

MONITORING & IMPLEMENTATION REPORT #1 – 2015

BIOCORREDOR MARTIN SAGRADO REDD+ PROJECT



Project Name	Biocorredor Martin Sagrado
Project Location	Peru, San Martin Region
Project Proponent	Pur Development Pte. Ltd., hereinafter referred to as "Pur Projet" Ltd.336 Smith Street, #07-302, New Bridge Center, Singapore (050336), Contact : Pierric Jammes - Managing Director - +33 1 55 28 98 07 pierric@purprojet.com
Auditor	Ecocert S.A., 36 Bd.de la Bastille, 75012 Paris, France Contact: Liana Morera – GHG Project & Forest Certification Services Manager +33 1 53 44 74 45 , liana.morera@ecocert.com
Project Start Date	January 1 st , 2010
GHG Crediting period and lifetime	The Crediting Period is January 1st 2010 to December 31st 2049. The Project lifetime is 80 years
Project Implementation period	January 1 st , 2010 to October 22 st , 2015
History of CCB Status	CCB Validation achieved on the 02/25/2013.
CCB Standards Edition Used	CCB Standard, Second Edition, December 2008
CCB Benefits Summary	The project has successfully reduced the deforestation in a project area of 295 654 hectares, avoiding GHG emissions by 162 258 tCO ₂ eq in the monitoring period. The project has successfully implemented activities in more than 30

	different communities gathering more than 10 000 people, over a total leakage management area of more than one million hectares. The project has implemented direct economic diversification and agriculture intensification activities in more than 400 households. The activities include development of non-timber forest products supply chains (honey, seeds, fish breeding, medicinal plants), reforestation in agroforestry models, solar energy units and improved cook stoves. The project created more than 10 fixed positions, and contracted members of communities for support.
Gold Level Criteria	The project has contributed to the preservation of High Conservation Value areas hosting 21 species on the IUCN red list (among which 1 is critically endangered and 4 endangered). Inventories, observations and fixed-spot photography enabled to observe the continued presence of Otorongos, Sachavacas/Tapirs, Pavas Negras, Mono Tocon, Gallito de las Rocas, Cedro Nativo, Helecho Arboreo. The project also contributes to the preservation of some endangered flora species, by re-planting them via the reforestation activities in the communities (Cedrela Odorata, Swetiena Macrophylla). The project is directly contributing to the education, capability development, and income diversification and increase of the population in more than 20 participating communities, where 78% of the families live under the poverty line, 66% have no education or only primary education, 10% only have access to water, 3% only have access to cellular phone.
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Prepared By	Pur Projet
Contact	4, Rue de la Pierre Levée, 75011 Paris + 33 1 55 28 98 07 contact@purprojet.com www.purprojet.com

Table of Contents

1	General.....	6
1.1	Summary Description of the Project (G3)	6
1.2	Project Location (G1 & G3)	9
1.3	Project Proponent (G4)	14
1.4	Other Entities Involved in the Project (G4).....	14
1.5	Project Start Date (G3).....	17
1.6	Project Crediting Period (G3)	17
2	Implementation of Design	19
2.1	Sectoral Scope and Project Type.....	19
2.2	Description of the Project Activity (G3)	19
2.2.1	Legal.....	19
2.2.2	Control and Surveillance	21
2.2.3	Sensibilization and Communication	21
2.2.4	Non-Timber forest valuation	23
2.2.5	Scientific and Inventory	24
2.2.6	Renewable Energy	25
2.2.7	Reforestation	26
2.2.8	Expansion, training and empowerment of communities	27
2.3	Management of Risks to Project Benefits (G3)	30
2.4	Measures to Maintain High Conservation Values (G3).....	32
2.5	Project Financing (G3 & G4)	33
2.6	Employment Opportunities and Worker Safety (G4).....	34
2.7	Stakeholders (G3)	35
3	Legal Status	38
3.1	Compliance with Laws, Statutes, Property Rights and Other Regulatory Frameworks (G4 & G5) 38	
3.2	Evidence of Right of Use (G5)	39
3.3	Emissions Trading Programs and Other Binding Limits (CL1)	39
3.4	Participation under Other GHG Programs (CL1)	40
3.5	Other Forms of Environmental Credit (CL1)	40
3.6	Projects Rejected by Other GHG Programs (CL1)	40
3.7	Respect for Rights and No Involuntary Relocation (G5).....	40
3.8	Illegal Activities and Project Benefits (G5)	41
4	Application of Methodology	42

4.1	Title and Reference of Methodology	42
4.2	Deviations from the Monitoring Plan	42
4.3	Project Boundary (G1)	42
4.3.1	Spatial boundaries.....	42
4.3.2	Temporal boundaries	45
4.3.3	Carbon Pools.....	45
4.4	Baseline Scenario (G2)	47
4.4.1	Baseline Scenario	47
4.4.2	Definition of the land-use and land-cover change of the baseline	49
4.4.3	Description of How the 'Without Project' Scenario Would Affect Communities	49
4.4.4	Description of How the 'Without Project' Scenario Would Affect Biodiversity.....	50
4.5	Additionality (G2).....	50
5	Monitoring Data and Parameters	54
5.1	Description of the Monitoring Plan (CL3, CM3, B3)	54
5.1.1	GHG removals monitoring.....	54
5.1.2	Global monitoring plan	57
5.1.3	Organizational structure for monitoring	59
5.1.4	Adaptative management plan	59
5.1.5	How the monitoring information will be disseminated in order to encourage replication of successful practices	60
5.2	Data and Parameters Available at Validation (CL3)	60
5.3	Data and Parameters Monitored (CL3, CM3, B3).....	61
6	Quantification of GHG Emission Reductions and Removals (CLIMATE)	63
6.1	Baseline Emissions (G2).....	63
6.2	Project Emissions.....	63
6.3	Leakage.....	65
6.4	Summary of GHG Emission Reductions and Removals (CL1 & CL2).....	66
6.5	Climate Change Adaptation Benefits (GL1).....	66
7	Community	68
7.1	Net Positive Community Impacts (CM1)	68
7.2	Negative Offsite Stakeholder impacts (CM2).....	71
7.3	Exceptional Community Benefits (GL2)	72
8	Biodiversity	72
8.1	Net Positive Biodiversity Impacts (B1)	72
8.2	Negative Offsite Biodiversity Impacts (B2).....	74
8.3	Exceptional Biodiversity Benefits (GL3)	75

1 GENERAL

1.1 Summary Description of the Project (G3)

1.1.1 VCS summary description

The Biocorredor Martin Sagrado REDD+ Project aims to address deforestation and its resulting emission of greenhouse gases (GHG) in the Huayabamba river watershed, in the Department of San Martin, Peru. The project's main objective is to protect the remaining areas of primary forests in Huayabamba watershed, hosting high conservation value ecosystems, and providing multiple ecosystem services for the populations living in the buffer areas around the forests. In particular the forests there host multiple water sources, vital for the populations' livelihood and agriculture. The project seeks to protect these exceptional ecosystems, while improving the quality of life of the families that live in these areas and depend upon forest resources and services.

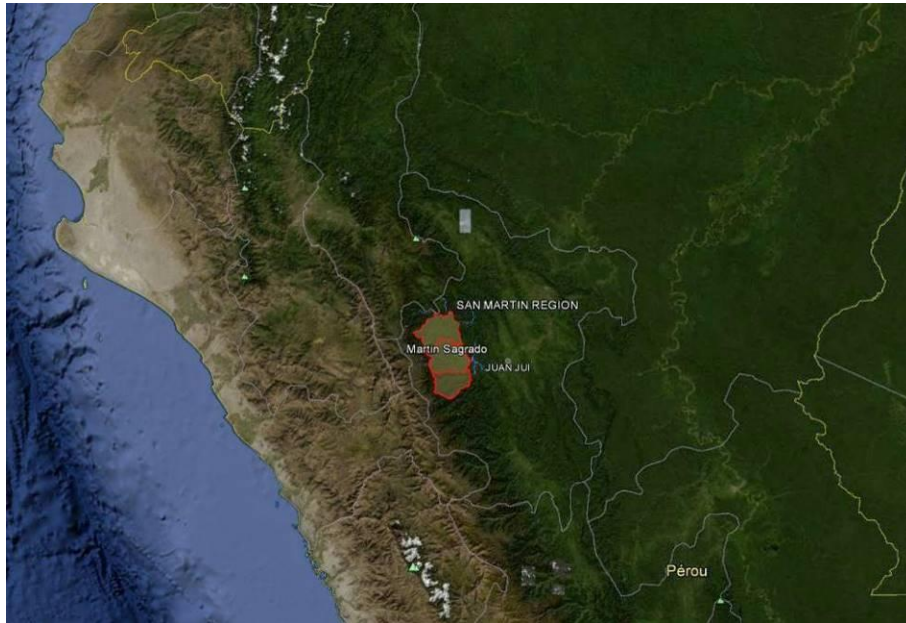
The project started in January 2010 at the initiative of Pur Projet, Acopagro cooperative, APROBOC, APAP, APAPMASAR, and APAHUI associations, the latter 3 deciding to gather (along with Oro Verde cooperative) to create, at Pur Projet's initiative, the "Fundacion Amazonia Viva", a non-profit democratic organization aiming to coordinate the community activities and projects in favor of community reforestation and conservation in San Martin region. The REDD+ project started as a complementary strategy to the "Alto Huayabamba" community reforestation project, implemented by Acopagro cooperative since 2008 with Pur Projet support, with more than 2,200,000 trees planted by more than 1800 farmers before the end of 2014.

The REDD+ project initially started with the protection of 3 concessions for conservation (El Breo, Martin Sagrado, Montecristo, owned by community associations and cooperatives) over a total area of 295 654 hectares of forest at the heart of Huayabamba watershed, but with a broader and long-term vision to involve all communities in the Huayabamba watershed (over an area close to 2 million hectares) in the sustainable management of their watershed and remaining forests.

The project supported communities in creating democratic organizations (mostly associations) and claiming concessions for conservation, for the populations to sustainably manage and conserve their own forests area. As a result of this large-scale and participative project strategy, more communities wished to join the project and were supported by the project to claim their own area of conservation, with 16 new concessions owned and managed by community associations and organizations, covering 159 785 hectares, already attributed or in the process of being attributed.

The strict project area is therefore constituted by the 3 initial concessions for conservation over an area of 295 654 hectares, but the project has supported the extension of protected areas to more than 450 000 hectares. The new concessions will constitute the formal project area of a second REDD+ project (extension of the current one).

Figure 1: General location of the project



Since its creation, the Fundación Amazonia Viva has been in charge of the overall coordination and management of the Biocorredor Martín Sagrado project, through a consultative and participative process empowering the communities in their own management of economic development and ecosystem preservation. All communities were consulted and participated in the project design, and communities who voluntarily decide to participate in the project choose the activities they will implement in their area of influence, under the supervision and technical assistance of the Fundación Amazonia Viva.

This Biocorredor Martín Sagrado project supports sustainable forest management, agroforestry, non-timber economic activities and livelihood development in the area of influence of the project. The project aims to create long-term diversified income streams that will directly enhance household livelihoods and natural resource management capacity. The project supports rural communities in developing a range of livelihood activities including non-timber forest products, improved agroforestry activities and productivity intensification, community-based ecotourism infrastructure, as well as other economic, social, cultural and environmental activities. The project also helps communities to implement the measures necessary to control and monitor deforestation within the project area, enforce the law.

Since the project start, the mobilization of the communities 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 the Fundación Amazonia Viva and Pur Projet. These activities are discussed, prioritized and budgeted yearly by the communities and the Fundación Amazonia Viva.

As a result of the large-scale and long-term vision of Pur Projet and the Fundación Amazonia Viva, the project has consistently gained increasing attraction among communities spread over larger areas and various regions. The project therefore meets its initial ambition by going way beyond the strict preservation of the project area and working with communities in an area of close to 2 million hectares spread across 3 regions (San Martín, La Libertad, Amazonas), with outstanding outcomes rewarded by international recognitions: registration of the whole area under the “Bosque Modelo / Model Forest” network in 2014, and current registration of the 2 million-hectare area as a Biosphere Reserve at UNESCO, for the project’s outstanding model of community management for sustainable economic development and preservation of exceptionally rich ecosystems.

1.1.2 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 of Biocorredor Martin Sagrado project area's and neighboring forests. This effort is estimated to lead to a net impact of 8 789 000 Tons of CO₂ eq emissions avoided (after leakage), over the 40-year crediting period. The project leverages 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 capabilities of local communities and involved cooperatives (Acopagro, Apahui, Cooparm, etc.) to conserve forests collectively, through a strong coalition of stakeholders who are committed to achieve the project goals including supporting villagers to improve the quality of forests, maximizing benefits to local communities participating in the project.

Operationally, the success of the project depends on the development of communities' capabilities and awareness raising, in order to protect forests through legal recognition, technical and financial support. The institutional, logistical, and political support of the Fundacion Amazonia Viva, in coordination with government instances, enhances the effectiveness of community efforts to protect forests. Community reforestation, agro-forestry, are implemented in the project area's buffer zone, in order to reduce further pressure on the remaining forests. The emphasis on community involvement will minimize long-term permanence risks.

Through supporting and documenting the role that communities play in forest carbon conservation and sustainable management, The Fundacion 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 duplication of this strategy as a national program.

The long-term goals of this project are to avoid GHG emissions, contribute to the devolution of forest management rights to rural communities, and contribute to a sustainable territorial development with effects at a larger scale.

Community Objectives

The project seeks to ensure the security of families in the project community and to assist them by increasing opportunities of diversified incomes, as well as improved livelihood based on a sustainable use of their natural resources. The project strengthens community leadership, organizational and financial capabilities, improves relationships with local government, helps resolve conflicts on the use of natural resources, and educates farmers and communities on climate change, forest management, ecosystems management, as well as economic diversification and community management. 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.

Training, technical support, and funding for non-timber forest livelihood activities (such as the sustainable use of forest resources – seeds, medicinal products, honey, etc.) 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 are encouraged too and economic development via diversified economic activities.

Biodiversity Objectives

This project contributes to the protection and conservation of Peru endangered flora and fauna in tropical rainforests by supporting the engagement of rural communities as local managers. Project technical staff facilitates 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.

Beyond the project area of 295 654 hectares, a global project strategy for an area of 2 million hectares encompassing the project area ensures the surrounding area and neighboring communities will be positively affected by project implementation.

1.2 Project Location (G1 & G3)

1.2.1 Project location and Boundaries

Project Location

The project is located in Northern Peru, in the western part of San Martin province. The province of San Martin is located in the Amazon Andes, tropical region of Peru, at the transition between the high Andes and the lower Amazon basin.

The project zone is constituted by the Huayabamba River watershed, 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.

Project area

The project area is constituted by 3 concessions with conservation purposes spreading over a total area of 295 654 hectares, listed in the table hereafter.

Table 1 : Table of concessions in the project area

Region	District	Conservation areas (concessions for conservation, protection areas)	Concessionaire	Community	Area (hectares)
San Martin	Saposoa	CC-Martin Sagrado	Cooperative ACOPAGRO	N /A	108 818
San Martin	Huicungo	CC-El Breo	Association APROBOC	Dos de Mayo	113 826
San Martin	Huicungo	CC-Montecristo	Association APAHUI	Huicungo	81 055
				TOTAL PROJECT AREA	295 654

Removing the non-forested areas from the total area of the 3concessions, we get the exact project area, which covers 295 654 hectares (see figure 1).

Other areas of conservation in the project's leakage belt

As targeted by the project since the beginning, the area under conservation was progressively extended over the first years of the project, as more communities of the Huayabamba watershed showed interest in the project and decided to join, and as the project supported them to create formal associations, demarcate areas they would like to dedicate to conservation, and claim concessions for conservation at

the Regional Government. As a result of the continuous project's efforts, the regional government attributed 16 more concessions to communities (listed in Table 2).

While these additional concessions cannot be included in the project area, the plan is to include them in the project area of a new REDD+ project (extension of the current one)

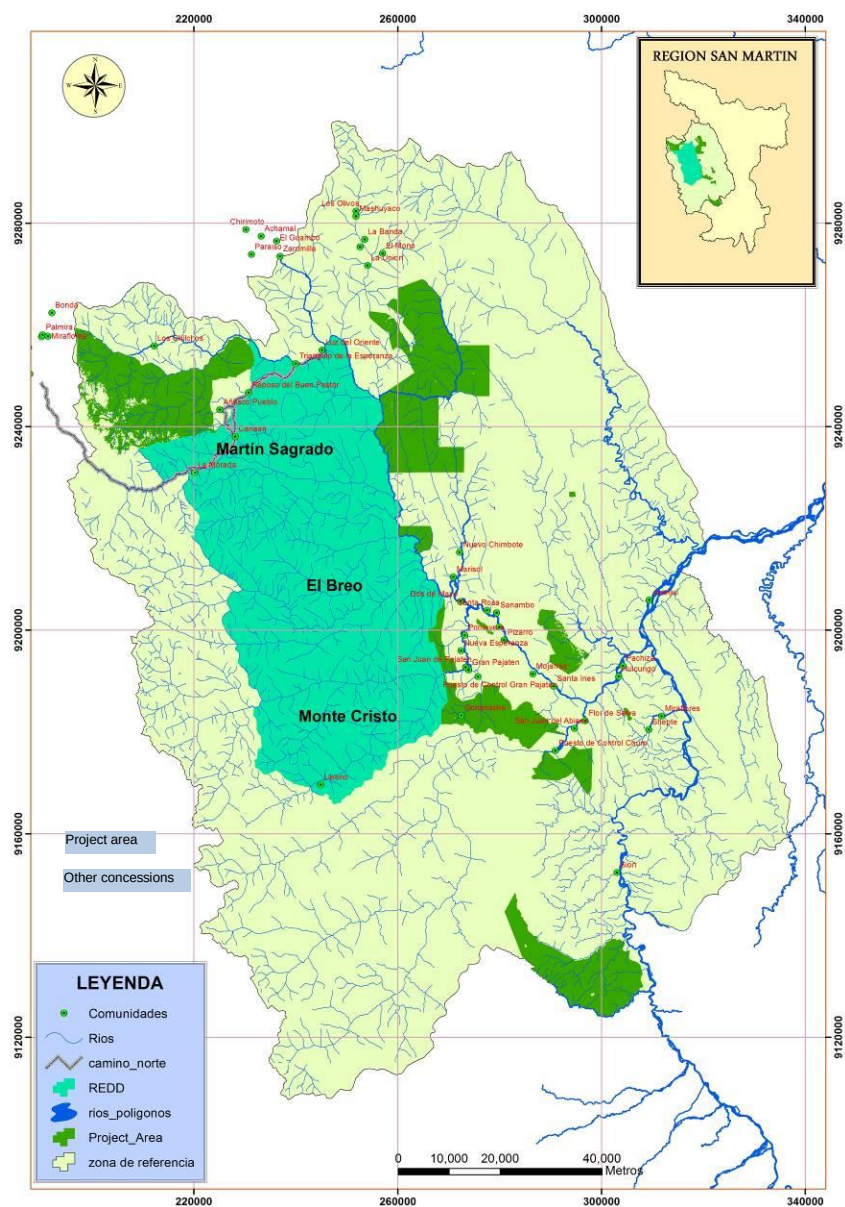
Table 2 : Table of additional concessions for conservation supported by the project (to be included in another REDD+ project – extension of the existing one)

Region	District	Conservation areas (concessions for conservation, protection areas)	Concessionaire	Community	Area (hectares)
San Martin	Pachiza	CC-Tamushal	Association SHEMACACHE	Nuevo Chimbote	2 156
San Martin	Huicungo	CC-Salas	Association SALAS	Salas	233
San Martin	Huicungo	CC-Pucalpillo	Association APAP	Pucalpillo	304
San Martin		CC-Maquizapa	Association SOLAPACHE		13 247
San Martin	Huicungo	CC_Nueva esperanza	Association PUMASAPA	Nueva Esperanza	1 124
San Martin	Huicungo	CC-Dos de Mayo	Rondas Campesinas	Dos de Mayo	670
San Martin	Huicungo	CC-Gran Pajaten	Rondas Campesinas	Gran Pajaten	8 185
San Martin	Huicungo	CC- San Juan de Pajaten	Asociacionde productores	San Juan de Pajaten	300
San Martin	Sion	CC-Valle del Sion	Asociación de productores del valle de Sion	Sion	24 445
San Martin	Piscocoyacu	CC-quebrada Bujurque	Asociacion para la conservacion del Bosque la Primavera	Piscocoyacu	120
San Martin	Huicungo	CC-San Juan del Abiseo	Asociacion de productores San Juan del Abiseo	San Juan del Abiseo	6 084
San Martin	Pachiza	CC-Tres Quebradas	Asociacion de productores Bagasan	Bagasan	4 177
San Martin	Pachiza	CC-Shitariyacu	Asociacion de productores Ricardo Palma	Ricardo Palma	1 573
San Martin	Saposoa	CC-Gran simacache	Asociacion de productores Saposoa	Saposoa	41 029
Amazonas	Leymebamba	CCP - Los Chilchos	comunidad campesina de Leymebamba	Leymebamba	40 000
Amazonas	Saposoa	CC-Jardines angeles del sol	Asociacion de productores agropecuarios la primavera-sector paujil	Distrito de saposoa	7 140
				TOTAL AREA	150 785

Reference Region:

The reference region encompasses the two provinces of Mariscal Caceres and Huallaga. The reference region was chosen to meet all criteria of the VCS Methodology VM0015, in terms of size, homogeneity of drivers of deforestation, landscape and ecological conditions, socio-economic and cultural conditions.

Figure 2 : Location of the project area in the reference region



1.2.2 Project area parameters

The proposed REDD project activity takes place in the Tropical Rainforest area (according to GPG LULUCF 2003, IPCC1). According to the Köppen Classification System2, 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.

