While the international community has embraced the Reducing Emissions from Deforestation and forest Degradation (REDD-plus), the role played by land outside the forest in storing carbon and reducing emissions, has not been sufficiently addressed.

The project, ‘Architecture of REALU: Reducing Emissions from All Land Uses’ pays specific attention to the interactions between forest carbon stocks, other carbon stocks affected by land use, the major drivers of land-use and forest change, and the livelihoods of the hundreds of millions of people whose actions shape these changes.

A broad-based approach to carbon management can lead to greater emissions reductions and larger benefits for local people.

This project is implemented by the ASB Partnership for the Tropical Forest Margins in collaboration with local and international research partners in eight countries: Indonesia, Philippines, China, Nepal, Vietnam, Cameroon, Peru and Tanzania.

ASB is the only global partnership devoted entirely to research on the tropical forest margins. ASB’s goal is to raise the productivity and income of rural households in the humid tropics without increasing deforestation or undermining essential environmental services.

The research in Peru was led by ASB and the World Agroforestry Centre (ICRAF) in coordination with the Peru Ministry of Environment (MINAM) as support to the REDD preparation process and locally organized by ICRAF Peru, Amazonians for the Amazon (AMPA), the Research Institute of the Peruvian Amazon (IIAP) and the National Institute for Agricultural Research (INIA).

This work was funded by NORAD - the Norwegian Agency for Development Cooperation, but views expressed in this publication do not necessarily reflect views of the donor.
Reducing emissions from all land uses

Report for REALU Project-Peru

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<td>BM&amp;F</td>
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<td>BPP</td>
<td>(acronym in Spanish) - Permanent production forest</td>
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<td>CCB</td>
<td>Climate, Community and Biodiversity</td>
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<td>GDP</td>
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<td>Research Institute of the Peruvian Amazon</td>
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<td>IIRSA</td>
<td>Initiative for the Integration of the Regional Infrastructure in South America</td>
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<td>SERNANP</td>
<td>(acronym in Spanish) – National service of natural protected areas by the State</td>
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<td>SFM-BAM</td>
<td>Sustainable Forest Management – Amazonian Forests</td>
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<td>SINANPE</td>
<td>(acronym in Spanish) - The National System of Natural Protected Areas by the State</td>
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<td>SPDA</td>
<td>(acronym in Spanish) - Peruvian Society for Environmental Law</td>
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<td>TNC</td>
<td>The Nature Conservancy</td>
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<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
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<td>UNEP</td>
<td>United Nations Environment Programme</td>
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<td>UNPD</td>
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Abstract

In order to achieve the goal of reducing emissions of greenhouse gases in Peru, the current legal, institutional and policies that have an influence on forests need to change. Joint action between public and private sector, particularly cross-sectoral work and international alliances are needed based on the voluntary agreements of the Conference of the Parties 15 of the United Nations Framework Convention on Climate Change (COP 15 of the UNFCCC), which recognizes that REDD+ can contribute to achieving the objective of climate change mitigation.

This report explores key elements for a comprehensive approach for landscape carbon accounting in Peru. These include: the definitions of forest and international negotiations, rights, access to resources, tenure and potential conflicts regarding REDD, the causes of deforestation and degradation in the Amazon and estimates of future deforestation, perceptions of fairness and efficiency of the REDD value chain, the current legal and institutional framework with regard to land use, and post-Kyoto challenges, the implications of the definitions of reducing deforestation and degradation on carbon accounting, and forest governance and governability to integrate mitigation measures for deforestation and degradation and the opportunities of REDD+ in carbon markets.

Keywords

REDD+, emissions reduction, carbon, climate change, Peru, integral accounting, deforestation, degradation, forest, Amazon
Acknowledgements

This study was possible through the generous support of the Government of Norway and the Norwegian Agency for Development Cooperation (NORAD) within the Project ‘Reducing Emissions from all Land Use (REALU).’ We thank each of the participants and presenters at the National workshop on ‘Initiatives to reduce deforestation in the Andean-Amazonian Region’, particularly, the regional governments in Tumbes, Loreto, La Libertad, Puno, Huanuco, Amazonas, Arequipa, Junin, Pasco and Madre de Dios, and the organizers: World Agroforestry Centre (ICRAF), the Peruvian Society for Environmental Law (SPDA), the Ministry of Environment (MINAM), in particular to Mrs. Gaby Rivera and Mr. Augusto Castro, and the National Institute for Agrarian Innovation (INIA).

We also thank the participants of three training and consultation workshops in Ucayali, San Martin and Loreto, which were conducted in 2009, and the local organizers of each event: ICRAF Peru team, Dennis del Castillo (IIAP), Karina Pinasco (AMPA) and their teams, and MINAM for taking into account the results as part of the preparation process for REDD in Peru.

Many others have shared information and helped clarify some issues to improve this report. We specially thank Sandra Tapia (SERNANP), Lucia Ruiz (CIMA), Jorge Torres Padilla (SFM-BAM), María Eugenia Arroyo (WWF) and Angel Armas (Amazon Initiative). The authors take full responsibility of any errors in this report.
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1. Introduction (Velarde SJ)

Peru is considered one of the most diverse countries on the planet as it contains most of Holdridge’s life zones (Rodriguez and Young, 2000) and a large number of useful species of fauna (about 1,200) and between 40,000 to 50,000 species of flora, of which only 50% have been described. About 6% of its territory can be used for agricultural activities, while water is the limiting factor for production on the coast and the Andes. Throughout the country, soils of low fertility, acidic and limited in nutrients are typical, and in some cases such as in slopes, soils are susceptible to erosion (CONAM, 2001). Furthermore, the official deforestation rate in Peru is about 150,000 ha/year (MINAM, 2009a).

Approximately 17% of greenhouse gases (GHGs) in the world are emitted from deforestation and land use change (Rogner et al, 2007). In Peru, this sector accounts for 47% of greenhouse gas emissions (MINAM, 2009b). At the Conference of the Parties (COP) 15 of the United Nations Framework Convention on Climate Change (UNFCCC), Peru submitted a proposal to reduce these emissions and launched the National Conservation Program of Primary Forests. This program is expected to protect 55 million hectares of land-use change, if properly funded (MINAM, 2009c).

Following the enforcement of the Kyoto Protocol in 2004, a series of conditions for the establishment of an international carbon market were created. This protocol is built-in the UNFCCC, which also delineates the so called ‘flexibility mechanisms’1. The Clean Development Mechanism (CDM) is the only flexible mechanism that recognizes the reduction of GHG emissions in developing countries and their transfer to developed countries. However, this mechanism does not include the accounting of emission reductions based on the conservation of forest cover.

REDD stands for reducing emissions from deforestation and forest degradation. This term was introduced at the UNFCCC as part of the program at the COP11 in Montreal, Canada in 2005. Two years later, this mechanism was included in the ‘Bali roadmap’ (COP13) decisions promoting ‘approaches to stimulate action.’ During this meeting, due to the lack of a national technical team exclusively in charge of REDD, Peru presented proposals concerning procedures and methodologies for a REDD mechanism jointly with countries such as Costa Rica and Paraguay. At COP14, the Ministry of Environment expressed the country’s

1 Flexibility mechanisms under the Kyoto Protocol include: International Emissions Trading (IET), Clean Development Mechanism (CDM), Joint Implementation (JI).
willingness to achieve a zero net deforestation rate within 10 years, which would contribute to
the global mitigation efforts (MINAM, 2009a).

The concepts and terms around deforestation and degradation have evolved from RED
(reducing emissions from deforestation) to REDD (reducing emissions from deforestation and
forest degradation) to REDD+, which includes conservation, sustainable management of
forests and increase of carbon reserves or stocks. Despite the lack of internationally agreed
procedures on its implementation, funding for REDD+ has been pledged by Norway for up to
US$ 1 billion (UN-REDD, 2010). Additional funding might be available through the
‘Copenhagen Green Climate Fund’ suggested in the Copenhagen Agreement (UNFCCC,
2009). Furthermore, Peruvian President Alan Garcia pointed out at the Asia-Pacific
Conference (APEC) in 2008, that funds for climate change mitigation must be raised from
taxes on fossil fuels.

The REDD debate in Peru built momentum in October 2008, along with the ‘Declaration of
Tarapoto’ which acknowledges the opportunity that REDD presents for conservation and
sustainable management of forests in Peru and outlines the REDD roadmap for the period
2008-2012. So far, the progress related to knowledge on this topic at the country level, has
focused on analyzing the legal and institutional framework (Capella and Sandoval, 2010), and
on study opportunity costs of REDD in the Amazon (Armas et al, 2009). On the other hand,
there has been little progress regarding the development of a national deforestation
monitoring and control system. At the regional level, progress has become more evident
through baseline studies of carbon stocks in San Martin and Madre de Dios regions.

Additionally, there are ‘early initiatives’ led by the private sector and NGOs, which are
oriented to the voluntary carbon market. For instance, two forest concessions in Madre de
Dios have been certified by the ‘Community, Carbon and Biodiversity (CCB)’ standard and
traded their first 40,000 tons of CO2-equivalent through the voluntary market for US$ 7 per
ton (PointCarbon, 2010). The Cordillera Azul National Park is finalizing the respective
project design document, while the carbon project ‘Alto Mayo’ was funded by the Walt
Disney Company (The Walt Disney Company, 2009). In addition, there are many other
REDD projects that are still in their early stages.

Regarding the institutional framework, the Ministry of Environment has increased its capacity
on REDD through the establishment of the REDD Technical Working Group as part of the
National Commission on Climate Change. Similarly, roundtable discussions convened by
the civil society have been organized at the regional and national level, as a consequence of the
high expectations on REDD as a source of funding for conservation and development projects.

Objective of the Study - This report explores key elements for a comprehensive approach for landscape carbon accounting in Peru. These include: the definitions of forest and different REDD schemes, the current legal and institutional framework with regard to land use, rights, access to resources and tenure, the causes of deforestation and degradation in the Amazon; perceptions about fairness and efficiency of the REDD value chain. It also presents some options for mitigation of deforestation and degradation based on changes in forest governance and governability and the opportunities of REDD+ schemes within carbon markets.

The document structure - This report is authored by various contributors and is based on participatory processes of collaboration and consultation. The specific topics addressed are mainly related to research activities on: the analysis of the causes of land use change in tropical forest margins, the analysis of the rights and potential roles of different actors throughout the REDD carbon value chain, and the review of the ‘high carbon stocks development pathways’ such as agroforestry systems.

This report includes:
1. Introduction (Velarde SJ)
2. Project Description REALU (Ugarte-Guerra J and Velarde SJ)
3. A review of forest, deforestation and degradation definitions (Rugnitz Tito M and Ugarte-Guerra J)
4. A legal review about access to resources, ownership and potential conflicts regarding REDD in Peru (Capella JL, Sandoval M, Velarde SJ)
5. A review of the causes of deforestation in the Peruvian Amazon, including a detailed analysis of the ASB study site in the Aguaytia basin and future deforestation in the Amazon (Velarde SJ, Hyman G, Marin JA and Barona E)
6. A study about the perceptions of the REDD value chain in the Peruvian Amazon (Velarde SJ)
7. Institutional analysis for a REDD establishment in Peru (Capella JL, Sandoval M, Velarde SJ, Castro A)
8. The implications on the carbon accounting due to different definitions for reducing deforestation and degradation (Hyman G, Marin JA, Barona E)
9. An analysis of mitigation of deforestation and degradation options in the Peruvian Amazon within a forest governance and governability context (Rugnitz Tito M).
10. Conclusions of the REALU Study - Phase 1 and the way forward (Ugarte-Guerra J, Velarde SJ)

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2. REALU Project: Reducing emissions from all land uses (Velarde S, Ugarte-Guerra J)

2.1 What is REALU?²

Currently, new options are being promoted to account for carbon that is not emitted into the atmosphere and that contributes to climate change mitigation. One of these options comprises a mechanism that promotes the emission reductions from deforestation and forest degradation (REDD). However, REDD alone, can only contribute to a small portion of the total emission reductions due to land use change.

To improve the efficiency of the REDD mechanism, there is need to pay special attention to the complex interactions between: (1) forest carbon stocks, (2) other carbon stocks affected by the land use change, (3) the major drivers of land use and forest change, and (4) livelihood strategies of hundreds of millions of people living on the margins of agricultural lands and forests, interacting continuously with the tropical forest and whose actions have large impacts on the carbon stored in these different land uses.

This document is based on a proposal which supports a landscape approach focused on Reducing Emissions from All Land Uses (REALU) contributing more efficiently in reducing emissions from land use change and supplying sustainable shared benefits for local people.

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² Sections 2.1, 2.2 and 2.4 are adapted from the REALU flyer, prepared for and distributed at the World Forestry Congress in Buenos Aires, Argentina in 2009. The original English text was prepared by van Noordwijk, M. and P. A. Minang, 2009. REALU flyer. World Agroforestry centre (ICRAF) ICRAF.
Why a landscape approach for carbon accounting?

The underlying hypothesis is that REDD is a valid and viable mechanism for climate change mitigation, but it will be much more effective if developed as part of a global comprehensive architecture, addressing all land uses in tropical countries -most of which are considered as developing countries- and are potential carbon sinks.

If a comprehensive approach to landscape carbon accounting is not adopted, the application of the REDD mechanism alone will be likely hampered by: (1) methodological problems to quantify leakage, (2) unclear definition of "forest", (3) methodological issues for carbon measurement, (4) equity issues between and within developed and developing countries involved which have different agro-ecosystems.

2.2 Objectives and principles of REALU Architecture project

The REALU Architecture project aims at strengthening the ability of developing countries to build and implement effective strategies for reducing emissions from deforestation and degradation, including the following principles: rural development vision, national sovereignty, respect for local and indigenous communities, and integration of national and global standardized greenhouse gas accounting systems. REALU project is implemented by the ASB research Partnership for the Tropical Forest Margins and its local partners in five countries of the humid tropics.

2.3 Study Sites

Research on desirable characteristics of an inclusive REALU scheme was carried out on tropical forest margins in Indonesia, Cameroon, Nepal, Peru, and Vietnam, building on long-standing relationships and collaboration with partner institutions. In Peru, the main study area is the Aguaytia River Basin, in the Ucayali region, and the extent of the analysis was adapted according to the specific topic under discussion and the availability of published information. Thus, REALU Architecture project in Peru applied different levels of analysis as illustrated in Figure 1:

a) International level: Implications of international agreements and conventions regarding REDD+.

b) National level: A legal review about rights and access to resources, with emphasis on the institutional framework for REDD+ in the Amazon.
c) Macro-regional and Amazonian level: A study about the causes of deforestation and alternatives mitigation strategies for deforestation and degradation in Peru.

d) Regional level: A study on the REDD+ value chain perceptions in specific regions: Loreto, San Martin, Ucayali, and specific cases of deforestation and examples of overlapping rights and access to resources in Madre de Dios; and maps of future deforestation in the Amazon towards 2050.

e) Basin level (Aguaytia Basin, Ucayali): Study and maps about the implications of different definitions of RED (RED, REDD, REDD+, REDD++ or REALU) for carbon accounting under different land uses.

![Diagram of analysis levels]

**Figure 1.** Different levels of analysis of the REALU Architecture Project in Peru

### 2.4 Activities

The REALU Architecture project links scientific and local knowledge with action through the following activities: 1) Analysis of cross-sectoral linkages in the tropical forest margins, based on long-term collaboration with ASB research partners in Asia, Africa and Latin America, 2) multi-stakeholders events to explore the implications of the design of a post-2012 effective regime, and 3) building the scientific and political basis for change through communication and networking activities.

Specific research activities include:

1. Analysis of drivers of land use change in the tropical forest margins.
2. Analysis of bargaining power, rights and responsibilities along the REDD value
chain.

3. Review of "high carbon stock rural development pathways" to describe how shifting cultivation systems can evolve into carbon-storing agroforests and diverse tree crop production systems.

4. Review of smallholder timber production and marketing as alternative to plantation forestry in the context of efforts to deflect drivers of forest conversion.

3. International Negotiations, definitions of forest and REDD (Rugnitz M, Ugarte-Guerra J)

This chapter sets the framework for the evolution of terms and concepts of forest, deforestation and degradation, as given by international agreements and organizations, and their national implications with emphasis on the Clean Development Mechanism (CDM) and the Reduction of Emissions from Deforestation and Degradation (REDD). It recommends to focus on a more comprehensive carbon accounting scheme and to use established rules for Agriculture, Forestry and other Land Uses (AFOLU).

3.1 REDD in International negotiations

The issue of Reducing Emissions from Deforestation (RED), which involves activities that promote forest conservation was first discussed in the context of the UNFCCC, at the Conference of the Parties (COP) 2001. At that time, the negotiators did not include the issue as (part of) an international mechanism to mitigate climate change because of: (1) methodological issues: difficulties in establishing baseline emissions and carbon leakage outside the project areas; (2) market aspects: fears that large volumes of emission reductions could destabilize or reduce the price of carbon certificates, and (3) political issues mainly because some countries outside the group claimed that the Annex I countries could promote the loss of sovereignty over non-Annex I countries. In 2005, during the negotiations at the COP11 in Montreal, there was a proposal for a RED mechanism that also incorporates emission reduction projects or programs that reduce their forest degradation (REDD) by Papua New Guinea and Costa Rica. During the COP13 (2007), Bali, Indonesia, it was formally agreed to discuss how the REDD mechanism could be implemented in developing countries.

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3 The Kyoto Protocol was ratified by industrialized countries (also called Annex I parties), which are required to reduce their Greenhouse Gas emissions (GHG) by an average of 5% below their 1990 levels. Developing countries are not yet required to reduce their GHG emissions.
Recently, two new REDD modalities called REDD+ (plus) and REDD++ (plus, plus) were defined in order to include activities not only helping conserve forest biomass, but also those which help to enhance, fix and store carbon in various types of land use (in addition to forests). Paragraph 1 (b) (iii) of the ‘Bali Action Plan’ addresses “Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests; and enhancement of forest carbon stocks in developing countries” (UNFCCC, 2008). This paragraph reflects the understanding of REDD+. On the other hand, REDD++ or reducing emissions from all land uses (REALU) also includes agriculture, and guarantees good land use practices that ensure non-deforestation (van Noordwijk and Minang, 2009).

According to the reasoning of the REDD++ scheme, agroforestry uses systems and components with greater biomass production and consequently maintains higher carbon stocks, contributing to climate change mitigation and promoting sustainable use of natural resources with increased well-being for rural communities. Traditional communities and smallholders contribute to the environmental services through forestry and agroforestry activities and contribute also to carbon storage. However, to date, they have not benefitted economically due to their limited access to carbon markets.

3.2 Implications of forests, deforestation and degradation concepts

In a context where mitigation actions are increasingly discussed and negotiated to promote the conservation and restoration of forests, negotiators, project developers, traditional community leaders, farmers, technicians, researchers, among others, constantly use the term “Reducing Emissions from Deforestation and Degradation”. However, what do deforestation and degradation mean? What is the difference between deforestation and degradation? Is there a general definition to be used in different countries and bioclimatic contexts? To answer these questions we must first define ‘forest’.

3.2.1 What is a forest?

The term forest is used at all times; however, it is not an easy task to provide a precise definition of the word. The most likely answer would be, forest is an area consisting of trees, shrubs and herbaceous plants of different sizes and ages (in the case of the tropical regions it may include many species), great number of animals and microorganisms interacting with one another. What is the minimum area size for it? What features do we need to define a forest? These questions must be answered based on clear definitions.
In Peru, there is no specific legal definition of forest. However, the current Wildlife and Forestry Regulation, contains definitions of natural, primary and secondary forest (which are specified in Chapter 4 of this report). These definitions include other concepts like “ecosystems”, using broad and non-objective terms and with no concept restrictions, such as “predominance”, “abundance”, among others. The lack of a clear legal definition of forest is a common pattern among Latin American countries.

To participate in afforestation and reforestation projects (A/R) within the CDM, Non-Annex I countries, which are mostly developing countries, must adopt a definition of forest. The UNFCCC has developed morphological criteria based on quantitative parameters such as tree height, canopy cover, size and forest area to define ‘forest’ within the CDM.

In 2001, the UNFCCC established the definition of forest for CDM as a minimum area of land of 0.05-1 ha with canopy cover (or equivalent carbon stock level) of more than 10-30% with trees that have the potential to reach a minimum height of 2-5 meters (m) at maturity. A forest may consist either of closed forest formations or open forest. Young natural stands and all plantations which have the potential but are yet to reach a canopy density of 10-30% or tree height of 2-5m are included under forest, as they are normally areas forming part of the forest area which are temporarily unstocked as a result of human intervention, such as harvesting or natural causes but which are expected to revert to forest. Note that there is no time limit in this definition.

Figure 2. Parameters to define forest for CDM projects. Source: Lucio Pedroni

4 “Afforestation” is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forest land through planting or seeding; “Reforestation” involves the same process of conversion (planting) limited to lands that did not contain forest on 31 December, 1989.
5 Annex I countries are committed by law to determine and report minimum values to the Executive Board.
6 Decision 11 COP 7.
A Non-Annex I country could only develop Afforestation/Reforestation-CDM (A/R-CDM) projects and, thus, negotiate their carbon credits in the regulated market. The minimum parameter values for forest definition were notified to the UNFCCC Secretariat (CDM Executive Board) through the Designated National Authority (DNA) by 1st January 2007. Peru chose the maximum values from the range allowed, except for the minimum area value of forest cover (ha). Hence, in Peru, a forest within the CDM context is defined as “Land with canopy cover of more than 30 per cent of the area and a minimum area of 0.5 ha. Trees must reach a minimum height of 5m at maturity in situ.”

3.2.2 Differentiating deforestation from degradation

**Definition of deforestation**

Deforestation is the partial or complete removal of forest cover from an area originally occupied by forest. This activity aims at generating economic benefits through the utilization of the forest products and/or through the land use conversion (agriculture, livestock, road construction, etc). A summary of the causes of deforestation and degradation in Peru is shown in Chapter 5 of this document.

Every country must establish the parameters to determine in which specific cases the concept of deforestation may be applicable. In order to develop the global forest resources assessment (FRA), which is undertaken regularly in each country, FAO (2001) has proposed a broad concept to clearly determine the limits of the deforestation process. According to FAO (ibid), deforestation is defined as “the conversion from forest to other land use or the long-term depletion of forest canopy cover to less than 10 percent.” This definition has two possibilities of when a forest cover removal can be considered deforestation. According to the first statement, deforestation means that the canopy area is lost to be converted to another land use different from forest. In this case, the parameter is replacing the forest by other land use. The second statement conveys the parameter as a function of surface and time. From this statement, deforestation involves the loss of more than 90 percent canopy cover for a period greater than 10 years (FAO 2001 cited in Schoene et al, 2007).

The FAO definition excludes: (1) areas where trees have been removed as a result of logging while preserving over 10% of forest cover, and (2) areas where the forest is expected to regenerate naturally or with silvicultural practices (Schoene et al, 2007). These draw a distinction between the concept of deforestation and degradation.
The concept of deforestation proposed under the UNFCCC includes cultural activities of the agents of deforestation. Deforestation is defined as “direct human induced conversion of forests to non-forest land.” This definition was presented in the decision 11 of the Conference of the Parties’ report on its seventh session (COP7) held in Marrakech (UNFCCC, 2001). This report also identified the general guidelines (operational rules) for the flexible mechanisms for Land Use, Land Use Change and Forestry (LULUCF).

From both definitions, deforestation is the transition from forest to non-forest. Therefore, under the CDM context, having a clear definition of forests and the distinct parameters is essential in order to delineate the extent of deforestation. This highlights the importance of selecting the morphological criteria presented by UNFCCC.

**Definition of forest degradation**

There are many proposals in the international arena to define forest degradation. According to the FAO definition (Schoene et al, 2007), forest degradation denotes changes within the forest, which negatively affect the structure or function of the forest stand or site, and thereby lower the capacity to supply products and/or environmental services. The definition of forest degradation is limited to the minimum canopy cover greater than 10% (see definition of forest).

On the other hand, as shown in Table 1, the definitions presented by the IPCC (2003), UNEP/CBD (2001) and ITTO (2005), in addition to delineating a reduced supply of goods and services provided by the forest, they also denote the intrinsic human participation as a driver of degradation.

