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Assessing Sustainable Forest Management practices in Timber and Brazilian Nut concessions: case study of Madre de Dios (Peru)

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ABSTRACT OF THESIS submitted by:
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for the degree of Master of Science and entitled: Assessing Sustainable Forest Management practices in Timber and Brazilian nuts concessions: case study of Madre de Dios (Peru**)**
Month and Year of submission: May, 2011.

Unsustainable harvesting of timber is one of the major causes of global deforestation and degradation, especially in developing countries. Sustainable Forest Management (SFM) practices aim to preserve forest eco-system services while meeting human social and economic needs.

This thesis assesses the compliance with SFM practices of timber and non timber concession in the Madre de Dios region of Peru. This region is characterized by high bio – diversity value, large population dependent on forest harvesting, and many NGOs working in the area to disseminate SFM practices.

This research is based on field work conducted by the author in March and April, 2012. I interviewed four timber and eleven nut concessionaires, evaluated in relation of three dimensions of SFM (economic, social, and environmental), and their stakeholder and conflict management. The concessionaires were selected according to the criteria of: size, forest certification status, and business strategy. The last characteristic is defined according to how a concessionaire accesses the market (national or international) and the added value provided.

This research leads to three findings. In the first place, the compliance with SFM is improving as result of new laws and incentives, but it is still very variable.
My second finding is that certification significantly improved performance in timber and non timber concessions. Firstly, certified concessions maintain a better administrative management, which supports the economic sustainability. Secondly, they tend to comply more carefully with the law and to implement better environmental practices. Thirdly, they show better labour and safety conditions, and lower vulnerability to external threats. These factors are confirmed even for those concessions that lost their certification, as they maintained some “improved” practices.

My third conclusion is that, despite their benefits, certification systems leave important gaps in SFM. It may be not too convenient for small concessions without access to the credit system or to international market. Also, national standards can have similar or even better performances, if properly implemented. Another issue arising from this research is that the certification has no diffusion capacity, so for instance certified Brazilian nuts were harvested with illegal timber.

Keywords: Tropical Forest, Deforestation, Sustainable Forest Management, Sustainable Development, Certification, Peru, Madre de Dios

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GRAZIE

GRACIAS HERMANOS

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List of Abbreviations

ACCA	Asociacion para la Conservacion de la Cuenca Amazonica [Association for Conservation of Amazon Basin]
ASCART	Asociacion de Castaneros de la Reserva Tambopata [Association of Nut Gatherers of the Tambopata Reserve]
BCRP	Banco Central de Reserva del Peru [Peruvian Central Bank]
CAMDE	Conservacion Ambiental y Desarrollo [Environmental Conservation and Development]
CEDANET	Center for Education and Development Assessment
CESVI	Cooperazione e Sviluppo [Cooperation and Development]
CFP	Carbon Forest Partnership
CIFOR	Center for International Forestry Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CoC	Chain of Custody
DESA	Department of Economic and Social Affairs of the United Nations Secretariat
DGFFS	Direccion Forestal y de Fauna Silvestre [General Division of Forestry and Wildlife] (former INRENA)
EIA	Environmental Investigation Agency
ETFRN	European Tropical Forest Research Network (ETFRN)
FEPROCAMD	Federacion de Castanero de Madre de Dios [Federation of nut gatherers of Madre de Dios]
FAO	Food and Agriculture Organization
FLO	Fair-trade Labeling Organization
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
IEHM	Instituto de Estudios Historicos y Maritimos [Institute of Historical and Maritime Research]
IFAD	International Fund for Agricultural Development
IFIA	Inter-African Forest Industry Association
IFOAM	International Federation of Organic Agriculture Movement

IISD	International Institute for Sustainable Development
ILO	International Labor Organization
INEI	Instituto Nacional de Estadistica e Infomatica [National Institute of Informatics Statistics]
INRENA	Instituto Nacional de los Recursos Naturales (now DGFFS)
ITTO	International tropical timber organization
MEA	Millennium Ecosystem Assessment
MCPFE	Ministerial Conference on Protection of Forests in Europe ()
NC	Nature Conservancy
NGO	Nongovernmental organization
NTFP	Non Timber Forest Products
OECD	Organization for Economic Cooperation and Development
OSINFOR	Organismo superior de revision de los recursos forestales y de fauna [Supervisory Body for Forest Resources and wildlife]
PEFC	Programme for Endorsement of Forest Certification Schemes
RIL	Reduced Impact Logging
RONAP	Recollectores Oganicos de la Nuez Amazonica del Peru
SAF	Society of American Foresters
SCBD	Secretariat of the Convention on Biological Diversity
SFM	Sustainable Forest Management
SGC	Structural Genomics Consortium
SLIMF	Small and Low Intensity Forest Management
SPDA	Sociedad Peruana de Derecho Ambiental [Environmental Law Peruvian Society]
SSNC	Swedish Society For Nature Conservation
SW	Smart Wood
SWOT	Strenghts, Weaknesses, Opportunities, Threats
TFT	The Forest Trust (former Tropical Forest Trust)
UNECE	United Nations Economic Commission for Europe

UN	United Nations
US	United States
USDA	United States Department of Agriculture
WB	World Bank
WFTO	World Fair-Trade Organization
WRI	World Resources Institute
WRM	World Rainforest Movement
WWF	World Wildlife Fund
Ha	hectares
Masl	meters above the sea level
Pers. comm.	Personal communication
Pers. Obs.	Personal Observation

Chapter 1: Introduction

1.1 Introduction

Deforestation has become one of the current major environmental issues in the last 20 years. According to the Food and Agriculture Organization (FAO), deforestation is still a serious issue, forest area decreased by 5.2 million ha in 2000-2010, and land conversion affected over 13 million ha. By 2010, the global forest area is estimated to be 4 billion ha, and 36% of this figure is primary forest (FAO 2010a).

There are many causes of deforestation; most of them are triggered by economic uses of the forests. One of them is forestry: for the period from 2003 to 2007 wood and non – timber products raised 100 and 18 billion US $ respectively (FAO 2010a).

Although forest and logging were one of the main reasons of deforestation (IFAD 2008) in the last 20 years, there has been a growing interest in sustainable use of forests, and forest sector has recently tried to shift toward sustainable forest management (SFM). Probably, the most important and successful programs to promote SFM are forest certification schemes. These schemes grew in the last decade in terms of forest area covered and certified companies, spreading and auditing sustainable forestry practices (UNECE 2010).

The forestry sector is particularly important in developing countries. Firstly, developing countries rely more significantly on forests services (IFAD 2008). Secondly, the deforestation rate is generally higher in these countries (IFAD 2008 and FAO 2010a), mainly due to cheaper labor costs, lack of control, and poorly enforced regulations (Perry 2005). Also, illegal timber, land invasions and poor information represent often an important burden to implement sustainable practices

in these countries (Contreras – Hermosilla *et al* 2007). Finally, although certification has globally grown, this is not always the case for developing countries, where the growth of certified land is slower or in some cases decreasing (UNECE 2010).

This thesis focuses on Peru as a case study, and it assesses different forestry concessions. This research aims to determine whether SFM practices are taking hold and if certification is the primary driver. It is based on field research of forest operations in the Madre de Dios region of Peru conducted by the author in April 2012. With the help of CESVI, I visited 15 concessions and interviewed 7 operators. I chose the Madre de Dios region for several reasons.

Firstly, Peru is a tropical country, with one of the largest forest areas in the world (FAO 2010a), mostly located in the Amazon Rainforest, which is considered the most diverse terrestrial habitat (Turner 2001). Secondly, the country is characterized by high deforestation rate (FAO 2010a), lack of enforcement of regulations and corruption (EIA 2012). In addition, although cattle and farming are the most important causes of deforestation and forest degradation, logging is the second (Asner *et al* 2010). Furthermore, the timber sector in Peru is characterized by several problems: high percentage of commercialized timber is illegal, corruption, lack of funding and poor monitoring (EIA 2012). These problems are common to other tropical countries (Contreras – Hermosilla *et al* 2007). Although timber is not the main export product of Peru, this may change in the near future, because the prices are increasing for the two most commercialized species: cedar and bigleaf mahogany (EIA 2012). The last specie is particularly relevant, because its harvest was banned in Brazil, and increasing demand will probably affect the Peruvian rainforest (EIA 2012). Consequently Peru is considered to be a good case study.

Peruvian forest is located mainly in the Amazonian regions, among them the region of Madre de Dios has been chosen for the case study, owing to its unique

features. Firstly, its forest is much less degraded than others, mainly due to poor infrastructure development (EIA 2012). Only recently the infrastructure improved with the opening of the Interoceanic Highway, which will probably increase local commerce, but also accelerate deforestation and forest degradation in the region (Brotto *et al* 2010). Secondly, this region has a complex subdivision of State owned concessions, so it offers an opportunity for an innovative research on forest management for timber and non timber products. In addition, some of these concessions became recently certified, under different schemes. Also, many NGOs are operating in the area trying to promote SFM, including via certification. And there are both certified and non certified operation, which allows the researcher to determine whether certification and other aspect promote SFM.

All these new challenges require a study to identify good sustainable practices and relevant issues in these concessions. It should be mentioned, that this area remains unexplored with few studies analyzing practices of timber concessions in Madre de Dios. The previous researches are based on analysis of certified concessions immediately after the preliminary phase of certification. This may be a limitation, as SFM is a long term process (Jenkins & Smith 1999) on the contrary this research assesses companies after two years of being certified.

These studies do not compare SFM practices according to the dimensions of sustainable development, but tend to analyze practices itself not related to a framework, and they ten to underestimate the stakeholder and conflict management. In addition, the previous studies generally compared private companies with collective territories. On the contrary, there are many studies on non-timber in Madre de Dios, but there is no analysis on the impact of certification on their practices. These issues are actually crucial for future certification project, because some nuts concessions lost their certification, and only few maintained. Therefore this paper

analyzes why this happened, and in which cases it was possible to keep the certification scheme. Therefore, this research is based on investigation of sustainable practices in timber and non timber concessions. Both types of concessions will be assessed according to different classifications: whether they are certified or not, their size, and business strategy.

1.2 Aims

This research aims to assess the extent to which Sustainable Forest Management practices have been adopted by commercial forest (timber and non-timber) operations in the Madre de Dios region of Peru. Assessment criteria include three dimensions of sustainable development—social, environmental, economic—as well as stakeholder and conflict management. In addition to general conclusions, the research aims to determine the extent to which SFM performance is a function of certification status, size, and business strategy.

1.3 Research Questions

- How does certification, business strategy again, and size of operations affect SFM practices in timber and Brazilian nut concessions in Madre de Dios?
- Is certification a trigger for a significant improvement in sustainability performance according to four categories? Is certification working to promote Sustainable Forest Management Practices? How could these actors increase their performance in relation to the four categories assessed?

- Are these actors sustainable according to the economic, social and environmental dimension of sustainable development? Which practices or strategies are implemented to increase the performances of these 3 spheres of development?

- What opportunities and threats do timber and non-timber operations face? How are they working to capture opportunities and reduce threats?
- Are these actors strengthening alliances and able to resist to external threats? Is stakeholder and conflict management properly functioning? How is each actor vulnerable and how does it respond to external threats? Are there important strategic allies? What is their role in increasing the resistant to potential or actual external threats?

1.4 Objectives

- To identify different relevant timber concessions in the area of study
- To identify relevant nuts concessions in the area of study
- To assess each sector practices according to the three dimensions of sustainable development (DESA 2001)
- To assess each concessionaire capacity to build strategic alliances and respond to external threats
- To compare the difference between timber concession in relation to their certification status, size, and business strategy.
- To clarify whether forest certification schemes lead to more sustainable forest management practices and better strategies against external threats
- To develop recommendations based on the lessons learnt, useful for future projects design and implementation.

1.5 Thesis Outline

The thesis is composed of six main chapters, including this introductory chapter. The second chapter is the literature review. It describes the forest trends, its most important services and contains a brief description of the forestry sector.

The same chapter introduces forest certification schemes, with particular attention to the FSC. Finally, this chapter ends with a description on the main SFM practices, on which this research bases its assessment.

The third chapter details the methodology used. It describes the research strategy, the secondary sources used and methods to collect field data. This chapter ends with a detailed analysis of scope and limitations.

The fourth chapter is local context. This chapter starts with the description of Peru' and its forest sector. After, it investigates relevant national and international legal background. Finally, it describes the region of Madre de Dios and its relevant characteristics.

The fifth chapter is the data analysis. This chapter analyzes each concession, according to three dimensions of sustainable development and their different conflict and stakeholder management .

The sixth chapter summarizes the main conclusions of the sustainability and vulnerability assessment, providing possible recommendations for both sectors and the certification it. Finally, this chapter ends with discussion on possible future research in the area of study and on missing parts of this research.

Chapter 2: Literature Review

2.1 Justification of the problem

Increasing concern about forest management arises from the high level of deforestation and its negative effects on development and the environment. Deforestation is defined as a permanent conversion of at least 10% of the crown cover of a forest to non-forest use (Kanninen *et al* 2007).

The last FAO's report is an important effort to show forest global facts and figures about the forest (2010a). However, this report is missing relevant information such as global primary forest[1] figures, data on protected areas, and forest area under management plans are incomplete. In addition, there is no figure on forest degradation, because there is no current available dataset (FAO 2010a). Forest degradation occurs "when forests remain forests but lose their ability to provide ecosystem services or suffer major changes in species composition due to overexploitation, exotic species invasion, pollution, fires, or other factors" (MEA 2005). Thus, it is difficult to measure.

However the table shows interesting global figure to understand the size of forest area and deforestation trends (table 2.1).

Table 2.1: Main forests global figures (FAO 2010a)

Total Forest Area	**4 billion ha**
Forest loss (2000 – 2010)	**5.2 million ha**
Forest converted to other use (2000 – 2010)	**13 million ha**
Forest Loss 1990 – 2000	**8.3 ha**
Forest converted to other use (1990 – 2000)	**16 million ha**
Forest used for production (% of the total)	**30**
Forest used for "multiple use" (% of the total)	**24**

[1] Primary forest is defined as "Relatively intact forest that has been essentially unmodified by human activity for the past 60 to 80 years" (WB 2000, p xxix)

As shown in the table, forest coverage decreased significantly in the last decade (2000 – 2010), but with a slightly lower rate, if compared to the period between 1990 and 2000. The following figure (2.1) graphically shows regional forest trends.

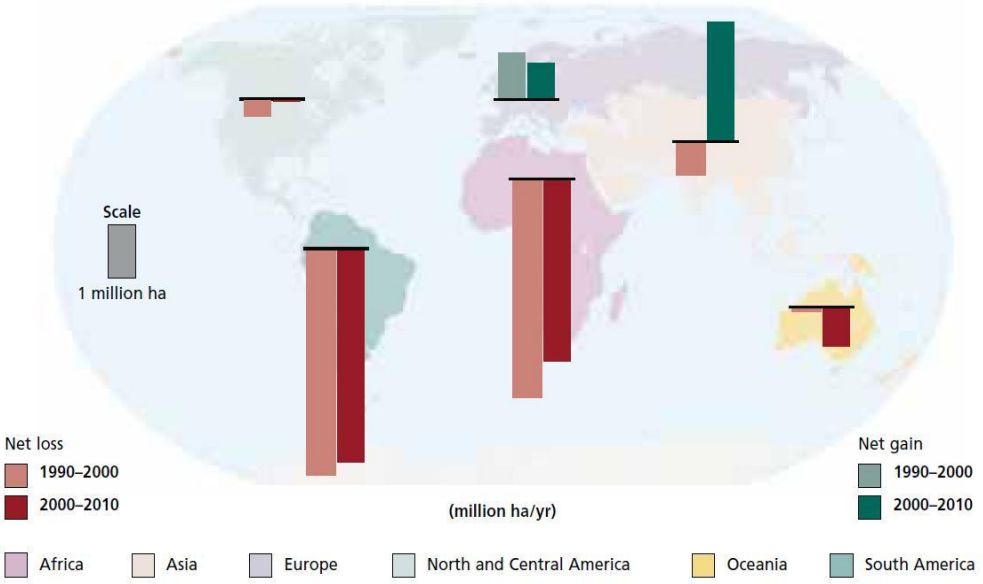

Figure 2.1: Forest coverage change rate (FAO 2010a)

There is a net gain in Europe and Asia, triggered by political reforms in EU and Chine (FAO 2010a), however this aggregate number does not take into account the high deforestation rate in South East Asia. This is not the case for other regions: South America and Africa keep on high net loss, even though slightly decreasing; Oceania is reverting negatively its trend, especially due to fires in Australia (FAO 2010a).

Deforestation is originated by several causes. On one hand, there are some direct triggers, such as land conversion for agriculture (including bio - fuel), cattle ranching, logging, fire, and roads construction (Martino 2007). On the other hand, indirect causes are also relevant: economic causes, such as economic (for instance, timber prices or external debt), policy and institutional causes (corruption, weak governance, poorly defined land tenure, but also trade policies), technology (for instance, by increasing the access to remote lands), and also demographic trends

(Myers 2007). However these issues are generally connected to important global challenges, such as economic growth, population growth and poverty (Sodhi *et al* 2004). These factors are particularly relevant in developing countries (IFAD 2008), because lack of enforcement, corruption and cheap labor costs can worsen direct and indirect causes of deforestation (Perry 2005).

Moreover, loss of forest coverage has important negative social and economic consequences. Firstly, forest deforestation and degradation contributes to climate change up to more than 20% of total CO_2 emissions (ACCA 2010, UNREDD 2010a); also it affects the carbon cycle, and it is a main cause of soil degradation (landslides) and siltation (Kanninen *et al* 2007). Other impacts are related to forest environmental services, such as flood control, biodiversity importance and water sources protection (Kanninen *et al* 2007).

2.2 Forest Services

Forests are the most diverse terrestrial ecosystem: they provide different services and benefits, which were grouped by the SCBD (2009 see table 2.2).

Table 2.2: Main Forest Services (SCBD 2009)

Provisioning Services	***Cultural Service***
Food, Fiber and Fuel	Spiritual and religious values
Genetic Resources	Knowledge system
Biochemical	Education
Fresh Water	Recreation and aesthetic value
Regulating Services	***Supporting Services***
Invasion resistance	Primary production
Pollination and Seed Dispersal	Habitat
Climate and Disease regulation	Nutrient cycling (including carbon and Water)
Erosion and hazard regulation	Soil formation and retention
Water Purification	Production of atmospheric oxygen

The majority of people depending on forest services live in developing countries (FAO 2010a and IFAD 2008). Most of these services directly benefit the local population and are very difficult to be substituted by market mechanisms, especially in rural areas. These services sometime are not only difficult to identify, but also to valuate. For instance, supporting and regulating services may be ignored even by the same people who benefit from them. However, the number of people depending on forest services at different levels is impressive (table 2.3).

Table 2.3: People depending on forest services	
Directly employed in the forest sector	**10 million (FAO 2010a)**
Wholly dependent on forest resources	**60 Million (World Bank 2004)**
Largely dependent on forest services	**350 (IFAD 2008)**
Living in forest area	**900 million (IFAD 2008)**
Indirectly dependent on forest services	**1.2 (IFAD 2008) – 1.5 Billion (FAO 2010a)**

Thus, these estimations clearly demonstrate the importance of the forest and its linkage not only to environment and conservation, but also to socio - economic development issues.

2.3 The forest sector and Sustainable Forest Management (SFM)

Several economic activities contribute to forest degradation and deforestation, but this research focuses particularly on forestry. Forestry is defined as “the profession embracing the science, art, and practice of creating, managing, using, and conserving forests and associated resources for human benefit and in a sustainable manner to meet desired goals, needs, and values (SAF 2008). Consequently, it is not forestry itself to be blamed for deforestation, but the way how this science is applied. Forestry was generally applied for conventional

logging, which is defined as “the felling, skidding, on-site processing, and loading of trees or logs onto trucks” (SAF 2008) and was characterized by “less concern about forest regeneration, frequently lacking government control— and unsustainable, that is, not focused on long-term timber supplies” (WB 2000, xxvii). Therefore, logging has several negative impacts on forest area and on its services.

- Direct loss of forest coverage, habitat and fragmentation[2] (SCBD 2009). The logging itself requires clearing and cleaning, felling, and extractive operations, which directly reduce forest coverage (IFAD 2008).
- Logging operations need transportation, so habitat fragmentation caused by road construction is inevitable.
- In addition, roads increase access to rural lands, so logging indirectly facilitates land invasions and conversion, and formation of illegal settlement (Fannin & Lorbach 2007, Gucinski *et al* 2001). The more accessible is the forest, the faster the land is converted (Brotto *et al* 2010).
- Land conversion and clearing for those livelihoods created in logging camps (SCBD 2000).
- During logging operations, more people live in the forest increasing food demand, and often hunting (IFAD 2008 and SCBD 2009).
- Logging contributes to climate change, owing to the content of carbon stored in forests (SCBD 2009).

All these negative consequences led to an important international reflection on forest protection and management. This sector is very important, with 100 billion dollar revenues from wood products and 18 billion for non wood timber products per year from 2003 and 2007 (FAO 2010a). This sector remains strategic especially in

developing countries, despite the economic crisis which is considered the first cause of decreasing timber consumption by 12% (UNECE 2010).

However, this figure does not take into account the illegal logging losses, which account for around 15 billion dollars (Contreras – Hermosilla et al 2007). Illegal logging " takes place takes place when timber is harvested, transported, bought or sold in violation of national laws" (Brack 2003, p 196).

Illegal logging is one of the main challenges for the forest sector and specifically in high risk and tropical countries (Contreras – Hermosilla et al 2007). Illegal loggers have several advantages: they do not pay for an inventory or bureaucratic procedures; they do not have any restrictions regarding volume and species and do not have to apply any precautionary technique (Contreras – Hermosilla et al 2007). Illegal operations have generally to pay fines or to bribe officials, but especially in developing countries sanctions and costs of bribing are lower than the advantages arising from the incompliance with the laws (Contreras – Hermosilla et al 2007).

According to the same authors, there are two suggested strategies to reduce illegal logging. On the supply side, the authorities should increase the punishment and enforce local regulation, set simple and clear rules, implement a more transparent and advanced information system to reduce corruption, and introduce incentive to SFM and certification. On the demand side, there should be a reward for legal wood and incentives to increase control on the wood origin. According to the same authors, illegal logging and unsustainable practices are connected, and if there is no control a violation of legal or good practices is highly probable.

[2] Fragmentation is defined as "the process by which a landscape is broken into small islands of forest within a mosaic of other forms of land use or ownership" (SAF 2008)

The **sustainable forestry** is a concept that started with the Brundtland report (UN 1987), where the sustainable development was defined[3]. The definition was expanded for businesses, resulting in "business strategies that meet the needs of the enterprises and its stakeholders today, while protecting, sustaining and enhancing the human and natural resource in the future" (IISD 1992). This concept was further developed with the introduction of the three dimensions of sustainable development: economic, environmental, social (DESA 2001,see appendix 1). Therefore, combining these three dimensions with highly performing businesses can be part of the solution, through investments in cleaner and more advance technologies, higher environmental standards, and compliance with the laws (IISD 1992).

This concept can be applied to forest sector: some forest companies may redefine their strategy and opt for long term sustainability instead of short term benefits (IISD 1992). Several conferences, international institutions, and organizations have recently put in place principles and mechanisms to protect forests and implement some more sustainable forestry practices. These conferences and initiatives introduced different strategies to improve logging practices: some initiatives set rules and criteria at governmental or non Governmental level, while others provide incentives to reduce deforestation (see appendix 2).

