosques espinosos de la Costa cuando encuentran agua disponible; también, los pastizales altoandinos son utilizados en forma estacional. El oso de anteojos es típico de los bosques nublados y enanos de las Yungas Peruanas y se considera especie emblemática en campañas de conservación de los bosques nublados Andinos.

Rol Ecológico: Es de costumbres nocturnas y diurnas, terrestres y parcialmente arborícolas. A pesar de pertenecer al orden Carnívora, su dieta es principalmente vegetariana, una escasa proporción está relacionada con material animal, entre insectos y roedores principalmente, el resto lo conforman bayas, cortezas, corazones de bambú, peciolo de hojas de palmera, bromelias, cactus y frutos. Es considerada una especie muy importante para la diseminación del polen y dispersión de semillas de varias especies botánicas.

Amenazas: El oso es cazado para obtener sus patas y pelo para usos en medicina tradicional; por ejemplo, en el mercado de herbolarios de la ciudad de Chiclayo es frecuente encontrar puestos de venta donde se ofrecen esos productos provenientes de las montañas nubladas de San Martín, Amazonas y Cajamarca. Los osos también son eliminados por los campesinos cuando estos destruyen los cultivos; es frecuente, por ejemplo, el ingreso del oso a los campos de maíz. Por otro lado se considera que esta especie está perdiendo hábitat debido al establecimiento de agricultura y ganadería de vacunos en desmedro del bosque; esto último conlleva a la fragmentación y disminución de la productividad del hábitat y, posteriormente, al aislamiento paulatino de las poblaciones de oso.

Mono Nocturno Andino

Aotus miconax

Aspectos Generales: Mono nocturno del grupo "cuello rojo". Pesa aproximadamente 1 kg. Longitud de cabeza y cuerpo: 24 a 27 cm; cola (no prensil): 9 cm. El estatus taxonómico de esta especie es incierto, ya que solo se conocen especímenes antiguos, a pesar de ello actualmente se reconoce como una especie válida.

Distribución: Endémico del Perú. Departamentos de San Martín, Huánuco, Amazonas. Esta especie es solo conocida por pieles y cráneos colectados en el río Chinchao (departamento de Huánuco) en 1922 por E. Heller (depositados en el Field Museum of Natural History de Chicago) y por otros restos depositados en el Museo de Historia Natural de la Universidad Mayor de San Marcos (Lima) colectados en 1948 en el río Cayumba (departamento de Huánuco); sin embargo, coincidentemente, varios autores consideran su rango de distribución en términos muy similares a lo que son las Yungas del departamento de San Martín y el norte del departamento de Huánuco. El CDC-UNALM ha registrado en dos ocasiones (sin colección) Aotus sp. en los Andes Peruanos 1992 y 1997.

Hábitat: Bosques de neblina de la región centro-oriental del Perú, encima de los 800 msnm, compartiendo hábitat (simpatria) con *Lagothrix flavicauda* y *Callicebus oenanthe*, otros dos primates endémicos del país.

Rol Ecológico: Arborícola y nocturno. No se conoce mucha información sobre sus hábitos; sin embargo, se sabe que es principalmente frugívoro, aunque se alimenta también de insectos y néctar de flores.

Amenazas: Raramente es cazado para subsistencia debido a su escaso peso corporal; pero sí está perdiendo hábitat debido al establecimiento de agricultura y ganadería de vacunos; sufre también captura de individuos para mascotas.

Gallito de las Rocas

Rupícola peruviana

http://www.tunqui.com

Aspectos Generales: Tiene un tamaño aproximado de 30 cm. El macho y la hembra presentan cresta, la cual casi llega a cubrir el pico; el macho es de color rojizo anaranjado con alas y cola negra; la hembra es marrón rojiza. Es considerada el ave nacional del Perú.

Distribución: Se distribuye desde el noroeste de Venezuela hasta Bolivia. En el Perú se distribuye en la vertiente oriental de los andes.

Hábitat: Habita las selvas nubladas densas y húmedas (500 a 2400 msnm), cerca de ríos y riachuelos con acantilados rocosos y precipicios.

Rol ecológico: Se alimenta de frutas e insectos.

Amenazas: Esta ave está perdiendo hábitat natural debido al establecimiento de agricultura y ganadería de vacunos en desmedro del bosque; sin embargo, pareciera que es una especie que puede adaptarse a hábitats perturbados, habiéndose registrado en bordes de chacra o ecotonos bosque-chacra. El gallito de las rocas es eventualmente cazado para obtener especímenes disecados con fines ornamentales o para uso en medicina tradicional; por ejemplo, en el mercado de herbolarios de Chiclayo puede encontrarse puestos de venta donde se ofrecen animales disecados provenientes de las montañas nubladas de San Martín, Amazonas y Cajamarca

Loro Mejillas Doradas

Leptosittaca branickii

Aspectos Generales: Lorito o cotorra mediana (30 a 35 cm) y de cuerpo delgado, lo que lo asemeja a un guacamayo pequeño; es de color general verde, tiene una franja amarilla delgada desde el lores hasta los cobertores de oídos, abdomen naranja.

Distribución: Regiones Andinas húmedas de Colombia, Ecuador y Perú. En Perú reportado desde Amazonas-San Martín hasta Junín-Cuzco. Su localidad tipo es Maraynioc, departamento de Junín 3240 msnm.

Hábitat: Bosque de neblinas, ocasionalmente visita el páramo; altitudes entre 2400 y 3400 msnm, incluso de la línea de bosque (timberline, es decir el límite superior hasta donde llega el bosque), eventualmente llega a 1400 msnm.

Rol Ecológico: Se alimenta de semilla y frutos (Moráceas, Podocarpáceas), por lo que debe ser un dispersor de semillas y polen.

Amenazas: Esta ave es rara y sólo se ubica en localidades fragmentadas. Ha perdido hábitat natural debido sobre todo al establecimiento de agricultura y ganadería de vacunos; sin embargo, algunos autores sugieren que el incremento de áreas de cultivo (sobre todo de maíz) en su área de distribución natural podría favorecer a este lorito.

G.1.8.3.d. Other rare and valuable species

The forest in the project area is very important in terms of biodiversity conservation since it is conformed by important populations of the specie *Swietenia macrophyla* (mahogany), and *Cedrela odorata* (cedar), which have been incorporated respectively to the Appendix II and III of CITES for being considered endangered and vulnerable species.

G1.8.4 Areas that provide critical ecosystem services

G.1.8.4.a. Regulation and water supply

The concession El Breo itself covers approximately 9% of the Huayabamba River subwatershed, including the middle and lower basins of the Breo and Cordoncillo rivers and complements the Conservation concession for Alto Huayabamba in the regulation of water sources that descend abruptly from the 4400-4600 meters to 600 meters in just 60 km horizontal projection. Thus, the role of forest cover is essential to prevent erosion and regulating base flow that would otherwise be discharged as a stream in a short period of the year. This is based on the hydrological study of the San Martin region by Maco, J. (2005), which indicates that during the dry season river flow exceeds Huayabamba Huallaga river at the point of intersection. In this sense we can say that water environmental services provided by the concession area for Conservation El Breo have a regional scope, directly benefiting the population living in the middle and lower sub Huayabamba river as well as indirectly to that established in the middle basin of the Huallaga River, which now represents the valley's most populous and largest development and production of the San Martin.

Protect and preserve vegetation and waterways in the area will allow the maintenance of water environmental services associated with it, thus contributing to the regulation of water flows as well as storage and water retention that makes it possible the efficient supply (in terms of quality and quantity) of

this vital resource in the watershed, reservoirs and aquifers, allowing fresh drain into the populations in its area of influence, both for human consumption for drinking and for use in agriculture, aquaculture, industry and transportation.

It is important to note that the contribution of CC water regulation contributes to a certain extent with the maintenance of the hydroelectric potential of the basins of Huayabamba and Huallaga Central, which is related to the strong flows and waterfalls that are normally therein, which may be exploited for the installation of small hydro power plants which supply power to the local populations, thus contributing to the use of renewable energy do not depend on fossil fuels, apart from being expensive, pollute the environment.

G.1.8.4.b. Erosion control and sediment retention

The project area soils are shallow and located in areas of steep slopes. 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.1.8.4.c. Carbon sequestration and regulation of the microclimate

At this point in the negotiations for the mechanism of the Kyoto Protocol is undoubtedly the role of deforestation in the contribution of greenhouse gases. Keep the primary forests of the lease has an undeniable advantage over other forms of land use due to high carbon stored. Thus, this project is an opportunity to add to inventory forests that Peru 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 air flow contributes to the regulation of rainfall and other climatic processes biologically mediated locally and regionally.

G.1.8.4.d. Habitat for fish reproduction

The lower parts of the requested area is located on the river Huayabamba are recognized by local people and sites that contain a high concentration of hydro-biological resources, among them outstanding tarpon (Brycon cephalus) and boquichico (Prochilodus nigricans). The observations conducted by the evaluation team and the stories of the people to infer that the riparian forests in the lower area are temporary refuge habitats during the rainy season or spawning areas. There is a local consensus that commercial fishing in these areas should be prohibited, especially in the Martin Sagrado and El Breo waterfall sites . These are sites that are depending on subsistence fisheries and trade conducted along the lower reaches of Huayabamba.

G.1.8.4.e. Pollination and dispersal of species of commercial value

The CC El Breo is adjacent to the Zone 2 Permanent Production Forest (BPP) of San Martín (0549-2002 RM-AG). Healthy populations of pollinators and dispersers within the concession emerge as an important safeguard to maintain the processes of natural regeneration of commercial species within Zone 2 of the BPP. Thus, logging units located in southwestern sector have an important source of seeds and pollinators in the CC El Breo. Similarly, the El Breo CC would favor commercial plantations carried out in the vicinity, including local production of cocoa, bananas and citrus. El breo CC Forest ecosystems would be acting as pollinators, dispersers and core or a barrier for biological pest control.

G1.8.5. Areas that are fundamental for meeting the basic needs of local communities (e.g., for essential food, fuel, fodder, medicines or building materials without readily available alternatives)

G.1.8.5.a. Food provisions gathered by hunting

The population located inside the zone and on the outskirts is benefiting from hunting wildlife migrating from the surrounding forests. Large mammals and birds have almost disappeared from grocery nuclei populated in the lower basin of Huayabamba. However, in nearby towns, it is still possible to access game animals that ensure to maintain healthy populations and eventually migrate from the high forests of the requested area (source). Thus, the forest of the area requested has been contributing steadily to the local diet. This environmental service be maintained only if it maintains the integrity of the forest and implement measures to regulate the rational use of this fauna.

G.1.8.5.b. Unique landscapes with opportunities for recreation

The area also features ecotourism attractions as the Falls of El Breo, Velo de Novia and Chambirillo Falls, Cajañahui canyon, among others; in addition to forests in good condition and riparian landscapes of crystal clear waters inhabited by fish tame that invite contemplation and appreciation of nature in its pristine form. Because of its location in a transition zone between the lowlands and Andean highlands, the area allows the expression of many types of landscapes that differ from the familiar Amazon floodplain. The landscapes in the area of the region have always intrigued locals and travelers, we believe that these attractive landscapes should be protected to be shared with future generations.

G1.8.6 Areas that are critical for the traditional cultural identity of communities (e.g., areas of cultural, ecological, economic or religious significance identified in collaboration with the communities).

The projet zone is an area of great archaeological wealth of pre-Hispanic ancestors. There is was no research before first archaeological field work (Schjellerup 1997[20]). There are remains of the Chachapoyas culture (800-1470), in the form of rounded structures of stone and many funeral homes are built on the slopes of the rocks with red paint and architectural ornaments symbol. The symbols were significant ethnic and social value, the use of symbols offered a demonstration of potential for local identity, which was maintained through the Inca period.

East of the Cordillera Oriental are many Inca sites (1470-1532), such as buildings in drywall or along the banks of Huabayacu (Schjellerup 1997). An Inca trail comes from Bolívar and unites with another way Hornopampa, where the Inca trail follows the river Huabayacu, crossing a mountain range and Continual north to the province Rodríguez de Mendoza. Near La Morada are the remains of a fortress and rectangular structures (Rangrapata and Hornopampa) and a site with masonry style Inca Cuzco. The farms currently in the Morada and surrounding area is the remains of stone terraces, which is being destroyed by the settlers.

[20] Schjellerup, Inge (1997) Incas and Spaniards in the Conquest of the Chachapoya

G2. Baseline Projections

G2.1. Most Likely Land-use Scenario in Absence of Project

G2.1.1. Context and history of deforestation

“One of the worst problems about global warming is that mankind in the last 500 years has destroyed 50 percent of forests on the planet and that is a very serious problem indeed,” Antonio Brack, Environment Minister of Peru, (Rhett A. Butler, mongabay.com, August 03, 2009).

“Up to now development has consisted of the woodland practice of slash and burn to clear land for crops and livestock, but that has given mediocre results because of the 10 million hectares where that has been done, 8 million hectares are unproductive. It’s shameful and we can’t keep doing it." he said, adding that programs aims “to save these forests and at the same time see how we can give a basic income to these communities for the woodland they preserve.”
“Peru can contribute enormously to the world in preserving biodiversity, native cultures and forest management, and we’re laying down a big challenge to protect those forests, create wealth from them and not destroy them." (Antonio Brack, Environment Minister of Peru, August 03, 2009)

Peru has historically had one of the lowest annual deforestation rates in the Amazon basin, but forest loss has been increasing in past decades due to illegal logging, mining, agriculture, and expansion of road networks, including the paving of motorways that provides access to a remote and biologically-rich regions.

Conflict between developers and native communities has been escalating over the past year. In June 2010 more than 30 were killed in a clash between indigenous protesters and federal police over the government's plan to promote energy development in the Amazon rainforest. More than 70 percent of the Peruvian Amazon is now under foreign concession. Deforestation and land use change accounts for roughly 70 percent of Peru's greenhouse gas emissions, according to the Carbon Dioxide Information Analysis Center (CDIAC). Spanning a variety of ecosystems, including the dry coastal region, the tropical Amazon, and the high Andes, the country is particularly vulnerable to climate change.

The Peruvian government estimates that the country's glaciers have shrunk by more than 20% in the past 30 years and expects them all to disappear by 2040. The loss of glaciers, which are the source for as much as 50 percent of the water in the upper Amazon, could have a significant impact on agriculture and urban water supplies as well as the Amazon rainforest. Indigenous communities are believed to be especially at risk from climate shifts. (Source: Rhett A. Butler, mongabay.com, August 03, 2009).

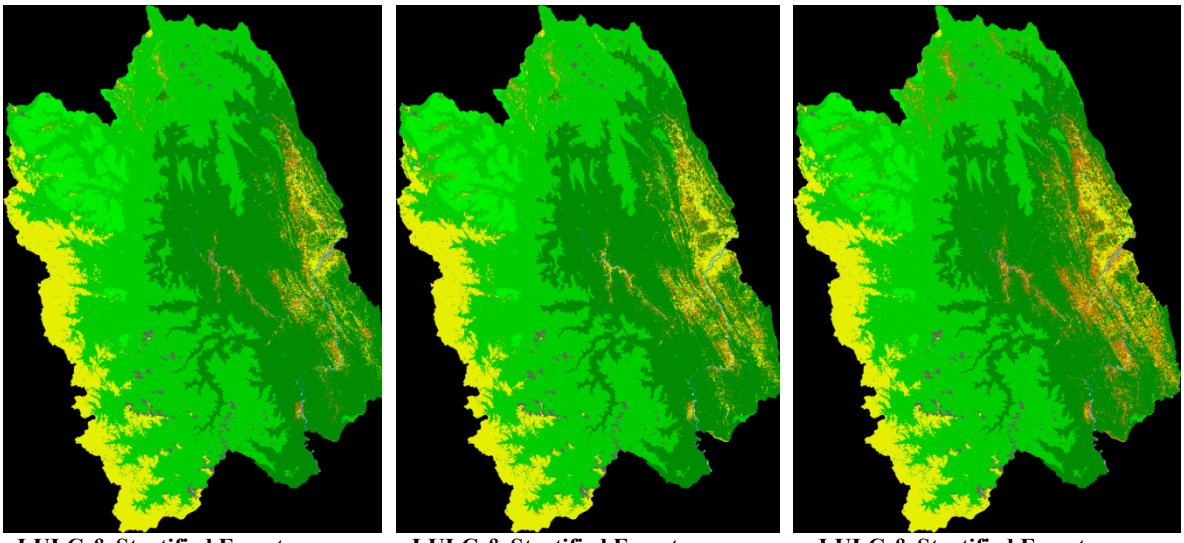
Historical analysis of land-use and land cover changes in reference period 2000-2010 in the project zone

The analysis of historical land-use and land-cover changes over the 2000-2010 period in the reference region (Huallaga and Mariscal Caceres provinces) was completed following the VCS methodology VM00015, and the complete process and results of the analysis are available in appendix “Historical analysis of land-use and land-cover changes”.

The results of the analysis are presented hereafter:

A total of **75 042 hectares were deforested from 2001 to 2010** in the reference region (Huallaga and Mariscal Caceres provinces) (32 711 ha from 2001 to 2005 and 42 331 ha from 2005 to 2010), equivalent to an **average annual rate of deforestation of 0,6% over the historical period.**

Figure 21 : LULC maps, after forest stratification



LULC & Stratified Forest map – 2001

LULC & Stratified Forest map – 2005

LULC & Stratified Forest map – 2010

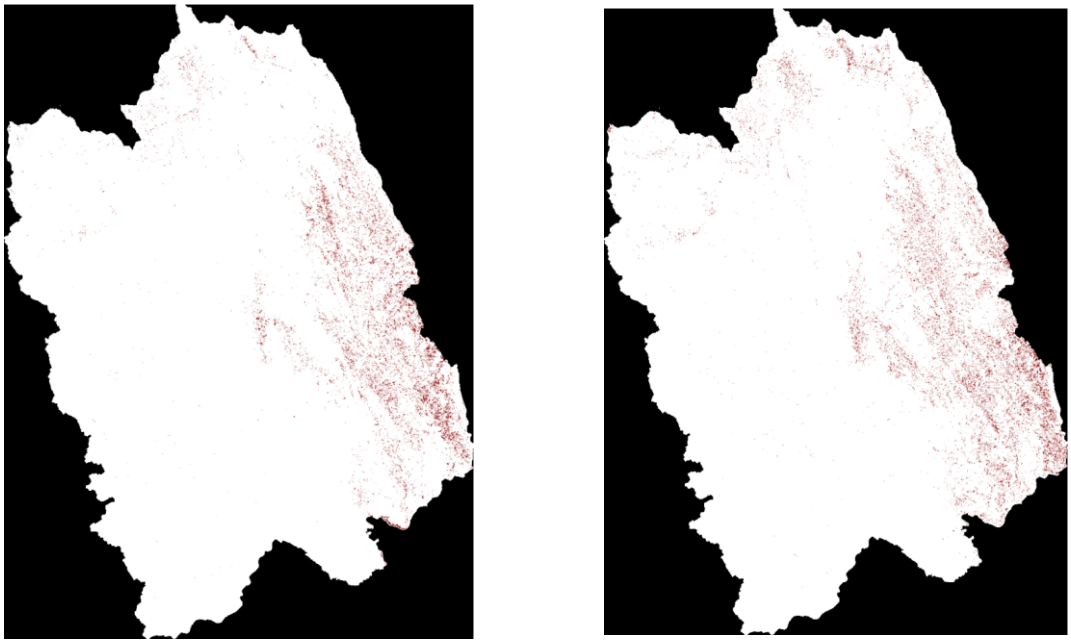
Legend:

- Water
- Amazonian Moist Forests
- Andean Moist Forests
- Andean Dry Forests
- Floodplain Forests
- Bare soils, Cropland, Settlements
- Non-Forest Vegetation (fallows and plantations)
- Clouds and shadows

Table 12 : LULC classes area after forest stratification

IDcl	LULC classes	Areas 2001 (ha)	Areas 2005 (ha)	Areas 2010 (ha)
2Fcl	**Water**	7 199	7 199	7 199
1Icl	**Amazonian Moist Forests**	604 684	574 398	537 303
2Icl	**Andean moist Forests**	718 813	716 537	711 615
3Icl	**Andean Dry Forests**	88 730	88 595	88 286
4Icl	**Floodplain Forests**	125	85	78
1Fcl	**Bare soils and cropland, Settlements**	224 646	246 803	245 370
3Fcl	**Non-Forest vegetation**	31 364	41 919	85 683
0	**Clouds and shadows**	**14 235**	**14 235**	**14 235**

Figure 22 : Deforestation Maps for 2001/2005 and 2005/2010 periods



Deforestation map – 2001 / 2005

Deforestation map – 2005 / 2010

Legend:

- Deforestation
- No Changes

Table 13 : LULC changes matrix in ha, after forest stratification

Class		LULC 2005						
		1Icl - Amazonian Moist Forest	*2Icl - Andean moist Forest*	*3Icl – Andean Dry Forest*	*4Icl – Floodplain Forests*	*3Fcl – Non-Forest Vegetation*	*1Fcl – Bare Soil, Croplands, Settlements*	*TOTAL (2010)*
LULC 2010	*1Icl - Amazonian Moist Forest*	537 303	0	0	0	0	0	**537 303**
	2Icl - Andean moist Forest	0	711 615	0	0	0	0	**711 615**
	3Icl – Andean Dry Forest	0	0	88 286	0	0	0	**88 286**
	4Icl – Floodplain Forests	0	0	0	78	0	0	**78**
	3Fcl – Non-Forest Vegetation	19 171	3 115	140	2	27 252	35 988	**85 668**
	1Fcl – Bare Soil, Croplands, Settlements	17 912	1 804	168	4	14 666	210 798	**245 351**
	TOTAL (2005)	**574 385**	**716 534**	**88 594**	**85**	**41 918**	**246 786**	**1 668 302**

Additional maps (Forest Cover Benchmark Map, LULC Change Map, etc) are available in Appendix "Historical Analysis of LULC changes" and in GIS files.

G.2.1.2. Drivers and agents of deforestation

Project assessments, interviews and participatory rural appraisals indicate that at least nine threats of deforestation and six agents of deforestation have been and continue to be active in the San Martin Province.

A complete survey was conducted in August 2012 among 174 families of the project zone communities as an assessment to design an education an awareness raising program. The assessment surveys the families on various aspects including subsistence means, activities (including deforestation activities), trends, environemental perception and education, etc. ("Informe de diagnóstico para la elaboración del plan operativo de difusión y sensibilización"). The results from the surveys show insufficient environmental concerns and insufficient economic alternatives to deforestation activities and expansión of agricultura that support the following analysis of drivers and agents of deforestation.

Table 14 : Threats of deforestation and agents

	Agents of deforestation						
Drivers - deforestation and degradation practices / Land-Use	Local communities	Migrants	Mine/Oil dealers	Illegal dealers	Loggers	Government	Total
1. Conversion to croplands, pastures and housing	17%	28%		25%			70%
2. Conversion to settlements / infrastructure (Roads, water and electricity)	5%	7%				3%	15%
3. Selective logging of high-value species for commercial sales	1%	1%			8%		10%
4. Timber harvesting for local use (housing and infrastructures)	0,5%	0,5%					1%
5. Fuelwood gathering	0,5%	0,5%					1%
6. Uncontrolled fires	1%	1%					2%
7. Intentional fires (Paths opening and fires for hunting)	0,5%	0,5%					1%
8. Mining and Hydrocarbon activities encroachment			0%			0%	0%
9. Economic land concession (timber and agriculture)						0%	0%
Total	25,5%	38,5%	0,0%	25,0%	8,0%	3,0%	100%

G.2.1.2. 1. Deforestation agents

The deforestation agents are the following:

Local rural communities

A socio-economic description of the communities in the project buffer zone, their sources of incomes and living conditions, is available in the Appendix 3.

Expansion of agricultural land: Most of the communities live from agriculture, both from permanent crop (cacao, orange, cotton) as well as annual crops (corn, banana, etc.) cultivated in cyclic slash and burn practices, with fallow cycles getting longer as the soil fertility decreases. Most of the time, when a parcel is not productive enough anymore, farmers tend to clear another parcel of forest to implement new parcels for their annual crops, leading to higher areas deforested per family.

Population increase: The rural population average increase rate is at 4,7 % for San Martin. (INEI, 2009[21]). With the rural population expanding at a rate of 5 % per year (33 498 more people each year), demand for farmland will require an additional 67 000 to 160 000 hectares annually based on 2 to 5 hectares for each household.

As the demography expands, local communities are experiencing overpopulation and also require an increasing amount of farmland as children marry and establish independent farms. Traditionally, village elders have been responsible for identifying forest areas that are suitable for rain fed corn and paddy fields. Young families or migrants requiring land approach the elders to request a farmland allocation. Usually a 2 to 5 hectares plot with good soil moisture is selected within the forest. Many committees are accepting these plots on the basis that the "owner" agrees not to expand the existing fields.

Migrants

Since 1940's, San Martin has been characterized by many waves of migrants coming mostly from the Andes, looking for better farming conditions and better climatic conditions. Coca production was.

The proportion of migrants went from 7.7 % of migrants installed in 1940, up to 28,7% (209 418 persons) of total population in 2007 (INEI, 2009). Census figures show that 67 947 persons migrated from 2002 to 2007 to San Martin region, (i.e. 13600 persons/year, approx. 2,1% of population). Socio-economic surveys conducted by the project team in the participating communities have shown even higher migration rates (2% to 15% population increase per year depending on the communities). Communities do not all have internal policies to control migration of and integration of new families to the communities. This has led to an increasing pressure on deforestation for agricultural activities.

"Land dealers"

While migrants may participate in forest clearing for future land sales, land speculation is often driven by business-people, officials, and local villagers who seek to claim and clear forest land for sale in San Martin. According to reports, "power men" hire migrants or local villagers to fell and burn off forest cover for $50 to $100 per hectare. Small huts are constructed to indicate residence, although these are frequently not occupied. This pattern reflects attempts to grab available public forest land and hold it until it can be resold at a higher price. While these actions are usually illegal, letters from local officials are used to create an appearance of legitimacy. Once one plot is opened it appears to encourage other migrants to open forests in neighbouring areas. In some cases, poor migrants may sit on the plot for one to two years waiting for land values to rise. These plots are then sold to a "consolidator" or businessman who buys a number of them to form a larger plot.

The province has no budget to protect, rehabilitate or develop these lands and so they often are either leased as large Economic Land Concession or reclaimed by migrants.

Loggers

The Timber sector in the San Martin region accounts for 8 % of the Peruvian national official production of wood. There are officially 216 Timber companies and an estimated 350 additional ones not legally formalized. There is very little data about actual wood production and a large part may be exploited without legal record, being illegal logging for most of it.

[21] INEI, Perfil Sociodemográfico del Departamento de San Martín, 2009

Forest in the project area and reference region boasts high value timber species (Tornillos, Caobas, Ishpingo, etc.) with very old and valuable specimens. Timber companies as well as individual illegal loggers contribute to forest degradation by conducting selective removal of high-value species.

However, to a smaller extent, loggers can also contribute to deforestation in areas where timber removals require clearing of land for extraction.

There are zones designated as Forests of Permanent Production (FPP, BPP in Spanish: Bosques de Produccion Permanente) in the San Martin Region for a total of 1 501 291 ha (RM N° 0549 – 2002 – AG, 2002[22]). Of which 576 192 ha are in areas of protection, 750 336 ha in areas of protection associated with timber production and 237 614 ha in areas of recuperation.

Government

To a lesser extent, government infrastructure projects such as expansion of roads, electrical network, water network, etc. lead to a small amount of deforestation.

Additionally, the government has the possibility to deliver new Economic Land Concessions to companies for timber or agriculture purposes for example. This threat is mentioned here solely for the purpose of keeping track of it, however the regional government in charge of land concessions has for now embarked on a policy targeted more to conservation in the project reference region and has signed and published in October 2010 an "Ordenanza Regional" stating that the government would not deliver mining, oil, timber or agriculture concessions in that area. However, it is a political decision that could be reversed as the government change. It is therefore important to identify this threat, also it is considered here to have no contribution to deforestation

Mining / Oil companies

Mining and oil potential have already been identified in the project zone and reference region, with 10 mining concessions in the project area that had already been solicited by the mining companies to the regional government.

As described above, the "Ordenanza Regional" now forbids the development of mining/oil activities in the project area and reference region. This agent group is therefore considered to have no contribution to deforestation but are mentioned here for the purpose of keeping track of the evolution of the situation.

G.2.1.2. 2. Deforestation drivers

For each deforestation threats, non-spatial (quantity of deforestation) and spatial drivers (location of deforestation) have been identified and summarized in the following table.

Table 15 : Summary of deforestation threats, agents, drivers, and underlying causes

[22] Gobierno Regional San Martin, Gerencia de recursos naturales y gestion del medio ambiente -La region San Martín y el manejo de los recursos naturales, 2002

	Agents of deforestation							Causes - Drivers of deforestation		Underlying causes of deforestation
Deforestation threats	Local communities	Migrants	Mining/Oil Companies	Land dealers	Loggers	Government	Total	Non spatial	Spatial	
1. Conversion to croplands, pastures and housing	17%	28%		25%			70%	- Population density increase (demography + immigration) - Good revenues from agriculture; development of cocoa industry in San Martin Region - Soil fertility - Historical use of cattle as patrimony	- Further exploration of rivers upstream - Projects of roads construction	- Poor economic perspectives and living conditions in the mountains - Demography (natality rate) - Lack of clear land tenure / property - Country infrastructure development
2. Conversion to settlements / infrastructure (Roads, water and electricity)	5%	7%				3%	15%	- Population density increase (demography + immigration) - Cocoa fermenting / drying facilities - Schools - Football fields - "Hostel"	- Development of economic activities in the vicinity (mining, oil exploration) - Further exploration of rivers upstream - Projects of roads construction	- Poor economic perspectives and living conditions in the mountains - Demography (natality rate) - Lack of clear land tenure / property - Country infrastructure development
3. Selective logging of high-value species for commercial sales	1%	1%			8%		10%	- Some species with high value (timber/ medicinal) : e.g., tornillos, caoba	- Logging concessions on left bank of rio Huayabamba (East). Possible encroachments/ crossing of river is easy - On-site wood cutting , close to rivers (difficult extraction, lack of accessibility and material)	- Short term thinking . No economic alternative to date more profitable short term than timber sales
4. Timber harvesting for local use (housing and infrastructures)	0,5%	0,5%					1%	- Population density increase (demography + immigration) - Wood used for construction, fencing		- Demography (natality rate) - Other construction materials too expensive
5. Fuelwood gathering	0,5%	0,5%					1%	- Population density increase (demography + immigration) - Wood used for cooking		- Demography (natality rate) - No alternative for cooking
6. Uncontrolled fires	1%	1%					2%	- Tradtional slash and burn practices for agriculture		
7. Intentional fires (Paths opening and fires for hunting)	0,5%	0,5%					1%	- Population density increase (demography + immigration) - Hunting practice - Provoque rainfall (Local belief)		- Demography (natality rate) - Cultural habits and belief
8. Mining and Hydrocarbon activities encroachment			0%			0%	0%	POTENTIAL RISKS - Mining potential identified / Metal and Oil rich soil		- Large economic stakes for Peru - No immediate risks due to "ordenanza regional" forbidding oil and mining activities in the region
9. Economic land concession (timber and agriculture)						0%	0%			
Total	25,5%	38,5%	0,0%	25,0%	8,0%	3,0%	100%			

Main non-spatial deforestation drivers are:

- Population increase, through demography and immigration : this driver has already been described in the description of agents.

- Attractiveness of agriculture : The region boasts good climatic and soil conditions for agriculture (see Appendix 1), in particular cacao keeps growing as a profitable secure and long-term crop, favoured by the establishment of strong, growing, and well-known producers organizations and cooperatives (Acopagro, Naranjillo, Tocache, Apahui, etc). These organizations offer attractive conditions for the producers : a secured market, guaranteed prices (with fairtrade premium for some of them), organizational structures, loans, etc.. Additionally, orange is a growing market with increasing local demand, and banana and corn are historical crops that have had a good local market.

- Presence of high-value tree species in the forest : As described in Appendix 2, the forest is the habitat for many high-value timber species which have a very good local (and/or international for some species, e.g. mahogany, cedar, etc.) market, as well as excellent features for local use in construction. Targeted species include: Mahogany, Cedar, Tornillo, Ishpingo, among others.

Main spatial drivers are

- Accessibility: presence of roads, navigable rivers, reasonable slopes. Deforestation will tend to happen first in most accessible areas. Historical analysis of deforestation show that populations are progressing deeper in the forest along the rivers, and settling further away from the road. Also,

- Slope : In the western part of the reference region, terrain is in some place rugged with very steep slopes, cliffs, etc. which limit the settlements and farming, although farmers traditionally are able to cultivate crops in terrains with significant slope (up to 70%)

- Proximity of populated centre or economic activity : migrants will gather and settle around economic or populated centers, or close to economic activities development (mining, oil centers)

Impact and significance of drivers on deforestation is further detailed in section A4.4 hereafter, for each specific deforestation threat.

G.2.1.2. 3. Underlying causes of deforestation

For each deforestation threats, underlying causes to drivers described above have been identified and summarized in the table 38 above.

Main underlying causes are:

- Bad economic perspectives / living conditions in the Andes: The main cause driving migration of populations from the Andes to the lower regions in San Martin is the difference existing between living and farming conditions in the Andes and in the lower forest. Climate, soils are poorer in the Andean regions, and communities are typically more isolated, further away from markets. Due to isolation, Andean communities also have less access to health support or higher education. Populations (an especially younger generations) tend to migrate to find better living conditions

- Demography: Although global Peruvian fertility rate has decreased over time to reach 2,5 in 2009, there is a great disparity over the country. According to INEI (2002), fertility rate in urban areas in Peru was 2,4,

whereas it reached 4,8 in rural areas. Communities of the project are rural communities with high fertility rates (socio-economic surveys conducted show a number of children per women of 3 to 5 in the communities involved), which means a growing population with increasing younger generations.
In the project area and reference region, most of the population arrived in the 1980's during the boom of coca cultivation. They were families with young kids. The generation of settlers' children has just become in the recent years in age of creating their own families and settle with their own land. The demographic pressure is therefore only getting stronger in the area close to the project area.

- Lack of clear land tenure/property: Clear land property / land tenure does not always exist in the reference region. Before settlement of farmers, there is no identified land property / tenure for the forested land. Once settled in a new place, farmers can claim the property title for the land they've occupied and cultivated for at least 5 years. This policy drives a lot of new settlements in forested areas. In reality, only less than 20% of the farmers have a legal land title or recognition of land tenure considering that the proceedings for titling the land are not simple and expensive. Forested areas remain free of defined property status and remain open to migration and new settlements. Additionnally, communities usually don't have clear rules for migrants acceptation, and cannot enforce them anyhow. This explains why legal activities and definition of land property / rights (through the claim for concessions for conservation purposes, or titling of individual farms, etc.) is critical in the project, as well as helping the communities to better define rules for immigration. The grand majority of land to date in the reference region remains free of any property or concession claim, open to migration and settlements.

Impact and significance of underlying causes on deforestation is further detailed in section A4.4 hereafter, for each specific deforestation threat.

G.2.1.2. 4. Chain of events leading to deforestation / Detailed analysis of each deforestation threat

Forest clearing for conversion to croplands and pastures

The population of San Martin is estimated at 669 973 people (San martin Region, 2005), which represents 2.6 % of Peru and 20 % of the population living in the Amazon rainforest in Peru. Majority of population is urban (65.3 %). Density is at 13.07 people / km2 but if considering only potential productive lands, it is at 60 people / km2.

Forest clearing for land sales and conversion to croplands is mainly driven by local population, migrants, and illegal dealers.

Migrants

San Martin is characterized by many waves of migrants coming into the region (for crops and coca production) since 1940. It went from 7.7 % of migrants installed in that year, up to 31.7 % of total population (175 363 people) in 1993 (Source: GORESAM and IIAP: Instituto de Investigaciones de la Amazonia Peruana, 2005). This has led to an increasing pressure on deforestation for agricultural activities.