The definition proposed by ITTO 2002 (amended by FAO 2003) is notable for the dynamic aspect of the concept: “forest degradation is the long-term reduction of the overall potential supply of benefits from the forest.” This dynamic aspect is also discussed in one of the IPCC definitions (2003b) as well as in the ITTO proposal (2005). The definition specifically excludes the canopy cover loss recovered naturally due to the normal cycle of forest management operations. This means that measuring degradation during a short period of time is complicated.
Considering the dynamic aspects of the process and concept, it is important to emphasize that forest degradation can lead to deforestation, but not always constitute the cause of deforestation. Unsustainable logging practices can contribute to degradation if the extraction of mature trees is not accompanied with their natural regeneration, if the use of heavy machinery causes soil compaction or the loss of the productive forest area. In most cases, degradation does not show as a decrease in the forest area but rather as a gradual biomass reduction, changes in species composition and soil degradation (Schoene, 2007). Although forest degradation does not constitute a change in land use, it can be a great source of GHG emissions (mainly in countries with low rates of deforestation). This shows the importance of quantifying GHG emissions caused by degradation. However, estimation, quantification and verification of emissions from forest degradation are methodologically more difficult, than those from deforestation.

In order to facilitate the understanding of the different concepts, figures 3a and 3b illustrate the difference between the definition of CDM forest and that by FAO (2000) in Peru, while 3c and 3d shows the definition of deforestation and degradation according to the parameters proposed by FAO (2000):

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**Box 1. Definitions of forest degradation**

IPCC (2003) defines forest degradation as: (1) "a direct human-induced loss of forest values (particularly carbon), likely to be characterized by a reduction of tree cover" (2) "the overuse or poor management of forests that leads to long-term reduced biomass density (carbon stocks)" (3) "a direct human-induced activity that leads to a long-term reduction in forest carbon stocks" (4) "a direct human-induced long-term loss (persisting for X years) of at least Y% of forest carbon stocks (and forest values) from time T and not qualifying as deforestation or an elected activity under Article 3.4 of the Kyoto Protocol"

UNEP/CBD (2001) defines forest degradation as a secondary forest that has lost, through human activities, the structure, function, species composition or productivity normally associated with a natural forest type expected on that site.

ITTO 2005 defines forest degradation as a direct human-induced loss of forest values (particularly carbon), likely to be characterized by a reduction of forest cover.
3a. Forest parameters by CDM in Peru: minimum land area of 0.5 ha with a canopy cover above 30%.

3b. Forest parameters by FAO (2000): minimum canopy cover must always be above 10%, for it to be considered forest.

3c. Deforestation parameters FAO (2000): reduction in canopy cover below the minimum threshold of 10% in the long term.


Figure 3 a-d. Definitions of forest for Peru by CDM (a) and FAO (b), deforestation (c) and degradation (d) by FAO.

3.3 Implications of using the CDM forest definition in REDD++ schemes

Unlike most of other Latin American countries, Peru selected the lower value from the range allowed for forest cover area (0.5 ha). This decision makes Peru a more selective country in defining suitable areas for CDM forestry projects, but less restrictive in terms of the scale of eligible projects, encouraging the development of small-scale projects.

According to what Peru has defined, for example, a rectangular forest fragment (natural or planted) of 10m X 50m and covered with 30% of the area (i.e. 166 m²) by the tree canopy greater than 5m height, can be characterized as forest for CDM. Assuming that trees easily have crowns with more than 8m in diameter (50.27 m² per tree canopy), over three scattered trees of 8m in diameter (50.27 m² + 50.27 m² + 50.27 m² = 150.81 m²) would be almost sufficient in this rectangle of 10 m x 50 m to characterize this area as forest. Drawing on the definition of deforestation proposed by FAO (2001), the removal of a single tree would be

\[
\text{Area} = \pi \times r^2 = 3.1416 \times (4m)^2 = 50.27m^2
\]
sufficient to characterize this area as deforested. Figure 4a and b facilitate the understanding of this process:

4a. Minimum conditions for the definition of CDM forest in Peru

4b. Loss of minimum conditions for the definition of CDM forest in Peru

Figure 4a-b. Minimum conditions for the definition of forest for CDM and how these conditions may be lost.

On the other hand, the REDD+ mechanism also includes special considerations for forest conservation, sustainable management and the increase of forest carbon stocks. REDD++ would include in addition, agriculture, ensuring the implementation of good practices and guaranteeing non-deforestation. This implies that trees outside the forest (all trees which are outside the area defined as forest) may be considered for a REDD++ mechanism. Trees outside forests, or in isolation, are largely planted and domesticated in agroforestry systems, farms and small plots. These can grow in the plains, grazing areas and on farms or along rivers or roads, where tree vegetation is not predominant.

The implementation of a REDD++ mechanism will result in the inclusion of carbon accounting of additional systems besides forests, such as net carbon emissions produced by agroforestry systems management outside the areas defined as forest.
Finally, within this context, if a REDD+ mechanism in developing countries becomes a reality, would it be necessary to consistently define degradation and deforestation for all participating countries or to adopt a national definition for forest as it done in the case CDM?

3.4 Conclusions
This chapter has demonstrated the implications of adopting a definition of forest, deforestation and degradation. The various ecological conditions and dissimilar interests (land use change patterns, development projects, sectoral expertise) in Peru, hinder the consensus process in the establishment of the minimum parameter values needed to define forests, deforestation and degradation. When determining these values, the ones responsible could:

1) Choose to prioritize a particular region or establish a weighted value for each parameter that best represents all regions, in order to allow maximization of land eligibility taking into consideration the type and scale of project (CDM, REDD, REDD+ and/or REDD++)
2) Through the use of models based on the same parameters, establish an optimal value for each selection parameter. This dynamic model will generate the percentages of the total project area that can be considered as forests or deforested areas, through field measurement values and prioritization (%) of project types.

However, a valid alternative is to obviate the need for definitions, due to the complexity and difficulty to reach a concept that is applicable to all countries, and to focus on a comprehensive carbon accounting, regardless of the nature of the landscapes or ecosystems and to use established accounting rules for Agriculture, Forestry and other land uses (AFOLU) (IPCC, 2003a).

3.5 References
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van Noordwijk M, Minang PA. 2009. If we cannot define it, we cannot save it. ASB PolicyBrief No. 15. ASB Partnership for the Tropical Forest Margins, Nairobi, Kenya.
4. Rights, access to resources, tenure and potential conflicts regarding REDD+ in Peru (Capella JL, Sandoval M, Velarde SJ)

This chapter presents a detailed analysis of the legal framework about the rights, access to natural resources and services originated from these, and forest and land tenure which is considered key for the understanding of possible schemes and potential conflicts concerning environmental services and their compensation in Peru. It starts with the international conventions’ framework and further describes in depth and hierarchically the content of the relevant national laws.

4.1 Conventions and main agreements on natural resources signed by Peru

Peru has signed several international conventions and agreements related to natural resources, which may be relevant for the implementation of REDD+, and which constitute a national law under the Peruvian Constitution and are being implemented through various norms and regulations.

With regard to forests or forest ecosystems, the Convention on Biological Diversity promotes the conservation and maintenance of forest ecosystems. The agreement aims at the protection of biodiversity, the sustainable use of the biological resources and the equitable shared benefits of the resources.

Similarly, Peru has ratified international conventions such as CITES, which has made substantial progress in the conservation of certain species such as mahogany, and consequently improving the protection of its habitats.

With respect to the climate change legal framework, Peru has signed the United Nations Convention on Climate Change, the Kyoto Protocol and participates actively in the international debate on the implementation of a new binding agreement on this matter. Within this framework, Peru has contributed to the Climate Change Committee and subsequently participated in international events, such as the latest in Copenhagen (MINAM, 2009 and UNFCCC, 2010).
A relevant position from these negotiations is the Peruvian intention to favour a strategy for gradually reducing to zero net emissions from deforestation in the next 10 years, according to the statement by the Minister of Environment, Antonio Brack, at COP 15 (MINAM, 2009).

With regard to the protection of fundamental rights of indigenous populations living in forests, the country is a signatory of the Convention 169 of the International Labour Organization - ILO. The implementation of this Convention took effect only in recent years in Peru, due to the native communities opposition to the land and forest regulations that were adopted without prior consultation, a principle established by the Convention. Thus, after several conflicts triggered by this matter, the Congress recently passed the bill on Indigenous Peoples Consultation (Servindia, 2010).

4.2 National law regarding access, natural resources rights and tenure and their relation to the establishment of REDD+ schemes

4.2.1 General Framework

Constitution of Peru
The Political Constitution of Peru contains specific items defining the normative framework regarding natural resources. Indeed, Article 66 states that natural resources, renewable and non-renewable resources are the patrimony of the Nation; therefore the state is autonomous in its use. Organic laws set out the conditions of use and grant use of such natural resources. This article defines that natural resources are granted under concession arrangements, and not as property, as the State must keep control over natural resources as explained in Table 2.

Article 68 provides the State an explicit mandate to promote the conservation of biological diversity and natural protected areas. The specific rules governing these areas are elaborated within this article’s framework.

The Political Constitution of Peru governs according to the following core regulations:

- Organic Law for the Sustainable Use of Natural Resources.
- General Environmental Law.
- Specific laws directly linked to land, forests and agricultural regime such as: Forest and Wildlife law, Natural Protected Areas Law, Land Law, Legislative Decree 673, among others.
Specific laws linked to natural resources or economic activities affecting the implementation of PES schemes related to forests and climate change, such as the General Law of Hydrocarbons, General Mining Law, regulations about road construction, among others.

**Box 2. The State’s eminent domain on natural resources**

The State’s "eminent domain" means that the State has eminent control over natural resources which are National Patrimony. The State does not own natural resources, but exercise eminent domain over them, and thus on the goods and products offered by them until they are granted as concession or other schemes, in accordance with the law. The State is responsible for the resources management on behalf of the Nation. The State is responsible for ensuring that such use is conducted under the provisions of the relevant legislation. The state cannot "trade" the natural resources, but it may grant rights to third parties for their sustainable use according to pertinent law.

The key regulations related to rights, access to resources, tenure and potential conflicts regarding REDD + in Peru are explained as follows:

**General Environmental Law**

This law is intended to organize the legal normative framework for environmental management in Peru, thus it sets out principles as well as basic and mandatory rules in order to ensure that the right to a healthy environment and sustainable natural resources utilization, and the sustainable development of the country is effectively exercised.

This law identifies the environmental services in its article 94, and they include those services that are provided by natural resources and other environmental components that maintain the conditions of ecosystems and the environment. It indicates that these services are: the protection of water resources, protection of biodiversity, mitigation of greenhouse gas emissions and scenic beauty, among others. In addition, these benefits or services are utilized without required payment or compensation. The State is given the mandate to establish mechanisms to enhance, reward and retain the provision of environmental services. This law also clearly indicates that the National Environmental Authority (now the Ministry of Environment) should promote the creation of funding, payments, and monitoring mechanisms of environmental services.

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*Law 28611, promulgated in October 2005.*
The Organic Law for Sustainable Use of Natural Resources considers natural resources as natural components that could be utilized by humans to satisfy their needs. These resources may have an actual or potential value in the market. Thus, this regulation identifies some natural resources such as water, soil, subsoil, and any land use capacity as either agricultural, livestock, forestry or protection; biodiversity and genetic resources, plant specimens and fauna, the atmosphere, minerals and hydrocarbon resources, among others.

The purpose of this regulation is to establish a regime for sustainable use of natural resources, through terms and conditions for granting rights to private entities over those resources.

According to this regulatory framework, and as explained in the Constitution section, land and forests are considered natural resources, which in turn implies National Patrimony and therefore the State has the ‘eminent domain’ over them. However, it is worth distinguishing the case of land suitable for agriculture and / or livestock. Thus, according to the Constitution, these lands can be granted tenure (unlike those suitable for forestry or protection, for instance) to anyone, whether natural or legal person and so these rights are not regulated under the Organic Law for Sustainable Use of Natural Resources.

It is important to note that the legal framework established for all natural resources by this regulation is directly related to the provision of environmental services. Hence, the conservation activities and sustainable use carried out by the holders of the rights granted under this regulation, will largely be one of the main reasons why these resources and their ecosystems, maintain the environmental services provision. This connection is fundamental to understanding the reasons why such rights holders over natural resources could obtain rights to environmental services that these resources provide.

Also, under the same regulation the environmental services are interpreted to be part of the natural patrimony of the nation, and as such their management by the State should be guided by the concepts applicable to natural resources. Figure 5 shows a conceptualization of the Forest Patrimony in which the natural resource provides ecosystem services and resources and service which are all Forest Patrimony.

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Some important concepts arise from this law about possible linkages of the provision of environmental services and the relationship to avoid emissions from all land uses, with specific regulations on natural resources:

- Addressing the overlap between forest concession and non-renewable natural resources rights.
- Addressing the overlap of responsibilities of different entities.
- Compulsory payments of all types of resources use rights.

**Figure 5.** Forest Patrimony conceptualization according to Peruvian law in force
4.2.2 Specific Laws

Indigenous Communities

According to current legislation, indigenous communities are organizations which originated from tribal groups in the lowland and highland forest, and are constituted by group of families linked by major elements such as language or dialect, cultural and social characteristics, tenure, and common and permanent use of the same territory or in dispersed settlements (Article 8 of Decree No. 22175).

In Peru, the indigenous communities are located in the Amazon region and grouped into 42 ethnolinguistic groups, as shown in Figure 6:

Figure 6. Map of ethnolinguistic groups.
According to information from the Agency for the Formalization of Informal Property (COFOPRI), indigenous communities officially recognized by the Peruvian state add up to a total of 1,497 as at December 2006, and have a territory of 10,787,211 hectares. In addition, 237 of these native communities are awaiting land titles (COFOPRI, 2008).

The indigenous communities have specific regulations regarding the recognition and the granting of rights to land and natural resources. Thus, according to the indigenous Communities and Agricultural Development Law, the Peruvian State is responsible for the recognition of indigenous communities, including its legal existence. The respective Regional Agrarian Offices perform this procedure. Additionally, the agricultural regional offices grant them rights to the land where they are settled and where they perform their ancestral practices. The technical process of demarcation of communal land is carried out by COFOPRI.

The Peruvian State, as provided in the Political Constitution of Peru, recognizes the customary rights of communities over their lands, to exercise opposition or enforce rights in full against third parties. The native communities require the recognition of their legal existence as well as for the land in which they are settled. In practice, the effective exercise of these rights is subject to the general policy framework on land and forest resources of Peru.

On the other hand, communal lands are constituted according to their major use capacity such as areas suitable for agriculture, livestock, forestry and protection. However, tenure is granted only on land suitable for agriculture or livestock, in accordance with the provisions of the Political Constitution of Peru, Decree Law No. 22175, Indigenous Communities and Agricultural Development Law of the Regions of lowland and highland forests, and its regulations. Land suitable for forestry is granted as ‘use concession’ and is governed by the Forestry and Wildlife Law.

There are numerous tools for granting rights over land and forest in Peru. Table 1 summarizes the type of rights granted by type of actor, over different land suitability or area given and the minimum and maximum extent of the area.
<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Type of rights granted</th>
<th>Suitability of land or on what type of areas are the rights granted</th>
<th>Minimum and maximum extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indigenous Communities</td>
<td>Property</td>
<td>Clean crops and permanent crops for grazing</td>
<td>Not applicable. Depends on the extent of its cultivation area and grazing. Granted limited to the area.</td>
</tr>
<tr>
<td></td>
<td>Use concession of community forests in lands suitable for forest with forest or not, or protected lands.</td>
<td>Suitable for forests</td>
<td>Not applicable.</td>
</tr>
<tr>
<td></td>
<td>Forest land. Permission released for use in native communities.</td>
<td>Forestry or Protection suitability.</td>
<td>Not applicable. Depends on the space where the indigenous community intends to do forestry.</td>
</tr>
<tr>
<td>Rural communities</td>
<td>Property</td>
<td>Over all land where they are settled and carry out their activities (agriculture, livestock, etc.)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(Coast and Andes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural communities</td>
<td>Property</td>
<td>On a portion where they are settled (cultivation and grazing).</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(Tropical forest)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use concession, with ability to access forestry permits.</td>
<td>Forestry suitability</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Natural or legal person</td>
<td>Property. Only on land suitable for agriculture.</td>
<td>Clean and permanent crops</td>
<td>Depending on the magnitude of the activity</td>
</tr>
<tr>
<td>in general</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Timber forest concesión.</td>
<td>Forests for permanent production created by Ministerial Resolution of the Ministry of Agriculture.</td>
<td>Up to 40,000 ha concession granted by public tender. Up to 100,000 ha in</td>
</tr>
<tr>
<td>Concession for other forest products.</td>
<td>Forest for permanent production and on forest production land</td>
<td>Concessions granted by public tender (still none given).</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>--------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Concession for ecotourism and conservation.</td>
<td>Primarily on protection forest land. Preferably granted on forests not declared as forest for permanent production.</td>
<td>Ecotourism Concessions: Up to 10,000 ha Conservation Concessions: Not applicable. Depends on the conservation purpose or the type of tourism that is implemented</td>
<td></td>
</tr>
<tr>
<td>Forest concession for reforestation or afforestation, under Law 27308. Concessions for reforestation according to Law 28852.</td>
<td>Forest land without forest cover or wastelands.</td>
<td>Up to 10,000 ha in both cases.</td>
<td></td>
</tr>
<tr>
<td>Plantations on private or communal land.</td>
<td>Agricultural land or forest land where property rights were granted under a previous regulatory framework.</td>
<td>Not applicable.</td>
<td></td>
</tr>
<tr>
<td>Permits and authorizations</td>
<td>Production forests in reserves. Local forests. Privately owned forests. Other vegetation.</td>
<td>Privately owned forest depends on the size of the property. Local Forests: Up to 500 ha.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Elaborated on the basis of existing legislation.

Use concession contracts granted to native communities include access rights (forest permissions) to exploit the forest resources and wildlife contained in those areas. In the
case of use for commercial or industrial purposes, community forest management plans should be submitted.

However, such contracts do not explicitly include the rights for the full utilization of the areas granted to these communities and thus, obtaining the benefits provided by the environmental services is not specifically included. While the activities of conservation and sustainable use by the communities in the areas granted are essential for the provision of environmental services, the opportunity of these communities benefiting from those services should be clearly expressed. It is necessary to modify the mentioned contract of use concession so that it can grant rights to indigenous communities for the full utilization of their forests.

Rural communities from the forests and other forest dwellers
In general, rural communities can be distinguished in two categories, a) communities from the coast or the Andean region and b) those found in tropical forest areas. In the first case, many settled rural communities have a long history of settlement. Also, the areas where they have settled have been historically used for farming or livestock. Considering these factors, rural communities have been the first to be granted tenure rights over their land.

However, in the case of rural communities settled in the forest, sometimes called “riverine farming communities”, they do not necessarily have a long history of settlement in the area. In these cases, some of them have been granted tenure rights over a portion of the land on which they are established, especially those used for agriculture or grazing. However, in case of lands suitable for forest or for protection, lands have been given to rural communities as ‘use concession’ (under similar conditions to those granted to indigenous communities, as explained in the previous section).

Similar to indigenous communities, rural communities of the forest expecting to exploit the forest resources or wildlife in the area for industrial or commercial use will need a permit or authorization and will be required to develop and implement a forest management plan. Given that these communities carry out sustainable management activities that help maintain or produce environmental services, they should be included in a REDD+ scheme.
4.2.3 Other especial laws

In Peru there is no specific regulation that explicitly address the issue of environmental services or reducing emissions from deforestation and degradation. However, there are at least three specific regulatory frameworks, in addition to the general frameworks mentioned before, addressing the topic of forests, forest resources, environmental services and the criteria for their management, both by the State and individuals.

Forest and Wildlife Law and its Regulations\textsuperscript{10}

This norm governs, in accordance with the Organic Law on Natural Resources Utilization, the promotion and granting of special rights to private entities over forest resources, wildlife and forest environmental services for their conservation and sustainable use\textsuperscript{11}.

The norm defines forest resources as natural forests, plantation forests and lands, whose major use capacity is forest production and protection, and of other wild components of terrestrial and aquatic flora, in any location in the country. It also defines forest environmental services as those aimed at soil protection, water regulation, biodiversity and ecosystem conservation, scenic beauty, carbon dioxide absorption and general maintenance of essential ecological processes.

The Forestry and Wildlife Law, No. 27308 promulgated in 2000 and in force to date, does not contain a specific definition on what forest legally refers to, finding for instance Article 3 within its regulation, definitions of natural forest, primary and secondary forest shown in Box 3. Additionally, both the law and the regulations also include various forest types within forest management, where forest production is divided into permanent production and production in reserve, forest for future use, secondary forest, forest for land protection, forest in indigenous and rural communities, and local forests among others.


\textsuperscript{11} According to the provisions of Article 3 of the Forestry and Wildlife Law Regulations, sustainable use refers to the "use of resources of flora and fauna in a manner and pace that does not cause the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations".
Regarding the procedures for obtaining special rights to commercially exploit the forest, the Forest and Wildlife Law provides three legal instruments: the concessions, permits and authorizations, which are explained below:

**Concessions**

A concession grants rights to the holder for the use and enjoyment of forest resources, and the time limit according to each type of concession. The concessions are final and irrevocable and the holder must comply with its obligations and the relevant management plan stipulated under the forestry legislation. The concession right may also be subject to disposition, mortgage, assignment and claim. The Forest and Wildlife Law includes the following types of concessions:

- Forest concessions for timber purposes: They are granted by the competent forestry authority (see Box 4) for the use of forest resources mainly timber, following management plans for permanent production forests, and given for 40 years renewable. If the grantee wishes to leverage other resources from its concession area, such as non-timber forest resources, he must submit additional management plans, which must be approved by the competent authority. In February 2010, 546 forestry concessions were approved for timber extraction (OSINFOR, 2010) summing up to a total of 7.1 million hectares in the regions of Madre de Dios, Ucayali, San Martin, Huanuco and Loreto.

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12 Getting rid of an asset or security through a direct sale or some other method.
Concessions for other forest products: This refers to the use of forest products other than timber. These concessions are granted in permanent production forests and forests with production land for a renewable term of 40 years and on areas for up to 10,000 hectares. These are given according to the product (leaves, flowers, fruits, seeds, gums, resins, palms and other commercial or industrial purposes) and technical considerations of the management plan. In addition, the concession holder can request a complementary management plan to utilize the timber resources in the area of the concession. Most of these concessions are in the department of Madre de Dios, and are dedicated to the Brazil nut harvest (*Bertholletia excelsa*). In the area, the Brazil nut harvest has become a major livelihood activity of the population with fewer resources. The common belief is that this activity has a potential to improve the livelihood of local populations, as it maintains the forest and environmental services in the area. However, Escobal et al (2003) found that “seasonal Brazil nut extraction is accompanied by unsustainable forestry activities during the rest of the year”.

**Box 4. Forest Concessions and competent Forest Authority**

The timber forest concessions were granted by the existing National Institute of Natural Resources-INRENA, of the Ministry of Agriculture until 2008, whose functions with regard to forest resources and wildlife were adopted from 2009 by the newly created Wildlife General Division of the Ministry. According to the transfer process of functions on agriculture, regional governments will be responsible for granting rights over forest resources and wildlife, such as forest concession for timber. The beginning of the transfer process differs in each case with each regional government. In November 2009, the regional governments of San Martin and Loreto received the transfer of these powers. At the beginning of 2010 the transfer to Ucayali became effective. In all cases these processes are still complex and with little monitoring from the national level, and no regional government has delivered yet the budget for the implementation of activities.

Concessions for Ecotourism: These are granted up to 10,000 hectares of forests preferably not classified as permanent production forest or land for protection, for renewable periods of up to 40 years. The right conferred is to exploit the natural landscape as a resource, with the conditions and limits set out in the concession contract. Harvesting and any action that could substantially alter the nature of the forest ecosystem is prohibited by law.