¹ IPCC, Good Practice Guidance for Land Use, Land-Use Change and Forestry, 2003

² 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

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.

1.2.2.1 Geology and soils

Geological units

- **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.
- **Yarahungo 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 area 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.

Soils units:

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 "Zonificación Ecológica Económica 2004", made by the regional government of San Martín, following the US Soil Taxonomy (1990)

Climate :

The proposed REDD project activity takes place in the Tropical Rainforest area (according to GPG LULUCF 2003, IPCC³). According to the Köppen Classification System⁴, 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.

According to the Economic Ecological Zoning San Martín Region⁵, 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.

³ IPCC, Good Practice Guidance for Land Use, Land-Use Change and Forestry, 2003

⁴ 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

⁵ Zonificación Ecológica Económica de la Region San Martín, Diciembre 2005

1.3 Project Proponent (G4)

Project Proponent : Pur Projet

Organization name	Pur Development Pte. Ltd., hereinafter referred to as "Pur Projet".
Contact person	Pierric Jammes
Title	Managing Director
Address	Ltd.336 Smith Street, #07-302, New Bridge Center, Singapore (050336),
Telephone	+33 1 55 28 98 07
Email	Pierric@purprojet.com

Roles / responsibilities: The Project Proponent Pur Projet is the project developer, who started the project on the field, participates in project design, administrates project activities and funds, including revenues from the sale of carbon credits, conducts monitoring and inventory activities, supports forest protection and enforcement, guarantees capacity building for local communities and stakeholder consultation.

1.4 Other Entities Involved in the Project (G4)

1.4.1 Stakeholders

Fundacion Amazonia Viva:

The Fundacion Amazonia Viva (Fundavi) 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 cooperative, and 3 local community associations : APAHUI (Asociacion de Productores Agropecuarios de Huicungo), APAP (Asociacion de Productores Agroforestales Pucallpillo), APAPMASAR (Asociacion de Productores Agropecuarios y Protectores del Medio Ambiente Santa Rosa). It is operated by an assembly of representatives from each member organization, and works with a management and technical team responsible for planning of activities, daily coordination of activities, and management of funds.

The Fundavi was created to support and coordinate the efforts of each organization, to reach a higher level of effectiveness and recognition. The Fundavi is a mean to increase 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 Fundavi 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.

Contact: Roldan Rojas Paredes, Jr. Sargento Lores s/n Cda 01 - Juanjuí – San Martin - Perú,
Phone: (+51) 951 641 290 roldan_martin_sagrado@hotmail.com

Cooperative ACOPAGRO:

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 and NOP (National Organic Program)) 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.

ACOPAGRO and PUR PROJET set up a reforestation program in 2008 called Alto Huayabamba. The plantation started in April 2008 and has planted more than 2.2 million trees until end of 2014, on degraded 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 carbon credits and was certified according to the VCS standard.

Acopagro has been strongly involved in the development of the REDD+ project and owns a concession for conservation Martin Sagrado over an area of 108 818 hectares.

Contact: Gonzalo Ríos, Jr. Arica 203- Juanjuí - Perú,
phone: +51 42 545190, acopagro@acopagro.com.pev

APROBOC (Association de Proteccion de bosques Comunales Dos de Mayo) :

Dos de Mayo is the most populated village in the area (2000 inhabitants). They are considered as a “minor populated center” and have a delegated mayor. 59% of the inhabitants 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. 10.34% of the villagers are illiterate, 48.28% have a primary education, 34.48% have a secondary education and 6.9% have a higher education. There is a medical center in the village. The Association de Proteccion de bosques Comunales Dos de Mayo is strongly involved in the REDD project since the beginning, with the first concession for conservation constitutive of the REDD+ project area: concession El Breo, over an area of 113 826 hectares.

APAHUI (Asociacion de Productores Agropecuarios de Huicungo) :

Huicungo, located on the banks of the Huayabamba river, only 10km before the junction with Huallaga river, is a major populated centre, and a district municipality. Major incomes come from cocoa production, with some farmers members of ACOPAGRO cooperative, while others have joined APAHUI, who has developed into a complete cocoa cooperative. APAHUI is a founding member of the Fundacion Amazonia Viva and has been involved in the whole development of the REDD+ project. APAHUI owns the concession for conservation Montecristo of 81 055 hectares.

APAP (Asociacion de Productores Agropecuarios de Pucalpilllo)

Pucalpilllo: 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 1000kg/ha. 56% of the inhabitants have a primary education, 36% have a secondary education, 6% are illiterate and 2% have a higher education (no university). There is no medical centre in the village. Strongly involved in the project since the beginning, APAP is a founding member of the Fundacion Amazonia Viva and has been involved in the whole development of the REDD+ project. APAP owns a concession for conservation Pucalpilllo of 304 hectares.

APAPMASAR (Asociacion de Productores Agropecuarios y Medio Ambiente de Santa Rosa)

Santa Rosa: on the bank of the Huayabamba river, Santa Rosa is constituted by approximately 40 cocoa farmers, majority of the area is dedicated to cocoa production, with average yields of 1500 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, APAPMASAR is a founding member of the Fundacion Amazonia Viva and has been involved in the whole development of the REDD+ project. APAPMASAR is now soliciting a concession for conservation of 10 000 ha.

Other concessionaires

Across the development of the project, multiple communities decided to group as associations and claim concessions for conservation. They have been supported by the Fundacion Amazonia Viva in their institutional creation as well as in the process of claiming concessions for conservation.

The list of concessionaires and their respective concessions is detailed in Table 1 above.

Other communities

Beyond associations owning a concession for conservation, multiple communities located in the area of influence of the project are involved and participate in the REDD+ project activities.

Table 3 : Table of participating communities

REGION	PROVINCIA	DISTRITO	COMUNIDAD	POBLACION ESTIMADA	ASOCIACION / ORGANIZACION	CONCESION	AREA TOTAL (hectares)
COMUNIDADES ACTIVAS - CONCESIONARIOS							478 991,06
SAN MARTIN	Mariscal Caceres	Huicungo	Dos de Mayo	1 536	Asociacion de proteccion de bosques comunales Dos de Mayo Alto Huayabamba (APROBOC)	CC-El Breo	113 826,13
SAN MARTIN	Mariscal Caceres	Huicungo	Huicungo	2 395	Asociacion de Productores Agropecuarios de huicungo (APAHUI)	CC-Montecristo	81 055,08
SAN MARTIN	Huallaga	Saposa	Saposa		Cooperativa Agraria Cacotera ACOFAGRO	CC-Martin Sagrado	108 817,73
SAN MARTIN	Mariscal Caceres	Huicungo	Pucapillo	132	Asociacion de Productores Agropecuarios Pucapillo (APAP)	CC-Pucapillo	304,04
SAN MARTIN	Mariscal caceres	Huicungo	Santa Ines	293	Asociacion de productores agropecuario forestal y de conservacion Solapache (APAPCOSOL)	CC-Maquizapa	13 246,80
SAN MARTIN	Huallaga	Saposa	Distrito de saposa		Asociacion de Agricultores para la conservacion de bosques naturales del SIMACACHE	Gran simacache	41 029,06
SAN MARTIN	Mariscal Caceres	Pachiza	Nuevo Chimbote	1 000	Asociación productores agropecuario forestal y de conservación Shemacache (APAFCSH)	CC-Tamushal	2 156,12
SAN MARTIN	Mariscal Caceres	Huicungo	Salas	2 395	Asociación agroforestal y conservación de bosques del sector salas (AGROCOMBOS)	CC-Salas	232,52
SAN MARTIN	Mariscal Caceres	Huicungo	Nueva Esperanza	131	Asociacion de conservacion y desarrollo pumasapa nueva esperanza	CC_Nueva esperanza	1 124,45
SAN MARTIN	Mariscal Caceres	Huicungo	San Juan del Abiseo	85	Asociación Agroambiental de San Juan del Abiseo (ASAT)	CC-San Juan del Abiseo	6 083,74
SAN MARTIN	Mariscal Caceres	Huicungo	Gran Pajaten	52	Rondas Campesinas Gran Pajaten	CC-Gran Pajaten / Ochanache	8 184,52
SAN MARTIN	Mariscal Caceres	Huicungo	Dos de Mayo	1 536	Rondas Campesinas De dos de Mayo	CC-Dos de Mayo	670,00
SAN MARTIN	Mariscal Caceres	Huicungo	San Juan de Pajaten	37	Asociacion de productores San Juan de Pajaten	CC- San Juan de Pajaten	300,00
SAN MARTIN	Mariscal Caceres	Campanilla	Centro poblado del valle de Sion	750	Asociación de productores agroambientales del valle de Sion	CC-Valle del Sion	24 444,50
SAN MARTIN	Huallaga	Piscocayacu	Piscocayacu		Asociacion para la conservacion del Bosque la Primavera	CC-quebrada Bujurque	119,59
SAN MARTIN	Mariscal caceres	Pachiza	Bagasan	701	Asociacion de Areas de proteccion y conservacion las tres quebradas	Tres Quebradas	4 176,54
SAN MARTIN	Mariscal caceres	Pachiza	Ricardo Palma	233	Asociacion de conservacion productores Ricardo Palma	Shitariyacu	1 573,23
AMAZONAS	Huallaga	Saposa	Distrito de saposa		Asociacion de productores agropecuarios la primavera-sector paujil	CC-Jardines angeles del sol	7 140,00
AMAZONAS	Chachapoya	Leymebamba	Comunidad campesina de leymebamba		comunidad campesina de Leymebamba	CCP - Los Chilchos	40 000,00
AMAZONAS	Rodriguez de mendoza	Chirimoto	Chirimoto		COOPAR chirimoto viejo Distrito de limabamba	CC- Monte alegre	24 000,0000
AMAZONAS	Rodriguez de mendoza	Omnia	Nuevo Chirimoto		Asociacion de productores de Libano Nuevo chirimoto	CC-Hocicon	507,0000
COMUNIDADES ACTIVAS - SIN CONCESIONES							
SAN MARTIN	Mariscal Caceres	Pachiza	Santa Rosa	1 016	APAPMASAR		
SAN MARTIN	Mariscal Caceres	Pachiza	Marisol	250	ACAMAR		
SAN MARTIN	Huallaga	saposa	Canaan	520	Asociacion de productores agroecologicos del caserio de canaan (AGROECAN)		
SAN MARTIN	Huallaga	saposa	Triangulo de la Esperanza				
SAN MARTIN	Mariscal caceres	Huicungo	Mojarras	411	ASPRADEM		
SAN MARTIN	Mariscal caceres	Huicungo	Pizarro	362			
SAN MARTIN	Mariscal caceres	Huicungo	Primavera	225			
AMAZONAS	Amazonas	Leymebamba	Palmira		Asociacion agricola forestal y turistica palmira leymebamba		
AMAZONAS	Chachapoya	Leymebamba	Añzco Pueblo	70	Asociacion de productores agroecologicos de Añzco pueblo		

ONF International:

Technical partner assisting in the baseline scenario modeling, satellite images interpretations, and maps of deforestation.

Contact: Anne-Cécile Capel, Jardin Tropical, 45 bis avenue de la Belle Gabrielle,
 94732 Nogent sur Marne cedex, France
Phone: +33 1 43 94 72 94, ac.capel@onfinternational.com

1.4.2 Identification of key skills and Experience of Management Team

Fundavi: Fundavi's members, 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 Fundavi 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 Fundavi technical team includes highly skilled agronomists and environmental engineers with previous extensive experience in community reforestation project, an economist with strong experience of relationship with local authorities, legal issues, and community management supported by two assistants (Administrative and Accounting).

Acopagro: As mentioned, Acopagro implemented with Pur Projet a community reforestation project since 2008 with 2000 farmers, and hosts a technical team of 12 persons (agronomists, forest engineers, technicians) dedicated to reforestation, conservation and environment. For the REDD+ project in particular, Acopagro employs 2 engineers and an economist.

Pur Projet: a private organization based in Paris, France, and specializing in the development of community forest and agroforestry projects, in particular through the sale of carbon credits. Pur Projet has developed similar projects with rural communities of tropical regions in the world.

- Alto Huayabamba community A/R project, VCS validated in 2012 and verified in 2014
- Jubilacion Segura community A/R project, to be VCS validated and verified in 2015
- Aprosacao community A/R project with small-scale cocoa farmers ongoing Gold Standard validation in Honduras.
- Pur Projet has a portfolio of 20 other A/R community projects with small farmers in developing countries (Indonesia (2), Thailand (4), Philippines, India, China, Japan, Ghana, Ethiopia, Uganda, Honduras, Guatemala (2), Colombia, Peru, Morocco, Brazil)

12 years prior 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.

1.5 Project Start Date (G3)

January 1st 2010 is the starting date of the proposed REDD project activity crediting period.

Real action of the project activity started the 1st of January 2010 with ACOPAGRO starting the official application process for establishing the Martin Sagrado Concession with Conservation Purposes, and with an agreement with Asociacion Dos de Mayo for the integration the El Breo concession to the Biocorredor Martin Sagrado REDD project

1.6 Project Crediting Period (G3)

Crediting Period

The crediting period is **from January 1st 2010 to December 31st 2049**.
The length of the crediting period is **40 years**.

Project Lifetime

Project emphasis is on forest conservation, as a primary objective of the Fundacion Amazonia Viva and communities, whose main goal is the promotion of conservation and reforestation activities. The Fundacion Amazonia Viva was developed at the project developer's instigation and with the support of the regional government, and gathers various partners, including the local communities, around a long-term vision of environmental and social innovation. The Jubilacion Segura community reforestation project developed in the same region is also managed under the global supervision of this foundation, reforestation and conservation being complimentary on the long run.

One objective of the project is to help the project participating communities and the members of the Fundavi to develop sustainable economic activities complimentary to their current activities, and to preserve the primary forests and their related resources (carbon stocks, water resources, fauna and flora) over the long-term. This is why the project runs on a period of 80 years (40 years concession contract period, renewed for at least 40 years, i.e. project duration of more than 80 years, to ensure the project participants develop a long term sustainable conservation activity).

The contracts between the participating communities and the Project Proponent have a duration of 80 years.

Concessions contracts are signed with the regional government for 40 years, and can be renewed several times for the same duration. Considering the implementation of the REDD project on these concessions and therefore the effective financing of conservation activities, there is no reason why the government would not renew the concessions, especially since the regional government is a promoter of REDD initiatives in Peru, and supportive of the Biocorredor Martin Sagrado project.

The 80-year project longevity is also consistent with the VCS validated project longevity (80 years) of the A/R project "Alto Huayabamba" developed in the leakage belt as leakage management practice. Both projects are very complimentary and have the same overall long-term objectives.

2 IMPLEMENTATION OF DESIGN

2.1 Sectoral Scope and Project Type

- Sectoral scope: AFOLU
- AFOLU project category: REDD
- Activities: Avoiding Unplanned Deforestation and/or Degradation (AUDD)

2.2 Description of the Project Activity (G3)

2.2.1 Legal:

Community areas of conservation / concessions for conservation

The formalization of the project area was conducted through the attribution, registration, and maintenance of concessions for conservation at regional government level.

At project start, only APROBOC association had the concession for conservation El Breo. The project supported Acopagro cooperative and APAHUI cooperative in the process of claiming concessions for conservation (respectively Martin Sagrado and Montecristo cooperative). The project supported financially and technically the cooperatives, in the process of communities consultation, area delimitation, writing of the technical proposal, submission to the government, corrections, and final attribution, and writing of management plan for each concession. This process lasted 3 years for the initial 3 concessions in the project area.

Since then, multiple communities showed interest to join the project and claim their own concessions. The project, through the Fundacion Amazonia Viva, supported the communities in creating environmental associations within each major community participating to the project. The support provided by project entities contributed to the constitution of the status of the associations and its members, the recognition by the Peruvian government, the mapping of the areas under the association jurisdiction, the establishment of structured procedures of communication between the community members and with the project entities.

These associations contribute to the evolution of participating communities toward a better understanding of their rights over the land they rely upon. They are also a key strategy of development for the project as the guaranty an efficient communication network and are at the root of the creation of any new Concessions for Conservation.

A list of active community associations is available above in 1.4.1

The project then supported some of these associations in the process of claiming their own concessions for conservation, with a similar process as for the initial 3 concessions: consultation, self-determination by the communities of their land-use plans, delimitation, technical documentation, submission to the government authorities, approval, writing of the management plans.

As a result of this process, the project has helped 16 associations and community organizations to get their own area of conservation from the government (full list of concessions in section 1).

The Fundavi developed with every concessionary and project entities a condensed management plan for each concession. The condensed management plan is updated on a yearly basis in a democratic manner and shared with participating communities in order to meet with the objectives of the VCS standard and the Peruvian national criteria for maintenance of concessions for conservations. This is done in order to ensure that every stakeholders understand challenges relative to the project implementation.

Individual Land Titles

The Cadastral plan was redesigned through a joint-action of ACOPAGRO, FUNDAVI and the ARA (“Autoridad Regional Ambiental”) based on initial Cadastral plans. This facilitated the procedure of recognition of the rights over land for smallholders who obtained official land titles.

As part of the overall strategy in the project zone, a process was initiated in 2011 with Acopagro, the Fundacion Amazonia Viva and the regional government to facilitate and prioritize the land titling for the communities of Mariscal Caceres province, hosting most of the population involved in the REDD+ project. As a first step, a contract was signed in 2011 between Acopagro and the Titling department of San Martin Regional Government (ex-COFOPRI) for the prioritization of land titling for the farmers in the area of influence of the project in San Martin. The process is a long one, and is carried out over several years. As a result of this ongoing process, several thousand land titles were already registered in 2013 and 2014 in the project zone. More recently in September 2015, a new meeting gathered the Fundavi, ARA San Martin (regional government), Direccion Regional de Ministerio de Agricultura Ministry of Agriculture), specifically to define a common strategy for the government to support the development of Pur Projet and Fundavi’s projects in San Martin, in particular through a prioritized strategy for land titling of the project’s beneficiarie.

Figure 3 : Description of land titling process initiated by the project

Description of land titling process initiated by the project

- May 26th, 2011 : Official letter of support of ARA San Martin (Regional Environmental Authority) for the process of land titling of Acopagro farmers.
- Oct 24th, 2011: Coordination meeting between Acopagro, Direction of Agriculture Regional Government (Titling authority - DRASAM), Pur Projet, Fundavi, for the preparation of a contract between Acopagro and DRASAM, and the definition of each party’s counterparts.
- December 23th, 2011 : Contract signature between Acopagro and DRASAM for the prioritized titling of Acopagro farmers. Acopagro puts at disposition of DRASAM staff offices, material, computers. (financed by the reforestation project)
- June 26th, 2012: First official delivery ceremony of several hundred land titles in Juan Jui, with Acopagro, DRASAM, DEVIDA, etc.
- August 13th, 2012: Coordination meeting Acopagro and DRASAM for pursuing the titling process
- April 12th, 2013: Meeting with head of DRASAM in Tarapoto (Pur Projet, Fundavi, Oro Verde). Discussion on the progress of titling process, roadblocks, prioritization of activities for future titling.
- April 26th, 2013: Major official delivery event of thousands of land titles in Juan Jui, with Acopagro, ARA, DRASAM, DEVIDA, etc.
- September 25th, 2015: Multi stakeholder meetings in Tarapoto with the Fundavi, the ARA San Martin (Regional government), Direccion Regional de Ministerio de Agricultura to discuss the regional and national strategy to support the reforestation and conservation projects developed by Pur Projet and the Fundavi, and the pursuing of titling process and prioritization of project’s areas. Preparation of a signed agreement for the prioritized land titling in the project’s area.

2.2.2 Control and Surveillance

The project provides support to community members to improve the pathways, demarcate forest boundaries, construct and maintain walkways and patrol/protect forest areas with endorsement of the local authorities and participating communities. Several control posts were established at strategic points of possible entrance to the project area, and are starting point of regular patrols by dedicated community forest guards chosen and paid by the community associations themselves. The community forest guards received a training and legal habilitation for their patrolling and surveillance work. The project finances the infrastructure of the control points, the salary of the community forest guards, and the equipment and material.

The community forest guards watch for illegal intruders, register the intrusions and whenever possible intercept them with formal denunciation to legal authorities.

The Fundavi developed with the community associations in charge (mainly APROBOC) an integrated management system for the formalization and communication of any case of witnessed illegal logging or non-compliance with regard to environmental laws and regulation in place. The project entities also assist participating communities leaders through legal actions against persons and organizations convicted. These greatly contribute to reduce to encroachment of new settlements and farms in areas of action of FUNDAVI and Partner Communities.

2.2.3 Sensibilization and Communication

The managing staff and technical teams of the Fundavi and other project entities are regularly meeting with stakeholders at the regional level.

The numerous training sessions and workshops organized by the technical teams of the project ensure that a high percentage of the members of participating communities are efficiently trained upon conservation. The most active members attend a majority of sessions of capacitation and then relay the information within the participating communities. An important momentum for conservation was created by the project in the region. As a result various communities opened to the project (see table in 2.2.1.).

The full support from all levels of institutions, district, provincial municipalities, regional government, national government (MINAM) and institutions (SERNANP, DEVIDA, etc). Regular meetings are organized between the Fundacion Amazonia Viva and the various level of institutions. Numerous visits to the project area from government representatives were also organized.

The project also gained increased visibility and awareness raising with the promotion at international level, with international agencies (e.g. GIZ, UNESCO, Model Forest network, etc.) visiting the project and recognizing the outstanding community outcomes of the project.