"Land dealers"

While migrants may participate in forest clearing for future land sales, land speculation is often driven by business-people, officials, and local villagers who seek to claim and clear forest land for sale in San Martin. According to reports, "power men" hire migrants or local villagers to fell and burn off forest cover for $50 to $100 per hectare. Small huts are constructed to indicate residence, although these are frequently not occupied. This pattern reflects attempts to grab available public forest land and hold it until it can be resold at a higher price. While these actions are usually illegal, letters from local officials are

used to create an appearance of legitimacy. Once one plot is opened it appears to encourage other migrants to open forests in neighbouring areas. In some cases, poor migrants may sit on the plot for one to two years waiting for land values to rise. These plots are then sold to a “consolidator” or businessman who buys a number of them to form a larger plot.

The province has no budget to protect, rehabilitate or develop these lands and so they often are either leased as large Economic Land Concession or reclaimed by migrants.

Local population

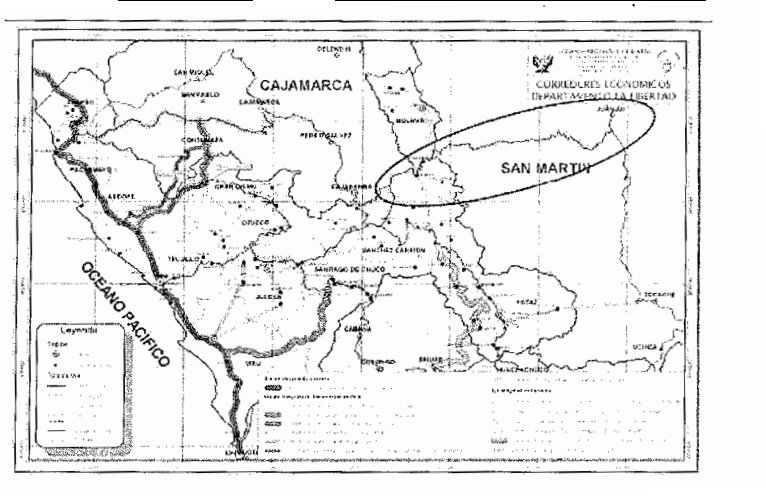
The rural population average increase rate is at 5 % for San Martin.
With the rural population expanding at a rate of 5 % per year (33 498 more people each year), demand for farmland will require an additional 67 000 to 160 000 hectares annually based on 2 to 5 hectares for each household. In addition, the Provincial Governor has proposed the development of new settlements for migrants. Aside from migrant pressures on forest clearing, local communities are experiencing overpopulation and also require an increasing amount of farmland as children marry and establish independent farms. In the past, village elders were responsible for identifying forest areas that are suitable for rain fed corm and paddy fields. Young families or migrants requiring land approach the elders to request a farmland allocation. Usually a 2 to 5 hectares plot with good soil moisture is selected within the forest. Many committees are accepting these plots on the basis that the “owner” agrees not to expand the existing fields.

Causes leading to deforestation
Population density increase (demography + immigration), Good revenues from agriculture, development of cocoa industry in San Martin Region, Soil fertility, Historical use of cattle as patrimony.

Improved accessibility through the opening of roads, paths is a major cause leading to migration and increased deforestation.

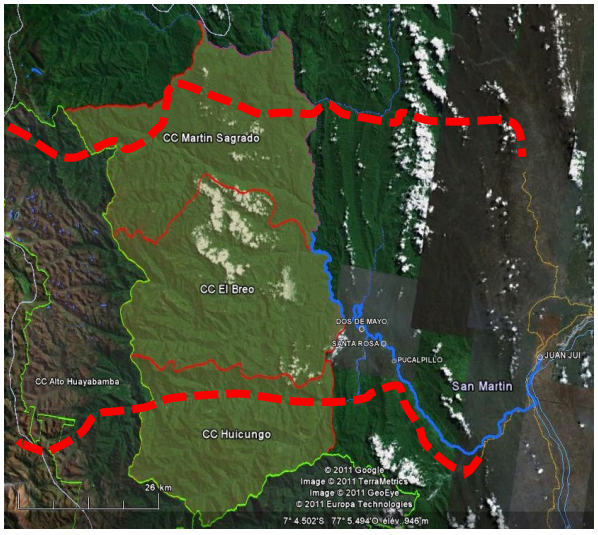
Road construction is one of the most important underlying threat for the area sustainability, as road construction will damage the forest and open the zone to easier illegal invasions. Past road projects show how damaging such constructions may be. In particular, the road project “Salaverry – JuanJui” connecting La Libertad to San Martin region, would cross straight through the project area, along Jelache River. Another road project Chuquibamba - La Morada – Saposoa connecting Amazonas region (Chuquibamba) to San Martin region across the mountains would also cross straight through the project area

Figure 23 : Salaverry – Juanjui road plan



Source: Plan vial departamental participativo La libertad, 2004[23]

Figure 24 : Map of the potential road projects crossing project area



Source: Plan vial departamental participativos La libertad y Amazonas[24]

Underlying Causes
Lack of economic activities in the mountains, population pressure, lack of clear land property and titles, country infrastructure development.

We consider this major **driver at 70 % of potential contribution to deforestation**.

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[23] Gobierno Regional La Libertad, Plan vial departamental participativo de La Libertad, 2006

[24] Gobierno Regional Amazonas, Plan vial departamental participativo de Amazonas, 2005

Conversion to settlements / infrastructure (Roads, water, electricity, buildings)

Throughout the reference region settlements have been expanding rapidly over the past decade (at a comparable rate as population increase at 5 % per year). Settlement growth occurs through the expansion of village boundaries as forests are cleared for roads, houses, shops, and other buildings in the region. In addition, newly created communities are also established by migrants or local families interested in creating new villages. New villages are approved by local government officials but some install their homes without legal authorization (ex: Puerto Mojaras Case, Acopagro visit, 2010; and Alto Shamboyaco Case, 2010). The area likely reflects population growth trends in general.

This driver is assessed at **15% in terms of contribution to deforestation** in San Martin, though this may be further accelerated by private and public sector investment.

Causes
Demographic growth implies the need for new and more infrastructures (schools, roads, electricity, football fields, cocoa modules, etc.)

Underlying causes
Population pressure on environment, lack of clear land tenure, development of the country's infrastructures, lack of education on environmental stakes, a lack of financial means and/or alternatives.

Selective logging of high-value species for commercial sales

The Timber sector in the San Martin region accounts for 8 % of the Peruvian national official production of wood. There are officially 216 Timber companies and an estimated 350 additional ones not legally formalized. There is very little data about actual wood production and a large part may be exploited without legal record, being illegal logging for most of it.

Local communities and migrants are as well, at a smaller scale, agent of this forest degradation within the reference region and outside.

Illegal logging contributes significantly to forest degradation but is particularly hard to monitor in terms of area. High-value "luxury wood" is selectively felled. Illegal timber smuggling is widespread, often organized by private sector operators who obtain support from local military and police. Armed soldiers are often involved in these activities presenting control problems for weaker Community Forestry Management Committees. Illegal loggers also benefit from the lack of transparency and information on land title and land tenure rights.

There are zones designated as Forests of Permanent Production (FPP, BPP in Spanish: Bosques de Produccion Permanente) in the San Martin Region for a total of 1 501 291 ha (RM N° 0549 – 2002 – AG, 2002). Of which 576 192 ha are in areas of protection, 750 336 ha in areas of protection associated with timber production and 237 614 ha in areas of recuperation. Of these FPPs, divided in 120 parcels, 75 have been already contracted as forest concessions by 28 forestry companies for a total of 472 184 ha. (Source: CIF 2006 & Mediante RM N°0549-2002-2002). Logging concessions are situated on the left bank of rio Huayabamba (East). There are possibilities of encroachments, on-site wood cutting, close to the rivers (difficult extraction, lack of accessibility and material) and the river can be crossed easily.

Hence, there is an additional risk of deforestation leading to partial or total deforestation, giving the very limited control capacity from local authorities on that aspect. Some additional timber concessions could be distributed in the future and the areas extended, hence we consider the **driver at 10 % of potential contribution to deforestation**.

Underlying causes
There is no economic alternative to date more profitable short term than timber sales of high value species.

Timber harvesting for local use (housing and infrastructures)

Housing in rural settlements is classified as semi-permanent (roofs and walls constructed of temporary materials like bamboo, thatch, grass, reeds, etc.) and permanent (constructed with more durable materials like wood, concrete, etc.). Permanent housing requires the felling of straight timbers to construct residences, businesses, and shops. Semi-permanent housing also requires the harvesting of timber, and their temporary nature often means they are abandoned and their inhabitants move on to other areas, increasing degradation on forestlands and requiring the use of additional forest resources.

Causes:
The demographic growth due to natural population increase and immigration leads to timber harvesting by local stakeholders, conducted to accumulate building materials for construction of lodging and basic infrastructure in settlements. Considering the limited number of families in the area and their very large forests , this driver is marginal, but could increase with the years if population increases and if neighboring communities or additional migrants settle in the area.

Due to the very low density of population within the project area, **timber harvesting for local use is estimated at 1 % of total deforestation drivers.**

Underlying causes:
Population pressure and high prices of other construction materials.

Fuelwood gathering

Communities participating in the project are mostly dependent upon fuel-wood for their energy needs (although some of them are testing solar or hydroelectrical energy), most of them being too isolated to bring any source of external energy.

The growth of urban centers (e.g. Tarapoto, Juanjui...) and small industry, where charcoal is the fuel source of choice, are stimulating expansion of the charcoal industry. Without the introduction of fuel-efficient stoves as recommended in the project, it is likely that fuel-wood consumption would continue to rise, rather than stabilize.

Fuelwood consumption in the Region of San Martin is evaluated at 1.3 m3 / person / year for people living in rural areas of the San Martin Region (234 000 people in 2007), accounting for 304 200 m3 / year.

A typical household might consume between 1 to 2 MT of fuel wood annually, reflecting a 55 to 110 MT of fuel-wood used in the project area each year, which is quite marginal, but still has to be followed up, since it can gain critical level with population increase of the community or of neighboring communities gathering fuelwood from the Martin Sagrado territory.

Underlying causes:
Demographic pressure, and lack of efficient alternative to fuelwood for cooking

This is a driver with a contribution assessed at less than 1 % to deforestation on the project area.

Uncontrolled fires due to slash and burn practices

Spontaneous fires in the region have been observed following spread of slash and burn practices, which are carried out when planting a parcel, or after replanting, after a period of 3 to 5 years of cultivation, followed by a period during which the farmer will not use the parcel anymore, for 5 to 10 or up to 20 years. These slash and burn practices are performed by farmers which are not members of ACOPAGRO (this practice is not accepted for organic certification and not practiced by Acopagro members).

Spread of fires from neighboring parcels to the preojct area is very limited since slashed and burned parcels are usually closely monitored by the farmers, and fires cannot easily migrate from a slashed parcel to a forest area because of humidity of forested areas. It can happen however on a fairly rare basis during dry summers. Children and careless smokers may also start these fires.

This is a driver with a contribution estimated to be of 2%.

Intentional fires (Paths opening and fires for hunting)

Forest fires are frequent occurrences in many areas and there are few resources available for local communities or government agencies to control the damage to woodlands or the resulting carbon emissions. In the absence of project, it is likely that ground fires will continue to degrade forests and suppress natural regeneration. The frequency of fires is increasing regularly and they often grow beyond their intended size and spread to other forest lands leading to significant degradation of forests and deforestation. As a result, biomass is lost and regrowth is slowed, at the same time fuel wood and timber is extracted leading to a gradual erosion of vegetative material and forest health.

Causes:
Concerning hunters, forest fires are occasionally started to flush out wild game (wild pigs, turtles, monitor lizards etc.) from heavily forested areas and concentrate the game into smaller parcels, where they are easier to catch. The burning of bunches of leaves and small branches is also practiced with the purpose of producing smoke to drive bees away from their hives to facilitate the collection of honey. Occasionally, this practice is the source of forest fire.

Moreover, in the mountain communities, a local belief according to which provoking fires would lead to increased rainfalls may encourage this practice, although it is very limited.

Underlying causes:
Game animals are typically hunted for subsistence. Increased urbanization, and demand for exotic meat may increase pressures on hunting lands and stimulate the use of hunter-induced forest fires to concentrate animal populations. The project will allow for the protection of forest lands from hunting fires by “social fencing”, patrolling, and fire-prevention activities. Within the project area, hunters induced forest fires is considered very limited and is not used by the local community, this is more a practice outside of the project area. However it is important to consider it as a danger to the forest as it would be hard to prevent a fire to spread to the project area. Migrants may also induce this practice where they settle.

Due to the very low density of population, annual forest fires are estimated at 1 % of total deforestation drivers within the project area.

Mining and Hydrocarbon activities

The attribution of oil and mining concessions has been suspended in October 2010 in the project area and reference area, following the signature and publication of an "Ordenanza Regional" in which the government commits to avoid the expansion of oil and mining activities in the reference region. Considering this law, oil and mining concessions cannot be considered as a future active deforestation driver for the project area.

However, it is important to keep this threat included in the analysis, bearing in mind the high potential risks it would generate in case the public policy on that matter was to change in the future.

In fact, mining potential has already been identified in the reference region, with 10 mining concession that had already been solicited by the mining companies to the regional government.

Table 16 : Information on the mine sites identified and concessions solicited to the government in the Biocorredor Martin Sagrado reference region

Nombre Petitorio	Ha	Clasificación	Titular	Fecha de presentación	Fecha Doc INRENA	Publicación
VM222	1000,000	Metálica	VOTORANTIM METAIS CAJAMARQUILLA S.A.	07/08/2008	18/11/2008	06/12/2008
VM267	1000.00	Metálica	VOTORANTIM METAIS CAJAMARQUILLA S.A.	27/08/2008	18/11/2008	06/12/2008
VM224	1000.00	Metálica	VOTORANTIM METAIS CAJAMARQUILLA S.A.	07/08/2008	27/11/2008	20/12/2008
VM220	1000.00	Metálica	VOTORANTIM METAIS CAJAMARQUILLA S.A.	07/08/2008	27/11/2008	20/12/2008
VM225	1000.00	Metálica	VOTORANTIM METAIS CAJAMARQUILLA S.A.	07/08/2008	27/11/2008	20/12/2008
VM237	1000.00	Metálica	VOTORANTIM METAIS CAJAMARQUILLA S.A.	07/08/2008	30/12/2008	04/01/2009
VM239	400.00	Metálica	VOTORANTIM METAIS CAJAMARQUILLA S.A.	07/08/2008	22/12/2008	04/01/2009
VM223	1000.00	Metálica	VOTORANTIM METAIS CAJAMARQUILLA S.A.	07/08/2008	30/12/2008	04/01/2009
VM221	1000.00	Metálica	VOTORANTIM METAIS CAJAMARQUILLA S.A.	07/08/2008	30/12/2008	04/01/2009
VM219	1000.00	Metálica	VOTORANTIM METAIS CAJAMARQUILLA S.A.	07/08/2008	17/12/2008	04/01/2009

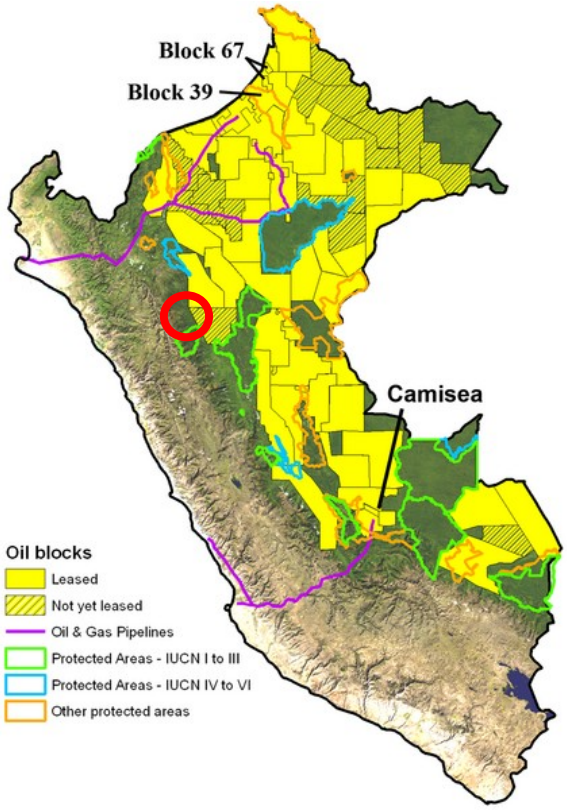
Source : AMPA, 2009[25]

Mining activities would not only imply encroachment in the project area but would also contribute to strong pollution of the tributaries of the Huayabamba river, therefore impacting all depending communities downstream.

[25] AMPA, Minería en San Martín: Sustento Técnico y Legal para su tratamiento en zonas de conservación del patrimonio natural y cultural, 2009

Hydrocarbon potential in the reference region is also strong:

Figure 25 : ***Map of the leased block for hydrocarbon exploration and exploitation***



The above map shows the current and potential future status of land lease to oil companies in Peru.

One can see that the project area is directly threatened by oil exploration since the land next to the reference region has been already leased for this activity. A Decree of January 15 th 2000 (Mediante Decreto Supremo 002-2000-EM) was signed with the Perupetro and Advantage Resources, Selva LLC (Burlington) for the exploration of the Lot n° 87.

Martin Sagrado project area is located in the lot n°153, and although not leased yet, there is a risk in case of chage of public policy that future participatory or authoritary decisions will allow agains this activity to develop.

Hence, the risk is high, both for deforestation but as well pollution of the rivers of the area, the Huayabamba River, among others.

Causes:
In case of oil exploitation, we can envision a driver of 33 % for deforestation and degradation potential of the area, with the complimentary development of such activities (blasts for additional sismic studies road and settlement constructions, additional migration of population, etc...). Former cases have proven heavy direct and indirect impacts on the environment after installing such activities. The very rapid expansion of

oil concessions: multiplied by 6 since 2003, up to 41 % of forest area in Peru in 2009 and bound to reach 70 % of forest areas in Peru, justifies this Driver as being the main one.

***Underlying causes** :*
Large economical stakes for the Peruvian government, on a national and international scale. In that sector, lobbying is extremely strong, as well as direct or indirect international pressures, which could lead to a change in the government's policy.

Given the current position of the government on the attribution of new oil and mining concessions in the San Martin province, this driver is considered to have a nil impact on baseline deforestation. However, this is a threat that needs to be monitored and included again in case of policy changes.

Economic Land Concession (timber and agriculture)

Over 769 079 ha (14.90 % of the Area) has been designated as production areas by the San martin government (ZEE, Gobierno Regional San Martin, 2005). These concessions are currently being cleared of forest for rice, papaya, corn and other commercial crops cultivation.

Similarly as for oil and mining concessions, position of regional government is not to attribute new ELCs in the Huayabamba river basin, considered by the regional government as an area for protection. However, lobby and strong underlying drivers may render ELCs again more attractive in the future and this threat shoud be kept in the analysis.

***Underlying causes**:*
It is important to understand the economic and political dynamics driving the issuance of concessions. Some government planners maintain that underutilized lands need to be developed to generate revenues for the state however critics argue that past timber and other leases have produced minimal income for the country. Large ELCs are being criticized, for a failure to follow through on their commitment to implement management plans. There is some speculation that some business interests seek ELCs simply to harvest high value luxury wood, with no intention or financial capacity to invest in the development of their land.

Considering the current position of the government on the attribution of ELCs in the project region, this driver is considered to have a nil impact on baseline deforestation. However, this is a threat that needs to be monitored and included again in case of policy changes.

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

The key barrier to implementation of the project is financial. Project activities would not be possible without revenues from the sale of carbon credits. Farmers have have a maximum total net disposable income of a maximum of 4 000 Euros / year per family (for ACOPAGRO members) to cover basic needs but with this small amount, they surely cannot fund the project activities. Without carbon revenues, areas protected by the project would be subject to deforestation and degradation. Funds will enable to provide training, workshops, technological assets and funding to support the ongoing monitoring of carbon stocks to ensure project activities are continued for the planned duration of the project.

There are no laws in place in Peru that require the project area to be protected. The project has contributed significantly to community awareness and ability to protect their lands. The project will also facilitate the development of government capacity to support and implement carbon projects, which prior to project intervention did not exist. In addition, the project has clarified land tenure and demarcated

boundaries with signs between various community land-holdings. Both are key requirements in the development of carbon projects and distribution of carbon-related benefits.

Additionnally, a complete survey was conducted in August 2012 among 174 families of the project zone communities as an assessment to design an education an awareness raising program. The assessment surveyed the families on various aspects including subsistence means, activities (including deforestation activities), trends, environemental perception and education, etc. (CREAR, 2012[26]). The results from the surveys show insufficient environemental concerns and insufficient economic alternatives to deforestation activities and expansión of agricultura that support the analysis of dirvers and agents of deforestation presented above and the baseline scenario.

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

The projection of future deforestation was completed following the methodology VM00015, and the complete process and results are available in the appendix "Projection of future deforestation". Main results are summarized hereafter.

G.2.3.1. Projection of the quantity of future deforestation

Stratification of forest class

Forest in the reference region area was stratified using Ecological Systems such as defined by Josse, C. *et al.* (2007).[27] Four of the ecological system groups are within Reference Region:

- Amazonian Moist Forests (*Bosques Humedos Amazonicos*)
- Andean Moist Forests (*Bosques Humedos Andinos*)
- Andean Dry Forests (*Bosques secos y matorales wericos andinos*)
- White Water Floodplain Forests (*Bosques inundables por aquas blancas*)

Stratification is static (delimitation of vegetation types is due to climatic / geographic parameters)

Baseline approach

The choice of the baseline approach was made following the recommendations of step 4.1.1 of the methodology.

The analysis of historical LU-LCC changes was completed over two sub-periods only (2001-2005, 2005-2010). Given this small number, the deforestation rates measured in the two sub-periods (-0.59% from 2001 to 2005, and -0.62% from 2005 to 2010) do not reveal a statistically meaningful trend.

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[26] CREAR & Fundacion Amazonia Viva, Informe de diagnóstico para la elaboración del plan operativo de difusión y sensibilización, 2012

[27] Josse, C., G. Navarro, F. Encarnación, A. Tovar, P. Comer, W. Ferreira, F. Rodríguez, J. Saito, J. Sanjurjo, J. Dyson, E. Rubin de Celis, R. Zárate, J. Chang, M. Ahuite, C. Vargas, F. Paredes, W. Castro, J. Maco y F. Reátegui. 2007. Ecological Systems of the Amazon Basin of Peru and Bolivia. Clasification and Mapping. NatureServe. Arlington, Virginia, USA. Data are available in shapefile format at http://www.natureserve.org/aboutUs/latinamerica/gis_data_downloads.jsp

Additionally, no conclusive evidence emerges from the analysis of agents and drivers explaining the different historical deforestation rates between the two sub-periods. Indeed, 85% of the deforestation comes from the expansion of communities due to migration and agricultural land expansion, but no specific changes in the conditions (neither legal, climatic, nor political) could explain a change in these practices from one sub-period to the other. Disrupting changes had happened before the period of historical analysis (eradication of coca in 1993-1995).
No variables can be thought of that would explain the different historical rates and that could be used for a modelling approach ("approach c")

Finally, the "approach a" based on historical average approach is more conservative than the other approaches (approach b would lead to an increase of deforestation rate)

As a result, the chosen baseline approach is "approach a" according to VM00015 methodology: Historical average approach, where the rate of baseline deforestation assumed to be a continuation of the average annual rate (-0,604%) measured during the historical reference period in the reference region.

Constraints

The result of the analysis of constraints shows that the average annual area of deforestation over the period 2000-2010 (7 509 ha) is 104 times smaller than the maximum potential area for deforestation. We consider therefore that there is no constraint on deforestation, which matches Olander et al. analysis on the regions with high forest cover.

Quantity of future deforestation

As a result of the projection of the historical average deforestation rate, the quantity of deforestation in the reference region for the fixed baseline period is the following:

Table 17 : Quantity of future deforestation in the reference region

Date	Zone référence	
	Taux de déforestation	Surface de déforestation
2010-2011	-0,60%	8088
2011-2012	-0,60%	8040
2012-2013	-0,60%	7991
2013-2014	-0,60%	7943
2014-2015	-0,60%	7890
2015-2016	-0,60%	7842
2016-2017	-0,60%	7795
2017-2018	-0,60%	7748
2018-2019	-0,60%	7701
2019-2020	-0,60%	7655
Total	**X**	**78693**
Annuel moyen	**-0,60%**	**7869,3**

G.2.3.2. Projection of the location of future deforestation

The model has been calibrated based on Forest Benchmark Maps (Forest/Non-Forest) maps that have been produced for 2001 and 2005 time points.[28] In consistency with the analysis of drivers and agents of deforestation made by Pur Projet, two types of location factors have been introduced into the model: the anthropogenic ones and the natural ones (Mas et al., 2002 ; Lambin, 1994). Locations where human activities are developed (including agriculture and settlements expansion), strongly depend on natural constraints (such as slope, elevation or soil types) and on accessibility (such as existence of roads, cities or villages, existence of hydrological network).[29]
Based on the analysis of deforestation drivers and agents, several location factors have been identified and tested. The best combination of statistically significant location factors has been input into the model. The factors finally used in the model are listed below[30]:

Distance to cities and villages;
Distance to roads and tracks;
Distance to large rivers;
Distance to already cleared lands;
Elevation;
Slopes;
Combination of distance to already cleared lands and distance to large rivers.

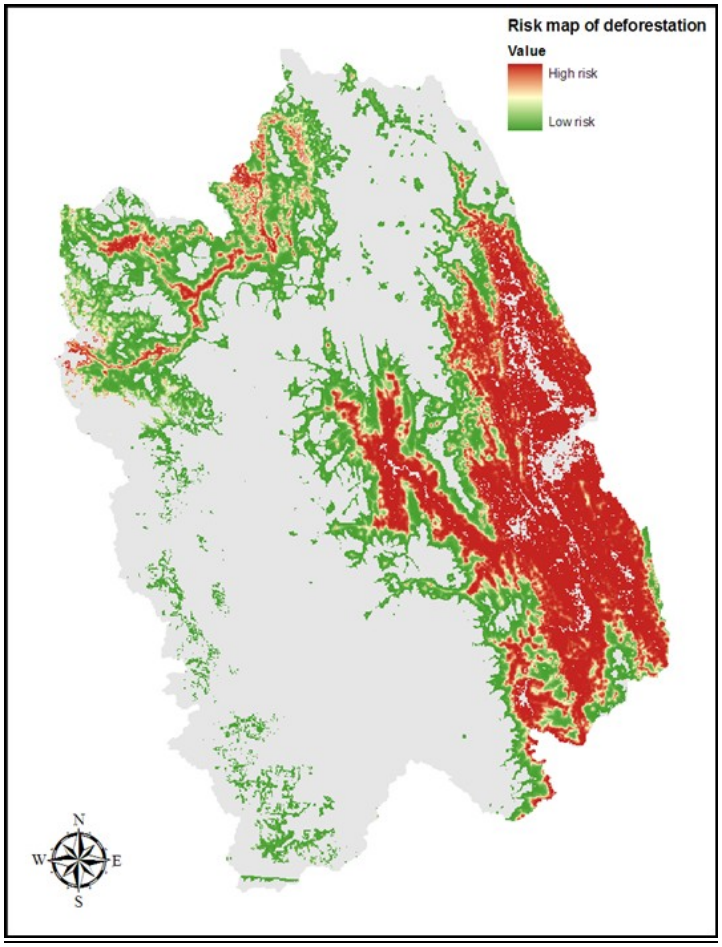
Among those factor maps, some are static (i.e. constant over time) and others are dynamic (i.e. need to be updated every year). Elevation, slope, large rivers as well as cities and villages (for which no extension are planned and documented) have been considered as constant, i.e. only one layer has been used over the whole projection period (2010-2020). On the opposite, roads and tracks, as well as already cleared lands are dynamic ones for which the evolution will have to be updated every year during the projection period (2010-2020). Indeed, some roads are planned to be developed on the RR by 2015, and documents are available to assess it.
In a location of deforestation model, factors based on already cleared lands (i.e. here distance to already cleared lands and combination of distance to already cleared lands with distance to large rivers) are considered as endogen because their evolution is directly linked to deforestation expansion. Evolution of those factors will be updated every year using the previous year deforestation projection.

Deforestation risk map

Based on the identified factors, deforestation risk maps for the reference region were produced, showing the level of deforestation threats on a given area. Since some variable (Distance to roads, Distance to already cleared land and Combined distance to rivers and already cleared land) are dynamic the risk map must be updated for each year of the baseline period.

[28] See the document prepared to describe the historical analysis of Land-Use and Land cover changes.
[29] Many authors underlined the influence of natural constraints and accessibility on deforestation: (Maeda et al., 2010; Roy Chowdhury, 2006, Geoghegan et al., 2001, Sader, 1988, Geist, et al. in 2002, Mertens et al., 2002, Greenberg, et al., 2005).
[30] Other variables were tested during calibration as soil types, land tenure, rainfall, geology and climate but they were not included because they damage the predictive quality of the final model.

Figure 26 : Deforestation risk map for 2011



Model validation

The process used to determine the quality of models is the calibration and validation on two sub-periods: 2000-2005 and 2005-2010. The model is calibrated over the period 2001-2005 and validated over the period 2005-2010.

Once the model is calibrated, a simulation map of 2010 is produced and compared for validation to historical map of 2010, using statistical analysis

Map of Baseline deforestation

Using the model of future deforestation localization and the quantity of deforestation as defined by the historical average annual deforestation rate, deforestation has been projected over 2010-2020 baseline fixed period. The deforestation risk map is used to select pixels with the highest probability of deforestation until the annual area of deforestation (ABSLRR) has been reached. The operation is repeated for each year of the baseline period.

According to the analysis of deforestation drivers and agents, some roads are projected to be implemented in 2015, within the Reference Region. Those roads have then been introduced in the model, starting to be considered from 2015 simulations.

We obtain the following Maps of Baseline Deforestation:

Figure 27 : Map of Baseline Deforestation

Period 2010-2010

Period 2010-2050

G.2.3.3. Definition of the land-use and land-cover change of the baseline

Combining the maps of annual baseline deforestation presented in section 2.4.3 with LU/LC maps, we obtain the following tables of annual surface gain / loss per forest and non-forest class.

To allocate deforestation to each post-deforestation classes, we use the "Historical LU/LC change" method, in which historical LU/LC changes observed from 2005 to 2010 (2000-2010 LU/LC change matrix completed in the historical analysis (section 2.4.1)) are assumed to be representative of future trends. This is relevant to the project as there is no expected disruption in the deforestation agents / drivers and the deforestation practices will remain similar.
Therefore, the weight of each final non-forest class in the total area deforested is assumed to be equal to the percentage computed in the 2000-2010 LU/LC change matrix completed in the historical analysis (section 2.4.1).

In our case, it means **53%** of deforested areas are assumed to be converted **to non-forest vegetation** (perennial crops, fallows) and **47%** of deforested areas converted **to bare soils** (pastures, annual crops, etc)

Table 18 : Annual area deforested / created per class in the project area in the baseline scenario (ABSLPA)

		Annual areas deforested / created per class in the project area (ABSLPA)								
Year	Project year	Initital forest classes					Final non-forest classes			
		1Icl Amazon Moist Forest	2Icl Andean Moist forest	3Icl Andean Dry Forest	4Icl Floodplain forest	Total Forest	3Fcl Non-forest vegetation	1Fcl Bare Soil, Croplands and settlements	2Fcl Water	Total Non-Forest
		ha	*ha*	*ha*	*ha*	*ha*	*ha*	*ha*	*ha*	*ha*
							53%	*47%*		
2011	1	36	75	9	0	120	63	56	0	120
2012	2	42	82	12	0	136	72	64	0	136
2013	3	38	86	7	0	131	70	62	0	131
2014	4	51	69	6	0	126	67	59	0	126
2015	5	67	73	11	0	151	80	71	0	151
2016	6	76	74	10	0	160	85	75	0	160
2017	7	87	78	9	0	174	92	82	0	174
2018	8	88	81	8	0	177	94	83	0	177
2019	9	93	75	7	0	174	92	82	0	174
2020	10	92	75	9	0	176	93	83	0	176
2021	11	109	85	8	0	202	107	95	0	202
2022	12	120	98	7	0	225	119	106	0	225
2023	13	134	104	10	0	248	132	117	0	248
2024	14	155	108	12	0	275	146	129	0	275
2025	15	161	131	10	0	302	160	142	0	302
2026	16	164	135	10	0	309	164	145	0	309
2027	17	186	149	19	0	354	187	166	0	354
2028	18	199	155	15	0	369	196	173	0	369
2029	19	219	167	18	0	404	214	190	0	404
2030	20	228	175	21	0	424	225	199	0	424
2031	21	252	185	25	0	462	245	217	0	462
2032	22	253	201	24	0	479	254	225	0	479
2033	23	248	212	24	0	484	257	228	0	484
2034	24	274	227	24	0	525	278	247	0	525
2035	25	273	226	31	0	531	281	249	0	531
2036	26	298	235	28	0	561	297	264	0	561
2037	27	313	236	31	0	579	307	272	0	579
2038	28	307	244	38	0	589	312	277	0	589
2039	29	331	259	31	0	621	329	292	0	621
2040	30	320	255	38	0	613	325	288	0	613
2041	31	329	273	40	0	642	340	302	0	642
2042	32	350	276	50	0	675	358	317	0	675
2043	33	366	278	59	0	703	372	330	0	703
2044	34	387	297	46	0	729	386	343	0	729
2045	35	354	305	56	0	715	379	336	0	715
2046	36	416	285	60	0	762	404	358	0	762
2047	37	394	308	69	0	770	408	362	0	770
2048	38	380	305	73	0	757	401	356	0	757
2049	39	437	322	70	0	829	439	390	0	829
2050	40	414	294	76	0	785	416	369	0	785

G.2.3.4. Carbon pools and GHG emissions selected

Table 19 : Carbon pools included or excluded within the boundary of the proposed REDD project activity

Carbon pools	Included / TBD[1] / Excluded	Justification / Explanation of choice
Above-ground	Tree: Included	Carbon stock change in this pool is always significant
	Non-tree: Included for non-forest post deforestation classes	This carbon pool is included only for post-deforestation non-forest classes (perennial crops such as cacao, orange, etc.). For initial forest classes, this carbon pool is not significant and has not been included in forest carbon stocks. This approach is conservative.
Below-ground	Included	Recommended for trees as it usually represents between 15% and 30% of the above-ground biomass.
Dead wood	Partly included	▪ Lying dead wood has not been included in forest classes based on field observations. ▪ Standing deadwood has been included in forest classes as it was easy to measure and looks significant (analysis showed that it is accounting for part of the stocks). Only above 5cm DBH standing deadwoods have been taken into consideration. In order to avoid overestimates, standing deadwood stocks have been divided by two. ▪ Both lying and standing deadwood are included in Lapeyre et al. (2004). ▪ It is conservative to consider those pools in post-deforestation classes and not in forest classes as they should not increase under baseline scenario. As a matter of fact, deforesting farmers use slash and burn practices which consumes almost all biomass, and they remove possible remaining burned logs, which would disturb the installation of their crops (cocoa, corn, etc). Dead wood is therefore not significant in post-deforestation classes.
Harvested wood products	Not Included	Not significant (see explanation below)
Litter	Not included	Not to be measured according to VCS Program Update of May 24th, 2010
Soil organic carbon	Not included	Not to be measured according to VCS Program Update of May 24th, 2010. It is conservative.

Fuel wood	Not included	Not significant (see explanation below)

Non-significance of harvested wood products:

- As described in the analysis of drivers and agents of deforestation, deforestation for selective extraction and commercial timber sales accounts for 10% of total deforestation.
- Of these 10%, below-ground biomass represents 20% and is not converted to wood-products, leaving a maximum of 8% of above-ground biomass potentially converted to wood-products. But only a fraction of above-ground biomass can be converted in long-term wood products; considering a biomass expansion factor of 1,5 for tropical deciduous species (IPCC GPG table 3A.1.10) and average loss in sawmills of 58% (INRA (Institut National pour la Recherche Agronomique) / Ecoinvent), this leaves 3,1% of total biomass that could potentially be converted to wood products.
- However, only trees with a minimum diameter of 25 cm are typically sold commercially or used in local constructions, smaller trees are left on the ground or burned. Average values from biomass inventories conducted in the project area indicate that 76% of total above-ground biomass is in trees with diameter larger than 25cm. This leaves 2.3% of total forest biomass potentially converted to wood products
- On top of that, only high value species are converted into wood products, which means loggers will clear some forest over a given area but only extract and sell the higher value species (caoba, tornillo, cedro, ishpingo..) which represent an estimated 20% of all biomass of trees above 25cm diameter, i.e. 0,46% of total biomass deforested.
- Finally, a 10% loss can be reasonably estimated in the extraction and transport of the timber (complex extraction via rivers), which can be damaged, lost, or left degrading for a period of time.