Currently, there are 26 concessions for ecotourism, of which 20 are located in the Peruvian Amazon. The largest number and extension of these concession type are in Madre de Dios, as highlighted in Table 2.
Table 2. Concessions for Ecotourism

<table>
<thead>
<tr>
<th>Region</th>
<th>Area (ha)</th>
<th>Number of concessions</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ancash</td>
<td>104.06</td>
<td>1</td>
<td>0.19%</td>
</tr>
<tr>
<td>Cusco</td>
<td>2,000.00</td>
<td>1</td>
<td>3.57%</td>
</tr>
<tr>
<td>Ica</td>
<td>1,438.36</td>
<td>1</td>
<td>2.57%</td>
</tr>
<tr>
<td>Junín</td>
<td>245.34</td>
<td>1</td>
<td>0.44%</td>
</tr>
<tr>
<td>Loreto</td>
<td>10168.69</td>
<td>2</td>
<td>18.17%</td>
</tr>
<tr>
<td>Madre de Dios</td>
<td>36,523.67</td>
<td>17</td>
<td>65.27%</td>
</tr>
<tr>
<td>Tumbes</td>
<td>101.94</td>
<td>2</td>
<td>0.18%</td>
</tr>
<tr>
<td>Ucayali</td>
<td>5,375.31</td>
<td>1</td>
<td>9.61%</td>
</tr>
<tr>
<td><strong>Total concessions</strong></td>
<td><strong>55,957.37</strong></td>
<td><strong>26</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Source: Elaborated based on information from the Division of Forestry and Wildlife of the Ministry of Agriculture, August 2009.

- Concessions for conservation: These concessions are granted on protection lands to develop biodiversity conservation projects for a minimum period of 10 up to 40 years, renewable. The main objectives of these concessions are: protection, research and environmental education. The concession area is determined on request and based on technical studies carried out by the competent forestry authority, taking into account criteria for watershed management, including forest ecosystem types and requirements for maintaining biodiversity. As shown in Table 3, Loreto has the greatest conservation concession area, followed by Madre de Dios and San Martin.

Any activity taking place within these concessions must be specified in the management plans to be submitted to and approved by the competent forestry authority. It is therefore important to note that activities for protection, research, education and sustainable forestry use including non-timber resources or landscape resources (if included in the management plan) contribute to providing environmental services of forest ecosystems within the granted area, and its area of influence.
Table 3. Concessions for Conservation

<table>
<thead>
<tr>
<th>Region</th>
<th>Area (ha)</th>
<th>Number of concessions</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cusco</td>
<td>6,975.99</td>
<td>1</td>
<td>1.08%</td>
</tr>
<tr>
<td>Ica</td>
<td>513.31</td>
<td>1</td>
<td>0.08%</td>
</tr>
<tr>
<td>Junin</td>
<td>1,776.54</td>
<td>1</td>
<td>0.27%</td>
</tr>
<tr>
<td>Loreto</td>
<td>303,437.58</td>
<td>4</td>
<td>46.81%</td>
</tr>
<tr>
<td>Madre de Dios</td>
<td>164,567.99</td>
<td>7</td>
<td>25.39%</td>
</tr>
<tr>
<td>San Martín</td>
<td>150,894.49</td>
<td>2</td>
<td>23.28%</td>
</tr>
<tr>
<td>Tumbes</td>
<td>7,445.93</td>
<td>1</td>
<td>1.15%</td>
</tr>
<tr>
<td>Ucayali</td>
<td>12,599.91</td>
<td>1</td>
<td>1.94%</td>
</tr>
<tr>
<td>Total concessions</td>
<td>648,211.74</td>
<td>18</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Elaborated based on information from the Division of Forestry and Wildlife of the Ministry of Agriculture, August 2009.

- Afforestation and reforestation concessions: These two deserve special attention. They were included in the Forest and Wildlife Law and 282 contracts were awarded in the regions of Madre de Dios, Pasco, Junin, Ucayali, Piura and Lima, ascending to a total of 135,142 hectares. These concessions were granted for 40 years, renewable on an area of up to 40,000 hectares in forestry land use capacity and/or for forest restoration. However, in 2006, a Law for Promotion of Private Investment in reforestation and agroforestry, was promulgated, Law 28852. The regulation on reforestation and agroforestry was drawn from the Forest and Wildlife Law and included in this new framework through which new concessions would be granted and are now called for ‘reforestation and agroforestry’.

Unlike the concessions granted under the Forest and Wildlife Law, the new concessions are granted for up to 60 years, renewable through the Agency for Private Investment Promotion – PROINVERSIÓN, and through public auctions together with the respective regional governments. The lands granted under this new instrument should not exceed 10,000 hectares. However, this law had not been regulated at the time of writing this chapter, and no concession had been granted on the basis of this new legal framework.

Furthermore, afforestation and reforestation contracts granted under the previous legislation were controversially discussed in Peru, as grants had been given for areas considered as primary forests. Also, the possibility given of timber harvesting for existing
species, had opened access to those interested in extracting the resource, and not necessarily in reforestation.

This issue has two key aspects: (a) there is no clear definition of forest and (b) there is not a registry of deforested or degraded areas, and rights are granted without further verification of information in the field.

**Concession holders and REDD+**

The role of concession holders in the establishment of payment schemes for environmental services such as REDD+, requires some important definitions within the regulatory framework because in most cases, no explicit mention is made about the environmental services. The possibility of benefiting from such schemes would be subject to the rights expressly provided for the negotiation of the services offered by the forests, complementary to the approved activity.

In the case of forest concessions for timber purposes, it is expressly stated that resources such as wild flora, tourism services and environmental services within the area granted under concession can be utilized, if it is included in the General Management Plan.

It is also advisable to register a management or conservation activity at project level with the responsible authority accounting for the reduction of GHG emissions, in this case, the MINAM, in order to comply with the requirements of a REDD+ project. It is therefore important that the authority responsible for ensuring compliance with the concession management plans coordinates with the MINAM, to avoid double bureaucracy in the efforts to access carbon markets from REDD+.

Currently, there is a bill ready for debate in Congress proposing to regulate the necessary procedures for a REDD scheme at the project scale (e.g. within a forest concession) registration, clear rights on carbon (or other forest environmental services), and in general, the legal certainty needed to initiate the process.

**Permits and Authorizations**

In the case of permits and authorizations, it is important to distinguish those forestry lands granted under the control of the Peruvian State, such as:
(a) Management and utilization of timber and non-timber resources in forest for reserve production (see Box 5),
(b) Vegetation management on public lands
(c) Local forests

Also, permits for the sustainable use of forest resources are granted on land allocated to privates or to native communities such as permissions over:

(i) forest lands of rural or native communities (see Box 5).
(ii) private owned forests.

In the latter case, it is important to note that in spite of forest resources being granted as tenure to individuals or corporations, the standing forest resource is always recognized as National Patrimony, and therefore the Forest and Wildlife Law governs its use as depicted in Figure 7. This figure presents an example of forests over an area whose major use capacity is crops and pastures.

Figure 7. Scheme of property on areas which main use capacity is crops and pastures. Source: Authors. Image: GoogleEarth.
An application is made to the competent authority for the use and management of these forest resources. Permits are granted depending on the requested resource and the area. In case of requests of forest products use for industrial and/or commercial purposes, a management plan for the concession area should be elaborated as pre-requisite.

Moreover, as in the case of forest concessions, permits should explicitly state the rights, obligations and requirements to benefit from the environmental services of managed forests.

Box 5. Production forest in reserves, local forests and forests on indigenous and rural communities land

**Production forest in reserves** are "areas of production forests, that according to the forestry authority of the State, are held in reserve for timber forest concessions and can also obtain contracts for the use of other goods other than wood such as environmental services, while not affecting the potential of timber harvesting" (Article 40).

**Local forests** are "forested areas delineated by the INRENA, by remaining primary forest, secondary forest, or forest land protection for the sustainable use of forest resources through authorizations and permits issued to rural populations and towns (Article 44).

**Forests on rural or indigenous communities land** are "those located within the recognized territory of indigenous and rural communities. Its use is subject to the provisions of the Law and its Regulations. No forest concessions are granted to third parties on indigenous or rural communities lands".

Source: Forest and Wildlife Law Regulations.

**Natural Protected Areas Law**

Natural protected areas comprise many important forest ecosystem cases regulated by Article 68 of the Political Constitution of Peru, which declares that the State is obliged to promote the conservation of biodiversity and natural protected areas. According to the provisions of the Natural Protected Areas Law, these areas are delimited by the State for ecosystems

conservation, biodiversity and landscape attraction. The law serves to protect a representative sample of the country's biodiversity.

In Peru, as in other countries, even though the creation of natural protected areas should result in effective protection of the area; in reality it must be recognized that its designation as such does not necessarily ensure protection. It is essential to consider the funding gap (León Morales, 2007) as well as the challenges on their integrated management. Additionally, the drivers of deforestation and degradation go beyond the scope of control, even of the National System of Protected Areas by the State (SINANPE). In other words, the natural protected areas are not safe from the threats of deforestation and degradation; on the contrary, among the main threats related to land use identified in the latest National Report on Protected Areas (INRENA, 2007, p.37) are:

- "Mega-projects do not consider protected areas / Large investments in extractive activities (mining and hydrocarbons) / Megaprojects changing land use
- Disorderly colonization and migration causing intense conversion of ecosystems to agricultural systems or others
- Illegal logging, fishing or over hunting
- No respect for land uses (use capacity)"

On the other hand, analysis done by Oliveira et al (2007, p.1234) in the Peruvian Amazon for the period 1999-2005 showed that “only 2% of forest disturbances and 1% of deforestation occurred within the boundaries of natural protected areas.”

In Peru there are now three levels of protected natural areas:\footnote{For more information on the regulatory and institutional framework for protected areas: www.legislacionanp.org.pe}:

- National natural protected areas: are part of the SINANPE, directly administered by the SERNANP and have two category levels: indirect use (national parks, national and historic sanctuaries) and direct use (national reserves, communal reserves, protected forests, among others). Management plans are approved for their implementation.

- Regional Conservation Areas: Complementary to SINANPE, administrated by the regional governments. Unique category for direct use. Master plans are approved for their management.
- Private Conservation Areas: Complementary to SINANPE, these areas are voluntarily established on land owned by private, indigenous or rural communities, based on a recognition procedure led by SERNANP. The private owner, indigenous or rural community's owner develops a master plan of the conservation area to be reviewed and approved by SERNANP.

Regarding rights and mechanisms for civil society participation in natural protected areas within SINANPE, it should be clear that they do not obtain exclusive rights over the use of forests, but can perform certain activities of the natural protected areas master plans. Thus, management contracts, either total or partial, are awarded to nonprofit organizations, which may be for activities or areas within the protected area for implementation, as shown in Table 4. In addition, there is no explicit mention regarding these organizations rights over environmental services, or even more, about their nature. Considering that this would be a case of co-management of the protected natural areas, this situation needs to be clarified.

Table 4. Administration contracts in natural protected areas of Peru

<table>
<thead>
<tr>
<th>Institution</th>
<th>Legal basis</th>
<th>Date</th>
<th>Protected Natural Area</th>
<th>Management contract mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center for Promotion and Development Studies - DESCO</td>
<td>Resolution 054-2006-INRENA-IANP</td>
<td>12/18/06</td>
<td>National Reserve ‘Salinas y Aguada Blanca’</td>
<td>Partial management contract</td>
</tr>
<tr>
<td>Mennonite Economic Development Associates - MEDA Subsidiary Peru</td>
<td>Resolution 012-2008-INRENA-IANP</td>
<td>03/17/08</td>
<td>National Sanctuary ‘Los Manglares de Tumbres’</td>
<td>Total management Contract</td>
</tr>
<tr>
<td>Association for Research and Integral Development - AIDER</td>
<td>Resolution 053-2008-INRENA-IANP</td>
<td>10/21/08</td>
<td>National Reserve ‘Tambopata’ and National Park ‘Bahuaja Sonene’</td>
<td>Partial management contract for operations of the components of biological monitoring and research</td>
</tr>
<tr>
<td>Center for Conservation, Research and Management of Natural Areas - CIMA</td>
<td>Resolution 041-2008-INRENA-IANP</td>
<td>07/24/08</td>
<td>National Park ‘Cordillera Azul’</td>
<td>Total management contract</td>
</tr>
<tr>
<td>Fishing - Hunting and Tourism Club - Piura</td>
<td>Directorial Resolution 034-2002-INRENA-DGANP</td>
<td>12/27/02</td>
<td>Coto de Caza ‘El Angolo’</td>
<td>Partial management contract in the form of full implementation of operations management and administration of the ‘Sauce Grande’ sector</td>
</tr>
</tbody>
</table>

Source: Elaborated based on SERNANP information, september 2009.
Crime Code

One of the Peruvian State obligations under its commitment to the annex on forest sector management, Chapter 18 (environmental section) of the Trade Promotion Agreement with the United States, was to increase the criminal penalties provided in Article 310 of the Crime Code. The trade agreement was signed on December 8, 2005 and ratified by both countries on June 29, 2006 by the Peruvian Congress and December 4, 2007 by the Congress of the United States.

Pursuant to this agreement, Peru amended several articles of the Crime Code relating to forests, forest resources, illegal logging, deforestation and penalties to those who violate the national natural patrimony, through Law 29263. Thus, within the chapter on crimes against Natural Resources, there is an article that punishes with imprisonment of not less than 3 or more than 6 years and community service from 40 to 80 days to those who "do not have permission, license, authorization or concession granted by a competent authority engages in action that destroys, burns, damages or logs, whole or part of forest and other forest formations, whether natural or plantations" (Article 310 of the Crime Code).

Among the major changes made to the chapter on environmental crimes, are articles related to the liability of those making direct illegal logging or clearing forests, including penalties for those involved in the criminal chain: (a) as part of the preparatory acts (financing, enabling or causing such activities), (b) as public servants that make decisions permitting any activity contrary to the law, such as illegal deforestation of areas suitable for forestry, (c) those involved in the illegal chain as collectors, transporters or traders of illegally harvested forest resources.

There are also penalties for officers who provide false information in studies, assessments, environmental audits, forest management plans or other documents of forest management. In such cases, the officer should have known about the falsity of the information provided.

Draft bill on environmental services

The Ministry of Environment - MINAM, developed a proposed regulation in late 2008 entitled "Law Regulating the Compensation for Ecosystem Services," which aimed at establishing the general framework for compensating the environmental services and contributing to the conservation, restoration and sustainable use of biodiversity and natural resources of the country.
This proposed regulation was made available to the general public for their comments or suggestions through the MINAM’s website, and approved by the Council of Ministers and sent as a legislative proposal to the Congress. It was accepted as a bill to the Congress in April 2009 under the name "Environmental Services Law."

The bill was referred to the Commission of Andean, Amazonian and Afro-Peruvian Communities, Environment and Ecology in the Congress. It is noted that in addition to the draft, another project by APRA, the ruling party, was presented for discussion entitled "Law of Promotion and Compensation for Environmental Services". Therefore in the Commission session, both draft regulations were discussed and in order to unite them, a regulation called "Act on Provision of Environmental Services" was proposed. This new bill aims at establishing a general framework for regulating the provision and use of environmental services in order to contribute to the conservation, restoration, enhancement and sustainable use of biodiversity and natural resources of the country. Some topics covered by this proposed regulation are:

- Definition of various concepts such as environmental services, supply, suppliers, beneficiaries of environmental services and compensation for environmental services.
- Indication of the compensation offered for environmental services and an explanation on how the state can distribute those benefits.
- Establishment of the State's role and the possibility of promoting public and private investment on environmental services.
- Establishment of guidelines to conserve ecosystems based on compensation schemes for environmental services.

Currently, this regulation is pending to be discussed in the Congress, however, prior to this, indigenous people have requested a consultation procedure in accordance with Convention 169 of the International Labor Organization.

Additionally, some discordant points or elements that should improve the bill have been identified, such as:

- As this proposed regulation also implies a vision of the Natural Patrimony as an ecosystem and not as a natural resource (like the rest of Peru’s

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15 Recently, the Congress passed the Law on Indigenous Peoples Consultation, but it requires the President to subscribe/asent to it.
regulatory framework), it should provide a definition of the legal nature of environmental services.

- Establish a more concrete link between land rights and forest and the carbon rights or other market elements derived from environmental services.
- Delineate more clearly the government’s role about environmental services, including a more effective role as promoter and regulator.
- Benefit-sharing considerations, taxation, contractual aspects.

4.3 Legislation and policies that could be counterproductive towards the establishment of REDD+ schemes

Peru, for many years, has promoted public policies in order to drive activities that have not taken into account the special characteristics of forest ecosystems, thereby generating perverse incentives that have led to degradation and deforestation of these ecosystems. For instance, agricultural policy promoted by the Ministry of Agriculture, whose objective is to expand the agricultural frontier among others. Although regulations that promote the value of forest resources and environmental services exist, as indicated in the preceding sections, implementation is still weak, and there is particular need for an effective and integrated implementation plan that harmonizes the various public policies.

Within this context, the incentives to conserve natural forests as sources of environmental services create an opportunity to value and consolidate a forestry policy on environmental services. A series of regulations that could be counterproductive to the establishment of REDD+ schemes are analyzed here:

**Private property titles**

There is a small percentage of forestry lands with land-tenure rights granted by the State, probably due to procedures for granting titles based on land use changes (to agriculture activities). These procedures were based on ambiguities in the regulation as well as lack of capacity, and transparency or suitability of those responsible for implementation.

Thus, the legal framework for land titling in lowland and highland forest\(^\text{16}\) has led to land use change of forest land to crop establishment in order to obtain the titles. This practice, which

\(^{16}\) Law 26505, Law of Private Investment in the Development of Economic Activities in the lands of the National Territory and of Rural and Indigenous Communities, in force since July 1995 and Legislative Decree 653, Investment Promotion Law in the Agricultural Sector, in force since August 1991.
would become illegal under the Forest and Wildlife Law and the Crime Code has obtained formal recognition and therefore the granting of titles. Moreover, the condition of these titles are that the landowner continues to undertake agricultural activities, even when this involves deforestation activities.

**Extractive Industries**

The extraction of non-renewable natural resources (hydrocarbons and minerals), has increased because of their high prices in international markets especially oil and gold. Due to this situation there is more pressure for exploration and exploitation of non-renewable resources on all forest areas, including natural protected areas, forestry concessions and indigenous community lands, among others.

Thus, in all these areas, whether or not there is a pre-existing law on forest resources or land, there is a possibility of giving rights on the existing non-renewable natural resources. This causes an overlap of rights with respect to different natural resources in the same area and also results to various social, economic and environmental issues. Examples of overlaps are found in different types of forests and conservation or management tools such as private conservation areas and conservation concessions. For instance, ‘Chaparri’- coastal dry forest or ‘Huiquilla’ – Amazonas, private conservation areas; conservation concessions ‘Alto Huayabamba’ - San Martin or ‘Los Amigos’ - Madre de Dios; or indigenous communities forest (e.g. indigenous communities of Madre de Dios).

Although environmental and social assessments were included (environmental impact studies), the establishment of extractive activities involves deforestation (through the issuance of permits for forest clearing), and hence the use of other renewable natural resources involving extensive use of water channels, which could jeopardize the ecosystems of these areas without the strict application of an environmental impact study.

While the General Environmental Law and the Organic Law for the Sustainable Use of Natural Resources require coordination between stakeholders and relevant sector entities, in practice this is not done effectively (Alza and Ipenza, 2007). It is therefore necessary to formulate and approve measures to carry out inter-agency coordination between the competent authorities that grant rights over renewable and non-renewable natural resources.

**Infrastructure in the Amazon**

Integration initiatives among South American countries have been promoted at the regional level through the development of major infrastructure (main roads). The completion of these
major infrastructure projects will give access to areas currently not accessible to large populations, such as some natural protected areas, increasing their vulnerability.

In Peru, an emblematic case is the paving of the Southern Inter-Oceanic Highway as part of the Initiative for the Integration of the Regional Infrastructure in South America (IIRSA according to its acronym in Spanish). This will see dramatic changes in ecosystems over the next few years due to increased population and economic activities of consumption, as small-scale gold mining (often informal) and logging of primary forests have been predicted. Similarly, authors like Dourojeanni (2006) have predicted the reduction of water sources, increase of deforestation, the decrease in the release of oxygen and carbon sequestration, landscape reduction for tourism activities, intensification of illicit crops and of the threats to natural areas.

**Monocultures – biofuels**

In order to reduce greenhouse gas emissions and as an alternative to the oil industry, the establishment of monocultures to be used for bio-fuel production has been promoted in Peru. In 2007, the government promulgated a legislation related to its compulsory use, determining a mandatory blending of 2% biodiesel in diesel by 2009, and 5% by 2011. Similarly it established a 7.8% mandatory blending of ethanol in gasoline from 2010. To enforce this policy, it will be necessary to increase crop areas for the necessary inputs needed for biofuels, such as oil palm, *jatropha* or pinion, canola, sugar cane and caña brava. In this context, lands to establish this type of crop will be needed.

Unfortunately, there are certain cases where forest land that has gone through degradation or deforestation processes, has been considered as agricultural land, even by reducing the area of a Neighbouring Permanent Production forest (BPP for its acronym in Spanish). Such “reclassification” case happened in a part of the BPP in San Martin whose categorization as such was removed and then offered through a procedure to the Regional Agrarian Division, and transferred as agricultural land to an enterprise (as private property). This area was deforested (through forest clearing permits), and an oil palm plantation was established. Fortunately, due to pressure from settlers, the company has stopped the process of adjuration in a part of the area (Servindi b, 2010).

The greater demand for land and scarce supply creates a latent threat to areas whose major land use capacity is forests, and the possibility of changing them into agricultural lands. In this regard, the coordination of policies relating to the promotion of bio-fuels is necessary in order to avoid perverse incentives that could become serious threats to the conservation and
sustainable management of forests, as well as hinder the possible implementation of REDD+ schemes.

4.4 Potential environmental conflicts and conflict resolution regarding REDD+

There are several factors that could cause conflicts in forest ecosystems as we have found throughout this chapter. One of the most frequent causes of conflict is the overlap of different natural resources rights in the same area. Another key cause is that the rights granted over non-renewable natural resources in a given area could jeopardize the effective implementation of a REDD+ scheme depending on the scale of the activity undertaken. Before entering into a conflict, a possible solution is the proper use of management tools such as ecological and economic zoning and land use planning.

For instance, as shown in Figure 8, in Madre de Dios, a number of rights have been granted (indigenous communities, timber forest concessions, conservation concessions, ecotourism concessions, among others) and there are certain protected areas, which may imply a sufficient existing land use management capable of supporting a tool such as REDD+. However, there are other projects and initiatives that could potentially or directly cause problems for its implementation such as unplanned road construction, illegal mining, and advancing the agricultural frontier without planning; hydrocarbons blocks, among others.

Hydrocarbon blocks are of particular interest. The following statistics presented by Finer et al (2008) provide an idea of the magnitude of the problem:

- In 2008, there were 48 active oil and gas blocks under contract with multinational companies in the Peruvian Amazon (Figure 9.)
- About two thirds of the Peruvian Amazon is covered by oil and gas blocks.
- Only National Parks, National and Historic Sanctuaries are fully protected from oil and gas activities, which represent approximately 12% of the total Peruvian Amazon.
- 20 blocks overlap 11 less strictly protected areas, such as Communal Reserves and Reserved Zones.
- At least 58 of the 64 blocks overlay land titled to indigenous peoples.
- 17 blocks overlap areas that have proposed or created reserves for indigenous groups in voluntary isolation.
Figure 8. Different land uses and interests in Madre de Dios
Source: Current Land Use Map of Department of Madre de Dios, SPDA (2008).

Figure 9. Oil blocks in the Peruvian Amazon and protected areas.
A possible cause of conflict that is not yet fully considered is the excessive interest that is being created around the potential economic benefits implied by a tool like REDD+. This could generate interest from the general population and encourage migration to forested areas or conflicts due to the invasion of areas that have land rights or rights over forest resources. Therefore it is necessary to establish mechanisms to discourage such actions through early warning and activities that provide adequate information on the design and implementation of REDD+ schemes.

The conflict resolution mechanisms should be included throughout the process of implementing a REDD+ scheme from its initial design. These mechanisms must be agile and flexible, and since the National Forest Patrimony is involved, the participation of a public institution is necessary as an intermediary between the prospective parties of the conflict. Why? Because it is not possible for the two private parties to negotiate the breach of obligations under a title granted by the Government, or activities that generate offences or crimes against forest resources, which should be sanctioned either by the competent forestry authority or by the courts concerned.

The institution resolving this conflict is required to diminish the power relations that might prevail in this, as well as to provide the necessary and easy access information to the parties in conflict. While the Ministry of Environment may act as a mediator in these conflicts, as part of its efforts to promote such schemes, we do not exclude the participation of other institutions, such as the Ombudsman, which has among its responsibilities to supervise and ensure that public institutions fulfil their duties. Therefore if there is a conflict of interest between two public institutions, the Ombudsman should mediate the participation of both institutions.