None of these initiatives resulted in a binding treaty on forest management, partially due to the lack of funding to provide real economic alternatives to those countries with large forest areas (IFAD 2008). In addition, many countries, including Brazil, Russia, Canada and the US, considered their forests a strategic sector, so refused to receive external control over their natural resources (Lipschutz 2001): a

[3] Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (UN 1987)

binding treaty on an important natural resource was considered a possible threat to the right of exploitation of a sovereign resource (Lipschutz 2001).

However, these initiatives contributed to the very first definition of sustainable forest management (SFM), defined as “use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems” (MCPFE1993, point D, H1). Even though this definition is valid, this research prefers to define SFM as “ the pursuit of innovation, investment and institutional reform for regimes of actions that improve long term ecological processes and productivity, while satisfying human wants”, while sustainable forestry is the “adaptive capacity for timely and sufficient response to economic , ecological, and social changes that otherwise would undermine the desired long - term process, services and products of a forest “ (Jenkins and Smith 1999, p 336). This definition is preferred because SFM is a continuously improving process, so linked to adaptive learning, which depends on spontaneous innovation, investment and also institutional reform, thus it is crucial to adapt to SFM evolution (Jenkins & Smith 1998).

The SFM changes completely the very basic concept of logging, because it focuses on long term profitability, and continuous assessment and monitoring of forest operations (Maser & Smith 2001). According to the same authors, this represent a shifting from the concept of sustained yield[4], (generally based on quantity and maximum volume, without taking into account ecosystem management),

[4] The yield that a forest can produce continuously at a given intensity of management (SAF 2008)

to the concept of sustainable yield (which takes into account a long term perspective and the complexity of forest ecosystem and applies precautionary principles).

Conventional forest management was based on wrong ecological assumptions: tree farms were considered more organized and to have better quality than forests (Maser & Smith 2001). Furthermore, conventional forest management tended to look at only above ground conditions, underestimating fertility, and other events such as solar energy, fertility, wind patterns and air quality (Maser & Smith 2001).

There are many factors which should be taken into account when defining a sustainable forest management system. This thesis has identified 4 categories for SFM practices: three are directly related to sustainable development, the fourth one is conflict and stakeholder management. Indeed, some practices have impacts on more than one category categories at the same time.

2.3.1 Economic Dimension

The economic dimension of sustainable development stresses the importance of long term growth and profits (UN 1987), this can be applied to SFM practices. .

The first and probably most important characteristic of a sustainable forests operation is its economic sustainability, mainly because an activity in loss will not last long. Therefore, economic performance should take into account long term financial viability. This means that a SFM plan should include a proper long term financial budget and balance (including costs and future projections) for each product, the harvest system land use, and regeneration of commercial species (Maser & Smith 2001). However, a long term commitment is more common in family businesses, as they tend to be personally linked to their lands (Maser & Smith 2001).

Economic performance should be measurable with economic indicators, such as profits, costs, revenue, return of investment, prices breakeven point, cash flow, internal rate of return, net present values, and discount rate (Harrison et al 2000). The costs must be clearly analyzed: fixed and variable costs, management cost, road/infrastructure maintenance, taxes, human resources, and also a long term investment projection (Maser & Smith 2001).

This information is crucial to balance the operation scale and its intensity: less intense operations may affect the economic performance of the operations in the short term, while too intense operations affect their long term sustainability (Lindenmayer & Franklin 2005).

In order to reduce the market risk, a forest operation should not to rely only on one product. Depending on one or few products is risky due to price fluctuations and also because forest operations may ecologically deplete only few specie with negative consequences on their long-term supply capacity (Maser & Smith 2001, and Jenkins & Smith 1999). Forest companies should analyze also their non timber forest products (NTFP), which are generally underestimated (Maser & Smith 2001). NTFPs have low environmental impact, grow relatively quickly, improve products differentiation and diversification, reducing the market risks (Maser & Smith 2001, Harrison *et al* 2000, IFAD 2008). Furthermore, a forest company should ameliorate the quality through innovation: technological development reduces the impact on forest (Harrison et al 2000 and Jenkins & Smith1999).

For instance, improved processing reduces the waste, also it increases the income per cubic meter harvested due to the higher quality (Jenkins & Smith1999). Also, providing added value to forest resources is generally more profitable owing to higher prices of processed products (Jenkins & Smith1999), but also because the company controls all the phases of production, reducing significantly its market risks

(Vera pers. comm.). Another important request for forestry operations is the chain of custody[5], which is crucial to prove that its product from harvesting to retail (Maser & Smith 2001).

All this paper work is an additional administrative cost, however it has important benefits (rarely calculated), in terms of maintaining budgets, production, costs and projections in order and making them easily available (Harrison et al 2000). In addition, SFM may generate other income from ecotourism, carbon trade or REDD+ (Harrison et al 2000).

Indeed, the financial analysis is much more difficult in developing countries. Firstly, companies in these countries rarely have proper budget management and planning (Harrison et al 2000). Secondly, these companies, especially small and middle enterprises, are more vulnerable to market risks, due to the high cost of capital, difficulties to access the credit system, and lack of financial guarantees (Harrison et al 2000). In conclusion, a sustainable forest management plan should take into account the profits, but also have a long term vision in terms of product differentiation, financial analysis, proper management and projections.

2.3.2 Environmental Dimension

The environmental dimension of sustainable development aims at conserving and enhancing the natural resources (UN 1987). Forestry is based on harvesting of natural resources, so SFM should surely include practices relevant for the environmental performance. Data management is crucial for selecting harvesting: volume, number of trees, age classes, density, and diameters (Maser & Smith 2001). This paperwork is really important, for legal (compliance with the laws) and ecological reasons (respect of some basic criteria on selecting species to harvest)

[5] Chain of custody is defined as "the monitoring process of the production and distribution channels of forest products from forest floor to end product"(Jenkins & Smith 1998, p 327)

(ITTO 2009 and Contreras – Hermosilla *et al* 2007). From an environmental perspective, forestry companies should be careful about many other aspects.

Habitat fragmentation is probably the biggest problem in forest operations (Perry 2005). Therefore, road management is crucial in forest operation and it is one of the major costs, due to engineering studies required, such as building outsloped roads or limiting the access to the roads in some periods (Fannin & Lorbach 2007 and Maser & Smith 2001). Thus, skid trails should be minimized, and when applicable cable transportation can reduce the impact of transportation (Maser & Smith 2001).

Heavy trucks are one of the major causes of erosion, especially during the raining season (Maser & Smith 2001). Soil erosion increases natural organic matter runoff, causes eutrophication and may affect irreversibly riparian habitat (IFAD 2008 and Maser & Smith 2001). Consequently, forest companies should analyze the soil erosion, and also create buffer zones to protect riparian habitats (Harrison et al 2001).

Another aspect not always taken into account is the waste management, so a forest operation should always manage organic, inorganic and hazardous waste (Maser & Smith 2001): the last two categories should be managed outside the forests (Forestry Commission 2011). Moreover, harvesting is very detrimental to the forests in tropical forests, company operations damage 27 trees, build 40 meters of road and open 40 meters of canopy just to harvest one tree (Metthew & Day 1998). Therefore, reduced impact logging (RIL) techniques, such as directional felling, thinning from below, selecting harvesting or reducing the log area should be implemented to minimize the impact of harvesting and transportation (IFAD 2008, Harrison et al 2000, and Maser & Smith 2001).

An interesting and often advanced strategy involves a biological assessment, which is useful in order to evaluate the impact of operations over the wildlife and plan activities to protect vulnerable species (IFAD 2008). Due to its high costs, biological monitoring is rarely implemented and completed only for few species, mainly those listed in CITES appendices or in extinction, and rarely for keystone, endemic or umbrella species (Maser & Smith 2001). However, it is possible to train some workers to complete a brief assessment at relatively low costs (Maser & Smith 2001).

Another practice often ignored is the protection of old growth trees, important owing to their biological importance (Maser & Smith 2001), these are generally ignored: in the US only 6% of the commercial forests have more than 175 years, while 55% has less than 50 years (Perry 2005).

More often, in their lands forest companies establish intangible or protected areas, which is important from ecological, cultural and sometime religious points of view (Maser & Smith 2001). At the same time, more companies implement reforestation in their areas after harvesting, this contributes to recover the land coverage and canopy (IFAD 2008). Indeed, the science has an increasing role in forest management and there is a great production of some species, with high reforestation rates (Lindemayer & Franklin 2005). However, some companies may be tempted to plant high commercial non local species, with possible negative effects on the ecosystem (Harrison *et al* 2000). Native and endemic species should always be preferred, because they are adapted to the area, grow relatively quickly and have less environmental impact (Harrison *et al* 2000).

More complex conservation techniques may involve the implementation of agro – forestry systems and permaculture, which take advantage of natural and biological instruments, such as fertilizer trees to reduce the pests and increase

productivity at relatively low costs (SCBD 2009). Another advanced technique very often publicized, is the landscape management (see appendix 3), which is a more holistic and integrated strategy: it involves the creation of biological corridors (SCBD 2009), connecting protected areas, a system of buffer zones to protect the wildlife, the plantation, the watershed, the protected area and to preserve forest services (ITTO 2009 and IFAD 2008). Owing to costs and time required to implement a proper landscape level management, this strategy is often suggested, but rarely implemented in practice (Lindemayer & Franklin 2005).

In conclusion, it is in some cases very complex and costly to comply with SFM environmental good practices, but there is a growing interest and promotion of these techniques (demonstrated by the success of certification), even if not fully implemented.

2.3.3 Social Dimension

The social dimension of sustainable development is concerned about meeting human needs in terms of job and also quality of life (UN 1987). Therefore, a SFM operation has responsibilities to respect the dignity of its employees and of the local communities surrounding their operation. Thus, relation with local communities is crucial to avoid conflicts and control whether forestry activities may affect them (SCBD 2009). Thus, understanding local culture and tradition may contribute to create good relations with local populations, especially if the company is not from the area (SCBD 2009).

Local participation is crucial, and community forestry is not always being connected to SFM: first community forestry projects were implemented in the 80s (Hughes & Flintan 2001), and now these projects focus mainly on eco – tourism, sustainable forestry and sustainable agriculture (Agrawal & Reford 2006). Despite the fact that there are many researchers criticizing this approach (see appendix 4 for

more details), these projects were often seen as a win - win solution to protect the forests and reduce local poverty (Christensen 2004).

Furthermore, national and ILO workers' rights must be respected in terms of salary, gender equality, security, health insurance, and pension schemes (SCBD 2009). In addition, when possible, the forest operation should employ local people and use local products (Maser & Smith 2001). This would stimulate local economy, so a share of the benefits from natural resources exploitation would remain in the area. Another advanced practice consists of directly financing social projects to benefit the surrounding communities (SCBD 2009, Maser & Smith 2001).

SFM plan should include also collaboration with the surrounding social context and involve different stakeholders: private and public sectors, and representatives of local society (SCBD 2009). Finally, in general, forest operations should implement an adaptive management, in order to be able to challenge risks, but also to facilitate public participation and transparency (IFAD 2008).

2.3.4 Stakeholder and Conflict Management

The conflict management is "is the practice of identifying and handling conflict in a sensible, fair, and efficient manner" (CEDANET n.d.). Stakeholder Management is " the process of forming, monitoring and maintaining constructive relationships with investors by influencing their expectations of gain resulting from their investment" (GEP 2012). This business definition can be applied to forest operations.

External factors may influence the sustainability of forest operations; therefore efficient stakeholder and conflict management increases the capacity to respond to external stress.

According to Harrison et al (2000), there are different risks which should be taken into account. The first type of risk is the timber yield risk, which depends on disease, pest and production. The second risk arises from the market (mainly price fluctuation). The third risk is the sovereign risk, which depends on external factors, such as policies, taxation, crimes and changes in the government. Therefore, a SFM plan should include contingency plan for all these possible threats (Harrison et al 2000).

An important factor is to build strategic alliances with public authorities, other companies/operations and NGOs. This strategy reduces external threats (Isoraite 2009), and it is particularly valid in developing countries, where there are more uncertainties linked to legal compliance, land tenure and invasions (Landell-Mills and Ford 1999, SCBD 2009).

2.4 Forest Certification

The application of SFM practices encountered resistance from Governments and private companies. Binding treaties failed, so voluntary regulations and soft laws were applied to protect forest areas. Probably the most interesting and successful forest voluntary regulations are independent forest certification schemes. The forest certification is a voluntary agreement, which aims at improving forest management (Maser & Smith 2001). The certification is voluntary, because it intends to create a real consensus on SFM and to identify operations on standards that forest businesses can really comply with (Maser & Smith 2001). Being voluntary agreements, these standards are more easily accepted by those businesses that saw, at the beginning, the forest certification as an attempt to stop their activity (Maser & Smith 2001). The certification can be considered a success, looking at the numbers (figures 2.2).

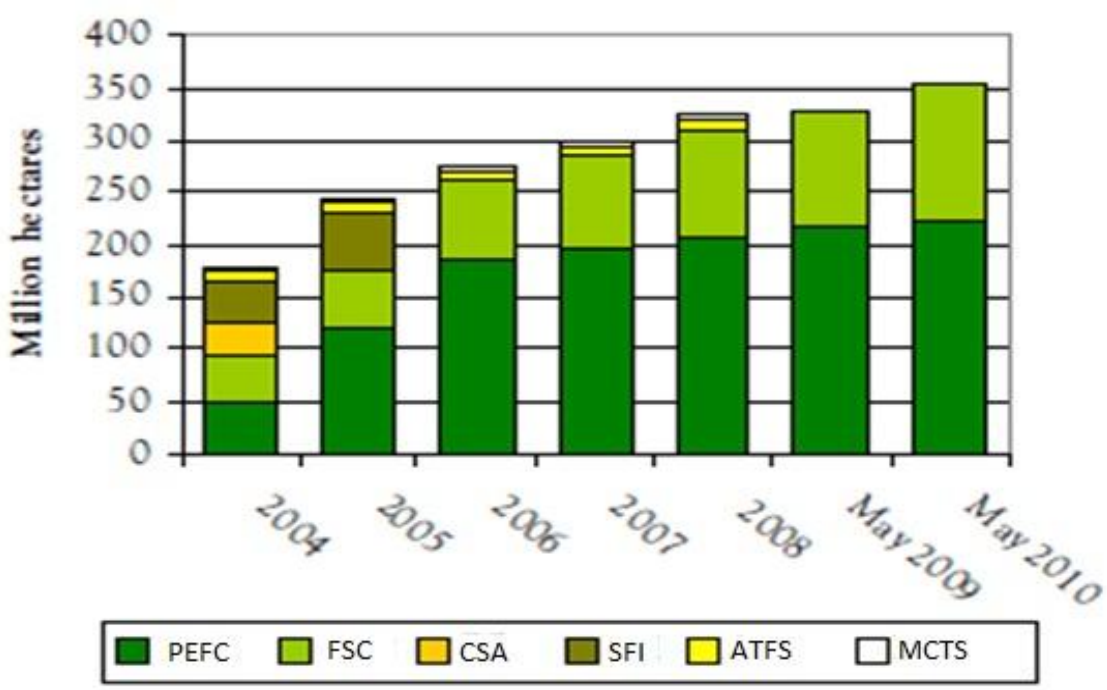

Figure 2.2: Certified forests in million of ha (UNECE 2010)

Despite the global economic crisis certified forest reached in 2010 more than 355 million ha, (9% of the total forests) with an overall global growth of 28 million ha (8% growth compared to 2009) (UNECE 2010). The FSC accounts for 129 million ha certified (3.3% of the total), while the other major certification scheme PEFC (Program of Endorsement for Forest Certification) covers 226 million ha (5.7% of the total) (UNECE 2010). PEFC provides actually endorsement to all the other certifications under its label (UNECE 2010). According to the same source, the growth has been uneven worldwide, for instance Latin America, shows a regression in certification (UNECE 2010 see appendix 5). The success of certification arises from the higher consciousness of the public interest in sustainable products, also it is a good business opportunity for some companies as it is reducing costs and increasing the product quality (Jenkins & Smith 1999 and Maser & Smith 2001).

The FSC was the first international certification scheme; it was created as a response to the global deforestation in the 1990, when timber users, traders, and environmental and human rights organization met to create a global consensus on

good forest management (FSC 2012a). Thus, the first certification scheme was issued in 1994 from the Forest Stewardship Council (FSC), as a pilot project, and in the same year the first principles and criteria were approved (FSC 2009). This represented the beginning of forest certification.

Since the 1994, the certification process has improved its principles and criteria, which are subjects to revisions and improvement, and are equally related to social, environmental and economical criteria and indicators, which reflect common main principles of SFM from the FSC (see appendix 6). Consequently, certification criteria are strongly linked to SFM practices. There are many certification schemes; however their differences are nowadays much less relevant: all of them have third party auditors, chain of custody, and stakeholder consultation (Fernholz et al 2010, UNECE 2010, see appendix 7 for a more detailed comparison).

In the first place, the researcher chose the FSC scheme because it is the only forest certification scheme in Peru In addition, the two certified timber companies have FSC certificate. Beyond practical reasons, the FSC is considered the most consistent certification scheme (Ozinga and Brunner 2004 and UNECE 2010).

Its main strengths are a strong credibility and a more advanced participation scheme. Indeed, FSC has an interesting process to set its principles and criteria (FSC n.d. a): the organization accepts proposal, which are reviewed by a general assembly. The process involves a participatory decision making process, so a working group (balanced between environmental, social and economic).

The certification process is based on five steps (FSS n.d.b):

1) the applicant contacts one of the accredited certification bodies to receive basic information;
2) the applicant signs an agreement with the selected certification body;
3) the operator is assessed by the certification body

4) The certification body prepares a report
5) The applicant is accepted, or it must implement some changes (in the second case, the certification body can asses later the operation)

If the applicant complies with the observations, a 5 year certificate is issued, but the certification body conducts annual audit to assess compliance with FSC principles (FSC n.d.b). Furthermore, small holders certifications are promoted with specific schemes in some regions with group certification and Small and Low Intensity Managed Forests (SLIMF) programs (FSC 2012b), which reduces the number of audits, and also "community forestry" (Irvine 1999), which is defined as "any situation that intimately involves local people in forestry activity" (FAO 1978). For instance, in FSC the consultation with indigenous peoples is mandatory, while in PEFC schemes this consultation applies only if the land is public (Fernholz 2010).

Another positive factor of FSC consists on the fact that it is not driven by the industrial sector, unlike the PEFC scheme (Ozinga and Brunner 2004, Fernholz et al 2010). In addition, FSC has complete ban on GMOs (FSC 2009), and this is another important signal of independence from big corporations.

The FSC certification regards mainly two aspects: the forest management and the chain of custody (FSC 2012b). A third area regards "mixed wood", which certifies the origin of product resulting of mixing certified and non certified wood, but it is less common (FSC 2012b).

The concept of Chain of Custody (CoC) is an especially important keystone of certification. At the point of sale only products with CoC can be labelled with the FSC logo (FSC 209). This allows consumers to choose sustainable harvested and processed timber (FSC 2009). At the point of sale, Indeed, the CoC is one strategy to reduce illegal logging and its application is significantly increasing (UNECE 2010, figure 2.3).

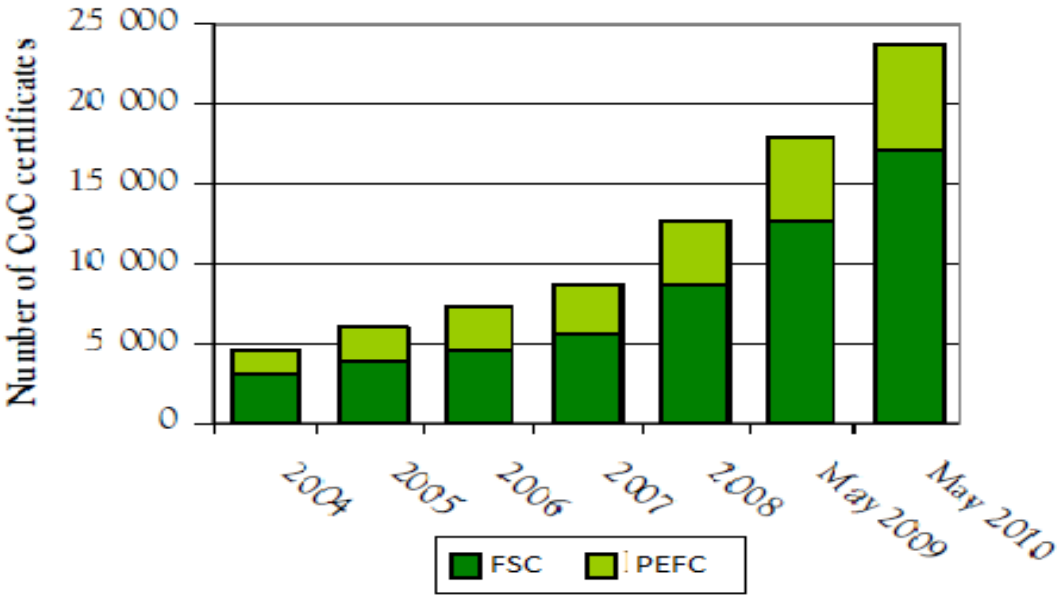

Figure 2.3: Number of CoC certificates in the world (UNECE 2010)

This growth is mainly triggered by the high demand of product accountability in the international market UNECE 2010). Thus, the label should guarantee that the wood used in all the process is legal. In order to comply with CoC requirements, the forest operation must record volumes, with all proper invoices and documentations, label along all the stages of the process from the first processing phase to the retailer, and also take all precautions in order to avoid mixing certified and conventional wood (Maser and Smith 2001).

In conclusion, both CoC and forest management certification are incentives to forest certification, as both certifications have to respect the FSC principles. In the next session, in order to complete the analysis, the main critics to FSC are discussed.

2.5 FSC critics

The FSC was object of many critics. Even though It has a specific scheme for small companies (FSC 2012b), the costs are still very high and difficult to comply with: this does not regard only forest management costs (Contreras – Hermosilla et al 2007 and Ozinga and Brunner 2004), but also the payment of the visit and the

audit of the third party certification bodies (Maser & Smith 2001). Therefore, the cost of certification may be unsustainable, especially for small operations (Maser & Smith 2001). Small scale operations may also experience difficulties to comply with certification standards, due to the complex and unclear language used, as well as to the continuously changing indicators and requirements (Greenpeace 2008).

Furthermore, SFM practices, promoted by the FSC, have economic return only in the middle – long term, so conventional loggers may have low motivation to implement SFM (Ozinga and Brunner 2004). In addition, due to the high rate of illegal logging in tropical countries, applying SFM is even harder there (EIA 2012). Therefore, these factors may discourage the certification.

A strong critic to FSC and other certification schemes came from a joint declaration (Fern 2008) of Fern, Greenpeace, Inter-African Forest Industry Association (IFIA), Precious Woods, the Swedish Society for Nature Conservation (SSNC), and Tropical Forest Trust (TFT). A List of the main critics follows:

- FSC does not evaluate directly the operations, but only through certification bodies (such as Smartwood –SW - and SGC) (Fern 2008)
- Each certification body has different methodologies and performances (Fern 2008)
- There is not a clear and established threshold for each certification body and indicator (Fern 2008)
- There is no incentive to improve the audit system in addition poor audit is cheaper (Fern 2008). Therefore, a comprehensive monitoring is rarely implemented (Jenkins *et al* 2008).
- Sometimes certification bodies have conflict of interest, so they do not care about increasing the standards, but about maintaining the certification (Fern 2008).