This leaves an estimated 0,41% of total biomass deforested potentially going into long-lived wood products. According to VCS definition of “significant” carbon pools, **the harvested wood products are not a significant carbon pool.**

Non-significance of fuelwood:

- As described in the analysis of drivers and agents of deforestation, deforestation for fuelwood colletion is very low and accounts for 1% of total deforestation.
- Of these 1%, below-ground biomass represents 20% and is not converted to fuelwood, leaving a maximum of 0,8% of above-ground biomass potentially converted to fuelwood. But only a fraction of above-ground biomass willbe converted in fuelwood (branches and pieces of right dimension, no leaves); a percentage of 10% of the biomass can reasonably be estimated not to be transformed into fuelwood (leaves, big pieces).
- Finally, a 15% loss can be reasonably estimated in the logging and transport of the fuelwood, which can be damaged, lost, or left degrading for a period of time.

This leaves an estimated 0,62% of total biomass deforested potentially going into fuelwood. According to VCS definition of “significant” carbon pools, **fuelwood is not a significant carbon pool.**

Sources of GHG emissions

Table 20 : GHG emissions included or excluded within the boundary of the proposed REDD project activity

Sources	Gas	Included?	Justification / Explanation
Biomass burning	CO_2	No	Excluded by the methodology
	CH_4	No	The project activities will precisely tend to decrease the fires to clear forests, leading to a reduction of biomass burning emissions. The exclusion of biomass burning emissions is therefore conservative (in line with methodology recommendation in 6.2) Leakage management activities such as reforestation in agroforestry models do not foster additional fires as the trees are planted in agroforestry systems or in already cleared areas.
	N_2O	No	Excluded by the methodology
Livestock emissions	CO_2	No	Excluded by the methodology
	CH_4	No	The project activities will not increase the number of livestock in the project and leakage areas. On the contrary, the project will tend to avoid the conversion of forest to pasture and promote activities alternative to livestock farming, therefore reducing the amount of livestock emissions. The exclusion of livestock emissions is therefore conservative.
	N_2O	No	

G.2.3.5. Impact on carbon stock changes

Carbon stock estimates presented in section G1.4 are long-term average for each LU/LC class. Whenever there is a LU/LC change, carbon stocks from pre-deforestation class are not all released instantly. Similarly, new carbon stocks from post-deforestation classes do not appear instantly.

In accordance with VCS AFOLU Requirements section 4.5.3, a transition period is considered for each LU/LC class over which pre-deforestation carbon stocks will decrease linearly until reaching 0 after a period of 10 years, and post-deforestation carbon stocks will increase as new crops/plantations grow, linearly until reaching their long-term average value after 10 years.

- Deforestation: for all forest classes:
Common deforestation practice in the reference area is slash and burn.
Therefore, above ground carbon stocks can be assumed to be released in the air and be reduced to 0 "instantly". Below-ground biomass will remain in the ground until it gets degraded over time by natural degradation cycle or replacement by other crops / land-uses. A 10 year linear decay is considered, in accordance with AFOLU Requirements 4.5.3.

- Growth of post-deforestation classes:
According to revised version of methodology VM00015, a linear increase of carbon stocks over 10 years shll be considered fro post-deforestation classes.

The following table summarized the evolution of carbon stocks for each LU/LC class in case of a transition: carbon stocks per class $Ctot_{cl,Ac}$ for a given Age of change A_c (Number of years after the transition)

Table 21 : carbon stocks evolution for each LU/LC class after a transition :

Year	Age of change	Land-Use class											
		1Icl Amazon Moist Forest			2Icl Andean Moist Forest			3Icl Andean Dry Forest			3Fcl Non-forest vegetation	1Fcl Bare Soil, Croplands and	2Fcl Water
	A_c years after transition	Cab_{Ac} (Above- t CO2e ha-1	Cbb_{Ac} (Below- t CO2e ha-1	**$Ctot_{Ac}$ (Total)** t CO2e ha-1	Cab_{Ac} (Above- t CO2e ha-1	Cbb_{Ac} (Below- t CO2e ha-1	**$Ctot_{Ac}$ (Total)** t CO2e ha-1	Cab_{Ac} (Above- t CO2e ha-1	Cbb_{Ac} (Below- t CO2e ha-1	**$Ctot_{Ac}$ (Total)** t CO2e ha-1	**$Ctot_{Ac}$ (Total)** t CO2e ha-1	**$Ctot_{Ac}$ (Total)** t CO2e ha-1	**$Ctot_{Ac}$ (Total)** t CO2e ha-1
Before deforestation		880	211	1 091	685	165	850	647	175	822	0	0	0
to (change year)	0	0	190	190	0	148	148	0	157	157	17	3	0
to+1	1	0	169	169	0	132	132	0	140	140	35	5	0
to+2	2	0	148	148	0	115	115	0	122	122	52	8	0
to+3	3	0	127	127	0	99	99	0	105	105	69	11	0
to+4	4	0	106	106	0	82	82	0	87	87	87	13	0
to+5	5	0	84	84	0	66	66	0	70	70	104	16	0
to+6	6	0	63	63	0	49	49	0	52	52	121	19	0
to+7	7	0	42	42	0	33	33	0	35	35	138	21	0
to+8	8	0	21	21	0	16	16	0	17	17	156	24	0
to+9	9	0	0	0	0	0	0	0	0	0	173	26	0
to+10, and forward	>10	0	0	0	0	0	0	0	0	0	173	26	0

And the following table gives the annual carbon stocks gain or loss per class $\Delta Ctot_{cl,Ac}$ for a given Age of Change A_c (number of years after the transition)

Table 22 : ***Annual carbon stocks loss or gain for a given Age of change A_c***

Year	Age of change	Land-Use class					
		1Icl Amazon Moist Forest	2Icl Andean Moist Forest	3Icl Andean Dry Forest	3Fcl Non-forest vegetation	1Fcl Bare Soil, Croplands and	2Fcl Water
	A_c years	$\Delta Ctot_{Ac}$ (Total) t CO2e ha-1	$\Delta Ctot_{Ac}$ (Total) t CO2e ha-1	$\Delta Ctot_{Ac}$ (Total) t CO2e ha-1	$\Delta Ctot_{Ac}$ (Total) t CO2e ha-1	$\Delta Ctot_{Ac}$ (Total) t CO2e ha-1	$\Delta Ctot_{Ac}$ (Total) t CO2e ha-1
Before deforestation		0	0	0	0	0	0
to (change year)	0	-901	-702	-664	17	3	0
to+1	1	-21	-16	-17	17	3	0
to+2	2	-21	-16	-17	17	3	0
to+3	3	-21	-16	-17	17	3	0
to+4	4	-21	-16	-17	17	3	0
to+5	5	-21	-16	-17	17	3	0
to+6	6	-21	-16	-17	17	3	0
to+7	7	-21	-16	-17	17	3	0
to+8	8	-21	-16	-17	17	3	0
to+9	9	-21	-16	-17	17	3	0
to+10, and onward	10	0	0	0	0	0	0

As a result of existing transition periods in carbon stocks per ha evolution after a LU/LC change, the total carbon stock changes for a given year t can be computed as the following:

$$\Delta CBSLPA_t = \sum_{y=1}^{t}\left[\sum_{icl=1}^{Icl} ABSLPA_{icl,y} * \Delta Ctot_{icl,t-y} + \sum_{fcl=1}^{Fcl} ABSLPA_{fcl,y} * \Delta Ctot_{fcl,t-y}\right]$$

Where :

$\Delta CBSLPA_t$	Total baseline carbon stock change within the project area at year t ; t CO_2e
$ABSLPA_{icl,y}$	Area of initial forest class icl deforested at time t within the project area in the baseline case ; ha
$\Delta Ctot_{icl,Ac}$	Carbon stock loss in the initial forest class icl at Age of change Ac (# of years after LU/LC change)
$ABSLPA_{fcl,y}$	Area of the final non-forest class fcl at time t within the project area in the baseline case ; ha
$\Delta Ctot_{fcl,Ac}$	Carbon stock gain in the final non-forest class fcl at Age of change Ac (# of years after LU/LC

Table 23 : Projected carbon changes in the project area under baseline scenario

Project Year	Calendar Year	Baseline scenario	
		Annual baseline carbon stock change (ΔCBSLPAt)	Cumulative Annual baseline carbon stock change (ΔCBSLPA)
		t CO2e	*t CO2e*
0	2010		
1	2011		
2	2012		
3	2013		
4	2014		
5	2015		
6	2016		
7	2017		
8	2018		
9	2019		
10	2020		
11	2021		
12	2022		
13	2023		
14	2024		
15	2025		
16	2026		
17	2027		
18	2028		
19	2029		
20	2030		
21	2031		
22	2032		
23	2033		
24	2034		
25	2035		
26	2036		
27	2037		
28	2038		
29	2039		
30	2040		
31	2041		
32	2042		
33	2043		
34	2044		
35	2045		
36	2046		
37	2047		
38	2048		
39	2049		
40	2050		

G2.4. Description of How the 'Without Project' Scenario Would Affect Communities

Without the project it is likely that the communities of the area will increasingly lose control over the forest. These communities depend on the forest for a wide range of products including foods, house construction, fuel-wood, timber, medicinal plants and seeds.

Loss of access to these resources will create economic hardships for local communities and undermine the achievements of the Millennium Development Goals. Encroachment of these forests by private corporations and migrants will also likely generate social conflicts in the area. Not only will forest cover be lost and environmental services weakened (including biodiversity and hydrological functions, especially for crops), local communities will experience diminishing access to forest resources. This will lead to social and economic marginalization and possible displacement of these rural families, and potentially create conflict between concessionaires, migrants, and local populations.

An additional component of the non-project scenario is the deterioration of hydrological services essential to the lives of rural families. They depend on water for domestic supplies and their agriculture is rain fed, the forest ensures good levels of rainfalls and water stocking. The clearing of forests will adversely impact water resources, including possible change to micro-climate. Since agriculture is almost exclusively rain-fed, declining rainfall and soil moisture will likely cause declines in family farm productivity. Without revenues from carbon sales, including agricultural intensification, water resource development, or NTFP processing, activities geared to enhance community livelihood will not take place.

The province has experienced severe erosion as forest cover has been removed. Erosion problems have accelerated over the past decade. This region experiences an extended dry season and often torrential wet season.

Forest conservation is a key element in any strategy to preserve Peru's complex hydrological systems and avoid further loss of soil through erosion. During the extended dry season, many rural areas in San martin Province experience chronic water shortages. Forest loss exacerbates these drought conditions by creating a hotter microclimate and accelerating water run-off rates. Without the project, land degradation will be more extensive; there will be greater soil erosion and reduced water infiltration and aquifer recharge.

G2.5. Description of How the 'Without Project' Scenario Would Affect Biodiversity

In the absence of the project it is likely that forest habitat in the project area will be reduced by 15% in the next 40 years through land clearing, illegal logging and slash and burn practices. In addition, forest degradation will reduce the density of the understory vegetation and disrupt the natural age distribution of trees, leading to a substantial loss of habitat.

The reduction of key habitat will place pressure on already-stressed flora and fauna. Without the project, community efforts to control poaching and regulate hunting will not be implemented. High market prices and growing demands for luxury hardwoods (often originating from endangered and slowly growing tree species) in Peru have placed growing pressures on forests, with much of this valuable timber harvested illegally. Logging bans and the decline of natural forest resources in Brazil have increased the pressure on Peru's forests. Many of the species with the highest value are already listed on the IUCN threatened species list. As these trees and forests are depleted, so too are important indigenous sources of seed, reducing the potential for regeneration. In addition, hunting and poaching are common, resulting in an increasing number of endangered fauna species. Finally, the clearing of forest for commercial agriculture is rapidly reducing the habitat for many flora and fauna species, and reducing biodiversity. The rampant deforestation will almost certainly lead to the extinction of the last feline population in Peru (pantera onca in particular).

G3. Project Design and Goals

G3.1. Summary of Project's Major Climate, Community, and Biodiversity Objectives

Climate Objectives

The project is designed to mobilize the communities in the project zone, to avoid further deforestation and degradation, as well as facilitate the natural regeneration of Martin Sagrado and neighbouring forests. This will lead to an avoided emission net impact of **8 789 000 Tons of CO2** eq (after leakage), over the 40 year project (see Climate chapter).The project will develop and demonstrate a carbon finance mechanism to reduce greenhouse gas emissions, contribute to economic and social development, and conserve biodiversity over the next 40 years.

Principle project strategies include building the capacity of local communities, and of ACOPAGRO and APAHUI managers, field workers to conserve community forests, as the primary managers of REDD project forests, creating a strong coalition of stakeholders who are committed to achieving the project goals including supporting villagers to improve the quality of forests, maximizing benefits flows to local communities participating in the project, and studying and developing additional REDD projects.

Operationally, the success of the project depends on strengthening community capacity to protect local forests through legal recognition and technical and financial support. The institutional, logistical, and political support of the Amazonia Viva Foundation and local government may as well enhance the effectiveness of community efforts to protect forests. Community managed assisted natural regeneration, enrichment planting activities and agro-forestry following agro-ecological practices are planned to enhance carbon sequestration in degraded forests and reduce soil erosion, while improving forest livelihoods and local employment opportunities. The emphasis on community involvement will maximize the longevity of the sequestered carbon, and minimize the risk of losing the carbon assets. In addition, by increasing biodiversity in these forests, especially the number of birds, reptiles, and amphibians, the risks of farm pests will be reduced. Through supporting and documenting the role communities play in forest carbon conservation and sustainable management, Amazonia Viva and Pur Projet seek to provide "proof of concept" to the Government of Peru and to the donor community that will encourage the replication of this strategy as a national program.

The long-term goals of this project are to sequester carbon, contribute to the devolution of forest management rights to poor, and demonstrate the viability of utilizing carbon offset credits to finance the national forest management program.

Community Objectives

The project seeks to ensure the security of families in the project community and to assist them by increasing employment opportunities and livelihood on a sustainable basis from their natural resources. The project will strengthen community leadership, organizational and financial capabilities, improve relationships with local government, help resolve resource conflicts, and educate farmers and

neighbouring communities on forest management and biodiversity. Community bookkeeping and project management skills will be developed as a major goal of the project, while project funds will be used to build capital reserves.

In addition, new micro-finance groups will be created to help manage non-timber forest product enterprises. Training, technical support, and funding for forest-based livelihood activities (such as the sustainable extraction of non-timber forest products) and the extension and adoption of more productive and sustainable agricultural practices will also be provided by the project (namely agro-forestry). Community eco-tourism activities will be encouraged too and economic development via micro-credit activities.

Biodiversity Objectives

This project will contribute to the protection and conservation of Peru endangered flora and fauna in tropical rainforests by supporting the engagement of rural communities as resident managers. Forest regeneration will be facilitated with enrichment planting of endangered species to increase the quantity and quality of available habitat. Project staff will facilitate community dialogues and provide technical guidance regarding effective practices for conserving flora and fauna. Project communities will also conduct regular monitoring of biodiversity with support from the project staff. High Conservation Value areas mentioned before will not be negatively affected.

Though the project area consists only of the three concessions Martin Sagrado, El Breo, and Monte Cristo, the surrounding area and neighbouring communities will be positively affected by project implementation.

G3.2. Description of Each Project Activity

The project aims to prevent the deforestation through the implementation over 80 years of the following categories of activities:

1. Legal: Formalization of project area will be conducted through the attribution, registration, and maintenance of concessions for conservation at regional government level, as well as registration at higher international level. In combination, financing of legal actions will help to fight illegal intrusions, encroachment and logging in the area. The project will also help developing forest management plans in a collaborative fashion. The project will support the communities in developing land and water resource development plans in a participatory and democratic manner by making improvements in the existing monitoring system managed by the local communities and by making large investments in the work of the environmental protection infrastructure and staff and the land titling agencies.

2. Control & Surveillance: Construction and maintenance of control points, demarcation of area boundaries, improvement of walkways, and patrolling/forest guarding are essential elements to effectively prevent uncontrolled deforestation. Also, increasing legitimacy of patrol groups and strengthening relationships with the local Forestry Administration will help creating a unified group of stakeholders that can prevent further forest encroachment, illegal logging, uncontrolled migration and other threats to forest integrity.

3. Sensibilization and Communication: Sensibilization of communities on conservation stakes will be done through local promoters, communication material, and implication of communities in the activities. Visits of the area will be conducted to raise awareness on forest's richness and environmental services. Education centres will be constructed to train and transmit scientific information to local communities in conservation efforts as well as to provide opportunities for the training of professionals specializing in biology, forest management, environmental education, etc.

4. Non timber forest valuation: community organization and training will be combined to improve the local capacity in forest management and forest product extraction such as seeds or medicinal plants. Research and development of new technologies will allow for innovation in the quality and types of products local communities produce. Furthermore, market development activities such as eco-tourism will be undertaken to improve market access. This combination should also enhance the production of forest products from the local communities involved in the project.

5. Scientific and Inventory: Inventories of biodiversity and carbon stocks will be conducted to improve knowledge on high conservation values species, on environmental services rendered by the forest in the whole region. Inventories will also contribute to monitoring of deforestation and conservation impacts on species conservation. Alongside, other scientific studies will investigate onsite the relationships between forest and water, food resources and food sovereignty, living conditions, wellbeing.

6. Renewable Energy: Even minor contributor, the development of renewable energy and equipment to lower fuelwood is a key component to make people aware of the need to develop alternative sources of energy.

7. Reforestation: Development in the leakage belt, where community lives, of agroforestry programs to plant native timber trees in the farmers parcels. This reforestation activity aims at lowering the pressure of agriculture on surrounding forest (yield increase), provide alternative source of fuelwood an timber to the communities, as well as raising communities awareness on forests. The project will build upon Pur Projet's experience in reforestation programs in the region. The project will also conduct Assisted Natural Regeneration within the project area to re-enrich degraded areas with native species.

8. Expansion, training and empowerment of communities: Empowerment of the communities on conservation, sustainable agriculture, resources management, and coordination with other neighbouring communities is very important to secure the sustainability of the project and limit leakage and risks from outside of the project area. It will help also promote the project in the whole region of San Martin.

Each of these activities targets one or more of the identified deforestation drivers

Table 24 : ***Summary of Project Activities Categories and their effectiveness on each driver***

	Contribution DF (d)	Effectiveness (a.d) : Relative reduction in the impact of driver due to activities (%)									
Deforestation threats	Relative importance of driver to total deforestation (%)	Legal	Control & Surveillance	Sensibilization & communication	Non Timber forest valuation	Scientific & Inventory	Renewable Energy	Reforestation in agroforestry models	Coordination, Expansion & Transmission	Total
1. Conversion to croplands, pastures and housing	70%	15%	20%	20%	20%	5%		10%		90%
2. Conversion to settlements / infrastructure (Roads, water and electricity)	15%	15%	25%	20%		5%	5%		15%	85%
3. Selective logging of high-value species for commercial sales	10%		30%	20%	15%	5%		5%		75%
4. Timber harvesting for local use (housing and infrastructures)	1%			50%			10%	10%	20%	90%
5. Fuelwood gathering	1%			20%			30%	10%	10%	70%
6. Uncontrolled fires	2%		30%	40%					20%	90%
7. Intentional fires (Paths opening and fires for hunting)	1%		30%	15%	30%	5%			20%	100%
8. Mining and Hydrocarbon activities encroachment	0%	40%			40%				20%	100%
9. Economic land concession (timber and agriculture)	0%	50%			50%					100%
Effectiveness of activity on total deforestation		12.8%	21.7%	20.7%	15.8%	4.8%	1.2%	7.7%	3.2%	87.7%

The following section contains a description on how each of these activities affects each of the drivers. It is also described how the effectiveness of each of these activities changes throughout the project's lifetime due to gained experience, or differences in funding. The relative effectiveness refers to the effectiveness relative to what is maximally achievable given the project's conditions, but may be different

from this maximum due to timing of funding or lack of experience. In other words, the relative effectiveness will always be 100% at some point during the crediting period, regardless of the absolute effectiveness of the activity in reducing

G.3.2.1. Legal

Land tenure formalization :

Land is the single most important asset for most Peruvians, as economic and social lives are inexorably tied to the use of natural resources. Transparently assuring land-tenure rights structures is of upmost importance both to the livelihoods of local populations and the prevention of unregulated and unsustainable land use.

Project area:

First legal priority is to formalize the legal tenure of the project area, through the finalization of attribution and registration of the three concessions for conservation. This includes elaboration of maps and technical files for the attribution process, accompany the communities in the formal process of concession solicitation, elaboration of the management plan for the concession. The Asociacion Dos De Mayo already has the concession El Breo attributed. ACOPAGRO has been attributed the concession Martin Sagrado in 2012. APAHUI has solicited the concession Monte Cristo to the government.

Leakage belt:

Conventional land tenure for forest areas does not always extend to tenure over housing and agricultural lands, and a lack of protection for agricultural lands can lead to families moving deeper into forest areas to clear new patches. In the project zone, all of the farmers have clear land use rights as they have been there and cultivating their land for more than 5 years. However, only 10 to 20% of the farmers legally own the land on which they settle and use for agriculture. As part of the project, Amazonia Viva foundation will work with the regional government to prioritize land titling for the participating farmers who don't own a legal land title yet.

A cadastral plan has to be developed too, to manage the land use between agricultural land and forest preservation areas. By establishing legally-binding forest management agreements, this will help secure the community forest. This action provides exclusive management rights and responsibilities to the communities over the project area, greatly enhancing their ability to protect and conserve these resources.

Legal enforcement:

Without legal enforcement, maintaining tenure over land against migrants or concessionaries is extremely difficult. The establishment of these agreements often requires financial resources to implement, which can be generated by sales of carbon credits from the project. These financial resources can also be used for forest monitoring and patrolling programs, as well as forest boundary demarcation to ensure that migrant populations do not encroach on forest lands part of the Biocorredor Martin Sagrado project area.

Maintaining formal land-tenure rights is also important in ensuring that agriculture lands are not granted to large corporations as ELCs (Economic Land Concessions) or as timber concessions to harvest luxury woods. The creation and reinforcement of land tenure rights can effectively accomplish this by granting land rights to communities and ensuring this land is not taken through ELC or exploited by in-migration. The Amazonia Viva Foundation will also be responsible for meeting with new migrant communities and leaders, as well as the local government to clarify boundaries of the project area, resolve any existing conflicts, and emphasize the intention of the AMAZONIA VIVA foundation to secure the area.

Forest management plan:

While the local village leaders are consulted in land allocation activities, there are currently no land-use plans for the project areas. However, developing forest management plans in a collaborative fashion is a key element in sustainable resource management. The project will support the communities in developing land and water resource development plans in a participatory and democratic manner. The plans contain guidelines on the amount of timber each person can harvest, based on current and future timber needs, and how much land within the project sites can be converted in the future for expansion of settlements and cropland.

The forest management plans also identify areas for assisted natural regeneration and enrichment planning. Areas of high biodiversity, hydrological value and High Conservation Areas are identified for special management. The forest management plans increase the efficiency of the current land-use, and take into account the increased need for land for settlements and agriculture in the future. By planning the future conversion and avoiding the random conversion of forest patches, forest degradation along settlement and cropland edges is reduced.

The development of forest management plans requires community-wide discussion on how to best manage natural resources, emphasizing the inclusion of all stakeholders. This policy of inclusion cultivates a feeling of resource ownership, motivating sustainable land use practices. The project guides communities in identifying appropriate areas for future settlement and agricultural expansion while clarifying and demarcating areas for permanent forest conservation. Often the need for new settlement or agricultural space leads to the degradation of forest lands. The involvement of knowledgeable local stakeholders and outside experts allows for the realization of technical and sustainable methods of expansion. During the stakeholder meetings, there are also discussions on how the forest should be managed with respect to the use of fire to “clean” the land. For this, the technical support of the ACOPAGRO and APAHUI cooperatives’ and Amazonia Viva’s technicians are key. Additionally, participatory land-use planning can also provide guidance and rules in case of disputes or conflict over land or resources.

Land-use planning procedures include the preparation of large scale maps (1:25,000) of the project area with zoning information to be posted in the community meeting room. The resource management plan maps are used for resource related discussions, annual work-plan development, fire management, and other spatial monitoring needs. Data from maps are transferred into the project GIS data base on an annual basis.

The potential of the proposed REDD+ project to generate carbon revenues for forest management has been instrumental in generating an action plan to resolve tenure conflicts in the project area through meetings, workshops, site visits, as well as higher level policy discussions.

Legal formalization and enforcement are a key backbone of the project to secure the forest areas. It is estimated to contribute to an overall 13 % of the protection of the forest against the different drivers of deforestation. It is particularly effective against oil exploration, large economic land concessions and timber concessions as it commits the communities to conservation and prevents the community or members of the community to sign a contract with these economic players.

G.3.2.2. Control and Surveillance

This strategy involves supporting the community members as they improve the pathways, demarcate forest boundaries, construct and maintain walkways, and patrol/protect forest areas. Project support provides training in management planning, uniforms, communication equipment, patrol huts, boundary markers and signage, and employment. These actions increase the legitimacy of patrol groups in the eyes of outsiders and enhance status of AMAZONIA VIVA Foundation members in their local communities. In

addition, the project seeks to strengthen cooperative relationships between the local Amazonia Viva staff, police, and military effort in order to create a unified group of stakeholders that can prevent further forest encroachment, illegal logging, forest fires set by humans and poaching.

Similarly, forest protection activities prevent the unsustainable harvesting of fuel-wood and timber for local use. The project will provide financial support to local staff to develop a quick-response mobile unit to react to illegal forest activities in cooperation with local government, police, and military.

Illegal logging risks will be mitigated through a number of measures including demarcating boundaries and posting signage, blocking tractor access through trenching and other methods, regular patrolling, development of a network of patrol huts and fire roads to facilitate rapid movement, rapid response and confiscation of chainsaws and other equipment, and improve communications through the use of mobile phones.

Migrant encroachers for illegal logging or to slash and burn require a minimum amount of time, at least one week, to clear the forest to establish a settlement on encroached land. Routine weekly forest patrols and increased monitoring activity will ensure migrant encroachers are unable to settle, or are removed quickly.

In addition, a case tracking system would be set up so that the prosecution of major offenders can be followed through.

The project would support the Amazonia Viva Foundation, ACOPAGRO and APAHUI cooperatives, local authorities, NGOs, and other partners to create a cell-phone network to act as an early warning system to control illegal forest activities. Cell phone communications provides a low-cost way to strengthen coordination among the inter-organizational enforcement team. Text messages sent to all participating communities are a rapid way to inform communities of fire or other threats. Workshops and meetings would be held to build team relationships, ACOPAGRO and APAHUI cooperatives are key to that aspect. Previous work with the communities has already increased their awareness and sensitivity to their land rights.

Overall, the control and surveillance activities will contribute to an estimated 21% of avoided deforestation and degradation.

G.3.2.3. Sensibilization & Communication

Sensibilization of the communities, the local stakeholders, and the government is critical in raising the awareness of the necessity of conservation. Local stakeholders must understand the importance and the benefits of preserving for them of for the region.

Also we have observed that this ambitious program for avoided deforestation and conservation must gain a great momentum to become effective and efficient. A way of gathering people, communities, other stakeholders around this conservation subject is to develop important communication on the project existence, the development of project activities. This can be done through the distribution of T-shirts branded to the conservation project, painting of the boats which are the common way of going around, leaflets, exhibitions, as well as of course regular visits to all communities.

It is also critical to make the communities feel directly implicated and part of the success of the project. In this sense, development of communication tools such as community radios, exhibitions, participation in concourses is key for the communities involved to be able to share their experience, communicate on their actions, their difficulties and their successes, and also to increase proudness of the communities in the project

Since the beginning of the project in 2010, a large part of the budget has been spent in communication and sensibilization activities, which allowed to create an important momentum on the region for conservation, to get on-board the project new communities and new organizations (APAHUI, Pucalpillo, etc.), and to also get the full support of the regional government. Also, it is to be noted that this intense communication may have contributed to the recent increased focus of the regional government on conservation and environmental stakes, the suppression of concessions attribution to oil and mining companies. Also, the number of solicitations for concessions for conservation has increased dramatically in the last year, likely due to the huge momentum created by the communication around the reforestation and conservation projects, the creation of Amazonia Viva Foundation.

Overall, sensibilization and communication is estimated to have an impact of 21% on overall avoided deforestation and degradation.

G.3.2.4. Non timber forest valuation

The project plans several livelihood enhancement activities to boost the incomes of project participants and in neighbouring communities. These include seeds extraction and tree nurseries, enhancing production, processing, and marketing of non-timber forest products including cocoa, essential oils, traditional medicinal plants, eco-tourism, and other income generating activities, and productivity increase. Cultural activities generating income are part of this too. A micro-credit fund is made available for communities members to start non timber activities.

The sale of non-timber products will help to increase rural income, shifting the burden from the sale of agricultural and timber products, and reducing the need for cropland. The project will also assist communities in establishing micro-finance accounts that can receive small grants from carbon income,

allowing capital formation to be used for revolving loans for education, health, and small enterprise development. Small grants will be awarded to farmer-innovators who wish to perform trials of new sustainable farming system techniques.

The project will develop similar activities in the leakage area and with all the neighbouring activities.

Non-timber forest product development activities are supported during the full time span of the project. Similar as to agricultural intensification measures, a period of 5 to 10 years is assumed before these will be fully effective because marketing networks must be developed, etc. A final adoption rate of 50% is assumed after terminating the project's support for these activities. Together with legal contracting they are the main backbone of the project success and are estimated to contribute to 16% of the avoided deforestation.

G.3.2.5. Scientific & Inventory

The project will realize scientific studies and inventories in the project area and in the project zone, in order to understand and publicize better the biodiversity richness of the project zone, as well as the environmental services brought by the forest.

Such scientific studies will include inventories of biodiversity (fauna and flora), inventory of biomass, and studies about link between forest and water cycle preservation, forest and food sovereignty, forest and climate, etc.

This improved knowledge and the results of the studies will help defend better the goals of conservation against potential future alternative for local communities (cropland extension) or for the local government (oil, mining concessions or ELCs)

These studies are also critical to target better which activities to develop and in which areas specifically in order to best preserve biodiversity, ecosystemic services, and natural resources.

Altogether, it is estimated that scientific & Inventory activities will contribute to 5% of avoided deforestation and degradation.

G.3.2.6. Renewable Energy

Even minor contributor, the development of renewable energy or more efficient energy-saving techniques to lower fuelwood consumption, is a key component to make people aware of the need to develop alternative sources of energy. During the various meetings, many farmers pointed as well this as a priority to them. In July 2010, a first batch of 150 solar panel lamps (of 2 different kinds), were handed over to the Pucalpillo community by Pur Projet, as a start.

In some communities, farmers have been helped to upgrade their stoves to improved cooking stoves in order to reduce fuelwood consumption and to reduce smoke in the kitchen.

Also, the development of alternative sources of energy (solar, hydroelectric) could avoid the construction of electricity lines that would degrade or deforest the area. For example, an electric line has been planned along the Huayabamba river up to upstream communities, and it will be necessary to remove some forest to build this line in a forested landscape. Would the communities be self-sufficient in electricity with other sources, this line would not be necessary.

G.3.2.7. Reforestation

Agroforestry in the leakage management areas :

Development in the buffer zone of the project area, where community lives, of agroforestry programs to plant native timber trees in the farmers' parcels. This reforestation activity aims at lowering the pressure of agriculture on surrounding forest (cocoa yield increase in agroforestry, limiting the need to expand cultivated areas), provide alternative source of fuelwood and timber to the communities (pruning and thinning products of reforested parcels), as well as raising communities awareness on forests. On top of that, the sales of trees at maturity (according to a sustainable management plan) will provide additional revenues for the farmers, diversifying their incomes, and decreasing their need for other sources of revenues they could get from deforestation of the project area

The project will build upon Pur Projet's experience in reforestation programs developed with ACOPAGRO since 2008 in the same region.

Assisted Natural Regeneration :

In the project area itself, plantation in degraded areas of removed or missing species in order to recreate natural complete ecosystems and regenerate the biodiversity, carbon stocks of these high conservation value areas. In particular, in areas where illegal loggers have come to cut selectively high value tree species such as Tornillos, Cedars, the Assisted Natural Regeneration will replant these tree species to help recreate original conditions.

G.3.2.8. Expansion, training and empowerement of communities

Training and empowerment of the communities on conservation, sustainable agriculture and resources management are a key issue for project's sustainability and will be mainly addressed by Amazonia Viva's, Pur Projet's, ACOPAGRO's and APAHUI's staff as well as the promoters in the communities. Training will be very wide and on multiple subjects, with in-field trainings and technical trainings, both on agro-forestry, forest management and the development of non-timber activities.

The communities need to feel on-board the project, implicated, and learning from the project. This only will ensure permanency and sustainability of the action.

Coordination and development with other neighbouring communities as well transmission to future generations is also very important to secure the sustainability of the project and limit leakage and risks from outside of the project area. It will help promote the project in the whole region of San Martin too.