The Ombudsman Office has identified 75 cases of socio-environmental conflicts in its Social Conflicts Report No. 53 of July 2008, the major cause of conflict registered. While to date most of these conflicts are linked to mining activities, necessary precautions for the establishment of any economic and financial incentive (including a REDD+ scheme) will be required so as to have in place proper dissemination, conflict resolution, and decision-making procedures to avoid conflicts.
4.5 Conclusions

Following are the main conclusions of this chapter:

- International Agreements: Peru has ratified key international agreements on the possibility of linking forests, land and land use with climate change. It has also ratified agreements, which establish the respect to indigenous people’s lands and natural resources. In addition to this, bilateral agreements, like the Free Trade Agreement with the United States of America, constitute an opportunity to improve forest governance and implementation within the forestry legal framework.

- Legal treatment of environmental services within the framework of natural resources: Peru has a regulatory framework for natural resources, and therefore the concept of environmental services from these natural resources must be developed properly. One option is to treat environmental services as natural resources if a payment scheme for environmental services on the country's Natural Patrimony is structured.

- There are regulations relating directly or indirectly with environmental services and reducing emissions from all land uses, such as:
  
  o Directly related regulations: Political Constitution of Peru, General Environmental Law, and Organic Law for the Sustainable Use of Natural Resources. In addition, specific regulations: Forest and Wildlife Law and National Protected Areas Law.
  o Indirectly related regulations, by its relation to activities that can promote deforestation and degradation: Rules on mining, hydrocarbons, hydropower, and roads, among others.

- Levels of granting rights over forest and land in Peru: There are a variety of forms to grant rights and various authorities responsible for this (Table 1). According to Peruvian legislation, the government has eminent control over natural resources, such as lands suitable for forestry and forest cover. The rights conferred on forest resources do not grant their holders per se, rights to the environmental services. The main conclusion is that there is no ownership of the forest, and the Peruvian government should explicitly grant all rights to benefit from the ecosystem services.
- National protected areas and ability to develop schemes from co-management or co-administration: Based on tools of management contracts over natural protected areas, the Peruvian government can implement, through non-governmental entities, payment schemes for environmental services or REDD+ with positive results for the designated areas.

- Decentralization and granting of rights: The decentralization process involves a series of opportunities and likely problems in the forests and wildlife management. This process should be handled directly by the government.

- Clear definitions of forests are necessary in areas with potential to provide environmental services and areas that require some level of intervention to provide these services (areas for reforestation).

- Specification in titles providing conditions and requirements for environmental services use. The adoption of a possible Environmental Services Law with specific criteria, guidelines, requirements and other details needed for the implementation of REDD+ schemes or over any land use in Peru is pending. The establishment of clear rules, transparent and objective institutions will facilitate the promotion of new schemes.

- There are regulations influencing the occurrence of deforestation or degradation:
  - Land titling in the Amazon and promotion of deforestation.
  - Extractive industries (energy and mining). Development of mega projects.
  - Unplanned infrastructure works or poor effective planning (monitoring of direct and indirect impacts).
  - Monoculture biofuels and agroforestry systems.

- The Peruvian course of action on REDD+ and emissions from land use and forest, after Copenhagen17.
  - The Peruvian position to avoid deforestation and forest degradation is clear and was held strong at COP15. The international context, unfortunately, did not accompany the country needs to reverse the deforestation of the Amazon.

17 In italics, find comments linking the delineated national framework, with the national and international negotiations.
Peru is taking important steps to improve its institutional, legal and technical framework to seize opportunities such as REDD+. The Ministry of Environment is the body responsible for leading this process, e.g. through REDD Readiness under the Forest Carbon Partnership Facility (FCPF). It is expected that the support and the exchange of skills and technologies flow in a more concrete form from developed countries to countries such as Peru, as it was suggested in recent international discussions.

The regulatory and institutional framework on environmental services and REDD+ is now being revised and improved by the Peruvian government based on two important processes that merit attention. First, the process of the National Forestry Policy and the new Forest and Wildlife Law, undertaken by the Ministry of Agriculture, as the national forestry authority. Second, the process for a Compensation for Environmental Services Law by the Congress. Although there is consensus on the importance of these rules and policies, the forest governance required to implement such schemes goes beyond the adoption of rules, but verification is needed for concrete changes in the forests reality and how Peruvians use them. This implies a high level of implementation and adoption of regulations and adequate systems for managing the land use and forest. Negotiations have recently emphasized the need to establish clear national mechanisms for the proper accounting, recording and monitoring of projects allocated to reduce emissions from land use. For the Peruvian case, this requirement may be met only if a national system, and effective and efficient regional anchors are put in place.

Benefit sharing from REDD+ schemes and respect for indigenous communities and local actors are very important factors for the next steps in this tool. Only under schemes that benefit people closest to the forest and/or responsible for changes in attitude over forests can a reduction of deforestation and degradation be ensured. The role of the Peruvian state and the provision of resources to effectively carry out this role should also be taken into account.
4.6 References

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Instituto Nacional de recursos naturales – INRENA. Informe Nacional - Perú, 2007 del Sistema Nacional de Áreas Naturales Protegidas por el Estado Peruano - SINANPE.


(Accesed on 3rd June 2010).


5. Drivers of deforestation and degradation and future deforestation in the Peruvian Amazon (Velarde SJ, Hyman G, Marin JA, Barona E)

This chapter summarizes the drivers of deforestation and degradation in the Peruvian Amazon using the conceptual framework of Geist and Lambin (2002), which defines two types of drivers of deforestation (and degradation): Direct drivers and underlying drivers. Understanding the root of deforestation and degradation should form the basis for the formulation of initiatives to reduce them. In addition, estimations of future deforestation in the Aguaytia basin and other regions of the Peruvian Amazon are shown based on models. Estimates of deforestation and degradation scenarios based on plans for the Amazon are also discussed, both from the state and private sector (Dourojeanni et al. 2009).

5.1 Drivers of deforestation and degradation in the Amazon

This section is a meta-analysis of deforestation in Peru and its causes, primarily using sources published in international journals, books and official reports from the Peruvian Government, and working papers that have been validated, either by local stakeholders (Pautrat et al 2009), or open for public comment in general (Greenox, 2009). More recent official sources correspond to studies published by the Ministry of Environment such as the Narrative report of the Forestry map 2000 (MINAM, 2009a) and the study on causes of deforestation and mitigation measures (MINAM, 2009b) as well as more detailed studies at the basin level (see Chapter 8 of this working paper). The methodologies of each study are therefore different. Grey and unpublished literature has not been included, therefore the findings of this chapter may be biased.

There are two types of drivers of deforestation and degradation, direct and underlying drivers. The direct drivers are those visible, where the driver can be identified. The underlying or indirect drivers are not easy to identify or understand and include national and international policies, markets, and elements often outside from the place where they influence. In Peru, migration, deforestation and poverty are positively related and Andean migration is the most important direct factor of deforestation in the Amazon (Pautrat et al, 2009).

The tables below show the results of this review based on available information and using the conceptual framework of Geist and Lambin (2002) in three major areas of study: The
Northern Amazon (Loreto and San Martin), Southern Amazon (Madre de Dios and Apurimac and Ene River Valley) and Central Amazon (Ucayali). Table 5 shows the direct drivers of deforestation and degradation, while Table 6 shows the underlying drivers.

Slash and burn or shifting cultivation is the most commonly cited driver of deforestation along with expansion of the agricultural frontier with large-scale crops (like oil palm) and the development of infrastructure, particularly roads and highways (Table 5). The underlying drivers most often cited are Andean migration; policies for the promotion and formalization of property which constitute a perverse incentive forcing the owner to develop agriculture, and the lack of institutional coordination (Table 6). On the other hand, the literature review also highlighted labor shortage in the Amazon as one of the key things that hinder deforestation and degradation (Coomes, 2000 and White et al, 2005a and b and Zwane, 2007).
Table 5. Direct drivers of deforestation and degradation in the Peruvian Amazon

<table>
<thead>
<tr>
<th>Direct drivers of deforestation and degradation/Region</th>
<th>Northern Amazon (Loreto and San Martin)</th>
<th>Southern Amazon (Madre de Dios and Valley of Apurimac and Ene River)</th>
<th>Central Amazon (Ucayali)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure</td>
<td>Openings or access roads (6), including oil access roads (15)</td>
<td>Future inter-oceanic highway (north) (4), Iquitos-Nauta road (14)</td>
<td>Brazil-Peru Trans-Oceanic Highway (IIRSA) (3,4)</td>
</tr>
<tr>
<td>Agricultural Expansion</td>
<td>Agriculture caused by slash and burn subsistence farming (7 and 8 cited in 6).</td>
<td>Promotion of large-scale cultivation of oil palm in San Martin (4, 5) Shorter fallow periods in Loreto (9)</td>
<td>Promotion of large-scale cultivation (4)</td>
</tr>
<tr>
<td>Logging</td>
<td>Exploitation of rubber by mid nineteenth century in Loreto (9); charcoal production in swamp forests (12)</td>
<td>Current and future increase by better access to markets (4)</td>
<td>Forest roads provide access for migrants to settle (1)</td>
</tr>
<tr>
<td>Gold Mining</td>
<td>NA</td>
<td>In rivers and using toxic minerals like mercury (4)</td>
<td>NA</td>
</tr>
<tr>
<td>Energy Projects</td>
<td>48 active oil and gas blocks leased to private companies (15) Spreads on about 2/3 of the Amazon (15).</td>
<td>Hydropower projects, exploration and exploitation of oil and natural gas (4, 15), particularly the future Inambari dam (10)</td>
<td></td>
</tr>
<tr>
<td>Other factors</td>
<td>Coca leaf production in the Upper Huallaga Valley (4, 13)</td>
<td>Coca leaf production in Valley of Apurimac and Ene River (10)</td>
<td>Coca leaf production in the upper Aguaytia basin (1985-1995) (1) Lack of fire control (1)</td>
</tr>
</tbody>
</table>

Table 6. Underlying drivers of deforestation in the Peruvian Amazon

<table>
<thead>
<tr>
<th>Underlying causes of deforestation / Region</th>
<th>Northern Amazon (Loreto and San Martin)</th>
<th>Southern Amazon (Madre de Dios and Apurimac and Ene River Valley)</th>
<th>Central Amazon (Ucayali)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic factors</td>
<td>Andean Migration (4)</td>
<td>Andean Migration (4)</td>
<td>Andean Migration (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Availability of labour (2)</td>
</tr>
<tr>
<td></td>
<td>Population increase: Forest has grown from 1772 000 inhabitants in 1981 to 4 115 000 in 2007 according to INEI (National Institute of Statistics and Informatics). Loreto and San Martin are the most populous areas (6).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic factors</td>
<td>Future connection with global markets through IIRSA (4)</td>
<td>Connecting to global markets through IIRSA (4)</td>
<td>Agricultural loans (2)</td>
</tr>
<tr>
<td></td>
<td>Agricultural loans (7, 11)</td>
<td>Agricultural loans and credits (8, 11, 12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poverty and poor access to forests is related to shorter fallow (9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amazon rural poverty, which increased from 68%, in 1985, to 69.2% in 2000. This creates the need to start income generating activities in the short term, taking the forest as the main source of resources (6).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urbanization of new areas (6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technological factors</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Institutional and political factors</td>
<td>Nationally, lack of clear, comprehensive and cross-sectoral development policies, identifying a short term, medium and long-term vision of the country, political and economic interests of neighbouring countries (10) and lack of institutional coordination (see Chapter 4, this document)</td>
<td>Rural Forestry Settlement 'Alexander von Humboldt' (1983) (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1940-1970: State Policy promoting migration to the forest in order to expand the agricultural frontier (6)</td>
<td>Land titling and formalization (1), conditional upon development of agricultural activities (see Chapter 4 of this document)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Policies for the promotion and formalization of the property (4 and Chapter 4 of this document)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of land management policies at regional level (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of Strategic Environmental Impact Assessments for mega projects in transport and energy (4).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>State policies on biofuels (see Chapter 4, this document)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural factors</td>
<td></td>
<td></td>
<td>Andean migration with little knowledge about Amazon ecosystem management (1945) (1)</td>
</tr>
<tr>
<td></td>
<td>Local producers short-term vision on the decisions of (6) and related to poverty</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2 Case Study: Aguaytia Basin

As stated throughout this report, Peru shows great interest in the development of REDD+ schemes. A key principle of REDD+ is the scheme to reduce future deforestation to what would be a normal rate ("business as usual"). But what is this scenario or normal rate? Several initiatives and studies have measured the rates of deforestation, which can simply be projected into the future. However, there are no studies about the estimation of deforestation in the future that are specific to Peru or that are spatially explicit at the Amazon level.

An important approach to estimate the future deforestation is looking into the past. For this purpose, we conducted an analysis of deforestation and degradation in the Aguaytia basin, Ucayali, Peru. This basin was taken as an example due to its abundant scientific information as it constitutes a study site of the ASB and the World Agroforestry Centre (ICRAF) since 1994. The study integrates spatial and temporal analysis of deforestation patterns from the development of roads in the Amazon basin and plains of the Ucayali River since 1950 and uses mainly remote sensing images, census data, as well as other secondary data.

The drivers of deforestation dynamics in the Aguaytia basin are road construction, shifting cultivation, pasture establishment for livestock (not necessarily occupied by livestock and in many cases not occupied), internal migration, population growth, agricultural loans, government policies and trends in the timber industry, among others (Ugarte-Guerra, 2009, and Hyman and Barona, 2010).

The patterns of deforestation in the Aguaytia basin suggest different types of processes and drivers of deforestation as shown in Figure 10:

- Patches suggest selective logging and agricultural production, possibly illegal.
- The island pattern also suggests the possibility of illegal coca production.
- Corridor pattern shows the government's efforts to link a main road of a major river in the region.
- The most prominent model is large geometric shapes mostly associated with the land use change in the area.
This analysis provides important evidence about future deforestation, for instance, the national efforts and the significance to build a road connecting Lima with the Ucayali River as shown in Figure 11. Although road construction was relatively quick, the current pattern of deforestation has developed in a period of six decades. The historical record in this region shows some periods with higher levels of deforestation than others. Figure 12 shows higher levels of deforestation in the periods 1974-1985 and 1986-1996, which corresponds to the period of political violence in the country.
Many efforts are needed with respect to the estimates of future deforestation. A model for this type of analysis was performed for the entire Amazon by Soares-Filho et al. (2006a,b) with emphasis on the Brazilian Amazon. This model applies techniques of automatized cells to model the deforestation transition to 2050. The method of analysis of land use change can
model the possible future trends of deforestation. Existing roads can be inserted in the model, as their construction is one of the most important direct drivers of deforestation in the Amazon. The authors developed a model with a business as usual and a governance scenario.

Table 7 shows deforestation estimates for the year 2030 in Loreto, Ucayali, Madre de Dios and San Martin. In 2010 almost 5% of forest cover has been removed. According to the model, an equivalent amount of deforestation will occur in just 20 years, in 2030 the Peruvian Amazon would lose 10% of its forests. As the current level of deforestation represents losses for a period of 50 to 100 years, these projections suggest that forest clearing will substantially occur in the next two decades.

Table 7. Deforestation scenarios for four Amazonian regions in Peru to 2030, per km²

<table>
<thead>
<tr>
<th>Deforested areas</th>
<th>2001</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loreto</td>
<td>7,754</td>
<td>8,254</td>
<td>9,173</td>
<td>11,600</td>
</tr>
<tr>
<td>Ucayali</td>
<td>5,432</td>
<td>6,667</td>
<td>8,218</td>
<td>9,997</td>
</tr>
<tr>
<td>Madre de Dios</td>
<td>1,231</td>
<td>4,800</td>
<td>9,805</td>
<td>15,209</td>
</tr>
<tr>
<td>Quechua-Lamas San Martin</td>
<td>9,565</td>
<td>12,355</td>
<td>16,009</td>
<td>18,567</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Forest areas</th>
<th>2001</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loreto</td>
<td>330,005</td>
<td>329,506</td>
<td>328,586</td>
<td>326,160</td>
</tr>
<tr>
<td>Ucayali</td>
<td>95,025</td>
<td>93,789</td>
<td>92,238</td>
<td>90,480</td>
</tr>
<tr>
<td>Madre de Dios</td>
<td>80,474</td>
<td>76,905</td>
<td>71,900</td>
<td>66,496</td>
</tr>
<tr>
<td>Quechua-Lamas San Martin</td>
<td>33,961</td>
<td>31,171</td>
<td>27,517</td>
<td>24,959</td>
</tr>
</tbody>
</table>

Source: Amazon Initiative with data from Soares Filho 2006a,b.

5.3 Deforestation and degradation plans in the Peruvian Amazon

Although the results of spatial models explained in the previous section help us understand the magnitude of the problem of deforestation and degradation in the Peruvian Amazon, other sources such as investment plans in the Amazon region can also provide revealing results. Dourojeanni et al (2009) compiled and analyzed relevant information to each sector and each region regarding the short and medium term plans for the Peruvian Amazon basin, from both state and private companies for the period 2009-2021. According to the authors, the variety and quantity of the projects found demonstrate a lack of State and Peruvian society planning for the Amazon and reveals the Brazilian interest regarding the access to the Pacific seaports.
and hydropower sources. Thus, under an optimistic scenario to 2041, 43.6 million hectares will be deforested and 70.3 million under a pessimistic scenario, corresponding to 56% and 91% of the Peruvian Amazon, respectively (see Table 8). These figures correspond to estimates based on projects proposed to be developed in the Peruvian Amazon such as:

- 52 hydropower plants
- 53 oil plots granted on 35.3 million ha
- 24,818 rights granted for mining on 10.4 million ha
- 4,486 km of improved roads, including 880 km of new roads and 2.089 km of paved roads.
- About 2,000 km of railways
- 4,213 km of hydroways
- 483,581 ha of new biofuels plantations
- 7.7 million ha (current) to 23.8 million ha in forest management concessions and other concessions, authorizations and licenses.

Table 8. Forest deforestation and degradation in the Peruvian Amazon accumulated to 2041

<table>
<thead>
<tr>
<th>Major drivers of deforestation and/or degradation</th>
<th>Optimistic scenario (Million ha)</th>
<th>Pessimistic scenario (Million ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Deforestation (2009)</td>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Areas impacted by deforestation (30% or more)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roads: agriculture, livestock and disturbed or abandoned areas</td>
<td>17.1</td>
<td>25.1</td>
</tr>
<tr>
<td>Other roads not foreseen to date</td>
<td>1.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Others: mining, hydropower, urban expansion, hydrocarbons</td>
<td>1.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Forest degradation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logging in forest and reforestation concessions, and in native communities</td>
<td>10.0</td>
<td>14.0</td>
</tr>
<tr>
<td>Logging outside concessions</td>
<td>6.0</td>
<td>17.2</td>
</tr>
<tr>
<td>Total</td>
<td>43.6</td>
<td>70.3</td>
</tr>
</tbody>
</table>

Source: Adapted from Dourojeanni et al, 2009.
5.4 Conclusions

Among the direct drivers of deforestation in the Peruvian Amazon, shifting cultivation is a key driver along with infrastructure operations like road construction, hydropower projects and hydrocarbons exploration and exploitation. Selective logging is a major cause of degradation. Among the underlying drivers, government policies, such as the requirements for granting property titles and the promotion of biofuels have led to perverse incentives.

For a detailed analysis of scheme designs for reducing deforestation and degradation and assessing future variables, plans and projections within the country and neighboring countries should be considered in addition to the analysis of historical trends and possible patterns.

5.5 References


Ministerio del Ambiente (MINAM), 2009b. Causas y medidas de mitigación a la deforestación en áreas críticas de la Amazonía peruana y a la emisión de gases de efecto invernadero. Ministerio del Ambiente, Lima, Perú.


6. Perceptions about fairness and efficiency in the REDD+ value chain (Velarde SJ)

This chapter summarizes the results of three training and consultation workshops about REDD in October 2009 in Pucallpa, Moyobamba and Iquitos, Peru. The perceptions from local stakeholders about fairness and efficiency in the REDD+ value chain are documented here. The methodology “Fair & Efficient REDD Value Chain Allocation” was used, and applied in Indonesia as pilot method. High expectations were found in relation to the REDD mechanism, and concern was raised about fairness and efficiency in its design, in order to share benefits with local population and at the same time, to achieve the desired positive environmental effects (reducing carbon emissions). It was recognized that the transaction costs could be very high. Furthermore, the following needs were raised: (1) clear game rules at the national and international level, (2) capacity building, (3) greater transparency and participation throughout the process, and (4) changes in the model of conventional development.

6.1 Why a perceptions study?

The perceptions about fairness and efficiency prior to the real establishment of compensation mechanisms for the environmental services provision, may have an important impact on local stakeholders participation and therefore, on the efficiency of the intervention (Sommerville 2010). Pascual et al (2010) recognize the interdependencies between efficiency and fairness as clue features of the environmental services payment scheme (PES). According to the authors, it is important to focus on what “fair” implies in PES as it reflects the relative importance given to the efficiency and fairness.

Moreover, a key issue in relation to REDD+ is that expectations are overvalued. These overvalued expectations were found in this study and match with those found in PES case studies in Fuquene, Ecuador, and Alto Mayo, San Martin, Peru (Moreno 2006, cited by Poats 2007). In a regional PES workshop carried out in Ecuador, it was concluded that actions must be focused on populations with lower resources, and expectations for PES mechanism design should be clear. Particularly on the scope of the mechanism based on rural development wishes and demands: “a key factor is to recognize PES as a means but not the end in itself” (Risas in Poats 2007, p. 52).
Due to the current over expectations about a REDD mechanism in Peru and considering the prior premises, a study about perceptions on different aspects related to REDD mechanism, and especially about its value chain, was developed. Currently, there is no empirical evidence of the REDD transactions as such, therefore the assumption of this study is that “due to lack of actual data, the stakeholders actions and options are based on their perceptions on how a REDD mechanism would work in the future.” (Velarde et al. 2010).

6.2 Study methodology: the FERVA method

The method used in this study was the “Fair & Efficient REDD Value Chains Allocation” (FERVA) (van Noordwijk 2008), designed and applied as a pilot study by ICRAF in Indonesia (Suyanto 2009). FERVA proposes a dialogue between the different stakeholders in the REDD chain value, that is, local stakeholders, government institutions at different levels, civil society and the private sector – for monitoring, certification, and verification – as well as interested groups willing to invest and/or pay for certified emission reductions. This dialogue can include several of these groups or be based on specific groups.

A value chain is “the representation of a sequence of actions that transform the raw materials (land use to increase the carbon sequestration) to commercial products (certified emission reductions) that a user can buy” (Velarde et al. 2010). This concept is key for the application of the FERVA method. The REDD value chain is explained in Box 6.
Box 6. REDD Value Chain

The REDD value chain has 8 functions ranging from local producer who has direct influence on land use, to the production of a Certified Emission Reduction (CER) with monetary value on the international market. The various intermediate functions in the REDD value chain refer to the processes of monitoring, reporting and verification, and add value to local efforts to reduce emissions.

Thus, as shown in Figure 13, functions 1 and 2 refer to the efficiency (reducing emissions) and fairness (support of sustainable livelihoods). Functions 3 to 8 are part of transaction costs. Functions 3 and 4 (guard against leakage: physical and temporal, and secure additionality by establishing clear baselines) are filters for any REDD mechanism. If these functions are not clear, the quality of implementation and results of the mechanism cannot be ensured. They also provide indicators for future monitoring and verification. Then the national certification scheme (function 5) requires and must follow international rules on eligibility (function 6), for subsequent independent verification (function 7) until the CERs can be sold on the international market, currently the voluntary market (function 8).

Figure 13. Eight functions of the REDD value chain.
Source: Velarde et al. 2010.
The FERVA method applied in 3 workshops in Peru

The FERVA method attempts to answer the question on how the different stakeholders along the REDD value chain will be compensated or will negotiate their participation and how they can support this negotiation process (van Noordwijk, 2008), and the difference between what they “expect” and what is “desirable”. The method steps are described below (adapted from Velarde et al. 2010 and van Noordwijk et al. 2008):

1. First, the topics of climate change and the role of the greenhouse gases are introduced in order to ensure a common understanding of concepts between the participants, are introduced. This explanation may vary in its depth depending on the degree of knowledge of the participants. For a gradual understanding of the subject, reading material should be sent in advance to the participants. The participants can be local communities, government agents, NGOs, university officials and private sector altogether or in separated groups (depending on the local situation). Thereafter the participants are exposed to the subject of “fairness and efficiency” in relation to REDD through presentations on the applications of both concepts.