- The complaint mechanism does not accept non FSD members, and it is expansive (Fern 2008).
- The mixed wood certification does not really guarantee the origin of the timber (Fern 2008)
- There is no strategy to protect old growth forests (Counsell 2008)
- FSC certified monocultures and plantations in Thailand and Brazil (such as eucalyptus), despite the well known and documented negative environmental, social and economical consequences (WRM 2003, WRM 2008)
- There is no plan of action in high risk countries, characterized by high level of corruption, and nothing has been done to improve or put pressure on these governments (Jenkins et al 2008).

Indeed, the strongest critic came recently from the SSNC, which quit FSC board due to the continuous violations of laws, weak standards, lack of audit and too soft sanctions (SSNC 2010). However, even those NGOs which criticized the FSC, still collaborate with this scheme (e.g. Greenpeace), and they also admit that it is the best certification system (Counsell 2008). In conclusion, despite all critics the forest certification is nowadays probably the only current set of credible standards. After having analyzed its characteristics and critics, it is important to analyze the SFM in practice.

2.4.1 Other non forest Certification Schemes

FSC is used to assess timber products; however, other types of certification can be issued for NFTP. This thesis takes into account two certification schemes.

The first scheme is the Organic certification. This certification guarantees that a product is organically grown, so “it is food grown and processed using no synthetic fertilizers or pesticides (EPA 2012). This is a broad definition and each country has

different standards to define organic food; however, it generally involves avoiding use of chemicals and other types of possible contamination, managing waste, handling harvesting and processing, and testing the product (EPA 2012).

Another important certification is issued by the Fair-trade Labeling Organization (FLO). Fair trade is defined as “trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalized producers and workers – especially in the South” (WFTO 2009). So its main interest is to increase profits of smallholders, reduce risks and to respect labor rights.

These two certifications do not directly involve forest management, but some of their principles are compatible with SFM and FSC principles. For instance, handling chemicals, avoiding contamination, and waste management are common to FSC and organic certification. Also, FLO certificate requires fair labor conditions, decent salaries, and local development. These characteristics are also part of FSC principles, and in general SFM practices.

Chapter 3: Methodology

The research strategy of this paper is inductive (Newing *et al* 2010) therefore from a case study analysis it will be possible to derive an assessment to evaluate SFM in different conditions and sectors. This strategy was preferred to a deductive analysis to avoid preconceptions, which may affect the study and the researcher. However, a theoretical background and analysis of SFM practices, already described in the previous chapter, was crucial for conducting the research.

This research focuses on Madre de Dios (Peru), and especially on two sectors, chosen for their importance: timber and Brazilian nuts concessions. After choosing the area of study, a comparative approach was implemented: timber and Brazilian nut concessions were selected according to certification status, size and business strategy[6]. The certification status is chosen because it is assumed that certified concessions would comply better with SFM practices, so it is interesting to compare certified and non – certified concessions. Also, different certifications are implemented in the area (Candela 2006), with variable results. The size is chosen because one of the main critics of certification is its high costs for smallholders, also a big company may show better performance in terms of investment and technology implemented. The business strategy may also be relevant: the added value, market, and sale strategy (direct through an intermediary for instance) can be a stimulus or detrimental to the sustainability of these concessions.

Four timber concessions and eleven Brazilian nut concessionaires were interviewed. The nut concessions were later divided into three groups: members of ASCART, members of RONAP, and others. The first to members are considered the

[6] The concept of business strategy is intended as: how a concessionaire accesses the market (national or international) and what is the added value provided.

most successful nut associations, and are chosen for implementing different strategies to achieve success.

Their comparison was crucial to understand how different requirements may affect the management practices, according to 4 classifications: economic, environmental, social sustainability, and stakeholder and conflict management. Each category was based on certain indicators for each category. However, these categories have some overlapping. For instance the stakeholder and conflict management concept is very wide, so it partially includes indicators from the previous categories. This thesis uses this concept to assess how a company builds strategic alliances and respond to external threats.

Indeed, some indicators can be used for different categories, as these categories are interconnected (the number of species harvested may impact the environmental sphere). Also, the analysis is qualitative, so the four timber concession and three nut concessions grouped will be evaluated according to each dimension on a qualitative scale from very bad to excellent. This scale is qualitative because it is difficult to numerically value each practice (for example, it is hard to evaluate, if it is better to implement a buffer zone around watershed or an environmental monitoring program). The only exception is the economic dimension: for instance, a company in loss has always lower performance than one in profits.

From this analysis and comparison, the research aims at resulting in a context validity, which may be generalized to design a wider theory or guidelines to draw and implement SFM or certification projects in other contexts. Regarding the methods used, the research will take advantage of both qualitative and quantitative methods, functional to complete the comparative research.

3.1 Methods

Different techniques were implemented to collect the data. These included secondary sources, archives, interviews, observation, and focal groups.

3.1.1 Secondary Sources

A wide literature review was necessary in order to assess SFM. CEU and Monterey libraries were accessed, as well as online libraries such as Google Scholars, Science Direct, and JSTOR. In addition, websites and publications from national and international NGOs, FSC, Local Authorities were crucial to define the research questions and the most important issues to investigate in the sector.

3.1.2 Observation

Observation was crucial to collect informal data of the surrounding environment. The observation focused on one Timber Company, visited for two days during its operation, and on two sawmills. In addition, this research is based on field visits in seven nuts concessions of eleven interviewed. Visiting the territory was c-rucial to have an understanding of the process and to receive additional information about forest management practices. In addition, it was possible to analyze workers' behaviour in the field, and some general good and bad practices. The observation was complementary to the interviews.

3.1.3 Interviews

Semi structured interviews were the most important technique applied in this research. They were used to provide additional information missing in the secondary sources, and they gave the most important data of the entire research.

The interviewees were selected according to a targeted sample, chain referral and snowballing, in order to identify those people who had the most relevant information for the research (Newing *et al* 2010). Due to the large distances, it was often difficult to reach potential interviews, so one of the selection criteria was

accessibility. The nuts gatherers were all anonymous and denominated only for their membership in a nuts association. Anonymity was preferred to guarantee sincere information. However, three companies agreed on being cited.

The semi structured interviews followed the scheme from appendix 8, allowing the researcher to assess each producer's practices according to the Research Questions. Also, open interviews were conducted with different NGOs officials, member of local authorities. This was important to understand the complex local context.

3.1.4 Focal Groups: Business Model Canvas, SWOT Analysis and action planning matrix

In addition to the interviews and questionnaires, focal group methods were used to identify in a group dynamic the strengths, weaknesses, opportunities and threats of forest management, from the perspective of the local population. This methodology was implemented to understand the general context and main management problems of the "Forest Management Board of Muy Manu Manuripe River" (CGB), which is a local authority, formed by members of civil society, private companies, and public authorities. As it is difficult for a foreigner researcher to deeply understand the local dynamics, this research considered crucial to investigate general relevant environmental and social issues with this participatory and bottom up local authority. Three methods were used with focal group.

The first is the business model Canvas (annex 9, Osterwalder and Pigneur 2010), which identified different areas for a business or an organization and helped the group to identify key components of their most important activities. This model was slightly modified to adapt it to the local context, so three components were added: re-investment strategy, environmental and social issues. Secondly, a SWOT (strengths, weaknesses, opportunities, and threats) analysis was used to evaluate

the major issues for forest management. Finally, through an action planning matrix (annex 9) the members of this Board could identify how to reply, in relation to the results of the SWOT analysis.

3.2 Scope and Limitations

The main scope of the thesis is to research about forest management practices, however not all concessions were included in the study. Thus, this research focuses only on the most relevant concessions: timber and Brazilian nuts. The other concessions (ecotourism, reforestation, and palm) were excluded, due to lack of time and minor importance. Although farms are relevant for forest management, they were excluded because difficult to access, too variable (caused by the different land tenure, as farms are private lands) and also owing to the lack of time. An exception refers to two farms owned by some title holders of nut concessions, (because their farms were inside the concessions or bordering them) and two examples of organic farms, chosen to understand alternatives to slash and burn.

Another relevant sector excluded was the mining sector. Informal mining is crucial in the region, but it was difficult to collect information for two main reasons. Firstly, it was difficult to interview the people involved in this mostly illegal business. Secondly, at my arrival in Madre de Dios, there was a general strike (see appendix 10), leaded by the mining sector with dozens of injuries, and unfortunately three fatalities. Consequently, this sector was considered too dangerous to be investigated. Due to the difficulties to study indigenous people in such a short time, collective territories were excluded by this study.

Some limitations must be taken into account also for the sectors studied. Available data is limited or missing is: financial data (especially in the third group of nut concessions), costs for nut concessions are briefly estimated, GIS information is

missing (in most of the timber concessions, but also in one group of nuts gatherers), as well as in general a long-term dataset, which made impossible a temporal analysis.

Additionally, logging companies start their operation generally in May, when the dry season starts, so I could not check their operation. Also, due to the lack of time, extremely long distances (more than 2 days to reach a concession) and costs of transportation (and a single visit should have lasted for at least 10 days), I could visit only one forest company in full operation. Indeed, the lack of the lack of communication services (phones, electricity, and public transportation) and the long distance (up to half day by car/boat) make the visits time-consuming and difficult to coordinate a visit. It is important to consider also that while it is raining, it is not possible to visit any rural areas, as it becomes inaccessible or dangerous. Unfortunately, I could not visit any concessions from the national reserve, due to the difficulties to receive the required authorization.

Also, the number of gatherers and timber operations interviewed is insufficient to be statistically significant. However, the data collected was enough to draw a general evaluation of different concessions and on their practices. Furthermore, certification is recent and this research is not based on a long term dataset, which may be crucial for a more precise evaluation.

In addition, the two non certified companies represented a failed business (for different reasons), but there are other non certified companies still operating, so these two companies may represent the worst scenario, not an average case.

Due to the short time available, it was difficult to build trustiness, so, even if most of the interviewed knew it was anonymous and provided even sensitive information, it was difficult to deeply investigate in such a short time.

Chapter 4: The national Context, Peru'

4.1 Country Information

Peru' covers 1.3 million km^2 and it is the third biggest country in South America after Brazil and Argentina (IEHM 1994). It borders Ecuador, Columbia, Brazil, Bolivia and Chile (annex 11). The country has a population of around 30 million inhabitants, and around 10 million people live in the capital city, Lima (INEI 2007). The distribution of the population is limited by deserts, wetlands, forest and impervious mountains (up to almost 7,000 masl) (IEHM 1994).

The country has lived in the last ten years an impressive economic growth, doubling its GDP (WB 2012), and generally an improvement in several social indicators: for instance, the population living under the poverty line decreased from 44.5 to 31.3% in the last 5 years (WB 2010).

According to the IEHM (1994), Peru is one of the 12 most biodiverse in the world, and it has 28 climatic zones. The geography is characterized by three main regions the "Coast" (costa); the "Highlands" (sierra); and the "Amazonian region" (selva), (IEHM 1994, annex 11).

Peru' has the 9th largest area of forest in the world, 4% of the world forest coverage, the second largest forest area in South America (FAO 2010a, figure 4.1).

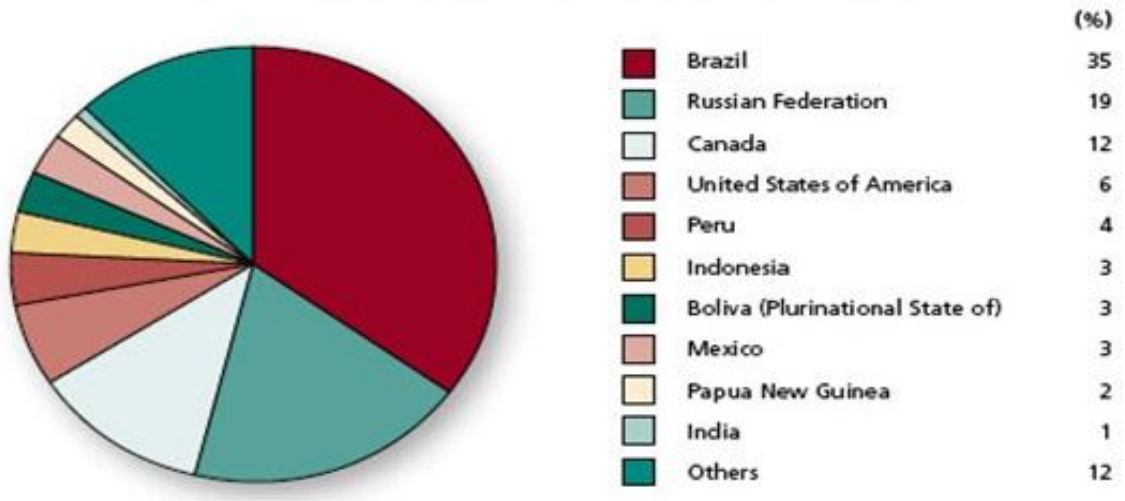

Figure 4.1: Countries with largest forest areas (FAO 2010a).

The forest area is around 67.7 million ha, and 90% of them is primary forest (around 60 million ha) (FAO 2010a). Deforestation trend is significantly high in Peru, as shown by the FAO's report on forests (2010a, figure 4.2).

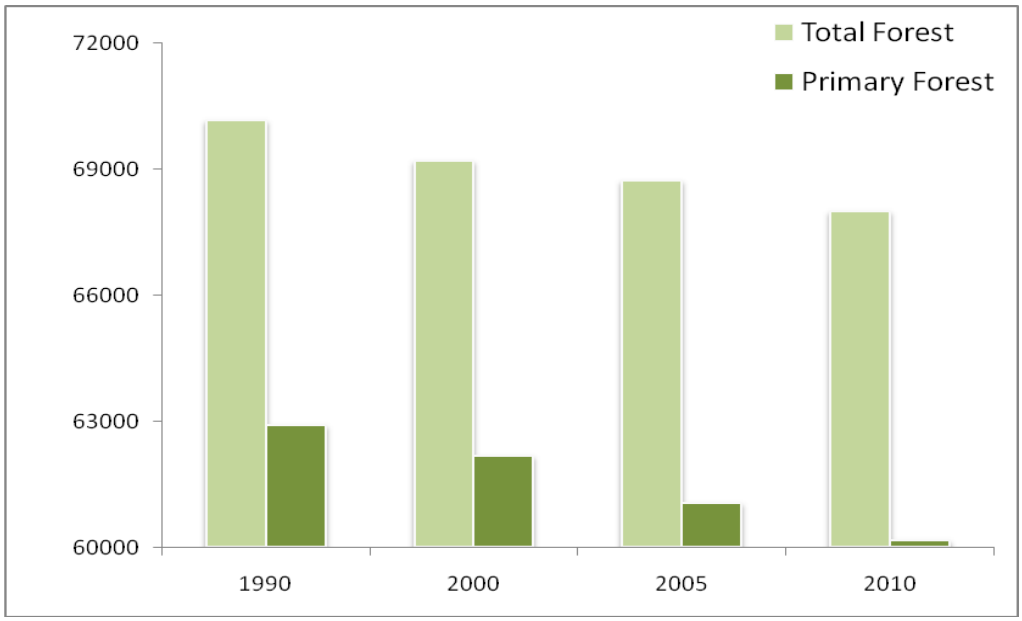

Figure 4.3: Forest area trend in Peru, 1,000 ha. Excel 2010 (Data Source: FAO 2010a)

The trend is significantly negative, with a higher deforestation annual rate in the last five years, as shown in the table (4.1).

Table 4.1: Annual forest area change rate (FAO 2010a)

Year	Annual Change Rate	
	Loss Ha	%
1990 – 2000	94,000	-0.14
2000 – 2005	94,000	-0.14
2005 – 2010	150,000	-0.22

The forest loss is ecologically relevant as Peru has one of the most diverse forests in the world with up to 300 different species of trees per ha (Galarza & La

Serna 2005).In Peru' deforestation is triggered mainly by land conversion for various economic purposes. The major cause of deforestation and forest degradation is land conversion for farming and cattle ranching, logging and mining are other major triggers of deforestation (Asner *et al* 2010, figure 4.3).

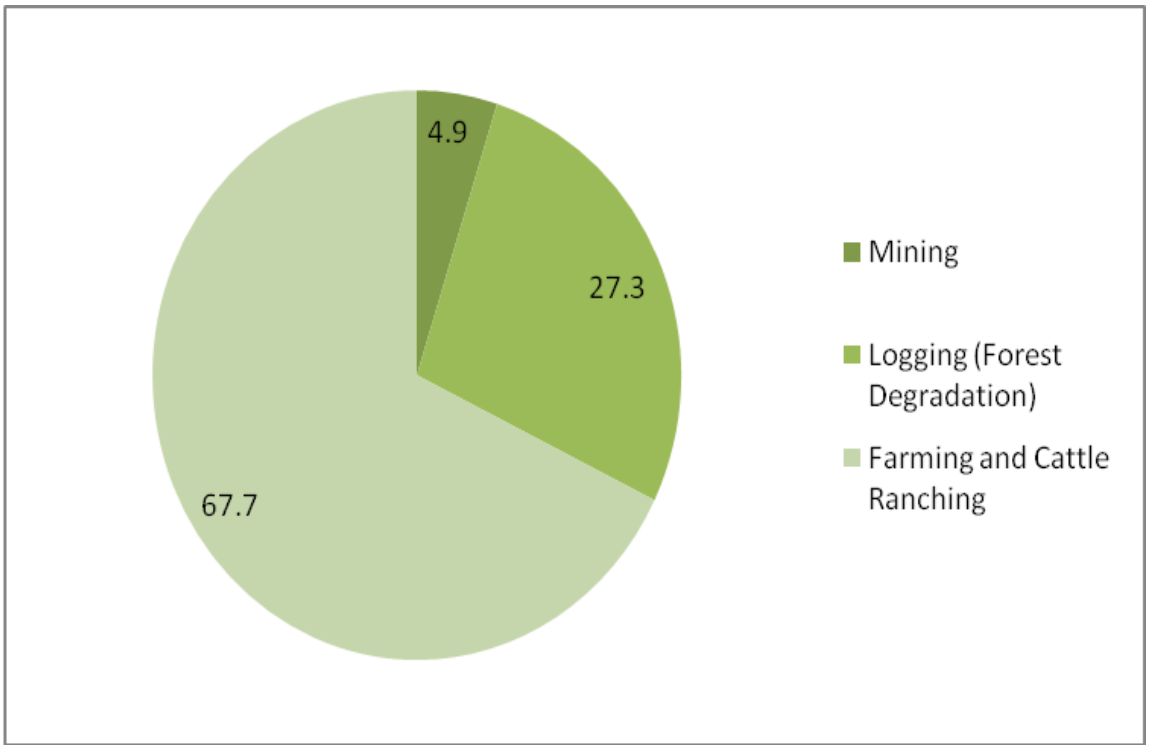

Figure 4.3: Main causes of deforestation and forest degradation (Asner *et al* 2010)

According to the same authors, the samples area experienced a 38% secondary growth in 10 years. Even though this trend seems positive, it does not take into account possible irreversible ecological damage and biodiversity loss. At national level, the forest use is destined mainly to production, as shown by the figure (4.4).

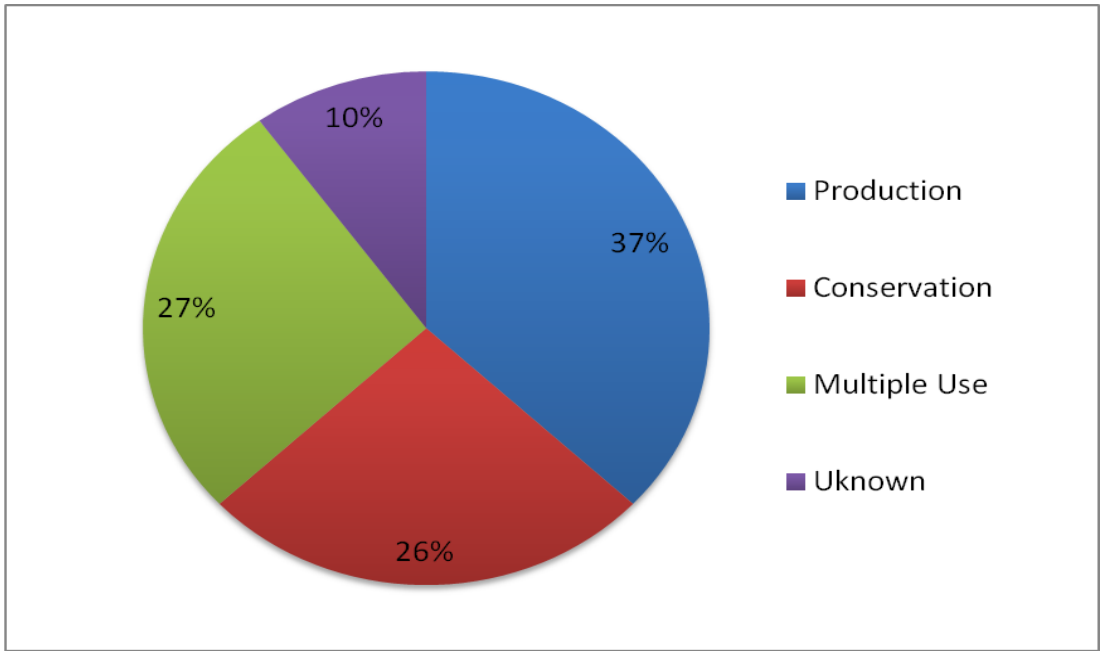

Figure 4.4: Forest use in Peru (FAO 2010a)

The productive forest is mainly located in the Amazonian regions of Loreto (top exporter), Madre de Dios and Uyacali (FAO 2010b, annex 12). The national production overcomes 2 and 0.6 million m^3 for respectively for roundwood sawnwood (DGFFS 2011).

The forestry sector in Peru is potentially relevant, but it accounts only 1.1 % of the GDP at the moment (FAO 2010b, Galarza & La Serna 2005). The total export value in Peru is around 3.5 billion US $, and it is mainly depending on mining, fossil fuel and agriculture (EIA 2012). The forest sector accounts only for only 4.8% of the export (around 0.16 billion US$) (EIA 2012). The export of timber and non timber products is limited to few countries: China, Mexico and the US altogether account for 89% of the total export in the sector (EIA 2012).

For the low share of export, the forest sector is not wholly exploited, mainly due to the lack of infrastructure in the “Amazonian” region (EIA 2012). However, this may change in the near future because the prices of the two most commercialized species, big leaf mahogany (*Swietenia macrophylla*) and cedar (*Cedrela odorata*), are increasing: they are sold respectively at 1.7 and 1 thousand US $ per m^3 (EIA

2012). In addition, the recent ban of mahogany harvesting in Brazil may increase the demand of this species in Peru' (EIA 2012).

The sector relies also on other less valuable species, such as (EIA 2012): cumala (*Virola spp.,Iryanthera spp.*), lupuna (*Chorisia integrifolia*),tornillo (*Cedrelinga cateniformis*), shihuahuaco or cumaru (*Dipteryx micrantha, Dipteryx spp*.) and capirona (*Calycophillum spruceanun*).

The Peruvian forest sector has been rarely sustainable, mainly owing to several problems, unfortunately common to other tropical countries (Contreras – Hermosilla et al 2007). Firstly, this sector focused only on few species, so out of more than 2,500 species, only 600 have been classifies, and 80 harvested (Galarza & La Serna 2005). Secondly, illegal logging is a huge problem in the country: it is estimated that 80% of exported timber is illegal (EIA 2012). This data is economically relevant and it accounts for 44 – 76 million US $, which is a big figure when the profits from legal timber are only 31 million US $ (EIA 2012).