Table 25 : Overview of project activities and estimated budget

Costs		Total 2010-2089	Total 2010-2014	Total 2015-2049	Total 2050-2089
Total Costs		**42 638 688**	**2 097 734**	**20 841 403**	**19 699 551**
Activities		**24 046 692**	**1 002 892**	**11 066 200**	**11 977 600**
1 - Legal	Elaboration of maps Martin Sagrado	**2 000**	2 000	0	0
	Registration of Martin Sagrado concession	**15 000**	15 000	0	0
	Demarcation and registration of Monte Cristo concession	**21 405**	21 405	0	0
	Delimitation and elaboration of maps concessions Pucalpillo & Santa Rosa	**4 351**	4 351	0	0
	Registration of Pucalpillo and Santa Rosa Concession	**15 000**	15 000	0	0
	Elaboration and revision of Management plans ("Plan de manejo") to maintain concession	**437 000**	62 000	175 000	200 000
	Legal assistance (lawyers) to get court decision on migrants invasion in conservation area	**150 000**	0	70 000	80 000
	Activation and Monitoring of unique registers of associations	**27 500**	20 000	3 500	4 000
2 - Control & Surveillance	Construction and maintenance of 6 control checkpoints at entry points of the project area	**760 000**	40 000	320 000	400 000
	Land demarcation and landmarks construction, maintenance, and replacement	**82 400**	4 200	37 000	41 200
	Sub-Landmarks construction, maintenance, and replacement	**115 200**	3 600	54 000	57 600
	Forest guarding. 20 forest guards	**7 640 000**	140 000	3 500 000	4 000 000
	Boat and equipments for patrolling (Purchase, maintenance, replacement)	**499 300**	26 800	222 500	250 000
3 - Sensibilization & Communication	Painting of 15 boats to the colors of conservation and Fundacion San Martin Verde	**118 000**	5 500	52 500	60 000
	T-shirts Fundacion for all communities involved and surrounding communities	**222 000**	12 000	98 000	112 000
	Installation , improvement, extension, and maintenance of Community radios	**27 541**	3 541	11 200	12 800
	Radio host and programmation for Radios	**121 600**	1 600	56 000	64 000
	Local promotional and education material	**316 000**	16 000	140 000	160 000
	Educational field visits for schools in conservation area	**268 600**	13 600	119 000	136 000
	Local external communication especially via local transport companies and agencies.	**296 000**	0	136 000	160 000
	Compensations for local promoters and trainers of the program HEM	**390 000**	15 000	175 000	200 000
4 - Non timber forest valuation	Design, creation, and management of Botanical Garden to value flora biodiversity present in the forest and sell plants extracts locally	**351 000**	57 000	142 000	152 000
	Medicinal plants: seeds extraction and tre nursery activities to sell	**142 000**	67 000	75 000	0
	Seeds extraction activity and elaboration of tree nurseries	**188 300**	53 300	135 000	0
	Developement of bee heaving and honey supply chain	**140 000**	40 000	100 000	0
	Developement of fish farming activities	**126 000**	51 000	75 000	0
	Construction, expansion, and maintenance of base centers in neighbouring communities to facilitate access to the concession and develop activities : eco-tourism, scientific and press	**614 000**	39 000	275 000	300 000
	Ecoturism activities: tours to discover landscape, fauna and flora inside the concessions	**156 000**	45 000	51 000	60 000
	Equipment and developpement of conservation area for ecoturism : paths, miradors, etc.	**400 000**	25 000	175 000	200 000
5 - Scientific & Inventory	Elaboration of the technical study (Expediente tecnico) for all concessions area	**57 000**	57 000	0	0
	Inventory management : monitoring of biodiversity	**936 000**	36 000	420 000	480 000
	Specific scientific studies: link with water, food security and sovereignty, cocoa yields, etc.	**378 000**	36 000	162 000	180 000
	Reporting to regional, national and international authorities and institutions, research publications	**52 500**	0	24 500	28 000
6 - Renewable Energy	Implementation of distribution channel for solar panels and solar lamps and coordination	**77 595**	2 595	35 000	40 000
	Implementation of improved cookstoves in communities	**134 400**	2 400	132 000	0
7 - Reforestation in agroforestry models	Plantation of timber trees in agroforestry systems in surrounding communities	**170 000**	50 000	120 000	0
	Natural assisted regeneration : plantation of high conservaiton value species of trees and plants in degraded areas of the project area to reinforece natural ecosystems	**40 000**	10 000	30 000	0
Other unplanned activities	Other unplanned activities to fight new deforestation threats	**7 420 000**	0	3 420 000	4 000 000
Damages and unexpected	Damages and unexpected operational expenses	**1 135 000**	10 000	525 000	600 000
Local Project management and coordination. Expansion, training, and empowerement of communities		**3 609 462**	**145 462**	**1 620 000**	**1 844 000**
	Supervision of conservation activities, management of San Martin Verde Fundation, and coordination with government.	**943 926**	43 926	420 000	480 000
	Coordination of all legal and administrative processes. Expansion and empowerment of communities	**625 324**	25 324	280 000	320 000
	Training and assistance of farmers and community members in conservation activities	**774 243**	24 243	350 000	400 000
	Management of conservation activities by forestry engineers	**772 000**	22 000	350 000	400 000
	Construction, Expansion and maintenance of offices buildings in concessionaires	**166 000**	19 000	71 000	76 000
	Empowerement of Asociacions members of San Martin Verde and contractualization of	**228 500**	3 500	105 000	120 000
	Implication and participation in Mesa REDD San Martin	**5 072**	3 072	2 000	0
	Meeting and coordination with regional governement (ARA) for formalization of concessions	**47 043**	2 043	21 000	24 000
	Field visit of Regional Governement's representants	**47 354**	2 354	21 000	24 000

Costs		Total 2010-2089	Total 2010-2014	Total 2015-2049	Total 2050-2089
Monitoring costs		**1 419 000**	**149 000**	**820 000**	**450 000**
	Monitoring carbon	**445 000**	95 000	350 000	0
	Monitoring of leakage	**90 000**	20 000	70 000	0
	Monitoring of drivers of deforestation	**234 000**	9 000	105 000	120 000
	Monitoring of activities	**390 000**	15 000	175 000	200 000
	Monitoring of environmental and socio-economic impacts	**260 000**	10 000	120 000	130 000
External partners and network for project strengthening, distribution and promotion		**1 316 778**	**41 778**	**595 000**	**680 000**
	Field visit of partners, prospective clients; base camp installation in the concession	**157 778**	7 778	70 000	80 000
	Project presentation and promotion (European and US network), and Consortium. Lobbying, Media, advertising, partnership and conferences.	**392 000**	17 000	175 000	200 000
	International promotion and recognition (UNEP, IUCN, UNESCO, Bio Fund)	**767 000**	17 000	350 000	400 000
Project certification		**3 347 878**	**411 301**	**1 922 601**	**1 013 976**
	Preparation to VCS Validation	**127 500**	127 500	0	0
	Preparation to VCS Verification	**400 000**	25 000	175 000	200 000
	Validation audit costs VCS	**25 000**	25 000	0	0
	Verfication audit costs VCS	**400 000**	25 000	175 000	200 000
	VCS credits issuance costs	**1 157 878**	16 301	1 087 601	53 976
	Preparation to CCBA Validation	**62 500**	62 500	0	0
	Preparation to CCBA Verification	**375 000**	0	175 000	200 000
	Validation audit costs CCBA	**25 000**	25 000	0	0
	Verfication audit costs CCBA	**400 000**	25 000	175 000	200 000
	External forestry expertise and technical assistance in monitoring (ONFI)	**375 000**	80 000	135 000	160 000
Project taxes & Insurance		**1 917 878**	**26 301**	**1 437 601**	**453 976**
	Taxes to Peruvian State	**1 157 878**	16 301	1 087 601	53 976
	Insurance	**760 000**	10 000	350 000	400 000
Project development and management (Pur Projet)		**6 140 000**	**180 000**	**2 760 000**	**3 200 000**
	Project design, implementation and coordination	**6 140 000**	180 000	2 760 000	3 200 000
Marketing & Sales costs		**841 000**	**141 000**	**620 000**	**80 000**
	Media (Videos/Photos)	**25 000**	10 000	15 000	0
	Annual reports	**156 000**	6 000	70 000	80 000
	Sales costs (sales and client follow-up)	**660 000**	125 000	535 000	0
Total Costs		**42 638 688**	**2 097 734**	**20 841 403**	**19 699 551**

G3.3. Map Identifying Location of Project Areas, Activities and Leakage Areas

Project area:

See map in Section G.1

Leakage area:

Leakage Belt (LB) corresponds to the geographical area surrounding or adjacent to the Project Area (PA) where agents of deforestation could displace their deforestation activities, outside of the Project Area (PA), due to project implementation.

LB has been defined analyzing agents' mobility, in accordance with the methodology (part 1.1.3, VM0015). Mobility of deforestation agents has been assessed through an integrated analysis of geographic information systems (GIS) and multi-criteria evaluation (MCE) (Guezo Fêdowidé, 2010). This type of analysis refers to decisions-making situations based on a multiple criteria analysis (Bensaid et al., 2007). First challenge was to identify factors (i.e. criteria) that may influence the mobility of deforestation agents from one place to another. For each criterion, a weighting hypothesis has been calculated. Multi criteria analysis enabled to identify areas surrounding PA where agents could displace their deforestation activities if they want to circumvent constraints that will result from project activities implementation.

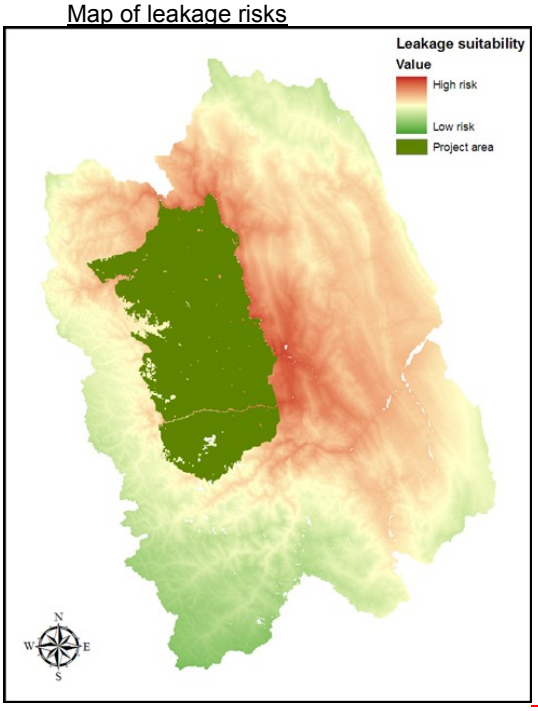
The criteria selected for the analysis were the following: Distance to Project Zone, Elevation, Distance to already cleared land, Distance to cities and villages, Distance to roads and tracks, Slope, Distance to rivers.

A maximum area must also be defined to define the leakage belt (LB) boundaries. According to the Avoided Deforestation Partners methodology (VM0007, VMD0007 v3.0), LB must at least equals 90% of PA. As there is not such an indication in VM0015, we used VMD0007 threshold and assumed that Martin Sagrado REDD Project LB should be at least 265,500 ha (i.e. 90% of 295,000 ha).
In order to increase homogeneity a filter has been applied to remove less than 100 hectares holes within LB. All those small patches have been included within LB.

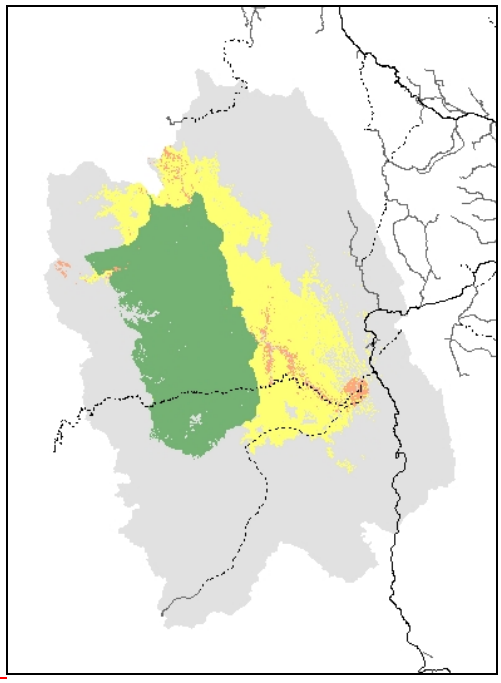
Finally, leakage management areas (non-forest area only) have been excluded from the leakage belt.

Figure 28 : Maps of leakage risks and leakage belt

Map of leakage risks



Map of leakage belt



The detailed process for leakage belt definition is available in appendix "Geographical Boundaries".

Expected leakage intensity

Leakage is expected to be low because of the presence around the project area of other protected areas or areas dedicated to conservation : to the South, the National Park Rio Abiseo, to the West, the concession for conservation Alto Huayabamba, to the North West, the conservation area of Leymebamba.

On top of that, accessibility is difficult in the region and it is hard for deforestation agents to move from one place to another (no roads, no paths, rugged terrain, etc.).

To the North (Province of Leymebamba, Mendoza area), communities are already settled and have deforested extensively in the past. It is therefore likely that additional deforestation will be low and not directly attributed to the project. To the East (left bank of Huayabamba), most of the area is already leased as forestry concessions. Commercial loggers are therefore already present in the area and additional deforestation is likely not to be attributed to the project activities but part of the baseline scenario really.

Still, to the North, and to the East, the leakage area was selected according to methodology described above to encompass all accessible forests around the project areas that could be under pressure during the project's lifetime.

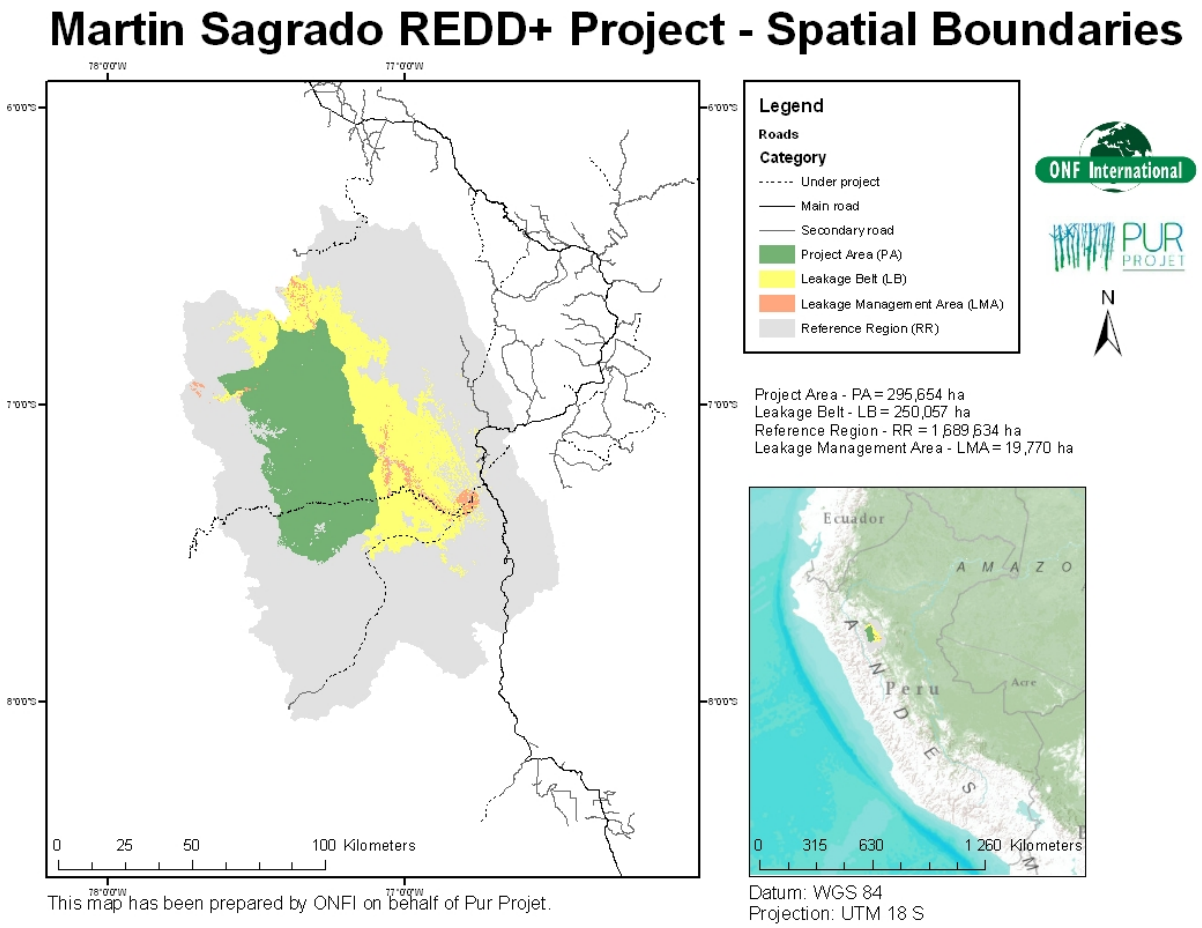
Area of activities / Leakage management areas

Most of the project activities from the categories: Non Timber Forest Valuation, Sensibilization & Communication, Reforestation, Renewable Energy will be implemented in the leakage belt with the communities involved in the project. These activities both prevent deforestation inside the project area as

well as leakage outside the project area (in particular, awareness campaigns, education, reforestation, non-timber products, etc.)

The Leakage Management Areas are therefore the non-forest areas where these activities will be implemented, in the vicinity of the communities participating to the project (list of communities in section 1.4)

Figure 29 : Map of Leakage Management Areas



G3.4. Definition of Project Lifetime and GHG Accounting Period

Project Lifetime

The project's lifetime is 80 years, including the 12 months project preparation period (2010 : Year 1) that involves stakeholder consultations, PRAs, mapping, boundary demarcation, community training and initial livelihood activities, and negotiations with brokers, and buyers.

The first 3 years of the project (i.e. Years 1-3) represent the project establishment period. The goal of this period includes:

- stabilizing project boundaries;
- controlling drivers of deforestation and degradation in the project areas;
- developing community project management institutions;
- building REDD and A/R project development and management capacity;
- regenerating degraded forest lands within the project boundaries;
- Instituting monitoring and measurement systems for carbon accounting, biodiversity, and livelihood generation.

During Years 4-80, the project will move into the maintenance period during which the management will be supported by the project communities, the Amazonia Viva Foundation and local NGOs.

The project lifetime was designed to allow sufficient time to:

- stabilize threatened forest cover;

• restore degraded forests;
• Build enduring community forest management institutions. These encourage livelihoods activities that support the long term conservation of the area.

GHG Accounting Period

The GHG Crediting Period is 40 years (2010-2050) during which net revenues from carbon payments during this period will be used to benefit local communities by enhancing livelihoods and improving the quality of the forest. The project started on January 1 st, 2010 and will end on December 31, 2090.

The Crediting Period was chosen to be shorter than the project's lifetime periodto match the duration of the lease of concessions for conservation. Although the concessions for conservation can be renewed for another 40 year after the first period, since future position of local government cannot be predicted ni 40 years time, and since proof of title is mandatory for carbon credits emissions, the project chose conservatilvely 40 years as the GHG crediting period.

Though the planned life of the project is 80 years, the benefits and the returns from the project will last far beyond the project timeline. Trees are a long-lived species and the forest will endure beyond the 80 years provided management and protection schemes remain in place. Reforestation that takes place within the project timeline will create habitat corridors and refugia needed for threatened and endangered species. If these species are protected within the project timeframe they can be expected to live on past the life of the project. Lastly social bonds, education and lessons learnt will be gained forever in the hearts and minds of the local communities.

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

Potential risks at the community level include the following:

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

The project seeks to sustain the authority of the Amazonia Viva Foundation over the project forests by facilitating its legal status and the formalization of agreements as a condition for project implementation. The project will also bring together a provincial level working group, via the ACOPAGRO and ORO VERDE Cooperatives, APAHUI association and Local Government officials to monitor project implementation. The project seeks to provide special support to local public agencies and governments to build their capacity to partner with project communities in forest protection. The main stakeholders among the public sector institutions, especially at the provincial and district level, lack the logistic means and human capacity needed to meet the challenges of sustainable natural resource management. The project hopes that, by addressing these weaknesses, a coalition of public institutions and community groups can develop and implement longer term natural resource management plans and strategies.

2. Community members experience loss of confidence in the Amazonia Viva Foundation (AMAZONIA VIVA)

The project provides for institutional strengthening of the AMAZONIA VIVA foundation and activities to engage the project communities such as Assisted Natural Regeneration (ANR) and forest protection. Uniforms, identification cards, equipment and financial support for the AMAZONIA VIVA foundation will help formalize forest protection activities and enhance the status of AMAZONIA VIVA foundation members in their communities. These actions will also increase their legitimacy in the eyes of outsiders. There is a risk that increasing status and dominance of the AMAZONIA VIVA foundation members leads to conflicts within the communities due to jealousy or feelings of being left out and not getting direct access to benefits. Regular meetings of the AMAZONIA VIVA foundation and community members are scheduled to discuss management issues and project priorities.

Finally, the project monitors benefits flowing to community members every 3 years to ensure equity in access to employment and development activities. The local Forestry Authorities officers and particularly the ACOPAGRO technicians and agronomists are also involved in providing training and capacity building to community members. They are engaged in monitoring community performance and motivational levels on an ongoing basis throughout the life of the project. The AMAZONIA VIVA foundation is knowledgeable regarding the linkage between carbon revenues and the project activities and grant programs that they fund, as well as the ability of AMAZONIA VIVA foundation to protect and restore forests. As a consequence, a direct financial incentive will be maintained to encourage and motivate participating members and communities to succeed in forest conservation and regeneration efforts.

3. Population growth forces agricultural expansion in project area

It is estimated that the population density will increase from 17 people per square km in 2006 to 28 per square km in 2021 in the San Martin Province. While this is still low, it represents a 60% increase in population over a 15 year period and an annual growth rate of 2.74%.

This value may double or triple depending on immigration rates, however as available forest lands decrease it is anticipated that migration into the province will slow. The project will work with the participating communities to assist them in developing long term resource management plans for their community forests areas as well as other natural resources in the leakage belt under their control. The key

is to involve the entire community in a land-use planning process that clearly demarcates conservation forests, as well as anticipating future agricultural land resource needs based on community priorities. This includes ensuring that forest and land resource management regulations are formulated by the community and sanctions are put in place. The project will guide communities in identifying appropriate areas for future settlement and agricultural expansion while clarifying and demarcating areas for permanent forest conservation.

The project will also actively promote and support agricultural intensification via agro-forestry and agro-ecological practices, rather than further forest clearing. For this, agronomists will be key to provide appropriate training to participants and neighboring community members.

Most families have sufficient land in terms of their labor availability, and consequently the amount of arable land is less of a constraint than the availability of farm inputs and agro-ecological techniques. As a result, increasing yields is likely the best way to enhance food security and farm income.

The project, via the Amazonia Viva Foundation, will also provide communities with extension information on sustainably productive farming systems and provide small grants to innovative local farmers willing to conduct innovative cropping trials.

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

This project proposes to reduce risk of carbon leakage from land clearing, illegal felling and fire by building strong partnerships between the Amazonia Viva Foundation, the communities' members, the cooperatives and local NGOs at the field and provincial level. Pur Projet will seek as well the support of national and international organizations to fund and lobby for the promotion of the project.

Illegal logging risks will be mitigated through a number of measures including demarcating boundaries and posting signage, blocking of tractor access through trenching and other methods, regular patrolling, development of a network of patrol huts and fire roads to facilitate rapid movement, rapid response and confiscation of chainsaws and other equipment, and improved communications with FA through two-way radios and cell phones. Land encroachment will be addressed in three ways. First the AMAZONIA VIVA Foundation will take responsibility for meeting with new migrant and neighbouring communities and leaders, as well as local government to clarify the boundaries of the project area, resolve any existing conflicts, and emphasize the intention of the AMAZONIA VIVA Foundation to secure the area. 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, the AMAZONIA VIVA Foundation will demarcate boundaries with pillars and signage, maintain regular patrols, and call in the support of the local FA, police and military as needed. These actions will be coordinated with commune chiefs and district governors. Third, villagers who established in-holdings within the CF areas prior to the project will be asked to sign contractual agreements with the AMAZONIA VIVA Foundation that will allow them to continue farming provided that they do not expand further into the forest area. They will also be forbidden to sell their in-holdings to any outside person.

5. Insufficient Funding or Inappropriate Use of the Revenues

Project planning and implementation costs are funded through Pur Projet own's funds end sales of environmental services initially, and the on-going carbon sales income then. These costs have been estimated and budgeted for the life of the project (at 26.7 million Euros, without distribution costs) and in the initial years the ability for carbon to pay for project costs is based on estimates of potential net carbon income. Depending on the price of carbon and payment schedule for carbon payments, this cash flow

may need to be augmented with additional grants in the early years of the project. Once the project is validated, any potential funding gap can be identified and additional funding sources can be secured.

The project is developing a mechanism for the allocation of income from the sale of carbon credits, after project costs and management costs for the project are covered, that will be acceptable to participating communities, the Amazonia Viva Foundation, the provincial government and to Pur Projet. The goal of allocation will be to direct income from carbon credits to benefit participating communities, restore the health of forests and develop new REDD projects in Peru after project development and management costs are covered.
It is proposed that the carbon revenues be managed by Pur Projet and AMAZONIA VIVA foundation for operations management and expenses reporting, with allocations made annually for project implementation costs based on the approved annual work plans. Any net revenues generated after project costs and management costs for the project are covered would be placed initially in a project grant fund administered by the AMAZONIA VIVA foundation.

Net carbon revenues may be then channelled into the AMAZONIA VIVA foundation account that will support livelihood activities for project communities, as well as finance the development of new REDD and A/R projects. The allocation plan will also assess how community carbon payment funds are managed in terms of technical support, institutional capacity building, reinvestment in forest restoration and economically productive forest enterprises, etc. Annual audits on project funds will be competed at the end of each year.

It is estimated that from the total budget of 26.7 million euros of the project (without distribution costs), at least 17 to 18 million will be directly invested or spent via the AMAZONIA VIVA foundation to the participating communities, equivalent to 63 % to 67 % of total budget directly invested in project activities for the beneficiaries.

6. Natural risks

Fire risk
Since the proposed activity is located in very humid area, fire risk in the project area is extremely low. There is no record of spontaneous fire, only intentional fires for paths opening or hunting, or uncontrolled fires which are part of slash and burn techniques used for clearing lands, these fires being restricted to the slashed area and having impacts limited to the area and eventually neighboring parcels (to a limited extent). In addition, the small communities living inside the project area are living in altitude in fresh and humid area.

Note that uncontrolled fires from slash and burn have been identified as deforestation threats and the project will fight against. This kind of fire is therefore not an additional risk to baseline deforestation and should not be considered here.

Mitigation:
- All farmers located inside the area and directly on the border will be trained by Acopagro agronomists not to use slash and burn practices, on how to plant cocoa under the canopy without burning, by taking out only the layers 1 and 2 of the canopy but keeping the highest level for covering the cocoa fields. The project plans to extend this training for free to nonmembers, to reduce impact of agricultural practices on forest degradation. This service will target in particular migrants coming into the area who will be proposed free training and incentives to develop their land without slash and burn techniques.
These trainings proved to be very efficient as almost no Acopagro farmers use slash and burn practices now.

- The farmers and community members receive additional trainings about fire risks, and the participants facing a fire risk (for example when the neighbors use slash and burn practices) will implement a five-meter-large protection strip around the parcel, two months before the end of the rainy season.

Pests and diseases

The project area is filled with primary forest, which is and has always been a natural self-regulated ecosystem. The project activities will not induce the introduction of exotic or foreign or invasive species, and all the activities happen close or outside the borders of the project area.

Extreme weather (floods, wind damages, droughts)

- The flooding risks are insignificant as the whole project area is filled with canyons, mountains and significant slopes (see the physiographic analysis in the PDD part 1.13.4). Existing forest in the project area counts with floodplain forest in the few plain areas next to the rivers. This forest type is naturally adapted to temporary flooding and will not see its carbon stock reduce because of flooding.
- No severe droughts in the project area (see climatic diagram).
- There's very little wind damage in the region, especially because of rugged topography and steep slopes that break high wind. Wind damage in the project area is part of natural forest equilibrium and is already reflected in the standing living carbon stocks measured in the field.

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

Inventories of biodiversity have been conducted in the past at different level, the San Martin province level, but as well more in detail in the project area, for the concessions El Breo and Martin Sagrado (see section G1). It means there is good knowledge of biodvisersity and high conservation value in the project area, with already identified conservation ragets, distribution patterns, and activities ot prserve this value. Still, inventory is not 100% complete yet and extended to the whole project area.

However, in accordance with the precautionary principle, this lack of complete scientific data is not postponing the implementation of activities to preserve the area. As it can be seen in the overall chronogram, all types of conservation activities (see section G3.2) will be started and implemented, alongside the completion of more detailed inventories and studies of the biodiversity.

For the assisted natural regeneration of forest resources, priority will be given to areas that are natural habitats for rare or threatened species. Enrichment planting will occur with unique endemic species. For the monitoring of biodiversity, unique habitat areas and species of exceptional importance for conservation will be identified so that project activities can focus on them.

The project seeks to ensure the maintenance of the cultural High Conservation Values (HCV) areas by supporting traditionally forest-dependent lifestyles through (1) clarifying the land-tenure and stewardship of the local communities over the forest they have been living in for centuries, and (2) by supporting the community's livelihoods through the various measures that are being financed from the carbon credits.

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

The project plans several activities to permanently enhance and support the incomes of project households. Example of such activities include supporting the sustainable harvesting, production and marketing of non-timber forest products including seeds, medicinal plants,… Through the micro-finance mechanisms and small grants supported by the project, small enterprises can be developed and farmers can enhance their production and yields without the on-going need for funding.

The education, training, empowerement of the commmunities provided within the project is a key investment in the social capability of the communities to pursue the activities beyond project lifetime. The success of the project on the long run will be driven in a large part by the appropriation of the project by the communities.

A proportion of the funds will be used to develop other carbon projects within the neighbouring communities and to a larger extent, in the San Martin Province. As a consequence, this project can serve as a catalyst for other forest conservation and poverty reduction projects.

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

Identification and Organization of Stakeholders and Communities Affected by the Project

The main stakeholders are the owner of the concessions constituting the project area: ACOPAGRO cooperative, Asociacion Dos De Mayo, and APAHUI association, as well as two other main communities (Santa Rosa and Pucalpillo), also willing to ask for large concessions for conservation in the same zone, and heavily involved in the project since the beginning. These 5 main stakeholder were selected due to the concessions they had or they wanted to ask on large forest areas in the Huayabamba river, in the biological corridor between National Park Rio Abiseo and Bosque de Proteccion Alto Mayo, because of their commitment to for protection of the forests and their awareness about environemental issues, and their capacity to form an organization towering the project (Amazonia Viva). They has also been involved (ACOPAGRO in the first place) in the development and success of a reforestation program started in 2008 in the same region.

The Amazonia Viva Foundation was founded by these 5 stakeholders (plus the cooperative ORO VERDE, involved in another reforestation program in San Martin province), in order to coordinate actions for conservation and reforestation in the province, and more specifically to coordinate locally the Biocorredor Martin Sagrado REDD project. The Foundation is today constituted by the 6 members, with elected representatives at the board, and managed by a General Manager and a team of engineers and technicians. The members of the foundation will meet at least quarterly to review progress and take decisions.

The other stakeholders are all the forest dependent communities in the project zone (Huayabamba river basin). These communities have expressed their desire to support and comply with the carbon project management plans in return for technical and financial support to build their stewardship capacity and local economy. The communities along the Huayabamba river have been involved in the previous reforestation program developed by Pur Projet and ACOPAGRO and have been identified and consuted through this channel on the REDD project. Communities in the northern part of the project zone have been identified by Amazonia Viva Foundation a bit later on, and consulted and included in project design through various onsite visits to the communities (Chuquibamba, Leymebamba)

Other stakeholders in the REDD project include the provincial and district governments, commune chiefs and councils, NGOs and civil society groups, and the national and local Forestry Administration. All of them have been consulted by Pur Projet and Amazonia Viva Foundation, and implicated to a lesser extent in the feasibility and design of the project. Pur Projet has a long history of presence in the province and zone, through the development of reforestation projects, and has build strong relationships with all stakeholders in the area.

Involvement of Communities in Project Design

A series of meetings was organized to involve the identified stakeholders in the project design process. This series of meetings coincided with field sampling and social appraisals. The meetings had high levels of community participation to the Amazonia Viva Foundation activities, and therefore helped to ensure that decision making is done transparently and through the consensus of group members. Given high levels of illiteracy in project communities and the complexities of carbon project modalities, the project development team communicated and shared project concepts with communities through a series of village meetings.

In July 2010, contracts were signed between ACOPAGRO Cooperative and Pur Projet to start the operational activities, organize additional meetings with all project neighbouring communities, to discuss the procedures and modalities of the REDD project including introducing the concept, benefits and risks, as well as exploring the current situation and existing problems that communities are facing. This information has been used to formulate contractual agreements with local communities covering project participation, as well as in designing the annual work plans for technical and financial assistance.

The following sections contain a summary of the input of each of the stakeholder

a) Specific Inputs from Participating Communities (including Dos de Mayo)

The project developers and AMAZONIA VIVA Foundation members met with communities to ask their opinion and get input on the project design, key problems, and other development priorities. For the most part, the problems and needs mentioned by the different communities were very similar, as were their requests for support.

A number of communities wanted to improve walkways and build more patrol posts. Communities also requested employment opportunities to be built into the project design, and that the majority of funds actually go to them.

Communities have requested legal support to address encroachment by more powerful stakeholders and economic land concessionaires. The AMAZONIA VIVA Foundation shall organize a series of meetings in

2011 and 2012 to inform other stakeholders of the project's goals and request that they respect the boundaries of the project area.

The communities also mentionned they would like to restore their forests and would like to regenerate native and medicinal species. Most of these species have multiple uses and are endangered or threatened species. In addition, villagers would like to enrich plant species that are valuable, including frutal species.

Some leaders reported that while initially community members were reluctant to confront migrant encroachers, as they have become better organized they are actively confronting individuals engaged in illegal forest activities. The community members have requested more of the following to strengthen protection: budget to better the walkways, patrol posts, legal recognition from the Forestry Administration for sites that are not yet approved, boundary posts, walking paths around boundary, two-way radios, some salary subsidies for patrols, and uniforms. In addition, the communities would like to receive some livelihood development support including training on cocoa and coffee cultivation, seeds collection and other non timber revenues. The villages also expressed a need for improved access to schools.

These communities' inputs have been key in the design of the project to support activities which will directly build their capacity to protect forests, while generating employment and income to local communities. Special initiatives funded under the project will reflect community priorities including walkways improvement and development, livelihood training and micro-financing, agricultural intensification, and related needs.

b) Specific Inputs from ACOPAGRO Cooperative.

Another main stakeholder is the organic and fair trade cooperative ACOPAGRO. The Cooperative is key to the project, as it was implicated since the beginning in the design of the project. Moreover, it has been developing since 2008 with Pur Projet a reforestation program in the same region with the same communities, and has therefore a strong legitimity among farmers on environmental programs. On top of that, it is a famous cocoa cooperative in the whole province of San Martin and even outside the province, with a strong legitimacy and image. It is therefore helpful as primary member of Amazonia Viva foundation, to make the link and ensure smooth communication between Pur Projet and the participating communities.

On a technical point of view, ACOPAGRO's extensive experience in the development of agro-forestry organic agriculture and natural productivity intensification will be key as well to give training to the communities. Moreover, the Cooperative will be in capacity to setup and manage the supply chains and ensure distribution of non-timber products like seeds, medicinal plants extracts, honey, etc... ACOPAGRO will also be in charge as well of developing micro-credit activities.

ACOPAGRO will provide training to the communities on:

- improved agro-forestry practices, agro-ecological practices, forest protection, boundary demarcation,
- patrolling support including uniforms, huts, and communication equipment;
- Assisted Natural Regeneration activities;
- Small enterprise training and micro-finance development.

c) Specific Inputs from APAHUI organization.

APAHUI is a strong organization of cocoa producers created recently before the project start with 80 farmers, but with a strong motivation and goal to become a complete cooperative with higher volumes of production.

They decided to join the REDD project in 2011, whith the goal of joining their “Municipal Area for Conservation Huicungo” to the 2 others concessions for conservation, and foramlize the land tenure of this area by asking for a concession for conservation for an area of 80 000 has from this municipal conservation area. The project expanded from 236 000 has to 316 000 has at their initiative.

d) Specific Inputs from Local Government.

At the origination of the project, Local Government representatives mentionned that they have no funding to dedicate to meetings to discuss community forestry management issues at the provincial, district, or municipality level. They even requested funding from the project to allow provincial and district officials to travel to community forests areas, as well to meetings with stakeholders to resolve forest conflicts.

Local Forest Administration (INRENA) staff comment that they have limited resources with which to provide extension and custodial support to the community forests groups. They have requested project support to cover travel expenses to the forest areas including, transportation, gas and maintenance, and per diem for accommodation and food.

The stakeholder meetings with Forestry Administration, Local Government, and civil society organizations generated a range of comments that were discussed, explored and integrated into the project strategy and work plan. Community comments, as well as those of other stakeholders provide the basis for formulating activities.

This includes:

- improved forest protection through walkways improvement, boundary demarcation, patrolling support including uniforms, huts, and communication equipment;
- employment for Assisted Natural Regeneration activities;
- small grants for agro-forestry development;
- enhanced livelihoods through small enterprise training and micro-finance institution development.

Later after projet initiation, local government developed the “Mesa REDD San Martin”, workgroup and exchange platform dedicated to the elaboration of the baseline scenario for REDD readiness of San Martin region in Peru. The roundtable involves technical consultants, representatives from regional and national government, representatives from the differnet conservation initiatives in the region, representatives of native communities, etc. Pur Projet and Amazonia Viva are part of the roundtable. So far the roundtable has been a platform to exchange on drivers and agents of deforestation, historical deforestation rates, future threats, etc. These elements were integrated to the project design.

Provisions for On-going Stakeholder Consultation during Project Implementation

The project ensures regular community feedback through discussions between the AMAZONIA VIVA Foundation and the implementing communities, and Pur Projet. The Amazonia Viva Foundation will meet quarterly to review experience and best practices to identify innovations for extension. These practices will receive special attention for inclusion in the coming year’s work plan. AMAZONIA VIVA Foundation will also organize quarterly broader assemblies where all community members will be able to participate to give their feedbacl on the project. Given the lack of accessibility of some communities, AMAZONIA VIVA Foundation staff will also conduct regular field visits to all communities involved to collect heir feedback. The AMAZONIA VIVA Foundation will play an active role in distributing key project documents to affected community members and key stakeholders as well as publicizing community events/meetings.