During the morning sessions the dialogue foundations were set. The essential concepts about REDD were presented, opportunities and challenges, essential aspects about value chains and the REDD value chain, characteristics of a fair chain against an efficient chain, legal-normative aspects, and the Latin-American REDD forum.

2. The participants were divided into small groups. Each group held a dialogue whether a REDD mechanism should be fair or efficient. Each group discussed the mechanism and presented their conclusions in plenary.

3. The concept of “value chain” was presented using a local agricultural product for instance (coffee, rubber, or wood), and comparing the prices per unit weight (or volume) at three different points: farm gate price, after processing and market price, when it is bought by the customer /consumer. In this case the price increases along

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18 Augusto Castro (MINAM-SPDA) presented to the workshop in Pucallpa “REDD in Peru: Challenges and opportunities of a construction process” and then this presentation was done by Velarde SJ (ASB-ICRAF) in Moyobamba and Iquitos.
19 Milagros Sandoval, Peruvian Society of Environmental Law (SPDA, now Conservation International) presented the legal and normative aspects in relation to REDD in the Moyobamba’s Workshop.
20 Sandra Tapia, National Service of Protected Areas by the Government (SERNANP) also shared the results of a study about opportunity costs of REDD carried out by SERNANP and the Amazon Initiative.
the chain as the product is transformed physically and becomes more available to the end-customer.

4. Subsequently, the concept of “value chain” is applied to the REDD mechanism. The product negotiated in the carbon market is a document called “Certified Emission Reduction” (CER) (see Box 6). This is a key step to access the understanding of the participants through a session of questions and answers before proceeding to group work.

5. Finally, the participants were divided into small groups (from 5 to 10 persons per group) to discuss the distribution of the REDD benefits payment. Then, we asked the participants to assign 100 units (ideally casino chips, beads, toy or true money bills) among the 8 functions of the value chain established in step 4 within two scenarios that they expect to happen (or their current perception based on experience from prior projects related to environmental services payments, carbon credits sales or conservation projects) and what they see as desirable or ideal.

Further steps can include the use of tools from experimental economics that quantify the willingness of individuals to cooperate and jointly achieve benefits for all.

6.3 Results

The three participatory training and consultation workshops about REDD in the cities of Pucallpa, Moyobamba and Iquitos, in October 2009, had the participation of more than 110 persons, of which 73 attended all sessions. The study was led by ASB and the World Agroforestry Center (ICRAF) in coordination with the Ministry of Environment (MINAM) as part of the Ministry’s support to the REDD preparation process (i.e. Readiness Preparation Proposal-RPP). The workshops were locally organized by ICRAF Peru, Amazonians for the Amazon (AMPA), the Research Institute of the Peruvian Amazon (IIAP) and the National Institute for Agricultural Research (INIA).

The participants had high expectations with regard to the financial results of the application of a REDD mechanism and evident interest and concern about the details of the potential benefits of its application and scope. The target audiences of the workshops were officials government and non-governmental institutions; researchers and civil society working on climate change mitigation and avoided deforestation.
**Fairness and Efficiency**

In relation to the topics of fairness and efficiency within the REDD mechanism, the participants are oriented towards a balanced approach - a chain that is both equitable and efficient, with stakeholders proposing productive alternatives to those that cause deforestation and at the same time sequester carbon. Two issues that caused concern and controversy during the dialogues were:

- Lack of availability of information about REDD to local stakeholders in formats and languages they can understand (the most recent information is only available in English), in order to build an effective mechanism with the direct participation of local communities, indigenous population and other actors, and to avoid future conflicts.
- High transaction costs, particularly for the certification and verification currently dominated by consulting companies and/or international enterprises.

**REDD value chain**

The participants drew maps of stakeholders, identified related national and regional policies and analyzed the REDD value chain presented, assigning a current perceived or expected value and a desirable or ideal value to each function of the chain. The discussions below assume that the first function of the chain “reducing real emissions” represents efficiency, while the second function “support sustainable livelihoods” represents fairness.

The summary discussions of each Workshop are presented below:

**Pucallpa, Ucayali**

Deforestation in Ucayali is equivalent to 9,26% of its surface (966,191 ha), making Ucayali the third most deforested region of Peru (MINAM, 2009). Andean migration to this area started in the 40’s with the construction of the Federico Basadre road connecting to the capital, Lima (Ugarte-Guerra, 2009) and later massive waves of migrants populated the area. The deforestation has faced different patterns over time, for example, fishbone type deforestation at the sides of the road and then bow waves (Hyman and Barona, 2010) which correspond to the location of crop plots to both sides of the road, and correspond to San Alejandro-Pucallpa, Neshuya-Curimana, Campo Verde-Nueva Requena and Campo Verde-Honoria. Currently, the main causes of deforestation in Ucayali are expansion of the agricultural frontier, the substitution of forest by illicit crops (e.g. coca), unsustainable logging, conversion of secondary forests to pastures, and shorter fallow cycles due to the increasing demographic density.
The participant’s perceptions on how the resources are currently distributed between different parts of the value chain of carbon projects are very diverse, possibly due to the different degree of knowledge about related projects in the area. On the other hand, the assigned values along a desirable or ideal value chain were very similar, showing few variations (less than 9% in average).

**Figure 14.** Average of REDD value chain allocation in Ucayali

The following summarizes the recommendations from the participants (Figure 14):

- The resources assigned to perform the verification must be reduced (from 13.75% to 6.5%), as well as those assigned to establish a regulatory framework (from 23.25% to 12.75%); and those to the certification costs (from 12.5% to 8.5%).

- The resources allocated to ensure the existence of real emission reductions (‘efficiency’) must significantly increase (from 7.5% to 17.5%) as well as the resources to support sustainable livelihoods (‘fairness’) (from 6.5% to 14%) and to control leakage.

Similarly, during the dialogue some cases were exemplified such as enterprises in developing countries charging US$ 27,000 – 30,000 per certification (in the voluntary market) or for designing a CDM project. A solution discussed was the formation of a national or regional enterprise (with South American countries) capable to develop these certifications and
verifications and reduce costs. There is a risk that the REDD process within a new Climate Change Protocol could be a restrictive process as CDM currently is, with low impact to populations possessing rights over small areas of land. Finally the participants remarked that there are some regional policies that promote deforestation, such as incentives for oil palm cultivation.

**Moyobamba, San Martin**

San Martin is the region with the highest total deforestation in Peru, 32.55% equivalent to 1’629,434 ha (MINAM, 2009). The main driver of deforestation in the region is illegal crops (World Bank, 2007). In addition, the Cordillera Azul National Park is located in the region and aims to be certified in the voluntary carbon market.

The participants of this workshop requested up-to-date and detailed information about carbon projects and the allocation of resources within them. However since this information was not available during the workshop, they analyzed as one group, conservation projects in the region as proxy to REDD projects or future carbon projects. The participants expressed the usefulness of such exercise compared to a qualitative hypothetic analysis as proposed by the FERVA methodology. Karina Pinasco (AMPA) facilitated the discussion.

The recommendations for future conservation projects in the region are shown in Figure 15:

- Decrease significantly the assigned resources for salesmanship (from 20% to 5%) and to ensure additionality (from 54% to 0%). It is important to mention that most of the perceived resources under “additionality” are “good intentions” with no concrete outputs, according to the participants.

- Increase the resources for the real conservation actions (efficiency) (from10% to 30%), support sustainable livelihoods (fairness) (from 7% to 30%), control leakages (from 1% to 9%) and establish a regulatory framework (including monitoring and control) (from 2% to 20%).

- The issue of certification and verification which is very relevant to carbon projects, seems to have low importance to participants mainly due to the analyzed context, and its specific focus on conservation projects.

In addition, about REDD in particular, the participants expressed:

- Concerns about REDD as a means of control used by developed countries regarding the future access and use of resources in developing countries, particularly in the Amazon.
• A need to fill the information gaps about values or prices in each part of the value chain. For example, in real terms, how much does it cost to ensure the additionality of a carbon project?

Iquitos, Loreto

According to the available official statistics, in 2000, 3.05% of Loreto’s area was deforested, equivalent to 1’136,563 ha, and constitutes the second most deforested region of Peru (MINAM, 2009). Its capital, Iquitos, is the most populated Amazonian city of the country.

The participants analyzed the REDD value chain using integrated development and conservation projects which they are familiar with, as proxy. As shown in Figure 16, participants recommended to:

• Significantly increase the resources allocated for the real emission reductions (‘efficiency’) and to support livelihood alternatives (each function from 9% to 19%).
• Significantly reduce the resources intended for additionality (from 32% to 17%), as well as reduce the resources for certification, verification and to establish a regulatory framework (which add up from 32% to 23%).

In addition the participants expressed their concerns about:

• How the current regulation proposal about environmental services would affect REDD.
• Forest concession legislation that currently grants rights over the environmental services of the concessions (e.g. carbon), if included in the Management Plan. The inclusion of communities and indigenous populations in the process. How can they benefit from the REDD mechanism and how would they be the link with MINAM’s Program “Conserving together” that plans to pay 10 Nuevos Soles (approximately US$ 3) per hectare to native communities holding land titles?²¹.

²¹ The pilot project experience of “Conservando Juntos” will initiate in Rio Apurimac and Ene River Valley (VRAE) with 84 native communities and it expects young people to work as forest rangers (Inforegión 2010).
Figure 15. Value chain for conservation Projects in San Martin.

Figure 16. Value chain for projects of integrated development and conservation projects in Loreto.
6.4 Conclusions\textsuperscript{22}

The conclusions from the workshops are summarized as follows:

- Fairness and Efficiency: the REDD mechanism must be formulated in an equitable and efficient way if deforestation is expected to be efficiently reduced and improve the local population livelihoods. It is expected that the benefits obtained from carbon markets reach the source of the services i.e. the local producers and actors causing deforestation\textsuperscript{23} and at the same time, have the desired environmental effects (reducing carbon emissions), i.e. be efficient. The participants expect an increment (at least double) of resources assigned to effectively reduce emissions (in the field) as well as of those assigned to ensure sustainable livelihoods. The high transaction costs, particularly those of certification and verification, are currently benefiting mainly international consulting enterprises, making the regulated carbon market an “exclusive” and not “inclusive” mechanism. The inclusion of communities and indigenous population in the process and how they would benefit from REDD has not yet been well defined.

- Clear game rules: MINAM is requested to submit a position about the REDD process as a country and collaborate with other countries in order to present a joint position in the international negotiations about climate change. Additionally, to clearly define how the REDD mechanism, still being developed, would be related to the current government initiatives about compensation for conservation and how those mechanisms will be considered within the new forest and the environmental services laws, both still under discussion.

- Capacity building: while REDD could represent a funding opportunity for different sustainable development and conservation activities in the Peruvian Amazon, it is important that the MINAM and other related authorities lead the capacity building, as Peru is not ready for an immediate implementation of a REDD scheme in important aspects (e.g. governance and technical) at the national level.

- Changes in the development model: the Peruvian government needs to change its model of “primary development” or “extractive” based on the exploitation of natural resources to one of sustainable economy. Furthermore, it is reaffirmed that the government must ensure the creation of a legal system where the financial interests

\textsuperscript{22} Adapted from Velarde 2010 and Velarde et al 2010.
\textsuperscript{23} Deforestation agents are those causing deforestation, decision makers at all levels, from producers, private and politic sector, which have direct or indirect effects in the land use change.
are not placed over the environmental nor social interests. The numbers of social conflicts related to the environment increased considerably in recent years in particular in the Amazon (Defensoría del Pueblo, 2008). The beginning of a change in the development model for the country is therefore necessary.

- Transparency and participation: There is no available information about REDD in understandable formats and languages for local stakeholders, e.g. most of the latest advances on the subject are in English. This prevents the creation of an effective mechanism with the direct participation of local communities, indigenous population and other actors in order to avoid conflicts in the future.

6.5 References


of fairness and benefit distribution in community-based Payment for Environmental Services interventions: A case study from Menabe, Madagascar. Ecological Economics 69 (6): 1262-1271


7. Institutional framework regarding REDD+ in Peru and post-Kyoto Challenges (Capella JL, Sandoval M, Velarde SJ, Castro A)

The first part of this chapter summarizes the roles of various national institutions and their current or potential influence on the performance of REDD+ schemes, either positive or negative, from national and regional government institutions to NGOs and private institutions. The second part raises a number of challenges about national regulatory and institutional frameworks in the context of a renewed international binding commitment on Climate Change that includes forests and all types of land use. It is concluded that there are three key challenges for the design and implementation of REDD+ schemes: 1) The granting of rights over environmental services to individuals, 2) the need to assess the existing institutional structure in order to clarify the capacity to promote and establish these schemes, and 3) establishing mechanisms for benefit sharing, so that they effectively reach people/communities carrying out conservation or sustainable use of forest ecosystems.

7.1 Institutional framework about REDD+ in Peru

There are several public and private institutions that will influence the design and implementation of REDD+ schemes; several actors play a role in favour and others even against the implementation of such a tool. Below is a description of the institutions related to REDD+ in different capacities or roles as shown in Figure 16. Note that some of their roles overlap.

- Public institutions responsible for promoting and assisting in the design and implementation of REDD+ schemes in Peru:

  a) Ministry of Environment: According to the provisions of the General Environmental Law and by its founding law, MINAM promotes the assessment, design and implementation of payment schemes for environmental services, which include REDD+. 
b) **Ministry of Agriculture:** Through its General Directorate of Forestry and Wildlife, the Ministry is responsible for establishing national policies for the promotion, management, monitoring and evaluation of forest resources and wildlife as well as coordinating with regional forest and wildlife authorities for effective implementation of these policies.

c) **Regional governments:** In the current framework of the decentralization process in Peru, forestry management functions are being transferred from the central government to regional governments, making them responsible for granting rights over their forest and wildlife resources, approving management plans, carrying out control of the rights granted, among other functions. In addition, as indicated by the Organic Law of Regional Governments, Law 27867, specifically on the subject related to environmental services, regional governments have competencies to make plans, develop and implement programs for the sale of environmental services in forests regions or protected natural areas.

d) **National Natural Protected Areas Service - SERNANP:** It is the Ministry of Environment’s public technical specialized body, responsible for managing the National System for Natural Protected Areas by the State – SINANPE, and ensuring that it functions as a single system. It deals with promoting, granting and regulating rights over the environmental services and other similar mechanism generated by protected areas of national administration.

e) **Supervisor Agency for Forest Resources (OSINFOR):** A public executing body assigned by the Presidency of the Council of Ministers in June, 2008. It was entrusted to supervise granted rights under the Forestry and Wildlife Law as well as environmental services.

f) **Assessment and Environmental Control Agency (OEFA):** This is a public technical body at the Ministry of Environment created by Legislative Decree 1013, the Law under which the of Ministry of Environment was founded in 2008. The body is responsible for auditing, supervision, control and sanctions related to environmental matters.
g) **National Fund for Natural Protected Areas - PROFONANPE, Promotion Fund for Forestry Development - FONDEBOSQUE, National Environment Fund - FONAM and Americas Fund - FONDAM:** are public-private institutions that support the financial aspect of funds from foreign sources through project implementation to promote conservation or sustainable management of forest ecosystems.

h) **Ministry of Public Affairs (Public Ministry):** An autonomous constitutional body in service of society and administration of justice. It acts in defense of society at the Commission of environmental crimes as stipulated in the Crime Code. It is worth mentioning the recent creation of the Provincial Prosecutor Specialized in environmental matters and with jurisdiction over investigations on crimes under Title XIII of Book II of the Crime Code and Environmental Crimes\(^24\) related to environmental matters, in all its forms.

i) **National Police of Peru:** Through its Tourism and Ecology Department, the unit is specialized to engage the community in raising awareness on the need to preserve and conserve natural resources and environment, and also punish environmental crimes.

j) **Ombudsman:** An independent constitutional body created by the Constitution of 1993. It includes several divisions of responsibilities within its institutional order, such as the Division of the Environment, Public Services and Indigenous Peoples. It is responsible, inter alia, for protecting the right of citizens to enjoy a balanced and suitable environment for their livelihoods, by monitoring the performance of the state administration duties.

k) **National Congress of Peru:** Specifically, the Commission of Andean, Amazonian, Afro-Peruvian Communities, Environment and Ecology, responsible for reviewing the draft Law of environmental services from the Executive (Ministry of Environment). The new draft Law of Forestry and Wildlife would be reviewed by this Commission as well as by the Agrarian Commission.

Public institutions that could discourage or threaten the establishment of REDD+ schemes in Peru:

a) *Ministry of Housing Construction and Sanitation*: Its intervention is channeled through the Agency to Formalize Informal Property – COFOPRI. This is a public decentralized agency in charge of designing and implementing a program for the formalization of property and its maintenance in the country comprehensively and rapidly. COFOPRI further serves to centralize responsibilities and decision making.

b) *Regional Agricultural Directorates*: In the framework of the current decentralization process, these directorates are in a transitional process, where some of them depend on the Ministry of Agriculture for regulation and technically, but on the regional government administratively and budget allocation. These are in charge of promoting and regulating activities related to agricultural development, and hence the main coordination body of the agricultural public sector activities and the private sector at regional scale. In addition, these institutions are responsible for granting property titles to peasant and indigenous communities.

c) *Ministry of Energy and Mining*: Central Agency in charge of the Energy and Mining sector, which aims to develop and evaluate national policies on sustainable development of mining and energy activities. It is also the competent authority on environmental issues related to these activities. However in the case of small-scale mining and artisanal mining, according to the Organic Law of Regional Governments - Law 27867, these competencies were transferred to regional governments with a view to promoting the exploration and exploitation of mineral resources in regions at these levels.

d) *Ministry of Economy and Finance*: It is in charge of designing, proposing, implementing and evaluating, with efficiency and transparency, economic and financial policies to achieve growth. Such policies are a basic condition conducive to sustainable economic development that takes care of the general welfare of the population.
e) Ministry of Transport and Communications: Its function is essential to integrate the country internally and externally, to achieve a rational land use planning linked to resource areas, production, markets and towns; through regulation, promotion, implementation and monitoring of transport infrastructure and communications. Among its tasks is the construction of major infrastructure (roads) that do not have negative indirect impacts on natural ecosystems.

Special Working Groups:

a) National Commission on Climate Change (CNCC in Spanish): Created officially in 1993, but enforced by the MINAM in 2009. This commission "seeks to strengthen the technical and institutional capacity of the country to fulfill its commitments to the Global Convention on Climate Change [...] as well as design and promote the National Strategy on Climate Change (ENCC in Spanish)" (MINAM, 2009). The CNCC is comprised of representatives of the central government, provincial governments, the private sector, professional bodies and experts on issues related to the objectives of the United Nations Framework Convention on Climate Change. Working groups responsible for generating information and contributing to the development of national positions in international negotiations emerge from this National Commission (ibid).

b) REDD Technical Group: It aims to serve as specialized REDD technical advisory group for the National Commission on Climate Change and the institutions involved. The Technical Group will focus on addressing issues related to REDD in a comprehensive way integrating transverse approaches, through dialogue and consensus.

Private institutions and civil society:

a) Non Governmental Organizations (NGOs):

- National NGOs:
  - Design REDD schemes in specific areas such as concessions for conversion or through management contracts in natural protected areas (CIMA, AIDER).
  - Work specific topics, such as regulatory and institutional framework for REDD (SPDA), identifying the causes of deforestation (DAR), among others.
- International NGOs: They are involved in establishing such a scheme or supporting in the design and establishment of the same (CCBA, TNC, WWF, Rainforest Alliance).

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<th>ROLES</th>
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<td>Design/Implementation</td>
<td>MINAM – SERNANDE</td>
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<tr>
<td>Implementation (Including registry)</td>
<td>MINAM – Geophysical Institute of Peru and Research Institute of the Peruvian Amazon (IIAP)</td>
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*Min. of Housing, Construction & Sanitation
- COFOPRI
- Min. of Energy & Mining
- Regional Agricultural Directorates
- Ministry of Economy and Finance
- Min. of Transport and Communications

- Public Ministry
- National Police of Peru
- Ombudsman
- National Congress of Peru
- Commission of Andean, Amazonian, Afro-Peruvian Peoples, Environment and Ecology*

These could discourage the development of REDD schemes

These could negotiate positions at the international level

They are key to prevent deforestation and degradation

*Legislative functions

**Figure 17.** Public institutions around REDD+ in Peru

Source: Adapted from Capella and Sandoval, 2010 (p.37).
b) *For-profit organizations, companies and consultants:* These include those who are already interested in doing business with the rights holders over forest resources.

c) *Research institutions and universities:* These are working on studies related to climate change, greenhouse gases, among others, which will provide important information for the implementation of such schemes.

d) *Forest management committees and rural patrols:* Ways in which civil society organizes itself in a particular area in order to contribute to conservation activities and sustainable forest management and to control illegal activities. The forest management committees have been created in areas where there are several right holders over forest and wildlife resources, such as forest concessions in Amazon forest areas. The rural patrols have been formed in rural areas of Peru, having a specific legal framework through Law 27908, promulgated in 2002. They are recognized as an autonomous community organization supporting the rural and native communities in the exercise of judicial functions. They collaborate in resolving conflicts, as well as functions relating to security and communal peace. They also acquired rights of participation, control and monitoring of programs and projects to be implemented in their communal jurisdiction.

e) *REDD Table of Civil Society:* it was founded in 2008, includes sub-technical, economic and legal groups formed by organizations with an interest in the REDD subject.

### 7.2 REDD+ and REDD++ Challenges in a post-Kyoto commitment

This section describes the challenges for national policy and institutional frameworks in the context of a binding commitment (compulsory) on Climate Change that includes forests and all types of land use. A key institutional challenge associated with REDD is the multisectoral nature and functional overlap of the governmental organizations that requires them to clearly define their roles so as to effectively act with regard to the financial mechanism. The Ministry of Environment is optimistic and is getting ready to
submit proposals to several funding sources to increase their skills and work with other national institutions.

Another key institutional issue is decentralization. Most policies on access to natural resources are shifting from national government to regional governments. Currently, two regional governments, Loreto and San Martin, have obtained these rights.

Whatever the scenario, after the completion of the implementation period of the Kyoto Protocol, there will be major challenges to be faced by policy and institutional frameworks. Thus if an agreement on REDD, REDD+ or REDD++ at the international level is not reached, the voluntary market would probably give priority to those REDD+ initiatives that have been designed clearly and efficiently from previous years. Among these initiatives are two forest concessions with timber uses that already have certification under the standards of Climate, Community and Biodiversity – CCB in Madre de Dios.25 The relevant challenges facing national policy and institutional frameworks should be tackled so as to establish clear rules for granting rights over environmental services, identify the necessary institutional framework in order to avoid any conflicts that may arise.

On the other hand, in case an international agreement is signed, one of the challenges of the regulatory and institutional frameworks in Peru is to adapt existing frameworks to the requirements and formalities in order to conform to the international agreement. Thus, there are some background issues related to projects that are in progress which should be addressed in depth, such as:

- the concepts of carbon ownership,
- leakage management in project-based schemes,
- deforestation baseline establishment at regional level, and directing them to national level as recommended or as the ultimate goal,
- benefit sharing that favors those directly involved in avoiding emissions, among others.

In general, it would be necessary to adapt the REDD projects or initiatives that were implemented before the establishment of the international agreement so they can comply with its guidelines.

25 See: http://www.climate-standards.org/
7.3 Conclusions

The following summarizes the main conclusions of this chapter:

- It is noted that the institutional framework for REDD+ in Peru is diverse and contains several overlaps. There are also institutions that can contribute to the implementation of a REDD+ mechanism as well as others that could obstruct it.

- It will be necessary to adapt the existing institutional framework, competencies or functions to the international agreement. Undoubtedly, institutions like the Ministry of Environment and the Forestry authority (national and regional) will be protagonists in the establishment of such schemes. These entities should (as is the case of the MINAM) get ready for the challenge of promoting and regulating schemes related to environmental services of forest and land in their area of competence.

- Whatever the outcome of international negotiations and if an international agreement on REDD is adopted or not, it is clear that there is a need to identify at least some key points for the design and implementation of REDD schemes, which are:

  o **Granting rights to individuals or private sector over environmental services.** The characteristics of granting such rights should take into account the sovereignty of the State in terms of their natural resources as sources of environmental services.

  o **Need to assess the existing institutional framework** in order to clarify whether it can assist in the promotion and establishment of these schemes. It is therefore necessary to clarify the competencies and functions of both public and private institutions, and coordinate their work.

  o **Establish mechanisms for benefits sharing** so that these benefits that provide environmental services can efficiently reach people/communities that carry out conservation or sustainable use activities of forest ecosystems.