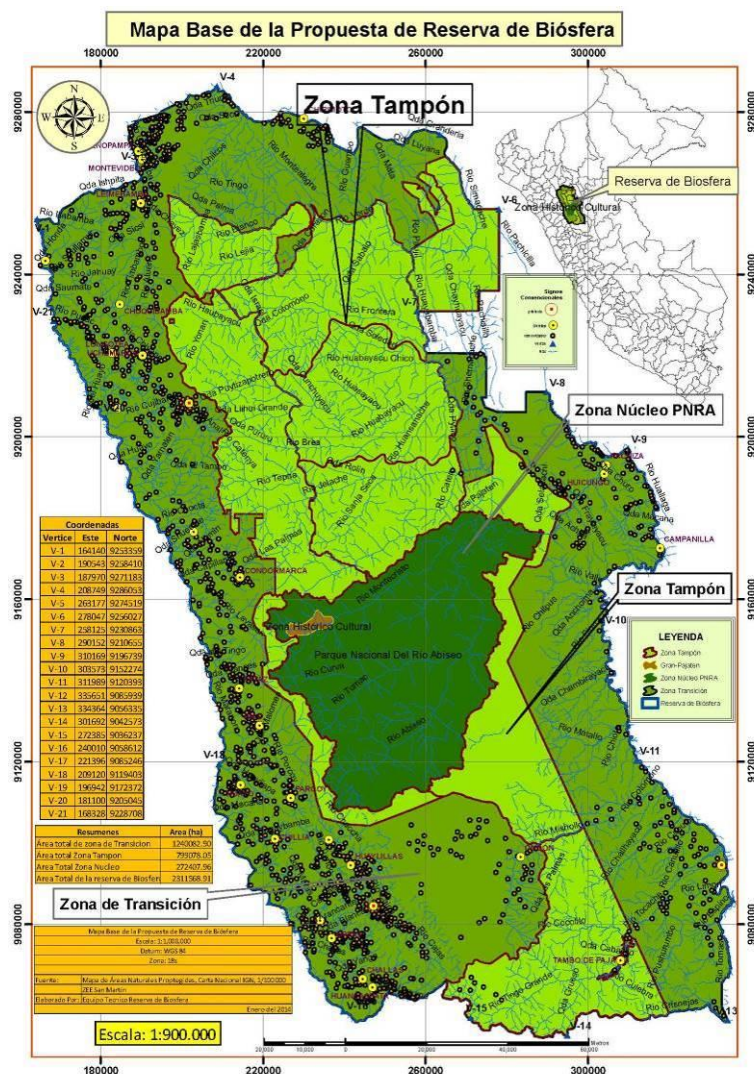
Process of Registration for the status of Biosphere Reserve with the UNESCO

An active process started early 2013 resulted in the redaction of a proposal for the creation of Biosphere Reserve⁶ that would cover a 2-million hectare area encompassing the project area and part of the leakage area. The Biosphere reserve is called “Reserva de Biosfera Gran Pajaten” (RBGP) and the Fundavi is lead member of the technical and administrative board of the RBGP.

Several visits by international experts as well as UNESCO representatives confirmed the great relevance of the area, mainly due to the outstanding and unique model of community management deployed by the project in the area, and to the presence of the National Park Rio Abiseo in the area, already registered as Work Heritage both Cultural and Environmental.

⁶ <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/>

Figure 4 : map of the proposed Biosphere Reserve Gran Pajatén



Various Peruvian governmental bodies' and UNESCO's representatives supported the proposal after visiting the RBGP area. The full proposal was approved and sent by the Peruvian Government to the UNESCO headquarters in Paris, France, end of 2015. The approval is expected for first semester 2016.



The promotion of the RBGP started late 2013 with joint effort from the project entities. The technical and managing staff availed the communication benefits of major Cocoa and Social fairs in major townships to spread the core ideas and concepts of the RBGP. The project participant are highly interested in the creation of such park has it would trigger major interest from the international community toward the project area.



2.2.4 Non-Timber forest valuation

The project activities relative to the development of non-timber forest revenues were successfully conducted with numerous households. Voluntary households register at community level, and implementation in a given household is decided and prioritized by the communities in a participatory manner. The project technical team supported the development of initiatives such as seeds reproduction, tree nurseries, traditional medicinal plants, fish breeding, and beekeeping.

Table 4 : List of non-timber forest activities implemented by community

Activity	Community	Number of Production units
Beekeeping (productive beehives)	Canaan	53
	Anazco Pueblo	5
	Dos de Mayo	1
	Huicongo	1
	Marisol	4
	Mojarras	4
	Pizarro	12
	Pucapillo	4
	Santa Ines	4
	Santa Rosa	10
	Nuevo Chimbote	1
Fish breeding	Pucapillo	1
	Mojarras	1
	Dos de mayo	1
	Sanambo	1
	Marisol	2
Tree nurseries	Canaan	1
	Triangulo	1
	Rodriguez de Mendoza	1
	Leymebamba	1
	Pucapillo	1
	Sion	1
	Santa Rosa	1
Production of Medicinal Plant	Pucapillo	12
	Santa Rosa	1 (collective botanical garden)

2.2.5 Scientific and Inventory

The project supported various scientific studies and inventories in the project zone to spur on participating communities toward greater understanding of the conservation areas, the natural cycles of provision of ecosystem services. These studies also facilitate the location process for activities of conservation (reforestation, establishment of new concessions) and activities related to non-timber-products.

The scientific studies (with related database and reports) have been completed based on the investigation plan (Forest tree and species richness inventories report, inventory of biomass etc...) developed by project entities and Pur Projet. Each study period is concluded with the presentation of the results to the project technical teams and community members chosen to be relays of information.

Table 5 : Completed and ongoing monitoring studies for the project

Service	University partner	Student name	Start date	End date	Mission
Soil quantity Water erosion and retention	ENSAT	Coline Blanchard	04/2014	10/2014	1 - Setup & Testing
	UNAS	Marilyn Quiñonez Alvarado	09/2014	05/2015	1 - Setup & Testing
	UNAS	Cecilia Sanchez Saldaña	09/2014	08/2015	2 - Measurements & Improvements
	Supagro	Laura Etienne	07/2015	08/2015	2 - Measurements & Improvements
	UNAS	Karina Padilla Manchay	08/2015	01/2016	2 - Measurements & Improvements
Biodiversity soil	UNAS	Vaness Llontop Fasanando	01/2014	04/2014	1 - Setup & Testing
	UNAS	Analy Aponte Jaramillo	01/2015	03/2015	2 - Measurements & Improvements
Livelihood Cacao yield	ULB	Agathe Salmon	02/2015	03/2015	1 - Setup & Testing
	Supaéro	Arthur Feltrin	07/2015	08/2015	2 - Measurements & Improvements
Livelihood Economic resilience	PhD ONFI/IRD/CI RAD	Oriane Plédran	09/2015	2017	0 – Definition 1 - Setup & Testing 2 - Measurements & Improvements 3 - Analysis of the initial results 4 - Data collection 5 - Analysis 6 - Closure of the study
Livelihood - Socioeconomic impact	UCL	Alex O'Connor	04/2014	05/2014	2 - Measurements & Improvements
	UCL	Agathe Faure	05/2015	07/2015	2 - Measurements & Improvements

ENSAT: École Nationale Supérieure Agronomique de Toulouse

UCL: University College London

ULB: Université Libre de Bruxelles

UNAS: Universidad Nacional Agraria de la Selva

2.2.6 Renewable Energy

The use of fuelwood is sustainable if the rates of consumption stay under a given threshold. The Fundavi and project entities supported 32 households for participating communities to upgrade their stoves to improved cooking stoves. The project provided material (bricks and coating) and technical assistance. This had a strong impact in reducing the consumption of fuelwood, generated interest among other community members hence contribute to maintain low the fuelwood consumption per household.



A partnership between the Fundavi and different private companies provided financial scheme to support the community members interested in solar-rechargeable portable lights and photo-voltaic systems for houses. The members of highly remote participating communities showed great interest in this technology as they do not have electric energy access yet.

Table 6 : list of solar energy systems implemented in the project

Activity	Community	Number of units
Solar rechargeable and portable	Leymebamba	21
	Rodriguez de Mendoza	5
	Pucalpillo	5
	Mojarras	2
Photovoltaic system	San Juan de Pajaten	10
	Gran Pajaten	9
	Primavera	67
	Mojarras	34

2.2.7 Reforestation

Agroforestry and reforestation in the leakage management areas through the “Jubilacion Segura” project:

The reforestation activities are completed through the scope of the Jubilacion Segura A/R project and 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 from reforested parcels), as well as raising communities awareness on forests. The agroforestry component of the project contributed to the plantation as summarized in the following table.

Table 7 : Trees planted in the project buffer area

Plantation Year	Number of parcels planted	Cumulated distance planted (in m)	Cumulated planted area (ha)
2012	82	20 202	3
2013	13	5 655	6
2014	217	50 239	36
2015	230	48 949	54
Total	542	125 045	98

Timber management plan

For timber plantations, a sustainable timber management plans is developed through the project in a participatory and democratic manner following FSC standard. The monitoring system is developed by Pur Projet and local entities for the later to implement harvests and timber basic transformation starting in 2018. The first wood collection and commercialization trials were completed early 2015.

Table 8 : Estimation of timber volume per year and province

Year of the estimate	Estimated total available timber (m3) per year and per province				Total (m3)
	BELLAVISTA	HUALLAGA	MARISCAL CACERES	PICOTA	
2018	-	-	70	-	70
2019	60	4	588	-	652
2020	-	-	150	-	150
2021	544	412	2 505	-	3 462
2022	87	126	506	53	771
2023	166	128	961	-	1 256
2024	189	-	1 169	-	1 358
2025	356	211	3 212	-	3 780
2026	1 225	1 263	2 929	499	5 916
2027	428	876	3 982	166	5 452
2028	412	658	5 882	-	6 953
2029	20	1	391	-	412
2030	276	126	1 651	53	2 105
2031	502	339	3 783	-	4 623
2032	1 138	1 137	2 448	446	5 169
2033	282	748	3 411	166	4 608
2034	499	784	6 573	53	7 908
2035	166	128	1 012	-	1 306
2036	189	1	1 235	-	1 426
2037	356	227	3 308	-	3 891
2038	1 225	1 263	3 024	499	6 010
2039	428	876	4 003	166	5 473
2040	412	671	5 996	-	7 079
2041	22	4	489	-	514
2042	278	126	1 942	53	2 398
2043	502	357	3 840	-	4 699
2044	1 138	1 139	2 514	446	5 236
2045	282	764	3 507	166	4 720
2046	499	784	6 458	53	7 794
2047	166	128	983	-	1 277
2048	189	13	1 283	-	1 485

2.2.8 Expansion, training and empowerment of communities

Community organization

The Project implemented a system of community leaders/ managers “Gerentes Comunitarios”, paid by the project to be the persons in charge for projects activities in each active community. The “gerentes comunitarios” are key intermediaries between the individual project participants and the Fundavi technical team. They are members of the communities hence have perfect knowledge of the living conditions and local mindsets. They report on activities implemented and are trained at The Fundavi’s headquarter on regular basis. Their main tasks are:

- Gathering members of communities for training sessions and workshop at communal houses.
- Supporting establishment and follow-up of the project activities in the communities they are in.
- Participating to activities relative to the management of areas of conservations for conservation.
- Teaching the members of communities who are willing to receive complementary information after workshops.

Table 9 : list of gerentes comunitarios in active communities

Gerentes Comunitarios	Associations	Communities
Wili Pagan Ricra	Asociación de Productores Agroambientales del Valle de Sion	Sion - Huallaga
Andrés Cachique	Asociación Agroforestal y Conservación de Bosques del Sector Salas	Sector Salas
Segundo Vidarte	Asociación de Productores agropecuarios forestales y de conservación Solapache	Santa Inés
Robert Caballero Mendoza	Asociación de productores agroforestales de Pucallpillo	Pucallpillo
Francisco Alegría Ruíz	Asociación de Productores Agropecuarios protectores del medio ambiente Santa Rosa	Santa Rosa
David Añazco Bardales	Asociación de productores agroecológicos de Cannan	Canaán
Fabián Añazco Bardales	<i>Ongoing creation of association</i>	Triangulo de la esperanza

Empowerment of community associations

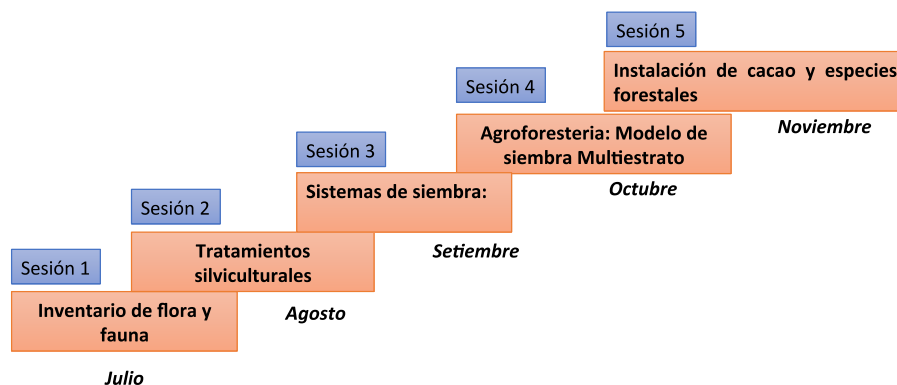
Aside from gerentes comunitarios, and in communities where associations are well established and representative of the community population, the Project mainly Works through the association and its members. The project actively supports the association and trains them in project management, funds management, planning and roll-out of activities, reporting. The Fundavi provides tools and procedures to the association for them to properly manage and report on their activities.

This process is particularly important for concessionaires associations, who need to plan precisely their activities according to the management plan signed with the government and report strictly on the implementation of the activities and use of funds.

Integrated formation curriculum : Escuelas de campo (ECA)

A complete curriculum of trainings was developed by the Fundavi in order to harmonize the trainings followed by the different participating communities, depending on their background.

Figure 5 : Example of training modules of ECAs



Every project members that take part of this ECAs is invited to pass a validation test at the end of a cycle and receives a formal diploma for the yearly course. The following table summarizes the results of the year 2014 for the various ECAs.

The Fundavi technical teams (technicians and “gerentes comunales”) directly manage the trainings and workshops for the participating communities, on subjects such as rural participative diagnostic, conservation, sustainable agriculture, climate, forest resources, agroforestry, etc.. These sessions include field and indoor trainings on various subjects such as cooperativism, agroforestry and the development of non-timber-product related activities. The trainings are of major importance to ensure the permanency and sustainability of the project as it facilitates transmission of knowledge among community members and younger generations.

Table 10 : list of communities who received ECAs curriculum in 2014 and participants

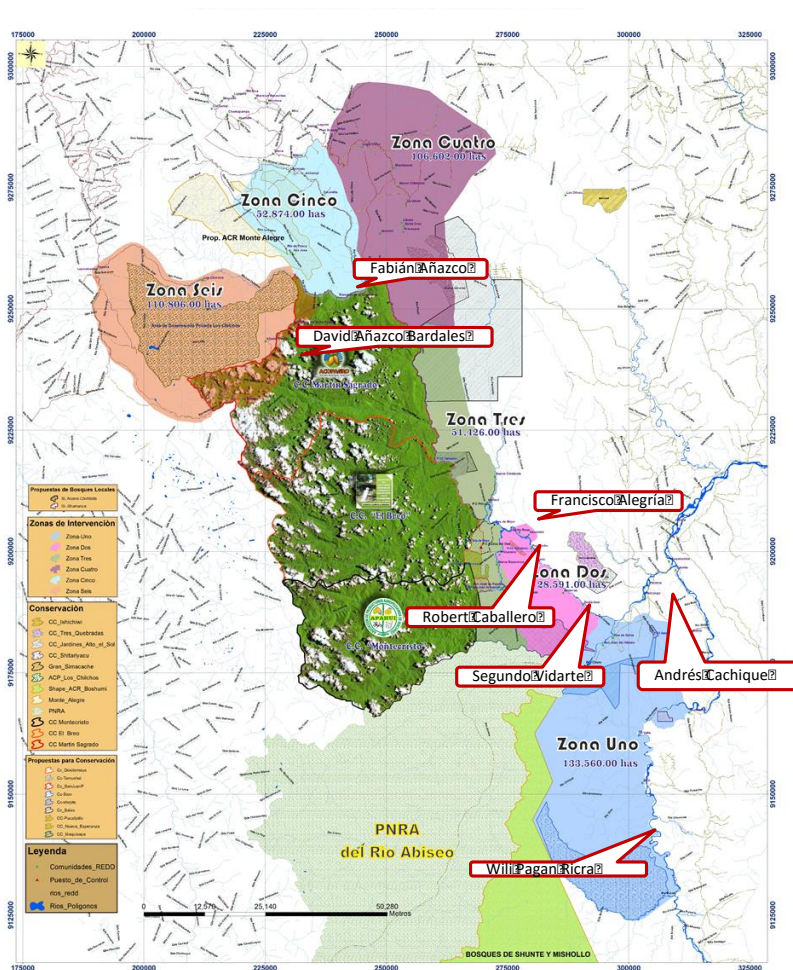
Subjects part of the Curriculum	Participating associations	Number of members of asociation	Number of participants	Number of sucessful participants
- Instalation of the ECA - Rural participative diagnostic - Caracterization of forest types - Forest inventories - Sivicultural practices - Agroforestry systems	AGROCOMBOS	118	21	15
	APAHUI	11	0	0
	APAFCOSOL	165	35	21
	APAP	146	29	19
	APAPMASAR	121	24	14
	APROAVAS	147	22	14
	ASAFCOMAR	89	11	9
	APROBOC	99	13	8
TOTAL		896	155	100

Technical Assistance

The Fundavi hires field-level engineers and technicians for continuous presence in the field, in communities. These technicians are in charge of conducting the trainings and ECAs, support the community members in the implementation of reforestation and other diversified economic activities, conduct participative sessions and appraisals, collect farmers' feedback on the project, and facilitate communication with the Fundacion Amazonia Viva. They are also in charge of the field monitoring and data collection for the project activities implemented.

The Fundavi hires 5 field technicians each in charge of an area. They are supported by the “gerentes comunitarios” for more continuous presence in the communities.

Figure 6 : Areas of influence of the technicians and gerentes comunitarios.



2.3 Management of Risks to Project Benefits (G3)

2.3.1 Management of Risks

2.3.1.1 Communities lack of effectiveness to control the Conservation forest area

The communities are supported by the Fundacion Amazonia Viva in the formalization of environmental associations. The contract signed between the communities and the Fundavi stimulates the awareness of the community leaders upon the importance of their role in protecting and monitoring the Conservation forest area.

The presence of the promoters and dedicated technicians in every sub-project areas further strengthen the communities' capabilities in managing themselves their areas of conservation. Communities are trained by the Fundavi through ECAS, organization and budget management, activity planning and reporting.

The framework designed and implemented by the Fundacion Amazonia Viva ensures the activities are effectively implemented and outcomes are monitored.

2.3.1.2 Community members experience loss of confidence in the Fundacion Amazonia Viva (Fundavi)

The communication processes (and tools) between the Fundavi and other project entities and participating communities is designed in to make small holders feel that they are welcome to directly get in touch with the technical and management teams of the project entities.

The tools are regularly updated and displayed in communal houses (maps, progress reports, condensed management plans). The project technical team wears uniforms of the project and is composed by technicians 100% dedicated to the project. Each sub-area of the project is managed by a duo (dedicated technician and “gerente communal”), which set example.

During general assemblies, the Fundavi demonstrate the flow of benefits from the project entities toward members of communities based on financial support (revised by the CONSUF). On a more regular basis, the Fundavi, community leaders and concession managers gather to discuss budgets, objectives and achievements, and approve condensed management plans with prioritized activities.

Up to date, the involvement of the Fundacion Amazonia Viva allowed better project management, optimization of resources, increased visibility, more continuous presence on the ground of technicians providing technical assistance. The growing number of communities and associations willing to join and actively participate in the project indicate that the perception of the Fundavi among communities is excellent.

2.3.1.3 Population growth forces agricultural expansion in project area

Demographic pressure

The demographic pressure is high due to high fertility rate (5 kids per households in average) in rural area of Amazonas and San Martin, Peru. The development of the participating communities is at the center of the strategy of the project. The entire process of the project is designed in order to empower the community members and ECASs (“Escuelas de campo”) directly support the rural education system. The development and empowerment of community members lead to greater level of general knowledge, which should gradually curb down fertility rates.

Migration

The Fundavi supports participating communities in the development of community land-use plans aiming to define the areas dedicated to agricultural use and expansion, settlements of new migrants, sustainable timber harvesting, and conservation. This community process allows to better control the migration and settlements of newcomers, to avoid slash and burn practices in remaining forests and conserved areas.

Sustainable intensification

The establishment of agroforestry systems is seen as key for a sustainable intensification of cocoa farming. The Fundavi and Pur Projet have extensive experience in the establishment of shade for cocoa (main crop in the project zone). The sustainable intensification of the cocoa parcels with exclusively organic inputs will relieve some of the pressure currently existing upon the primary forest areas as households with better incomes from cocoa farms (see 2.2.8.) will not look forward to get more land to cultivate.

2.3.1.4 Loss of carbon stocks through fire, illegal logging, and land clearing

Fires at catastrophic scale have not been reported since the beginning of the project. The summer of 2011 was particularly dry and provoked various fire starts but did not result in any major scale loss.

The presence of community forest guards at strategic entry points, and patrolling, combined with the ability to quickly and efficiently answer illegal intrusions in the project area lowers the risk of illegal felling and land clearing. The project processes make sure that the information of illegal intrusions is quickly communicated from the community guards to the relevant authorities to answer issues.

The project network is based on advanced cooperation between major actors at regional, provincial and municipal levels. The Fundavi leads the coordination between stakeholders (community and associations members and leaders, Local NGOs representatives, Regional and Provincial government), which ensure adequate answers to illegal logging and land clearing cases.

The protected areas are clearly demarcated with signs and pillars. The accesses are controlled (ex. Boat on the Huayabamba, walking patrols on paths). The Fundavi and other entities work in close cooperation with the local police (even though it is rarely needed to get the Police on site).