In addition, monitoring of socio-economic and environmental impacts will be conducted on a continuous basis, through the use of surveys (see questionnaire in appendix). A sample of farmers in the participating communities will be surveyed every 2 years to monitor the impact of conservation activities and collect their feedback on the project.

Periodic focus group discussions will be used to document how key activities are progressing and identify problems and issues. Case studies will be written by project staff and consultants to ensure lessons are captured.

Quarterly meetings of the provincial working group and the AMAZONIA VIVA Foundation will be used to inform local government representatives regarding project achievements and experiences.

Project documents and biodiversity and community monitoring data will be collected and processed by Pur Projet, and put at disposal of the communities and the cooperatives.

Annual work plans and budgets are developed each year based on feedback from the previous year's operations. The goal of this annual review by the AMAZONIA VIVA Foundation is to enhance the impact of project resources on carbon storage and sequestration, as well as livelihood and biodiversity goals. While an overall budget and strategic plan is provided in the Project Development Document (PDD) and related documents, the AMAZONIA VIVA Foundation together with project implementing organizations and community participants will have the flexibility to modify their annual strategies and budgets based on experiences from the previous years and emerging development priorities.

G3.9. Procedure to publicize Public Comment Period

Parallel to the publishing of the English-version of the PDD on CCBA website, a simplified spanish-version of the document will also posted on ACOPAGRO and Pur Projet's websites for the 30-day public comment period.

A printed version of the document will be distributed in the participating communities for free consultation.

In addition, Amazonia Viva will also organize a series of community sessions to present the document.
All Spanish comments will be centralized by one person within the AMAZONIA VIVA Foundation, and translated into English, and sent to Pur Projet before the end of the public comment period. Pur Projet will then submit the comments from local communities and other stakeholders to the annex of this PDD.

G3.10. Process for Handling Unresolved Conflicts

The project relies on existing and emerging institutions to mediate any conflict arising from project related activities. The AMAZONIA VIVA Foundation, ACOPAGRO, and APAHUI are the focal point in the community for preparing annual work plans and ensuring a transparent and participatory process among members. Since the AMAZONIA VIVA Foundation has close interaction with ACOPAGRO staff, and receives support from them, this process allows a consensus plan to emerge that minimizes the chance for conflict. Leading up to the start of project implementation, the project team will meet with all AMAZONIA VIVA Foundation members to receive their input into the first year work plan.

Conflicts that may arise during the course of project implementation will be handled by a defined process (available on request) supervised by Public authority of National Park Rio Abiseo, in whose buffer area is developed the project. The National Park Rio Abiseo authority approved his role as a third-party mediator to address conflicts within 30 days and resolve them. Since the park creation, the park authority has had a

strong implication in the park's buffer area, and has a strong legitimacy for the communities and the various organizations in the area. Project conflicts and their associated responses will be documented by the National Park Authority and Fundacion Amzonia Viva.

The detailed process for handling conflicts is available in appendix.

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

Up-front project funding for the project has been provided through the investment of Pur Projet's own funds in the first place.

In the first years, sales of environmental services (certificates of hectares preserved) and in smaller proportions of ex-ante carbon credits permitted to cover all start-up costs as well as the cost of validation of methodology and Project Documents for the CCBA. Such funding will continue throughout the project lifetime.

However, most funding will come from the sales of VCUs generated by the project after VCS validation and verification of the project (2013). Estimated net carbon revenues (net of commercilaization costs) from the project, totaling up to 50 million euros over 40 years, is expected to exceed all project-related costs (evaluated today at 26 million euros) as well as all on-going carbon monitoring costs. Detailed 80-year financial projections have been developed for the project, and will be made available to the Validator upon request. Main categories of expenses are presented in the section G.3.2 of the present PDD.

G4. Management Capacity and Best Practices

G4.1. Identification and Roles of Project Proponents

The specific roles of each of the project partners are outlined in table 38.

TABLE 38
Role of each of the project partners

Pur Projet	Pur Projet is the **project proponent**, responsible for the project design and implementation. Pur Projet is at the initiative of the REDD+ project. Pur Projet has been present in San Martin region and in the project zone since 2008, starting with the development of community reforestation programs. Pur Projet designed and started the REDD+ project in 2010, is responsible for the general coordination of the project, and in charge of the commercialization of the carbon credits issued by the project.
Fundación Amazonia Viva	The Amazonia Viva Foundation is the main local implementing organization Foundation created at Pur Projet's initiative, in order to coordinate and support reforestation and conservation activities in the San Martin region. The foundation gathers ACOPAGRO and ORO VERDE cooperatives, and 4 local community associations: APAHUI, Asociacion de Proteccion de Bosques Comunales Dos de Mayo, APAP (Asociaccion de Productores Agroforestales Pucallpillo), APAPMASAR (Asociacion de Productores Agropecuarios y Protectores del Medio Ambiante Santa Rosa). The foundation members have been implicated in Project design and implementation since the beginning. The constitution and formalization of the foundation came up in 2011 after the beginning of the first project activities, in order to facilitate and optimize local management of the project. Within the scope of REDD+ project, the foundation assists Pur Projet with coordination of project actions, including implementation, management and monitoring of the project. Participates in project design. Facilitation between various stakeholders, ensuring accountability, transparency in use of revenues, and good governance. Support with training of local communities, stakeholder consultation and integration. Designing and conducting social appraisals, and support with conducting forest inventories. Support forest protection and enforcement, capacity building for local communities, stakeholder consultation and conducting forest inventories. Daily administration of all project activities.
Other participating communities (in project area and in project zone)	List of communities in section G.1.5. All participating communities were included in the project design and the decision process and the choice of activities. The communities are responsible for the implementation and monitoring of project activities in the field. The project includes empowerement of these communities.
ONFI	Technical partner assisting in carbon calculations, development of Project Design Documents, creation of management system to gather monitoring data, design of forest stocks inventory plan.

Reforesta Peru	Project partner for forestry expertise and seedlings sourcing for reforestation activities. Growth of seedlings monitored by agronomists and engineers dedicated to reforestation and agroforestry as part of project activities. Trainings on forestry aspects and forests management.

Each year the Fundacion Amazonia Viva will prepare an annual project report to be approved by the communities and Pur Projet. Every six months meetings will be held to allow project managers to report to the ACOPAGRO management regarding progress, needs, and achievements. At the field level, the implementing organization will oversee the daily administration and monitoring of the REDD project activities in cooperation with the implementing partners allowing coordination with local government and technical agencies.

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

Members of the Amazonia Viva Foundation, as the implementing organizations and the implementing partners have extensive experience in designing and implementing community development projects in rural areas, as well as practical and technical field knowledge. The foundation is managed by Roldan Rojas Paredes, who ran a few times the municipals and was a counselor of Acopagro in cooperativism. He has a large experience and knowledge of the region, its communities and the various stakeholders. The Amazonia Viva Foundation management team also includes a agronomist engineer with previous extensive experience in community reforestation project, an economist with strong experience of relationship with local authorities, legal issues, and community management. Acopagro cooperative also has experienced agronomists, forestry and community specialist, as well as many filed tecnicians who have a strong knowledge of the communities.

In addition, the project will be supported by the **local Forestry Administration** staff that will provide technical and custodial support to local Amazonia Viva Foundation.

Pur Projet, a private organization based in Paris, France, and specializing in the development and marketing of community forest carbon credits has supported the development of all carbon market preparatory work and will ensure that buyer-seller negotiations are conducted in an efficient manner and that carbon measurement and submission to registries are successfully completed. Pur Projet will complete the project design document and facilitate negotiations between the communities and the foundation to ensure a smooth transition as field activities are initiated.

Pur Projet has a portfolio of 8 other afforestation/ reforestation projects in tropical countries (Indonesia, Ghana, Thailand (4), Honduras, Peru) developing agroforestry and afforestation with small-scale farmers (cocoa, rice, coffee), 3 REDD+ projects (Peru, Brasil) with native communities, and 5 additional plantation projects (Philippines, Morocco, South Africa, Brasil). Pur Projet is at the initiative of the creation of Amazonia Viva consortium.

12 years experience of Pur Projet's founders (Tristan Lecomte, Alexis Kryceve, Mathieu Senard, Edouard Rollet, Ilse Keijzer) in grass roots development projects through their experience at Alter Eco (they co-founded Alter Eco in 1998, leading Fair Trade company in France). They developed long term partnerships and development projects (combining Fair Trade and Organic) with over 60 cooperatives of small-scale farmers in more than 40 countries. More references available at validators request.

Reforesta Peru is a Peruvian tree nursery company with heavy expertise in forestry and combination of forestry with agriculture (forestry and agronomists experienced engineers). Reforesta Peru has been involved in reforestation projects with the same communities with Acopagro for the last 4 years, and has extensive knowledge on the local forest characterisitcs, tree species, combination with agricultural systems, markets for timber, etc.

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

Training will be provided to the project's employees and participants. Depending on the needs for the project, these will include training in forest inventories, biodiversity assessments, silvicultural management for risks in mitigation, or silvicultural management for assisting natural regeneration. The training for these jobs will be organized by the Amazonia Viva Foundation, Pur Projet, and other requested organizations, such as the organization who will conduct the biodiversity monitoring.

Additionally, the project counts with little employees, but relies more on the involvement of local community members to conduct specific community activities (tourism, flora valuation, inventories, etc), as members of the community associations, which are payed by the project. As such, they receive training and education as part of the overall training, education and awareness raising plan for all communities participating to- and impacted by the project, managed by Fundacion Amazonia Viva with CREAR.

The detail of this plan is available in appendix.

G4.4. Equal Opportunity of Local Community Members for Employment

We believe strongly that local employment is a key component in the project. Local community members are more knowledgeable about the local flora, fauna, conditions, geography, weather and culture than most experienced outsiders. In addition, employing local community members not only will create significant direct and indirect job opportunities over a 40 year period, but facilitates a stronger connection to the land and forest resources. The training and employment directly offered and created by the project will support the creation of a lifestyle that emphasizes sustainable forest protection and forest stock enhancement.

Jobs related to project implementation range from improving the walkways, conducting forest inventories, developing and managing non-timber forest activities (botanical garden, seeds extraction, ecoturism…), forest patrolling, to managing microfinance, and thus require a range of skill-sets. Though all community members are given an equal opportunity to apply for employment, the ultimate decision is up to the local groups mentioned above based on the abilities of the individual. As local community members train each other, become more self-sufficient, and knowledgeable of their trade they will move into upper management. The project proponents will investigate if specific community groups are underrepresented. Project proponent will organize training sessions targeting underrepresented community groups to ensure the inclusion of such groups into employment activities.

Special attention will go to gender equality and the participation of women in capacity building and employment activities.

G4.4. Compliance with Regulations Covering Worker Rights and Plan to Communicate Regulations

The project will not hire many workers as employees, as the goal is to give to the community members directly the keys to manage and develop the activities themselves, through their local community associations. In that sense, funds will be transferred from Amazonia Viva to community associations, who

will be in charge of financing the local activities and managing the financial compensations for the community members whenever appropriate.

Additionally, the project will rely a lot on external consultants for trainings, education, communication, technical work (inventories, etc) and interactions will be formalized through legal contracts between the Foundation and third-party organisations.

For Fundacion Amazonia Viva employees, compliance with the national legal framework is guaranteed by the explicit registration of the Fundacion in the Fundations national registries, which includes the approval of the status, organizational and operational description documents (ROF/MOF) of the foundation, which describes the organization of the Fundacion and the working and labor conditions within the Fundacion.

Foundations in Peru are very strictly controlled by the national administration (Consejo De Supervigilancia De Fundaciones Del Ministerio De Justicia, attached to the Ministry of Justice and Human Rights) regarding compliance with fiscal, labor, and foundation specific regulations. Two persons in the Fundacion Amazonia Viva (Tirso Ruiz, legal and administrative assessor, Jenry Palacios, ex funcionario auditor de la SUNAT y contador independiente de cooperativas y organizaciones sin fines de lucro) are in charge of interactions with administration and compliance with regulations.
The employees will be informed of their rights by the Director when hired by the Foundation Amazonia Viva, in accordance with legal framework for worker rights (described in appendix)

G4.5. Assessment of Risk to Worker's Safety and Plan to Communicate and Minimize Risks

The risks to worker's safety are identified and rated in the table below. Mitigation processes implemented by the project are also described in the table below

Generaly speaking, safety guidelines will be formulated to address risks that endanger worker health. The Project Implementation team will review worker risks and mitigation strategies annually to ensure risks are minimized. Often disadvantaged groups become associated with jobs of greater health risk. Special attention will be given to make sure that AMAZONIA VIVA foundation workgroups will be from diverse backgrounds and that knowledge of any risk associated with project employment is understood by all means possible.

Table 26 : List of risks to workers safety and mitigation activities

Risk	Description	Risk occurrence	Risk level	Risk mitigation practice
Falling in water / Drowning	Most of the transports are completed in boat on the river. In case of heavy rainfalls, water flow can become strong and river agitated.	Low - only in few places and in strong rain events	Medium - if falling in water, there is little risk for drowning except in very few agitated places	- The project ensures workers can reasonably swim - The project ensures that The boats for workers transportation contain lifejackets and that workers wear them in bad river conditions - The project ensures that workers don't take the boat whenever there are severe water conditions
Miscelaneous injuries using tools in the field	While doing field visits, inventories, trainigns on agroforestry techniques, pruning, thinning, there is a risk of accidents while using pruning /thinning/inventory tools in the field. There is very limited use of chainsws as harvesting is not part of the project activities.	Low	Low - Injuries remain in most cases benign (almost no use of chainsaws, only clippers, shears , or machetes)	- The project ensures that workers wear gloves while manipulating chainsaws. - The project ensures that workers are trained on safety procedures while pruning /thinning
Insects and snakes bites	While doing deep field inventories in the forest, risk of insect / snakes bites	- Medium/High for insects bites - Low for snakes	- Low for insects bites - benign - Medium-High for snakes	- The project ensures that all workers wear rubber boots and closed pants and shirts for inventories/ patrolling in the forests - The project ensures that all workers are trined on direct reactions in case of snakes bites
Driving accidents	Road accidents while driving to communities	Low - very few communities to be accessed by motored vehicles	- Low; if transport by car - Medium; if driving motorbikes	- The project ensures that all motored vehicles used for long drives (especially going to northern communities) are well maintined and that drivers are well acquainted to long and mountain drives - The project ensures that all personal motorcycles are maintained

G4.6. Financial Health of Implementing Organization

The project is being jointly implemented by Pur Projet and the Amazonia Viva Foundation, whose main members are Acopagro and Oro Verde cooperatives.

Pur Projet is a private organization, based in Paris and attracts donor funding and carbon finance funds. Currently, Pur Projet implements over 15 carbon offset and community forestry projects in 11 countries, with offices in France and the US, using multi-dimensional approaches to enhance the capacity of individuals, organizations, networks, and communities to deliver environmental services and fair trade and organic products, and increase learning in four key sectors: fight against climate change, community-based natural resource management; improving livelihoods; civil society awareness on sustainability. These programs generally entail institutional strengthening, technical assistance and training for national and grassroots organizations, as well as management of grant funds on behalf of donors and the private sector.

Project Proponent has as evidence its audited financial accounts of 2009, 2010, and 2011, to prove that Pur Projet has callable funds to cover more than 50% of cash-out from the date of validation to the project break-even point in 2015. Refer to document “Financial situation Pur Projet 2012.pdf” in appendix for explanations.
Cash-out from project validation date to project break-even point is 1 070 000 €. As of December 2011, Pur Projet had 753 000€ in current assets, 320 332 € as treasury and 409 956 € in advances and payments in accounts receivable. Since then, additional large contracts (500 000€, 300 000€, etc.) have been signed with clients, increasing available of resources. Activity is cash flow positive, clients paying in advance for the services rendered, so the financial situation of the company is very strong in terms of cash flow.
Pur Projet is fully self-funded since its start, by a large portfolio of clients (more than 70), among others multinationals like Nestle, Procter and Gamble, Unilever, Vinci, Chanel, Clarins, Carrefour,.. These clients are committed for 2 to 3 years commitment plans, which give good visibility on expected sales for the coming years and secure projects and activities. Pur Projet has already more than 800 000 euros of future expected revenues for 2013 by these clients.
Pur Projet is a fast growing and profitable company with provisions and financial reserves built up precisely to be able to meet an eventual default in the project. Since its start in 2008, Pur Projet has been profitable and its turnover grew from 500 K Euros in 2009 to 1.35 million euros in 2011, and expected to be 2.1 million euros in 2012. Fixed costs are very limited, and the direct approach to the projects allows getting good margin levels. Pur Projet develops projects directly sold to clients, and this absence of intermediaries allows a good strategic positioning on the market, with competitive prices for clients, significant returns for farmers and good margin levels for Pure Project.
Pur Projet has no debt and is fully self-funded by carbon sales.
Moreover, Pur Projet has a strict policy in provision making for future risks. As financial accounts show, the company had already provisioned 351 k€ as of end of 2011.
On the whole, the Pur Projet has a very cautious financial management policy and reinvests 100 % of net result in reserves as a company policy. Objective is to grow the financial reserves of the company, to secure partnerships and projects and leverage with other external financial partners to build up projects and duplicate them.

ACOPAGRO is an agricultural cooperative with over 10 years experience in the export of cocoa and 2000 active members. The organization is FLO and Organic certified (standards EU et NOP) and is very successful, both on its commercials activities (ACOPAGRO has become in ten years Peru’s first cocoa exporter) as well as towards its compliance to fair trade principles. ACOPAGRO can be considered as a model organization and has been certified under Alter Eco Gold Standards in 2009 by SGS.

Its mission is to build empowered communities that give people an opportunity for a better life. ACOPAGRO does this by strengthening the capacity of farmers to be good products providers. ACOPAGRO represents its stakeholders, network with others for learning and knowledge sharing, and advocate for social, economic and environmental justice. Interdependence, responsible stewardship, inclusion of vulnerable groups, and respect for local ownership and knowledge are core values across all of the programs both of Pur Projet and ACOPAGRO.

G5. Legal Status and Property Rights

G5.1. List of Relevant Laws and Assurance of Compliance

The proposed project activities are all within the existing national and regional legal framework of the Government of Peru.

The project area is constituted by the concessions for conservation attributed for 40 years by San Martin Regional Government for conservation activities, in accordance with the legal framework. The Regional Government authority, as attributor of the concessions, warrants the respect of the legal framework.

All project activities are implemented in the framework of - and in accordance with - the required Management Plans of the Concessions for conservation, approved by the San Martin Regional Government for periods of 5 years. In particular, the regional authority (Autoridad Regional Ambiental) approves the concessions Management Plans making sure that legal framework is respected.

The management of concessions for conservation falls into the legal framework constituted by the laws described in appendix, in particular the following laws : Ley General del Ambiente (ley Nº 28611), Ley orgánica de Aprovechamiento sostenible de los Recursos naturales (ley Nº 26821), Ley forestal y de Fauna Silvestre y su Reglamento (D. Leg.Nº1090), Ley de Áreas Naturales Protegidas (Ley Nº 26834).

Additionally, the Regional Environment Authority (ARA: Autoridad Regional Ambiental) of the San Martin Regional Government, in charge of the attribution and supervision of areas for conservations, has specifically approved the Biocorredor Martin Sagrado project, recognizing officially (supporting evidence available) that the project:
- is operated in accordance with Peruvian national and regional legal framework
- does not threaten the existence of high value species
- has a positive impact on the environment and ensures its sustainability

Moreover, the development of the Biocorredor Martin Sagrado project is development in the context of the REDD development initiative in San Martin Region. Pur Projet and the Fundacion Amazonia Viva participate actively to the regional working group on REDD projects and regulations, called the Mesa REDD, created by the regional government and in coordination with the Ministry of Environment, and which defines the conditions for the development of mixed private / public REDD projects . Pur Projet has presented the project in front of the participants of the Mesa REDD; the project Biocorredor Martin Sagrado falls into the framework of REDD project developments in San Martin Region.

Finally, the project will not encroach uninvited on private property, community property, or any other government property. Together, the cooperative ACOPAGRO, the Association APROBOC and the Association APAHUI have land tenure through concessions for conservation for the Project area, 303 699 hectares.

A list of relevant laws and regulatory framework is available for consultation.

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.

Pur Projet and the Amazonia Viva Foundation are members of the regional Mesa Redd San Martin, as REDD project developer in the San Martin Region recognized by the regional government. Pur Projet has been active for 5 years in San Martin Region with reforestation programs, and has the support and approval of the regional government for the Reforestation and REDD programs developed in the region.

See section 5.1 above.

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

The project will not encroach uninvited on private property, community property, or any other government property, as the project area was before an unused area owned by the government. The cooperative ACOPAGRO, the Dos de Mayo and APAHUI Associations have or are in the process of obtaining consessions for conservation purproses from regional government, for the Project area of 295 654 hectares.

Although they don't legally have any rights on the land, the communities living inside the project area (Canaan, La Morada, Anazco Pueblo) were consulted and gave their free prior informed consent for the project (documents available on demand).

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 activities will not involve the resettlement of any communities or households, since project goals include stopping settlements before they happen. Resettlement is not a component of the project design nor would it be acceptable, their participation in land-use planning is essential.

None of the project activities requires any relocation, voluntary or involuntary. However, due to the high pressure from migration into the San Martin Province, the project must be ready to respond to pressure from future migrants to encroach in the area. The project team is already conducting diagnostic studies to better understand in-migration patterns and drivers in the project area. The project team will organize a regular dialogue between the project communities and migrant communities in each area to develop natural resource management plans, as well as guidelines and regulations covering land-use allocation. Project benefits will also target local migrant communities where feasible, to ensure incentives are in place to stabilize and guide land-use and land-use change in the project area and leakage belt.

The formulation of clear land use plans with large format maps posted in public places will clarify tenure status for land in the project area. This will enable to explain new land and forest policies to migrants visiting the area. As the tenure situation is publicly and transparently clarified, word-of-mouth communications will inform prospective migrants and slow migration rates into the area.

G5.4. Identification and Mitigation of Illegal Activities

This project is designed to combat all illegal activities within the project boundary. The most common illegal activities are illegal logging, fires, and agricultural encroachment.

Cooperation between local communities, police, and Forestry Administration staff and the distribution of equipment to aid in patrols should be able to reduce 90% of deforestation associated with illegal logging. Frequent patrols will eventually dissuade illegal loggers from continuing their operations in the project area.

Intentional fires are used to "clean the land" and are often started by hunters to attract game to new shoots to feed. The clearing of land by fire severely harms the forest ecosystem and often is the first step toward agriculture encroachment. Intensified agriculture will help mitigate agriculture encroachment in forested areas. Local farmers will be trained to improve efficiency and give priority to permanent cultures (like coffee and cocoa) instead of moving to new land.

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

The Asociacion Dos de Mayo, ACOPAGRO, and APAHUI possess or are in the process of getting the legal concessions for conservation attributed by the government, which ensure the explicit and uncontested legal tenure to the local communities as well as the land management and carbon rights.

An agreement signed between each concessionaire (Asociacion Dos de Mayo, ACOPAGRO, APAHUI), and Pur Projet stipulates that the concessionaire, owner of the carbon rights, transfer the carbon credits to Pur Projet for distribution along the project development.

G6. Adaptive Management for Sustainability

G6.1. Design of management actions and monitoring programs

The project will use different sources to periodically collect reliable information as a technical support tool for decision making, to facilitate the adaptive management of the project.

The ACOPAGRO cooperative provides its own social monitoring. The efforts in the social area will be controlled through annual surveys, that will be directly conducted with the communities, in order to have continuous feedback evaluation.

The monitoring program will be performed by comparing the data raised periodically and the initial conditions of the Martin Sagrado project, which will be mapped and identified in the annual project report, through satellite images and field studies.

The land use area monitoring will be done with remote sensing methods, using images of medium resolution, generated in partnership with Planete Action. Associated with this, the monitoring program aims to involve the communities in mapping the threatened areas, identifying the risks and threats to which these areas are subjected. The large scale monitoring will be done through satellite images made available by Spot Image.

There is also a special monitoring report in order to ensure that the efforts of biodiversity conservation and sustainable use of the natural resources are being effective. The information is collected with a form that covers different key themes for evaluation, and completed by technicians connected directly (local team) or indirectly (institutional managers and co-managers) to the Martin Sagrado project implementation.

All of this reliable data that is collected and documented will be used as a technical support tool for decision making in order to improve project outcomes, and to adapt the project according to the actual needs and reality. These decisions will be made during the annual CFMC meeting to review the Activity Plan. On these occasions, the design of the monitoring plan will be analyzed according to its efficiency in generating reliable feedback and all the necessary inormation. Plan or management actions are identified, a corrective action will be designed and, if needed, discussed with the CFMC.

G6.2. Management plan for documenting decisions, actions and outcomes and for sharing this information with others within the project team

In order to avoid the loss of information, ACOPAGRO and Pur Projet will adopt a project implementation process in which annual reports will be prepared by every monitoring program and any corrective actions (i.e., to resolve conflicts or apply suggestions) taken by the team will be documented immediately following the execution. Every member of the project will be aware of how to document the actions taken

in the project and how to forward it to the project coordinator, who will keep track of this information and use it when necessary.

All these documents can be consulted at any time by anyone, if necessary. The most relevant information will be released to everyone involved in the project implementation during the project meetings or by mail.

G6.3. Flexibility of the project design to accommodate potential changes

The project adopts an adaptive management approach that is a structured and interactive process for decision making in the face of uncertainty. The objective is to reduce uncertainty over time through systematic monitoring. This system is useful in the definition of the operational objectives that serve to measure the project success, the effectiveness of the extension work and the project's contribution to positive change. The system allows lessons learned to be integrated into the project and into the manner in which the management team operates. The improvement in the quality of the project will be obtained using an adaptive management approach.

ACOPAGRO's experience in implementing a System of Monitoring Information for Fair Trade, Organic and reforestation activities will be very useful.

G6.4. Early commitment to the long-term sustainability of project benefits once initial project funding expires

Through a mechanism of payments for environmental services, the project seeks to provide value for forest conservation. Considering that the project aims at preventing emissions of at least 20 million tons of CO2 into the atmosphere over 40 years, and more than 6,8 million tons of CO2 over the first 10 years, there is a considerable potential for long-term project sustainability. Based on the current contract signed by ACOPAGRO and Pur Projet, Pur Projet will purchase the REDD credits generated by the Martin Sagrado Project at a price not less than US$ 1 per ton of CO2. Therefore, considering only the minimum price of US$ 1, the Martin Sagrado project is expected to generate more than US$ 6,8 million in the first 10 years; and more than US$ 20 million by 2050 through the sale of REDD carbon credits generated in the crediting areas. The base price for the initial carbon credits will be negotiated, to guarantee the financial sustainability that the project requires to achieve its environmental and social objectives.

It is worth noting that the expected resources from the REDD financial mechanism have not yet been generated; the investor partners involved in the implementation of the Martin Sagrado project, through partnerships with Pur Projet, will guarantee the financial support necessary for the effective implementation of the project's planned activities related to forest conservation and sustainable development.

The initial invested fund will be partiality used for community capacity building to generate income through sustainable business. Ecological activities already performed by community members will be amplified and improved in quality and efficiency, allowing the generation of income.

Community organization and business training will be combined to improve the local capacity in forest management and forest product extraction. Research and development of new technologies will allow for innovation in the quality and types of products local communities produce.

Furthermore, market development activities will be undertaken to improve market access. This combination should enhance the production of forest products from the local communities involved in the project.

G7. Knowledge Dissemination

G7.1. How the relevant or applicable lessons learned will be documented.

All the activities developed by Martin Sagrado Project participants related to the protected areas in the are documented through written reports, including activities such as awareness raising, expeditions for inventories, community meetings, training workshops, zoning workshops, management planning workshops and land use mapping workshops.

This documentation method will also be applied to all the activities to be implemented within the scope of the Martin Sagrado project. All of these reports will be made available on the Internet on Pur Projet website.

G7.2. How this information will be disseminated in order to encourage replication of successful practices

Examples include undertaking and disseminating research that has wide- reaching applications, holding training workshops for community members from other locations, promoting “farmer to farmer” knowledge-transfer activities, linking to regional databases and working with interested academic, corporate, governmental or non-governmental organizations to replicate successful project activities.

The dissemination of general information provided by the project will be achieved through the participation of team members in scientific and general events, both nationally and internationally, related to environmental conservation, climate, and sustainable development.

Furthermore, the project will develop a series of pamphlets, brochures and reports to document and disseminate the lessons learned by the project inside and outside the project boundaries. Other dissemination activities include making presentations at schools, universities and promotional events. The team will also be involved in exchange programs in which communities and local stakeholders participate, allowing the successful replication of project activities elsewhere.

The Martin Sagrado project will promote internal workshops to exchange technical information and experiences among the communities within the project area and also among communities in other protected areas.

The documentation and reporting of the project activities and lessons learned through prior experience in other protected areas in the San Martin region will be the basis for the continual improvement of the processes and methods that will be applied in the management of this project and others that will be created in the future. The exchange of experiences with similar initiatives will also be important for improving the concepts, processes and methods used.

The project’s knowledge dissemination to the community has already begun, with activities such as workshops for introducing the project and discussing climate change issues.


CLIMATE
SECTION

IV. CLIMATE SECTION

CL1. Net Positive Climate Impacts

CL1.1. Net Change in Carbon Stocks due to Project Activities

The calculation of net change in carbon stocks due to project activities is conducted according to VCS VM0015 methodology wich was used for the VCS validation of the project.

Decrease in carbon stocks due to planned activities

There will be no decrease in carbon stocks due to planned activities in project scenario : Most of the project activities will be conducted In the leakage belt with the communities in the buffer area of the project area. Activities conducted inside the project area will be scientific studies, patrolling, demarcation, which, ecotourism, which do not require infrastructure or significant intervention in the forest. No timber harvesting, charcoal production, nor fuelwood collection is planned inside the project area.

Increase of carbon stocks due to planned activities

Forest in the project area is old-growth primary forest where carbon stocks are already at their optimal level at maturity. No increase in carbon stocks due to project activities is therefore expected. Anyhow, it Is conservative not to consider potential carbon stocks increases in project scenario.

Unavoidable unplanned deforestation

- Optimal effectiveness index:

To assess overall effectiveness of project to stop deforestation, the impact of each project activity category on each of the deforestation threats was assessed, based on the activity plans, the feasibility of Implementation and the challenges from the field. Refer to detailed description of each activity category in section 1.8.3 for more details.

This analysis leads both to the calculation of an overall effectiveness index of the project on each of the threats, and the effectiveness of each of the activity category on the whole deforestation. Combining both dimensions and using the estimated contribution of each deforestation threat to the total deforestation (see section 2.2), we estimate a **total optimal Effectiveness Index of the project of 70%**

Table 27 : Relative reduction in the impact of each deforestation threat due to each project activities (Optimal effectiveness of activity a on deforestation threat d)

		Effectiveness index Relative reduction in the impact of driver due to activities (%)								
Deforestation threats	Relative importance of driver to total deforestation (%)	Legal	Control & Surveillance	Sensibilization & communication	Non Timber forest valuation	Scientific & Inventory	Renewable Energy	Reforestation in agroforestry models	Coordination, Expansion & Transmission	Total
1. Conversion to croplands, pastures and housing	70%	15%	15%	10%	15%	5%		10%		70%
2. Conversion to settlements / infrastructure (Roads, water and electricity)	15%	15%	10%	20%		5%	5%		15%	70%
3. Selective logging of high-value species for commercial sales	10%		30%	20%	15%	5%		5%		75%
4. Timber harvesting for local use (housing and infrastructures)	1%			30%			5%	5%	10%	50%
5. Fuelwood gathering	1%			15%			20%	10%	5%	50%
6. Uncontrolled fires	2%		30%	40%					20%	90%
7. Intentional fires (Paths opening and fires for hunting)	1%		30%	15%	30%	5%			10%	90%
8. Mining and Hydrocarbon activities encroachment	0%	40%			40%				20%	100%
9. Economic land concession (timber and agriculture)	0%	50%			50%					100%
Effectiveness of activity on total deforestation		12,8%	15,9%	13,4%	12,3%	4,8%	1,0%	7,7%	2,9%	70,7%

- Adoption rate

Due to various causes such as project timing, availability of funding, necessity of preliminary work to be completed before starting an activity, etc., all activities will not reach their optimal effectiveness in the first year. The relative effectiveness refers to the effectiveness relative to what is maximally achievable (optimal effectiveness) given the project's conditions, but may be different from this optimum due to the reasons listed above. In other words, the relative effectiveness will always be 100% at some point during the crediting period, regardless of the absolute effectiveness of the activity in reducing deforestation.

The increase of the relative effectiveness over time was estimated based on progressive adoption of the project by the communities, length of bureaucratic procedures, local knowledge of field conditions

1/ Legal

Impact of legal activities will be maximal after all concessions for conservation planned or wished by the communities will be attributed by the government. This will allow the communities to enforce legal control, demarcate the area, and control migration and Illegal logging. 60% of the optimal effectiveness is estimated to be reached in the 3rd year when the status of the 3 concessions constituting the project area is legally defined. Within two more years, the other envisioned concessions for conservation in the leakage belt will be attributed by the government, and legal interventions will be possible in the whole leakage management area.

2/ Control and surveillance
The progressive increase in effectiveness depends on the progressive adoption of the project by the communities in all regions around the project area. Some communities have been involved earlier and are already implicated in the control & surveillance activities. Control and patrolling work requires the construction of small Infrastructure (checkpoints) at the entrance of the project area, and demarcation fo project area, which can take several months.

3/ Sensibilization & Communication
Most of the communities have known Pur Projet and the project's idea and objectives for a long time (previous presence in the area with a reforestation project In agroforestry systems). Some communities have therefore been Implicated, empowered, trained since project start. This process will progressively replicate to all communities, especially after year 3 in which a comprehensive education, training plan for the first ten years of the project has been decided and started. Still, it is estimated that it will take 5 to 6 years so that all communities involved are fully aware of the conservation stakes.

4/ Non-Timber Valuation
The impact of this activity will be progressively reached as more and increasingly diverse alternative economic activities will be implemented in the communities. Project has started from the beginning with seeds collection and nursery, botanical garden, and is now expanding with more activities (bee heaving, fish breeding, essential oils, medicinal products, etc.). 5 to 6 years will be needed to have complete sustainable product chains.

5/ Scientific and inventory
Some biodiversity, biomass inventories and socio-economic surveys have been completed since project start to create a baseline. However, effectiveness of scientific activities will be optimal when ongoing monitoring procedures will be fully implemented.

6/ Renewable energy
Optimal effectiveness will be progressively reached as more community members will get equipped with solar panels/lamps, improved cookstoves. Plan is to equip all voluntary people within 6 years.

7/ Reforestation in agroforestry models
Although this activity was started since the beginning of the project (and even before since 2008 In the zone), benefits and effectiveness will be progressive as the trees grow and bring benefits for crops yields, soil regeneration, extra fuelwood, revenues from timber, etc.

8/ Coordination, Expansion, and transmission
Implication, training, and smooth cooperation between all stakeholders (not only the communities, but also government institutions, native communities, universities, etc) implies a progressive learning curve.
Optimal emancipation and empowerment of the communities to manage the interactions at all levels is estimated to be reached after 6 years.