7.4 References


8. Implications of the definitions about reducing deforestation and degradation on carbon accounting (Hyman G, Marin JA, Barona E)

This chapter explores how the different terminology and concepts about REDD can influence the estimation of carbon stocks. The Aguaytia basin, Ucayali, Peru is presented as a study case. This chapter illustrates how the progressive development of the REDD scope could improve the accuracy of estimates of carbon in the Aguaytia basin in Ucayali, Peru.

8.1 Definition and measurement for carbon accounting

The definitions of forest and concepts of REDD have a strong influence on carbon accounting results and opportunity cost for avoided deforestation. The ASB Policybrief 15, describes how the REDD definition has evolved in its scope, from the estimation of forest and non-forest areas to a progressively more detailed land use analysis that takes into account the carbon in different landscape types (van Noordwijk and Minang, 2009).

In the reducing emissions from deforestation schemes (RED - Figure 18A), only the categories of non-forest and forest are considered. In this scheme, no differences are distinguished between different forest densities; thus, deforested areas by selective logging would be excluded. As trees removed under selective logging are usually the largest and oldest ones, under this classification system (forest and non-forest), huge amounts of carbon could be lost without being accounted for. According to the concepts explained in Chapter 3, there is no deforestation, but degradation. The main advantage of this classification system is that a remote sensing analysis only needs to differentiate between forest and non forest, a relatively easy task and with little margin of error.

Schemes for reducing deforestation and degradation (REDD), as shown in Figure 18B, were developed to account for carbon in forests with selective logging. The land cover classification for the Aguaytia basin includes four categories of forest density according to the estimation of forest cover. Primary forests have at least 90% of forest cover. Less dense forests have ranges of 70-90% cover, while 60-70% and 40-60% cover represent degraded forests by selective logging or where forest cover has been reduced due to natural causes. It is
important to note that this classification system was developed to estimate forest cover and does not determine areas undergoing selective logging.

Figure 18C may be considered as an example of REDD+—a classification system that includes forest, tree plantation and reforestation and any deforested area. This particular map contains a type called *mosaic*—comprised by land use, pasture, cultivated areas and forests. The forest within these land use classes cannot be considered within the other REDD scheme, leaving out significant amounts of carbon in biomass calculations.

Figure 18D may be considered as an example of REDD++. It includes many categories of non-forest land. This classification includes all land uses (REALU). This mapping exercise includes 35 land use categories and contains the highest level of detail in all classifications. The main advantage of this classification system is its ability to distinguish between many different land uses and their respective values of carbon stocks. Another advantage is that the land use analysis allows the development of policies and programs designed specifically for the more important land use transitions in the study area. The main disadvantage of this system is that the error level in a land use classification is higher than in other systems with fewer categories.
Figure 18A. RED contains only forest and non-forest classes.

Figure 18B. REDD includes all classes of forest depletion and degradation.

Figure 18C. REDD+ includes reforestation and secondary forest.
8.2 Methodological issues about measuring carbon at the landscape level

Carbon measurement is a very important issue on how REDD evolves in the future. Although satellite images have often been used for carbon measurement, maps using these images can reduce uncertainty (Goetz et al. 2009). Combining field measurements and the use of satellite images can estimate national carbon stocks (in combination with allometric relationships) (Gibbs et al. 2007, De Fries et al. 2007). Figure 19 illustrates the key transitions in land use between 1990 and 2007 responsible for the largest quantities of emissions of the Aguatia Basin in Ucayali.
The carbon flow from deforestation (and degradation) and the growth of tropical vegetation are components of high uncertainty in the total carbon accounting, often due to lack of explicit and consistent information about the forest cover change (De Fries et al, 2002). Ideally, to classify land use and land cover assessments, images of very high resolution can be used, such as QuickBird and IKONOS satellite images or recent images of Google Earth. The problem is that these images are only available for the last decade. However, evaluations of land use often need to go back to the 1980s and 1990s. An aerial photograph might be the solution, but the availability of photographs is usually limited. Consistent images over the last decades are products with medium scales such as Landsat and Aster satellite images.

Figure 20 illustrates a typical problem of scale. An Aster image of Aguaytia basin was digitized on screen at 1:100,000 scale. A remote sensing analyst can only distinguish homogeneous cover areas. At this point it is important to note that there is no difference between the digital and visual interpretation in the study area and also, low-budget projects can benefit from visual interpretation (Puig et al. 2002), particularly if they have access to free higher resolution images such as Google Earth. Using these images, forest patches were found in an area classified as pasture (Figure 21).
Figure 20. ASTER image of Aguaytia Basin, Peru. Small forest patches contained in the square area are insufficient to digitize land cover maps.

Figure 21. The same area, as shown in Figure 19, using Google Earth images. Right image shows the digitized forest sites to be included in carbon accounting if high-resolution images were available for various dates.

Due to the scale of the study, the forest patches in many types of land use, stay out of the carbon accounting for this region. The following figure (Figure 22) shows the amount of carbon not accounted due to the exclusion of forest patches as in the square area in the image above. The pasture landscape has very little carbon. Although the extent of forest area is small compared to the pasture area, only few trees are sufficient to make a big difference in the total amount of carbon.
Figure 22. Differences found in the amount of carbon equivalent, by using ASTER and Google Earth images.

Another example of landscapes traditionally considered to have little vegetation is urban areas. The following picture was taken from a high-resolution image in Google Earth, in the urban area of Campoverde in the Aguaytia basin (Figure 23). In this area of only 3.83 ha, 111 trees were counted based on visual interpretation. This number of trees is typical for cities and towns in the Peruvian Amazon.

Figure 23. Counting trees in urban areas in Campo Verde.
Source: Prepared based on Google Earth images.
Using a moderate figure of 65% forest cover, these urban areas tend to be between 80 and 120 tones of carbon per hectare (Figure 24). Throughout the Amazon, these carbon values in the total urban area may represent relative small amounts. However if we consider that a large number of trees exist in other landscapes considered as lacking in vegetation -such as shifting cultivation, pastures and others- these landscapes would increase the carbon content to a substantial level in the landscape, something that requires to be measured.

Future work in Peru should address the issue of trees on farms or small ranches and other landscapes (preliminarily global exploration by Zomer et al 2009, and later discussed its relation to mitigation, adoption and food security by Neufeldt et al. 2009) as it may contribute with a large carbon amount to the total balance. There is an urgent need of reaching a consensus on some estimates of what the contribution of these landscapes would be to total carbon.

Figure 24. Carbon levels on three blocks from the Campoverde town, Ucayali, Peru

8.3 Preliminary conclusions and the way forward

The REDD evolution is generally a very positive development if it includes more categories of land use. With great detail, the carbon balance values can be calculated more accurately. However, there are some advantages and disadvantages to overcome with respect to errors and problems in order to improve carbon accounting. A greater effort is needed to account carbon in non-forest landscapes such as mosaic, urban areas, agricultural areas for cultivation and pasture.

The magnitude of the carbon values poorly calculated from non-forest landscapes is unknown and will be a research topic for the next phase of this project. So far our research has shown that the scale errors can have significant effects on total carbon accounting. In the next
research phase, efforts will be made to provide a better estimate of the magnitude of these errors and effects.

8.4 References


van Noordwijk M, Minang PA. 2009. If we cannot define it, we cannot save it. ASB PolicyBrief No. 15. ASB Partnership for the Tropical Forest Margins, Nairobi, Kenya.

9. Forest governance and governability: Integrating Mitigation Measures for Deforestation and Forest Degradation (Rügnitz Tito M.)

The Ministry of Environment (MINAM) in Peru has published a document proposing specific mitigation measures for the deforestation process in the Amazon rainforest (MINAM, 2009). This chapter aims to supplement the information presented by MINAM, and explores initiatives already implemented in other countries (eg Brazil, Costa Rica among others) and contributes to the discussion on how to integrate key elements of these different initiatives. Thus, it extends the debate on the need to integrate mitigation measures for deforestation and forest degradation under a national sovereignty scheme with emphasis on the Amazon. This chapter proposes that an integration of these measures should be developed in the framework of the construction and consolidation of the forest governance and governability in each country.

9.1 Mitigation measures for deforestation and degradation: An overview

MINAM (2009) raises the following eight proposals for mitigation of deforestation based on issues related to deforestation in three critical areas26 of the Peruvian Amazon:

1. Replenish the deforested area, mainly areas adjacent to main roads;
2. Strengthen the development of silvicultural plans within the general forest management plans and annual operational plans approved by the forestry authority;
3. Train farmers on issues related to climate change, forest conservation, establishment of forest plantations, silvicultural management, green manures, tropical soils, etc.;
4. Strengthen the Research, Technological Development and Innovation (R + D + I);
5. Insert within the public forest sector organigram, a division responsible for the promotion of reforestation in the Peruvian Amazon;
6. Combat illegal logging in critical areas and departments of the Peruvian Amazon;

26 1) Mayo River Basin (San Martín Region); 2) Lower Inambari River Basin, Tambopata y Middle Madre de Dios River Basin; as well as the main road Mazuko-Puerto Maldonado-Iberia-Iñapari (Madre de Dios Region); 3) Upper Urubamba River Basin (Convención Province, Cusco Region).
(7) Strengthen the management and conservation of Natural Protected Areas and their buffer zones in critical areas;

(8) Establish policies and regulations for the promotion and incentives for the restoration of degraded lands due to gold mining in the Madre de Dios department.

The mitigation measures presented in this chapter are a complement to the MINAM document, and relates, whenever possible, to the financial mechanisms for international environmental services and carbon markets, as shown in Table 9

Table 9. Forestry Mitigation Measures

<table>
<thead>
<tr>
<th>Mitigation Measures</th>
<th>REDD</th>
<th>REDD+</th>
<th>REDD++</th>
<th>MDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strengthen the National System of Protected Areas and Indigenous Areas</td>
<td>+</td>
<td>?</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Promote NTFP (Non-Timber Forest Products) Value Chain</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Apply Sustainable Forest Management</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Promote Forest Plantations (productive, protective) *</td>
<td></td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Promote Agroforestry production (silvopastoral)</td>
<td></td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Strengthen Forest Governance and Governability</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

* As this measure is fully presented in the MINAM’s document (2009), it will not be included in this paper.

The international and national policy forums on climate change and biodiversity have identified conservation of existing forests and recovery of degraded areas - using systems with high carbon stocks – as one of the most efficient options in terms of cost-benefits for mitigating climate change (Stern 2006). In this context, to fulfill international agreements such as the Kyoto Protocol, flexible mechanisms such as the Clean Development Mechanism (CDM) were developed, and recently, the incorporation of new mechanisms such as REDD+ (plus) is being discussed. For more details see Chapter 3.

Regardless of which mechanism is implemented, it is important to recognize the need to integrate mitigation measures. This chapter proposes that an integration of these measures should be developed within the development framework and consolidation of the forest governance and governability in each country.

The search for alternatives to the serious environmental, social and economic impacts of deforestation and forest degradation at regional and global scales, acquire greater importance with most vulnerable social segments and is dependent on their agricultural and forestry production activities. Producers need specific tools and mechanisms to help them transform
their traditional production system of slash and burn to reducing deforestation and degradation rates gradually.

9.2 Biocapacity and pressure on natural resources

The world population continues to grow, which results in increased pressure over natural resources. Currently, the planet has about 6.7 billion people and the figure is expected to rise to a population of 9.2 billion people by 2050. According to FAO (2010), to meet the population needs in 2050, the food and fiber production (and biomass fuel) will have to increase by 70% compared to 2000.

According to the Living Planet Report 2006 and 2008 the planet's resources are being used faster than they can be renewed. Our consumption exceeds the planet's capacity to regenerate by nearly 25% (Hails et al 2006). A comparison between the consumption of each region and its biocapacity shows a clear deficit in most countries; especially those considered "developed" as Figure 25 reveals.

![Biocapacity and Consumption](image.png)

**Figure 25.** Consumption (solid bars) and biocapacity (dotted lines) by region in 2005.


In Figure 25, the height of each bar is proportional to the average consumption per person from a specific region, the width is proportional to its population and the area of dotted lines refers to the total consumption.

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27 It is expected that 90% of the expansion will be through intensification of production (i.e., increased production per unit area), and 10% will come from the expansion of the area, mainly in sub-Saharan Africa and Latin America.

28 The original concept in the study is "Ecological Footprint." To facilitate understanding, this document uses the word consumption rather than ecological footprint. The Ecological Footprint refers to biologically productive land area and water needed to provide ecological resources and services -food, fiber, and wood; land to build and soil to absorb carbon dioxide (CO2) released from fossil fuels.

29 Earth biocapacity is the amount of biologically productive area, farmland, grasslands, forests and fisheries, which are available to meet the needs of humanity.
Even after taking into account its considerable biocapacity, North America has the highest deficit per person: the average person uses 2.7 global hectares more than are available in the region (Hails et al 2008). The European Union (EU) follows with a deficit of 2.4 global hectares per person, which means that this region uses almost twice its own biocapacity. At the other extreme is Latin America, with ecological reserves of 2.4 global hectares per capita, so that the average consumption of a person in this region is less than half the biocapacity available in the region.

Will Latin America be the base for the growing over-consumption of industrialized countries? What is evident is that Latin America is the main region that can supply natural resources and food deficits to other regions. In other words, the pressure on resources in Latin America will increase if production and management systems that seek sustainability of resources are not established against the proposed mitigation measures mentioned in this chapter.

According to Hails et al (2008) over exploitation and depletion of natural resources can result in permanent loss of environmental services. Therefore, a careful management of the biocapacity allows countries to keep their options and prevents future economic and environmental impacts.

9.3 Deforestation Costs

Modern technology has contributed to the expansion of land occupation at unprecedented rates. In the Amazon region only, 84 million hectares of natural ecosystems were lost in the last three decades (Malhi et al. 2008). Indeed, technological expansion is associated with significant loss of ecosystem services. For a better understanding of the magnitude of the situation, deforestation and forest degradation caused by land use change, represent about 20% of annual global emissions of carbon dioxide (CO2) into the atmosphere caused by human activities. However, in some Amazonian countries, it can reach up to 70%.

Estimates of the socioeconomic costs of carbon emissions caused by deforestation vary considerably among different studies discussing the issue. The Stern Report (2006) does not reach a precise figure but it estimates that if a concentration of 550 ppm CO2 in the atmosphere is not passed, as recommended by IPCC, the social cost of carbon emissions would be between US$ 25 to 30/t tons CO2.

In a study on the socioeconomic costs of deforestation in the Brazilian Amazon, Margulis (2003) estimated that under ideal conditions, accounting all goods and services produced, one
forest hectare in the Amazon region will produce US$ 108/year. However, if expected profitability of each type of activity (Table 10) is compared with the values of the land rent for animal production (Table 11), none of the alternative activities to deforestation alone is more profitable than the rental value for animal production. This means that it is more convenient to cut down the forest, install pastures and lease the area than managing the forest, if other socio-environmental aspects are not involved.

Table 10. Value of alternatives to deforestation

<table>
<thead>
<tr>
<th>Activity</th>
<th>US$/ha/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct use value</td>
<td>37,7</td>
</tr>
<tr>
<td>Timber products</td>
<td>28,5</td>
</tr>
<tr>
<td>Non-timber products</td>
<td>0,2</td>
</tr>
<tr>
<td>Ecotourism</td>
<td>9,0</td>
</tr>
<tr>
<td><strong>Indirect value</strong></td>
<td><strong>18,0</strong></td>
</tr>
<tr>
<td>Carbon stocks</td>
<td>18,0</td>
</tr>
<tr>
<td><strong>Option value</strong></td>
<td><strong>21,0</strong></td>
</tr>
<tr>
<td>Bio prospection</td>
<td>21,0</td>
</tr>
<tr>
<td><strong>Existence value</strong></td>
<td><strong>31,2</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>108</strong></td>
</tr>
</tbody>
</table>

Source: Adapted from Margulis, 2003.

Table 11. Rental value of land for animal production

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rondonia</td>
<td>31,1</td>
<td>40,1</td>
</tr>
<tr>
<td>Acre</td>
<td>50,8</td>
<td>49,5</td>
</tr>
<tr>
<td>Amazonas</td>
<td>50,6</td>
<td>-</td>
</tr>
<tr>
<td>Pará</td>
<td>37,6</td>
<td>41</td>
</tr>
<tr>
<td>Tocantins</td>
<td>28,3</td>
<td>33,4</td>
</tr>
<tr>
<td>Maranhão</td>
<td>33,8</td>
<td>34,0</td>
</tr>
<tr>
<td>Mato Grosso</td>
<td>30,8</td>
<td>32,6</td>
</tr>
</tbody>
</table>

Source: Adapted from Margulis 2003 with data from Fundação Getúlio Vargas.

The estimated cost of deforestation by Margulis is in reality, an analysis of opportunity cost. The opportunity cost is the cost of the best alternative (to the project) not exploited. In Payments for Environmental Services (PES) schemes with direct benefits (through the sale of environmental services)\(^{30}\), the gathered benefits by suppliers depends on the difference between the price paid for a specific environmental service (in this case, carbon) and the opportunity cost alternative; i.e. the financial return that the provider fails to receive by adopting an alternative activity that is not detrimental to the maintenance of environmental services in question. The basis for calculating the opportunity cost for forest conservation or other interest system is a cost-benefit analysis of local land uses (including, in the case of forests, logging), which are activities causing GHG emissions due to impacts on vegetation cover of the region.

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\(^{30}\) This is one of the ways in which the local community can benefit from the PES. The other would be through PES positive impacts on the environment or local economy (indirect benefits)
In the Peruvian context, Armas et al. (2009) have estimated the opportunity cost for carbon projects in the Amazon region. The map in Figure 26 illustrates the distribution of opportunity costs at district-level in Peruvian Amazon. The average opportunity cost per tonne of CO2 at the district level is highly variable (S/. 2.95 to S/. 205). The map clearly shows that, in some areas of Madre de Dios, San Martin and Ucayali, the estimated opportunity costs are higher. The high opportunity costs are due, on one hand, to lower amount of carbon in forest vegetation (deforested and degraded areas) and, secondly, the higher income obtained by the intensive agriculture and timber extraction in these regions. In addition, the opportunity costs are also determined based on the proximity to infrastructure such as roads and urban areas. Similarly, low opportunity costs are tested in areas with high carbon stock, but either with limited access to transport or are predominant in pasture, as well as slash and burn agriculture.
Figure 25. Map of opportunity cost for carbon with an average payment S/.12.9 / tCO2-eq
9.4 Five mitigation measures for deforestation and degradation

Five mitigation measures for deforestation and degradation and their implications are described below.

**Measure 1 - Strengthening the National Protected Areas and Indigenous Areas**

The National System of Natural Protected Areas by the State (SINANPE by its acronym in Spanish) contains 63 Natural Protected Areas (NPA), with an extension of 18,043,337.84 ha, equivalent to 14% of the total area of Peru (MINAM 2009).

Considering the global average of carbon stored in tropical forests of 243,18 t C/ha (UNEP 2000 cited by León 2007), the carbon in tropical forests of natural protected areas in Peru is approximately four billion tonnes, and this emphasizes the importance of protecting these areas.

Oliveira et al (2007) found that between 1999 and 2005, deforestation across the Peruvian Amazon increased by an average of 645 km2/year. However, only 1.2% occurred within protected areas, 11% within indigenous territories and 9% in areas of recent forest concessions. This shows the effectiveness of the areas that are under some form of protection to avoid deforestation as shown in Figure 27.

But, what are the costs to the society to maintain protected areas? According to SINANPE’s long-term financial plan (2005-2014) (Ruiz 2005) the optimal cost to maintain a National Reserve is US$ 2.3/ha (Table 12). Assuming that one hectare of forest can store 100 tons of carbon, i.e. 367 t CO2/ha, the cost for the government to keep a ton of CO2 is about US$ 0.006/ha.
Table 12. Maintenance Costs of natural protected areas in Peru

<table>
<thead>
<tr>
<th>Categories</th>
<th>Nº</th>
<th>Extension (ha)</th>
<th>Total US$/ha Category</th>
<th>Annual Average US$ Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Minimum</td>
<td>Optimum</td>
</tr>
<tr>
<td>Forest Protection</td>
<td>4</td>
<td>389.896</td>
<td>3,0</td>
<td>4,0</td>
</tr>
<tr>
<td>Hunting Reserve</td>
<td>1</td>
<td>65.000</td>
<td>6,7</td>
<td>9,5</td>
</tr>
<tr>
<td>National Park</td>
<td>13</td>
<td>8.350.041</td>
<td>0,9</td>
<td>1,3</td>
</tr>
<tr>
<td>Wildlife Refuge</td>
<td>2</td>
<td>11.610</td>
<td>32,0</td>
<td>42,5</td>
</tr>
<tr>
<td>Communal Reserve</td>
<td>10</td>
<td>2.104.070</td>
<td>1,9</td>
<td>2,8</td>
</tr>
<tr>
<td>National Reserve</td>
<td>12</td>
<td>3.714.289</td>
<td>1,6</td>
<td>2,3</td>
</tr>
<tr>
<td>Landscape Reserve</td>
<td>2</td>
<td>288.858</td>
<td>2,9</td>
<td>4,1</td>
</tr>
<tr>
<td>Historical Sanctuary</td>
<td>4</td>
<td>41.279</td>
<td>48,7</td>
<td>65,0</td>
</tr>
<tr>
<td>National Sanctuary</td>
<td>9</td>
<td>662.988</td>
<td>4,3</td>
<td>6,2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>57</td>
<td><strong>15.628.032</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Figure 27. Spatial probability of distribution of forest degradation (blue) and deforestation (red) in the Peruvian Amazon between 1999 and 2005.

Source: Oliveira et al. 2007, Science 317, page 1234. Reprinted with permission from the American Association for the Advancement of Science - AAAS.
Measure 2 – Incentives for the Non-Timber Forest Products (NTFP) Value Chain

Non-timber forest products (NTFP) play an important role in the welfare of people who live in or near forest fragments. NTFP include products from trees outside the forests. The populations with fewer resources, in particular, depend on these products as sources of food, fodder, medicine, rubber, resins and construction materials (FAO 2002). Marketable products help meet their daily needs by providing employment and income, particularly for the rural population, especially women. The products traded internationally, such as bamboo, rattan, cork, rubber, aromatic oils and medicinal plants, contribute to the economic development. However, most NTFP used for subsistence form the basis of small scale family businesses (ibid).

In order to assess the social and economic importance of NTFP, FAO organized consultation workshops on NTFP undertaken as part of FRA 2000, during the year 1996. The information on non-timber products produced in Peru is presented in Table 13.

(FAO (2002) noted that national data on such basic resources, production and trade (quantity and value) of the main products are essential to assess the full contribution to the country's economy by the forestry sector and for purposes of forest management and policy development.

Other points highlighted by FAO from the consultation process include: (1) a serious lack of quantitative data on non-timber/wood forest products, at the national level, (2) there is no information on the resource base of NTFP and its use for subsistence, (3) lack of management of non-timber resources. This phenomenon often leads to unsustainable exploitation levels and the threat of species extinction.