2.3.1.5 Insufficient Funding or Inappropriate Use of the Revenues

The Fundavi manages funds under supervision of the project proponent. The results are displayed in monthly expense reports summaries used to optimize the impact of the project. There are no executed funds that are not directly or indirectly verified by the Fundavi (directly executed or executed by other concessions managers). All expenses are tracked and publicly available for consultation by any stakeholders, including communities. The Fundavi presents budget and expense reports to the project proponent on a monthly basis.

2.3.1.6 Natural risks

There are no direct or indirect risks of catastrophic loss of carbon stocks relative to

- Fires : Intentional fires start can happen in purmas in the leakage area when farmers clear fallow land to install new annual crops, but their spread is limited by the strong humidity, especially in primary forest. Therefore never reaching significant levels in the forested areas.
- Extreme weather event

2.3.2 Benefits beyond project lifetime (80 years)

The projects seeks to develop a sustainable timber supply chain with the participating communities (see 2.2.7).

2.4 Measures to Maintain High Conservation Values (G3)

Scientific studies and biodiversity inventories

The assessment of HCVs (for vegetal and animal biodiversity) was completed at validation and has been complemented with studies focused on groups of species and biodiversity inventories during monitoring period. A special focus was given to the soil functional macro biodiversity with regard to the cocoa productivity (see 2.2.6).

Botanical garden

The botanical garden is an area under jurisdiction of the community of Santa Rosa. One of the community member offered a piece of land previously dedicated to coca production in the 1980's and 1990's, that remained totally degraded and unproductive. The community decided to restore the area by replanting

rare and endemic species of special interest for traditional medicinal uses. Soil rehabilitation was difficult but the land has now been recovered with numerous species replanted over the last 4 years. There are expectations that some of the plants will enter in the composition of modern pharmaceutical or cosmetic products. The objective of the botanical garden is also to preserve traditional know-hows and raise other communities' awareness on the importance of preserving traditional plants.

Table 11 : table of species planted in the botanical garden

Tree species with medicinal properties planted in Botanical garden	Total number of trees planted per specie
PLANTA DE LA VIDA	10
ESTORAQUE	39
MARUPA	39
ANONA	40
SHIHUAHUACO	40
COPAIBA	57
GUANABANA	75
PIÑON BLANCO	125
CLAVO HUASCA	200
GUABA	350
CHACURUNA	500
UÑA DE GATO	500
AYAHUASCA	1 243
SANGRE DE GRADO	2 109
TOTAL	5 318

The botanical garden is used as a gathering location for workshops and trainings sessions on the importance of vegetal and animal biodiversity. It is also an important checkpoint for the touristic initiatives currently being developed by the Alto Huayabamba communities.

2.5 Project Financing (G3 & G4)

Project financing has been based on a combination of various mechanisms: private donors grants, sale of pre-issued carbon credits, sale of environmental services ("forest conservation certificates"). There are therefore limited negative cash flows in the beginning of the project. The funding of the project will continue mainly through the sale of issued and still pre-issued carbon credits, as well as continuous funding by donors.

Additionally the project aims to leverage Peruvian national public funding channeled via DEVIDA (anti-drug agency) who has shown great interest in supporting the project as a model of successful conversion from coca to cocoa; the project also aims to leverage more funding from regional government.

The project is being jointly implemented by Pur Projet and the Fundavi, and funded by Pur Projet.

Pur Projet is a private organization, based in Paris and attracts donor funding and carbon finance funds. Currently, Pur Projet implements over 30 carbon offset and community forestry projects in 27 countries, with offices in France, Singapore 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 financial accounts starting from 2009 to 2015 to prove that Pur Projet has callable funds to answer situations with regard to the project. 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,... Most of the 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 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. Pur Projet has no debt and is fully self-funded. Moreover, Pur Projet has a strict policy in provision making for future risks. As financial accounts show, the company had already provisioned 850 k€ as of June 2015.

2.6 Employment Opportunities and Worker Safety (G4)

2.6.1 Equal Opportunity of Local Community Members for Employment

As a participative project, activities of the project are implemented directly by the community members. Additionally, the project implements a system of “gerentes comunitarios” described in 2.2, “gerentes comunitarios” being community members selected by the communities themselves.

Community members are paid by their associations for their participation to project's activities. Paid activities related to project implementation range from community forest guards (patrolling, scientific inventories, welcoming visitors), improving the walkways, conducting forest inventories, developing and managing collective non-timber forest activities (botanical garden, seeds extraction, tree nurseries, etc.). Some community members also have a reporting, management role at their association level.

Though all community members are given an equal opportunity to apply for employment, the ultimate decision is up to the local community groups, based on the abilities and motivation of the individual. The Fundavi ensures that communities choose the people with no discrimination criteria, making sure that no specific community groups are underrepresented in the project staff. Special attention goes to gender equality and the participation of women in capacity building and employment activities.

2.6.2 Compliance with Regulations Covering Worker Rights

The project does 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 and material are transferred from The Fundavi to community associations, who are in charge of financing the local activities and managing the financial compensations for the community members whenever appropriate. The associations are accountable for the material and money under their responsibility, and report to the Fundavi on a trimestrial basis.

Additionally, the project does not substantially rely on external consultants for trainings, education, communication, technical work (inventories, etc) and possible interactions are formalized through legal contracts between the Foundation and third-party organizations.

For the Fundavi employees, compliance with the national legal framework is guaranteed by the explicit registration of the Fundacion and every created environmental association with participating communities

in the Foundations national registries which includes the approval of the status, organizational and operational description documents (ROF/MOF) of the Fundavi and other associations, which describes the organization and the working and labor conditions within the Fundavi and associations.

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 and his assistant) are in charge of interactions with administration and compliance with regulations.

The employees are informed of their rights by the Director when hired by the Foundation Amazonia Viva, in accordance with legal framework for worker rights (described in PPD at Validation).

2.6.3 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 Validation PDD. Mitigation processes implemented by the project are also described in the PDD.



Generally speaking, safety guidelines have been formulated to address risks that might threaten workers' health. The Project Implementation team review regularly (monthly technical meetings at the Fundavi headquarters) the worker risks and mitigation strategies to ensure risks are minimized. Often disadvantaged groups become associated with jobs of greater health risk. Special attention was given to make sure that the Fundavi workgroups is from diverse backgrounds and that knowledge of any risk associated with project employment is understood by all means possible.

2.7 Stakeholders (G3)

2.7.1 Involvement of Communities in Project Design

The project is by definition a community project, where the communities themselves participate in the project design, choice of activities and implementation.

All communities within 20km of the project area (communities listed in the PDD) have been consulted. As explained in the PDD, section 6, participatory rural appraisals were conducted in all communities:

- In all communities, Fundacion Amazonia Viva and Pur Projet organized a first community session with all households invited, and in presence of the community authorities ("teniente gobernador", "agente municipal"), to present the project, collect comments, and deliver the Spanish summary of the CCBA PDD, for future consultation by all community members.

- In the communities holding the founding members of the Fundavi (Santa Rosa, Pucapillo, Dos de Mayo, Huicungo), numerous community meetings were conducted to discuss in detail project design and implementation, to explain roles and responsibilities, funding mechanism, etc.
- In each community where conservation activities are implemented, several community meetings are regularly conducted to define objectives, organization, implementation scheme, responsibilities. A “community manager” (“gerente comunitario”), member of the community, is elected by the community to represent the community and its interests, and presents progresses at the Fundavi. He’s also trained by the Fundavi and in charge of local project activities roll-out and follow-up
- Participating communities also receive training curriculum which involves training modules on self-definition of community objectives for development and conservation, land-use plan, etc.

Detailed evidence of all meetings are summarized in appendix, including dates, assistance, agreements signed, summary of comments, pictures, etc.

Communities and farmers participate in the project on a voluntary basis.

Additionally, individual household surveys were completed to collect socio-economic information, understanding the level of education / environmental preoccupation of the farmers, and their comments and vision of the project and its impacts. Already more than 350 households were surveyed (results/report available). An average of 50 people per year will be surveyed over the lifetime of the project to monitor the impacts of the project and the evolution of the perception of the projects by the farmers, collect comments and recommendations.

Various trainings are conducted in all participating communities, as described in the PDD and in the ECAS curriculum (Escuelas de campo).

Finally, project generates high socio-economic positive impacts (see VCS PDD appendix 5 “Analysis of socio-economic impacts”, CCBA PDD content, and analysis of revenue increase).

2.7.2 Stakeholder Consultation During Project Implementation

Medium and large meetings

The project ensures regular community feedbacks through discussions between the Fundavi and the implementing communities, and Pur Projet. The Fundavi is constantly present on the field and meet quarterly to review experience and best practices to identify innovations for extension. These practices receive special attention for inclusion in the coming year’s work plan.

Regular meetings with the district, province and regional authorities also ensure the Fundavi fully informs the authorities of the project’s achievements and roadblocks. The institution also get a chance to give some feedback and inputs on the project implementation;

Field visits in communities

Given the lack of accessibility of some communities, the Fundavi technical team also conducts regular field visits to all communities involved to collect their feedback. Those periodic focus group discussions are used to document how key activities are progressing and identify problems and issues. Case studies and best practice formalization and immediate spreading. In addition, monitoring of socio-economic and environmental impacts is conducted on a continuous basis, through the use of surveys and the realization of studies with partnering universities (see 2.2.5.).

Communication of results

The Fundavi plays an active role in distributing key project documents to communities involved, as well as publicizing community events/meetings. Project documents and biodiversity and community monitoring data is collected and processed by Pur Projet, and put at disposal of the community organizations.

Adaptative management plans and Budgets

Annual work plans and budgets are developed each year based on feedbacks from the previous year's operations. The goal of the annual review by the Fundavi and Pur Projet 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 Fundavi together with project implementing organizations and community participants have the flexibility to modify their annual strategies and budgets based on experiences from the previous years and emerging development priorities.

2.7.3 Procedure to publicize Public Comment Period

The same procedure as for the validation of the PDD is followed for the Monitoring & Implementation report. Parallel to the publication of the English-version of the Monitoring & Implementation Report, a simplified Spanish-version of the document will be posted on CCBA website.

A printed version of the document will be available in the offices of the Fundavi and distributed to the participating associations.

All Spanish comments will be centralized by one person within the Fundavi, and translated into English, and sent to Pur Projet before the end of the public comment period.

2.7.4 Process for Handling Unresolved Conflicts

The project relies on existing and emerging institutions to mediate any conflict arising from project related activities. The Fundavi, Acopagro, Apahui, Cooparm, APROBOC, APAP, APAPMASAR, are now long established and reference organizations the communities will address to for feedback. These organisations, as well as the other community organizations, have the capacity to channel all feedback back to the Fundavi, either directly in Juanjui or through the network of field technicians and "gerentes comunitarios" present continuously in the field. The formalization of new environmental associations supported by FUNDAVI within every participating communities contribute to strengthen the capacity of mediation of conflicts.

The Fundavi will gather all grievances and requests and address them by meeting with the requesting party either in Juanjui or in the community concerned. Most of the misunderstandings have proved to be able to be solved simply through improved communication

Conflicts that may not be resolved 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 Amazonia Viva. The detailed process for handling conflicts is available in the Validation PDD.

3 LEGAL STATUS

3.1 Compliance with Laws, Statutes, Property Rights and Other Regulatory Frameworks (G4 & G5)

3.1.1 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 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 of the PD, in particular the following laws : Ley General del Ambiente (ley N° 28611), Ley orgánica de Aprovechamiento sostenible de los Recursos naturales (ley N° 26821), Ley forestal y de Fauna Silvestre y su Reglamento (D. Leg.N°1090), Ley de Áreas Naturales Protegidas (Ley N° 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 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.

The project will also comply with work / labour regulatory framework. Apart from the FUNDAVI's technical team, operating under strict work labour framework (Fundavi controlled by SUNARP directly), the project will not hire directly people, but will instead transfer funds to the community associations for the implementation of specific activities, always with the vision of empowering the communities in the self-management of the conservation activities. The transferred funds will be used for the purchase of services and equipment (through legal purchase contracts), or compensation of the participating farmers in accordance with the internal rules of the community associations.

3.1.2 Document that the project has approval from the appropriate authorities

The "Appropriate authorities" represent Government bodies (Regionals and Municipal, Agencies such as ARA, etc...) and 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 8 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.

Supporting documents (Conclusions of meetings, Approval letters, Support propositions by the government, etc) are available upon request.

3.2 Evidence of Right of Use (G5)

3.2.1 Land tenure

The project area is constituted by 3 concessions for conservation managed by 3 community organizations (associations APROBOC, APAHAUI, cooperative Acopagro).

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 request the concession first, building a technical file describing the area, the conservation stakes, and are given the concession after a public comment period 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.

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 over the project area within the San Martin Region.

3.2.2 Transfer of the emission rights

Transfer agreements for carbon emission rights are signed between each concessionaire and Pur Projet. The agreements stipulate that the concessionaire transfer their carbon credits to Pur Projet in exchange for the funding and support in implementation of conservation activities.

3.3 Emissions Trading Programs and Other Binding Limits (CL1)

3.3.1 Emissions Trading Programs and Other Binding Limits

The VERs generated by the GHG emission reductions of the project will be sold exclusively on the voluntary market, to private or public organizations willing to voluntarily offset their emissions.

The Project Proponent itself does not have any binding limits on GHG emissions, and does not look for any compliance with an emissions trading program.

3.3.2 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.

3.4 Participation under Other GHG Programs (CL1)

The project has not been registered under any other GHG programs and is not seeking registration under any other GHG programs.

3.5 Other Forms of Environmental Credit (CL1)

The project has not participated in any other program of environmental crediting for GHG emission removals. The project participates to CCBA (Climate, Community, Biodiversity Alliance) certification program, which is only a certification program for certifying environmental and community benefits, but does not bring any GHG-related environmental credit.

The project does not intend to generate any other kind of GHG-related environmental credit other than through the VCS Program. The Project Proponent aims to finance the project through the sales of VERs issued under the VCS program only to private companies buying VERs as voluntary offsetting of their emissions. Any other form of environmental credit for GHG removals would not be valued extra by the companies offsetting voluntarily their emissions and would therefore not be envisioned by the Project Proponent.

3.6 Projects Rejected by Other GHG Programs (CL1)

The project has not participated in any other GHG programs and has therefore not been rejected by any of them.

3.7 Respect for Rights and No Involuntary Relocation (G5)

3.7.1 Demonstrate that free, prior and informed consent has been obtained

The project is by definition a community project, where the communities themselves participate in the project design, choice of activities and implementation.

All communities within 20 km of the project area (communities listed in the PDD) have been consulted. As explained in the PDD, section 6, participatory rural appraisals were conducted in all communities:

- In all communities, Fundacion Amazonia Viva and Pur Projet organized a first community session with all households invited, and in presence of the community authorities ("teniente gobernador", "agente municipal"), to present the project, collect comments, and deliver the Spanish summary of the CCBA PDD, for future consultation by all community members.
- In the communities holding the founding members of the Fundavi (Santa Rosa, Pucapillo, Dos de Mayo, Huicungo), numerous community meetings were conducted to discuss in detail project design and implementation, to explain roles and responsibilities, funding mechanism, etc.
- In each community where conservation activities are implemented, several community meetings are regularly conducted to define objectives, organization, implementation scheme, responsibilities. A "community manager", ("gerente comunitario"), member of the community, is elected by the community to represent the community and its interests, and presents progresses at the Fundavi. He's also trained by the Fundavi and in charge of local project activities roll-out and follow-up
- Participating communities also receive training curriculum which involves training modules on self-definition of community objectives for development and conservation, land-use plan, etc.

Detailed evidence of all meetings are summarized in appendix, including dates, assistance, agreements signed, summary of comments, pictures, etc.

Communities and farmers participate in the project on a voluntary basis.

Additionally, individual household surveys were completed to collect socio-economic information, understanding the level of education / environmental preoccupation of the farmers, and their comments and vision of the project and its impacts. Already more than 350 households were surveyed (results/report available). An average of 50 people per year will be surveyed over the lifetime of the project to monitor the impacts of the project and the evolution of the perception of the projects by the farmers, collect comments and recommendations.

Various trainings are conducted in all participating communities, as described in the PDD and in the ECAS curriculum (Escuelas de campo).

Finally, project generates high socio-economic positive impacts (see VCS PDD appendix 5 "Analysis of socio-economic impacts", CCBA PDD content, and analysis of revenue increase).

3.7.2 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 do 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, the participation of communities in land-use planning is essential.

None of the project activities requires any relocation, voluntary or involuntary. Due to the high migration pressure 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 conducting assessments to better understand immigration patterns and drivers in the project area. The project team will organize a regular dialogue between the project communities and migrants 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 groups 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 by the communities themselves of clear land-use plans will aim to clarify tenure status for land in the project area. This will enable to explain new land and forest policies to migrants coming into the area. As the tenure situation will be publicly and transparently clarified, word-of-mouth communications will inform prospective migrants and slow down uncontrolled migrants settlements into the area.

3.8 Illegal Activities and Project Benefits (G5)

This project is designed to combat all illegal activities within the project boundary. The most common illegal activities are illegal logging, intentional fires, and agricultural encroachment.

Cooperation between local communities and authorities, the construction of checkpoints at the access points of the project area, the training of community guards, and the distribution of equipment to help in patrols have shown to significantly reduce illegal intrusions for logging and hunting. Illegal intrusions' and interceptions' data collected by community guards indicate a decrease in illegal activities.

Intentional fires 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 towards 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.

4 APPLICATION OF METHODOLOGY

4.1 Title and Reference of Methodology

Approved VCS Methodology VM0015/ Version 1.0/ Sectoral Scope 14 “Methodology for Unplanned Deforestation.”

4.2 Deviations from the Monitoring Plan

Although the project area was extended since validation, there are no deviations from the Monitoring Plan defined in the PDD. The Monitoring Plan applies to the whole project area.

4.3 Project Boundary (G1)

4.3.1 Spatial boundaries

4.3.1.1 Reference region

According to Methodology VM0015, a Reference Region (RR) had to be defined for Martin Sagrado REDD+ Project in order to serve both the historical analysis of deforestation (rates, agents, drivers and patterns of land-use and land-cover change) and ex-post monitoring of future evolution of deforestation. Martin Sagrado REDD+ Project falls within San Martin region in Peru. A jurisdictional REDD+ program is under preparation in San Martin (started before Validation). As the process could take time, Pur Projet 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 Reference Region had to be defined.

The size of the region and cost of remote sensing data analysis did not enable to consider the whole San Martin region as the reference region. Hence, a smaller reference region has been defined, according to VM0015 criteria.

According to this methodology, several similarity criteria have been used to define the reference region and to ensure that the reference region was representative to project area (PA) in terms of:

- Agents and Drivers of deforestation;
- Landscape configuration and ecological conditions;
- Socio-economic and cultural conditions

The chosen reference region encompasses the **two provinces of Mariscal Caceres and Huallaga**.

- Size:

The project area encompasses 295 654 hectares. The reference region includes the project area and encompasses 1 668 333 hectares, and is therefore 5,6 times larger than the project area.

- Similarity of agents and drivers of deforestation:

Deforestation trend is similar all across the provinces of Mariscal Caceres and Huallaga, with the presence of local communities living on subsistence cropping (homogeneity of crops: cocoa, orange, corn, banana, etc.), increasing migrants coming from the Higher Andes to settle in better farming conditions, land dealers clearing the land to resell it to migrants, loggers who extract specific timber species.

- Homogeneity of landscape and ecological conditions:

Reference area has been elected to meet criteria of homogeneity in terms of Forest/ Vegetation classes, Elevation, Slope, and Rainfall.

- Similarity of socio-economic and cultural conditions:

The project area is constituted by concessions for conservation. Others concessions for conservation purposes have existed in San Martin region, in particular in the reference area: concession for conservation Alto Huayabamba, owned by the NGO AMPA.

Current land-use in the project area is primary forest. Forest is also present elsewhere in the reference region. Projected non-forest land-use will be bare soils (pastures, annual crops, and settlements) and non-forest vegetation (permanent crops such as cocoa, banana, orange; fallows in cyclic slash and burn agriculture). These land-use are typical from small subsistence farming found everywhere in the reference region. Living and socio-economic conditions are similar for all small farmers present across the reference region and to a larger extent in San martin Region.

The project area is governed under the same legal framework as the whole region of San Martin, in particular the following laws: Ley General del Ambiente (ley N° 28611), Ley orgánica de Aprovechamiento sostenible de los Recursos naturales (ley N° 26821), Ley forestal y de Fauna Silvestre y su Reglamento (D. Leg.N°1090), Ley de Áreas Naturales Protegidas (Ley N° 26834).

4.3.1.2 Project area

The project area is constituted by 3 concessions with conservation purposes listed in 1.2.1.

The project area excludes the few areas inside the three concessions that are already deforested in 2010, as well as the course of the planned road that will cross the Montecristo concession (Juan Jui-Salaverry road) on a width of 20 meters. As a result, the exact project area covers 295 654 hectares

Please refer to GIS file of project area.

4.3.1.3 Leakage belt

As said before, the Biocorredor Martin Sagrado REDD+ Project Area 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. .

The 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.