Corruption, lack of funds and poor monitoring are the main causes of illegal export (EIA 2012). The same EIA's report (2012) documents the cleaning system, which is implemented at the different stages of the production, and which can clean the illegal timber through falsified permits, even if the papers are legal. This is relevant, because illegal logging is strongly linked to unsustainable practices (Contreras – Hermosilla *et al* 2007). Thirdly, the weak legal background was relevant for the savage harvesting system in the last years (Galarza & La Serna 2005). However, the law has significantly improved with the new legislation.

4.2 Legal Background

The current Peruvian Law on Forestry (Peru's Forestry and Wildlife Law 27308, 2000) creates a system of concessions, which last for 40 years. This law modified the widely criticized Peru's Forestry and Wildlife Law 2114 (1975), which

was evaluated very negatively (EIA 2012, Galarza & La Serna 2005). The law 2114 permitted harvesting to two categories: industrial operations, which had the right to exploit up to 100 thousand ha for 10 years with a management plan; and small operators, which had the right to exploit up to 1 thousand ha for a range from 2 to 10 years without a management plan (Peru's Forestry and Wildlife Law 2114, 1975).

The law was intended to increase the income of small concessions with poor resources (it was assumed they could not harvest large quantities, so that a management plan was too costly for them and unnecessary), but the result was the opposite (EIA 2012). Many companies used figurehead to access small concessions and harvest large forest area, without any management plan or serious control from the authorities (EIA 2012 and Galarza & La Serna 2005). In addition, the short term right to extraction (only up to 10 years) did not incentivize any sustainable practices (Landell-Mills & Ford 1999), with disastrous consequences in terms of environmental performance (EIA 2012). In addition, this system did not guarantee unique right over one concession; so for example, non timber extractors and timber harvesters worked in the same area (Cossio – Solano *et al* 2011). This created confusion and conflict among different concessions (Cossio – Solano *et al* 2011). In addition, there was no unique concessionaire responsible, and this incentivized illegal logging (EIA 2012).

The current law (27308, 2000) solved some of these problems, at least formally (EIA 2012). Firstly, the new law clearly establishes the differences between timber and non timber concessions. Secondly, it provides unique rights of extraction to the concessionaire over the products established in the management plan (Cossio – Solano *et al* 2011). Also, most of the concessions were assigned according to a transparent bid, where each applicant submitted an economical and technical offer (Cossio – Solano et al 2011, Giudice *et al* 2012). The only exception regarded nut concessions, when they could prove to have traditionally and for long time harvested

that land (Cossio – Solano *et al* 2011). In addition, the timber concessions have to pay a public fee per hectare (Giudice *et al* 2012). On one hand, this is positive for stimulating real operation in the concessions (Galarza & La Serna 2005). On the other hand, the company has to pay this fee every year, and the authorities do not take into account possible external issues, which may affect the operations and obstacle harvesting (Huanca pers. comm.).

The law provides obligations regarding allowed cubic meters, minimum diameters, and protection of tree seeds (EIA 2012, and Cossio – Solano et al 2011). Also, the exploitation is cyclical, following a rotation with the duration of minimum 20 years: this requires a long term management plan (Giudice *et al* 2012, and EIA 2012).

Moreover, every concession should submit an annual plan, a forest management plan for each product harvested, especially timber (Cossio – Solano *et al* 2011 and Galarza & La Serna 2005). Another important aspect is an improved control system implemented with the establishment of the Supervisory Body for Forest Resources and Wildlife (OSINFOR) as an independent and separately funded authority (EIA 2012). Furthermore, there is an interesting system of discounts of up to 75% of the total fee (INRENA 2004), aiming at incentivizing SFM (annex 13).

The new law is an improvement, and other international agreements also contributed positively to a diffusion of legal practices. Peru signed the convention on International Trade in Endangered Species of Wild Fauna and Flora in 1975 (CITES 2012a). This convention has specific rules for the two most commercialized species in Peru': mahogany and cedar (CITES 2012b and EIA 2012). Both species must be exported with all legal document and papers (cedar for being in appendix III), and in addition mahogany (considered endangered for being in appendix II) should be

carefully harvested to guarantee its survival (CITES 2012c and EIA 2012).A clear fail in compliance with these regulations result in a ban of the export (EIA 2012). Accordingly and despite several concerns about operations on the ground, this convention seems to have improved the management of these two species (EIA 2012).

Peru also signed a free trade agreement with the US, in the 2009 (EIA 2012). This agreement obliges the country to comply with CITES rules in order to trade with the US and it also impulses a strong commitment to fight against illegal logging EIA 2012). Consequently, the US can impose sanction, fines, or ban Peruvian timber (EIA 2012). This is particularly important because the US is one of the most important importers of Peruvian timber (EIA 2012). Indeed, this agreement has been criticized for not applying the sanctions (EIA 2012),

Other interesting laws may force Peru to increase control on illegal logging: the US Lacey Act and the Due Diligence in the European Union (UNECE 2010, EIA 2012). Both laws put in place obligations for timber suppliers, which have to demonstrate that the timber is legally harvested, transported, and exported (UNECE 2010).

In conclusion, although the country has still relevant problems of illegal logging and deforestation, these legislations may increase national and international standards and incentive SFM practices.

4.3 Certification in Peru

Forest certification in Peru developed only recently: the pioneers were two forest companies in 2007, while the last certification was registered in December 2011 (FSC Peru 2012).

In the country, 19 forest operations have forest management certification for a total of 812 thousand ha (FSC Peru 2012). The area of these certificates is variable:

from 4 thousand up to 180 thousand ha (FSC Peru 2012). As shown in figure 10, the certification was issued mostly in the three most important forest regions; the only exception is one certified operation in Huanco (figure 4.5).

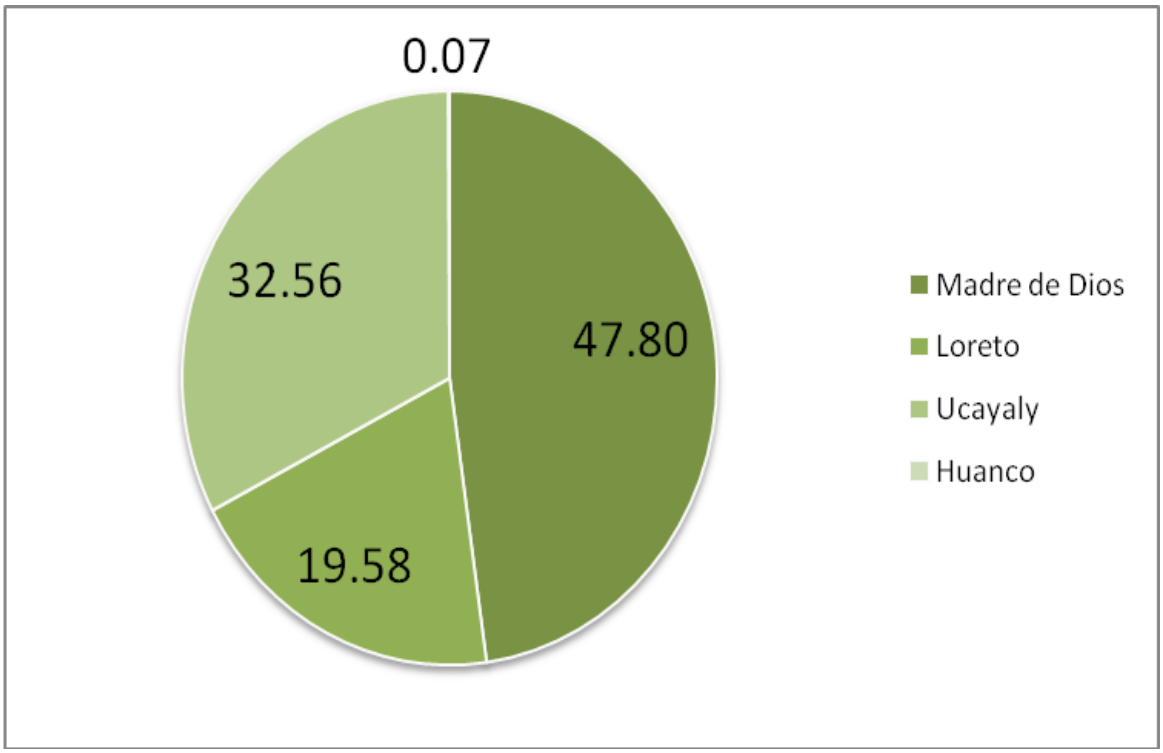

Figure 4.5: Forest Areas certified in Peru per regions in percentage (FSC Peru 2012).

In addition, 31 CoC FSC certificates were issued by 2012 (FSC Peru 2012). The second type of certification is the organic. This sector reached approximately 0.27 million hectares in 2007, and an exports of organic products of around 0.2 billion US % in 2008, so doubled respect with the 2006 (Martinez 2009).

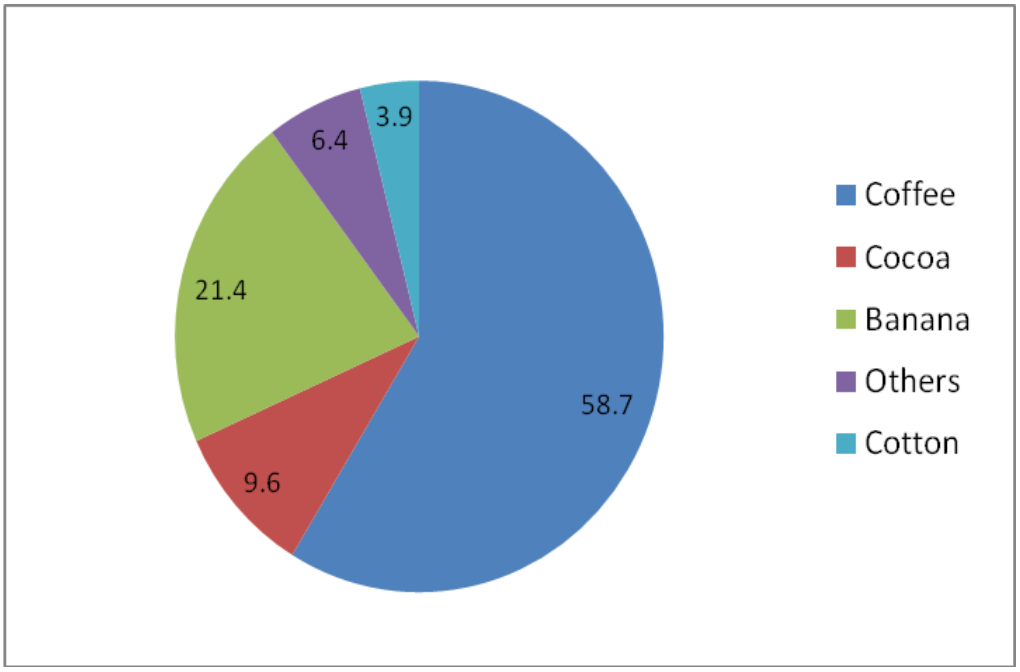

Figure 4.6: percentage of organic products exports (Martinez 2009)

The coffee is the most exported organic product, followed by banana and cocoa. There are several certification bodies, and the largest in the country is Control Union (Oslen 2009). This figure is relevant because in 2008 Peru was the first exporter for organic coffee, second for organic cocoa, and fifth for organic banana (Martinez 2008). The Brazilian nut is not so relevant at national level, because the Brazil nut tree (*Bertholletia excels*) grows only in the Madre de Dios Region in Peru (Candela 2006). However, in 2008 the Brazilian nut wass the third organic product for total export value among the minor products (so after coffee, banana, and cocoa) (Olsen 2008). Regarding FLO certification, the data available is very limited. However, sometime exporters have both labels (the case of banana) (Martinez 2009).

4.4 The Region of Madre de Dios

This region is located in the South Eastern (annex 14) part of the country and it is considered the Peruvian Capital of biodiversity (CESVI 2008a), owing to its natural resource. The table (4.2) shows the most general data about the region.

Table 4.2: Madre de Dios Factsheet (INEI 2007)

Area (thousand Km^2)	**85**
% of total area of Peru	**6.5**
% of Amazonian Regions	**15.3**
Total Population (1,000)	**109**
People living under the poverty line	**12.7**
GDP (million US $)	**240**
Provinces	**Tambopata, Tahuamanu, and Manu**

One of the major current social issues is immigration, in 5 years (2002 – 2007) twenty thousand people migrated from other regions to this region (INEI 2007). This was triggered mainly by the jobs available in gold mining, which represents around 37% of total GDP (BCRP 2010), and easily accessible lands, which is often invaded (Personal Observation). The region had been zoned according to the potential use (Table 4.3).

Table 4.3: Madre de Dios Zoning (INRENA 2007)

		1000 Ha	%
Productive Areas	**Farming and cattle grazing**	1,340	15.8
	Forestry	1,559	18.9
	Fishery	142	1.7
	Total	3082	36.37
Protected Area		4527	53.41
Site specific Management		863	10.18
Urban and Industrial areas		3	0.03
Other Areas			0.01

The majority of the land in the region has conservation purposes, followed by production, and some specific areas (such as highly polluted by the mining sector, or zones where indigenous people are living in voluntarily isolation).

There are different types of protected areas: 2 national parks (Manu and Alto Purus), one national reserve (Tambopata); two community reserves (Amarakaeri and alto Purus); finally there are some private concessions destined for conservation (Candela 2006).

The three main activities in the region are mining, agriculture, grazing (mainly cattle and ranching), and forestry (CESVI 2008a). The regional deforestation and forest degradation levels have been always considered low, when compared to other Amazonian regions, mainly due to poor infrastructures (EIA 2012). This may change as result immigration and the recently built inter-oceanic highway (Brotto *et al* 2010, see appendix 15). Both factors can contribute to increase pressure over forest resources.

Especially slash and burn and land invasion are a major threat to forests area, as identified by the focal groups (2012, appendix 16) and also by personal observation (appendix 17). Slash-and-burn is also known as shifting cultivation, which "is practiced mainly by smallholders who clear the forest lands for the purpose of crop production" (Tshaket *et al* 2007). This is advantageous because there is an increasing productivity due to the increase nutrient after burning and buffering capacity of ash (Fujisaka *et al* 2000).

The forest sector is characterized by the division of the land in concessions, given by the State, and private lands. The region of Madre de Dios is characterized by six main types of concessions (appendix 18): timber, nuts, ecotourism, conservation, palm, and reforestation (table 4.4).

Table 4.4: Concessions area and number of contracts (DGFFS 2010)		
Type of Concessions	**Ha (1000)**	**Number of Contracts**
Timber Concessions	1272	84
Nut Concessions	863	983
Eco Tourism concessions	37	18
Conservation	163	7
Rubber Tree	16	24

However, in some cases some concessions harvest more than one product, but generally among Non Timber Forest Product (NTFP), only nuts is relevant (Moreno pers. comm.). Only recently some NGOs, such as CAMDE Peru and Candela started to investigate economic potential of other NTFP in the region (Moreno pers. comm.). This research focuses on timber and nut concessions for being the largest and most economically relevant activities (appendix 19).

4.4.1 Timber Concessions

The timber concessions are assigned in Madre de Dios in two different bids, when each applicant had to submit an economic and a technical offer. Originally 87 concessions were released, but nowadays only 77 are active because the rest committed serious infractions: cutting seed trees, exceeding the limits or cutting non authorized trees (Plaza pers. comm.). The economical fees varied between 0.4 to 1.8 dollars per hectare, and timber concessions are often been analyzed and considered profitable in previous studies (Giudice et al 2012). This sector is relevant since Mare de Dios is the region is the third producer of round wood (9.4% of national production, figure 4.7) and sawn wood (10.3 % of national production) (DGFFS 2011). In addition, this sector employs 65% of the local population, so it is one of the most important economic activities (Cossio – Solano et al 2010). The

harvesting generally starts in April, at the beginning of the dry season (Melendez pers. comm. and Huanca pers comm.).

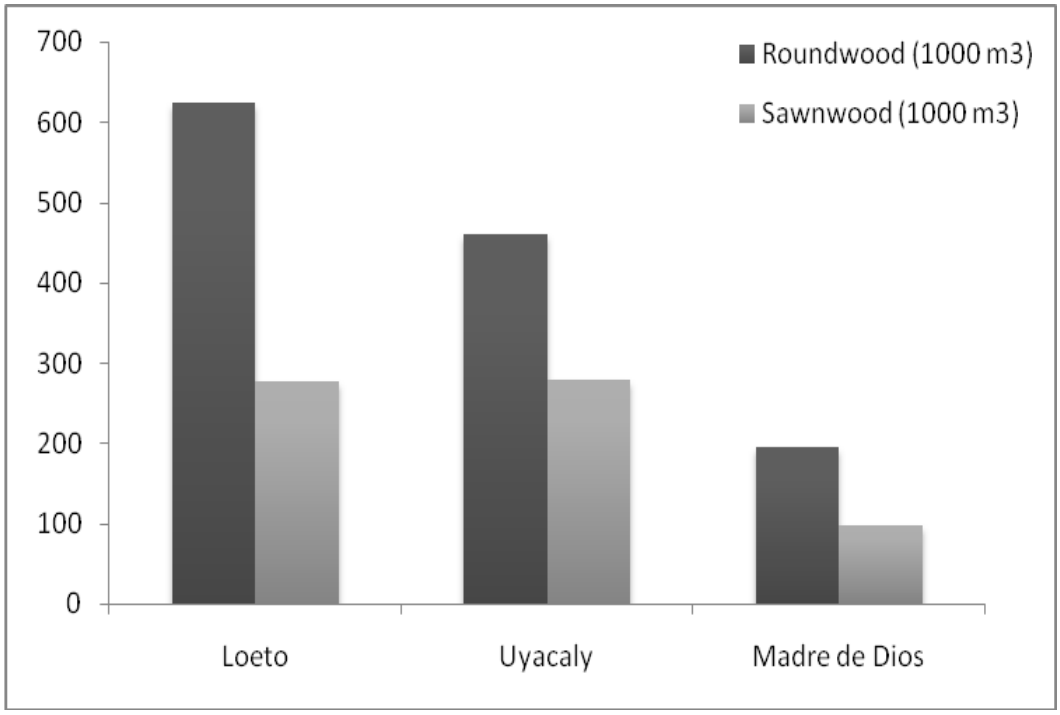

Figure 4.7: Timber production in the Peruvian Amazonian (DGFFS 2011)

Apparently, nowadays timber concessions are more responsible, tend to commit less infraction and they notify their management errors (Plaza pers. comm.). In general, there is an attempt to comply with the rules, also because timber concessions are more carefully observed (Plaza pers. comm.). However, OSINFOR does not have enough time, funds and human resource to complete 100% of the monitoring (Plaza pers. comm.). OSINFOR does not investigate on illegal timber, but it only controls the compliance with the law, but the police is in charge for investigation (Plaza pers. comm.). As mentioned above the new forestry law incentivised SFM practices and certification in Peru, and Madre de Dios is not an exception.

The certification process started in 2005 in Madre de Dios, promoted by WWF and CESVI (CESVI 2008b) In 2007, the first companies achieved the FSC forest management certification, and by 2012 more than 388 thousand ha of forest

(47.8% of total certified area) (FSC Peru 2012): seven logging companies and one native community (C.N. Belgica) achieved the FSC forest management certification (figure 4.8).

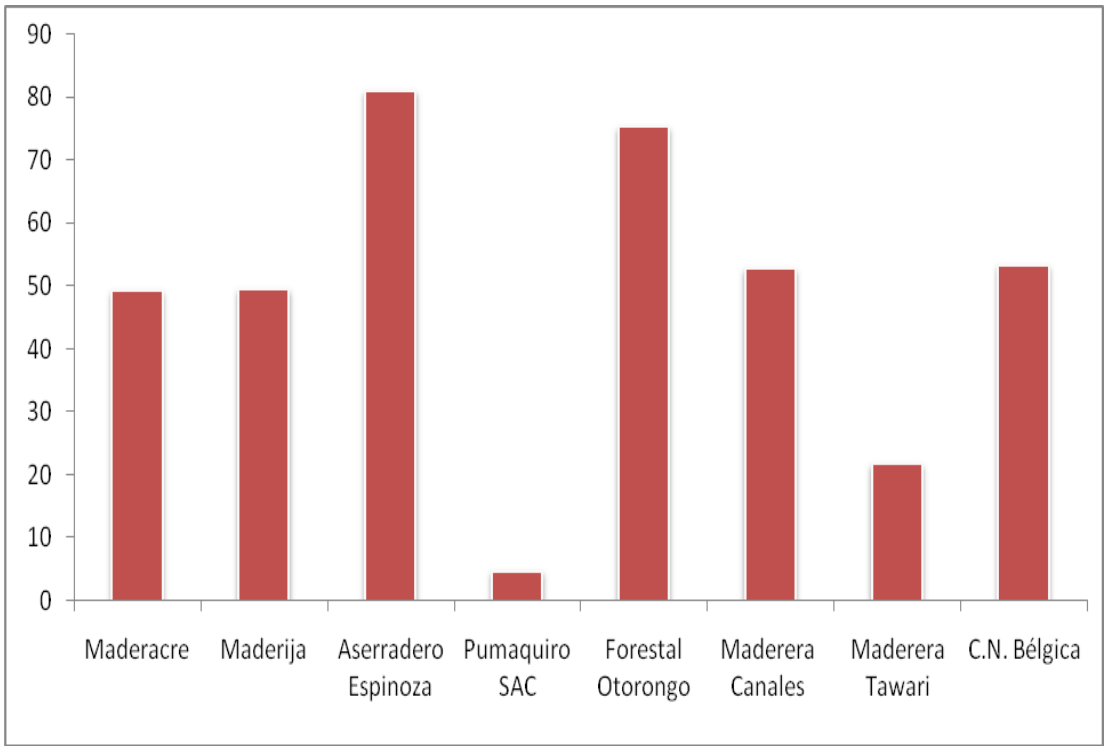

Figure 4.8: Forest management certified concessions and area (FSC Peru 2012).

The dimension of these companies is very variable: both large scale (such as Aserradero Espinoza and Forestal Otorongo) and small scale operations (such as Maderera Tawari and Pumaquiro) got the certificate.

4.4.2 Nut Concessions

Nut concessions are another important sector for Made de Dios. According to several studies, 22% of the population in the region relies at least partially on the extraction of the Brazilian Nuts (Cossio – Solano et al 2010, Escobal et al 2000). The Brazilian nut is a fruit, falling every year from the Brazil Nut Trees (*Bertholletia Excelsa)* (Candela 2006). This figure includes all the categories involved in nuts harvesting, processing, and commercialization: concessionaires, temporary workers, peeling companies, national and international retailers (Cossio – Solano et al 2010). These concessions are regulated by the Law 27308. In addition, potential applicants

had to: submit a proposal to the forest authority, a Forest management General Plan, and an annual plan (Cossio – Solano et al 2010).

Nut gatherers have minimal impact on the forests services and coverage (Cossio – Solano et al 2010 and CESVI 2008a), and they are often seen as guardians of the forests (Arias 2010).

The harvesting period (*zafra*) lasts from January to April (Candela 2006, Rivero 2012 pers.comm., Vera 2012 pers. comm., CESVI 2008a). wach concessionaire puts in place different and often mixed strategies: some directly peel the nuts, other subcontract companies to peel them, and others sell directly non peeled nuts (Candela 2006 and Escobal et al 2010). Non peeled nuts provide lower income, but are immediately paid, while peeled nuts are sold at higher price, but the payment takes some weeks or months because they need to wait for the peeling companies to process the product (CESVI 2008).