Despite the real and potential importance of NTFPs, national institutions do not perform regular monitoring of these resources, nor an assessment of the economic contribution they bring, unlike products such as wood and crops.
Table 13. Non Timber Forest Products produced in Peru

<table>
<thead>
<tr>
<th>Category</th>
<th>Vernacular name</th>
<th>Species</th>
<th>Amount, economic value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants and plant products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicinal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhatany</td>
<td>Krameria liandra</td>
<td></td>
<td>Production 1991: 20.5 t</td>
</tr>
<tr>
<td>Medicinal plants in general</td>
<td></td>
<td></td>
<td>Amount 1991: US$ 1.8 million</td>
</tr>
<tr>
<td>Barbasco</td>
<td>Lonchocarpus nicou</td>
<td></td>
<td>Production 1991: 70.7 t</td>
</tr>
<tr>
<td>Curare</td>
<td>Chondrodendron tomentosum</td>
<td></td>
<td>Production 1991: 62.8 t</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocoa</td>
<td>Theobroma cacao</td>
<td></td>
<td>Production 1997: 19.000 t</td>
</tr>
<tr>
<td>Palmitos</td>
<td>Euterpe dulis</td>
<td></td>
<td>In 1991: § Production: 677.1 t § Amount: US$ 1.6 million</td>
</tr>
<tr>
<td>Aguaje</td>
<td>Mauritia vinifera Mauritia flexuosa</td>
<td></td>
<td>Production 1991: 11 t</td>
</tr>
<tr>
<td>Umari</td>
<td>Poraqueibasericea</td>
<td></td>
<td>Production 1991: 1 t</td>
</tr>
<tr>
<td>Pijuayo</td>
<td>Bactris gasiapaes</td>
<td></td>
<td>Production 1997: 5.8 t</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carob tree</td>
<td>Caesalpinia spinosa</td>
<td></td>
<td>In 1993: § Production: 2.000.000 t § Amount: 2.400.000 US$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyes and tannins</td>
<td>Tara</td>
<td>Caesalpinia spinosa</td>
<td>In 1993: § Production: 6.000 t § Amount: US$ 6 million</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plants and plant products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tools, crafts and construction material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrizo</td>
<td>Arundo donax</td>
<td></td>
<td>1991: 4.865.093 U</td>
</tr>
<tr>
<td>Caña brava</td>
<td>Ginerium sagittatum</td>
<td></td>
<td>Production 1991: 2.108.200 U</td>
</tr>
<tr>
<td>Caña guada, guayaquil</td>
<td>Guada angustifolia</td>
<td></td>
<td>Production 1991: 104.011 U</td>
</tr>
<tr>
<td>Carricillo</td>
<td>Penisetum sp</td>
<td></td>
<td>Production 1991: 11.800 U</td>
</tr>
<tr>
<td>Junco</td>
<td>Juncus sp</td>
<td></td>
<td>Production 1991: 80.1 t</td>
</tr>
<tr>
<td>Totora</td>
<td>Typha angustifolia</td>
<td></td>
<td>Production 1991: 2.748 t</td>
</tr>
<tr>
<td>Cabuya</td>
<td>Fourcroya americana</td>
<td></td>
<td>Production 1991: 1.7 t</td>
</tr>
<tr>
<td>Toquilla</td>
<td>Carludovica palmata</td>
<td></td>
<td>Production 1991: 20 t</td>
</tr>
<tr>
<td>Pasayo</td>
<td>Erycotheca discolor</td>
<td></td>
<td>Production 1991: 654.9 t</td>
</tr>
<tr>
<td>Ornamental plants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several plants</td>
<td>Diversas especies</td>
<td></td>
<td>In 1991: § Production: 285 kg § Amount: US$ 6.014</td>
</tr>
<tr>
<td>Exudated</td>
<td>Latex</td>
<td>Castilloa ulei y Hevea spp</td>
<td>Production 1991: 62.8 t</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thola (energy)</td>
<td>Lepidophyllum quadrangular</td>
<td></td>
<td>1991: 2.263 t</td>
</tr>
<tr>
<td>Yareta</td>
<td>Azorella sp</td>
<td></td>
<td>Production 1991: 35 t</td>
</tr>
<tr>
<td>Animals and animal products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live animals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perico</td>
<td>Brotogeris pyrthopterus</td>
<td></td>
<td>9.500 U</td>
</tr>
<tr>
<td>Perico esmeralda</td>
<td>Forpus coelestis</td>
<td></td>
<td>3.000 U</td>
</tr>
<tr>
<td>Loro cabeza roja</td>
<td>Aratinga erythrogenys</td>
<td></td>
<td>8.142 U</td>
</tr>
<tr>
<td>Loro frente roja</td>
<td>Aratinga wagleri</td>
<td></td>
<td>1.998 U</td>
</tr>
<tr>
<td>Jilguero común</td>
<td>Carduelis magelianica</td>
<td></td>
<td>600 U</td>
</tr>
<tr>
<td>Picaflor</td>
<td>Myrtis fanny</td>
<td></td>
<td>400 U</td>
</tr>
<tr>
<td>Pacazo</td>
<td>Iguana iguana</td>
<td></td>
<td>4.413 U</td>
</tr>
<tr>
<td>Capones</td>
<td>Tropidurus occipitalis</td>
<td></td>
<td>1.150 U</td>
</tr>
<tr>
<td>Dyes</td>
<td>Cochinilla</td>
<td>Dactylopius cocus</td>
<td>77 t / 6.700.000 (1993) de US$</td>
</tr>
</tbody>
</table>

Source: FAO (2002).
Measure 3 - Sustainable Forestry Management and REDD+

The forest exploitation in tropical forests represents an activity with great economic potential for both companies and traditional populations. It is estimated that in the Brazilian Amazon the annual harvest is about 28 million m³, generating a Gross Domestic Product (GDP) of one trillion dollars (Pokorny and Steinbrenner 2005). However, conventional logging usually has a high impact on the environment. From an economic point of view, the current practices of forest exploitation in the Amazon region are highly inefficient. Due to lack of planning and appropriate techniques, productivity is low and a significant volume of wood is left in the forest or lost in the mills. This requires a greater intervention in the area so as to meet the demand.

To reduce environmental impacts and increase the profitability efficiency, some companies and communities use planned extraction techniques, known as "reduced-impact logging". According to Putz et al. (2008), numerous studies have shown that the implementation of appropriate logging activities, such as planning and using extraction roads and directional logging, including collateral damage from the extraction can be avoided above 50%. The following table provides an overview of the main practices included in reduced-impact logging and its effects on forests.

Table 14. Practice of reduced-impact logging and its effects on forests

<table>
<thead>
<tr>
<th>Practice</th>
<th>Purpose</th>
<th>Effect on forest *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning of long landings</td>
<td>Reduce size and number of log landings</td>
<td>Substantial</td>
</tr>
<tr>
<td>Planning of roads</td>
<td>Reduce length and area of trails</td>
<td>Substantial</td>
</tr>
<tr>
<td>Construction of bridges, water drains</td>
<td>Reduce water impoundments</td>
<td>Moderate</td>
</tr>
<tr>
<td>Planning of skid trails</td>
<td>Reduce soil and tree damage</td>
<td>Large</td>
</tr>
<tr>
<td>Marking of future crop trees</td>
<td>Reduce tree mortality and damage</td>
<td>Substantial/Large</td>
</tr>
<tr>
<td>Directional felling</td>
<td>Reduce tree damage and increase volume</td>
<td>Substantial</td>
</tr>
<tr>
<td>Liana cutting</td>
<td>Reduce collateral damage and gap size</td>
<td>Substantial</td>
</tr>
</tbody>
</table>

* Category of effects: Moderate ≤ 25%; Substantial 25-50%; Large ≤ 50%;

The practice of reduced-impact logging decreases the mortality of trees and has positive effects on carbon sequestration. However, the amount of forest carbon stock exploited not only depends on the type of practice adopted but also, on the intensity of the intervention (timber volume extracted and the time interval between interventions). Although the practice of reduced impact logging has less impact compared to traditional practices, it also promotes
change in the structure and composition of forest and subsequent biodiversity loss, soil compaction and nutrient loss. This process, which is part of a degradation process (see Chapter 3), contributes significantly to GHG emissions. To illustrate this trend, Figure 28 shows a comparison of the carbon stock in forest areas (intact, seized and burned) in the region of Paragominas in Para, Brazil.

Figure 28. Comparison of carbon stock between intact forest areas, exploited and burned in the region of Paragominas, Para, Brazil.

a. Intact; b. Moderately intervened: extraction of 35 m³/ha (5.7 trees/ha); c. Intensely intervened: 69 m³/ha (10 trees/ha); d. Intervened and slightly burned: fire 72% of the area; e. Intervened and intensely burned: three fires 96% of the area.

Source: Adapted from Gerwing and Vidal (2002).

Figure 28 shows the significant reduction in aboveground carbon stock with the increased intervention. The total living biomass on the forest soil moderately intervened had a 20% reduction compared to non-intervened. In the intensely intervened areas this reduction was 48%. In areas that suffered from fire, the carbon stock reduction was even greater. After moderate burning, there was a relatively small reduction in the total living biomass on the soil. This is the result of the relative strength of trees caused by low-intensity fire. However, in the intensely burned area (three fires), there was a drop of 85% of living biomass.
Putz et al. (2008), referring to a study on the impact of improved forest management in a forest in Malaysia, shows that after 30 years, typical cycle of logging period, the stock of carbon in the forest with better management is expected to be at least 30 t C/ha higher than those in the conventionally managed forests (Figure 29). Other issues to be considered when counting the amount of stock and carbon flow from a forest intervened are the type, amount and decomposition rate of dead biomass. Chambers et al. (2000) in a study of decomposition in a forest in central Brazilian Amazonia (near Manaus), has identified that coarse woody fragments were decomposed between 3 and 12 years (mean 5.9 years).

Figure 29. Simulation of carbon stock reduction under two logging practices in Malaysian forest. Source: Putz et al. 2008.

When taking into account socio-economic aspects, the importance of forest management activities by communities must be highlighted. According to Medina and Pokorny (2008), forest management by family farmers has the potential to generate income and employment while contributing to the maintenance of forests. Different from company exploitation, management by family farmers favours greater distribution of revenues between partners, with a more flexible work distribution and consistent with the traditions of the community members.

However, the current reality of exploitation of forest by communities is not very optimistic. An evaluation of eight community forestry management initiatives in the Brazilian Amazon

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The evaluation addressed technical models adopted, the investment required to implement these models, the productivity achieved, and the yields obtained.
supported by IBAMA\textsuperscript{32} / ProManejo\textsuperscript{33}, Medina and Pokorny (2008) confirms that the studied models i) require large investments for their implementation, ii) tend to demand continuing subsidies and have limited financial profitability, and iii) have modest possibilities for producers to generate financial benefits. The authors suggest the need for a thorough review in order to understand forest use by family producers in order to exploit the comparative advantages of family farmers in forest management and regional development.

It is clear that sustainable forest management practices contribute to reducing GHG emissions and also ensure work for people living in the forest, as well as other possible socioeconomic and environmental benefits. Precisely in this context, the formal text of decisions made at COP13 (2007), Bali, Indonesia, contained the REDD+, which includes activities that not only help conserve the forest biomass, but also allow improving it, and becoming carbon sinks. This is ensures that REDD+ includes the role of conservation, sustainable management of forests and increase of carbon stocks in developing countries forests.

Measure 4 - Promoting Agroforestry production for the implementation of REDD++

A REDD++ mechanism must include agriculture, so as to guarantee good practices that ensure non-deforestation. Once accepted as an international mechanism, it is expected that biomass systems and trees outside forests can be also be counted.

Many of the trees outside forests are present in agroforestry systems (AFS). In this section we introduce and use the Agroforestry concept presented by ICRAF in 2008, in which agroforestry is defined as a “dynamic, ecologically sound system of natural resource management. By integrating trees on farms and in the agricultural landscape, it helps diversify and sustain production for enhanced economic, environmental and social benefits” (World Agroforestry Centre, 2008, p.1).

Compared to more simplified systems, agroforestry systems have higher carbon content due to the optimization of vertical and horizontal occupation of the area. Table 15 provides

\textsuperscript{32} The Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) is a federal government institution, linked to the Ministry of Environment of Brazil. Among its main functions is to implement actions of the national environmental policies, such as providing authorization to use the natural resources and control actions, monitoring and environmental control, among others.

\textsuperscript{33} Program Support to Sustainable Forestry in the Brazilian Amazon (ProManejo) promotes the adoption of sustainable forest management systems in the Brazilian Amazon, with emphasis on timber products through strategic actions and demonstration projects.
information on the carbon stock of different land uses investigated by Alegre et al. (2000) in the study sites of Ucayali (*) and Yurimaguas carried out by the ASB Partnership for the Tropical Forest Margins in Peru.

Agroforestry systems could have an important role in carbon sequestration since they act as sinks and also avoid the depletion of existing sinks, and thus reduce pressure on forests. Carbon storage of these systems depends on the type of tree species and planting density used, the organic matter in soil, components’ age, soil types, site characteristics, climatic factors and silvicultural management in place (Ruiz 2002).

The use of the tree component in pasture (silvopastoral systems) and in the middle of other agricultural crops contributes to greater carbon storage in the system compared with simpler systems. In some agroforestry systems in Central America carbon sequestration rates range from 0.1 to 3.6 tC/ha/year (Table 16).

Table 15. Carbon stock of different land uses in Ucayali* and Yurimaguas, Peru

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Systems/Components</th>
<th>C in aboveground biomass (t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual crops</td>
<td>Rice</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Yucca</td>
<td>3*</td>
</tr>
<tr>
<td>Pastures</td>
<td>Degraded</td>
<td>2 a 5*</td>
</tr>
<tr>
<td></td>
<td>Improved</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Rubber</td>
<td>126*</td>
</tr>
<tr>
<td>Perennial crops</td>
<td>African Palm</td>
<td>41*</td>
</tr>
<tr>
<td>SAFs multistrata</td>
<td>Mahogany, Columbina glandulosa, Bactris, Inga, Coffee and centrosem</td>
<td>59</td>
</tr>
<tr>
<td>Fallow</td>
<td>3 years</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>5 years</td>
<td>21*- 44</td>
</tr>
<tr>
<td></td>
<td>15 years</td>
<td>126*-185</td>
</tr>
<tr>
<td>Managed forests</td>
<td></td>
<td>123*- 294</td>
</tr>
</tbody>
</table>

Source: Alegre et al. (2000)
Table 16. Agroforestry systems in Central America as carbon sinks in aboveground biomass

<table>
<thead>
<tr>
<th>Agroforestry System Type</th>
<th>Species</th>
<th>Density (tree/ha)</th>
<th>Rotation (years)</th>
<th>Production firewood (t/ha)</th>
<th>Fixation rate (tC/ha/year)</th>
<th>Fixation (t C/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shade trees</td>
<td><em>Gliricidia sepium</em></td>
<td>330</td>
<td>30</td>
<td>101,4</td>
<td>0,7</td>
<td>51,6</td>
</tr>
<tr>
<td></td>
<td><em>Inga densiflora</em></td>
<td>400</td>
<td>20</td>
<td>42,8</td>
<td>0,5</td>
<td>24,3</td>
</tr>
<tr>
<td></td>
<td><em>Mimosa scabrella</em></td>
<td>650</td>
<td>2</td>
<td>18,3</td>
<td>2,0</td>
<td>24,9</td>
</tr>
<tr>
<td>Trees in farms</td>
<td><em>Agnus acuminata</em></td>
<td>35</td>
<td>30</td>
<td>18,3</td>
<td>0,1</td>
<td>25,0</td>
</tr>
</tbody>
</table>

Source: Kursten and Burschel 1993.

Ávila (2000) estimates that silvopastoral systems in Central America can sequester between 0,4 to 4,3 Gt C/year. Taking into account this contribution, the National Forestry Financing Fund (FONAFIFO by its acronym in Spanish) from Costa Rica, has determined that the program of Payments for Environmental Services (PES), plus protection activities and forest management and reforestation, also includes scattered trees outside forests present in agroforestry systems. As seen in Table 17, the scheme proposes to pay US$ 1.3 per tree planted within the system and also rewards producers that allow natural tree regeneration in pastures.

Table 17. Type of activities, values per hectare and payment procedure of PES scheme in Costa Rica

<table>
<thead>
<tr>
<th>Activities</th>
<th>Value US$/ha</th>
<th>YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Forest Protection</td>
<td>64</td>
<td>20%</td>
</tr>
<tr>
<td>Forest Management</td>
<td>50</td>
<td>20%</td>
</tr>
<tr>
<td>Reforestation</td>
<td>816</td>
<td>50%</td>
</tr>
<tr>
<td>Established Plantations</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>Agroforestry</td>
<td>1.3*</td>
<td>85%</td>
</tr>
<tr>
<td>Natural Regeneration(Pastures)</td>
<td>41</td>
<td>20%</td>
</tr>
</tbody>
</table>

* Value to pay for each planted tree

Source: FONAFIFO 2007

Brack Egg (1994) identifies many successful agroforestry experiences in the Amazon basin as in the case of riverine dwellers and their calendar for the use of varzeas; indigenous people and the domestication of native fruits of the forest and soil classification; and settlers and methods of nutrient recycling. In a review of experiences for the rehabilitation of degraded areas in the Peruvian Amazon, Meza et al (2006) have identified potential technologies used
in the region. Most of these initiatives are agroforestry systems. Table 18 illustrates some of these initiatives.

### Table 18. Rehabilitation technologies of degraded areas promoted in the Peruvian Amazon

<table>
<thead>
<tr>
<th>Technology</th>
<th>Species used</th>
<th>Spatial arrangement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reforestation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native species</td>
<td>Associations of mahogany, cedar, tornillo, shihuahuaco, moena, cumala, bolaina, capirona, sangre de grado, etc.</td>
<td>5 x 5 m, 8 x 10 x</td>
</tr>
<tr>
<td></td>
<td>Associations of bolaina, cedro, moena y tornillo</td>
<td>5 x in three sticks</td>
</tr>
<tr>
<td></td>
<td>Associations of bolaina, ceda, moena and tornillo</td>
<td></td>
</tr>
<tr>
<td>xotic species</td>
<td>Pines, eucalyptus trees in mono-specific clumps</td>
<td>5 x 5 m, 10 x</td>
</tr>
<tr>
<td></td>
<td>Albizia, eucaliptos</td>
<td>5 x 5 m, 10 x in clumps and/or boundaries</td>
</tr>
<tr>
<td><strong>Agroforestry systems</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uña de gato, bolaina, sangre de grado</td>
<td>Uña gato: 8 x 2 m, Bolaina: 8 x 8 m, Sangre grado: 8 x</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coffee, frijol de palo, guava, eritrina</td>
<td>Café: 2 x 1.5 m, Frijol palo: 2 x 1.5 m Guaba: 8 x</td>
</tr>
<tr>
<td></td>
<td>Coffee, guava, timber: cacapana, ingaina, palippero, pinsha caspi, pucapuño, shaina, fruit</td>
<td>Coffee: 2 x 1.5 m, Guaba: 8 x 8 m, Timber: 2-row strips and 4 x</td>
</tr>
<tr>
<td></td>
<td>Cocoa, citrus, guava, capirona bolaina, sangre de grado</td>
<td>Cacao: 3 x 3 m, Guaba: 8 x 8 m, Capirona, bolaina, sangre grado: 6 x</td>
</tr>
<tr>
<td></td>
<td>Coffee, guava, laurel, eritrina</td>
<td>Coffee: 2 x 1.8 m, Guaba: 6 x 6 m, Laurel: 6 x 6 m, Eritrina: 10 x</td>
</tr>
<tr>
<td><strong>Forest management</strong></td>
<td>Management of natural regeneration of bolaina, auca atadijo, capirona + enrichment of purmas with capirona, marupá etc.</td>
<td>--</td>
</tr>
</tbody>
</table>

Source: Meza et al. 2006.

If there are good agroforestry experiences, then why are they not being adopted?

According to Nery and Uzeda (2009), the reason for adoption is based on the ability of farmers to adapt technology to their conditions, lower risks and demand for labor, generating income and increasing efficiency. According to Börner (2009), the agroforestry systems (AFS) can be economically competitive compared to other production systems in the Amazon, but these are not widely disseminated in the region. He pointed out a number of factors affecting their adoption such as: high transport and transaction costs, price fluctuations primarily in local markets that are less diversified, associated with other risks (e.g. accidental

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34 For Scherr and Muller (1991) Agroforestry adoption is the continued use of new combinations of trees / crops / pasture / animals and management practices, and distinguishes three levels: (a) readiness to try and establish in the field the new practice or technology, (2) willingness to maintain, and manage the new system and, (3) extension of the new system to other parts of the estate or restoration after harvest, accepting the technology as part of their production system.
fires), reduce the competitiveness of AFS compared to other production systems. These, combined with the inexperience of many farmers in forest operations and the lack of integration of AFS in the rural extension plans, are the main reasons for the non-adoption. Some of the main factors affecting the AFS adoption are presented in Table 19.

Table 19. Factors influencing the adoption of AFS and its situation in the Amazon

<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact on adoption</th>
<th>Situation in the Amazon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preference</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender (% male in the family)</td>
<td>+</td>
<td>&gt;50%</td>
</tr>
<tr>
<td><strong>Biophysical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil (quality)</td>
<td>+</td>
<td>Large areas suitable for AFS</td>
</tr>
<tr>
<td>Slope</td>
<td>+</td>
<td>Little or no inclination</td>
</tr>
<tr>
<td><strong>Resource Allocation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area size</td>
<td>+/-</td>
<td>Relatively large properties</td>
</tr>
<tr>
<td>Durable goods (Lifespan)</td>
<td>++</td>
<td>Variable</td>
</tr>
<tr>
<td>Credit</td>
<td>++</td>
<td>Limited access</td>
</tr>
<tr>
<td>Legal framework of the area</td>
<td>+</td>
<td>Often unregulated</td>
</tr>
<tr>
<td>Product prices</td>
<td>++</td>
<td>Competitive (eg cacao, coffee)</td>
</tr>
<tr>
<td>Distance to market</td>
<td>-</td>
<td>Large distances</td>
</tr>
<tr>
<td>Experience (forestry)</td>
<td>++</td>
<td>Most inexperienced</td>
</tr>
<tr>
<td>Rural extension, technical assistance</td>
<td>++</td>
<td>Limited access, low price for AFS</td>
</tr>
<tr>
<td>Participation in groups</td>
<td>+</td>
<td>Low levels of community organization</td>
</tr>
</tbody>
</table>


Like any other land use activity, AFS have biotic and abiotic risks caused by human action. However, as this is a diverse system that uses the tree component as part of it, usually the risk of using it is perceived/considered further by the producers. According to Borner (2009) there are three major risks related to the production of AFS in the Amazon: (1) production risks (variability of physical performance and final product quality, natural and depending on the weather and pests or diseases), (2) market risks (price variability, mainly for AFS products based on local demand, regional and international), (3) complete or partial destruction of AFS

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35 The biotic risks are related to pests and diseases; abiotic risks to natural adversities such as long droughts, floods, strong winds, wildfires, etc.; and anthropic risks, neighbor invasions to the collection of timber and firewood, and especially fire (accidental and intentional).
installed by accidental fires in areas with predominantly slash and burn agriculture and livestock.

**Measure 5 - Strengthening the environmental governance and governability**

Democracy in Latin America is young and very well-rooted, much of the population is immersed in poverty and there is a huge uneven income distribution (Barriga et al, 2007). Poverty in the region is further aggravated by corruption  which is weakening the moral authority of local leaders and the ineffectiveness of policies to address inequality, which directly affects the environment (ibid).

Furones (2008) in an analysis of the governance of the forestry sector in Honduras, describes lack of compliance with laws and institutions, common in Latin American countries where violations of the law are rarely punished and are not reported by the forest authorities, either because they lack resources or are not willing, or even fear of revenge. Corruption is common and prevents monitoring of these cases.

As part of efforts to mitigate these situations, the environmental governance and governability in the region should be strengthened. However, the first step is to distinguish governance and governability, because understanding the problems and proposing solutions must respect this distinction. Often decision makers can not differentiate between governance and governability (Bazzani 2006 cited by Loyo 2002). This situation occurs because of the absence of established and universally accepted concepts.

There are many attempts to etymologically distinguish these concepts, here a distinction made by Barriga et al (2007) is used, where governance is a way of governing, how people organize themselves to make decisions and implement activities, procedures and regulations that govern their relations, agreements and transactions. On the other hand, governability refers to the ability to govern and, therefore, is a quality of the architecture of governance.

In the environmental context, governability is the ability to process and implement decisions to improve environmental conditions in the landscape (Barriga et al 2007). According to DAR

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36 Corruption costs the country about 20% of its gross domestic product (Barriga, 2007 quoting the World Bank)
37 According to Altman (2001, cited by Barriga et al 2007), "if we understand the governments as networks of political institutions, then governability would be the ability to process and implement institutional policy decisions."
38 According to Barriga et al (2007), all social organizations have a governance architecture that enables them to operate.
(2010), governability is when the government has the ability to legitimatimize policies and implement them, which implies that the interaction with the population has generated confidence and justice relationships primarily as channels for satisfying the needs and problems of the society.

The example given by Loyo (2002, cited by Barriga 2007), contributes to understanding the difference between governance and governability. According to the author, in a context where one or more authorities or policy decisions have lost the legitimacy to exercise power, whether temporary or permanent, this is a "crisis of governability". However, the system (shape, way, scheme or architecture) of the government, their way of making decisions and their implementation is still ongoing and is socially accepted. In this case, we are witnessing a "crisis of governability" and not a "crisis of governance."

Following are four initiatives which are being implemented and aim to strengthen the instruments used by the environmental governance structure, which in turn are intended to provide governability for reducing deforestation and forest degradation.