Table 28 : Evolution of relative effectiveness of each activity over time

Adoption rate : Relative effectiveness of activity									
Project Year	Calendar Year	Legal	Control & Surveillance	Sensibilization & communication	Non Timber forest valuation	Scientific & Inventory	Renewable Energy	Reforestation in agroforestry models	Coordination, Expansion & Transmission
0	2010	10%	0%	10%	0%	10%	0%	10%	10%
1	2011	30%	10%	30%	20%	20%	20%	20%	30%
2	2012	60%	40%	50%	40%	20%	20%	30%	50%
3	2013	80%	80%	70%	60%	40%	40%	40%	70%
4	2014	100%	100%	90%	80%	80%	80%	50%	90%
5	2015	100%	100%	100%	100%	100%	100%	70%	100%
6	2016	100%	100%	100%	100%	100%	100%	90%	100%
7	2017	100%	100%	100%	100%	100%	100%	100%	100%
8	2018	100%	100%	100%	100%	100%	100%	100%	100%
9	2019	100%	100%	100%	100%	100%	100%	100%	100%
10	2020	100%	100%	100%	100%	100%	100%	100%	100%
>10	After 2020	100%	100%	100%	100%	100%	100%	100%	100%

- Dynamic effectiveness impact and estimation of carbon stock changes due to unavoidable unplanned deforestation

Applying the adoption rates of each activity to each activity's optimal effectiveness index, we get the following evolution for the total project effectiveness index, from 4% in year 0 to **70% (optimal index) after 7 years**

The annual carbon stock changes due to unavoidable unplanned deforestation correspond to the "non-effective" part of the activity in the given year.

As a result, the following table shows the effectiveness index over time, and the ex-ante estimation of total annual carbon stock changes in the project scenario and in the project area

Table 29 : Effectiveness index and total ex-ante estimated annual and cumulative carbon stock changes in the project area

Project Year	Calendar Year	Baseline scenario		Project scenario		
		Annual baseline carbon stock change (ΔCBSLPAt)	Cumulative Annual baseline carbon stock change (ΔCBSLPA)	Effectiveness Index	Net carbon stock change - project scenario (ΔCPSPAt)	Cumulative Net carbon stock change - project scenario (ΔCPSPA)
		t CO2e	*t CO2e*	%	*t CO2e*	*t CO2e*
0	2010			4,2%		
1	2011	-89 535	-89 535	15,5%	-75 697	-75 697
2	2012	-102 963	-192 498	30,5%	-71 524	-147 221
3	2013	-99 955	-292 453	47,1%	-52 886	-200 107
4	2014	-99 651	-392 104	61,6%	-38 241	-238 348
5	2015	-121 458	-513 561	68,4%	-38 375	-276 722
6	2016	-130 354	-643 916	69,9%	-39 191	-315 913
7	2017	-143 929	-787 844	70,7%	-42 171	-358 084
8	2018	-147 446	-935 290	70,7%	-43 202	-401 286
9	2019	-148 263	-1 083 553	70,7%	-43 441	-444 727
10	2020	-150 665	-1 234 218	70,7%	-44 145	-488 872
11	2021	-172 520	-1 406 738	70,7%	-50 548	-539 420
12	2022	-191 399	-1 598 137	70,7%	-56 080	-595 500
13	2023	-211 206	-1 809 343	70,7%	-61 883	-657 383
14	2024	-234 640	-2 043 983	70,7%	-68 749	-726 133
15	2025	-256 033	-2 300 015	70,7%	-75 018	-801 150
16	2026	-262 939	-2 562 954	70,7%	-77 041	-878 191
17	2027	-298 815	-2 861 769	70,7%	-87 553	-965 744
18	2028	-313 559	-3 175 328	70,7%	-91 873	-1 057 617
19	2029	-343 240	-3 518 569	70,7%	-100 569	-1 158 187
20	2030	-361 225	-3 879 793	70,7%	-105 839	-1 264 025
21	2031	-393 572	-4 273 366	70,7%	-115 317	-1 379 342
22	2032	-407 637	-4 681 002	70,7%	-119 438	-1 498 780
23	2033	-412 264	-5 093 266	70,7%	-120 793	-1 619 573
24	2034	-447 131	-5 540 397	70,7%	-131 009	-1 750 582
25	2035	-452 880	-5 993 277	70,7%	-132 694	-1 883 276
26	2036	-480 872	-6 474 149	70,7%	-140 896	-2 024 172
27	2037	-497 907	-6 972 057	70,7%	-145 887	-2 170 059
28	2038	-504 759	-7 476 815	70,7%	-147 894	-2 317 953
29	2039	-533 911	-8 010 727	70,7%	-156 436	-2 474 389
30	2040	-527 575	-8 538 302	70,7%	-154 580	-2 628 968
31	2041	-550 743	-9 089 045	70,7%	-161 368	-2 790 336
32	2042	-578 624	-9 667 669	70,7%	-169 537	-2 959 873
33	2043	-601 980	-10 269 649	70,7%	-176 380	-3 136 253
34	2044	-626 553	-10 896 202	70,7%	-183 580	-3 319 833
35	2045	-611 752	-11 507 954	70,7%	-179 243	-3 499 077
36	2046	-657 299	-12 165 253	70,7%	-192 589	-3 691 665
37	2047	-660 136	-12 825 389	70,7%	-193 420	-3 885 085
38	2048	-649 660	-13 475 050	70,7%	-190 350	-4 075 435
39	2049	-711 990	-14 187 039	70,7%	-208 613	-4 284 048
40	2050	-678 373	-14 865 413	70,7%	-198 763	-4 482 812

CL1.2. Net Change in Emissions of Non-CO2 Gases

The decrease in N2O and CH4 emissions due to reduced occurrence of fire in the project area are conservatively omitted. These are unlikely to account for more than 5% of the project's emission reductions. There is no other impact on the net changes in emissions of non-CO2 gases from the project.

There is no use whatsoever of any kind of chemical, pesticide or fertilizer, no methane emissions, or of any other GHG.

CL1.3. Other GHG Emissions from Project Activities

The following table sums up the GHG emissions included and excluded from the project. The selection was based on requirements of VCS VM0015 methodology and significance of GHG emissions

Table 30 : ***GHG emissions included or excluded within the boundary of the proposed REDD project activity***

Sources	Gas	Included?	Justification / Explanation
Biomass burning	CO_2	No	Excluded by the methodology
	CH_4	No	The project activities will precisely tend to decrease the fires to clear forests, leading to a reduction of biomass burning emissions. The exclusion of biomass burning emissions is therefore conservative (in line with methodology recommendation in 6.2) Leakage management activities such as reforestation in agroforestry models do not foster additional fires as the trees are planted in agroforestry systems or in already cleared areas.
	N_2O	No	Excluded by the methodology
Livestock emissions	CO_2	No	Excluded by the methodology
	CH_4	No	The project activities will not increase the number of livestock in the project and leakage areas. On the contrary, the project will tend to avoid the conversion of forest to pasture and promote activities alternative to livestock farming, therefore reducing the amount of livestock emissions. The exclusion of livestock emissions is therefore conservative.
	N_2O	No	

CL1.4. Net Climate Impact of the Project

The project has a positive net climate impact of about 10,4 million TCO2e that are generated during its 40 year duration before considering Leakage and Buffer.

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 don't 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.

CL2. Offsite Climate Impacts ("Leakage")

CL2.1. Determination of Leakage Type and Extent

Determination of Leakage Type

Leakage has been cited as being a major obstacle for the development of avoided deforestation projects. If the project is successfully able to reduce deforestation in the project areas, solely to be transferred to areas outside the project boundaries, this would not achieve the desired environmental benefits of the project. However, the mere potential for leakage does not necessarily negate the environmental integrity of an avoided deforestation project. Only in cases where potential leakage cannot be identified and quantified does leakage pose an insurmountable barrier. In addition, the leakage risk can be mitigated by incorporating leakage prevention activities into the project activities. Activities adopted to minimize leakage, and make communities less dependent on deforestation include agroforestry, introduction of fuel-efficient cookstove, solar panels, and non-timber forest activities (ecoturism, seeds extraction, botanical garden, etc). This project recognizes three different leakage types: (1) activity-shifting leakage within the leakage belt, immediately adjacent to the project sites (2) activity-shifting leakage outside of the leakage belt, and (3) market leakage.

• **Activity-shifting leakage versus market leakage**.

Activity-shifting leakage refers to the increased deforestation outside of the project area due to the project-related displacement of agents of deforestation from the project area. Market-effect leakage occurs when prices and market forces are affected by project activities, influencing the economic attractiveness of deforestation. This may occur, for example, by reducing the rate of illegal logging for commercial on-scale. The reduction in illegal logging can increase the price of illegally logged wood in the area, which will make illegal logging in other areas more attractive. A more in-depth review of leakage can be found in Aukland et al., 2003[31] . The conservative quantification of market leakage is based on coefficients set by the VCS AFOLU guidance.

• Activity-shifting leakage within the leakage belt vs. activity-shifting leakage outside of the leakage belt.

Some drivers are acting at a local level and are geographically constrained and will shift pressure from the project area to right outside of the project area, in an area that is referred to as the leakage belt. However, other drivers are geographically unconstrained and might shift pressures to areas far away outside of the project area. Examples of geographical constrained drivers are fuel-wood collection or collection of timber for local use. The range of action local agents of deforestation is constrained by the time it takes to move from a dwelling to the place of deforestation. Examples of geographical unconstrained drivers are oil exploration and migrant encroachment. Only activity shifting leakage within the leakage belt can be monitored. Activity-shifting leakage outside of the project area cannot be monitored as it can happen in completely different areas. As a consequence, loss of carbon credits from activity shifting leakage within the leakage belt can be estimated ex-ante but monitored and integrated ex-post for the calculation of the actual carbon credits. Activity shifting leakage outside of the leakage belt can only be conservatively estimated ex-ante using a factor approach and used in ex-post calculations. The assumptions made while assigning these factors must be monitored during the crediting period. Factors will be updated upon a validation of the baseline.

[31] Aukland, L., P.M. Costa, and S. Brown. 2003. A conceptual framework and its application for addressing leakage; the case of avoided deforestation. Climate Policy 3:123–136.

Extent of leakage belt

Biocorredor Martin Sagrado REDD+ Project falls within San Martin region in Peru. A jurisdictional REDD+ program is currently under preparation in San Martin. As the process could take time, Pur Project made the decision to develop a baseline scenario and an MRV system for Martin Sagrado project. Once available, jurisdictional results will have to be adopted, according to VCS Jurisdictional REDD+ Initiative. In the meanwhile and as results are not available yet, a leakage belt has to be defined. .

Leakage Belt (LB) corresponds to the geographical area surrounding or adjacent to the Project Area (PA) where agents of deforestation could displace their deforestation activities, outside of the Project Area (PA), due to project implementation.

LB has been defined analyzing agents' mobility, in accordance with the methodology (part 1.1.3, VM0015). Mobility of deforestation agents has been assessed through an integrated analysis of geographic information systems (GIS) and multi-criteria evaluation (MCE) (Guezo Fêdowidé, 2010). This type of analysis refers to decisions-making situations based on a multiple criteria analysis (Bensaid et al., 2007). First challenge was to identify factors (i.e. criteria) that may influence the mobility of deforestation agents from one place to another. For each criterion, a weighting hypothesis has been calculated. Multi criteria analysis enabled to identify areas surrounding PA where agents could displace their deforestation activities if they want to circumvent constraints that will result from project activities implementation.

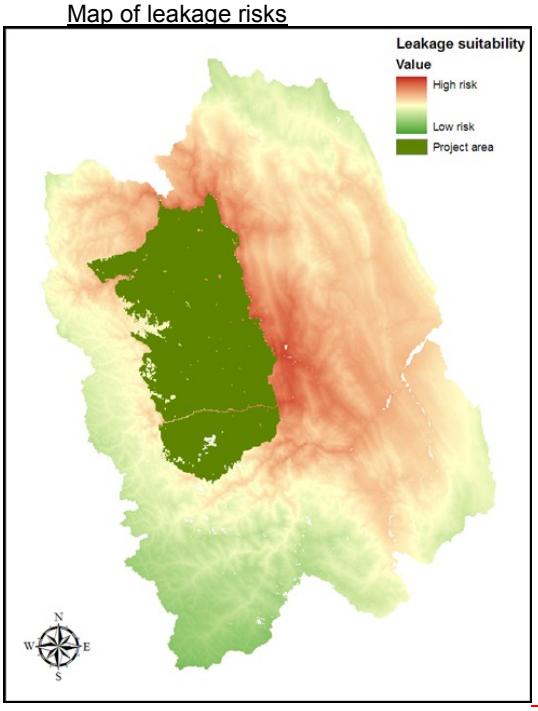
The criteria selected for the analysis were the following: Distance to Project Zone, Elevation, Distance to already cleared land, Distance to cities and villages, Distance to roads and tracks, Slope, Distance to rivers.

A maximum area must also be defined to define the leakage belt (LB) boundaries. According to the Avoided Deforestation Partners methodology (VM0007, VMD0007 v3.0), LB must at least equals 90% of PA. As there is not such an indication in VM0015, we used VMD0007 threshold and assumed that Martin Sagrado REDD Project LB should be at least 265,500 ha (i.e. 90% of 295,000 ha).
In order to increase homogeneity a filter has been applied to remove less than 100 hectares holes within LB. All those small patches have been included within LB.

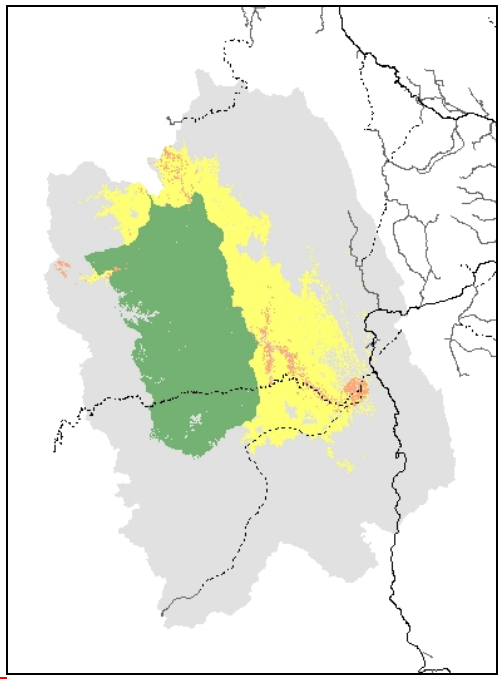
Finally, leakage management areas (non-forest area only) have been excluded from the leakage belt.

Figure 30 : Maps of leakage risks and leakage belt

Map of leakage risks



Map of leakage belt



The detailed process for leakage belt definition is available in appendix "Geographical Boundaries".

Expected leakage intensity

Leakage is expected to be low because of the presence around the project area of other protected areas or areas dedicated to conservation : to the South, the National Park Rio Abiseo, to the West, the concession for conservation Alto Huayabamba, to the North West, the conservation area of Leymebamba.

On top of that, accessibility is difficult in the region and it is hard for deforestation agents to move from one place to another (no roads, no paths, rugged terrain, etc.).

To the North (Province of Leymebamba, Mendoza area), communities are already settled and have deforested extensively in the past. It is therefore likely that additional deforestation will be low and not directly attributed to the project. To the East (left bank of Huayabamba), most of the area is already leased as forestry concessions. Commercial loggers are therefore already present in the area and additional deforestation is likely not to be attributed to the project activities but part of the baseline scenario really.

Still, to the North, and to the East, the leakage area was selected according to methodology described above to encompass all accessible forests around the project areas that could be under pressure during the project's lifetime.

Baseline scenario in leakage belt

Ex-ante baseline assessment of deforestation in the leakage belt is completed using the methodolgoy described in G2.3 for projection of future deforestation / LU/LC changes, and for carbon stock changes for each transition class.

The results of baseline assessment of carbon stock changes in the leakage belt are shown in the following table

Table 31 : Baseline Carbon stock changes in the leakage belt

		Total annual baseline carbon stock change in the leakage belt (ΔCBSLLBt)			Total cumulative baseline carbon stock change in the leakage belt (CBSLLBt)		
Year	Project year	Initital forest classes	Final non-forest classes	TOTAL	Initital forest classes	Final non-forest classes	TOTAL
		Total Forest	Total Non-Forest		Total Forest	Total Non-Forest	
		t CO2e	*t CO2e*		*t CO2e*	*t CO2e*	*t CO2e*
2011	1	-2 050 619	24 269	**-2 026 350**	-2 050 619	24 269	**-2 026 350**
2012	2	-2 168 889	49 307	**-2 119 582**	-4 219 507	73 575	**-4 145 932**
2013	3	-2 230 915	74 493	**-2 156 421**	-6 450 422	148 069	**-6 302 353**
2014	4	-2 323 583	100 178	**-2 223 405**	-8 774 005	248 247	**-8 525 758**
2015	5	-2 386 240	125 949	**-2 260 292**	-11 160 245	374 196	**-10 786 049**
2016	6	-2 502 637	152 422	**-2 350 214**	-13 662 882	526 618	**-13 136 264**
2017	7	-2 521 189	178 550	**-2 342 639**	-16 184 071	705 168	**-15 478 903**
2018	8	-2 598 133	204 976	**-2 393 157**	-18 782 204	910 144	**-17 872 060**
2019	9	-2 678 451	231 726	**-2 446 725**	-21 460 656	1 141 870	**-20 318 786**
2020	10	-2 760 029	258 795	**-2 501 234**	-24 220 684	1 400 665	**-22 820 019**
2021	11	-2 814 593	262 187	**-2 552 406**	-27 035 277	1 662 852	**-25 372 426**
2022	12	-2 754 702	264 065	**-2 490 637**	-29 789 980	1 926 917	**-27 863 063**
2023	13	-2 735 314	265 557	**-2 469 757**	-32 525 294	2 192 474	**-30 332 820**
2024	14	-2 759 063	266 870	**-2 492 193**	-35 284 357	2 459 344	**-32 825 013**
2025	15	-2 771 152	268 180	**-2 502 972**	-38 055 509	2 727 524	**-35 327 985**
2026	16	-2 737 353	268 423	**-2 468 929**	-40 792 862	2 995 948	**-37 796 914**
2027	17	-2 763 214	269 350	**-2 493 865**	-43 556 076	3 265 297	**-40 290 779**
2028	18	-2 745 078	269 732	**-2 475 345**	-46 301 154	3 535 030	**-42 766 124**
2029	19	-2 724 475	269 642	**-2 454 832**	-49 025 629	3 804 672	**-45 220 956**
2030	20	-2 739 739	269 441	**-2 470 298**	-51 765 367	4 074 113	**-47 691 254**
2031	21	-2 726 620	268 595	**-2 458 025**	-54 491 987	4 342 708	**-50 149 279**
2032	22	-2 763 532	268 948	**-2 494 583**	-57 255 519	4 611 656	**-52 643 863**
2033	23	-2 747 835	269 382	**-2 478 454**	-60 003 354	4 881 038	**-55 122 316**
2034	24	-2 732 491	269 388	**-2 463 103**	-62 735 845	5 150 426	**-57 585 419**
2035	25	-2 720 621	269 260	**-2 451 361**	-65 456 466	5 419 686	**-60 036 780**
2036	26	-2 709 964	269 392	**-2 440 572**	-68 166 429	5 689 078	**-62 477 351**
2037	27	-2 711 222	269 282	**-2 441 940**	-70 877 652	5 958 360	**-64 919 291**
2038	28	-2 676 262	269 073	**-2 407 189**	-73 553 914	6 227 433	**-67 326 480**
2039	29	-2 666 969	268 887	**-2 398 083**	-76 220 883	6 496 320	**-69 724 563**
2040	30	-2 717 624	269 208	**-2 448 415**	-78 938 507	6 765 528	**-72 172 979**
2041	31	-2 631 586	268 586	**-2 363 000**	-81 570 093	7 034 115	**-74 535 978**
2042	32	-2 644 991	267 767	**-2 377 224**	-84 215 084	7 301 881	**-76 913 203**
2043	33	-2 665 556	267 382	**-2 398 174**	-86 880 640	7 569 264	**-79 311 376**
2044	34	-2 602 043	266 453	**-2 335 591**	-89 482 683	7 835 716	**-81 646 967**
2045	35	-2 638 656	266 110	**-2 372 545**	-92 121 339	8 101 827	**-84 019 512**
2046	36	-2 618 270	265 672	**-2 352 599**	-94 739 609	8 367 498	**-86 372 111**
2047	37	-2 621 303	265 224	**-2 356 078**	-97 360 912	8 632 723	**-88 728 189**
2048	38	-2 589 152	264 809	**-2 324 343**	-99 950 064	8 897 531	**-91 052 533**
2049	39	-2 561 157	264 233	**-2 296 924**	-102 511 221	9 161 764	**-93 349 456**
2050	40	-2 577 777	263 223	**-2 314 555**	-105 088 998	9 424 987	**-95 664 011**

Displacement leakage factor

The relative impact of leakage is quantified by the estimation of a displacement leakage factor, representing the percent of deforestation expected to be displaced outside of the project boundary.

To estimate the displacement leakage factor, a detailed analysis of the estimated leakage factor for each of the identified deforestation threats was completed:

1. Conversion to Croplands
The availability of arable land is typically less of a constraint than the availability of farm inputs or water. Agroforestry and improvements in agricultural efficiency will improve crop yields from existing agricultural land, preventing the need for further deforestation to create new land to grow crops. Also, development of non-timber forest activities bringing additional revenues will prevent the local populations to increase their agriculture activities for income purposes. Also, project participants will have approved binding forestry agreements preventing the expansion of croplands within the project areas. Still, it is expected that about 15% of the impacts of reducing the conversion to cropland within the project area will be annulled in the leakage area.

2. Conversion to Settlements
Project participants will have approved binding forestry agreements that prevent the clearing of forestland for the creation of new settlements. In addition participatory land use plans will reduce the accelerated deforestation from random conversion to settlements. Furthermore, improvements in infrastructure subsidized including water distribution and purification in existing settlements will reduce the need for settlement expansion. With these measures, it is estimated that 15% of the benefits from reducing the forest area for conversion to settlements will be cancelled due to increased conversion in the leakage area.

3. Selective logging for commercial sales
Illegal loggers denied access to the project areas by forest patrols will also shift the location of their logging operations to alternate locations outside of the project area. However, a lot of the forest outside of the project area have already suffered degradation from selective extraction of high value species in the past, especially in the areas designated by the ZEE as Permanent Production Forest areas. This will result in an estimated a 20% leakage cancellation rate.

4. Timber Harvesting for Local Use
The need for timber on a local level will not decrease as a result of project implementation. However, some timber can be harvested from areas undergoing reforestation as leakage management activities and by controlling the timber harvesting volumes. Therefore, a moderate 30% leakage cancellation rate is assumed. Since the timber is harvested for local use, leakage from this driver will be confined to the leakage belt.

5. Fuel-wood Gathering
Because of very limited population within the project boundary compared to the total area, even in the neighbouring communities, there should not be significant leakage. Moreover, the project will help the communities switch to more fuel-efficient cookstoves and solar energy, reducing the need for fuelwood. However, to remain conservative, we estimate a 20% leakage cancellation rate within the leakage area.

6. Uncontrolled fires
Uncontrolled fires are triggered by slash and burn practices in agriculture parcels outside of the project area. The project will not displace the effect of this fire (in the leakage belt, fires are also already occurring), but will target the source of the fires, trying to reduce the occurrence. There is no leakage for this driver.

7. Intentional Fires
Hunters denied access to the project areas by forest patrols will shift the location of their hunting grounds to alternate locations. The use of forest fires to concentrate and drive animals from forest cover will shift to the leakage belt, however it is not very much developed in the area as it is already closer to populations and availability of animals is low. This results in a 10% leakage cancellation rate.

8. Mining and Hydrocarbon activities encroachment
It is likely that oil and mining companies that are not able to explore and extract in the project area due to the legal registration of the project and its protection like via forest patrolling will search for other concessions elsewhere (mot likely outside the San Martin region). In addition, oil and mining companies are not geographically constrained as they operate at national or international level and can open new exploration frontiers in any other region. However, some further exploration could happen in the leakage belt. Therefore, an expected leakage of 30% is estimated.

9. Economic Land Concessions
Economic Land Concessions granted by the government will not be allowed within the project areas. However, a number of large ELCs will continue to be granted at the national level. Since the project design will have affected national policies to a certain extent, the effective cancelling rate is envisioned to be around 30% outside of the project area.

Multiplying the estimated leakage factor for each threat by the estimated contribution of each identified threat to total deforestation, we obtain a weighted average of **15 % which is the global Displacement Leakage Factor**

Table 32 : ***Summary of Leakage factor per deforestation threat and calculation of overall Displacement Leakage factor***

Deforestation threats	Relative importance of driver to total deforestation (%)	Displacement leakage factor (%)	Weighted Displacement leakage factor (%)
1. Conversion to croplands, pastures and housing	70%	15%	10,5%
2. Conversion to settlements / infrastructure (Roads, water and electricity)	15%	15%	2,3%
3. Selective logging of high-value species for commercial sales	10%	20%	2,0%
4. Timber harvesting for local use (housing and infrastructures)	1%	30%	0,3%
5. Fuelwood gathering	1%	20%	0,2%
6. Uncontrolled fires	2%	0%	0,0%
7. Intentional fires (Paths opening and fires for hunting)	1%	10%	0,1%
8. Mining and Hydrocarbon activities encroachment	0%	30%	0,0%
9. Economic land concession (timber and agriculture)	0%	30%	0,0%
Total			**15%**

As a result of the application of the leakage factor to net project impact in carbon stock in the project area under the scenario, the ex-ante estimation of the total leakage is the following:

Table 33 : ***Total leakage***

Project Year	Calendar Year	Project scenario
		Leakage (ΔCLKt)
		t CO2e
0	2010	
1	2011	-2 124
2	2012	-4 826
3	2013	-7 225
4	2014	-9 426
5	2015	-12 753
6	2016	-13 994
7	2017	-15 620
8	2018	-16 001
9	2019	-16 090
10	2020	-16 351
11	2021	-18 723
12	2022	-20 771
13	2023	-22 921
14	2024	-25 464
15	2025	-27 786
16	2026	-28 535
17	2027	-32 429
18	2028	-34 029
19	2029	-37 250
20	2030	-39 202
21	2031	-42 712
22	2032	-44 239
23	2033	-44 741
24	2034	-48 525
25	2035	-49 149
26	2036	-52 186
27	2037	-54 035
28	2038	-54 779
29	2039	-57 942
30	2040	-57 255
31	2041	-59 769
32	2042	-62 795
33	2043	-65 330
34	2044	-67 996
35	2045	-66 390
36	2046	-71 333
37	2047	-71 641
38	2048	-70 504
39	2049	-77 268
40	2050	-73 620

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

Leakage is mitigated by implementing specific project activities that either increase livelihoods or reduce the need for land, or sales of timber related activities.

Project activities provide new livelihoods and will therefore reduce the need for local communities to deforest land for subsistence agriculture. Such project activities include participatory measurement and monitoring, forest patrolling, construction of walkways, assisted natural regeneration and enrichment planting and technical and financial assistance to develop agro-forestry and agro-ecological practices.

Project activities will increase the efficiency of already-deforested land for producing crops or providing settlement area by organizing stakeholder-driven Participatory Land Use Plans, and agricultural organic intensification.

Project activities will decrease the use of wood from the forest by increasing the efficiency of wood-stoves and solar panel within the renewable energy plan.

CL2.3. Subtracting Project related Leakage from Carbon Benefits

The overall net GHG emission reductions in project scenario is computed substractin leakage computed in section CL2 from Net carbon stock changes computed in section CL1.
The resuts are presented inthe following table.

Additionally, the table includes the calculation of expected number of VCUs that can be generated from the project, considering the VCS buffer. The Risk Assessment completedfro VCS validation with the VCS AFOLU Non-Permanence Risk Tool shows a Risk Factor of 10% for the project.

The overall ex-ante net GHG emissions reductions and number of VCUs are summarized in the following table.

The project is estimated (ex-ante) to contribute to GHG emissions reductions for 8 788 871 tCO2e , and to generate 7 750 611 VCUs over the 40 years of the crediting period

Table 34 : Summary of ex-ante net GHG emissions reductions and VCUs

Project Year	Calendar Year	Baseline scenario	Project scenario						
		Annual baseline carbon stock change (ΔCBSLPAt)	Annual carbon stock change - project scenario (ΔCPSPAt)	Leakage (ΔCLKt)	Annual Total net GHG emissions reductions (ΔREDDt)	Cumulative Total net GHG emissions reductions (ΔREDD)	Buffer VCS (VBCt)	Annual number of VCUs (VCUt)	Cumulative number of VCUs (VCU)
		t CO2e	*t CO2e*	*t CO2e*	*t CO2e*	*t CO2e*	*t CO2e*	*t CO2e*	*t CO2e*
							10%		
0	2010								
1	2011	-89 535	-75 697	-2 124	11 714	11 714	-1 384	10 330	10 330
2	2012	-102 963	-71 524	-4 826	26 614	38 327	-3 144	23 470	33 800
3	2013	-99 955	-52 886	-7 225	39 844	78 171	-4 707	35 137	68 936
4	2014	-99 651	-38 241	-9 426	51 983	130 155	-6 141	45 842	114 779
5	2015	-121 458	-38 375	-12 753	70 330	200 484	-8 308	62 021	176 800
6	2016	-130 354	-39 191	-13 994	77 170	277 654	-9 116	68 053	244 854
7	2017	-143 929	-42 171	-15 620	86 138	363 792	-10 176	75 962	320 816
8	2018	-147 446	-43 202	-16 001	88 243	452 035	-10 424	77 818	398 634
9	2019	-148 263	-43 441	-16 090	88 732	540 766	-10 482	78 250	476 884
10	2020	-150 665	-44 145	-16 351	90 169	630 935	-10 652	79 517	556 401
11	2021	-172 520	-50 548	-18 723	103 249	734 185	-12 197	91 052	647 453
12	2022	-191 399	-56 080	-20 771	114 548	848 732	-13 532	101 016	748 468
13	2023	-211 206	-61 883	-22 921	126 402	975 134	-14 932	111 469	859 938
14	2024	-234 640	-68 749	-25 464	140 426	1 115 560	-16 589	123 837	983 775
15	2025	-256 033	-75 018	-27 786	153 229	1 268 789	-18 102	135 128	1 118 903
16	2026	-262 939	-77 041	-28 535	157 362	1 426 151	-18 590	138 773	1 257 675
17	2027	-298 815	-87 553	-32 429	178 834	1 604 985	-21 126	157 707	1 415 383
18	2028	-313 559	-91 873	-34 029	187 657	1 792 642	-22 169	165 489	1 580 871
19	2029	-343 240	-100 569	-37 250	205 421	1 998 063	-24 267	181 154	1 762 025
20	2030	-361 225	-105 839	-39 202	216 184	2 214 248	-25 539	190 646	1 952 671
21	2031	-393 572	-115 317	-42 712	235 543	2 449 791	-27 826	207 718	2 160 389
22	2032	-407 637	-119 438	-44 239	243 961	2 693 751	-28 820	215 141	2 375 529
23	2033	-412 264	-120 793	-44 741	246 730	2 940 481	-29 147	217 583	2 593 112
24	2034	-447 131	-131 009	-48 525	267 597	3 208 078	-31 612	235 985	2 829 097
25	2035	-452 880	-132 694	-49 149	271 037	3 479 116	-32 019	239 019	3 068 116
26	2036	-480 872	-140 896	-52 186	287 790	3 766 906	-33 998	253 793	3 321 908
27	2037	-497 907	-145 887	-54 035	297 985	4 064 891	-35 202	262 783	3 584 692
28	2038	-504 759	-147 894	-54 779	302 086	4 366 977	-35 686	266 399	3 851 091
29	2039	-533 911	-156 436	-57 942	319 533	4 686 510	-37 748	281 785	4 132 876
30	2040	-527 575	-154 580	-57 255	315 741	5 002 251	-37 300	278 441	4 411 318
31	2041	-550 743	-161 368	-59 769	329 606	5 331 857	-38 938	290 669	4 701 986
32	2042	-578 624	-169 537	-62 795	346 292	5 678 150	-40 909	305 384	5 007 370
33	2043	-601 980	-176 380	-65 330	360 270	6 038 420	-42 560	317 710	5 325 080
34	2044	-626 553	-183 580	-67 996	374 976	6 413 396	-44 297	330 679	5 655 759
35	2045	-611 752	-179 243	-66 390	366 119	6 779 515	-43 251	322 868	5 978 627
36	2046	-657 299	-192 589	-71 333	393 377	7 172 892	-46 471	346 906	6 325 533
37	2047	-660 136	-193 420	-71 641	395 075	7 567 968	-46 672	348 404	6 673 937
38	2048	-649 660	-190 350	-70 504	388 806	7 956 773	-45 931	342 875	7 016 812
39	2049	-711 990	-208 613	-77 268	426 108	8 382 882	-50 338	375 771	7 392 583
40	2050	-678 373	-198 763	-73 620	405 990	8 788 871	-47 961	358 029	7 750 611

CL2.4. Inclusion of Non-CO2 Gases in Calculations

Non-CO2 emissions would be included if significant but there is no non-CO2 emissions generated by project activities. No fertilizer or pesticides are used, no methane emissions. These emissions are considered as nil. Refer to section CL1.3.

CL3. Climate Impact Monitoring

CL3.1. Plan for Selecting and Monitoring Carbon Pools

The following table contains a justification for which carbon pools were selected.

Table 35 : Carbon pools included or excluded within the boundary of the proposed REDD project activity

Carbon pools	Included / TBD[1] / Excluded	Justification / Explanation of choice
Above-ground	Tree: Included	Carbon stock change in this pool is always significant
	Non-tree: Included for non-forest post deforestation classes	This carbon pool is included only for post-deforestation non-forest classes (perennial crops such as cacao, orange, etc.). For initial forest classes, this carbon pool is not significant and has not been included in forest carbon stocks. This approach is conservative.
Below-ground	Included	Recommended for trees as it usually represents between 15% and 30% of the above-ground biomass.
Dead wood	Partly included	▪ Lying dead wood has not been included in forest classes based on field observations. ▪ Standing deadwood has been included in forest classes as it was easy to measure and looks significant (analysis showed that it is accounting for part of the stocks). Only above 5cm DBH standing deadwoods have been taken into consideration. In order to avoid overestimates, standing deadwood stocks have been divided by two. ▪ Both lying and standing deadwood are included in Lapeyre et al. (2004). ▪ It is conservative to consider those pools in post-deforestation classes and not in forest classes as they should not increase under baseline scenario. As a matter of fact, deforesting farmers use slash and burn practices which consumes almost all biomass, and they remove possible remaining burned logs, which would disturb the installation of their crops (cocoa, corn, etc). Dead wood is therefore not significant in post-deforestation classes.
Harvested wood products	Not Included	Not significant (see explanation below)
Litter	Not included	Not to be measured according to VCS Program Update of May 24th, 2010

Soil organic carbon	Not included	Not to be measured according to VCS Program Update of May 24th, 2010. It is conservative.
Fuel wood	Not included	Not significant (see explanation below)

Non-significance of harvested wood products:

- As described in the analysis of drivers and agents of deforestation, deforestation for selective extraction and commercial timber sales accounts for 10% of total deforestation.
- Of these 10%, below-ground biomass represents 20% and is not converted to wood-products, leaving a maximum of 8% of above-ground biomass potentially converted to wood-products. But only a fraction of above-ground biomass can be converted in long-term wood products; considering a biomass expansion factor of 1,5 for tropical deciduous species (IPCC GPG table 3A.1.10) and average loss in sawmills of 58% (source: INRA (Institut National pour la Recherche Agronomique) / Ecoinvent), this leaves 3,1% of total biomass that could potentially be converted to wood products.
- However, only trees with a minimum diameter of 25 cm are typically sold commercially or used in local constructions, smaller trees are left on the ground or burned. Average values from biomass inventories conducted in the project area indicate that 76% of total above-ground biomass is in trees with diameter larger than 25cm. This leaves 2.3% of total forest biomass potentially converted to wood products
- On top of that, only high value species are converted into wood products, which means loggers will clear some forest over a given area but only extract and sell the higher value species (caoba, tornillo, cedro, ishpingo..) which represent an estimated 20% of all biomass of trees above 25cm diameter, i.e. 0,46% of total biomass deforested.
- Finally, a 10% loss can be reasonably estimated in the extraction and transport of the timber (complex extraction via rivers), which can be damaged, lost, or left degrading for a period of time.