In order to start an operation the concessionaires generally receive funds (denominated “habilito”) from a peeling company or a retailer (called “habilitador”) (Candela 2006). Those “habilitadores” have an agreement with concessionaires, who sell them an established quota of their product (peeled or not peeled) (Rivero pers. comm. Vera pers. comm.).

Peeled nuts have different categories, according to their quality, so from an average 80 kilos bags (“barrica”) are produced 20 kilos of first quality nuts (CESVI 2008a). This amount is variable and it depends on nut management and processing: for instance, humidity is the major cause of plagues and it reduces significantly the production, this problem can be reduced with proper management (Candela 2006, CESVI 2008a)

Also, The Brazilian nut trees (*Bertholletia Excelsa*) have a very variable an fluctuating production (Escobal *et al* 2010, figure 4.9).

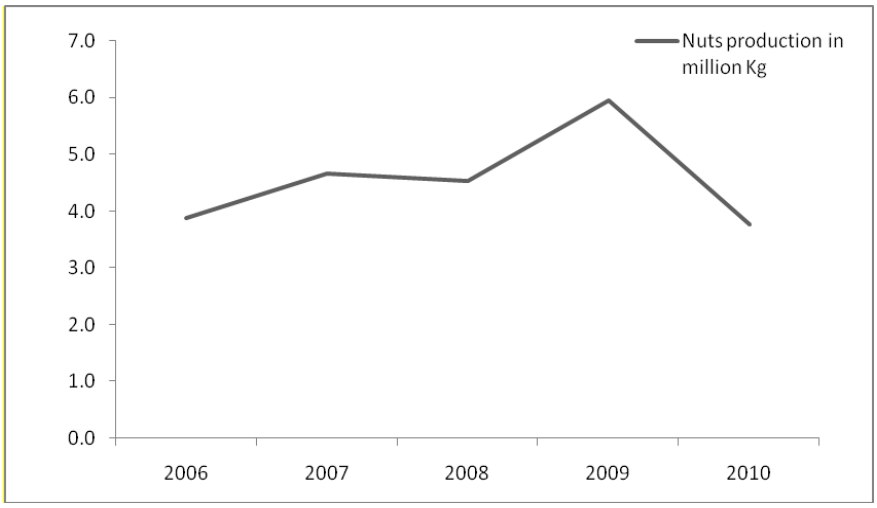

Figure 4.9: Production of peeled Brazilian Nuts in Madre de Dios (DGFFS 2012).

The price is also fluctuating (in the past varied from 1 to 9 dollars) (Rivero pers. comm.). This fluctuation occurs also in the same year, most of the interviewees agree that the price decreases in April, when the concessionaires have to pay tuition fees for the education of their children.

An important characteristic of nut concession holders is their advanced average age, 55 years (Candela 2006). This is often considered a strong limit to improve their management, complete successfully training workshops and introduce new practices (Wilson Suri pers. comm).

Nut concessionaires can harvest timber, if they submit a proper complementary management plan signed by a certified engineer (Cossio – Solano et al 2010). This activity is a perfect complement (and sometime it became the primary source of income) to nuts harvesting, because it starts in April, so after the nuts have been harvested (CESVI 2008a). However, logging has many negative consequences. There is no study about the effects of logging on nuts production, so the 5 m^3 limit per hectare is generally considered too high (Cossio – Solano et al 2010). According to the same authors, crucial factors are ignored, such as timber potential, nuts density and productivity. In addition, logging in nuts concessions is

suspected to be used to cover illegal timber, because the extraction per hectare has been higher in nut concessions than in timber concessions (Cossio – Solano et al 2010).

Nuts concession got different types of certifications: organic certification, Fair trade organization (FLO), and FSC (Candela 2006). FLO and organic certification provide an economic bonus for the concession, (Rivero pers. com.), while FSC did not find any specific market (Candela 2006) so it was generally abandoned (Vera pers. comm.).

An interesting opportunity for gatherers concession is the REDD initiatives promoted by the private Peruvian company Bosques Amazonicos. This initiative involves 261 concessions affiliated to the FEPROCAM (Federation of nuts gatherers of Madre de Dios), for totally 206 thousand hectares (appendix 20 figure 1, FEPROCAMD 2012). This project benefits nut concessions in two ways: the company invests in a nuts processing plant, and at the same time it calculates the carbon stock and sell it to the carbon market (Flores pers. comm.). The private company will also implement training, capacity building and provide services (Flores pers. comm.). The profits from these activities will be afterwards divided by the company and concessionaires according to the agreement (Annex 20, table 1). The main perceived threat for this project is a change in governmental policies, which have been favorable so far (Flores pers. Comm.). This may represent an interesting source of income for these concessions (Suri pers. Comm.). However, I perceived that there is not a clear strategy to address the main drivers of deforestation and in improving harvesting techniques. This may affect the success of the project, also because obligations and benefits for the nut concessionaires are not completely clear yet. Indeed, the project was participative and it has organized many meetings with the concessionaires to clarify this purpose and objective (Flores pers. comm.).

Chapter 5: Data Analysis

The research assessed 4 timber concessions and 11 nut gatherers concessions (table 5.1).

Table 5.1: The main characteristics of the sample

Type of Concession	Name of the Company[7]	N. of Hectares (1,000 ha)	Size / Business Strategy	Certification Status
Timber	Otorongo	75	Big – export	FSC (SGC): FM and CoC
Timber	Tawari	22	Small – local	FSC (SW): FM and CoC
Timber	Kalinowski	5	Small – local	No
Timber	TC1	46	Big – local	No
Nuts	ASCART 1	0.7	Added value – Local	Lost FSC
Nuts	ASCART 2	0.9	Added value – Local	Lost FSC
Nuts	ASCART 3	1.8	Added value – Local	Lost FSC
Nuts	RONAP 1	0.6	Certified - International	FLO (temp lost) and Organic
Nuts	RONAP 2	1.2	Certified – International	FLO (temp lost) and Organic
Nuts	RONAP 3	0.8	Certified – International	FLO (temp lost) and Organic
Nuts	RONAP 4	0.6	Certified – International	FLO (temp lost) and Organic
Nuts	NC 1	0.6	Local	No
Nuts	NC 2	1.2[8]	Local	Lost FSC and Organic
Nuts	NC 3	1.2	Added Value Local	Lost FSC and Organic
Nuts	NC 4	0.4	Local	No

5.1 The timber sector

The first company assessed[9] is the "Forestal Otorongo", which is part of the Peruvian company "Bozovich Group" (Grupo Bozovich 2010). The "Bozovich Group" is the major exporter of timber in Peru (EIA 2012) and it is formed by different companies, which work at different phases of the production (Melendez pers. comm.). Otorongo is the only certified concession of the Group, the other two in the

[7]One timber company decided to remain anonymous and it will be denominated TC1). The nut concessions are denominated only if they pertain to an Association as they did not authorize to use their name.
[8]The original concession is only 600 ha, this figure includes two private area (NC2 pers. comm.)

region are in the process of certification, but the company represents the first pilot project (Melendez pers. comm.). The Group's main market is the international, and it commercializes different products (from plywood, deck and parquet) (Bozovich 2012). The Group was criticized for its unsustainable management in the past (EIA 2012), however the recent FSC certification and commitment to SFM are promising. This research investigated only two phases of the process: from the extraction in the forest only in the concession managed by the "Forestal Otorongo" to planing wood, done by an associate company (member of Bozovich Group) "Forestal Rio Piedra" (certified CoC, FSC Peru 2012).

The second company is "Maderera Tawari'", this company produces plywood and its operations are all completed inside the forest with a portable sawmill (Huanca pers. comm.).

A third company, Maderera Kalinowski, was closed by the local authorities in 2010 owing to the lack of compliance with the forest management plan (Kalinowski pers. comm.). This incompliance is partially justified by a serious illness that happened to the owner, who could not control the operations (Kalinowski pers. comm.).

The last company had serious economic problems: this company failed, because it could not pay for several years the governmental fees (TC1 pers. comm.). This occurred because illegal mining operations invaded the river, and did not allow the company to transport its product (TC1 pers. comm.). As a consequence, the concession was sold to other entrepreneurs (TC1 pers. comm.). The table shows an assessment according to the 3 spheres of sustainability and stakeholder and conflict management (table 5.2).

[9] It is the only company where the researcher could visit both the concession and the plant

Table 5.2: Ranking of the 4 companies assessed

	ECONOMIC	ENVIRONMENT	SOCIAL	Stakeholder & conflict management
Otorongo	+	++	+	++
Tawari'	+	++	++	+
Kalinowski	=	--	-	-
TC1[10]	--	=	-	-

Legend:+++Excellent ++ very good, + good, = fair, - bad, -- very bad;

5.1.1Economic Dimension

The economic assessment was probably the most challenging due to the lack of data of some companies. Overall these concessions are considered to be profitable by interviewees and also previous studies (Giudice *et al* 2010).

The indicators used are detailed in the table (5.3).

Table 5.3: Economic Indicators Timber Concessions

	Otorongo[1]	Tawari	Kalinowski[2]	TC1
Profit	Very Good	Very Good	Very Good	Very Poor
Administrative Management	Fair	Very Good	Poor	Very Poor
Number of timber species harvested	Good (8)	Poor (2)	Poor (3)	Poor (3)
NTFP	Good	Good	No	No
Added value	Very Good	Sawning	Planing	Sawning
CoC	Yes	N/A	N/A	N/A
Use of by-product	Fair	No	No	No
Incentives, Subsidies	Good (State Incentive)	State Incentive, and NGOs funds	No	No
Access to the credit system	Yes	Difficult	No	No
Long Term Investment Plan	Yes	No	No	No
Total	**Good**	**Good**	**Fair**	**Very Poor**

1 Some indicators were considered as Bozovich Group or included the Empresa forestall Rio Piedra
2 This company was closed, but it is evaluated economically according to its last operation year (2008)

[10] Non – certified company 1

The most important parameter for a company is its financial performance, so the profits: a company in loss is unable to operate in the long run, so it is completely unsustainable. Indeed, most of the timber companies are in high profits, as confirmed also by previous studies (Giudice *et al* 2010).

The company TC1 was in loss, because it had a 400 thousand US $ debt with the government for not paying the concession fees (TC1 pers. comm.). Forestal Otorongo has relevant profits only if the entire Bozovich Group is assessed (Melendez pers.comm.). Consequently a proper financial analysis was not possible for the Forestal Otoronogo. Maderera Tawari' is also highly profitable: in 2011 profits accounted for approximately eighty thousand dollars, with an overall 1.77 cost benefit analysis (Tawari 2011). The last company is Maderera Kalinowski, which was in profit until it was sanctioned by the authorities (Kalinowski pers. comm..). This company had around 20 – 30 thousand US$ profits per year, which is impressive considering its size (Kalinowski pers. comm.); however this data is not supported by proper documentation.

The data and administrative management was another indicator for the economic dimension. This is often an invisible and indirect benefit, as it allows companies to calculate costs, benefit and to project eventual investments. The certification seems to be important: both certified companies (Forestal Otorongo and Maderera Tawari') have proper budgeting and financial plan. Indeed, the Bozovich Group structure does not allow for completing a proper assessment (the management is at national level). On the contrary, Tawari' provided all the relevant financial information, included in their management plan, including NTFP (Tawari' 2011). One of the main reasons for this company to be certified is that it is obliged to maintain proper administrative management, which is crucial to manage its activity (Huanca pers. comm.).

On the contrary, poor management was common to both non-certified companies. Accordingly, TC1 could not conduct any cost benefit analysis and its bid was too high. This miscalculation was one of the reasons for its business failure. Maderera Kalinowski did not have any administrative management, or a cost analysis (Kalinowski pers. comm.).

The number of products commercialized is another important parameter. Thus, Otorongo harvests more species than the others, so it has a strong advantage. This company is the only one with proper land transportation (Pers. Obs.). The other companies cannot harvest hardwood, because they transport timber on boats. This is a great limitation in terms of number of products commercialize, higher cost of transportation and dependence on weather conditions[11] (TC1, Kalinowski, Huanca pers. comm.).

Regarding NTFP, the certified companies again show better performances as they both gather Brazilian Nuts. In 2011, this activity accounted for around 10 - 15% of the income for Otorongo (Melendez pers. comm.) and, 66% of the income for Tawari' (Tawari' 2011). Probably due to the relative importance, Maderera Tawari manages better nut processing (so with a proper infrastructure) (Huanca pers. comm.); on the other hand, Forestal Otorongo only recently will build proper infrastructure for the nut processing (pers. observation). The Brazilian nuts commercialized are not certified, but there is the willingness to achieve the organic certification (Melendez and Huanca pers. comm.). On the contrary, the other two companies have never gathered any NTFP. However, Brazilian nuts fluctuation of price and production (much higher than timber) makes it an unreliable product.

[11] Transportation is dangerous during the raining season or very difficult during the dry season. In addition, part of the product may be lost during transportation)

Other NTFPs (palm) or economic activities (tourism) were not considered, as there are no studies to determine their economic potential (Melendez pers. comm.).

All the companies sell processed timber, but with different potential and at different phases. Maderera Kalinowski (when it was active) and Forestal Otorongo (including also Rio Piedra) process the timber until planing (Personal Observation). The Bozovich Grup further processes it to produce deck, doors and parquet in Lima (Bozovich 2012). The other two companies produce sawnwood within their concession with portable sawmills (Huanca pers. comm., TC1 pers. comm.).

Forestal Otorongo (and Empresa Rio Piedra) is the only company with CoC certificate, so it separates properly certified and non-certified timber (Pers. obs.). the CoC certificate is crucial, because the Bozovich Group is certified mainly because FSC certificate provides higher access to international markets. The only certified company is losing its certification after sawning, the timber is sold only in the local market, because the production is too low (Huanca pers. comm..). This is a great limitation, as this company does not access any direct benefit from certification. The other two companies sold timber at local market: if TC1 could not access the certification because it did not achieve minimum standards (its high debt and the invasions) (TF1 pers. comm..); Kalinowski did not want to be certified, because it had too low production and it would not have accessed the international market, the certification was considered pointless (Kalinowski pers. comm..).

TC1 and Tawari have no strategies to reuse their by-products, because they leave it in the forest. Neither Kalinowski implemented any strategy for this issue. Remarkably, Forestal Otorongo has put in place measures to reduce the waste, so in the plant there is one section specific to recovering the least usable wood to produce plywood (observation). However, the non – usable timber is burnt to

produce coal, which is a not recommendable waste of certified log (other uses may be more profitable) (observation).

Both certified companies receive the state incentive (55% for Otorongo and 35% for Tawari). This reiterates their good management. In addition, Otorongo has an internal subsidy, because it sells roundwood at a low price within its Group (Melendez pers. comm.). Tawari received and still receives important benefits and subsidies from other NGOs for training, certification, annual plan, biological study, plus other consultancies it may require(Huanca pers. comm.). This is risky, because these activities are costly and the company may not be able to keep the certification when the subsidy will not be granted, especially in a negative year. The other two companies did not receive any economic subsidy, only TC1 received some funds for training in 2003.

Investment plans and access to credit are linked, as the credit system may incentive investment. Due to its size and for being member of a big corporation, Otorongo has a favourable access to credit and also an investment plan (Melendez 2012 pers. comm.). All the other timber concessions expressed dissatisfaction with the credit system considered generally inaccessible, especially because these companies do not have credit guarantees (Huanca, Kalinowski, and TC 1 pers. comm.). Due to the same reasons, Tawari, Kalinowski and TF1 do not have a long – term investment plan.

In conclusion, the economic sphere assessment is justified by the indicators chosen. Otorongo has a very good performance, not excellent because it could not provide data at local level. Indeed, all the other indicators are positive. Tawari has a good performance, but not very good due to its lack of access to credit, few products commercialized, and high subsidies (so uncertain effective sustainability). The other companies have lower performances: Kalinowski is fair better because, although it

has low evaluation in many indicators, it was profitable and provides added value to its products; TC1 has a very poor performance: legal problems, poor cost benefit analysis, and poor budgeting were partially the reasons of its failure.

5.1.2 Environmental Dimension

The second category used is the environmental dimension; the main indicators are shown in table 5.4.

Table 5.4: Environmental Indicators Timber Concessions

	Otorongo	Tawari	Kalinowski	TC1
Forest Management Plan	Very Good	Very Good	Very Poor	Good
Buffer Zone	Very Good	Very Good	Poor	Fiar
Protected Area	Good	Good	Very Poor	Very Good
Other studies	Very Good	Fair	Very Poor	Very Poor
Waste Management	Very Good	Good	Poor	Fair
Reduced habitat Fragmentation	Fair	Fair	Poor	Poor
RIL techniques	Very Good	Very Good	Good	Good
Seed trees	Very Good	Very Good	Poor	Very Good
Reforestation	Good	Fair	Very Poor	Very Poor
Species Inventory and monitoring	Very Good	Very Good	Very Poor	Very Poor
Other innovative activities	Excellent	Fair	Very Poor	Poor
Diffusion of SFM practices	Poor	N/A	N/A	N/A
Total	**Very Good**	**Good**	**Very Poor**	**Fair**

This category shows a difference between certified and non – certified companies. Indeed, Kalinowski shows the lowest performance: it poorly respects the minimum legal requirements; accordingly it was closed by OSINFOR (Kalinowski pers. comm.). Although it was not certified, TC1 complied with most of the laws (except buffer zones), and implemented some interesting practices (such as

establishing a protected area, which accounted for more than 10% of its territory, triggered by the legal incentives). However, it was not interested in any study or advanced SFM practices (TC1 pers. comm.). The two non-certified companies have lower standards: both of them do not respect the buffer zone, do not implement any reforestation strategy and only complete the inventory of commercialized species, basically ignoring endangered species and nests (Kalinowski pers. comm. and TC 1 pers. comm.).

On the contrary, in this sphere the certified companies implement, as shown in the table, many activities: buffer zones around watersheds, a proper management of nests and endangered species, an inventory of fauna, waste management, conservation of seed trees, respect of the law, and maintain a conservation area of about 8% of the total concession (even though in both cases selected mainly for its inaccessibility, rather than high biological value) (Huanca pers. comm., Grupo Bozovich 2010, and Melendez pers. comm.). Only in the application of RIL techniques, the performance is quite similar for certified and non-certified companies (Plaza pers. comm.).

Indeed, habitat fragmentation is the main issue for all the companies: all of them use heavy machineries and only Otorongo and Tawari have guidelines to limit their impact (all interviewees pers. comm.). Although its overall higher habitat fragmentation impact (due to the large scale), Forestal Otorongo has implemented interesting not obligatory practices, such as the ban of mahogany harvesting (Nelsom Melendez pers. comm.).

In addition, it has put in place the most advanced practices: it installs in its logging camp a biological sewage system, it manages outside the concession the inorganic waste, and it prohibited hunting (Melendez pers. comm.). Also, this company pays impressive attention to research: soil erosion, reforestation analysis,

a comparative study on forest regeneration in area of operations and in the protected area, and a biological study for a long term environmental monitoring (Melendez pers. comm. and Grupo Bozovich 2010). These activities cannot be financed by a small certified company (Huanca pers. comm.).

The main limitation of the certification is its limits of diffusion. For instance, there is a general poor management in the processing plant of Empresa Forestal Rio Piedra, when the non certified section (coal production) was assessed (observation). In this plant, poor waste management and coal production may have impact on near watershed, ground waters and also increase the atmospheric pollution (the wood is burnt to produce coal) (observation).

Another big limitation of all the companies is the lack of a holistic vision, so no one implements a landscape management. For instance, the reforestation implemented does not imitate ecosystem dynamics, but it is more similar to a plantation (pers. observation, Forestal Otorongo). A partial justification is that SFM in the country is a new process, but indeed companies are now more responsible than before (Plaza pers. comm.).

In conclusion Otorongo has generally very good performance, although it could improve some practices. Tawari has also good performance, but its smaller size affects its possibilities to implement advanced techniques. TC1 had some interesting practices, but it did not implement any reforestation, research or innovative strategies. Maderera Kalinowski has the lowest performance, because it did not respect even the minimum legal standards or basic practices (such as respecting the annual plan, seed trees and diameter) (Kalinowski pers. comm.).

5.1.3 Social Dimension

The social sphere is the sustainable dimension, where the main difference between certified and non-certified occurs (table 5.5).

Table 5.5: Social Indicators Timber Concessions

	Otorongo	Tawari	Kalinowski	TC1
Legal Contracts	Very Good	Very Good	Poor	Poor
Working Conditions	Very Good	Good	Fair	Fair
Health and Safety Measures	Excellent	Very Good	Poor	Poor
Training	Very Good	Very Good	Fair	Fair
Hiring Local People	Good[1]	Good	Good	Good
Gender	Good	Good	Fair	Fair
Commitment with local development	Very Good	Very Good	Very Poor	Very Poor
Other Innovative Activities	Excellent	Very Good	Very Poor	Very Poor
Total	Excellent	Very Good	Poor	Poor

1 It is good for their effort to hire locals, even though not so successful

FSC certificate requires respecting workers' rights, legal contracts, organizing trainings, and implementing safety (such as head protection) and health measures (mainly medicine and emergency procedures) (Melendez, Huanca pers. comm.). In addition, training does not regard only the extraction, but also forest management, waste management and safety (Melendez and Huanca pers. comm.). Indeed, the educative process is long, especially when works change position or job, so it is positive to repeat the training every year (Melendez pers. comm.).

Similarly to the environmental dimension, these practices depend on the scale of operations, so a big company (such as Otorongo), for instance can hire a medical assistant, build a comfortable logging camp or install a radio communication system to be used in case of emergency (observation).

None of the non certified companies implement comparable safety measures, and most of the time they hire staff without a proper legal contract (Kalinowski and TC 1 pers. comm.). Also, these companies train occasionally their staff only for harvesting and extraction, while safety is ignored (Kalinowski and TC 1 pers. comm.).

Interestingly, the company Otorongo has a survey of self evaluation distributed to the workers (Grupo Bozovich 2010) and its camp has very good living conditions in terms of water supply, food, and also entertainment (observation). However, this company could not employ many local workers mostly for the high salaries provided by other activities in the area, such as informal mining (Melendez pers. comm.). This may change in the near future because Forestal Otorongo has an agreement with the local CGB aiming at increasing the number of local workers (Marchena and Melendez pers. comm.).On the contrary, all the other companies employ (or employed) generally locals (Kalinowski and TC 1, and Huanca pers. comm.).

Regarding the gender equality, women work in the forest operations generally in the kitchen (Kalinowski, Huanca, TC1 pers. comm.), this slightly changes in the Rio Piedra's processing plant (Rio Piedra), where the ratio is more even (observation). Interestingly, the company Tawari' is managed by a couple with an equal work division: the husband is in charge of operations and the wife responsible of administrative tasks (Huisa pers. comm.).

The lack diffusion of certification characterises also the social dimension: for instance, in the coal production area no one wears protection and in the nuts harvesting, there is no strict control over the workers (observation, Forestal Otorongo).

Certified companies also are awarded by FSC if they finance local development projects in their area of intervention. (Melendez and Huanca pers. comm.). Indeed, this activity is implemented upon request, without a clear and established methodology (Melendez pers. comm.., Huanca pers comm.).

In conclusion, this sphere is probably the area where the difference between certified and non-certified companies is more remarkable, as conventional businesses do not pay attention to the social development, as confirmed by OSINFOR (Plaza pers. comm..). Indeed, Forestal Otorongo can invest in better conditions, so it has an excellent performance (it could improve in hiring locals). Maderera Tawari has a very good performance, but it can implement fewer activities due to its limited scale. The main concern regards Tawari, which may not achieve the same standards without the subsidy and if a crisis of prices occurs.