**Case 1. FLEG20 Project, Colombia.** The Forest Governance Project / FLEG20 Forest, supported by the European Union, has proposed to improve the conditions of legality and governance, contributing to a more sustainable forest management and increase in the production and marketing of forest resources of small and medium producers in two regions of country.

To meet its objectives, the ones responsible, among other things, propose to assess governance and adapt the control measures of the results. This action is realized through a regional job board composed of environmental authorities and representatives of the production sector, which periodically evaluate the results and impacts in the implementation of the rules, regulations and controls.

The project develops actions to meet its objectives which include to:

- Evaluate and update management rules, harvesting and forest resource mobilization.
- Establish regulatory dialogue on forest policy and stakeholders.
- Establish Regional Forest Forum for analysis and debate of policies and regulations for the sector.
- Evaluate options and define the structure of a forest extension service (public-private).
- Develop a format and institutionalize the forestry extension service.
✓ Conduct training and accreditation process for extensionists and strengthen grassroots organizations.
✓ Establish and operate two public-private offices for information and advice to target groups and other stakeholders for marketing and technological development.
✓ Negotiate and formalize vertical and horizontal integration partnerships of productive chains among target groups.
✓ Promote and facilitate the establishment of financial mechanisms for small and medium timber and forest enterprises.

The project implementation provided the foundation for legality of institutional and community culture in the forest chain.

**Case 2. National plan on climate change, Brazil.** Presented in September 2008, the National Plan proposes the country's commitment in decreasing averages of deforestation in all ecosystems, measurable every four years to reach the so-called "zero illegal deforestation."

The document gathers the actions that the country intends to put into practice to combat global climate change and to create internal conditions or face the consequences. Among the actions related to forest governance and governability are:

✓ Implement the National Register of Public Forests;
✓ Establish land use planning, monitoring (high precision) and control, and promotion of sustainable productive activities;
✓ Increase auditing;
✓ Create the Amazon Fund - established in 2008, national and international resources;
✓ Create the Climate Fund - creation submitted to Congress for, among other purposes, financing actions to combat deforestation;
✓ Promote forest harvesting - a minimum price policy and set for seven extractive products to strengthen their production chains;
✓ Review the requirements for access to credit to make the reforestation activities more attractive (including areas for charcoal production);
✓ Encourage restoration of degraded areas of ‘legal reserve’ and permanent preservation;
✓ National Forest Inventory;
✓ Develop applications for forest products in energy production;
✓ Establish forest concessions;
✓ Combat the consumption of timber from illegal logging in the civil construction industry.
Case 3. Construction of forest governance architecture, Nicaragua. To strengthen forest governance in Nicaragua, local workshops and one national workshop on ‘Governance in the Nicaraguan Forestry Sector’ were held. During these workshops it was possible to demonstrate the wide interest of the Nicaraguan forest sector actors to contribute to the achievement of a consensus in the forestry sector as part of the effort in the fight against poverty (Modley and Solorzano, 2006). Participants suggested the following forest governance measures for the country:

✓ Forestry development strategy along the productive forest chain;
✓ Analysis and review of the administrative arrangements and simplification of procedures;
✓ Ownership and implementation of forestry and environmental legal framework;
✓ Implementation of the decentralization process and lack of concentration of the forestry component implementation;
✓ Arrangement mechanism operation with civil society;
✓ Linking and exchange of experiences between regions with forest resources;
✓ Development of the strategy for the implementation of land use on forest territory.

Case 4. Project to promote transparency in the forestry sector, Peru. This project advocates support for local environmental and human rights defenders and monitor transparency and defend issues relevant to local communities in Peru, which is led by the NGO Environmental Law and Natural Resources (DAR). The project objectives are: (1) To contribute to improving forest sector governance by monitoring and tracking indicators of transparency, public participation and access to information for a better administration and management of forests in Peru; (2) To promote incorporation of the principles of transparency, participation and access to public information in public entities with responsibility for forestry at national and regional level; (3) To articulate a consortium/network of social organizations, business associations union, indigenous and others who are interested in joining a community monitoring system to monitor the progress of the indicators of transparency and governance in the forestry sector and to collaborate in their advocacy efforts on public policies related or affecting the forestry sector and the National Forest Patrimony.

In order to meet these objectives, the project has developed the following strategies:

✓ Strengthen the capacities of forestry institutions to incorporate the principles of transparency in public management and governance in the forestry sector.

39 For further information about the project see: http://www.dar.org.pe/transparenciaforestal/inicio.html
Strengthen the capacities of incidence of civil society organizations to improve transparency and access to information in the forestry sector.

Promote forestry oversight in order to reinforce its monitoring and control in the forestry sector.

Promote discussion, consensus building and implementation of a National Forest Policy.

Promote the conservation, protection and management of forest resources.

In the 2009 Annual Report on Transparency in the Peruvian Forestry Sector, the state of access to information and transparency in public organizations of the forestry sector in Peru is assessed. This report proposes some recommendations that aim at strengthening the forest sector governance, such as:

Ensure effective rights to citizen participation in the forestry sector, as transparency and access to public information in the forestry sector are significantly lower than national averages.

The public organizations in the forest sector should identify information that is periodically requested by various actors to take a proactive action and make this information freely and easily available.

Create incentives for public forestry organizations and their officials, to develop culture of transparency and accountability.

Support public and civil society organizations in developing forestry skills and competencies.

There is no doubt that all cases presented here are moving towards the same direction of promoting reform in the environmental policy and legal framework, to make the application of the law more effective, providing transparent and accessible information relating to the subject, decrease corruption cases and market distortions.

Thus, it should, wherever possible, take into account the principles of good forest governance: a) transparency, 2) participation, 3) accountability, 4) coordination and 5) capacity (Brito 2009 cited by DAR 2010).

Barriga et al (2007), in an analysis of ten experiences in five countries showed that governance tends to increase dialogue between sectors and reduce the generation of conflict. It also serves as a platform for dialogue on issues of concern for the region: poverty, loss of
biodiversity, land tenure, human rights, equity, pollution, water scarcity and vulnerability reduction, which has political precedents and has scaled to a higher hierarchical level.

Strengthening environmental governance can be regarded as the main axis for mitigation of deforestation and forest degradation. Without the existence of an appropriate governance and governability architecture, mitigation actions will not be effective in the long term.

9.5 Participation in the carbon market

This section provides an overview of the current state of carbon markets and opportunities for obtaining profits from the RED (REDD, REDD+, REDD+++) schemes in Latin America.

**Formal Carbon Market**

Following the signing of the Kyoto protocol in 2005, regulated carbon markets governed by agreements between countries became a reality. This allowed companies and governments to sell emission reduction units to meet binding commitments to reduce GHG emissions. To ensure the fulfillment of the Kyoto Protocol, flexibility mechanisms were created under the UN Framework Convention on Climate Change (UNFCCC), including the Clean Development Mechanism (CDM), which is the only scheme that allows removal and/or GHG emission reductions made in developing countries.

**Four years of forestry CDM**

After more than four years of enforcing the Kyoto Protocol, there are only 15 forestry CDM projects registered with UNFCCC. None of these are small scale.  

The amount of forestry projects is much lower compared to energy CDM projects. This difference is due, to among other things, the inclusion of the temporary certificates (tCRE y lCRE) in the European Emissions Trading Scheme (ETS), driving away investors. It highlights the lack of approved methodologies, risks related to projects of land use, and the delay until the trees reach a suitable size for the verification of the removal.

However, it should be noted that since it began, participation of forestry CDM projects in the

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40 The small-scale projects are those that sequester up to 16,000 tonnes of CO2 per year (on average over five years) and which activities are developed and implemented by communities and individuals of low income, classified by the government of the country where project is developed.

41 European market, “European Union Emissions Trading Scheme”
Kyoto market is limited to 1% of the total emission reductions in the base year (1990) for the first period. This 1% is equivalent to 137,283,060 tCO2.

Table 20. CDM forestry projects registered

<table>
<thead>
<tr>
<th>Country</th>
<th>Project</th>
<th>(t CO₂/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin</td>
<td>25,795</td>
</tr>
<tr>
<td>Republic of Moldova</td>
<td>Moldova Soil Conservation Project</td>
<td>179,242</td>
</tr>
<tr>
<td>India</td>
<td>Small Scale Cooperative Afforestation CDM Pilot Project Activity on Private Lands Affected by Shifting Sand Dunes in Sirsa, Haryana</td>
<td>11,596</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Cao Phong Reforestation Project</td>
<td>2,665</td>
</tr>
<tr>
<td>India</td>
<td>Reforestation of severely degraded land mass in Khammam District of Andhra Pradesh, India under ITC Social Forestry Project</td>
<td>57,792</td>
</tr>
<tr>
<td>Bolivia</td>
<td>Carbon sequestration through reforestation in the bolivian tropics by smallholders of &quot;The Federación de Comunidades Agropecuarias de Rurrenabaque (FECAR)&quot;</td>
<td>4,341</td>
</tr>
<tr>
<td>Uganda</td>
<td>Uganda Nile Basin Reforestation Project No.3</td>
<td>5,564</td>
</tr>
<tr>
<td>Paraguay</td>
<td>Reforestation of croplands and grass lands in low income communities of Paraguari Department, Paraguay</td>
<td>1,523</td>
</tr>
<tr>
<td>Brazil</td>
<td>Reforestation as Renewable Source of Wood Supplies for Industrial Use in Brazil</td>
<td>75,783</td>
</tr>
<tr>
<td>China</td>
<td>Afforestation and Reforestation on Degraded Lands in Northwest Sichuan, China</td>
<td>23,030</td>
</tr>
<tr>
<td>Peru</td>
<td>&quot;Reforestation, sustainable production and carbon sequestration project in José Ignacio Távara’s dry forest, Piura, Peru&quot;</td>
<td>48,689</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>Humbo Ethiopia Assisted Natural Regeneration Project</td>
<td>29,343</td>
</tr>
<tr>
<td>Albania</td>
<td>Assisted Natural Regeneration of Degraded Lands in Albania</td>
<td>22,964</td>
</tr>
<tr>
<td>India</td>
<td>The International Small Group and Tree Planting Program (TIST), Tamil Nadu, India</td>
<td>3,594</td>
</tr>
<tr>
<td>Colombia</td>
<td>Forestry Project for the Basin of the Chinchiná River, an Environmental and Productive Alternative for the City and the Region</td>
<td>37,783</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>529,704</strong></td>
</tr>
</tbody>
</table>

Source: UNFCC, CDM website

10 out of 15 registered projects were registered last year and 4 in the beginning of this year. This shows intensification in the process of registration of CDM forestry projects in the past two years. With this, it is expected to record a large number of projects over the next two years of the Kyoto compliance period. Note that only one of the projects is being developed in Peru.
Opportunities in the voluntary carbon markets

In addition to the Kyoto market, there are other markets that generate opportunities to supplement income from agroforestry and forestry (reforestation or conservation) through revenues from carbon certificates. The market that is currently negotiating these certificates is called voluntary market represented by the ‘Chicago Climate Exchange’ (CCX). Additionally, there are other markets that currently do not represent an opportunity for Latin American forestry projects, but rather serve as models for other markets, such as the parallel Australian market “New South Wales GHG Abatement Scheme”. The voluntary market is generated due to the non-participation of Australia and the United States in the Kyoto process, in which these countries promote their own systems of policy/regulations and create their own carbon markets.

Depending on market and credit rates, prices may vary. One ton of carbon can cost between US$ 3 to US$ 20. Table 21 presents a comparison of trading volume in each market (regulatory and voluntary).

Carbon markets in Latin America

In the same year when the Kyoto Protocol (2005) came into force; platforms were created for Latin American market. The first was marked by the Rio de Janeiro stock exchange, controlled by the Brazilian Mercantile and Futures Exchange (BM&F), which has begun its market of carbon credits, with the formation of a register of buyers and sellers. Similarly, in the same year, Argentina signed a decree that creates the Argentine Carbon Fund (FAC), with projects to generate gas emission reductions.

Table 21. Volume traded in each market (regulatory and voluntary), 2007 and 2008

<table>
<thead>
<tr>
<th>Market</th>
<th>Volume (MtCO2e)</th>
<th>Value (millions) US$</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voluntary–Over the counter (OTC)</td>
<td>42,1</td>
<td>54,2</td>
<td>258,4</td>
<td>397</td>
</tr>
<tr>
<td>CCX</td>
<td>22,9</td>
<td>69,2</td>
<td>72,4</td>
<td>307</td>
</tr>
<tr>
<td>Total Voluntary Market</td>
<td>65,0</td>
<td>123,4</td>
<td>330,8</td>
<td>704</td>
</tr>
<tr>
<td>EU ETS</td>
<td>2.061</td>
<td>2.982</td>
<td>50.097</td>
<td>94.972</td>
</tr>
<tr>
<td>CDM</td>
<td>791</td>
<td>1.023</td>
<td>12.877</td>
<td>21.700</td>
</tr>
<tr>
<td>Joint Implementation</td>
<td>41</td>
<td>8</td>
<td>499</td>
<td>2.340</td>
</tr>
<tr>
<td>New South Wales</td>
<td>25</td>
<td>31</td>
<td>224</td>
<td>152</td>
</tr>
<tr>
<td>Total Regulated Market</td>
<td>2.918</td>
<td>4.045</td>
<td>63.697,0</td>
<td>117.058</td>
</tr>
<tr>
<td>Total Global Markets</td>
<td>2.983</td>
<td>4.168,4</td>
<td>64.028</td>
<td>117.762</td>
</tr>
</tbody>
</table>

42 www.forest-trends.org; www.ecosystemmarketplace.com; www.katoombagroup.org
44 http://www.ambiente.gov.ar/?idseccion=111
Examples of forest carbon project in the Voluntary Market in Peru

In the Peruvian Amazon one of the successful forest carbon projects in the country is the Project on: Reforestation of grasslands in Campo Verde with native species. Based on estimates of carbon stock, the project, plans to sequester about 151,000 tons of CO2-eq over 30 years of its life cycle (VCS 2008). To achieve this objective, the project reforested 747.5 hectares of degraded pastures with native commercial tree species. These species are Mahogany (**Swietenia macrophylla**), Tahuari (**Tabebuia serratifolia**), Marupa (**Simarouba amara**) and Shihuahuaco (**Dipterix odorata**). To facilitate early recovery of degraded soils Guava trees were used (**Inga edulis**) to incorporate organic matter, increase soil nutrients and provide windbreaks and shade for timber species (VCS 2008).

![Figure 30. Location map of the project ‘Campo Verde’, Pucallpa, Peru. Source: VCS, 2008.](image)

### REDD projects in Latin America

Important initiatives were launched under the REDD framework as shown in Table 22 while awaiting an international definition in the UNFCCC context with the inclusion or not of projects that promote forest conservation.

In addition to the four Peruvian projects listed in the table\(^{45}\), Cenamo et al. (2009) indicated an ‘early stage’ project ‘Certified Forestry Community for projects as an alternative to deforestation in three indigenous communities in Ucayali region, Peru.’ The project has a total area of 35,000 hectares in Ucayali region and aims to create a flow of cash to pay

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\(^{45}\) Out of these four, only one project has been certified with the CCB standards and traded its first 40,000 tons of CO2-equivalent through the voluntary market for US$ 7 per ton (PointCarbon, 2010).
communities for the conservation of forests, since yields of forest management are not sufficient to ensure control and monitoring areas. It also aims to increase environmental awareness of communities and promote sustainable agroforestry and agricultural practices. Each community is responsible for implementing the REDD project in its territory.

### Potential carbon funds for the region

There are institutions operating as a fund for forestry projects to reduce GHG emissions and carbon sequestration and most of them do not focus on a particular region. International funds are represented by government carbon funds, private carbon funds, funds from the World Bank or multilateral funds. The main international organizations that operate as funds for forestry projects in Latin America are presented in Table 23.

#### Table 22. List of REDD initiatives in Latin America

<table>
<thead>
<tr>
<th>Country</th>
<th>Region</th>
<th>Project</th>
<th>Area (ha)</th>
<th>Period (years)</th>
<th>REDD (tCO2e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolivia</td>
<td>Parque Noel Kempff, San Ignacio, Santa Cruz</td>
<td>Climate Accion Project developed at the National Park Noel Kempff (PAC-NK)</td>
<td>642.458</td>
<td>30</td>
<td>5.800.000</td>
</tr>
<tr>
<td>Brazil</td>
<td>8 municipalities of Acre</td>
<td>Carbon Project Acre - Payments for Environmental Services</td>
<td>5.800.000</td>
<td>15</td>
<td>62.500.000</td>
</tr>
<tr>
<td></td>
<td>Municipality Breves, Marajó island, Pará.</td>
<td>REDD Project Ecomapuá</td>
<td>94.171</td>
<td>20</td>
<td>6.000.000</td>
</tr>
<tr>
<td></td>
<td>Transamazonian highway between the cities of Senator Joseph Porfirio, Pacajá and Anapu, Pará</td>
<td>Avoided Deforestation in small rural properties in the region of Trans-Amazonia Roas</td>
<td>31.750</td>
<td>10</td>
<td>3.136.953</td>
</tr>
<tr>
<td></td>
<td>Municipality Antonina e Guaraqueçaba, Paraná</td>
<td>Conservation Project on Sustainable Development Reserve Juma</td>
<td>589.612</td>
<td>44</td>
<td>189.000.000</td>
</tr>
<tr>
<td></td>
<td>Municipality Antonina e Guaraqueçaba, Paraná</td>
<td>Conservation of the Atlantic, or Pilot Reforestation Project in Antonina and Action Project of global warming in Antonina</td>
<td>18.600</td>
<td>40</td>
<td>384.264</td>
</tr>
<tr>
<td></td>
<td>Indigenous area Sete de Setembro. Municipality of Cacual e Espigão d’Oeste, Rondonia e Rondolândia, Mato Grosso</td>
<td>Suruí Project</td>
<td>248.000</td>
<td>44</td>
<td>16.500.000</td>
</tr>
<tr>
<td></td>
<td>Area de Protecao Ambiental (APA) Serra do Lajeado, Taquareussu city council, Tocantins</td>
<td>Génesis REDD Project</td>
<td>1.076</td>
<td>20</td>
<td>57.389</td>
</tr>
<tr>
<td>Ecuador</td>
<td>Country</td>
<td>REDD project in the forest of the Maya Biosphere Reserve</td>
<td>4.000.000</td>
<td>7</td>
<td>190.000.000</td>
</tr>
<tr>
<td>Guatemala</td>
<td>4 municipalities of Petén</td>
<td>REDD project in the forest of the Maya Biosphere Reserve</td>
<td>600.000</td>
<td>20</td>
<td>20.000.000</td>
</tr>
<tr>
<td></td>
<td>Municipalities of La Tinta and Purulhá, Baja Verapaz and Alta</td>
<td>Program for the environmental service from carbon sequestration in biosphere reserve Sierra de las Minas</td>
<td>102.939</td>
<td>20</td>
<td>1.900.000</td>
</tr>
<tr>
<td></td>
<td>Municipalities of Libertad, Petén,</td>
<td>Avoided deforestation in the Sierra del Lacandon National Park</td>
<td>171.300</td>
<td>20</td>
<td>1.237.557</td>
</tr>
<tr>
<td>Paraguay</td>
<td>Mbaracayu, Floresta Natural Reserve, Ygatimi, Canindey</td>
<td>Conservation and Sustainable Use of the biodiversity in Mbaracayú</td>
<td>64.400</td>
<td>35</td>
<td>13.000.000</td>
</tr>
<tr>
<td>Peru</td>
<td>Municipalities of San Martin and Amazonas</td>
<td>Reforestation and avoided deforestation in the protected</td>
<td>425.405</td>
<td>30</td>
<td>4.243.582</td>
</tr>
<tr>
<td>Institution</td>
<td>Initiative</td>
<td>Type of Fund</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------</td>
<td>----------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bio Carbon Fund</td>
<td>World Bank</td>
<td>Government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European Carbon Fund</td>
<td>Caisse des Dépots and banco Fortis</td>
<td>Private</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan Carbon Finance - JCF46</td>
<td>Japanese Bank</td>
<td>Private</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KFW Carbon Fund</td>
<td>KFW Bank in cooperation with the German government</td>
<td>Government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNDP MDG Carbon Facility50</td>
<td>UNPD</td>
<td>Multilateral</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 23. International organizations operating as funds for carbon projects

9.6 Conclusions

The voluntary carbon market is far ahead of the regulated market. Efforts to make individual projects part of a bigger and more efficient national strategy for REDD+ are urgently needed. Financial mechanisms exist and are available for well designed projects, however, without an appropriate governance and governability architecture, no mitigation action will be effective in the long term.

9.7 References


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46 http://www.biocarbonfund.org
47 http://www.europenacarbonfund.com
48 http://www.jcarbon.co.jp
49 http://www.kfw.de/carbonfund


10. Conclusions and the way forward (Velarde SJ and Ugarte-Guerra J)

- Reducing emissions in all land uses (REDD++ or REALU) is a potential mechanism that can be integrated into the carbon market, however, there are still methodological and legal implications which should be resolved to promote its incorporation into the market.

- The definitions of forest (at national level) and degradation and deforestation (in the international context) have implications for carbon accounting at the national level. Moreover, a comprehensive system of carbon accounting that considers all land uses could obviate the need to develop these definitions in detail.

- The Peruvian legislation does not confer ownership over forests. The State is responsible for managing these resources as well as the goods and services that they provide. There is a gap on the regulation of environmental services that must be solved before the imminent development of REDD projects by private entities and NGOs. In particular, the issue of equitable distribution of benefits to avoid potential conflicts should be addressed. Legislative initiatives primarily related to forests and environmental services must be updated for implementation.

- The main driver of deforestation in Peru is shifting cultivation, however, this is not erratic or random. It is related to well-identified underlying drivers, which have a direct relationship with other political and economic variables as investment in infrastructure. Thus, these considerations are particularly important in determining the areas under greatest threat of deforestation. Better planning between government agencies and the private sector, national and international levels, could help to articulate a plan for sustainable development in the Peruvian Amazon.

- There are over expectations about the potential benefits that the carbon market could generate, especially in smallholder farms. An information campaign addressed to these stakeholders is particularly necessary, using accessible formats and languages. This would also promote financial mechanisms for the carbon sales that are inclusive and not exclusive.

- Several state institutions have different functions and overlapping roles with respect to natural resource management, including its regulation and control. Some
could contribute positively to the implementation of REDD+ schemes while others could hinder the process. Whether a post-Kyoto mechanism is adopted or not, there is an urgent need at national level to assess the existing institutional framework.

- Definitions of the type of financial mechanism (REDD, REDD+ or REDD++) to reduce degradation and deforestation in the international context have implications for carbon accounting. Thus, by including trees on farms for example, these would potentially have much more carbon than pure agriculture. The same applies for trees in urban areas of Amazon towns. The image resolution, available field information and clear rules of the categories of land use involved, are key for the measurement of carbon.

- To make effective the action of climate change mitigation by reducing emissions from deforestation and degradation, an appropriate environmental governance and governability architecture is needed.

- Many gaps remain in relation to REDD++, the rules of the game are not yet set. However, key socio-economic and geographical data are two main priorities for the development of any REDD scheme, therefore, further studies on the Aguaytia watershed already started to cover these topics. REALU Phase 2 will bring in these current data into application and to support the design of a REDD+ project in the Aguaytia Basin in Ucayali.
This document is part of a series of national reports on Reducing Emissions from All Land Uses (REALU), based on research and analysis conducted in 2009-2010. The report aims to disseminate interim results and stimulate feedback from the scientific community.

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In order to achieve the goal of reducing emissions of greenhouse gases in Peru, the current legal, institutional and policies that have an influence on forests need to change. Joint action between public and private sector, particularly cross-sectoral work and international alliances are needed based on the voluntary agreements of the Conference of the Parties 15 of the United Nations Framework Convention on Climate Change (COP 15 of the UNFCCC), which recognizes that REDD+ can contribute to achieving the objective of climate change mitigation.

This report explores key elements for a comprehensive approach for whole-landscape carbon accounting in Peru. These include: the definitions of forest and international negotiations; rights, access to resources, tenure and potential conflicts regarding REDD; the causes of deforestation and degradation in the Amazon and estimates of future deforestation; perceptions of fairness and efficiency of the REDD value chain; the current legal and institutional framework with regard to land use and post-Kyoto challenges; the implications of the definitions of reducing deforestation and degradation on carbon accounting; and forest governance and governability to integrate mitigation measures for deforestation and degradation and the opportunities of REDD+ in carbon markets.