This leaves an estimated 0,41% of total biomass deforested potentially going into long-lived wood products. According to VCS definition of “significant” carbon pools, **the harvested wood products are not a significant carbon pool.**

Non-significance of fuelwood:

- As described in the analysis of drivers and agents of deforestation, deforestation for fuelwood colletion is very low and accounts for 1% of total deforestation.
- Of these 1%, below-ground biomass represents 20% and is not converted to fuelwood, leaving a maximum of 0,8% of above-ground biomass potentially converted to fuelwood. But only a fraction of above-ground biomass willbe converted in fuelwood (branches and pieces of right dimension, no leaves); a percentage of 10% of the biomass can reasonably be estimated not to be transformed into fuelwood (leaves, big pieces).
- Finally, a 15% loss can be reasonably estimated in the logging and transport of the fuelwood, which can be damaged, lost, or left degrading for a period of time.

This leaves an estimated 0,62% of total biomass deforested potentially going into fuelwood. According to VCS definition of “significant” carbon pools, **fuelwood is not a significant carbon pool.**

CL3.2. Development of a Full Monitoring Plan

CL3.2.1. GHG removals monitoring

In accordance with VM00015 methodology and VCS AFOLU requirements, the monitoring plan includes two main tasks, and a third one at first verification only.

Task 0: At first verification, confirmation of project area boundaries

At the date of validation, the concession Montecristo (81055 hectares) has not been legally given from the government to APAHUI. As a result, only 73% of the project area is under control at time of validation.

In case the concession Montecristo does not become under control by the first verification, the following will be applied:

Spatial boundaries:

- The project area will be modified to exclude all forest area present in the boundaries of the concession Montecristo.
- The area within the boundaries of the concession Montecristo will be included in the leakage belt.
- The reference region will not be modified, as it will still match the requirements of the methodology.
- The leakage management area will not be modified, as the concession Montecristo does not encompass non-forest areas under control or potentially under control of the communities.

Baseline calculations:

- The projection of future deforestation completed at time of validation was completed for the whole reference region, so it will not be necessary to recomputed it.
- However, the results will be re-segmented according to the new project area, and the new leakage belt, to have the baseline data for each updated area (project area, leakage belt, reference region).

Monitoring of land-use and land-cover change:

- As described hereafter, the monitoring of land-use and lad-cover change will be completed for the whole reference region, so will not be impacted by the change of project area.
- The results will then be segmented according to the new project area, and the new leakage belt, to have the monitoring data for each updated area (project area, leakage belt, reference region).

Implementation of activities :

- In case the concession Montecristo does not become under control, it will not impact the implementation of most project activities, as most of the activities occur in the leakage management areas (non-forest populated areas) and the leakage management areas will not be modified.
- However, a certain number of activities will be slightly adapted:

Legal, control, patrolling: physical demarcation of the project area will follow the boundaries of the new project area, control points may be displaced closer to the updated boundary of the project area, patrolling circuits will be updated to control more specifically the boundaries of the project area.

Scientific : although scientific inventories and studies will still be conducted in the concession Montecristo, a stronger focus will be placed on the updated project area. Some scientific activities may be displaced from the concession Montecristo to the updated project area.

Task 1: Monitoring of carbon stock changes for periodical verifications

- Monitoring of project implementation

The implementation of project activities is decided and discussed on a continuous basis between the participating communities, the Fundacion Amazonia Viva, and the Project Proponent.

All records of project activities implemented are transferred from the Foundation Amazonia Viva to Pur Projet. The foundation transfers to the Project Proponent at least quarterly activity and economic reports of activities implemented (monthly in the first years), including pictures, testimonies, additional specific reports.
All material are kept both by the Fundacion Amazonia Viva and the Project Proponent in a digital way, organized by category of activities implemented, in accordance with project activities management plan.

- Monitoring of land-use and land-cover change

Monitoring of actual land-use and land-cover change will be done periodically at each VCS verification of the project, in one of the two ways:

- If Peru or San Martin Region have developed by then a jurisdictional program or approved MRV system, the project will use the MRV data generated by the jurisdictional program.

- In the contrary, the Project Proponent will contract GIS and remote sensing specialists, in the first place ONFI, technical partner of the project, to complete the Land-Use and Land-Cover change analysis since last verification/ monitoring. The procedures used will the exact same procedures and methodologies as for historical analysis for validation, as described in section 2.4.1, in order to ensure consistency with baseline completion.

Data collected will be the area of forest-land converted to non-forest land, per LULC change class, in the whole reference region.

Quality control : results of the analysis will be controlled by Pur Projet for consistency with local observed conditions and evolutions. Analysis results will also be cross-checked with potential results from other deforestation monitoring programs in the region of San Martin or at the national level.

Data will be archived by the Project Proponent in the project's digital data room, and will also be shared with- and archived by- the Fundacion Amazonia Viva.

- Monitoring of carbon stocks and non-CO2 emissions

Monitoring of potential carbon stock changes will only be necessary in case of catastrophic events. Otherwise, In accordance with Methodology VM00015 section 1.1.3 (no significant carbon stock decrease estimated in the ex-ante assessment), monitoring of carbon stocks is not mandatory and values measured for validation can be used throughout the baseline period.

- Monitoring of impact of natural disturbances and other catastrophic events

In case of natural disturbances and other catastrophic events occurring in the project area, field measurements of carbon stock per hectares in the affected area will be conducted within 3 months after the event. The measurements will be completed by the local project team along with local farmers, under the supervision of the Foundation Amazonia Viva, following the same biomass inventory protocol as for carbon stock measurements completed for validation.

Field data will be transferred to the project proponent for interpretation, quality control, and archiving. Consistency of data will be cross-checked against other literature sources for land-covers similar as the one after the event.

- Monitoring of leakage

Monitoring of leakage will be done periodically at each VCS verification of the project, in one of the two ways:

- If Peru or San Martin Region have developed by then a jurisdictional program or approved MRV system, the project will use the MRV data generated by the jurisdictional program.

- In the contrary, the leakage monitoring will be completed along with the monitoring of project area carbon stock changes. Activity displacement leakage in the leakage belt follows the exact same procedure as monitoring for the project area but focuses on the measurement of LULC changes in the leakage belt.

As described in section 3.3.1, and in accordance with the methodology, there will be no leakage associated with leakage prevention activities; this type of leakage will therefore not be monitored.

Similarly, emissions from forest fires are not included in the baseline and will therefore not be monitored.

Table 36 : Summary table of monitoring steps for monitoring LU&LC changes and ex-post estimation of net emission removals and number of VCUs

Activity	Detail	Perimeter	Output data	Responsability	Quality control	Archiving
Images collection and pre-processing						
1 Collection of data sources for year Yv	In order to be as close as possible to the work completed for baseline, satellite images of Landsat with 30m resolution of the year of the verification shall be collected. In case of failure or replacement of Landsat sensor in the future, the most similar images should be used. If higher resolution images are used, they will be degraded to match work completed with Landsat at validation	Cover of the whole reference region	Set of satellite (or toher vector's) images of year Yv	Technical partner (ONFI)	- Pur Projet : quick review of other potential forgotten available data, from partners (e.g. Planet Action) or public sources	Archiving of data both in data room of Pur Projet and by Technical partner
2 Pre-processing of images	Apply same pre-processing procedures as for validation[1]	All images from the data set	Pre-processed images			
Production of main maps / matrices for the reference region						
3 Production of LULC map (before forest stratification) for year Yv	Apply same procedures as for validation[1], in particular same classification algorithm	Reference region	LU&LC map for reference region	Technical partner (ONFI)	- Pur Projet : review of produced maps, matrices, and documents. Check for inconsistencies, errors, or divergences from field observations - Amazonia Viva : check for divergences with field observations	Archiving of data both in data room of Pur Projet and by Technical partner
4 Production of deforestation map for the period Y_{v-1} to Y_v	Apply same procedures as for validation[1]	Reference region	Deforestation map (Y_{v-1} to Y_v) for reference region			
5 Production of LULC change map	Apply same procedures as for validation[1]	Reference region	LU&LC change map for reference region			
6 Production of LULC change matrix	Apply same procedures as for validation[1]	3 different matrices : - Reference region - Project Area - Leakage Belt	3 different LU&LC change matrices : - Reference region - Project Area - Leakage Belt (areas in hectares)			
Post-processing: Forest Stratification						
7 Production of stratified LULC change map	Overlap forest stratification map (same map as for validation, permanent strataes) with produced maps. Apply same procedures as for validation1	Reference region	Stratified LU&LC change map for reference region	Technical partner (ONFI)	- Pur Projet : review of produced maps, matrices, and documents. Check for inconsistencies, errors, or divergences from field observations - Amazonia Viva : check for divergences from field observations	Archiving of data both in data room of Pur Projet and by Technical partner
8 Production of stratified LULC change matrices	Apply same procedures as for validation[1]	3 different matrices : - Reference region - Project Area - Leakage Belt	3 different stratified LU&LC matrices : - Reference region - Project Area - Leakage Belt (areas in hectares)			
Calculation of ex-post carbon stock changes and ex-post project impact for period Yv-1 to Yv						
9 Calculation of ex-post carbon stock changes	Apply carbon stocks decay models to deforested areas per initial forest class, and carbon stocks increase models to deforested areas per final non-forest class (using model of GHG calculations VCS - V2.0.xls workbook)	Calculations for: - Project Area - Leakage Belt	Ex-post carbon stock changes for the period Yv-1 to Yv for Project Area and Leakage Belt	Pur Projet	Cross verification of the calculations, data entry, and results by a second person at Pur Projet.	Archiving of Ex-post GHG calculations VCS workbook in data room of Pur Projet and by Technical Partner.
10 Calculation of ex-post net project emissions reductions (before leakage)	Compute the difference between the baseline carbon stock changes and the ex-post carbon stock changes in the Project Area a, to determine ex-post net project emissions refuctions for the period Yv-1 to Yv (using model of GHG calculations VCS - V2.0.xls workbook)	Project Area	Ex-post net project emissions reductions (before leakage) (in t CO2eq)	Pur Projet		
11 Calculation of ex-post leakage	Compute the difference between the baseline carbon stock changes and the ex-post carbon stock changes in the Leakage Belt, to determine ex-post leakage for the period Yv-1 to Yv (using model of GHG calculations VCS - V2.0.xls workbook)	Leakage Belt	Ex-post leakage (in t CO2 eq)	Pur Projet		
12 Calculation of Total net GHG emissions reductions (ΔREDD)	Compute the difference between the baseline carbon stock changes and the ex-post carbon stock changes in the Leakage Belt, to determine ex-post leakage for the period Yv-1 to Yv (using model of GHG calculations VCS - V2.0.xls workbook)	Project Area+Leakage Belt	Total net GHG emissions reductions (ΔREDD) for the period (in tCO2eq)	Pur Projet		
13 Calculation of number of VCUs	Apply the updated risk rating to know the percentage of VCU withholdings for the buffer and discount it from the Total net GHG emissions reductions to compute the number of VCUS for the period Yv-1 to Yv (using model of GHG calculations VCS - V2.0.xls workbook)	Project Area+Leakage Belt	Number of VCUs to be issued for the period (in number of VCUs)	Pur Projet		

Task 2 : Revisiting the baseline at the end of the baseline period

Baseline will be revisited every ten years.

- Monitoring of agents, drivers, and underlying causes of deforestation

An ongoing surveillance and monitoring of deforestation threats, agents, drivers will be conducted all along the project by the participating actors (communities, organizations) and by the Foundation Amazonia Viva. All relevant information, data, reports, legal documents collected will be kept by the foundation Amazonia Viva and communicated to the Project Proponent on a yearly basis.

All information collected will be used at each revisiting of the baseline to conduct a complete analysis of agents, drivers, and causes of deforestation, in the same way it was completed for validation

- Adjustment of LU/LC change component of baseline

Projection of future deforestation for next baseline period will be conducted in the exact same way as for the first baseline period, using monitoring data from the first baseline period as historical data to recompute deforestation trends and projected rates of deforestation.

The Project Proponent will contract GIS and remote sensing specialists, in the first place ONFI, technical partner of the project, to complete the modeling.

Quality control: results of the analysis will be controlled by Pur Projet for consistency with local observed conditions and evolutions. Analysis results will also be cross-checked with potential results from other deforestation monitoring programs in the region of San Martin or at the national level

New baseline scenario will be archived by the Project Proponent in the project's digital data room, and will also be shared with- and archived by- the Fundacion Amazonia Viva.

- Adjustment of carbon component

Carbon stocks per hectare in each strata will not be adjusted unless significant evolution has been observed over the first baseline period (natural disturbances, strong degradation), or unless more precise external data becomes available.

CL3.2.2 Global monitoring plan

More generally, the Project Proponent will monitor various elements along the project lifetime, as described in the following table:

Table 37 : Global monitoring plan

Topic	Elements to be monitored	Procedure of monitoring	Responsibility and field participants	Frequency over the project lifetime
Emissions reductions	Area evolution of each strata (ha)	- Teledetection / satellite imagery - On-site verifications	- Remote-sensing analysis: ONFI - Quality control : Pur Projet, Mesa REDD - Field verification : Fundacion Amazonia Viva	Periodically, at each verification (every 5 years)
	Carbon stock per ha, for each strata (tCO_2/ha)	Field measurements (biomass inventory plots)	- Execution : Fundacion Amazonia Viva - Communities - Quality control / Interpretation : Pur Projet	Only in case of catastrophic event, or when revisiting baseline in case of significant changes or more accurate data
Leakage	Area evolution of each strata in leakage belt (ha)	- Satellite imagery - On-site verifications - Surveys in communities - Public information from forest authorities	- Remote-sensing analysis: ONFI - Quality control : Pur Projet, Mesa REDD - Field verification : Fundacion Amazonia Viva	Periodically, at each verification (every 5 years)
	Identification of driver in cause		- Fundacion San Martin Verde - Pur Projet - ONFI - Participating communities	
Drivers of deforestation	Actualisation of drivers and agents of deforestation list : relevance of drivers	- Information recollection from authorities and other specialized organisation - Mesa REDD informations - On-site verifications - Socio-economic studies - Surveys in communities	- Fundacion Amazonia Viva - Pur Projet - Mesa REDD - Participating communities	Ongoing monitoring / watch. Complete analysis of drivers, agents, causes every 5 years.
	Actualisation of drivers and agents relative importance : trends monitoring			
Activities	Relevance of each activity to fight against deforestation drivers	- Quarterly report from each community / association on activities implemented, budget used - On-site verifications - Random questionning in communities	- Fundacion Amazonia Viva - Participating communities - Quality control : Pur Projet	All year long, during the whole prohect period
	Implementation of activities and results			
	Ressources / tools available vs. required			
	Achievement of activity's goal			
Environmental and socio-economic impact	Climate regulation	- Scientific inventories and thematic studies - Survey in communities - Public socio-economic studies - Public environmental studies	- Fundacion Amazonia Viva - Participating communities - Scientific partners - Government, NGO and other involved organisations in Peru	- On each topic, studies every 5 years - Surveying communities all along the project (100 surveys per year minimum)
	Soil enrichment			
	Water quality			
	Biodiversity			
	Community incomes			
	Food security			
	Food sovereignty			
	Grassroot empowerment and ownership feeling			
	Communities adaptation to climate change			
	Happiness			

CL3.2.3. Details on monitoring of socio-economic and environmental impacts

Monitoring of socio-economic and environmental impacts of the project will be completed using various tools: scientific inventories and thematic studies contracted to experts in each of the fields investigated (biodiversity, water, soils, etc.), surveys in the communities, and analysis of third-party (potentially public) socio-economic studies, environmental studies.

Surveys in the communities have been started in order to define a starting state against which comparing the evolutions. Existing templates and first results of community surveys are available.

Key indicators to be monitored during the project lifetime are the following (developed with Fair Trade Foundation):

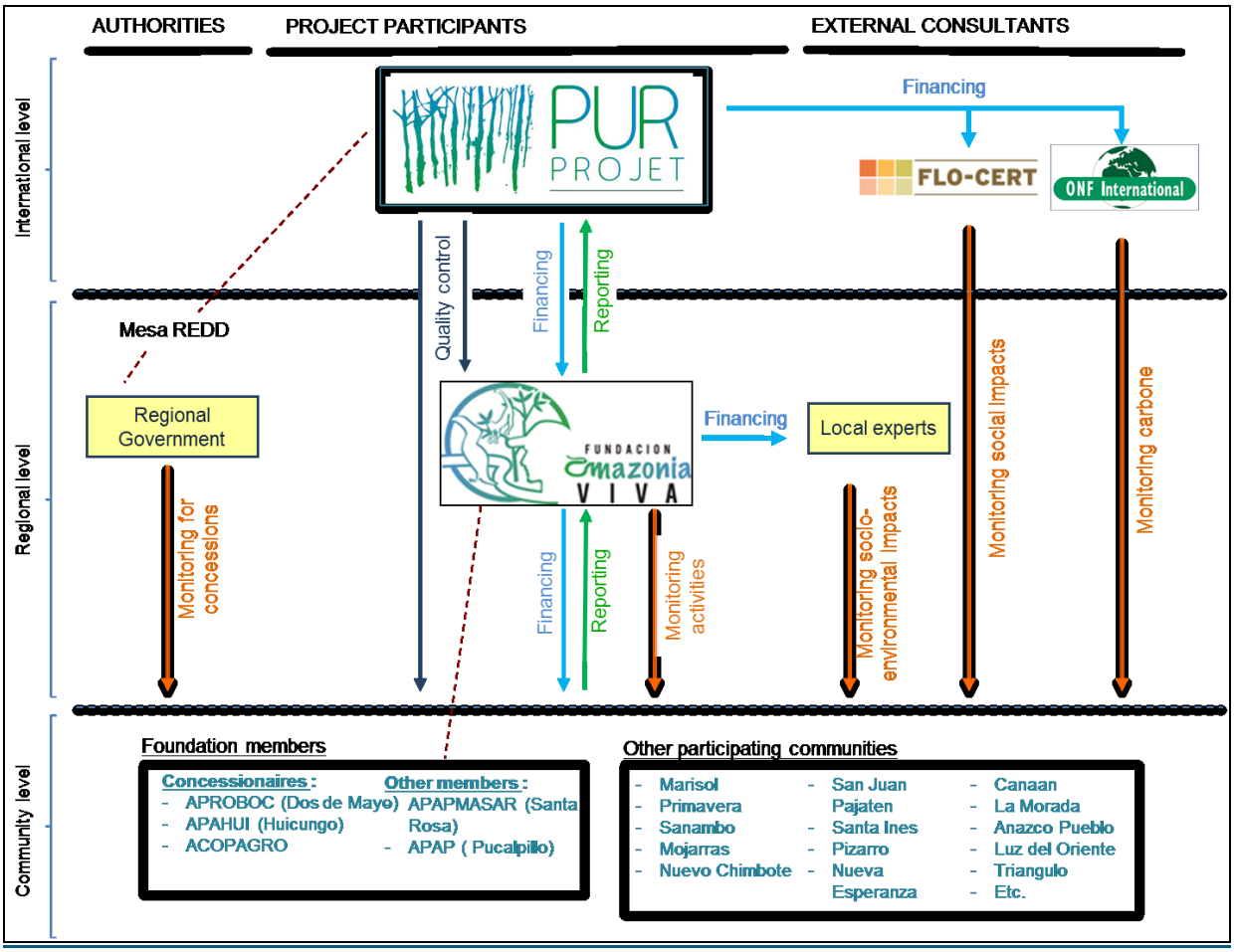
Table 38 : Key environmental and socio-economic indicators to monitor over time

Indicator	Monitoring	Method	Frequence
Avoided deforestation	Conservation area and leakage area forest coverage in ha, comparision with baseline scenario (done by Regional Government within the REDD Roundtable)	Satellite pictures and checks on site	Every 5 years (for VCS verifications)
Carbon sequestration	Biomass/ Carbon inventories in all stratae of forest area	Field inventories	Every 10 years (more frequently in case of natural disturbances, catastrophic events, or evolution trends)
Forest quality	Forest inventory and check on environmental services delivered by conserved forests, in comparision to baseline.	On site inventories	Every 10 to 15 years
Micro-climate regulation	Micro-climate follow-up with 3 to 5 local meteo stations, recording levels of rain, and counting drought days, both in forested and non-forest lands, at strategic points and different altitude levels.	Meteorological records	Throughout the years with analysis on a yearly, 5 years, and 50 years (back and forward) time span analysis.
CO2 Sequestration	CO2 Inventory in demonstrative parcels of the HEM conservation area, measures at BH to calculate trees biomass and qty of Carbon / ha	Satellite pictures and checks on site	Every 5 years (for VCS registration)
Biodiversity preservation	Biodiversity inventories throughout the project lifetime both in the pure conservation area as well as in the human related activities areas, HCV areas and watershed areas. (See PDD for more details). Special follow up of endangered species.	On site inventory (infrared cameras), observations.	Yearly with 5 to 10 years milestone inventories
Soil enrichment	Soil composition, especially nutrients, and soil activity, lombrics, NPK,,,,	On site sampling and analysis	Every 5 years, or on specific occasion (sampling in specific areas : degraded for long or still preserved, to monitor the link between forest conservation and soil quality
Water quality	Water quality, purity, presence of synthetic products (organochloral, organophosphates,..), % of dry matter / litter, drinkability, ...	On site sampling and analysis	Every 5 years, or on specific occasion (sampling in specific areas : degraded for long or still preserved with forests, to monitor the link between forest conservation and water quality
Water regulation	Water regulation throughout the year, between deforested areas and still forested areas. Within the concession, around the concession, and in the leakage area, in already severly degraded areas.	On site questionnaires and measurments on floods and droughts.	Every 5 to 10 years, with specific measurment in forest and non-forest areas.
Community incomes	Local communities income increase thanks to the project. Both via direct and indirect conscequences of the project.	On site questionnaires and follow up on investments via RUPP. .	Sociological impact study at least every 5 years. Usually PP undertakes such studies every year at the community level on all key indicators or specific ones, depending on applicability and partners demands.
Food Security	Food security level of local communities thanks to the project, limk between forest preservation and food security and diversity.	On site questionnaires	Every 3 years questionnaire follow-up and workshops at community level.
Food Sovereignity	% of food produced locally, by the participating communities themselves.	On site questionnaires	Every 3 years questionnaire follow-up and workshops at community level.
Grassroot empowerment and ownership feeling	Feeling expressed by local communities and subjectively perceived by auditors about actual empowerment and ownership feeling over the project by local communities. Local dynamics is the key element of a development project.	Questionnaires and workshops	Every year
Communities adaptation to Climate Change	Checking how the project contributes to helping the local communities to adapt to climate change (severe droughts, storms, ..)	Questionnaires and records	Every 10 years
Happiness	% of satisfaction expressed by local communities, both in general as well as level of satisfaction with the project	Questionnaires	Yearly with monitoring and reporting, to see eventual correlation between climate project and pride and self motivation to undertake development activities

CL3.2.4 Organizational structure for monitoring

The Biocorredor Martin Sagrado REDD project is based on the very close relationship between Pur Projet, project developer, fund raiser and carbon offset trader, and the Foundation Amazona Viva, in charge of the local coordination and implementation of the project.

Figure 31 : Organizational diagram and responsibilities



CL3.2.5. Adaptative management plan

All the procedures described in the documents are already the results of recurrent corrections and adaptations of precedent procedures.
More generally, the project has an adaptive approach, in which the project proponent and the local management team regularly document the lessons learned from previous experience and identify improvements to the project procedures.

After all visits to the project of the Project proponent, a report of progress, lessons learned and suggested corrections is made, discussed, and approved by the Project Proponent and Foundation Amazonia Viva.

Examples of such reports, proceedings, or meeting minutes can be found appended to the PDD. These reports lead to the adaptation of project procedures to constantly improve quality of the project.

Note : Pur Projet will develop a full monitoring plan within 12 months of validation of the project.The monitoring plan will be adjusted to be compatible with a potential future National Carbon Accounting System; this adjustment will be done in collaboration with the regional roundtable Mesa REDD San Martin. The results of monitoring will be made publically available and communicated to local stakeholders.

COMMUNITY SECTION

V. COMMUNITY SECTION

CM1. Net Positive Community Impacts

CM1.1. Methodologies to Estimate Impacts on Communities

Net Positive Community Impact Methods

The project initiated an ongoing series of community dialogues in November 2009 providing the communities to voice their aspirations and problems. The project development team of Pur Projet worked with ACOPAGRO Cooperative managers and agronomists to conduct a series of village Participatory Rural Appraisals (PRAs) and community sketch maps to assess proposed project areas. The PRAs continued on an ongoing manner since the beginning of the project.

The discussions focused on local drivers of deforestation, management problems, social conflicts, as well as priorities for development and perceived livelihood opportunities. Participants in the discussions included: Amazonia Viva staff, ACOPAGRO managers and agronomists, elected Community Forest management committee members, local farmers, and both men and women household heads.

Positive Community Impacts

Pur Projet and Amazonia Viva have identified three major project goals that will benefit forest dependent communities:

- improve the quality of the forests;
- maximize benefit flows to the local communities participating in the
- develop new REDD project sites that will benefit other forest-dependent communities.

The project will directly benefit communities by:

- engaging with local communities in the design and development of the project;
- providing training and support to local village organizations to build forest management capacity and develop agro-forestry and agro-ecological practices;
- Promoting to the Peruvian Government recognition of local communities forest management rights;
- generating carbon revenues that the community will use for forest restoration employment, improving farming systems, establishing micro-finance organizations, and capitalizing small livelihood enterprises;
- maintaining the access and use rights of local communities to continue harvesting NTFPs for customary use from the project area forests.

Based on project budget projections direct support for community forest protection and restoration will employ 5 people full-time from local communities, and support local police officers and Forest

Administration, while small grants for NTFP development and agricultural organic intensification will employ at least another **5 people full-time.**

The project strategy includes the following activities:

- **Improve the Quality of the Forest**

A substantial portion of project carbon revenues will be utilized to improve the quality of the forests, largely through supporting community protection and restoration efforts. Conserving and improving forests will enhance environmental services including microclimate stability, NTFP productivity and other benefits of importance to local communities. Leaders and members of the CFMC groups will receive training in forest management, agro-forestry as well as in resource planning, forest restoration,eco-tourism, microfinance, and small enterprises.

During the first two project years, the ACOPAGRO officers and implementing organizations will work with the Community Forest Management Committees (CFMC) in the project areas to strengthen forest protection capacity including forest patrols, fire control systems, and addressing resource conflict issues. Pur Projet, ACOPAGRO and the CFMC have formalized a Memorandum of Understanding to implement the REDD project. Project CFMC and their members are legally, technically, and financially supported to play a primary role in stopping the major drivers of deforestation and degradation currently operating in the project area and leakage belt. This is the most important action required to achieve the REDD project goals. Community action to secure forest boundaries by social fencing and by intensifying protection is the key strategy to control illegal logging, migrant encroachment, and fires. The first project budget allocates financial support for labor and equipment to establish forest boundary demarcation, walkway improvement, patrol hut construction and purchase of boards and patrol equipment.

In years 3 through 40, aside from support for forest protection, this REDD project will secure carbon credits through forest management activities allowable under REDD.

Forest management will focus on assisted natural regeneration and enrichment planting of degraded forest land, agro-forestry and agro-ecological practices. The project target will target 10,000 hectares of degraded forests (within the project area and in the leakage area and neighbouring communities) for regeneration during the first 20 years. Funds for the ANR activities will be directed to project communities primarily for labor and materials. The project planners estimate that this will provide approximately 10 person days of employment per hectare, meaning 5 000 workman days each year (500 ha each year during the first 20 years), equivalent to **20 full time employees.** Community members will be employed mainly during the agricultural off-season, meaning an average 40 people employed for a period of 6 months every year.

On the whole, the project will provide 30 full time jobs opportunities to the communities, for a total of 1 500 household, meaning social impact is very important. In terms of operations, 40 people will be employed for ANR activities during 6 months with 10 others will be employed all year round, meaning 50 people will participate in the project activities from the participating communities, equivalent to one person per household. Through micro-credit activities and other non-allocated budget for now, this potential of socio-economic impact can be as well greatly increased.

This will strengthen the project since all families will benefit directly from project activities.

- **Maximize Benefits to Local Communities**

The project will provide small grants to the communities associations to undertake:

- NTFP development activities

- Project promotion activities

- NRA and social development activities

- agroforestry development activities

According to discussions, small grants mechanism will be available for community members based on local level planning and participation of communities associations members in the application process. The project implementation team and partners will continue to provide training in bookkeeping and assist project participants to strengthen community institutions and accounts. Small grants are likely to include capital investment in NTFP enterprises including seed collection, medicinal plants planting and processing as well as NRA and social development projects including English speaking classes, cultural classes on traditional crafts and dances, school support and health, according to community priorities.

To reduce leakage and increase food security in the project area, support will also be provided to innovative local farmers who agree to conduct farming system trials. The project will facilitate access to technical extension services regarding promising methods for organic intensifying farming systems in a sustainable manner through the use of better water, green fertilizer, seed, and cultivation techniques. This will be linked to an ACOPAGRO program to improve agricultural and agro-forestry resources, with a focus on small grants and agricultural trials.

- **Compare the With-project Scenario and the Baseline Scenario of Social and Economic Well-being**

In Section G2.1, the economic and tenure situation of the project community and the drivers of deforestation are described in the Without-project Scenario. It is clear that without a project, several outcomes are likely, including:

  • increasing conflict with migrants, and concessionaires;

  • loss of control over forest lands;

  • deforestation of local forests critical for livelihood and environmental services;

  • growing poverty and social marginalization;

  • loss of biodiversity.

The project works to forge an alliance between project community and the ACOPAGRO Cooperative, as well as with other local stakeholders, providing legal recognition of community rights to manage and utilize local forests. Aside from enhancing tenure security, the project will bring in significant direct and indirect employment opportunities and investment funds for resource and community initiatives over a 40 year period, providing a stable financing mechanism for long term social and economic development.

- **Stakeholder Dialogue**

The project implementation team has engaged a range of stakeholders in discussions to guide the design of the project including Pur Projet team, Amazonia Viva and ACOPAGRO Management and field staff, commune, district, and provincial government officials, civil society organizations including local NGOs, as well as the forest dependent communities that represent the primary stakeholders. The ACOPAGRO Cooperative has played a critical role in supporting consultation at all levels.

An initial exploratory field visit was conducted by Pur Projet in 2009. In February 2010, a PRA exercise was held within the communities including semi-structure interviews and group discussions resulting in an initial social assessment. A more in-depth research project was conducted involving extensive dialogue with the organizing community members. A follow-up workshop with stakeholders was held in april 2010 at ACOPAGRO's offices in Juanjui. Each workshop has increased the knowledge and understanding of stakeholders regarding the goals and strategies that will be adopted under the project. It has also provided the project design team with inputs regarding local priorities and modes of operation.

Over the course of the project, annual stakeholder dialogues with a focus on project communities will be held to generate feedback and information necessary for project adaptation and documentation. The stakeholder dialogue will be held towards the end of each calendar year over a two week period allowing for decentralized, village level meetings culminating in a provincial workshop. The findings from the meetings will be posted on the project website.

Communities are the primary stakeholders of this project and all decisions will be made via the approval by the CFMCs, these are the main backbones of this project, fully based on the grassroot will and decisions.

CM1.2. Demonstration that no HCV Areas are Negatively Affected

The project aims at protecting the forest in the project area, which provides the environmental and socio-economic services mentioned in sections G1.8.4-6 (water resources regulation, fishing, hunting, turism). In addition, the project will also value and protect the cultural wealth of the area by developing a reasonable local eco/ethno-tourism. Therfore, the project's goal is directly to protect the HCV areas mentioned in G1.8.4-6.

CM2. Offsite Stakeholder Impacts

CM2.1. Identification of Negative Offsite Stakeholder Community Impacts

The social appraisals indicate that the distance of community impact beyond the project area is very limited. This is due to the fact that the land and forest beyond the project area has in many cases been claimed by other communities, “market driven” forces through the granting of ELCs, or has been cleared and settled by migrants moving into the region from other provinces. In the past 20 years, San Martin Province has transitioned rapidly from an “open frontier” environment to a “claimed domain” context. This is largely driven by many migrants seeking land for agriculture and resale, as well the dynamics of land speculation and oil exploration.

As explained in CL 2.2, due to diffuclty of access and hilly landscapes, a minimal number of deforestation drivers are expected to shift from the inside of the project zone to areas outside of the project zone. The drivers of deforestation that may be affected by project activities beyond the project zone include:

- forest clearing for oil exploration
- forest clearing for agriculture expansion by migrants entering the area;
- forest clearing for settlement expansion;

However, migration outside of hte project zone is happening already today in the same proportion as in the project zone. There will therefore not be any significant impact on migration outside of hte project zone. Similarly for oil and mining exploration, oil and mining companies are already targeting all areas they can have access to, inside or outside the project zone. The poject will not increase pressure from theses companies on the other areas.

As a result the impact for communities outside of the project is expected to be minimal. In most case drivers of deforestation are carried out by local communities’ members. By providing alternative forest-based incomes to local communities deforestation activities should discontinue and not just shift to another location.

CM2.2. Offsite Impact Mitigation Strategies

The project implementation team will assist project communities in establishing a dialogue with migrants to the area to inform them of the communities areas and management rules that govern them. Awareness-raising for participating and neighbouring communities will be addressed through dicussions and trainings, billboards, boundary demarcation, and meetings, with encouragement for surrounding migrant communities to emulate sustainable forest management practices under future REDD expansion. The project will also facilitate a natural resource management planning process with project neighboring communities that would involve local migrant families. This process would result in the formulation of land-use plans that will lead to more sustainable development in the areas outside the immediate project. Agricultural intensification projects will help boost farm output, encourage farmers to put energy into increased production, rather than further forest clearing. Fuel-wood needs will be reduced through the extension of a fuel-efficient stove and solar panels program that will reduce fuel-wood consumption for cooking and lighting among project households. Forest management plans reflecting NRA and enrichment planting activities will be developed by the communities to ensure that sufficient timber can be produced on a sustainable basis to meet local house construction requirements.

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

The project is designed to minimize any negative offsite impact. By building and empowering community institutions to manage and conserve local forests, creating employment and livelihood opportunities, and assisting in the formation of capital in community micro-finance institutions, this project will have a little negative offsite impact. The project will include all neighboring communities outside the project area in its socio-economic monitoring activities. This should allow feedback from non-project communities in the area concerning the negative and positive ways in which the project impacts them. The implementing organization team would also respond to queries and problems related to the project that may arise in neighboring non-project communities.

CM3. Community Impact Monitoring

The project partners have already drafted a monitoring plan based on indicators developed as part of the project methodology. The next stage in this process will be to fully involve local communities in developing their own articulation of indicators to track community impacts, the results of which will be integrated in the overall monitoring plan. The project will align to new monitoring standards such as REDD+ as they are further defined.

CM3.1. Selecting Community Variables to be Monitored

The project communities will be involved in an annual participatory monitoring exercise to assess the extent to which project activities are achieving the community and project goals. The following aspects will be monitored:

- social indicators;
- economic indicators;
- institutional indicators;
- biodiversity indicators;
- environmental indicators;
- carbon stocks and forest condition.

All methods will rely on community input regarding project impacts. Parameters to be measured will include:

- community member knowledge, attitudes, and behaviors related to the project, especially levels of participation;
- changes to forest related income and employment;
- institutional capacity to manage natural resources and finances;
- improvements in forest habitat and sighting frequency for indicator species;
- changes in carbon stock levels and forest conditions.

A detailed list of indicators to monitor and tools for monitoring is available in the preliminary monitoring plan.

Data will be collected through community focus group discussions, in-depth interviews, and sample surveys. This annual participatory assessment will be supplemented by field trip reports and the minutes of meetings facilitated by the ACOPAGRO Cooperative support. Longer term measurement of the impact of the project on local communities will be gathered through periodic sample surveys conducted with project families. Longer term measurement of the impact of the project on local communities will be gathered through periodic sample surveys conducted with project families. These surveys will cover a range of issues including income, land tenure, and employment, education, social capital, and resource availability and will be used to quantitatively measure socio-economic changes in the project communities.

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. Many HCV have already been identified and marked by GPS. These areas will be monitored similar to the aspects of community variables as listed above. Data on HCV areas will be collected through community focus group discussions, in-depth interviews, and field surveys within the HCV area. The effectiveness will be assessed by HCV areas not being negatively affected by project implementation over time. The effectiveness will further be monitored by reviewing interviews of community members over time. If the project is successful these interviews should show positive attitudes towards care of the HVC areas.