5.1.4 Stakeholder and Conflict Management

The last parameter takes advantage of the concept of stakeholder and conflict management, to assess how each concessionaire responds to external threats and if it has a system of alliances (table 5.6). This category was perceived as crucial, during the workshops (annex 16) and interviews.

Table 5.6: Stakeholder and conflict management Indicators Timber Concessions

	Otorongo	Tawari	Kalinowski	TC1
Important Allies	Very Good	Excellent	Very Poor	Poor
Monitoring	Very Good	Good	Poor	Poor
Response to External Threats	Very Good	Good	Poor	Poor
Other Innovative Strategies	Very Good	Very Good	Poor	Poor
Total	**Very Good**	**Very Good**	**Poor**	**Poor**

This category is complex, because some indicators overlap. Regarding the system of alliances, Maderera Tawari has the most advances. These partnerships contributed to reduce significantly the costs of training, monitoring, direct and indirect costs of certification (Huanca pers. comm.). In addition, Tawari' created also alliances with other forest companies, in the future they plan to build a road for common transportation and monitoring in the near future (Huanca pers. comm.). Building a road could be contradictory, as it may increase the risk of invasions. However, the support of international NGOs and the perceived higher protection from a certification status were the main reasons for Tawari to become certified (Huanca pers. comm.).

Forestal Otorongo also has well-established system of partnership: the co-management of its main road with other forest companies, a strong membership with the local CGB, and cooperation with local governments (Melendez and Marchena pers. com.). The other two companies did not have significant alliances. The company Kalinowski refused any support from NGOs and other governmental actors, because the owner considered it pointless due to its small scale (Kalinowski pers. comm.). TC1 suffered from a serious external threat, (the mining invasion) and even if it was a victim of the circumstances (TC 1 pers. comm.), building alliances before the invasion would have ameliorated its response capacity to these threats.

The monitoring system is strongly limited by the size of operations. A small company (such as Tawari) cannot monitor continuously its concessions (Huanca pers. comm.), while Forestal Otorongo has a well established and continuous monitoring system, so the risks of invasion are relatively low. In addition, Forestal Otorongo has a detailed conflict resolution guidelines and strategy (Melendez pers. com.).

Indeed, all the forest companies assessed experienced invasions or robbery, and all complained about the absence of the local authorities, generally considered not adequately funded and unable to protect the concessions (Kalinowski and Melendez pers. comm.). This is partially confirmed by OSINFOR, which admits that the process is slow and ineffective, mainly due to the lack of coordination among different departments, lack of fund to finance field visits and of skilled officers (Plaza pers. comm.).

In conclusion, both Tawari and Otorongo have a very good stakeholder and conflict management evaluation. The other two companies have generally poor performance.

5.2 Nuts Concessions

The nut concessions sector is very complex; so the interviewees were divided into three groups. The first group is represented by the member of ASCART (Association of Nuts Gatherer from the Tambopata Reserve, 32 members), the second group is composed by the members of RONAP (Gatherers of the Organic Amazonian Nuts of Peru', 55 members), while the third group gathers information by various gatherers from many other associations with less advanced practices. So, the first two groups represent the best cases in the region, while the third group could be a representation of the "average" nuts concession management.

Table 5.7: Ranking of the 3 groups of nut gatherers

	ECONOMIC	ENVIRONMENT	SOCIAL	Stakeholder & Conflict Management
ASCART[12]	+	+++	++	+++
RONAP	++	+	=	=/+
Others	=	=	=	=/-

Legend: +++Excellent ++ very good, + good, = fair, - bad, -- very bad

[12] It does not take into account the temporary lost of FLO certification (Rivero pers. comm..), because it did not submit proper reports of the assemblies and documents of participation of its members

5.2.1 Economic Dimension

The economic assessment for nut concessions did not use exactly the same indicators used for the timber concessions assessment.

Table 5.8: Economic Indicators for Nut Concessions

	ASCART	RONAP	OTHERS
Administrative Management	Good	Good	Poor to Good
Timber Harvesting	No	Yes	75% yes
Farming/Cattle grazing	No	No	Yes (50%)
Added value	Very Good	Fair	Poor to Very good
Incentives, Subsidies	Good	Very Good	Very Poor to Good
Access to the credit system	Poor	Poor	Poor
Long Term Investment Plan	Good	Fair	Poor
Profit	Very Good	Excellent	Good
Total	**Good**	**Very Good**	**Fair**

The members of ASCART are all located in the Tambopata Reserve, so they have a special management and stricter rules in terms of forest management, for this reason they cannot harvest timber, practice agriculture or grazing in their concessions. (Vera, ASCART 1, ASCART 2, ASCART 3 pers. comm.).

This association had FSC certification, but it lost it because they could not access the international market and receive any economic bonus, so the costs of certification were not justified (all ASCART interviewees, Vera pers. comm.). Indeed, some basic administrative practices required by FSC were maintained, and this is helpful to manage data and budgets (all ASCART interviewees pers. comm.).

ASCART is the only association with an operating processing plant, so it can peel autonomously their product and control all the phases of production (Vera pers. comm.). The control over different phases of production is extremely advantageous: the association can sell when it is more convenient (Vera pers. comm.), and there is a higher production of the first quality nuts (22 kilos of peeled out of one 80 kilos bag, instead of only 20 as usual) (ASCART1, ASCART 2 pers. comm.). In addition ASCART gives further added value to its product, producing also as oil (with the third quality nuts) and soap (this for self consumption) (ASCART 1 and 2 pers. comm.).

However, the association has certainly some problems. Firstly, the plant has been working for one year, so it does not have all the certificates and it cannot export (Vera pers. comm.). Secondly, ASCART is unable to provide entirely the "habilito" (Vera pers. comm.). Consequently, the members cannot wait for the price established by the association[13], and it is estimated that on average only 30% (only few deliver 100%) of their production is delivered to the plant (Vera pers. comm.). the plant demonstrates that the association has a long term strategy (each member contributed to build the plant), and that it could have important funds from national and international NGOs.

The members of RONAP had organic and fair trade certification, respectively since 2001 and 2004 (Rivero pers. comm.). The most important condition to be member of RONAP is to submit to the organization at least 70% of the production, thus the association has significant volumes (Rivero pers. comm.).

This analysis will assume that both certifications are still active (FLO was lost in 2011), as the association plans to apply for FLO again next year (Rivero pers

[13] Once submitted, the product is controlled by the ASCART directive, which decides when to sell it (Vera pers. comm.)

comm.). Indeed, the lost of the certification demonstrates the vulnerability of certification for small producers, but it cannot delete several years of good management.

The success of certification was caused by the bonus: 0.18 US $ and 0.3 US $ respectively for the organic and Fair Trade label (FLO) certifications (Rivero pers. com). The funds gained with FLO were used to finance RONAP administration , while those from the organic certification were paid during Christmas to the members[14]. This demonstrates a long – term strategy, rare in a rural association. In addition, FLO provides a minimum price of 2.6 US $ per kilo, even if the national or international prices collapse (Rivero, and all the interviewees from RONAP comm.). Finally, the certification significantly increased data and administrative management in the concessions (Rivero, and all the interviewees from RONAP comm.). However, this practice is not diffused to the timber sector (Pers. obs.).

This successful management was achieved also with the support of a fair trade NGOs, Candela Peru (Rivero pers. comm.): this NGO helped the association to access the international market. Candela is a special "habilitador" and it provides several services to the nut gatherers at a convenient price (transportation, training, little rural markets, legal assistance, a report with suggestions regarding the quality of the product, inspections and the "habilito") (Rivero, RONAP 1 and 2 pers. comm.). The partnership with Candela is positive, however this NGOs is also criticized by most of the producers, because it pays too late the "habilito" (RONAP 1, RONAP 2, RONAP, 3 pers. comm.).

[14] In December, the nut gatherers spend more money for Christmas; at the same time it is too early to collect then uts, and too humid to harvest timber.

Another activity implemented in the concessions is harvesting, which represents roughly 50% of the income of the members of RONAP interviewed (roughly 50%) (RONAP 1, RONAP 2, RONAP 3, RONAP 4 pers. comm.).

The third group of gatherers has a less advanced organization, so they are more dependents on the “habilitadores”. In this group two members had FSC certification, but they did not renew it for the same reasons as ASCART (NC 2 and NC 3 pers. Comm.). It is very difficult to evaluate this group because it is very heterogeneous: one producer sells almost all non peeled (observation); another has several activities in its concession, such as farming and cattle grazing (observation); a third processes at her home the peeled nuts to produce cakes and biscuits (NC 3 pers. comm.). The two producers who lost certification have slightly better data on their business (NC2, NC 3, all interviews from ASCART). Indeed, only one of the interviewees does not harvest timber, but she is planning to do it from this year (TC3 pers. comm.).

A final possible source of income is the REDD project, 5 producers (ASCART is excluded from the project for being part of the Tambopata reserve) joined the project, but they do not clearly know their obligations and benefits (NC2, NC3, NC4, RONAP 1, RONAP 2 pers. comm.). Indeed, this may potentially create incentives (payment from carbon market) and also more profits from the processing plant (which could follow the example of ASCART). However, this project is at a preliminary phase, so it is not included in this assessment.

The analysis of the third group is very difficult, due to its high variability and the general lack of data. However, these concessions do not show a general business strategy and reliable data is generally missing.

Surprisingly, none of the eleven producers have ever received training in business management or administration, and this should be addressed in the future.

This is indeed one of the main problems to improve their administrative management (observation). Also, none of them have access to the credit system, but they received some supports from national and international development funds (all interviewees pers comm.).

Indeed, RONAP and ASCART have the best economic performance, but also different strategies: the first association is based on certification and alliance with a strong commercial partner, the second based on controlling all the phases of production. It is difficult to establish the most profitable, consequently, this thesis developed a scenario analysis, based on price fluctuation. This analysis compares the two groups (ASCART and RONAP) each of them represented by a best case (100% of production delivered to the association for both groups) and an average case (See appendix 21, for more details about criteria, indicators and main assumptions). The results are in figure (5.1)

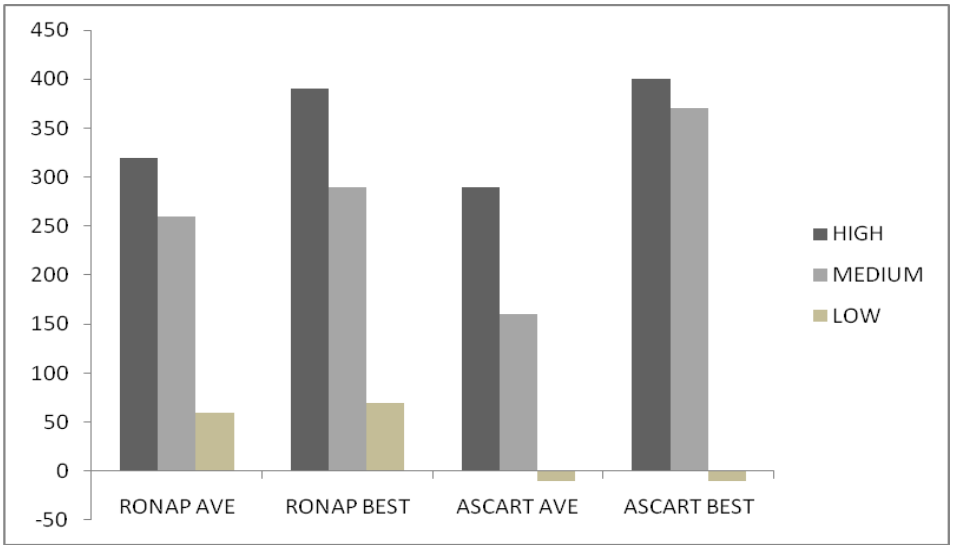

Figure 5.1: Estimated Return of Investment[15] in % according to the different scenarios.

The nut production is indeed a profitable business, if the prices do not collapse. The two "best cases" show better performances when compared to the average cases, as expected. Indeed, the bonus is not really significant at high and

[15] It is the profit divided by investment for the period

middle prices, but the certification benefits (and the minimum price) are relevant at low prices (the association without certification is in loss). The advantage of controlling the production is significant (ASCART case), but only when most of the product is delivered to the plant, and this has not often happened so far (but it may in the future). So, one of the major strenghts of RONAP is the obbligation for its member to deliver 70% of the total production, while ASCART delivers only 30% (Rivero, Vera pers. comm). This causes the significant difference. Another interesting data is the breaking even point, related to price variation (figure 5.2).

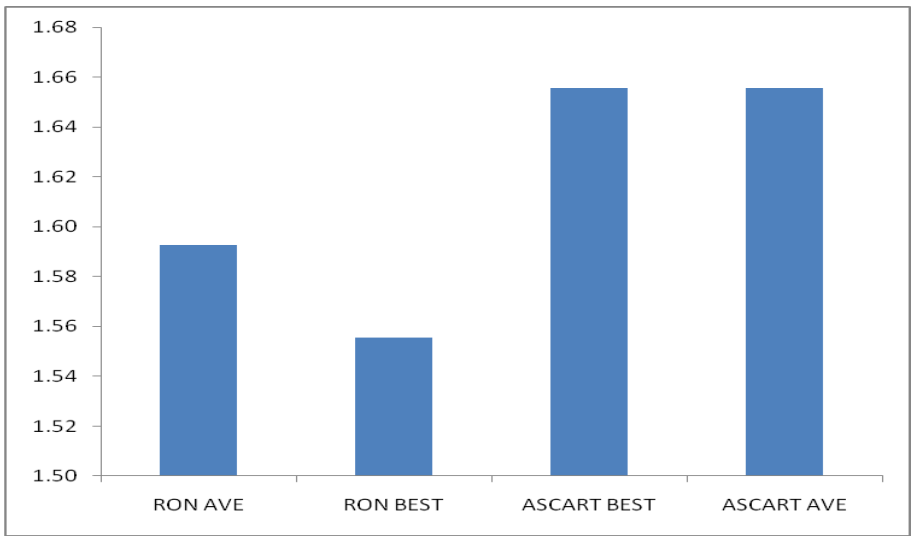

Figure 5.2: Break even point in relation to price (in US $) per kilo of peeled nuts

This graph shows that the minimum price set by FLO is crucial, because above the break even point. This is generally lower for RONAP, especially because they have generally lower costs (partnership with Candela and certification paid directly by RONAP with FLO benefits) and depend less on the market prices (FLO minimum prices).

ASCART is vulnerable in the low prices scenario, even though this does not take into account the production of oil and soap. In conlusion, RONAP shows a slightly better performance for the nut sectors. However, this analysis excludes the timber sector, which would increase the difference with ASCART. However, the

members of ASCART may increase their potential profits if the plant is successful and able to incentive its member to deliver more percentage of their production. The third group assessment is more complex, but this group generally lakcs of a long term financial strategy, which may improve with the future REDD project (which is too unclear to be evaluated).

5.2.1 Environmental Dimension

The environmental dimension is evaluated according to the indicators in table 5.9.

Table 5.9: Environmental Indicators Nut Concessions

	ASCART	RONAP	OTHERS
Nuts Management Plan	Excellent	Very Good	Fair
Timber (management)	No	Poor	Poor
Farming / Grazing (management)	No	N/A	Poor
Waste Management	Excellent	Very Good	Good to Very Poor
Protected Area	N/A	Poor	Poor
Hunting	Excellent	Fair	Fair
Species Inventory and monitoring	Fair	Poor	Very Poor
Reduced habitat Fragmentation	Excellent	Fair (Good for nuts, Poor for Timber)	Poor
Diffusion	N/A	Poor	Poor
Total	**Excellent**	**Good**	**Fair**

The members of ASCART have a very advanced forest management due to their location inside the Tambopata Reserve (ASCART 1, ASCART 2, ASCART 3

pers. comm.). The control of the authorities of the reserve is very strict; therefore there is an extremely high compliance with the annual management plan. In the Reserve logging is forbidden, as well as agriculture, cars and trucks (only boats are allowed) (ASCART 3, ASCART 1 pers. comm.). In addition hunting is controlled and the concessionaire is obliged to stop its activity by May (ASCART 1, ASCART 2, ASCART 3 pers. comm.).

Other obligations refer mainly to waste management: these concessions must manage outside the forest inorganic and hazardous waste, or chemicals (ASCART 1, ASCART 2, ASCART 3 pers. comm.). All these measures contribute to reduce significantly the impact of the gathering activities. Not surprisingly, the strict criteria of the reserve make it not so difficult to achieve the FSC certification (the only additional rule was the now abandoned biological monitoring) (ASCART 1, ASCART 2, ASCART 3 pers. comm.).

The members of RONAP have also advanced management practices. In order to comply with the certification, all the concessions manage their waste: inorganic and organic are buried in different holes, and only hazardous is taken out (interviewees from RONAP pers. comm.). Additionally, the members of this association have to manage chemicals and gasoline and also maintain toilets far from where they stock their product (Rivero pers. comm.). However, there is partially incompliance with this rule in some cases (RONAP 4).

Indeed, the major environmental impact arises from timber harvesting: all the interviewees from RONAP practice logging, with a poor management. For instance all the interviewees practice logging close to the watershed, there is no buffer zone, poor RIL, and none puts in practice road management plans. Only one of the members of RONAP interviewed did not use heavy machineries to extract the timber and received proper training on harvesting (RONAP 2), but the rest has poor

knowledge on SFM practices or RIL techniques. The logging complementary plan is also not fully respected (appendix 22). But this is unfortunately common to most of the concessions when logging is allowed and it happens partially due the lack of knowledge, or consciousness, but also owing to the subcontracting system (Plaza pers. comm.). This occurs when external actors pay the concessionaire to harvest timber, but they often do not pay attention to environmental standards or laws, as they will not pay the consequences. (RONAP 1, RONAP 2, RONAP 4, Plaza pers. comm.). Only one concessionaire claimed to harvest always directly its timber (RONAP 3).

Although, certification in nuts concession has some limitations of diffusion, its management is better than the other group. Only those who were previously certified manage their waste or the chemical, but none of them transferred these practices to its farm or its logging activity, demonstrating again poor diffusion of good practices (NC2, NC3 pers comm.). Also, three of them have recently practiced slash and burn in their concession, mainly because they do not know any other more sustainable practices (NC 1, NC 2. NC3 pers. comm.).

In conclusion, ASCART has demonstrated the best environmental performance, followed by RONAP, despite the overall poor timber management; the other non certified concessions may be classified with a fair management (result of former certified, with a good and never certified with a fair-to-poor management).

5.2.3 Social Dimension

The social dimension was assessed based on the following indicators (5.10)

Table 5.10: Social Dimension Indicators Nut Concessions

	RONAP	ASCART	The Others
Working Conditions	Very Good	Good	Fair to Good
Health and Safety Measures	Excellent	Good	Fair to Good
Training	Very Good	Fair	Poor to Fair
Hiring Local People	Good	Good	Good
Other social aspects	Excellent	Fair	Fair
Diffusion	Poor	N/A	Poor
Total	**Very Good**	**Good**	**Fair**

The respect of legal and decent working conditions is one of the main FLO's requirements. Therefore, RONAP has very good performance. All the he interviewees members of RONAP implement measures to prevent risks (such as providing medical kits) and training on health, general forest management, and safety (RONAP 1, RONAP 2, RONAP 3, RONAP 4 pers. comm.). According to the same interviewees, the main issue is the non compliance with the head protection, mandatory but rarely complied.

However, these practices are not again certification diffused to the other economic activities (such as farms or timber, see appendix 22). Again certification fails to diffuse its practices.

Indeed, ASCART maintains only few health and safety practices (such as having available a medical kit), while the third group is not generally paying attention to this aspect.

The training is crucial to improve and maintain good practices. ASCART, after losing the certification, has not renewed any training, only occasional workshops on forest management (ASCART 1, 2 pers. comm.). The other concessions have

generally lower social standards. Those who never joined certification have no interest in training, safety and health (NC1, NC4). Those concessions that had, but lost the certification have a similar performance as ASCART, so they had training, but implement it only partially (NC 2, NC 3 pers. comm.,). Only two out of eleven concessionaires have ever received any training in logging, and this is surprising because logging is the second most important activity in most of these concessions.

An interesting social benefit, deriving from the membership with RONAP is the provision of social funds (financed by the bonus from FLO) for the funeral of the members and a loan of around 100 dollars (at 0% interest rate) for medical care (Rivero pers. comm.).

In conclusion, RONAP shows very good social standards at individual and interesting practices at organizational level. The only exception is the timber sector, where these practices are not diffused. ASCART and those concessions from the third group which lost the certification have indeed good standards. Finally, NC1 and NC 4 never got the certificate, so they have a poorer performance, and this affects the third group evaluation.

5.2.4 Stakeholder and Conflict Management

Regarding the last category, indicators are shown in table 5.6

Table 5.12: Stakeholder and conflict management Indicators Nuts Concessions

	ASCART	RONAP	OTHERS
Alliances	Very Good	Very Good	Fair to Good
Protection from External Threat and Monitoring	Very Good	Poor	Poor
Invasions	Very Good	Poor	Poor
Total	**Very Good**	**Fair/Good**	**Fair / Poor**

The nut concessions have received strong support from national and international NGOs. For instance, only one concessionaire has never received

support from any development project (NC 4). This is a clear indicator that this sector received plenty of support in terms in different activities: elaboration of the annual plan, forest management plan, mapping, training, and infrastructure for nuts harvesting and drying, or in machinery for processing plants in the case of ASCART (all the interviewees except NC4, Moreno, Rivero, Vera pers. comm.). However, it is important to make a difference between project-based (short – term) alliances, which benefit most of the nut concessions, and strategic / long-term partnerships, such as the alliance Candela-RONAP (based on certification and market) and Authority of Tambopata Reserve – ASCART (based on the particular location). The long term partnership is generally more effective.

Regarding the protection from external threats and invasions, ASCART is the most protected, for being part of the Tambopata Reserve (Vera pers. comm.). The only reported invasion regards illegal logging and hunting from native communities, which have a minor impact (ASCART, 1,2 pers. com..), but no one reported problems of invasion in these concessions.

The members of RONAP are much more than those of SCART vulnerable to invasions and other robberies: the certification obliges them to protect their land, but it does not provide direct support (Rivero pers. com.). The situation is similar for the other concessions: all with problems of invasions. Indeed, the concessions located close to the roads are much more vulnerable (workshop 2012).

Indeed, none of these concessions trust the local authority for two main reasons. Firstly, it has never given them any support; secondly, there was no action after some concessionaires notified invasions or robbery (all the concessionaires pers. comm.). Consequently, no one of the interviewees notifies them, when they suffer from these events. This may cause a sanction in the future, because an official notification protects them from sanction (Plaza pers. comm.).

In conclusion, ASCART shows a very good performance, mainly for being located in a protected area. RONAP and the other group have similar performance, but RONAP has long – term partners, while the others only project based. Consequently RONAP has a slightly better performance.

Chapter 6: Conclusions

This research assesses sustainable forest management practices in timber and nut concessions in Madre de Dios Peru according to indicators of sustainable development. This assessment was mainly based on field research, using interviews, observation, and data analysis. This research aimed to assess these forest management initiatives, and their sustainability, in relation to four categories: economic, social, and environmental dimensions of sustainable development, and stakeholder and conflict management. Three variables were used for each category: certification status, size, and business strategy.

The economic dimension is certainly influenced by the certification, size and business strategy for both timber and nut concessions. The economic sustainability is significantly improved by certification. This may occur directly, for the bonus, incentives, minimum price or higher international demand; or it also occurs indirectly, mainly due to an improved administration and data management. This is the main advantage for most of the concessions, even if they cannot access the international market, which guarantees the direct benefits in terms of bonus or higher demand.