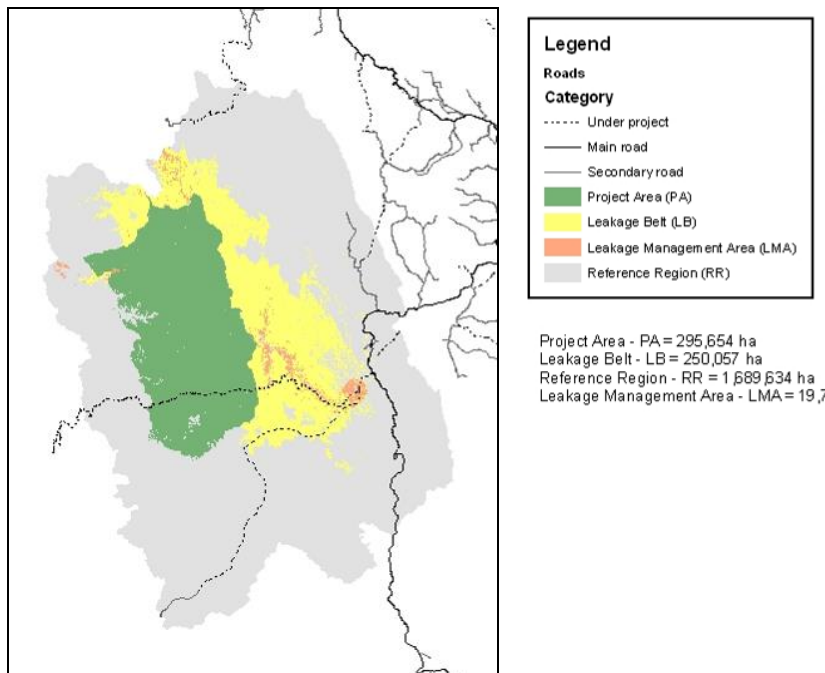
A maximum area must also be defined to define the leakage belt (LB) boundaries. According to the Avoided Deforestation Partners methodology (VM0007, VMD0007 v3.0), LB must at least equals 90% of PA. As there is not such an indication in VM0015, we used VMD0007 threshold and assumed that Martin Sagrado 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.

The detailed process for leakage belt definition is available in Appendix of the PD, "Geographical Boundaries".

Figure 7 : Leakage belt



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.

4.3.1.4 Leakage Management Areas

Most of the project activities from the categories: Non Timber Forest Valuation, Sensibilization & Communication, Reforestation, 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.

4.3.1.5 Forest

- **Forest definition** used for demarcation of forest area is the definition of forest communicated by Peruvian DNA: Land with a minimum area of 0,5 hectares, a minimum tree crown cover of 30 %, and a minimum tree height of 5 meters.

- **The Minimum Mapping Unit** used to complete the forest maps is 1 hectare

- Maps of forest cover were completed for the historical reference period for the years 2001, 2005, 2010; then for real data for 2015; and annual projections for the baseline scenario.

Detailed process is described in appendices of project description documents at validation, "Historical analysis of land-use and land-cover changes" and "Projection of future deforestation". All maps are available in GIS format.

4.3.2 Temporal boundaries

4.3.2.1 Historical reference period

The historical reference period is from 2001 to 2010

4.3.2.2 Crediting period

The crediting period is from January 1st 2010 to December 31st 2049. The length of the crediting period is 40 years.

4.3.2.3 First fixed baseline period

The first fixed baseline period runs from January 1st 2010 to December 31st 2019. (Duration of 10 years)

4.3.3 Carbon Pools

Carbon pools	Included / TBD/ 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 24 th , 2010
Soil organic carbon	Not included	Not to be measured according to VCS Program Update of May 24 th , 2010. It is conservative.

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.**

Source		Gas	Included?	Justification/Explanation
Baseline / Project	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 ₂ O	No	Excluded by the methodology
		Other	NA	
	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. cleared areas.
		N ₂ O	No	
		Other	NA	

4.4 Baseline Scenario (G2)

4.4.1 Baseline Scenario

The baseline scenario was completed following the methodology steps of the methodology VM00015. The complete process and results are available in PDD appendices “Historical analysis of land-use and land-cover changes”, “Analysis of agents, drivers, and underlying causes of deforestation”, and “Projection of future deforestation”.

A summary of main results is presented hereafter.

4.4.1.1 Analysis of historical land-use and land-cover change

The analysis of historical land-use and land-cover change was completed following the methodology VM00015, and the complete process and results of the analysis are available in Appendix of the PD, “Historical analysis of land-use and land-cover changes”.

Categories of Land-Use and Land-Cover classes

Explanations on how the classification has been post processed using those groups are provided in Appendix of the PDD, “Historical Analysis of LULC Changes”. Results of biomass inventory enabled to assess the suitability of this forest stratification.

Historical Land-Use and Land-Cover Change

A complete description of methodology, process, and assumptions is available in PDD Appendix “Historical Analysis of LULC changes”

A total of 75 042 hectares were deforested from 2001 to 2010 (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.

4.4.1.2 Analysis of agents, drivers and underlying causes of deforestation

A complete analysis of deforestation threats, identifying agents, drivers, and underlying causes of deforestation is detailed in PDD Appendix 4.

4.4.1.3 Projection of future deforestation

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.

Stratification of forest class

Forest in the reference region area was stratified using Ecological Systems such as defined by Josse, C. *et al.* (2007). See section 2.4.1 of PD for more details on Ecological systems, vegetation types.

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

The list of strata is the same as Land-Use/ Land-Cover classes described in section 2.4.1.2. of PD.

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.

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 **7 968,3 ha** (see PD section 2.4.3.1 for further details).

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.³ 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).

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 (See PD section 2.4.3.2. for further details) has been input into the model.

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 at validation, 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.

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.

4.4.2 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 of the PD with LU/LC maps, we obtain the tables of annual surface gain / loss per forest and non-forest class presented in the PD. 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).

4.4.3 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.

4.4.4 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).

4.5 Additionality (G2)

Additionality is demonstrated using the "VT0001 tool for the demonstration and assessment of additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) project activities".

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

Sub-step 1a. Credible alternative land-use scenarios

The project area is constituted only of by old-growth forest that has not suffered deforestation. In the absence of the project, credible land-use scenarios include the four most likely deforestation trends identified in the baseline scenario developed in section 2.4 of the PDD.

- a/ Conversion to croplands (perennial or annual crops), pastures and housing
- b/ Conversion to settlements / infrastructure,
- c/ Selective logging of high-value species for commercial sales;
- d/ Conversion to Economic Land concessions, Mining or Oil concessions

In the last 15 years, there has been no other land-uses within the project area than the ones described above.

Overall, the most credible alternative scenario is the baseline scenario developed and presented in section 2.4.of the PD, which is a combination of the various possible land-uses listed above.

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

In the absence of clear land property / land tenure for most of the reference region (forested area), there is no legal limitation on settlements and clearings of forested areas for agricultural practices.

Selective logging and sales of high-value species is illegal practice outside of Permanent Production Forest areas but has been observed in the reference region during the reference period, for lack of enforcement.

Conversion to ELCs, Mining or Oil concessions is unlikely given the "Ordenanza Regional" signed and published by the Regional Government in Oct 2010, committing not to deliver these kinds of concessions in the project region anymore

Overall, the baseline scenario presented in section 2.4 of the project PD already takes into account these restrictions.

Sub-step 1c/ Selection of the baseline scenario

According to the VM0015 methodology, the most likely baseline scenario for the VCS AFOLU REDD project activity is the baseline as defined in the project PD section 2.4.

Step 3. Barrier analysisSub-step 3a. Identification of barriers**- Barriers due to local traditions, social conditions, and traditional land-use practices**

The communities of the region don't have a tradition of long term vision / self-projection over several dozens of years (even less over 80 years); most of them have a tradition to focus on short-term activities (agriculture, timber extraction, etc.) that can provide them immediate revenues for livelihood purposes.

The understanding or consideration of long-term conservation benefits through preservation of local climate, farming, and living conditions is not natural for farmers who are for most of them migrants, and don't necessarily think of their surrounding environment as important for their subsistence ("land is big and fertile, conditions are good, just use it!").

Traditional land use (agriculture) respond better to the direct socio-economic needs of the farmer families than conservation activities: socio-economic surveys showed that a list of important requirements should be met by activities/ land-use alternative to traditional agriculture in order to be implemented:

For farmer families the following characteristics and requirements for land use are considered important:

1. Income within a relatively short period
2. Possibility to have direct access to capital in case of emergencies.
3. Investments should generate an increase value of their land.
4. Markets for products should be visible; farmers are more willing to invest if clear markets exist for their products.
5. Access to markets should be relatively easy, preferable access should be possible on an individual basis, without intervention of many intermediary stakeholders (middleman, community or producers organizations, etc.).
6. Handling of products should be relatively easy.
7. Constant and secure markets are preferred over insecurity in markets.
8. Labour demand, and peaks in labour demand should be well related to labour supply,
9. Relatively simple land use methods are preferred above more complex land use methods.
10. Level of investment.
11. Cost-benefits.

Without project intervention using specific strategies to solve the social and economic needs mentioned above, it is not very likely that farmers would implement conservation actions by themselves and manage

them over time, due to the following: REDD/ conservation activities cannot compete in terms of points 5,6,7,8,9,10 compared with traditional land-use systems (farming).

Population are farmers by tradition, and don't have sufficient knowledge, training, or education to develop by themselves other non-timber forest valuation activities, such as botanical gardens, ecotourism, bee heaving, etc., that would give them revenues alternative to crop expansion or timber harvesting.

Social conflicts exist between farmers, depending on their vision of land-use. A limited number of farmers may have been interested in conservation purposes, but they have faced a majority of unaware farmers that don't see an interest in conservation, leading to social conflicts between farmers or communities, and preventing the implementation of a widespread conservation activity.

- Barriers due to lack of organization of communities

The implementation of a conservation activity as large as the project requires the coordination of almost 20 communities (some of them begin very far apart one from each other) and the constitution of a coordinating body to supervise the overall implementation of the project. Communities have traditionally been fragmented, some being in conflicts one with each other for historical disagreements. Although some most advanced communities have created their own community associations, historical larger conflicts between communities, as well as the lack of organization skills, prevents the communities to develop a widespread collaborative action at the scale of the project area.

- Barriers related to land tenure

Two thirds of the project area was not under control of the communities before the beginning of the project (Out of the 3 concessions, only the concession El Breo existed before project start). Most of the forested land is not attributed to anyone and does not have clear land property / tenure. It is therefore impossible for communities to implement a conservation program over several hundred thousand hectares without having rights on the land they intend to protect.

The process of requesting concessions for conservation purposes has only been possible under the lead of the project proponent in the framework of the project (requires long-term administrative coordination skills with regional authority, technical expertise to develop technical files / management plans, etc).

- Institutional barriers

The authority for land concessions attribution and management was transferred from the national government to the regional government recently in 2009. In this new legal framework, no concession for conservation had ever been attributed in San Martin Region, before Acopagro asked for the concession Martin Sagrado, in the scope of the REDD project and at the project proponent's initiative. Considering the lack of experience and of other requests, it has been a long process of appropriation by the regional government where the project proponent and local coordinator (Fundacion Amazonia Viva) helped along for 2 years for the regional government to build capabilities and legal framework on concessions for conservation. It is likely that without this strong coordination, communities would have been unable to get the concessions, as much as the regional government might have taken many years before issuing concessions.

The project proponent's initiatives in San Martin Region - reforestation projects developed from 2008 on with ACOPAGRO and ORO VERDE cooperatives, REDD+ project started in 2010 in Huayabamba river basin - were a trigger for the regional government to start to develop conservation policies and a framework for promoting these types of activities in the region (e.g. mesa REDD initiated in 2010, "Ordenanza Regional" in Oct 2010 against oil and mining). There were no such policies or perspectives before.

- Investment barriers:

Project activities would not be possible without revenues from the sale of carbon credits and carbon compensation services to companies through the Project Proponent activities, and the proposed project will guarantee the financing need during the entire project period.

The key barrier to implementation of the project is financial. This is partly because almost $\frac{3}{4}$ of the project costs are not covered by revenues from project activities. There is no tradition within Peruvian companies for long-term investments, especially when repayment periods are long. Also the local partners do not have the financial resources to for the required initial investment: most community members have a total net disposable income of a maximum of 5 000 Euros / year per family to cover basic needs. The access to debt funding would not be possible for this kind of project because of a lack of equity capital and because the project would not be economically profitable without the origination of carbon credits, that the local actors would not have been able to obtain because of practical reasons such as a lack of financing or geographical isolation for instance. Finally, the local actors do not have access to international capital markets, except carbon markets in the case of the proposed project.

Sub-step 3b. Barriers would not prevent the implementation of the alternative land-use scenarios

The alternative scenarios (a, b, c, d) identified in step 1a. are by definition observed land-use practices (best use of one's own land between cocoa, annual crops, fallows). No needed Barriers identified in 3a. are therefore not an obstacle for these alternative scenarios. The alternative scenarios don't require external investment as traditionally farmers have managed their land and economic activities with their own funds. Investment barriers identified in 3a are therefore not an obstacle to the alternative scenarios.

Step 4. Common practices

At the start of the project, there were no concessions for conservation attributed to communities or communities associations in San Martin Region.

The areas dedicated to conservation at project start were publicly administrated areas such as National Parks (Parque Nacional Rio Abiseo, Parque Nacional Cordillera Azul, Bosque de Proteccion Alto Mayo, etc.). Only one concession for conservation purposes had already been attributed in the region (CC Alto Huayabamba), however to an NGO (AMPA) which has not shown intensions to develop a project including certifications under GHG scheme of any sort.

Since the project start, other REDD Initiatives have emerged in San Martin region following the set-up of the Mesa REDD roundtable, however the other projects build on areas already publicly administered for conservation (Bosque de Proteccion Alto Mayo, Parque Nacional Cordillera Azul) and are developed by private entities without implication of communities.

The existing initiatives in San Martin Region are therefore different in the set-up, timing (date of project start), long-term vision, or implication of communities in the implementation of the project.

There is therefore no similar activity as the project.

As a result of the previous steps, the project is **additional**.

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. Most farmers have had a maximum total net disposable income of less than 5 000 Euros / year per family 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. Additionally, a complete survey was conducted in August 2012 among 174 families of the project zone communities as an assessment to design an education and awareness raising program. The assessment surveyed the families on various aspects including subsistence means, activities (including deforestation activities), trends, environmental perception and education, etc. (CREAR, 2012²⁶). The results from the surveys show insufficient environmental concerns and insufficient economic alternatives to deforestation activities and expansion of agriculture that support the analysis of drivers and agents of deforestation presented above and the baseline scenario.

5 MONITORING DATA AND PARAMETERS

5.1 Description of the Monitoring Plan (CL3, CM3, B3)

5.1.1 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

Spatial boundaries:

The project area is constituted by 3 concessions with conservation purposes listed in 1.2.1.

The exact project area was obtained after removing the non-forested areas from the total area of the 19 concessions, and covers 295 654 hectares.

Baseline calculations:

- The projection of future deforestation completed at time of validation was completed for the whole reference region

Monitoring of land-use and land-cover change:

- As described hereafter, the monitoring of land-use and land-cover is completed for the whole reference region

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 is 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 be 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 of the PDD, 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 12 : 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 validation ¹	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 refutions 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 is 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.

5.1.2 Global monitoring plan

More generally, the Project Proponent monitors various elements along the project lifetime, as described in the following table:

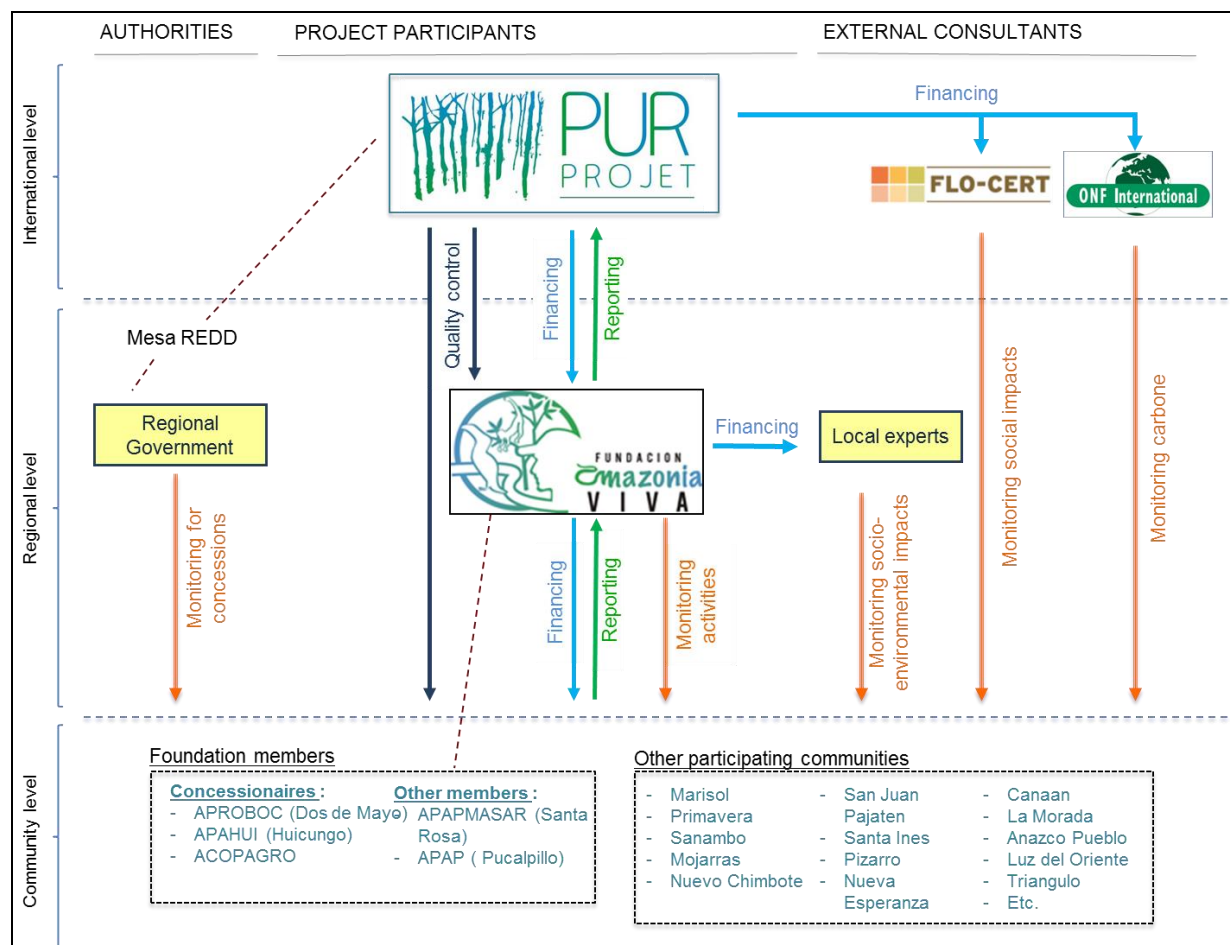
Table 13 : Global monitoring plan

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 - Fundacion San Martin Verde - Pur Projet - ONFI - Participating communities	Periodically, at each verification (every 5 years)
	Identification of driver in cause			
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			
	Implementation of activities and results	- Quarterly report from each community / association on activities implemented, budget used - On-site verifications - Random questioning in communities	- Fundacion Amazonia Viva - Participating communities - Quality control : Pur Projet	All year long, during the whole project period
Environmental and socio-economic impact	Achievement of activity's goal			
	Climate regulation Soil enrichment Water quality Biodiversity Community incomes Food security Food sovereignty Grassroot empowerment and ownership feeling Communities adaptation to climate change Happiness	- 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)

5.1.3 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 Fundacion Amazonia viva, in charge of the local coordination and implementation of the project.

Figure 8 : Organizational diagram and responsibilities



5.1.4 Adaptive 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.

5.1.5 How the monitoring information will be disseminated in order to encourage replication of successful practices

The results of monitoring efforts will be communicated to the Fundacion Amazonia Viva, at each verification for carbon stocks monitoring, and upon completion of monitoring studies for the other topics. The Fundacion Amazonia Viva develops printed material, workshop material and specific trainings to be displayed in the offices of the Fundacion Amazonia Viva, presented to visitors, community representatives, and distributed and implemented in the communities

The Fundacion Amazonia Viva and concessionaires also often participate in community fairs and events in Juan Jui and present the project's outcomes and results to the population for broad awareness raising.

The Fundacion Amazonia Viva is also frequently invited by institutions, regional governments, national governments to present the outcomes and results of the project as well as the monitoring data to the public, to other communities, native communities. Multiple workshops were conducted already to disseminate the successful practices.

Various exchange visits were already conducted for representatives of other regions' representatives (ARA Amazonas, Bagua etc), other communities (including native communities), and national and international institutions (DEVIDA, UNESCO, GIZ, Bosque Modelo, etc.) to observe the project's outcomes and community best-practices for duplication to other areas. This is a model that has proved to be very successful and that has driven strong interest from the governments and international agencies.

5.2 Data and Parameters Available at Validation (CL3)

Data Unit / Parameter:	Surface of each LULC strata in the reference region – historical: 2001, 2005, 2010
Data unit:	Hectares
Description:	Area of each LULC strata for three pivot years in the historical reference period: 2001, 2005, 2010
Source of data:	Remote sensing analysis and field validation. Annex Document Data and Parameters for emissions reduction calculation
Value applied:	Table 5; section 1.1.4; Annex Document Data and Parameters for emissions reduction calculation
Justification of choice of data or description of measurement methods and procedures applied:	Section 1.1; Annex Document Data and Parameters for emissions reduction calculation
Any comment:	Computed once at validation for completion of baseline scenario.

Data Unit / Parameter:	Surface of each LULC strata in the reference region – yearly projection for 2010-2020
Data unit:	Hectares
Description:	Projected area of each LULC strata for every years of the baseline period
Source of data:	Deforestation model. Annex Document Data and Parameters for emissions reduction calculation
Value applied:	Table 8; section 1.3.1; Annex Document Data and Parameters for emissions reduction calculation
Justification of choice of data or description of measurement methods and procedures applied:	Section 1.3; Annex Document Data and Parameters for emissions reduction calculation
Any comment:	To be reassessed for the next 10 years at each re-validation of the baseline

Data Unit / Parameter:	Carbon stocks per hectare for each LULC strata
Data unit:	tCO ₂ /ha
Description:	Carbon stock per hectare in aerial and below-ground living biomass in each strata
Source of data:	Complete Biomass inventory protocol for forest stratae. Literature for non-forest stratae. Annex Document Data and Parameters for emissions reduction calculation
Value applied:	Table 11; section 2.1; Annex Document Data and Parameters for emissions reduction calculation
Justification of choice of data or description of measurement methods and procedures applied:	Section 2; Annex Document Data and Parameters for emissions reduction calculation
Any comment:	Assessed and validated once at project validation for the whole duration of the project.