CM3.3. Community Impact Monitoring Timeline

A full community impact monitoring plan will be developed within six months of the validation date through collaboration between the implementing partners and Pur Projet. Participatory trainings on REDD project monitoring will be conducted with all the project communities in order to consult on required indicators and prepare local capacity for monitoring. The results of monitoring will be made publically available and posted on Pur Projet and/or ACOPAGRO project website. A central database will compile information to be uploaded to the project website. Communication to local communities and stakeholders will be consistent to that described in Section G3.8 and will be made available in local language (Spanish) when relevant.

CM4. Capacity Building

CM4.1. Accommodate with the needs of the communities

The community members and local stakeholders are already involved in the implementation of the project activities and will continue to participate throughout the entire process of developing the project. The project will provide organizational, management and technical capacity building activities to underscore the ownership of the local people's management of the Martin Sagrado project area, as well as to insure their involvement in decision-making and implementation of programs and in conservation and sustainable development efforts. Workshops, training sessions and events for sharing experiences will be organized to provide community people and local stakeholders with the necessary tools to improve their ability to manage their environment in a lasting and sustainable way.

The management plan will include community-strengthening activities aimed at promoting the organization of community groups and the training of community members in sustainable production methods to improve their earning capacity. Other activities will be done to improve the quality of life in the communities.

The activities and trainings already planned for promoting capacity building for the project communities are better described in item CM4.4.

CM4.2. Wide range of groups

The concept of "elite" does not exist within the existing social structures in the Martin Sagrado project zone. In the area, economic conditions are very homogeneous. The only observed difference is between those individuals who live in communities with higher levels of social organization and those people living in communities that are still in the process of organizing themselves.

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. Community participation in project implementation

In addition to the participation of community people in the community forest committees, and in decision making regarding the development and implementation of the project's management plan, several other programs will be implemented that require community participation, including:

• **Voluntary Environmental Agents Program**: The voluntary environmental agents are individuals without authority who are committed to the conservation of natural resources. These agents acts as multipliers of the awareness within the community and communicate with the authorities when there has been an infraction of the reserve's rules and regulations. The Voluntary Environmental Agents Program is

envisioned as a way of providing individuals interested in participating in environmental education, conservation, preservation and protection of natural resources of the protected area.

• **Biodiversity and Natural Resource Use Monitoring Program :** This program will prepare and accredit community members and inhabitants of the protected areas 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

• **Forestry Management**: It is crucial for project success that good practices in Forestry 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.

• **Environmental Awareness**: A program will be implemented at the public schools to train teachers and distribute material, so they can understand and disseminate information related to their reality, such as sustainability and climate change. It is believed that this measure will increase people's knowledge about their reality, situation and responsibilities related to sustainable development and nature conservancy, also increasing the success of the project in reducing deforestation.

CM5. Best Practices in Community Involvement

CM5.1. Knowledge of local customs

The Martin Sagrado project was created through a participatory process. This process included meetings and public hearings; interviews were performed with broad participation by local communities and stakeholders. The management plan is also developed by a participatory process, considering that community people and other local stakeholders know their environment and understand their conditions and needs better than anyone else.

Local partipatory studies show that local communities in the Martin Sagrado project zone are willing to improve their livelihoods with maintaining the environmental quality of their forests. It is important to point out that the teams that conducted these studies have extensive knowledge and experience in the reality of the Amazon.

Most of the communities of the project zone are cocoas producers Fairtrade certified. The implementation of Fair trade projects has already trained the communities to the process of deciding how to use the financial resources for community associations.

CM5.2. Employment positions

The majority of the local stakeholders that are expected to be involved in the implementation of the project will be part of the communities. Some specific actions (e.g., carbon and biomass dynamics studies) may require specialized professionals, who will perform this work on a contract basis. Local people will be prepared and trained, and will have the opportunity to be hired within some of the programs to be implemented as part of the development of this project (e.g., biodiversity monitors, climate monitors). They will also be invited to work in supporting field activities from project.

CM5.3. International rules on worker rights

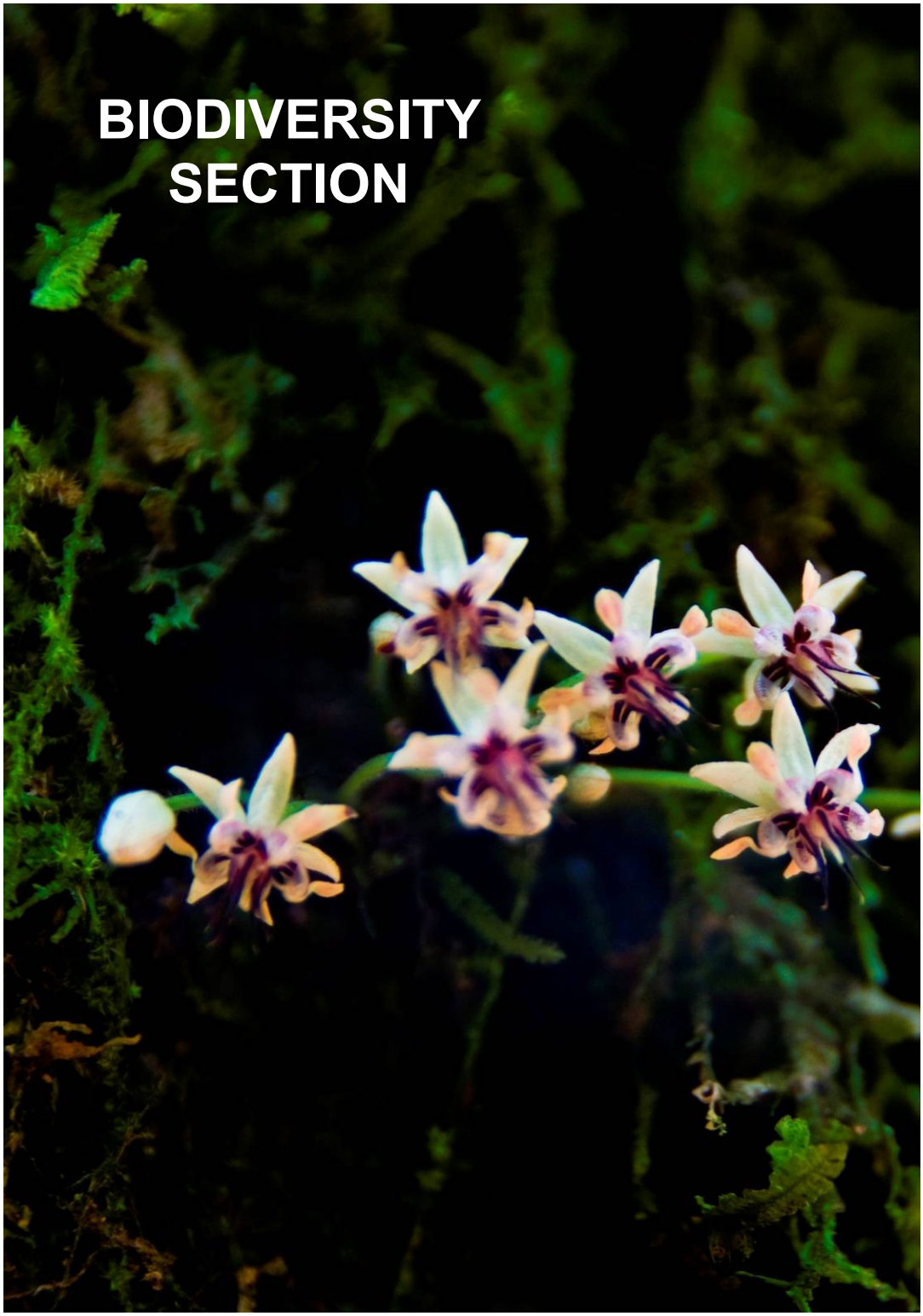
Hired people for the project will be made aware of their rights and obligations in their contracts as required by law. The recruiting done by Amazonia Viva Foundation is subject to the institution's external auditing. The implementation of the project guarantees the compliance of all social legal requests of Workers legislation, health and work security.

CM5.4. Substantial risk to worker safety

Local communities are accustomed to living in the forest ecosystems and to being surrounded by an environment rich in biodiversity. Major risks that could arise from the implementation of this project are related to potential forestry and forest management activities, the use of machinery and equipment, and the other related activities that are part of the process for implementing the sustainable production activities that will be promoted for the project's communities. Whenever necessary, appropriate training will be offered to people involved in such activities, including all safety procedures and the use of protection equipment that can manage the risks and avoid unnecessary accidents

CM.5.5. Minimize working risks

In order to avoid the risks in activities related to community-based forestry and forest management, during the implementation of such programs the workers will receive specific training for the activities, in addition to information on how to minimize the risk of accidents. The special training includes major procedures to be adopted to reduce accidents during these activities, such as the use of personal protection equipment (special boots, helmets, suits, tools, medicine, etc.) and the guidance and instructions to use, fill and transport the sawmill and other machinery.


BIODIVERSITY
SECTION

VI. BIODIVERSITY SECTION

B1. Net Positive Biodiversity Impacts

The main goal of the project is to avoid ensure the conservation of key habitat for threatened flora and fauna over 300 000 hectares and avoid the deforestation and degradation of the forest, constituted by rich and threatened flora and fauna ecosystems. The project seeks to conserve and regenerate forest ecosystems through improved protection from illegal logging, fire, and through assisted natural regeneration activities and agro-forestry practices. This strategy would restore unique habitat for amphibians, reptiles, mammals, and birds, while restoring high value and endangered tree species (see annex 3 for a list of potential species). The project will also create greater awareness among local communities regarding the value of biodiversity, as well as build monitoring, patrolling, and habitat restoration skills, which will result in better controls over hunting, poaching, and damage to critical habitat. Mobilizing the communities committees to engage in biodiversity conservation will also result in the community establishing rules and sanctions prohibiting hunting and regulating non-timber forest products collection to sustainable levels.

In the without-project scenario forest cover is expected to continually decrease causing a loss of biodiversity, quantity of species present, and quality of forest ecosystems. Under the with-project scenario forest cover will increase and forest ecosystems will be enhanced. Native species to the project area are expected to flourish with the project. Overall the project will have a net positive benefit to biodiversity in the project area.

B1.1. Methodologies Used to Estimate Changes in Biodiversity

The proposed participatory biodiversity monitoring methodology draws on the systems articulated by Finn, Danielsen[32]

This simple system was selected because it not only provides a cost-effective, field-based monitoring system, but it also creates a sense of ownership among resident people over the biological resources and their conservation. The main elements of the biodiversity monitoring system include:

- standardized recording of routine observations;
- fixed point photography;
- line transect surveys;
- focus group discussions.

[32] Danielsen, Finn et al. "A simple system for monitoring biodiversity in protected areas of a developing country" Biodiversity and Conservation (9:1671-1705), 2000

These methods have been field tested. These groups have confirmed the importance of involving local villagers in biodiversity assessment and monitoring in order to incorporate existing knowledge in the survey and build commitment to the monitoring program. Several key indicator species will be selected and monitored to track the impact of project activities in comparison to the baseline. At least one of these indicator species will be a species which has a market value and is commonly traded, thus indicating the human-wildlife dynamic as it evolves.

B1.2. Demonstration that High Conservation Value (HVC) Areas will not be Negatively Affected

Since the goal of the project is to enhance and protect forest resources, areas that are of High Conservation Value will not be negatively affected. These areas of special environmental, biological, and rare ecosystem significance are expected to flourish throughout and beyond the life of the project. Areas that provide habitat for IUCN listed species are part of the protected project area. The participatory biodiversity inventory and monitoring has started in April 2010, and provides identification of any protected species. The latter is consistent with the IUCN RED List. Some of the species mentioned in G1.8.1 have already been identified in the project area. Without the project these areas of special value are expected to decrease with the loss of forest cover.

B1.3. No introduction of invasive species in the Project Area

The Martin Sagrado Project is based on the management and conservation of native species and natural ecosystems. No activity involving invasive species will take place in the project area.

Additionnly, the agroforestry activities developed in the Leakage Management Areas with the communities in the buffer zone of the project area will include native species for more than 85% of the trees planted (10 native species – Capirona, Paliperro, Estoraque, Bolaina, etc – and 1 non-native specie in proportions less than 15% of planted trees –Teak). Teak is not an invasive specie. It has been planted in many regions and in similar locations without damages to surrounding environements.

Table 39 : List of tree species planted as agroforestry activities in the leakage management areas in the buffer zone of the project area

Local Name	Scientific name	Family	Origin	Growth speed	Minimum legal cut diameter (cm)	Average age at cut (years)	Tree height (m)	General Caracteristics
Shaina	*Colubrina Glandulosa*	Ramnaceae	Native	very high	41	10	3 to 5	Semi upright trunk
Pinochuncho	*Schizolobium Amazonicum*	Fabaceae	Native	very high	41	10	12 to 16	Cylindrical trunk
Bolaina	*Guazuma Crinita*	sterculaceae	Native	very high	41	10	12 to 15	Large crown cover,cylindrical trunk.
Capirona	*Calycophyllum Spruceanum*	Rubiaceae	Native	high	41	15	20 to 35	Upright and cylindrical trunk
Paliperro	*Vitex Pseudolea*	Berbenaceae	Native	high	41	15	8 to 15	Upright trunk
Teca	*Tectona Grandis*	Lamiaceae	Exotic (India, Asia)	high	41	18	25 to 30	
Tornillo	Cedrelinga catenaeformis	Fabaceae	Native	medium	41	25	40	
Estoraque	Miroxylon Balsamum	Fabaceae	Native	medium	41	25	34	
Cedro Nativo	*Cedrela odorata*	Meliaceae	Native	low	65	35 to 40	20 to 30	Cylindrical trunk
Caoba	*Swietenia Macrophylla*	Meliaceae	Native	low	75	35 to 40	20 to 35	Cylindrical trunk

B1.4. No negative impacts of non-native species

No non-native species will be used within the project area.

In the project zone, outside the project area, reforestation activity in agroforestry models will be conducted. 85% of the trees planted will be native timber species from the project zone, only a small proportion will be exotic species (Teak), however non-invasive. Teaks have been planted in the past in San Martin region in various plantation initiatives without negative biodiversity impacts.

Pur Projet and Acopagro have implemented a reforestation program in the San Martin region in the last 4 years, planting 9 species of native timbre trees, and Teaks in small porportion. Experience shows that non-native species are not invasive and do not impact negatively local ecosystems (no plagues, no diseases)

The use of Teaks ado in small proportions is interesting for the economic sustainability of agroforestry models, given their rapid growth, high timber value and good market. They also combine well with cocoa crops, and are well taken care of by the farmers. Ensuring good alternative revenues to the farmers from to successful agroforestry models is key to reduce deforestation pressure due to local community economic drivers.

B1.5. Guarantee that No Genetically Modified Organisms (GMO) will be used in the Project

The Project Design Team guarantees that no genetically modified organisms are included in this project design and that no genetically modified trees shall be planted under the project. In addition, agricultural interventions under the project will also avoid purchase of genetically modified organisms, and this requirement will also be specified in any sub-contracts with technical support or extension agencies.

The Project Design Team recognizes that genetically modified organisms are becoming more common for a source of seed, fast growing trees, and livestock feed all over the world, and San Martin Province is no

exception. Though we can guarantee that the project will not use any genetically modified organisms we cannot regulate the flow of community resources such as feedstock, and foods such as rice or other grain use in and out of the project areas.

B2. Offsite Biodiversity Impacts

B2.1. Identification of Potential Negative Offsite Project Impacts

The implementation of the project is not restricted to the strict project area. Buffer zones and leakage management belt in the project zone, which will be included in the monitoring program. The monitoring of resources will include the monitoring of areas around the reserve, which will result in the project's positive biodiversity impacts being extended to the areas adjacent to the area. The monitoring and surveillance programs will generate the necessary information for avoiding and managing negative offsite impacts, such as those caused by illegal logging, deforestation, etc.

Since the project will also support neighboring communities in restricting hunting and fire in the project and leakage areas, the project might displace some pressure from hunting or NTFP gathering pressures outside of the leakage belts. However, given the difficulty of access and obstacles to displacement of activities outside of the leakage belts, negative offsite project impacts will likely be insignificant.

B2.2. Mitigation Strategies for Negative Offsite Biodiversity Impacts

Strategies will be developed with project and neighboring communities to compensate for any loss in income or harvested forest products due to project-related restrictions. Sustainable harvesting methods for NTFPs will be included as part of a capacity building and livelihood program both within the project areas and in the leakage belt to mitigate the negative impacts of displaced NTFP collection. Many of the native species of flora are utilized by resident communities for subsistence purposes. These include a variety of tubers from native climbers and selected green leaves for vegetables. Bamboo is used for construction. Some hardwoods are used for house and tool construction, while many herbs are utilized as traditional medicines. The community-based biodiversity inventory will document all flora and fauna and their uses. Species that are reported to be scarce may receive protection or harvesting regulations based on these findings.

B2.3. Unmitigated Negative Off-site Biodiversity Impacts

No major unmitigated impacts on biodiversity are anticipated due to the project emphasis on community-based habitat restoration and the support program for biodiversity conservation. The benefits greatly outweigh any negative biodiversity impact.

B3. Biodiversity Impact Monitoring

B3.1. Biodiversity Monitoring Plan

The monitoring plan will follow the directives scientific inventories of biodiversity, which involve monitoring the species richness of animals (mammals, birds and reptiles, as well as associated products like eggs and leather) and plants (timber and non-timber products) utilized by the communities. If these species are found to be in decline, management and protection actions will be undertaken to guarantee their conservation. This monitoring is expected to generate the knowledge required to develop proposals for managing these resources appropriately.

The specific objectives of the biodiversity monitoring plan are to:

- Raise awareness among community members about the relevance of monitoring natural resource use to establish the rules for their sustainable use.
- Train community members in the protected areas to operate as monitors of biodiversity.
- Monitor species used by local communities, such as synergistic fauna (mammals, birds), commercial fish species and timber and non-timber species;
- Monitor “special interest” species, critically endangered species, endangered species, and species in threat of extinction (IUCN).
- Monitor land use and changes in vegetation cover .
- Monitor boat traffic in the area of the project.

Participatory methods will consistently be used by the monitoring program, from its creation to the evaluation of the results obtained and in discussions regarding new approaches. The monitors will be trained to perform their specific jobs, and present the results obtained from the surveys.

The biodiversity monitoring plan’s goals, indicators, monitoring frequency, and methodology is described in preliminary monitoring plan

Table 40 : Biodiversity monitoring Indicators

Goal	Indicators	Monitoring Frequency	Method/data source
Villagers are aware of biodiversity conservation goals	Proportion of villagers who have heard about project conservation activities	5 years	Socio-economic sample survey
Degraded forests are regenerating	Number of hectares of degraded forest where assisted natural regeneration activities undertaken last year (ANR, Enrichment Planting, Fire Control)	Annual	Project Report-field inventory
Forest fires are decreasing	Number of hectares burned last year	Annual	Project report-field inventory
Biodiversity increase and protected	Number of sightings of key indicator species last year by community members or through camera traps	Annual	Project report-field inventory

The biodiversity monitoring plan will be finalized within 6 months after validation.

The collection of data by the community members will be recorded on data sheets provided by the project's technical team. These sheets allow for the standardization of the informationcollection and permit information storage and processing.

Moreover, the program will count on the support of fisherman-collaborators who will collaborate on scientific research of interest and who will support the diagnostics of resource use. The program's technical team is responsible for validating the data, entering it into a database, and GIS. ACOPAGRO will perform data analysis, monitor the system and coordinate the logistics of the program.

Together with the monitoring, scientific research inventories will also be conducted, aimed at monitoring the biodiversity with more accuracy, as well as increasing the knowledge about recently discovered species and those that have not yet been described. Following the same methodology, it is possible to have the same basis of comparison between both data and to have more accurate results relating to their alteration over time.

The main assumption of the program is that through scientific research on the Martin Sagrado area's biodiversity (e.g., ecology of species, dynamics of populations, etc.) the subsidies to improve the Management Plan of the Reserve will be obtained, helping also to identify the needs and opportunities for the next research and monitoring activities. The knowledge about the conservation status of the threatened species in and around the Reserve will be improved, which will lead to specific measures for protecting these species.

Through the knowledge of these data, it is possible to have an overview of the availability of exploited species, generating information about the level of exploitation. These data can help to generate measures for instructing the communities about how to use the natural resources in a sustainable way, without affecting either their needs or the resources.

B3.2. Assessment of the Monitoring Plan Effectiveness

The project intends to rely on community participation for monitoring biodiversity and High Conservation Value (HCV) areas in the project area, with support and technical consultation from a locally-based agency. Community members will be tasked with monitoring a number of biodiversity indicators to track the effectiveness of habitat conservation measures.

These include the following:

- changes in number of sightings of designated species or resource use;
- changes in size of vegetation type blocks;
- changes in frequency of detection of designated fauna species along established transects;
- changes in perceived harvest volume per effort.

The indicators are designed to focus on trends in biodiversity and habitat quality. Special attention will be given to High Conservation Value areas, based on community and team discussion of the monitoring results, each year the CFMC and project implementers will identify any additional actions that need to be taken and integrated into the coming annual work plan.

B3.3. Commitment to Biodiversity Monitoring Plan Timeline

A full biodiversity monitoring plan will be developed by the implementing partners, in collaboration with the Forestry Administration (INRENA), within six months of the project start date. The results of monitoring will be made publically available and provided to Pur Projet and ACOPAGRO to be put on the internet. Communication to local communities and stakeholders will be consistent to that described in Section G3.8 and will be made available in Spanish.

B4. Water and Soil Resource Enhancement

B4.1 – Project activities are likely to enhance water and soil resources

The appropriate conservation measures within the Martin Sagrado area and its buffer areas will allow the forests and rivers to remain in their natural state. This is key for maintaining the natural hydrological cycles, the quality and quantity of the water and soil conservation.

B4.2 – Improvement of water and soil resources compared to the baseline

One of the consequences of the conversion of the Amazon forest into pasture will be a decline in rainfall in the Amazon and adjacent regions, considering that these rains comes from the water that is recycled through evapotranspiration (FEARNSIDE, 1997[33]).

Undisturbed forest has very low rates of soil and sediment loss. Deforestation generally increases rates of soil erosion by increasing the amount of surface runoff. The effect is considerably less than that which would exist with the presence of leaf litter, stems and branches. Roots increase the permeability of soil, increasing the absorption and infiltration of water. Forests also contribute to terrestrial evaporation and regulate the humidity of the soil through transpiration. Leaf litter and other organic residues transform the physical properties of the soil, increasing its capacity to hold water and nutrients. Deforestation can change the quantity of water present on the surface and underlying soil layers as well as the humidity in the atmosphere. Furthermore, these processes influence the rates of erosion and availability of water for ecological processes and for the maintenance of environmental services.

The creation and implementation of the Biocorredor Martin Sagrado project will protect not only the biodiversity of forests, but also the quality of life of the local inhabitants, and the climate. It will conserve the quality of soil and water, and the equilibrium of key processes like local hydrological cycles.

[33] Philip Fearnside, 1997. "Monitoring needs to transform Amazonian forest maintenance into a global warming-mitigation option," Mitigation and Adaptation Strategies for Global Change, Springer, vol. 2(2), pages 285-302, June.


GOLD LEVEL
SECTION

VII. GOLD LEVEL SECTION

GL1. Climate Change Adaption Benefits

GL1.1. Likely Regional Climate Change Variability

In Peru, occurrences of extreme climatic conditions including heavy rainfall during extended periods, flooding, as well as extended droughts are increasing in frequency. Extended dry periods are also exacerbating forest fires, resulting in fires burning larger areas with more intensity compared to the past. This pattern of increasing climatic variability will likely affect the project area by decreasing forest cover and exacerbating deforestation.

In the absence of the project forest cover will be decreased, increasing ground fuels, and subsequently fire frequency and intensity. Forest fires will likely burn into any existing forests further decreasing biodiversity. As fires initiate forest clearing for agriculture, climate change will likely exacerbate land use change to agriculture, with poor results due to intensified drought, and worsened weather patterns.

Scientific articles and reports on the topic:

1) Houghton, J. T; Y. Ding, D. J. Griggs; M. Noguer; P. J. van der Linden; X. Dai; K. Maskell; C. A. Johnson. 2000. Climate Change 2001: The Scientific Basis: Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change

2) Millar C.I., N. L. Stephenson, and S.L. Stephens 2007. Climate Change and Forests of the Future: Managing in the Face of Uncertainty. Ecological Applications 17(8): 2145-2151.

3) Davis, M. B. 1989. Lags in vegetation response to global climate change. Climate Change 15:75-82.

4) Smith J.E., and D.A. Tirpak, eds. 1989. Potential impacts of climate warming vol. 1, Regional Studies, Chapter 4. EPA-230-05-89-050. Washington D.C.: U.S. Environmental Protection Agency.

GL1.2. Identification of Risks to the Project and Risk Mitigation Strategies

Though the project is expected to conserve biodiversity, the effects of climate changes on species are not completely known. Research suggests that creating diverse forest conditions is a good way to have forests adapt to climate change when the outcome is not known. We anticipate that preserving and increasing forest cover will aid as a buffer for species to slowly adapt to climate change. Species are expected to move upslope as temperatures increase. Wildlife is expected to migrate faster than plant species which may leave wildlife without suitable habitats.

Throughout project implementation special attention will be given to species migration. As native tree species are planted project implementers will work to increase corridors, as well as increasing forest cover upslope. Species will be planted that are not known to be sensitive to changing temperatures.

GL1.3. Demonstration that Climate Change Impacts Community Well-being and Biodiversity

Many farmers within the project areas depend on rain-fed crops, and extended droughts present the biggest problems to these communities. Farmers are already affected by drought in the neighboring communities and continuing climate change will exacerbate these conditions.

Farmes in the project zone are mainly cocoa producers. The comparison of cocoa yields between communities located upstream on the banks of Alto Huayabamba, where area is still quite forested, and communities located in the deforested plain around Juan Jui, shows that cocoa yields are 5 to 7 times higher in the forested areas (1.5 to 2 tons per ha vs. 300kg per ha), with the same crop and same cultivation techniques. The farmers in the deforested area around Juan Jui suffer from lack of shade and water, especially in the dry season. They are also more threatened by propagation of fires.

Forest fire frequency and intensity is expected to increase with droughts, and will also greatly affect communities. Increased fire will destroy forest, and associated products from food crops to timber. Increased fire intensity may also destroy homes and settlements as many communities are in close proximity to forests.

On the other side, in the rainy season, the heavy rains becoming more and more frequent given the changing climatic conditions, coupled with the absence of forest covers would result lead widespread splash and sheet erosion that would decrease soil fertility, as well as increase land slides risks, therefore threatening communities.

Since many community members depend on forests for livelihoods for some or part of the year, climate change will cause an increasing loss of livelihoods.

GL1.4. Demonstration that Project Activities Assist Communities and Biodiversity to Adapt to Climate Change

The project team is developing strategies to respond to more severe weather conditions that may emerge in the project area as a result of climate change. The project will focus on retaining maximal forest cover to minimize micro-climatic change and ensure slowed water run-off and optimal ground water recharge as ways to mitigate drought. The project will provide small grants to participating communities for develop agro-forestry and agro-ecological practices to ensure crop protection during climate change educed droughts. The potential devastating impact of forest fires will be minimized by educating local people (and hunters) on the importance of preventing forest fires. The project will also support the development and improvement of the walkways one of the most necessary needs expressed urgently by the local community. Assisted Natural Regeneration of degraded forest patches will ensure that forest restoration is based on native species that can adapt to local soil, water, and climatic conditions.

Reforestation activities with project communities will also be developed to guide the restoration of degraded forests each year. The project will result in the enrichment planting of indigenous trees in forest gaps and deforested areas, which will help reduce erosion and slow water run-off. The Community Forestry Management Committee will also be trained and supported to implement better fire fighting techniques including the establishment and management of village fire brigades, and the establishment of stronger fire prevention regulations.

GL2. Exceptional Community Benefits

The project will train Community Forestry Groups in project communities in managing forest protection, reforestation operations, enrichment planting, and project management. This will include project planning, budgeting, bookkeeping, reporting, and technical techniques. Once trained, Community Forestry Groups will be asked to work with the project implementer to develop annual work plans and directly manage project operations in their area. As a consequence, communities will not only be participating in the project, but will be responsible for much of the actual management.

The project seeks to build the community capacity not only to staff, but to manage project activities. Community members have been involved in project preparation work since the beginning. Any activities developed with the Community Forestry Groups will naturally involve the hiring of project community members. Technical support will be provided largely by ACOPAGRO staff, who are residents within the province.

GL2.1. Demonstration that the Project Zone is a Low Human Developed Country

According to INEI[34], the poverty line in 2011 for Forest rural area is of 202 Nuevo Soles per month and per capita.

Individual surveys were conducted by the Fundacion Amazonia Viva with CREAR in August 2012 among 177 adult community members of the participating communities (representative sample of total adult estimated population in the participating communities of around 4000 persons)[35]. The survey results show that 77.9% of the families earn less than 600 Nuevo Soles per month. The survey also shows that families are constituted of 4,6 persons per family in average (76% of families with more than 4 people).

This means 77.9% of the families have a mensual income per capita of less than 130.4 Nuevo Soles, which is under the poverty line. **78% of the families involved in the project live below the poverty line.**

In that sense, the project zone can be considered as a low human developed country.

Additionally, the survey show the poor development and living conditions of the families with regards to education (66% have no education or only primary education), basic services (10% only have access to water, 12% to electricity), communication (3% only have access to phone).

GL2.2. Demonstration that the Poorest Communities will benefit from the Project

The poorest communities are the remote communities living on the shores of the river Huayabamba, more upstream than Huicungo, and the 3 communities inside the Martin Sagrado concession in the mountains.

Huicungo is the most populated community (small town) of the participating and impacted communities along the river with 800 families; Dos de Mayo is the second bigger populated center with around 300 families. Most families in Huicungo have road access, electricity, telephone, and some access to public water. They are therefore among the most priviledged of the participating communities. Dos de Mayo has communal lighting and electricity at night, better education services, and waste disposal services.

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[34] Instituto Nacional de Estadistica y Informatica, *Informe Técnico, Evolución de la Pobreza, 2007-2011,* 2011

[35] CREAR , *Informe de diagnóstico para la elaboración del plan operativo de difusión y sensibilización. Biocorredor Martín Sagrado*, August 2012

The most disadvantaged communities are therefore all the remaining participating communities but Huicungo and Dos de Mayo (approximately 50% of the involved population)

The project aims precisely at helping these communities that have less resources and services and that are more likely to keep deforesting for expanding their crops. These communities live in very basic condition, well below the poverty line and with no or very limited education, and very limited access ot basic services. (see section above). These low income households in San Martin Province rely solely on agricultural and forest products as their only significant source of income, and depend heavily on river water for their household needs. Forest protection and forest improvement will help these communities by protecting their income source and water sources.

Additionally, the non-timber forest activities developed by the project will target in priority these remote communities to offer economic alternatives to agriculture expansion and illegal timber harvesting. The households that have the lowest income will therefore benefit the greatest.

Activities already developed in the project prove that focus is put on the poorest communities to help them develop sustainably.

The Project Design Team has relied substantially on the knowledge of the ACOPAGRO staff who works with some of the poorest communities. This has given the Project Design Team a better understanding of local culture and adapting project strategies to blend well with local values and beliefs. Those whose livelihood depends on the forest will have the best local knowledge of common forest practices, local ecology and traditional customs.

GL2.3. Demonstration that Poor and More Vulnerable Households will not be Negatively Affected

The project will work with communities' leaders to identify members who are in need of fulltime or part-time employment and provide specific training for project involvement. Special attention will be given to ensuring that the capacity building opportunities are shared fairly among the community and that disadvantaged households, especially the poorest community members, receive special attention. A significant barrier to low-income groups has been a lack of access to and education about alternative incomes. They also lack specific necessities to link them to larger markets, and the capital needed to start alternative incomes. This project will both educate local communities in the many income topics listed above as well as aid in the basic knowledge of literacy and bookkeeping. By capacity building within communities and by connecting communities both with each other and ACOPAGRO Cooperative, households will be able to network resources and access larger markets.

The project will also facilitate a number of micro loans that will directly benefit disadvantaged and low-income households by providing the initial capital needed to generate alternative incomes. Village youth from low income families will be engaged as fire watchers, forest monitors, and nursery managers, and in other related roles.

Women will be targeted for training in craftwork, literacy classes, bookkeeping and management of micro-finance groups. Women are already playing an important leadership role in the CFMC. The project will support and encourage women's leadership in CFMC governance including management and planning activities. The project will also attempt to create linkages between women leaders in other stake-holding institutions such as ACOPAGRO and local government. The project will identify women leaders in the CFMC and in villages who can help organize capacity building activities where women's involvement or expertise is high, such as certain NTFP collection, processing, ecotourism and marketing or in household financial management. Training modules and programs specifically designed for women may include bookkeeping and microfinance organization management, marketing, and handicraft production. The organization of Self Help Groups and literacy programs for women will also be explored. Gender awareness will be raised among the communities as a whole in order to create increased appreciation and opportunities for women's participation.

GL2.4. Demonstration that Disadvantaged Groups will not be Negatively Affected

Often disadvantaged groups become associated with jobs of greater health risk. Workers may be at risk from forest fires, and falling trees associated with thinning operations. Special attention will be given to make sure that the communities work group will be from diverse backgrounds and that knowledge of any risk associated with project employment is understood by all means possible.

GL2.5. Community Monitoring of Disadvantaged Groups

Community monitoring will be continual with an annual participatory exercise to assess the extent to which project activities are achieving the community and project goals. The monitoring exercise specifically looks at social indicators and relies on community input. Special attention will be given to disadvantaged groups and women's input, attitudes, behaviours, and levels of participation in the project. If disadvantaged groups are lacking in participation of any part of the project, ACOPAGRO Cooperative, who has worked with the community in the past, will collaborate on ways to have better communication.

GL3. Exceptional Biodiversity Benefits

GL3.1. Demonstration of High Biodiversity Conservation Priority through the Vulnerability Criterion

As described in section G1.8.1.b, 21 species on the IUCN red list have been registered and identified with a high probability of occurence in the project area, 1 being critically endangered (CR) and 4 being endangered species (EN).

Table 41 : Endangered species in the proposed project zone

ESPECIES	GRADO DE AMENAZA		
	PERU	UICN	CITES
FLORA			
Cyathea spp. "helecho arbóreo"	--	--	II
Podocarpus oleifolius "saucecillo"	CR	LC	--
Ceroxylon crispum "palma de cera"	VU--	--	--
Cedrela odorata "cedro"	VU	VU	III
Cedrela montana "cedro"	VU--	--	--
Cedrela lilloi "atoc cedro"	EN	EN	--
Swietenia macrophylla "caoba"	VU	VU	II
Polylepis multijuga "quinoa"	EN	VU	--
Juglans neotropica "nogal"	NT	EN	--
FAUNA			
Aves			
Aulacorhynchus huallagae "tucancito semiamarillo"	EN	EN	--
Aburria aburri "pava negra"	NT	NT	--
Hemispingus rufosuperciliaris "hemispingo cejirufo"	VU	VU	--
Leptosittaca branickii "loro de mejillas doradas"	VU	VU	II
Thripophaga berlepschi "rabiblando bermejo"	EN	VU	--
Mamíferos			
Oreonax flavicauda "mono choro de cola amarilla"	EN	CR	I
Aotus miconax "mono nocturno"	EN	VU	II
Callicebus oenanthe "mono tocon andino"	VU	EN	II
Pudu mephistophiles "sachacabra"	EN	VU	II
Tremarctos ornatus "oso de anteojos	EN	VU	I
Panthera onca *"otorongo"*	-	VU	I
Tapirus terrestris *"sachavaca"*	-	-	II

Source. UICN 2008; CITES, PERU 2004 y 2006.

Through project implementation many endangered and vulnerable species will potentially be protected and populations enhanced. The project will directly help IUCN endangered indigenous tropical hardwoods by planting the species within the project area. The project will also directly affect IUCN endangered, threatened and vulnerable wildlife that use the project area or the services they provide.

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