On the other hand, certification is also a cost. This can be prohibitive if the company is too small, or unsustainable if a small concession depends on subsidies and these suddenly disappear. Moreover, small concessions often sell to local rather than international market. If there is no direct market advantage, the certification may be lost, as it happened for some nut concessions.

Size is also positively correlated with economic sustainability, mostly because a big company has easy access to credit while small companies do not. In addition, large companies can more easily afford to be certified, since the costs form a smaller share of total costs. if there is a combination of certification and large size,

the certification is a minimum share of the costs and it is much more economically sustainable.

However, even a small a company can be economically sustainable with a good business strategy. This is the example of ASCART and RONAP. Providing added value to its product, having a strong partner, maintaining a good and strong organization, and also having alliances for subsidies contribute to make greater profits. The business strategy is crucial, as it can make financially profitable even a small company/rural association if properly organized. Indeed, a big size does not help if the business strategy is inappropriate, as shown by TC1.

The environmental dimension is also significantly advantaged by certification: it forces the concessions to implement SFM practices, conduct research and respect the law. In the case-study the certification makes the difference, especially in a generally unsustainable business as timber. Even in nut production (often considered very sustainable), the certified actors show higher environmental performances than non – certified. Interestingly, this is true even when a concession lost the certification; its performance is still relatively high. An exception is ASCART, which for being inside a national reserve has even better practices than certified concessions, especially because the control is stricter and more continuous.

Size matters in the environmental sphere, but only if the company is certified, because it can implement more studies and develop more innovative strategies, which are too costly for a small operation. However, the size itself does not guarantee better environmental standards, as a big operation may be cause more fragmentation and deforestation or forest degradation (due to its higher harvesting capacity).

The business strategy is another factor which may be positive for the environmental dimension. In the first place, being certified can be a business

strategy, because it increases the international demand, but only if the company is big enough to export or it has a good commercial partner. Despite the national incentives for timber concession, there is no market bonus for certified products in this area. On the contrary, nut concessions have market bonus if they export, but no governmental incentive. In addition, providing added value does not seem to be directly related to a better environmental performance.

The social dimension is the sphere where the biggest difference occurs between certified and non - certified operations. So the certified concessions perform significantly better. This is truth also when a concessionaire lost the certification, because some good practices are kept.

The size of operations seems to be relevant for the social dimension, but only if the company is certified. This allows investments in health, safety, and in general better working conditions. This is not true if the company is not certified. Again, incentives, subsidies and other projects may incentive smallholders to implement some good practices in this sphere. However, these practices may be costly and economically unsustainable.

Similarly to the environmental sphere, the business strategy increases the social performance only if the company decides to receive the certificate. This would promote the export. On the contrary providing added value to the product does not seem to influence this dimension of sustainable development.

The last category is stakeholder and conflict management. The certification indirectly motivates the concessions to build alliances in the first place to achieve the certificate. These alliances may be put in place with civil society, local authorities or other companies. For instance, often timber companies and nut concessions (often grouped in associations) are obliged to cooperate. This is a big advantage, for instance in road maintenance and control, but also to respond to market risks.

The certification also obliges the operations to maintain good relations with local communities: the support to local development is a very interesting activity. However, this fund is financing activities without a long term strategy, and its effectiveness may be improved.

Another precondition for the certification is a conflict resolution strategy and a clear definition of concession area. Therefore, a concession has to try all its best to preserve its land. The need to protect the land against invasion also is a stimulus to build alliances; this may help especially small operations. However, the certification does not have any direct tools to protect certified area against external threats. They do not have enough funds to monitor their area. This is a big limit, especially in the Peruvian context, where laws are not enforced and there is a perceived inaction of the authorities after any notification.

Regarding the size, a big company can implement an appropriate monitoring system, while for a small operation a strong ally is required to protect the land, as shown by ASCART (alliance with the Authority of the Reserve). Another interesting case is Tawari: it is vulnerable because it is small, but this motivated the owners to build strategic alliances. A big company may not have this need.

The business strategy may be relevant too. Accessing the international market may require CoC, so a stricter control on timber. The added value does not seem to be influential in this aspect.

In conclusion, certification status is the most relevant factor to trigger SFM practices, even after the certificate is lost. Consequently, the certification is working and it also influences the other three categories. The size does not seem as relevant as certification status, but it may lead to improving SFM practices in certified operations. The last parameter is less relevant: the business strategy increases the economic performance, and indirectly the environmental sphere (especially if the

product is sold at international market). However, its influence on the other two categories is not as relevant. The social dimension is not significantly influenced, while the business strategy may be influential only if the company/concession needs an ally to reach the international market.

This conclusion shows that certification is relevant and it is working. However, some recommendations are advised.

6.1 Recommendations

Certification has important advantages; however, one of the main problems of certification is its diffusion. This problem was noticed in all the categories assessed and both in timber and nut concessions. Consequently, certification bodies should take this into account during the audit.

In addition, the certification does not provide any support against invasions, even after the certificate is issued. This scheme should be able to at least put pressure on the government and local authorities to protect certified forests and respond to their notifications.

Furthermore, there should be a discussion about certification viability, especially in small operations. The risk of not being able to afford certification costs exists, especially in small companies / concessions. Many concessions (especially nut concessionaires) lost their certificates recently. Thus, it should be questioned If supporting a national certification scheme for these concession would be more convenient. ASCART demonstrated that it is possible for a small operation to comply with good standards without paying the costs of certification, even if it sells its products in the local market. A national scheme could use as a model an organic participatory certification, such as Participatory Guarantee Systems (IFOAM 2009). This certification is locally focused, based on trust and with very limited management costs (IFOAM 2009).

The training is crucial, especially in small concessions. Indeed, some areas of training have been absolutely ignored: workshops on sustainable timber harvesting, alternatives to slash and burn, or on business management are crucial to improve concessionaires' performances. These trainings have to be organized, taking into account the age of most of the nut concessionaires. It is recommendable to invite their sons too.

Another crucial point is the credit system which is not supporting small concessionaires; so it should be created some microcredit institutions specifically for small size concessions. This would reduce the risks and stimulate the certification process, as there would be less risk, in case of one economically negative year.

Finally, the local and national Government is the missing actor. The role of OSINFOR and the police is crucial to reduce the risk of invasions. This national control worked pretty well for ASCART, so it could work potentially for other concession. Furthermore, this monitoring may be done at lower costs by strengthening local committees. In addition, the government could promulgate laws to incentive certification in nut concessions, this could promote certification in this sector as it did for logging companies.

6.2 Future Research

This research may be a stimulus for future investigations in the area.

- To compare successful timber non-certified concessions with certified concessions, in relation to the same parameters of this research. Are certified concessions really better?
- To assess farms, as this sector is particularly relevant for its known bad practices (slash and burn). How sustainable is this sector and how is possible to improve it?

- To investigate illegal logging. This was only briefly assessed in this research. Also, to assess whether the new US and EU laws on timber have a real impact in reducing the export of illegal logging. What is the impact of the new regulations on illegal logging?
- To research the influence of mining in forest management and its environmental impact.
- To assess the impact of logging in nuts concession, comparing the production of concession where logging is practiced and those where it is prohibited. Does timber harvesting significantly affect nut production?
- To analyze how nut concessionaires spend their income and how they manage their budget.
- To analyze and assess the potential profitability of timber byproduct (such as wood chips and sawdust).
- To asses and compare forest degradation in big certified and small non certified operations, with satellite images. Even though a big company implements proper SFM practices, is it really degrading less the forests?
- To investigate which other NTFP could be profitably harvested or gathered in nuts or timber concessions.
- In the future, to assess advantages and disadvantages of REDD+ project in nuts concessions, and its potential application in timber concessions.

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Appendix 1: Sustainable Development

1. Dimensions of Sustainable Development

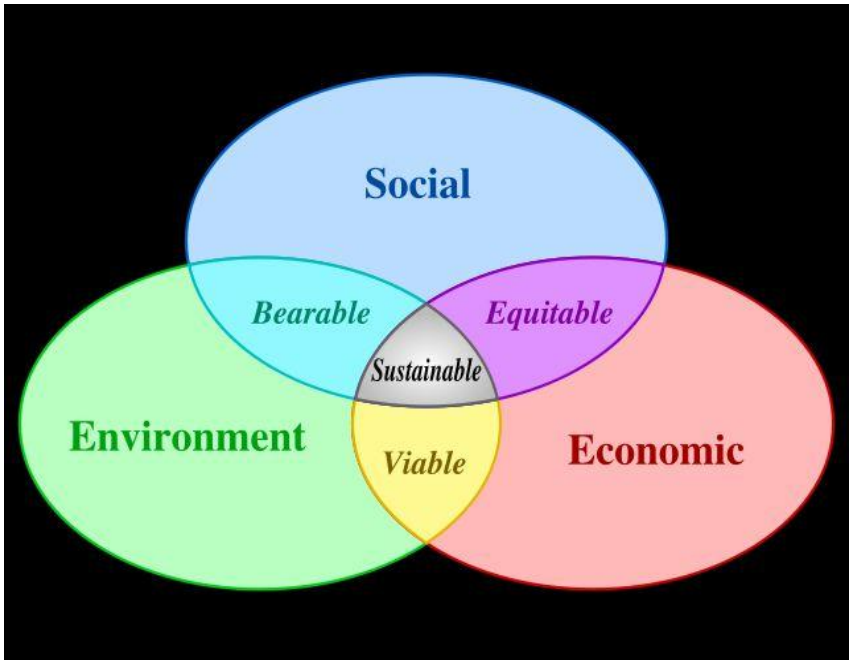

Figure A1.1: Dimensions of sustainable development (Source: http://dbreflections.blogspot.com)

1.2 Key themes of sustainable development

Table A1.1: Key themes for the for the dimensions of Sustainable Development (DESA 2001)	
Social	**Environmental**
Education and Health	Freshwater
Welfare and employment	Agriculture / food supply
Poverty and income distribution	Biodiversity
Cultural Heritage and Community Structure	SFM
Role of women	Climate Change
Access to land and other resources	Sustainable use of natural resources
Equity and Social inclusion	Land use change
Economic	
Income	
Consumption and production	
Waste Management	
Transportation	
Trade	

Appendix 2: International initiatives to promote SFM practices

Table A2.1: Main International Initiatives to protect forests areas(non comprehensive list)

Governmental Initiatives	
United Nations Conference on Environment and Development (UNECED 1992)	Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forest. The very first declaration (UN 1992).
Ministerial Conference on Protection of Forest in Europe	Sustainable Forest Management most used definition. (Ministerial Conference on Protection of Forest in Europe (1993).
World Bank	The World Bank forest Strategy (WB 2000)
UN Assembly	The UN assembly adopted the "Non-legally binding instrument on all types of forests". A more detailed explanation of principles and criteria, but still broad (UN 2007)
Montreal Process	Working Group on Criteria and Indicators for the Conservation and SFM of Temperate and Boreal Forests(Montreal Process 2007)
Non Governmental Initiatives	
International Tropical Timber Organization (ITTO)	First Sustainable Forestry guidelines in the 1990, continuously reviewed. (ITTO 1990)
Center for Information and Forest Research	Criteria and Indicators for sustainable forest management, in 1999 (CIFOR 1999)
First Certification Scheme (1994)	FSC principles 1994 (FSC 2009)
Incentives to reduce deforestation and forest degradation	
REDD+	Incentives to reduce carbon emission from deforestation and forest degradation in developing countries (launched in 2007, UN-REDD 2010b).
Carbon Forest Partnership	A fund created by the WB in 2008 to assist developing countries in REDD+ projects implementation (CFP 2008).

Appendix 3: Landscape Management scheme

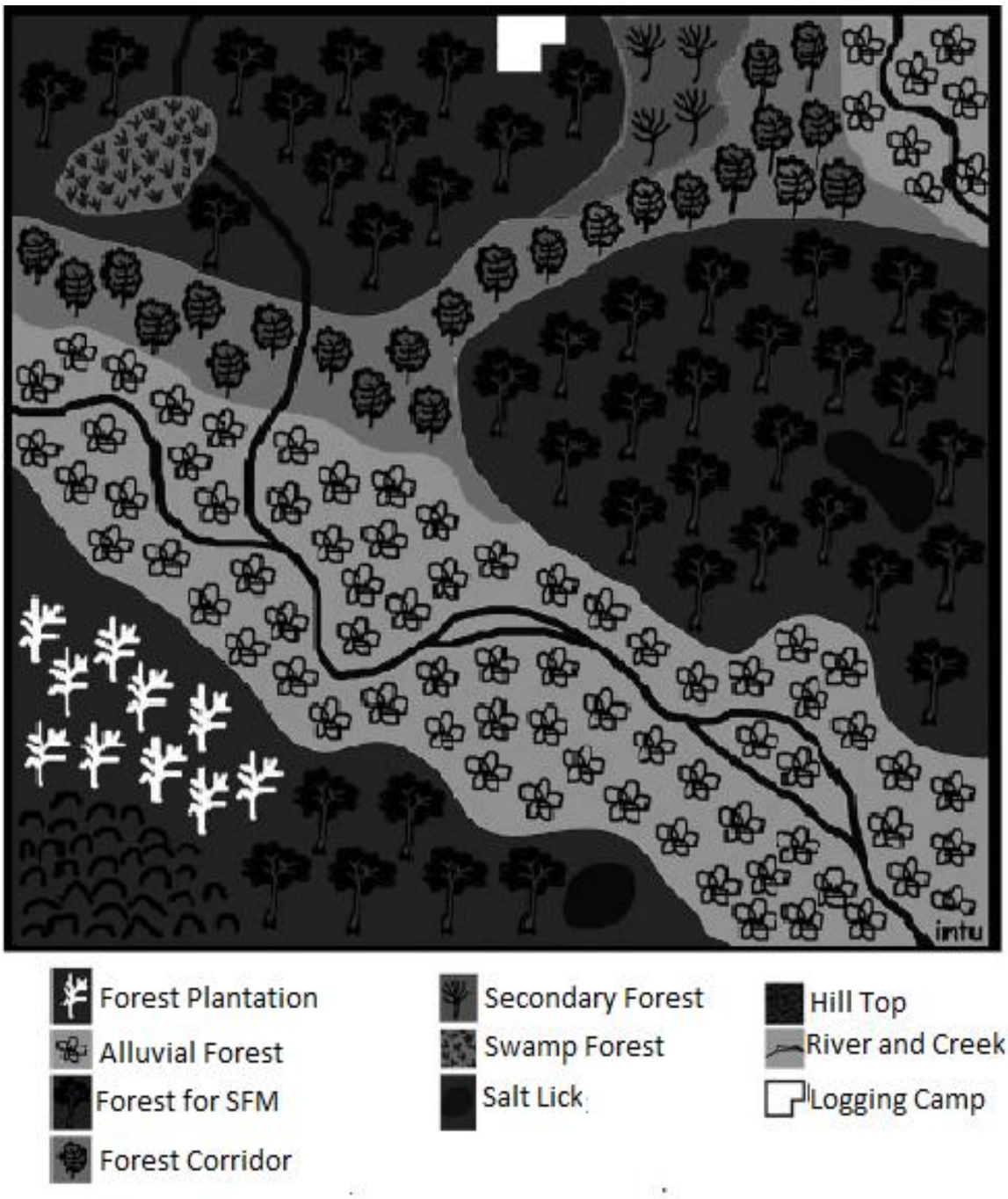

Figure A3.1: Landscape level management scheme (ITTO 2009)

Appendix 4: Community Based Forestry critical review

Table A4.1 Community based Forestry (CBF) discussion

Supportive Arguments	Critics
These projects increase local income. According to the Kuznets curve, when economic needs are satisfied, societies request a better environment and higher environmental standards (Hughes & Flintan 2001).	These projects are generally heavily subsidized, planned for few years, so the economic sustainability is generally questionable (Hughes & Flintan 2001)
These projects limit conflicts, because they involve local people, public authorities and private sector. (Haase & Camphausen 2007, Wells 1994 and Simao Seixas & Davy 2008)	The linkage between conservation and development is unclear, and generally based on weak assumptions (Christensen 2004 and Hughes & Flintan 2001)
CBF focuses on training and education, this contribute to generally decrease the damage to the environment (Huong 1999)	CBF projects are often implemented by international consultants without proper knowledge of the local context (Christensen 2004)
Most of the CBF projects have components to promote gender equality and participation (Rojas 1999)	CBF generates equity issues, as there are winners and losers (Hughes & Flintan 2001)
CBF empowers local communities, so they increase their capacity to influence national policies and their resilience to contrast external threats (Simao Seizas & Davy 2008)	There is a weak analysis of external threats (Hughes & Flintan 2001). Infrastructure, mining, legal issues or national plans are not often taken into account (Christensen 2004, Hughes & Flintan 2001).

Appendix 5: Certified forest Area per region

Table A5.1: Total Forest Area and total certified Forest per region

	Total Forest Area (million ha)	Forest Area Certified (million ha)			Forest Area Certified (%)		
	2010	2008	2009	2010	2008	2009	2010
North America	613.2	181.7	180.3	199.8	29.6	29.4	32.6
Western Europe	166.2	84.2	82.2	85	13.7	13.4	13.9
CIS	835.3	24.6	25.2	29.9	4.0	4.1	4.9
Oceania	206.3	9.4	10.3	11.6	1.5	1.7	1.9
Africa	635.4	3	5.6	7.3	0.5	0.9	1.2
Latin America	924.2	15	14.6	14.4	2.4	2.4	2.3
Asia	571.4	2	3	8.6	0.3	0.5	1.4
World Total	3952	319.9	321.2	356.6	8.3	8.2	9
Data Source UNECE 2010							

Appendix 6: FSC Principles

Table A6.1: FSC principles (FSC 2009)

Principle	Description
Compliance with laws	The certified forest should respect all the national laws and also international treaties relevant to forest protection.
Tenure and use rights and responsibilities	Long – term tenure should be clearly defined, appropriate mechanism implemented to solve disputes
Indigenous people's rights	*The forest operation must respect not only indigenous rights, but also avoid potential damage to their lands and territory is particularly important, with particular attention to those areas of cultural and religious importance.*
Community Relations and worker's rights	*The social development is crucial for forest operations: respecting labor rights and safety, but providing jobs and opportunities to the surrounding communities should be given possibilities of training and employment.*
Benefits from the forests	*This includes not only the economic performance and viability, but also the optimal use of timber, avoiding dependence on a single product, and social and environmental costs.*
Environmental impact	*An assessment of environmental impact must be completed, in relation to the scale of operations and it should include: training to manage hazardous substances, reducing soil erosion and eventual impacts from any activity related to the operations. The use of invasive / exotic species is discouraged, as well as land conversion and only allowed with strong justification.*
Management Plan	*This plan should include not only general data on the area of operation, but also of all management systems and activities, selected species, environmental safeguards and management of endangered species, maps, harvesting techniques.*
Monitoring and Assessment	*Monitoring assesses the health of the forest, its frequency depends on the scale of operations, but it should include: data on harvested forest, regeneration rate, composition o flora and fauna, environmental and social impacts, costs and efficiency of the forest management.*
Maintenance of high conservation value forests	*It is important to maintain a conservation area, appropriate to the scale of operations, selected after a proper study and due to its high conservation value, and managed with an appropriate management plan, which includes monitoring, maintenance, and enhancement.*
Plantations	*The plantation should include a management plan, highlighting the design, the pest and disease control, the preference of native species. It also should maintain fertility and overall diversity.*

Appendix 7: Certification Schemes Comparison

Table A7.1 Forest Certification Comparison

	Third Party Auditors	Chain of Custody	Public Reporting	Stakeholder Consultation	Independent Governance	On Product Label
American Tree Farm System	Yes	Yes	Yes	Yes	Yes	No
Canadian Standards Association	Yes	Yes	Yes	Yes	Yes	Yes[16]
FSC	Yes	Yes	Yes	Yes	Yes	Yes
PEFC[17]	Yes	Yes	Yes	Yes	Yes	Yes
Sustainable Forestry Initiatives	Yes	Yes	Yes	Yes	Yes	Yes

[16] CSA has adopted the PEFC on-product label and discontinued use of the original CSA on-product label (Ferhnolz et al 2010)

[17] PEFC endorses also the Brazilian Program for Forest Certification (CERFLOR) from 2005. CERFLOR meets the minimum standards for PEFC (INDUFOR 2011).

Appendix 8: Semi- Structured Interviews[18]

Economic dimension

1. Could you describe me your main economic activity from the extraction to commercialization?
2. How many people are employed? Is this a family business or of another type?
3. Do you have a business plan or middle – long term strategy?
4. What is your estimated revenue? Have you calculated your costs and profits?
5. How many products do you commercialize in your land (timber and non timber)? How many species? Have you ever thought about diversifying you products?
6. Do you sell timber or semi-finished products? Do you process the timber? Could you describe the process?
7. Do you set the price individually or in the association?
8. What are the advantages and disadvantages of being part of an association?
9. Have you ever received any training on business, financial management or any similar business/financial skills? If not, would you consider it important?
10. Do you have any plans to scale up the activity, improve the quality, reduce the waste and/or the costs to optimize the ratio revenue/volume? Do you have a plan to increase the quality of the product?
11. How do you manage the risk (yield risk, market and sovereign risk)[19]?
12. What is your main market? Local, Regional, International? Could you describe briefly the commercialization process?
13. What are the main problems in your business? (ex. Low prices? Difficult access to market?)
14. Do you have other relevant economic activities? How are these interrelated?

Social Dimension

1. How is the relation with the community? Are there any conflicts for your activity (water pollution, erosion)?
2. If you have employees, are they members of the community, family?
3. Is there any training/capacity building you participated in the last years? Could you explain their main topics? Were they useful and you used the acquired skills?
4. If there are sacred sites, are they protected somehow?
5. Are the women involved at some stages of production/ employment?
6. How is the redistribution process, if is there any? IS there any social investment? Any type of investment into the society paid by the association or individuals? Or some activities you do for the community?

Environmental dimension

1. Do you implement a forest Management Plan? If yes, would you describe its main components? If not, do you plan to implement it in the near future?
2. Do you have a timber inventory? Which species do you grow? Are they native? Are there exotic/ invasive species?
3. Do you have a biological inventory (endangered species, key stones, umbrella or endemic species)?

[18] The questions were translated in Spanish

[19] Yield risk is related to pests and diseases, the market to price changes, and the sovereign to policy changes.

4. Are there mechanisms to protect old trees? Are there any protected areas or intentionally not exploited?
5. What is the wood volume you extract and does it exceed the extraction volume? (To be considered good 2.5% difference)?
6. How do you operate thinning? And Felling? Selective harvesting? Clear cutting? Do you leave any deadwood or after exploitation everything is cleaned up?
7. Do you have roads? Do you implement a proper road management? Any problems of habitat fragmentation? How do you transport the wood (Skid trails, cable)?
8. Do you have a landscape management? Would you describe it?
9. Do you protect the wetlands? Riparian areas? How (ex. Buffer zones)?
10. Do you use pesticide? What is the practice used? IS there fire management?
11. Are there episode of illegal logging? If yes, could you explain in details?
12. What are the main problems related to the environment? What do you think about the forest management (too costly, too complex)? What would you change?