5.3 Data and Parameters Monitored (CL3, CM3, B3)

5.3.1 Emission reduction

Data Unit / Parameter:	Actual area per LULC strata
Data unit:	Hectares
Description:	Calculation of the total area for each strata at given date in Project Area analyze of satellite images.
Source of data:	Remote sensing analysis. Application of same process as for historical deforestation analysis. See section 1.1; Annex Document Data and Parameters for emissions reduction calculation
Description of measurement methods and procedures to be applied:	Refer to ONFI Appendix
Frequency of monitoring/recording:	Every 5 years
Value monitored:	Refer to tables in section 6
Monitoring equipment:	- Satellite imagery (Landsat) - GIS Software
QA/QC procedures to be applied:	- Own ONFI QA/QC procedures - FUNDAVI and Pur Projet feedback on ONFI outputs, based on knowledge of the area and control field visits
Calculation method:	Refer to ONFI Appendix
Any comment:	The measurement of actual area per LULC strata allows immediate computing of area per LULC change class from one verification year to another. The measurements made in the project area allow for ex-post calculation of actual carbon stock changes in the project area Measurements made in the leakage belt allow for ex-post estimation of activity displacement leakage Measurement made in the reference region may be used in case of re-validation of the baseline scenario.

Data Unit / Parameter:	Potential carbon stock decreases due to catastrophic events
Data unit:	T CO2/ha
Description:	Potential carbon stock decreases in case of natural disturbances or other catastrophic events
Source of data:	Field measurements in the affected areas after the event occurred.
Value applied:	Results of field measurements
Justification of choice of data or description of measurement methods and procedures applied:	Same field measurement method as for the carbon stock measurement completed for validation (See section 2.1; Annex Document Data and Parameters for emissions reduction calculation)
Any comment:	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.

6 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS (CLIMATE)

6.1 Baseline Emissions (G2)

Refer to PDD for details of baseline calculations.

Table 14 : *Baseline Emissions in the Project Area*

Project Year	Calendar Year	Baseline scenario		
		Annual Area Deforested in Project Area (ABSLPAt)	Annual baseline carbon stock change (Δ CBSLPAt)	Cumulative Annual baseline carbon stock change (Δ CBSLPA)
		ha	t CO ₂ e	t CO ₂ e
0	2010			
1	2011	120	-89 535	-89 535
2	2012	136	-102 963	-192 498
3	2013	131	-99 955	-292 453
4	2014	126	-99 651	-392 104
5	2015	151	-121 458	-513 561

6.2 Project Emissions

The quantification of baseline emissions follows the steps indicated in the methodology VM00015

6.2.1 Land-use and land cover change map 2010-2015

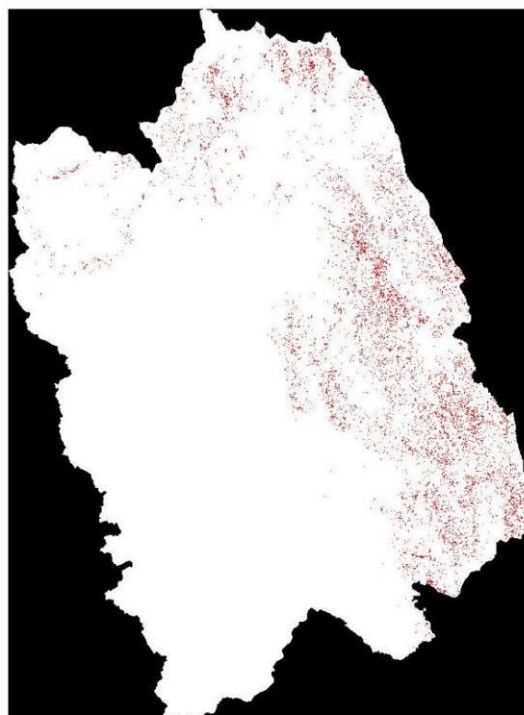
Monitoring of land use change was conducted on the project area, the reference area and leakage belt.

The methodology VM0015 requires to produce a forest / non-forest map, and locate deforested areas in the last period (2010-2015). The production of this map by ONFI will follow the same method as the previously used:

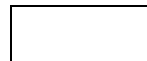
- Pre-processing
- Classification
- Post-processing
- Validation

The detailed description of activities and proceedings is available in appendix « Analysis of land use and land cover change 2010-2015”

The analysis shows the following results:

Figure 9 : Deforestation Map for 2010/2015 period**Legend:**

Deforestation



No Changes

Table 15 : Forest/Non Forest classification map areas by class (ha)

LULC classes	Reference area		Project area		Leakage belt	
	Areas 2010 (ha)	Areas 2015 (ha)	Areas 2010 (ha)	Areas 2015 (ha)	Areas 2010 (ha)	Areas 2015 (ha)
Forest	1 182 903	1 152 445	245 994	245 512	227 783	221 520
Non Forest	339 545	370 003	835,2	1 317	36 738	43 001
No data	167 118	167 118	48 890	48 890	9 879	9 879
TOTAL	1 689 566	1 689 566	295 720	295 720	274 399	274 399

The analysis indicates that 482 hectares were deforested in the project area in the 2010-2015 period, compared to 664 hectares deforested planned in the baseline scenario. Hence an avoided deforestation of 182 hectares.

Table 16 : ***LULC changes matrix in ha, after forest stratification for the project area (PA)***

PA		LULC 2015						
LULC 2010	Class	Amazonian Moist Forest	Andean moist Forest	Andean Dry Forest	Floodplain Forests	Non-Forest Vegetation	Bare Soil, Croplands, Settlements	TOTAL (2010)
	Amazonian Moist Forest	58353,12	0	0	0	53,46	33,84	58440,42
	Andean moist Forest	0	154650,87	0	0	208,17	101,79	154960,83
	Andean Dry Forest	0	0	32508	0	56,79	27,63	32592,42
	Floodplain Forests	0	0	0	0,18	0	0	0,18
	TOTAL (2015)	58353,12	154650,87	32508	0,18	318,42	163,26	245993,85

The above data from the land use change matrix was then converted to carbon stock change using the carbon stock data computed at validation, with the following results.

Table 17 : ***Project emissions in the Project Area***

Project Year	Calendar Year	Project scenario	
		Annual Area Deforested in Project Area (APSPAt)	Cumulative Net carbon stock change - project scenario (ΔCPSPA)
		ha	t CO2e
5	2015	482	-351 303

6.3 Leakage

The table 15 indicates that 6 223 hectares were deforested during the period 2010-2015, to be compared to the 12 087 anticipated in the baseline scenario.

This means that not only the project did not trigger any leakage in the leakage belt, but it also contributed to reduce the deforestation outside of the project area, in the leakage belt.

This is consistent with the large-scale strategy of the project described above, with a broad action at the level of the whole Huayabamba watershed over an area of 2 million hectares.

Converting the land-use change data in the leakage belt to carbon stock changes, the total amount of carbon stock change in the leakage belt is -5 931 913 tCO₂, to be compared to the carbon stock in the baseline scenario of -10 786 049 tCO₂. Thus indicating that the project did not trigger any GHG emissions in the leakage belt, on the contrary it contributed to reduce by half the planned emissions in the leakage belt.

Leakage is therefore nil.

Detail of the calculations are available in appendix.

6.4 Summary of GHG Emission Reductions and Removals (CL1 & CL2)

The project generated **162 258 t CO₂eq** GHG Emission Reductions and removals over the 2010-2015 period.

Table 18 : *Summary of GHG Emission Reductions and Removals*

Calendar Year	Baseline scenario	Project scenario				
	Annual baseline carbon stock change (ΔCBSLPat)	Annual carbon stock change - project scenario (ΔCPSPat)	Annual Net project emissions reductions (before leakage)	Leakage (ΔCLKt)	Annual Total net GHG emissions reductions (ΔREDDt)	Cumulative Total net GHG emissions reductions (ΔREDD)
	t CO ₂ e	t CO ₂ e	t CO ₂ e	t CO ₂ e	t CO ₂ e	t CO ₂ e
2010						
2011	-89 535	-69 272	20 263	-	20 263	20 263
2012	-102 963	-69 766	33 197	-	33 197	53 460
2013	-99 955	-70 261	29 694	-	29 694	83 154
2014	-99 651	-70 755	28 896	-	28 896	112 050
2015	-121 458	-71 249	50 208	-	50 208	162 258

6.5 Climate Change Adaptation Benefits (GL1)

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 would 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.

Deforestation would also lead to changes in water resources availability, with more frequent flooding in rainy events and increased river droughts in dry seasons.

In the framework of the “Jubilacion Segura” and “Alto Huayabamba” reforestation projects developed in the same region, the farmers are trained by Acopagro and FUNDAVI 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 farmers also received trainings about fire risks, and the farmers presenting 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.

Figure 10 : List of ecosystem services provided by the forest, and most important regulation services in the context of changing climate conditions



Farmers in the project zone are mainly cocoa producers. Extended droughts present the biggest problems to these communities and climate change will exacerbate these conditions. The farmers in the deforested area around Juanjui suffer from lack of shade and water, especially in the dry season. They are also more threatened by propagation of fires.

Agroforestry projects developed in the same region introduced a change in crop practices. The farmers have been trained on how to manage the crops under this model (tree density, pest management, shape pruning...) in order to maintain or increase significantly the cocoa yields. Well managed agroforestry model recreate real good micro-climate in the crop, modifying light access, soil's nutrients and water utilization, crop biodiversity through shade trees. PUR Lab's investigations in the project area showed that there are 55% more healthy fruits in low density agroforestry system compared to full sun system. The same comparison showed that the yields are 62% more important in the agroforestry low density system.

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.

The main goal of the project is to preserve and increase forest cover ensuring the conservation of key habitats for flora and fauna over 450 000 hectares of forest. By planting native tree species, the project increase corridors, as well as increasing forest cover upslope, and preserves unique habitat for amphibians, reptiles, mammals, bees, and birds. Recreating cooler microclimate conditions the project also help as a buffer for species to slowly adapt to climate change.

The project also promotes community and public awareness-raising on the richness of forest ecosystems and biodiversity, in the communities through “Escuelas de Campos” and environmental education, and in specific sites. Among the various initiatives, an educational circuit was designed and developed by the community forest guards at the project area’s main checkpoint to welcome visitors, inform and educate them on the species present in the forest, their value and importance of conservation.

At the regional scale the San Martin government is taking action through the implementation of the Zonificación Económica Ecológica (ZEE), designed to reduce the deforestation and promote sustainable development 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.

By fighting deforestation, the project preserves the ecosystem services of regulation provided by the forests (humidity and rainfall regulation, interception of rainfalls, run-off reduction and infiltration of water in ground water reserves, regulation of river flows over the year, regulation of microclimate (humidity, temperature), protection against strong winds, stabilization of the soils, soil erosion and landslide reduction. Generally speaking, the regulation services provided by forests are critical for the farmers to be able to keep farming their land without catastrophical damages from more frequent extreme climatic events.

7 COMMUNITY

7.1 Net Positive Community Impacts (CM1)

The project brings positive community impacts through various dimensions:

Organizational structure strengthening, democratic and collective process, formalization and empowerment of local organizations

The project is by definition a community project. It started building upon the existence of APROBOC association and their concession El Breo, along with the willingness of ACOPAGRO cooperative to claim an area of conservation as well for the benefits of the members. The Fundacion Amazonia Viva itself, now in charge of the project overall coordination, was born because of the willingness of 3 community organizations (APAP, APAPMASAR, APAHUI) – later joined by Oro Verde- to gather and better collectively manage the resources in San Martin regions. The Fundacion Amazonia itself is a model of democratic organization, operated by the community organizations themselves.

Since then, 17 more community organizations have showed interest in getting organized or better organized to collectively claim and manage an area of conservation. The project supported the communities to create, formally register and activate community associations, and helped them in the process of claiming the concessions. Additionally, the Fundacion Amazonia Viva provides technical

assistance and trainings on organizational management and key concepts (transparency, funds management, reporting, democratic votes, etc.).

The collective approach at the core of the project's philosophy, and the empowerment of community organizations is a key benefit for communities who have experienced very difficult and conflictual times in the 1980's and 1990's when coca production was predominant, terrorists and narcotrafficans used to raise communities and individuals against each other. This period had left strong marks in the communities and the REDD+ project is contributing to restore a collective thinking and development process.

Self-determination and autonomous participation

The project is by definition participative, and only voluntary communities participate in the project. All communities were consulted, and approved the development of the REDD+ project in the overall area. However not all yet are willing to actively implement activities in their communities. Participation remains voluntary.

The communities themselves, via their community organizations or institutional authorities, identify their development and environmental priorities, and decide collectively of the activities they want to develop in the framework of the project. They are supported for this process by the Fundacion Amazonia Viva, and a list of priority activities that can be funded by the project is approved collectively.

Once approved and financed, the activities are implemented by the communities and community members themselves. Populations are therefore not only beneficiaries, but real actors of the project. Alternative and complementary sustainable economic activities. Community organizations are then in charge of monitoring and reporting for all activities developed in their area of influence. They report regularly at the Fundacion Amazonia Viva during regular technical meetings.

Development of complementary sustainable economic activities

The project promotes the implementation of sustainable activities alternative to logging and forest resources looting, in order to provide diversified and increased revenues and subsistence resources to the communities. These activities are described in section 2, and contribute both to diversify local communities' capabilities and technical knowledge, as well as increase the participants' revenues.

These activities (fish breeding, bee heaving, seeds collection, community tree nurseries, ecotourism, etc.) leverage the resources of the forest without destroying them, and allow the communities to intensify their production and revenues with their actual piece of land, without having to

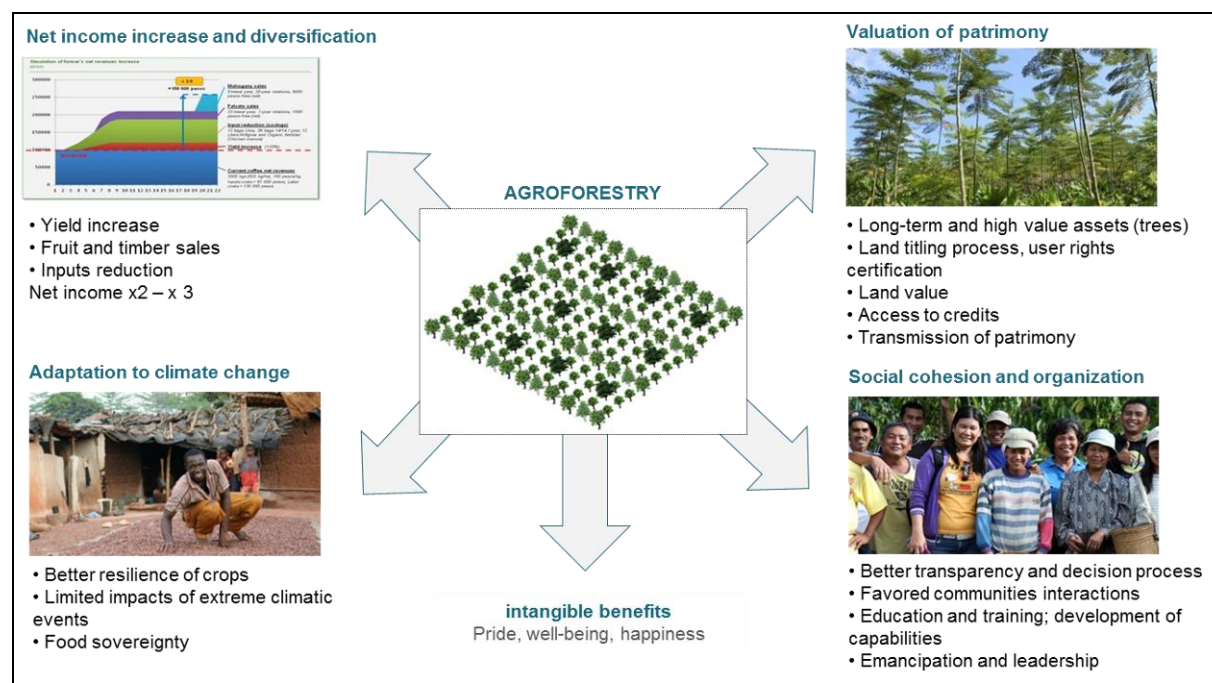
Agroforestry benefits

The agroforestry plantations implemented by the communities on their land will generate the following benefits

- Additional income from sales of timber will vary from around 450 USD and 10,500 USD per ha, depending if the farmer chooses partial or full reforestation. These are very conservative estimations. These additional incomes bring extra security to families who can compensate low crop productions or damages of climatic events. They can also serve as retirement pension, be used for the education of children, social insurance, or be transmitted as a capital to the next generation.
- Indirect increase of income will occur through the positive impact of agroforestry systems on farm production yields (soil improvement, shading of cocoa trees, etc.)
- For some tree species, the farmers can also harvest non-timber products such as essential oils, medicinal products (e.g. sangre de grado, aceite de copaiba), flowers, which can also be sold with high value on the market and generate additional income.

- Adaptation to climate change: Reforestation in agroforestry systems and with a landscape approach enables farmers to be less impacted by extreme events (soil stabilization, crop protection, temperature regulation, water retention, etc.) and maintain a more constant production.

Figure 11 : Summary of social and economic benefits of reforestation in agroforestry models



Increased visibility and linkage with third-party stakeholders

The scale of the project, embedded in a large-scale and long-term vision encompassing close to 2 million hectares to be sustainably managed by communities, enables the communities to gain recognition, visibility and influence at local and international level.

The success of the project's community model through visible outcomes, communicated by The Fundacion Amazonia Viva and Pur Projet, drove increasing attention of Peruvian authorities, from local municipalities, provincial authorities, regional governments and national government. National anti-drug entity has showed extremely strong interest in the project community model enabling a sustainable transition from coca to licit crops with strong community strengthening. All level of authorities have visited the project and brought their support and back-up to it. The communities in the area, gathered through the project, therefore benefit from greater visibility, prioritized policies (e.g. land titling), and gained a greater weight and influence on processes, discussions, policies.

Additionally, the funding mechanism implemented by Pur Projet through voluntary carbon market, grants from international companies, and investments in the project of international companies buying commodities (cocoa, coconut) in the area, has contributed to increase the linkage of the communities with the rest of the world, opening opportunities to develop new markets, new activities (e.g. international tourism, honey sales, premium cocoa products, medicinal products sales, etc.)

Finally, the international recognitions of Model Forest network, UNESCO (through registration of the area as Biosphere Reserve) contributed to enhance the project's and the communities' visibility at an international scale, therefore driving interests of potential investors, aid agencies.

Pride, well-being, happiness

As a result of the other community benefits (empowerment, collective organizations, visibility, linkage to markets and international stakeholders, diversified and increased revenues, improved livelihood, conditions to be better adapted to climate change), population develops progressively a sense of increased security, improves its patrimony, values its land and generates assets to transfer to the next generations. This process results in a general improvement of populations' satisfaction, pride, and happiness. These intangible benefits are monitored by the project through regular surveys.

HCV related to community well-being were identified in the PDD section G1.8 4-6, and include areas of forest that provide socio-economic services mentioned in sections G1.8.4-6 of the PDD such as water resources regulation, microclimate regulation, fishing, hunting, recreation, tourism, etc. By preserving the forests that provide those services, the project is precisely protecting the HCVs related to community well-being.

7.2 Negative Offsite Stakeholder impacts (CM2)

The experience shows 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 timber concessions, or has been cleared and settled by migrants moving into the region from other provinces. In the past 30 years, San Martin Region has transitioned progressively 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.

As explained in the PDD, 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 agriculture expansion by migrants entering the area. However, migration outside of the 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 the project zone.

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.

As a mitigation strategy, the Fundavi supports communities in defining themselves land-use plans and microzonification of their areas. This process results in clarified land-use and open areas for migrants to settle and for community members to extend agriculture to.

A consultative process is also ongoing for communities to self-define buffer forest areas between the farmed lands and forest areas to be conserved, dedicated to sustainable timber harvesting for local use by the communities (construction, bridges, furniture, etc.).

The intended result of this participative process done in each community is to define areas dedicated for agriculture land-use and settlements, areas for sustainable timber harvesting for local use, areas dedicated to conservation.

7.3 Exceptional Community Benefits (GL2)

According to INEI⁷, 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)⁸. 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 and the project specifically targets the communities.

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). Among the 33 communities in the scope of the project influence, 18 are only accessible by several hours of boat and 5 are only accessible by several days of walking.

The activities implemented by the project, and described in section 2, address the needs of those communities, and supports them both with education, and the development of complementary economic activities and agroforestry, that will enable the families to increase their self-sufficiency as well as diversify and increase their revenues.

Additional surveys are conducted every year among the participating communities to monitor the evolution of living conditions in the communities.

8 BIODIVERSITY

8.1 Net Positive Biodiversity Impacts (B1)

Net positive biodiversity impacts and High Conservation Values

The main goal of the project is to ensure the conservation of key habitats for flora and fauna over 450 000 hectares of forest, constituted by rich and threatened flora and fauna ecosystems. The project preserves unique habitat for amphibians, reptiles, mammals, and birds, while restoring high value and endangered tree species. The project also creates greater awareness among local communities regarding the value of biodiversity, as well as build monitoring, patrolling, and habitat restoration skills, which result in better controls over hunting, poaching, and damage to critical habitat. Mobilizing the communities committees to engage in biodiversity conservation also result in the community establishing rules and sanctions prohibiting hunting and regulating non-timber forest products collection to sustainable levels.

Records of community forest guards over the first years of the project indicate a decrease in illegal intrusions to the project area for hunting, poaching, and logging activities, demonstrating the net positive impacts of the project on biodiversity preservation.

⁷ Instituto Nacional de Estadística y Informática, *Informe Técnico, Evolución de la Pobreza, 2007-2011*, 2011

Aucune source spécifiée dans le document actif.

⁸ CREAR, *Informe de diagnóstico para la elaboración del plan operativo de difusión y sensibilización. Biocorredor Martín Sagrado*, August 2012

The project also promotes community and public awareness-raising on the richness of forest ecosystems and biodiversity, in the communities through “Escuelas de Campos” and environmental education, and in specific sites. Among the various initiatives, an educational circuit was designed and developed by the community forest guards at the project area’s main checkpoint to welcome visitors, inform and educate them on the species present in the forest, their value and importance of conservation.



Similarly, a community botanical garden was developed in Santa Rosa to replant, value, and promotes the native valuable species, in particular all species of traditional medicinal, ornamental, aromatic use. The community botanical garden aims at conserving the traditional knowledge on native plants, as well as preserve endangered species that are propagated in the garden area for conservation purposes. Visits of public and other communities facilitate awareness raising on the flora biodiversity.

Multiple educational materials (leaflets, children books) were designed and used by the Fundación Amazonia Viva to build awareness in particular among children on the biodiversity hosted in the forest and the importance of preserving these High Conservation Value area.

The goal of the project is precisely to protect forest resources and areas of High Conservation Value. 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 protected species. Regular inventories of biodiversity are being conducted by community forest guards through patrolling, observation, fixed-point photography. They indicate the continued presence of threatened and local fauna species. Without the project these areas of special value are expected to decrease with the loss of forest cover.

As the biodiversity monitoring plan are directly build and implemented by Concessions for conservation with the support of FUNDAVI, this is a consistent way to mobilizing and ensure community involvement and engagement in biodiversity conservation adequately and at long term. All the activities implementing in terms of biodiversity as for example establishing rules and sanctions prohibiting hunting and regulating non-timber forest products collection to sustainable levels, always results in a community agreement formalize in “Marco Logico” and “POA” review each year and adjust to needs and results.

The biodiversity monitoring plan developed by the implementing partners should have been constructed in collaboration with the Forestry Administration (INRENA). But after some exchange with the INRENA the implementing partners realized that INRENA wasn’t the relevant partner to construct this plan. We needed to be very reactive and we had in-house qualified staff to construct this plan with the communities.

However, the FUNDAVI and the INRENA now known as the SERNANP have been develop very good relation and signed a framework agreement (CONVENIO_FUNDAVI-SERNANP_DGANP firmado) in order to develop mutual actions which lead to the conservation of forests in the buffer zone of the Rio Abiseo National Park (PNRA), with emphasis on the sites where they are located existing concessions of conservation.

No adverse effects of non-native species

The project does not introduce any exotic species.

For reforestation activities in the leakage management areas, the following native species are used.

Table 19 : Tree species used in reforestation activities of the project

Local Name	Scientific name	Family	Origin	Growth speed	Average age at maturity (years)	Tree height (m)	Basic Wood Density (t dm/m3)
Shaina	<i>Colubrina Glandulosa</i>	Ramnaceae	Native	very high	10	3 to 5	0,74
Pinochuncho	<i>Schizolobium Amazonicum</i>	Fabaceae	Native	very high	10	12 to 16	0,49
Bolaina	<i>Guazuma Crinita</i>	sterculaceae	Native	very high	10	12 to 15	0,52
Cacapana/ Marupa	<i>Simarouba amara</i>	Simaroubaceae	Native	high	10	20 to 40	0.32 - 0.38
Paliperro	<i>Vitex Pseudolea</i>	Berberaceae	Native	high	15	8 to 15	0,56
Capirona	<i>Calycophyllum Spruceanum</i>	Rubiaceae	Native	high	15	20 to 35	0,65
Huayruro	<i>Ormosia coccinea</i>	Fabaceae	Native	Medium		25 to 35	0,59
Estoraque	<i>Miroxylon Balsamum</i>	Fabaceae	Native	Medium	25	34	0,76
Cedro Nativo	<i>Cedrela odorata</i>	Meliaceae	Native	Medium	25	20 to 30	0,40
Caoba	<i>Swietenia Macrophylla</i>	Meliaceae	Native	Slow	35 to 40	20 to 35	0,42 - 0,54
Ishpingo	<i>Ocotea quixos</i>	Lauraceae	Native	Slow	40	20	0,43
Putiquero							
Cedro Rosado	<i>Acrocarpus fraxinifolius</i>	Leguminosae	Exotic	High	10 to 12	30 to 60	-
Tornillo	<i>Cedrelia catenaeformis</i>	leguminosae	Native	Medium	25	30 to 50	0,45
Capirona	<i>Calycophyllum spruceanum</i>	Rubiaceae	Native	Medium	15	15 to 30	0,72
Copaiba	<i>Copaifera officinalis</i>	Fabaceae	Native	Slow	30	30	0,68
Estoraque	<i>Myroxylon sp.</i>	Fabaceae	Native	Slow	25 to 30	-	0,78
Shihuahuacu	<i>Dipteryx micrantha Harms</i>	Fabaceae	Native	Slow	40	40	0,87

For bee heaving activities, the bees (*Apis mellifera*) are captured in the wild by the participating community members assisted by a professional technicians of the Fundavi. They are therefore bees naturally present in the project's ecosystems.

For fish breeding, fishes breeded are "Gamitana" (*Colossoma macropomum*), naturally present in freshwater ecosystems of the Peruvian Amazon. They are not invasive, and fish ponds infrastructure design prevents any dispersion of fishes in the rivers. Fish are breeded with natural food waste, cocoa pods waste, fruits, tree seeds, etc. No GMO is used for fish breeding.

8.2 Negative Offsite Biodiversity Impacts (B2)

The project has not triggered any negative offsite biodiversity impacts. The implementation of the project is not restricted to the strict project area, but works with communities based in the buffer zones and leakage management belt in the project zone. All environmental education activities conducted with the communities will therefore have an impact beyond the project area.

Also the project is embedded in a large-scale strategy to work with communities and other stakeholders over a 2 million hectares area to be registered at UNESCO as a Biosphere Reserve. This broad community approach strengthens the activities of all stakeholders in the region, including the neighbour National Park Rio Abiseo, which has been conducting awareness raising on biodiversity for 20 years in the area. Other NGOs (AMPA, Mono Tocon, etc.) and local governments active in the whole 2-million hectare area, are also contributing through this common initiative to the global awareness raising among communities on the importance to preserve biodiversity.

Beyond this large-scale awareness raising and recognition model, the project also supports communities to develop sustainable economic activities alternative to deforestation, hunting, poaching, overfishing, as well as the intensification of agriculture through agroforestry in particular.

The development of these economic and improved agriculture activities, along with the broad awareness raising campaign across the whole 2-million Biosphere Reserve area, help mitigate the potential risk of displacement of hunting, logging, poaching activities to other areas.

8.3 Exceptional Biodiversity Benefits (GL3)

As described in the PDD, 21 species on the IUCN red list have been registered and identified with a high probability of occurrence in the project area, 1 being critically endangered (CR) and 4 being endangered species (EN). By protecting their habitats over 450 000 hectares of project area, the project contributes to the conservation of these endangered species. The project also generates broader awareness among the population on these species specifically, through environmental trainings, posters, education material.

Monitoring conducted indicate that the project has contributed to protect the endangered species.

In the first place, monitoring of deforested areas indicate that deforestation in the project area was reduced, and even completely avoided (see section 6 for deforested areas), in some of the concessions of the project area where some of the endangered species had been spotted during biodiversity inventories.

Several biodiversity inventories were conducted at the beginning of the project, and regularly since then by the community forest guards, assisted by Fundacion Amazonia Viva technicians. Animal spotting are frequent at the control checkpoints located on the boundary, and inside the project area along the river, and recorded by the community forest guards. Additionally 3 biodiversity research expeditions were conducted in 2012, 2013, and 2015 deep inside the project area to recognize the project area, identify the ecosystems, and spot high conservation value species. During these inventories and observations, endangered animal species such as Otorongos, Sachavacas, Pavas Negras, Mono Tocon, Gallito de las Rocas, were spotted, as well as endangered vegetal species (Cedro, Helecho Arboreo)



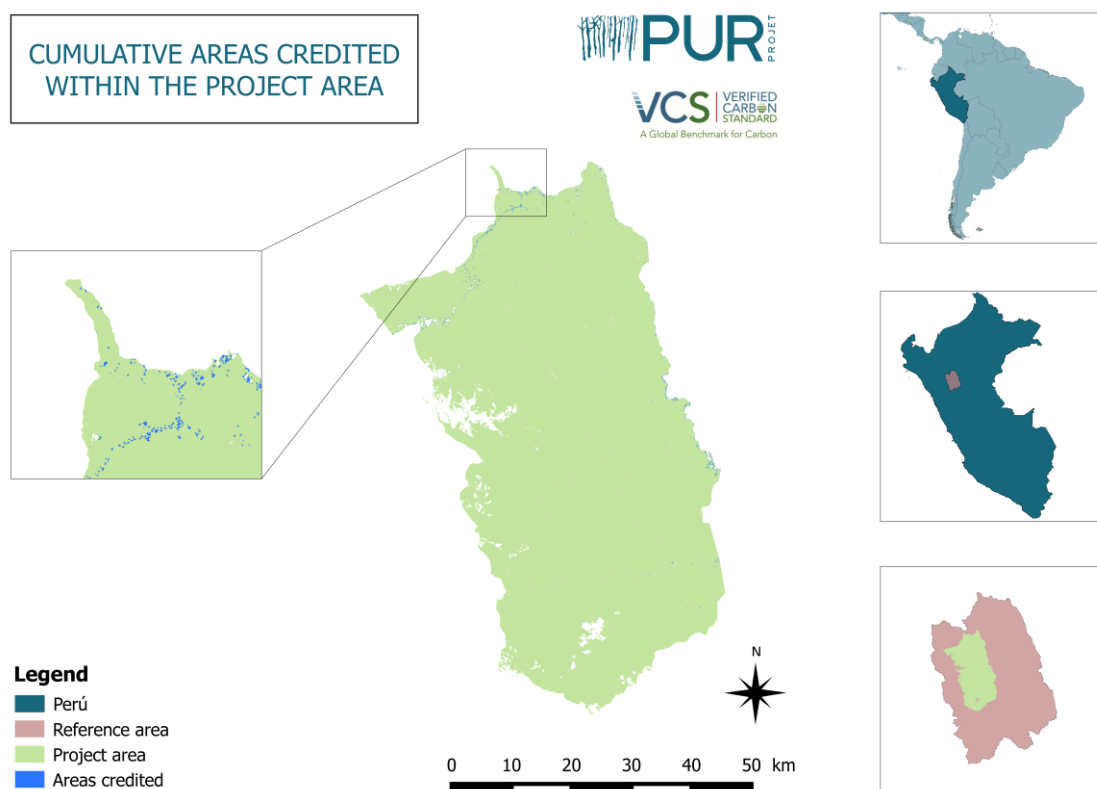
Fixed-spot photography (camera traps) were also used in the project area, and have managed to capture images of some endangered species (Tapirus Terrestris, Pavas Negras).

Finally, the project also contributes to the preservation of some endangered flora species, by re-planting them via the reforestation activities in the communities. The Cedro (Cedreal Odorata) and Caoba (Swetiena Macrophylla) in particular are integrated to the species planted by the communities within the project.

ANNEX DOCUMENT

Cumulative Areas Credited Within the Project Area

BIOCORREDOR MARTIN SAGRADO REDD+ PROJECT



ANNEX DOCUMENT
Data and Parameters for emissions reduction calculation
BIOCORREDOR MARTIN SAGRADO REDD+ PROJECT



1. Baseline Scenario

The baseline scenario was completed following the methodology steps of the methodology VM00015. The complete process and results are available in appendices “Historical analysis of land-use and land-cover changes”, “Analysis of agents, drivers, and underlying causes of deforestation”, and “Projection of future deforestation”. A summary of main results is presented hereafter.

1.1 Analysis of historical land-use and land-cover change

The analysis of historical land-use and land-cover change was completed following the methodology VM00015, and the complete process and results of the analysis are available in appendix “Historical analysis of land-use and land-cover changes”.

1.1.1 Data sources

According to the methodology and based on data availability, three time points were selected over the historical reference period: 2001 / 2005 / 2010.

Due to cloud cover and Landsat 7 ETM+ SLC problem, a time window of ± 2 year was tolerated for each time point. When Landsat 7 ETM+ had to be used, an algorithm has been used to fill the gaps, as explained below in pre-processing chapter.

Two types of data have been used for both interpretation and validation. Landsat 7 ETM+ data have been acquired throughout the Glovis USGS portal. SPOT 5 data have been acquired thanks to PLANET ACTION initiative. Those images were directly ordered to SPOT IMAGE SA and acquired in orthorectified pre-processed format.

Table 20 : Data used for historical LU/LC change analysis

Vector	Sensor	Resolution		Coverage (km ²)	Acquisition date	Scene or point identifier	
		Spatial	Spectral (μm)			Path / Latitude	Row / Longitude
Satellite	Landsat 5	30m	0.45 – 2.35	34 225	25/08/01	08	65
Satellite	Landsat 7 ETM+	30m	0.45 – 2.35	34 225	30/06/01	08	66
Satellite	Landsat 7 ETM+	30m	0.45 – 2.35	34 225	12/08/05	08	65
Satellite	Landsat 7 ETM+	30m	0.45 – 2.35	34225	16/01/05	08	65
Satellite	Landsat 5	30m	0.45 – 2.35	34 225	08/09/06	08	65
Satellite	Landsat 5	30m	0.45 – 2.35	34 225	24/11/05	08	66

Satellite	Landsat 5	30m	0.45 – 2.35	34 225	19/11/09	08	65
Satellite	Landsat 5	30m	0.45 – 2.35	34 225	03/11/09	08	65
Satellite	Landsat 5	30m	0.45 – 2.35	34 225	18/08/10	08	65
Satellite	Landsat 7 ETM+	30m	0.45 – 2.35	34 225	27/09/10	08	65
Satellite	Landsat 7 ETM+	30m	0.45 – 2.35	34 225	08/09/09	08	65
Satellite	Landsat 7 ETM+	30m	0.45 – 2.35	34 225	26/08/10	08	66
Satellite	SPOT 5	10m	0.5 – 1.75	3 600	21/08/10	647	365
Satellite	SPOT 5	10m	0.5 – 1.75	3 600	20/07/10	645	364
Satellite	SPOT 5	10m	0.5 – 1.75	3 600	20/07/10	645	365

1.1.2 Categories of Land-Use and Land-Cover classes

Land-use and land-cover classes have been defined crossing several approaches:

- Agents and drivers analysis, as well as Pur Projet very good knowledge of the area, enabled to pre-identify land-use and land-cover classes that should be looked at in order to translate the on-the-ground situation (including classical changes) and to follow the IPCC 2006 AFOLU Guidelines;
- An unsupervised classification has been run on the remote sensing data. It enabled to differentiate different spectral answer and to discriminate several classes. This unsupervised classification method have then been adjusted using supervised classification (SVM) thanks to ground-truthing points (see later);
- Classification has also been refined based on carbon stock assessment. Some classes have been merged due to their carbon stock homogeneity (e.g. Rock, Settlements and Bare Soil have been merged in a <Bare Soil> class).
- Post-processing enabled to further stratify forest class, using Ecological Systems such as defined by Josse, C. et al. (2007). Four of the ecological system groups are within Reference Region:
 - Amazonian Moist Forests (Bosques Húmedos Amazonicos)
 - Andean Moist Forests (Bosques Húmedos Andinos)
 - Andean Dry Forests and Weric Scrub (Bosques secos y matorales wericos andinos)
 - White Water Floodplain Forests (Bosques inundables por aguas blancas)

Explanations on how the classification has been post processed using those groups are provided in Appendix “Historical Analysis of LULC Changes”. Results of biomass inventory enabled to assess the suitability of this forest stratification.

- Water class has been discriminated through unsupervised classification. Very few changes occurred over time probably due to the water volume evolution. The final <Water> used for all three time points result from the merging of water-classified areas.

Table 21 : Land use and land cover classes existing at the project start date within the reference region

Class Identifier		Trend in Carbon stock ¹	Presence in ²	Baseline activity ³			Description (including criteria for unambiguous boundary definition)
ID _{cl}	Name			LG	FW	CP	
1Fcl	Bare Soil, Cropland and Settlements	constant	RR, LB	No	No	No	Bare soil refers to all surfaces which carbon density is null or close to be null. It includes: - Urban and rural areas (settlements, roads network, infrastructures, etc.); - Rocks, sand deposit areas; - Non wood vegetated areas such as grasslands; - Annual crops (maize, sugar cane, etc.) Bare soil can be a natural state (rocks) or an anthropogenic transformation (annual crops). In all cases, bare soil has to be understood as a permanent state, i.e. bare soil is not expected to naturally regenerate into forest or other vegetation, at least not in the next 10 to 15 years. This permanent characteristic can be due either to soil degradation (soil became too degraded to recover) and/or to permanent human activities. Among anthropogenic activities, bare soils host cattle raising (grasslands), settlements, and annual crops. Bare soils are of different types and can therefore be located in different areas. Rocks will be located in mountainous areas while sands deposit will be located alongside or within existing or former rivers' banks. Grasslands, annual crops fields are usually located in most accessible areas, with good irrigation capacities, i.e. alongside rivers or close to urban/rural areas.
2Fcl	Water	constant	RR, LB	n/a	n/a	n/a	This class refers to all delimited water surfaces, i.e. rivers, streams, lakes, artificial basins, etc. A priori, no vegetation can developed in water areas. For geophysical reasons, water will be found in valleys, but also in elevated areas (such as for high altitude lakes).
1lcl	Amazonian Moist Forests	constant	RR, LB, PA	Yes	Yes	No	Amazonian Moist Forests refer to dense evergreen forests, tall and multi-stratified. They are distributed along the low sub-Andean ridges with humid to hyper-humid pluvial bioclimates, below 1300m approximately. Species of <i>Rubiaceae</i> and <i>Lauraceae</i> are important components of the system, as well as <i>Oenocarpus</i>, <i>Iriartea</i> and <i>Wettinia</i> palm trees.
2lcl	Andean moist	Constant	RR, LB, PA	Yes	Yes	No	Andean Moist Forests refer to several types of forest from 2000m to 1200m. Those forests are 10 to 25 meters evergreen forests dominated by coriaceous, sclerophyllous, dark leaves. Abundant presence of

Forests			epiphytes, vascular and non vascular. In some lower areas, Andean palms (<i>Dictyocaryum lamarckianum</i>) are abundant or <i>Lauraceae</i> species (in mountainous hillsides the least exposed to the fog).
3Icl	Andean Dry Forests	Constant RR, LB, PA No Yes No	Andean Dry Forests refer to low and drought deciduous forests and. Those forests are found in xeric dru to semiarid bioclimate, between 2000m and 3100m, in inter-Andean valleys subject to a marked topographic rain shadow effect.
4Icl	Floodplain Forests	constant RR, LB No No No	Floodplain Forests are exposed to seasonal and relatively short sediment rich, white-water floods. It develops in the recent and sub-recent alluvial plains of white-water rivers. These forests reach up to 30m in height, and are characterized by an association of trees and palm trees of caepitose and thorny habits.
3Fcl	Non-forest vegetation (fallows and plantations)	Increasing RR, LB No Yes No	Non-forest Vegetation is a dynamic class. It refers to all successive states of slash and burn agriculture from just-burnt state to 4 to 5 years fallows. This class also includes plantations such as cocoa, bananas and oranges. In a general point of view, this class includes all surfaces that are not tall and/or dense enough to be classified within <Forests> class. In terms of land use, Vegetation in Transition should be seen as areas which where natural forests before and has been slashed and burnt. Those areas are usually cultivated for a 2 to 5 years period then left to fallows. During the following period, the area will recover and if not disturbed again, forest might regenerate. Most of the time, fallows are left for a period of time than slashed and burnt again. Repetition of slash and burn cycles will likely result in permanent bare soil areas (grasslands in non irrigated areas, shrublands in sandy areas). In some areas, while soil quality might be good enough to enable forest natural regeneration, invasive species (such as palms and bamboos) will stop the process. <Non-forest Vegetation> will likely be found in middle-accessible areas, i.e. not in direct periphery of rural and urban areas, contrary to bare soil. Non-forest Vegetation is usually frontier to forest and located in very mosaic landscape, i.e. in areas where cultivation fields are inserted into forests remaining patches.

Notes:

1. Note if “decreasing”, “constant”, “increasing”
2. RR = Reference Region, LK = Leakage Belt, PA = Project area
3. LG = Logging, FW = Fuel-wood collection; CP = Charcoal Production (yes/no)
4. Each class shall have a unique identifier (ID_c). The methodology sometimes uses the notation icl (= 1, 2, 3, ... Icl) to indicate “initial” (pre-deforestation) classes, which are all forest classes; and fcl (=1, 2, 3, ... Fcl) to indicate final” (post-deforestation) classes. In this table all classes (“initial” and “final”) shall be listed.

1.1.3 Categories of Land-Use and Land-Cover change classes

Land-use and land-cover changes have been defined based on analysis of agents and drivers of deforestation and forest degradation and thanks to Pur Projet knowledge on local agricultural practices. Figure 1 illustrates the possible types of changes that might occur on the Reference Region. The tables hereafter respectively lists the potential land-use and land-cover changes matrix from initial to final classes, and the corresponding categories of land-use and land-cover change categories.

Figure 12 : Land-Use and Land-Cover Changes Scheme

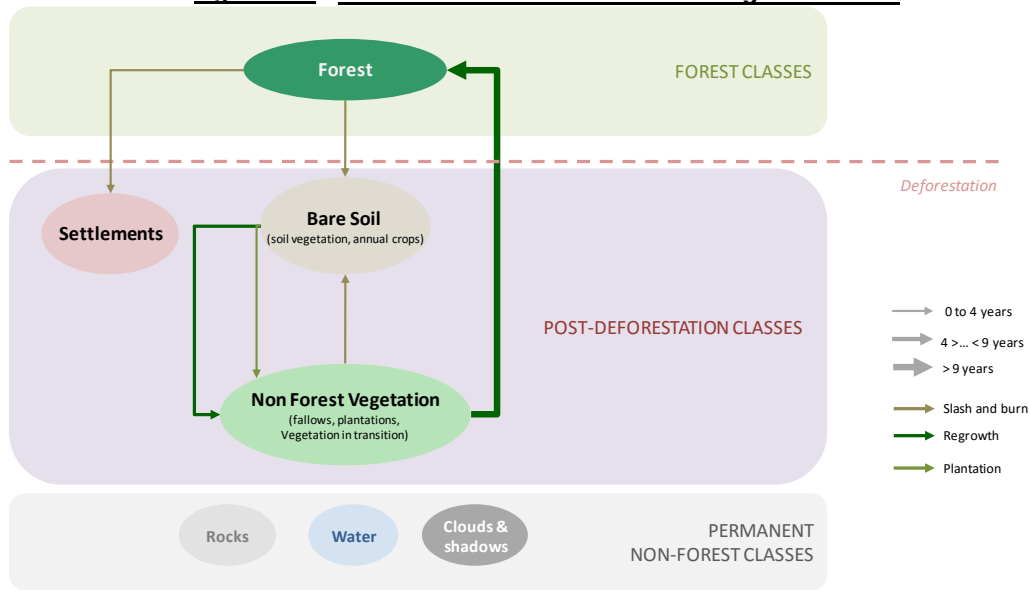


Table 22 : Potential land-use and land-cover change matrix

<i>ID_{Cl}</i>		Initial LU/LC class			
		<i>1lcl</i> – <i>Amazonian Moist Forest</i>	<i>2lcl</i> – <i>Andean moist Forest</i>	<i>3lcl</i> – <i>Andean Dry Forest</i>	<i>4lcl</i> – <i>Floodplain Forest</i>
Final LU/LC class	<i>1Fcl</i> – Bare Soil, croplands, settlements	1lcl/1Fcl	2lcl/1Fcl	3lcl/1Fcl	4lcl/1Fcl
	<i>2Fcl</i> – Water	*	*	*	4lcl/2Fcl
	<i>3Fcl</i> – Non Forest vegetation (fallows, plantations)	1lcl/3Fcl	2lcl/3Fcl	3lcl/3Fcl	**
	<i>0-Cloud and Shadows</i>	***	***	***	***

**Changes from Forests classes other than floodplain forests to water are not possible.*

***Fallows and plantation are usually not implemented in floodplain areas.*

****Changes from or to Cloud and Shadows are not possible as the three years cloud and shadow have been merged into one class.*

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

ID _{ct}	Name	Trend in Carbon stock ¹	Presence in ²	Activity in the baseline case ³			Name	Trend in Carbon stock	Presence in	Activity in the project case ³		
				LG	FW	CP				LG	FW	CP
1cl/1Fcl	Amazonian Moist Forests	constant	RR, LB, PA	Yes	Yes	No	Bare Soil, Cropland and Settlements	constant	RR, LB	No	No	No
1cl/3Fcl	Amazonian Moist Forests	constant	RR, LB, PA	Yes	Yes	No	Non-forest vegetation (fallows and plantations)	Increasing	RR, LB	No	Yes	No
2cl/1Fcl	Andean moist Forests	Constant	RR, LB, PA	Yes	Yes	No	Bare Soil, Cropland and Settlements	constant	RR, LB	No	No	No
2cl/3Fcl	Andean moist Forests	Constant	RR, LB, PA	Yes	Yes	No	Non-forest vegetation (fallows and plantations)	Increasing	RR, LB	No	Yes	No
3cl/1Fcl	Andean Dry Forests	Constant	RR, LB, PA	No	Yes	No	Bare Soil, Cropland and Settlements	constant	RR, LB	No	No	No
3cl/3Fcl	Andean Dry Forests	Constant	RR, LB, PA	No	Yes	No	Non-forest vegetation (fallows and plantations)	Increasing	RR, LB	No	Yes	No
4cl/1Fcl	Floodplain Forests	constant	RR, LB	No	No	No	Bare Soil, Cropland and Settlements	constant	RR, LB	No	No	No
4cl/2Fcl	Floodplain Forests	constant	RR, LB	No	No	No	Water	constant	RR, LB	n/a	n/a	n/a

1.1.4 Historical Land-Use and Land-Cover Change

According to the methodology and to good practices, three successive steps enabled to analyse historical land-use and land-cover changes in the reference region:

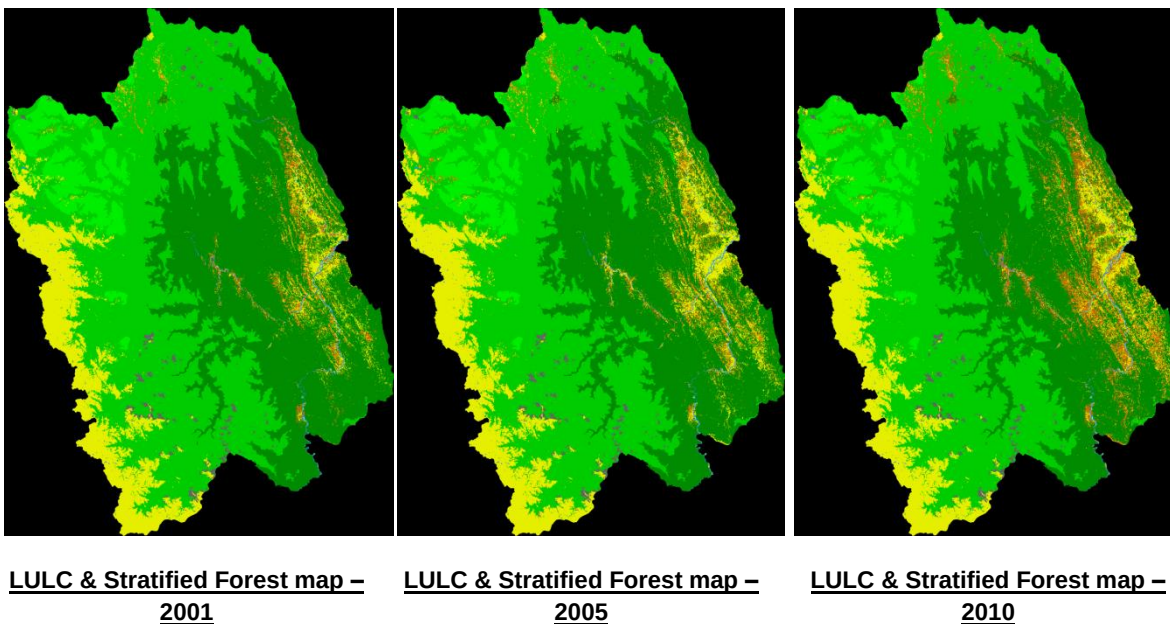
- Pre-processing
- Interpretation and classification
- Post-processing

A complete description of methodology, process, and assumptions is available in the Appendix “Historical Analysis of LULC changes”

The results of the analysis are presented hereafter:

A total of **75 042 hectares** were deforested from 2001 to 2010 (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 13 : LULC maps, after forest stratification



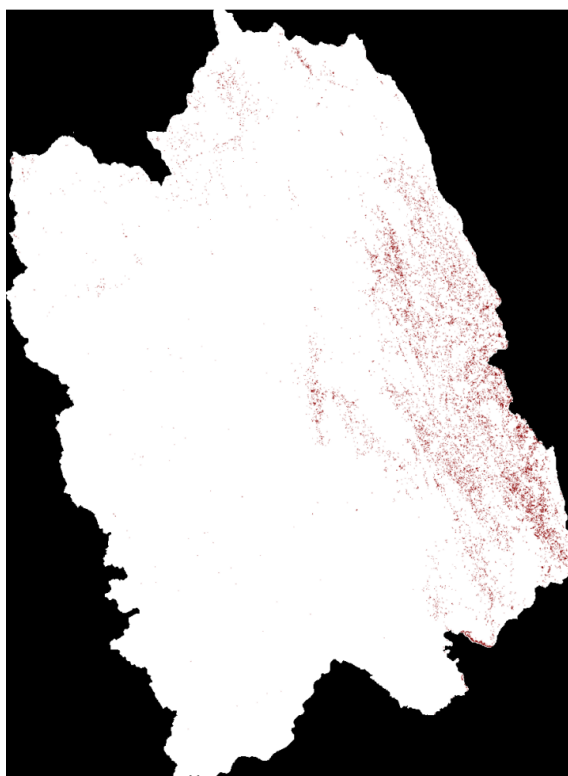
Legend:



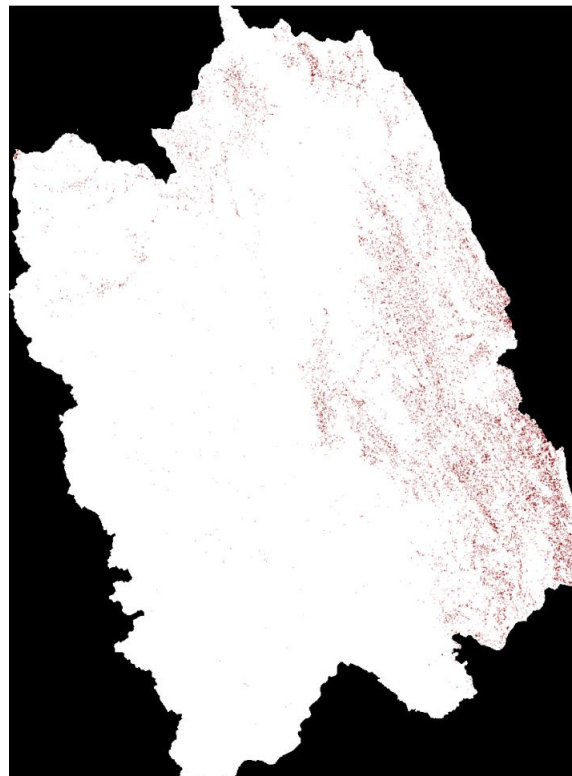
Table 24 : LULC classes area after forest stratification

IDcl	LULC classes	Areas 2001 (ha)	Areas 2005 (ha)	Areas 2010 (ha)
2Fcl	Water	7 199	7 199	7 199
1lcl	Amazonian Moist Forests	604 684	574 398	537 303
2lcl	Andean moist Forests	718 813	716 537	711 615
3lcl	Andean Dry Forests	88 730	88 595	88 286
4lcl	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 14 : Deforestation Maps for 2001/2005 and 2005/2010 periods



Deforestation map – 2001 / 2005



Deforestation map – 2005 / 2010

Legend:



Deforestation

No Changes

Table 25 : 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.

1.1.5 Map Accuracy assessment

According to VM0015, map accuracy has been assessed to validate classification process (i.e. LULC maps before stratification).

Neither ground-truthing points, nor aerial pictures or high resolution data were available for 2001 and 2005 time points. Following the methodology, map accuracy assessment has therefore only been performed for the most recent time point (2010). Improvement enabled through this process has then been applied to 2005 and 2001 time point.

2010 LULC map accuracy has been assessed through ground-truthing points and high resolution data, before post-processing (only one forest class has been validated):

- 287 ground-truthing points have been collected following the Field Validation Guidebook available in a separate document. Ground-truthing points are distributed over Forest class (before post-processing stratification), Bare soil, cropland and settlements class, and non-forest vegetation class.
- In addition, to improve the statistical representativeness of forest class which represents about 80% of the Reference Region, 60 random points have been added in homogeneous forested areas. These points have been collected within a 1 000 meters buffer inside forest class of 2010 LULC map (before post-processing forest stratification) in order to avoid resolution data

uncertainty. Indeed, as no higher resolution data were available, those points have been controlled on 10m SPOT images. This was possible considering the fact that most of ground-truthing points have been collected in accessible areas, i.e. in very mosaic landscapes.

LULC maps assessment

Results show that 94.4% of forest points have been well-classified. On the contrary, 4.2% of forest points had been mistaken classified in non-forest vegetation class. Among the 98 validation points of non-forest vegetation, 84.9% have been well-classified while 81.6% of 106 Bare soil, croplands and settlements validation points have been well-classified. The mean accuracy of 2010 LULC map is about **87%**.

Forest Cover Benchmark Map assessment

Results show that 94.4% of Forest class and 92.2% of Non-Forest class have been well-classified. Mean accuracy of 2010 Forest cover Benchmark map is **93.3%**.

1.2 Analysis of agents, drivers and underlying causes of deforestation

The following table summarizes deforestation threats, agents, drivers, and underlying causes of deforestation.

Table 26 : Summary of deforestation threats, agents, drivers, and underlying causes

Deforestation threats	Local communities	Migrants	Agents of deforestation			Causes - Drivers of deforestation			Underlying causes of deforestation	
			Mining/Oil Companies	Land dealers	Loggers	Government	Total	Non spatial		Spatial
1. Conversion to croplands, pastures and housing	17%	28%		29%			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%	13%	- Population density increase (demography + immigration) - Cocoa fermenting / drying facilities - Schools - Football fields - "Horse"	- 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., tonillos, cacao	- Logging concessions on left bank of rio Huayabamba (East). Possible encroachments/ crossing of river is easy - On-stemwood 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%	- Traditional 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 - Provogue rainfall (local belief)		- Demography (natality rate) - Cultural habits and belief
8. Mining and Hydrocarbon activities encroachment			0%				0%	POTENTIAL RISKS - Mining potential identified / Metal and Oil rich soil		- Large economic stakes for Peru - No immediate risks due to "ordenance 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%			

1.3 Projection of future deforestation

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.

1.3.1 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).⁹ 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 aguas blancas*)

See section 1.1 for more details on Ecological systems, vegetation types.

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

The list of stratae is the same as Land-Use/ Land-Cover classes described in section 1.1.2.

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.

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

⁹ 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

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 27 : 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

1.3.2 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.¹⁰ 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).¹¹

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 below¹²:

- Distance to cities and villages;
- Distance to roads and tracks;
- Distance to large rivers;
- Distance to already cleared lands;
- Elevation;

¹⁰ See the document prepared to describe the historical analysis of Land-Use and Land cover changes.

¹¹ 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).

¹² 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.

- Slopes;
- Combination of distance to already cleared lands and distance to large rivers.

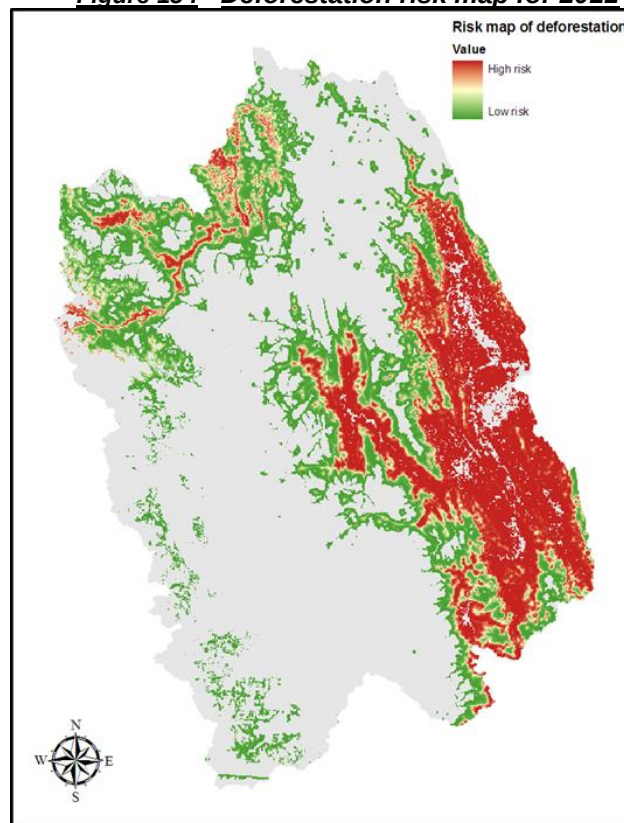
Among those factor maps, some are static (i.e. constant over time) and others are dynamic (i.e. need to be updated every year). Elevation, slope, large rivers as well as cities and villages (for which no extension are planned and documented) have been considered as constant, i.e. only one layer has been 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.

Figure 15 : Deforestation risk map for 2011

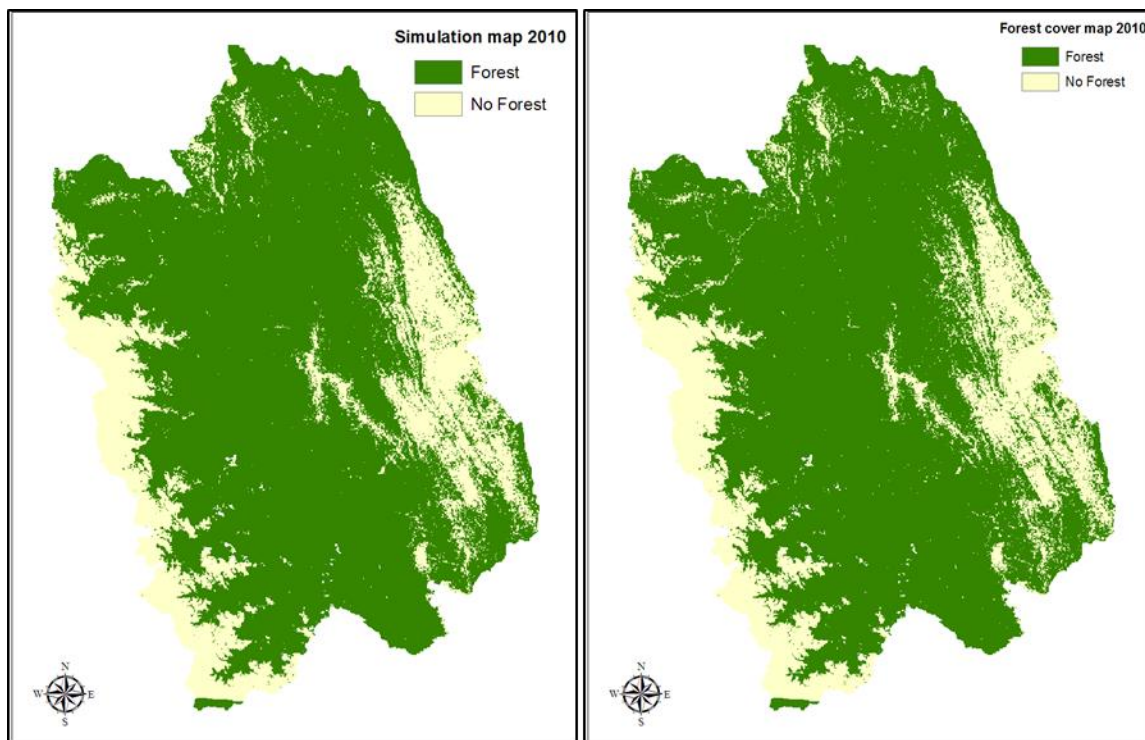


Model validation

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

Figure 16 : Comparison of 2010 simulated and observed maps



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 17 : Map of Baseline Deforestation

Period 2010-2020



Period 2010-2050



2. Baseline Emissions

2.1 Estimation of long-term average carbon stocks of each LU/LC class

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, 2007¹³).

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 28 : Sample size calculations

Stratum	Area (ha)	Ncl	Wcl	Mean	SI	CI	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*¹⁴. 2008, Higuchi *et al.* ¹⁵ 1998, Arévalo *et al*¹⁶. 2003). The three

¹³ Josse, 2007. Ecological Systems of the Amazon basin of Peru and Bolivia: Classification and Mapping.

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 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). Lapeyre et al. (2004) validated this equation in a study carried out in San Martín 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 Amazonia Peruana: 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. (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 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 Martín Region, one carbon study (Lapeyre et al., 2004¹⁷) 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;

¹⁴ Nogueira, E., Fearnside P., Nelson, B., Barbosa, R. and Keizer E. 2008. Forest Ecology and Management. 256 (1853-1867)

¹⁵ Higuchi, et al 1998 Acta Amazonica 28(2): 153-166. 1998

¹⁶ Arévalo L., Alegre J.C. & Palm C. 2003. Manual de reservas de carbono en diferentes Sistemas de uso de la tierra

¹⁷ 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 Martín, Perú. Ecología Aplicada. 3 (1,2)

- 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 29 : Summarized results of literature carbon stocks, Lapeyre et al., 2004

Source	Date	LULC class	Carbon stocks						Observation
			TOTAL	Viva	Muerta en pie	Muerta caída	Sotobosque	Chojarasque	
			tC/ha	tC/ha	tC/ha	tC/ha	tC/ha	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 Appendix: “Carbon stocks”.

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

Table 30 : Average long-term carbon stocks for each LU/LC class

LU/LC class		Average carbon stock per hectare ± 90% CI										Uncertainty
		Above-ground		Below-Ground		Dead wood	Litter	Soil	Harvested wood products	Total		
		C_{ab}_{cl}		C_{bb}_{cl}		C_{dw}_{cl}	C_{l}_{cl}	C_{soc}_{cl}	C_{wp}_{cl}	C_{tot}_{cl}		
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 $t\ CO_2\ e\ ha^{-1}$	
1lcl	Amazon Moist Forest	879,9	13%	211,2	13%	Not included	Not included	Not included	Not included	1 091	0	10,6%
2lcl	Andean Moist Forest	685,4	11%	164,5	11%	Not included	Not included	Not included	Not included	850	0	9,5%
3lcl	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	-		-						-	-	