Stakeholder and conflict management

1. What are the characteristics of land tenure? Is this secured? Any legal issues unsolved?
2. Do you have any strategic alliances? How is the relation within the Association of producers? With the local Government? How would you describe the partnership with other actors and how was it built?
3. Are there any policies which affect the forest management? Agricultural policies, resettlement policies?
4. Are there any external actors or activities which may affect the forest management (mining, illegal logging, land invasion)?
5. Do you plan to follow any certification scheme? If yes, which is your evaluation, analysis of advantages and disadvantages?
6. Do you know anything about REDD+? Are you joining the REDD+ programme

Appendix 9: Focal Group

9.1 Business Model Canvas

Table A9.1: Business Model Canvas

Key Partners	Key Activities	Value Proposition	Customer Relationships	Customer Segments
Who are your key partners? Who are the key suppliers? Which key activities do partners perform?	What key activities does our value proposition require? Which ones our distribution channels? And our customer relationships? Revenue streams?	What problems of the customers do you solve? Which need do you satisfy?	What type of relationship our customers require? Which ones are established?	Who are your most important customers?
List motivations for creating a partnership (Reducing risk, economy of scale, acquisition of particular crucial resource)?	Key categories such as: Production. Problem Solving, and Platform network?	What is our main value (price, design, customer experience, newness, performance, customization, design, risk reduction, cost reduction, accessibility)?	Hou much do they cost? How do you understand your customers? For instance: personal assistance? Communities?	Categories: Mass, Niche, Segmented, Diversified, Multi – sided)

Key Resources	Channels
What key activities does our value proposition require? Which ones our distribution channels? And our customer relationships? Revenue streams?	How is the company reaching the customers? Which ones are the most cost efficient? Do you use your own channels or partners? Could you describe your perception of the 5 channels: 1) Awareness: how do you raise awareness about the company? 2) Evaluation: how do you help customers to evaluate you organization's value proposition? 3) Purchase: how do you allow customers to purchase your products and services? 4) Delivery: How do you deliver the products? 5) After Sales: how do you provide post purchase customer support?
Key categories: Physical, Intellectual, Human, Financial?	

Cost Structure	Revenue Stream
a. What are the most important costs in the business?	What do customers pay? What is their WPA?
b. Which key activities and resources are most expansive?	Which are the revenue streams? How do they contribute to the total revenue?
c. Are you cost driven or value driven?	Asset sale, Usage fee, subscription fee? Lending, renting or leasing? Advertising?
d. What are your fixed costs? Variable?	

Re – Investment Strategy	Environmental Performance	Social Performance
How much of the profit is re-invested in the business? And How?	What techniqes are used to reduce the impact? Thinngin, selective harvesting, felling, quota.	Social Activities for the community? Labor conditions, accoridng to the law
Categories: Capacity building, machinery, R&D.	Landscape management (Riparian, PA, Old Forests, areas of endangered species)?	Role of vulnerable categories (women, disabled, elderly)? Training or Capacity building

9.2: Action Planning Matrix

Table A9.2: Action Planning Matrix

Opportunity, problems, threat etc,,	What has be done to address or build on it	Actions: What could we do?	Which of us will start doing it?	Who else we need to involve	By when we should aim to have it done?

Appendix 10: Mining Sector protesting in Madre de Dios

Figure A10.1: Mining protest in Madre de Dios (www.guillermotejadadapuetto.com)

Figure A10.2: Mining protests in Madre de Dios, the 14th March 2012 (www.periodismoenlinea.org)

Appendix 11: Map of Peru

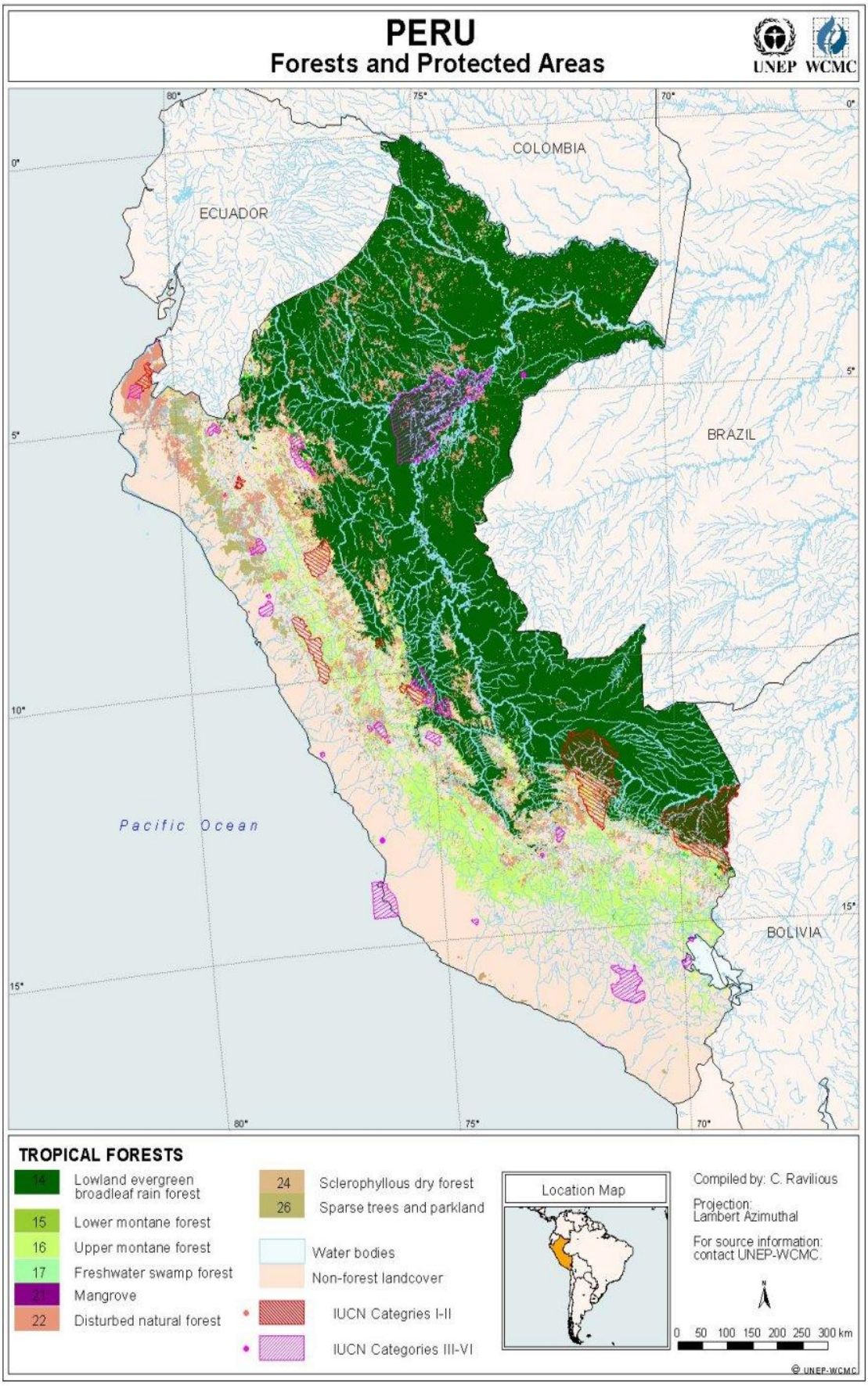

Figure A11.1: Peruvian forests (www. infoperu.com)

Appendix 12: Productive Forest in Peru

Table 12.1: Total Productive forest in 2003 (FAO 2010a)		
Region	Area (1,0000 ha)	Percentage
Loreto	14782	61.1
Uyacali	4089	16.9
Madre de Dios	2349	9.7
Others	2970	12.3
Total	24190	100

Appendix 13: Incentives for SFM

Table A13.1: Discounts according to the INRENA Resolution 104 - 2004

Category	Activity	Discount (%)
Conservation Area	< 10%	**10**
	> 10% - 20%	**20**
	> 20%	**25**
Certification	Scoping	**5**
	Official Certification	**25**
Processing	Sawing Panels in the concession / surrounding urban area	**15**
	Panels outside the urban area	**5**
	Secondary Processing (planing)	**10**
	Primary and Secondary processing	**25**
Maximum Discount		**75**

Appendix 14: Map of Madre de Dios

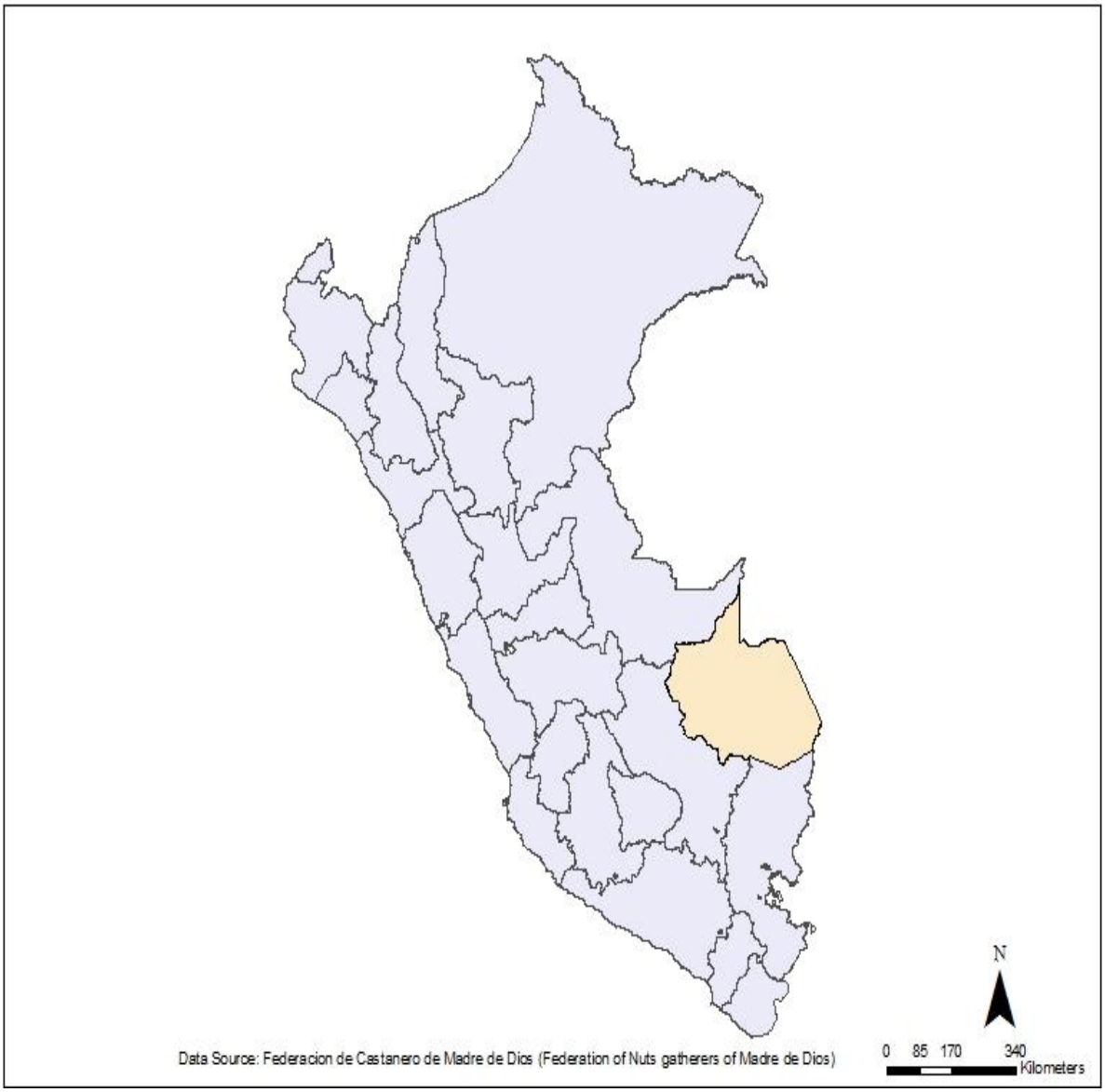

Figure A14.1: The Region of Madre de Dios (Arc Gis 9.3, source Federation of Nuts Gatherers of Madre de Dios)

Appendix 15: The Interoceanic Highway

Figure:A14.1: The Interoceanic Highway (Ciriminna 2012)

Figure A14.2: The Interoceanic Highway Route (Ciriminna 2012)

Appendix 16: Workshop

Figure 16A.1First Workshop 02 April 2012 (Ciriminna 2012)

Figure 16A.2: Workshop with focal group 02 April 2012 (SWOT analysis and plan action matrix (Ciriminna 2012)

Appendix 17: Slash and Burn and Invasions

Figure A17.3: Slash and Burn (Ciriminna 2012)

Figure A17.2: Land conversion after burning (Ciriminna 2012)

Appendix 18: Main Concessions in Madre de Dios

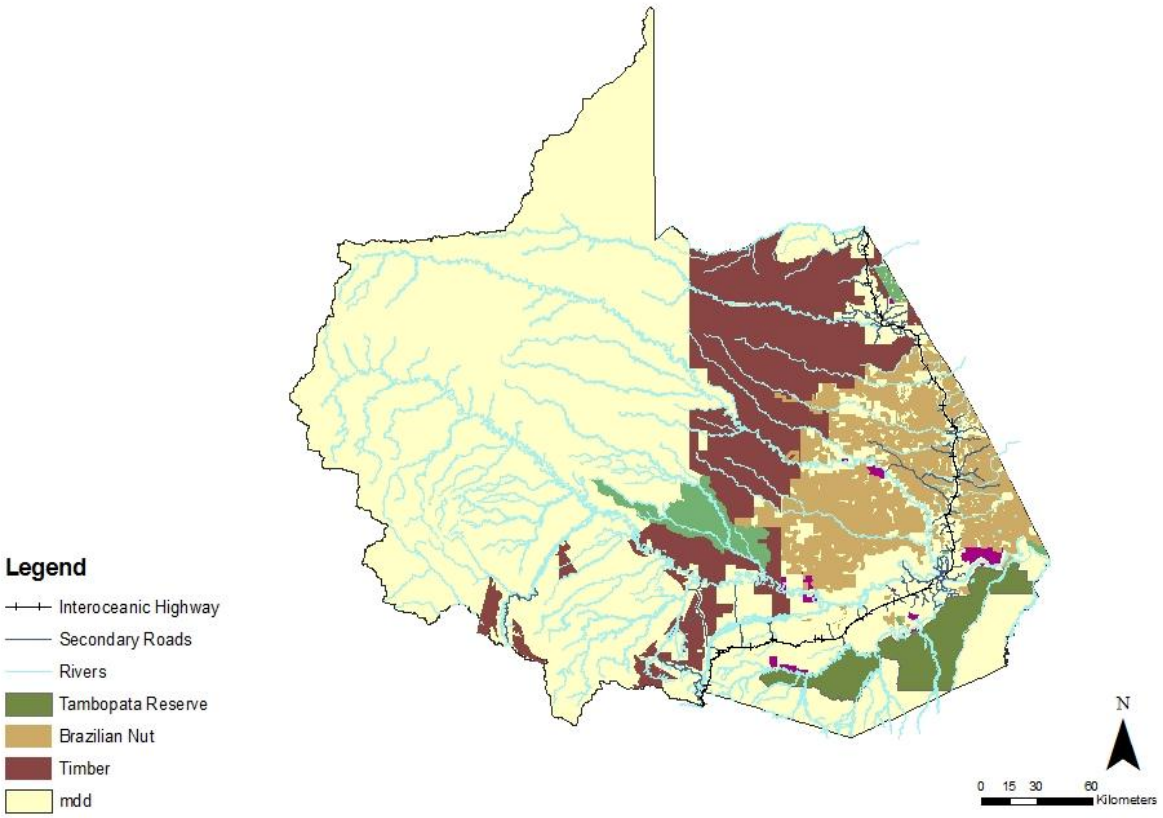

Figure A18.1: Concessions in Madre de Dios (Arc GIS9.3, Data Source FEDACAMD (Federation of Nuts Gatherers of Madre de Dios)[20]

[20] The data is actualized at 2007, so this is the most recent geographic files available

Appendix 19: Timbers and Nut Concessions

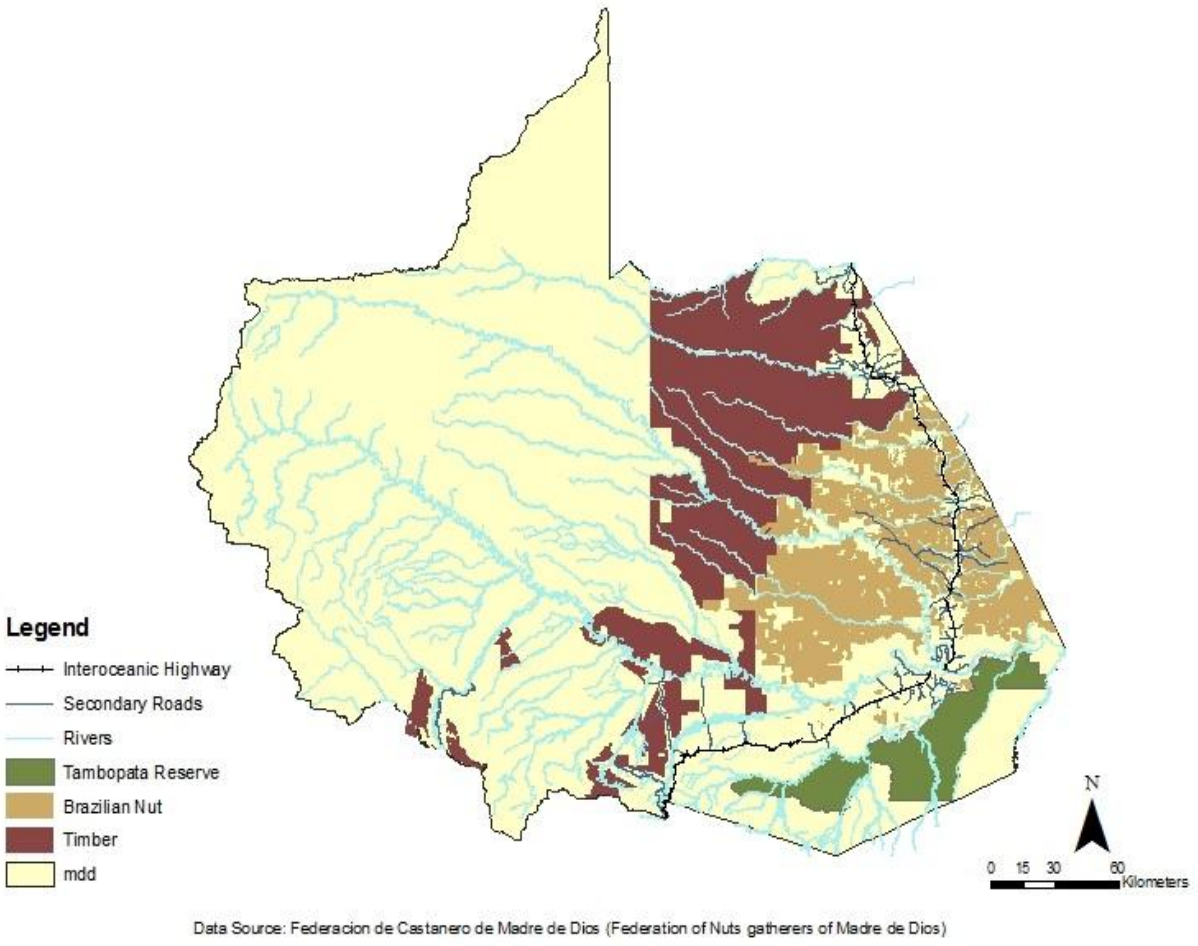

Figure A19.1: Nuts and timber concessions plus those located in the Tambopata Reserve[21] (Arc GIS9.3, Data Source FEDACAMD (Federation of Nuts Gatherers of Madre de Dios

[21] The data is actualized at 2007, so this is the most recent geographic files available

Appendix 20: Participants to REDD project

20.1: Map of nuts concession members of the REDD project

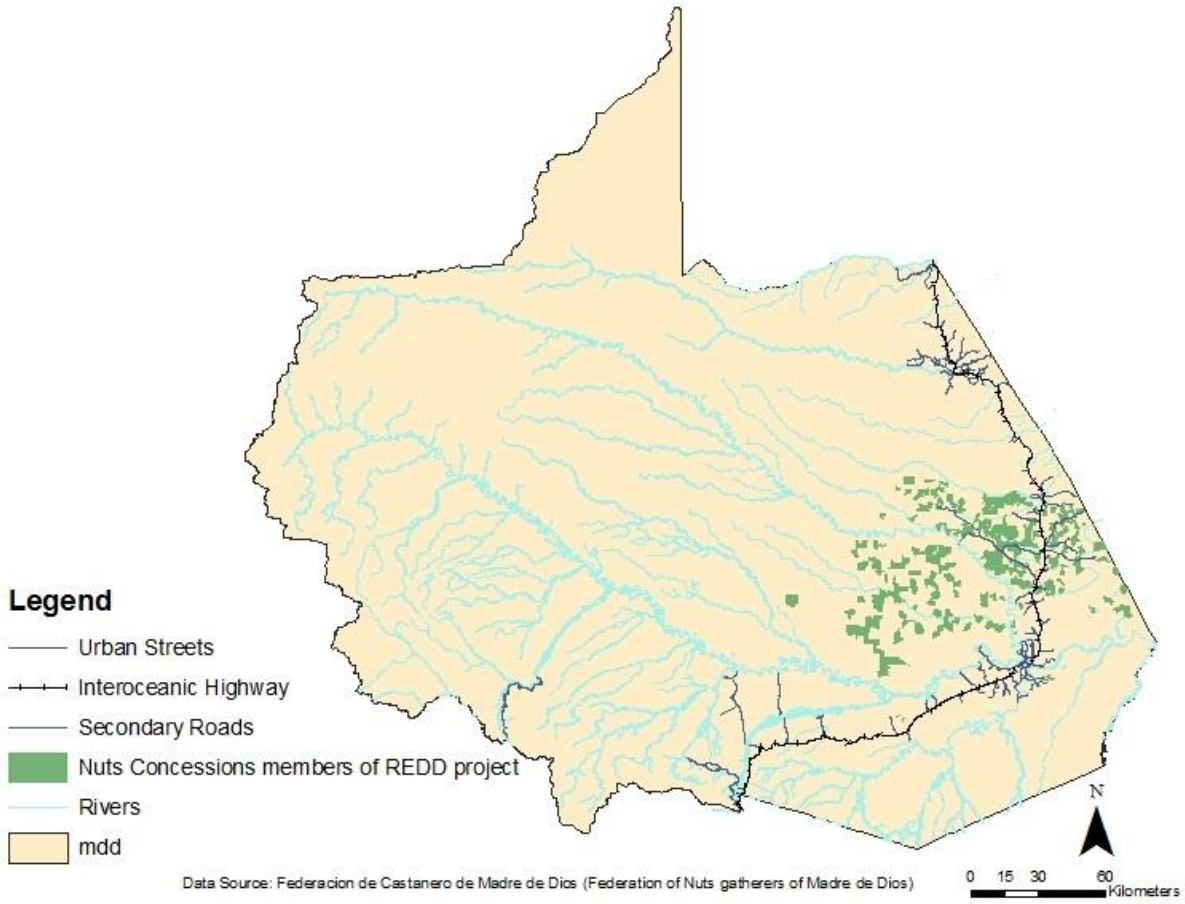

Figure A20.1: Nuts concessions members of REDD project[22] (FEDACAMD 2012)

9.2: Profits division of the REDD project

Table A 20.2: Profits distribution of the REDD Project

	Bosques Amazonicos	Concessions
Processing Plant	30%	70%
Payment for reduced deforestation in carbon markets	70%	30%

[22] The data is actualized at 2012

Appendix 21: Scenario Analysis

21.1: Estimated profits in relation to price fluctuation

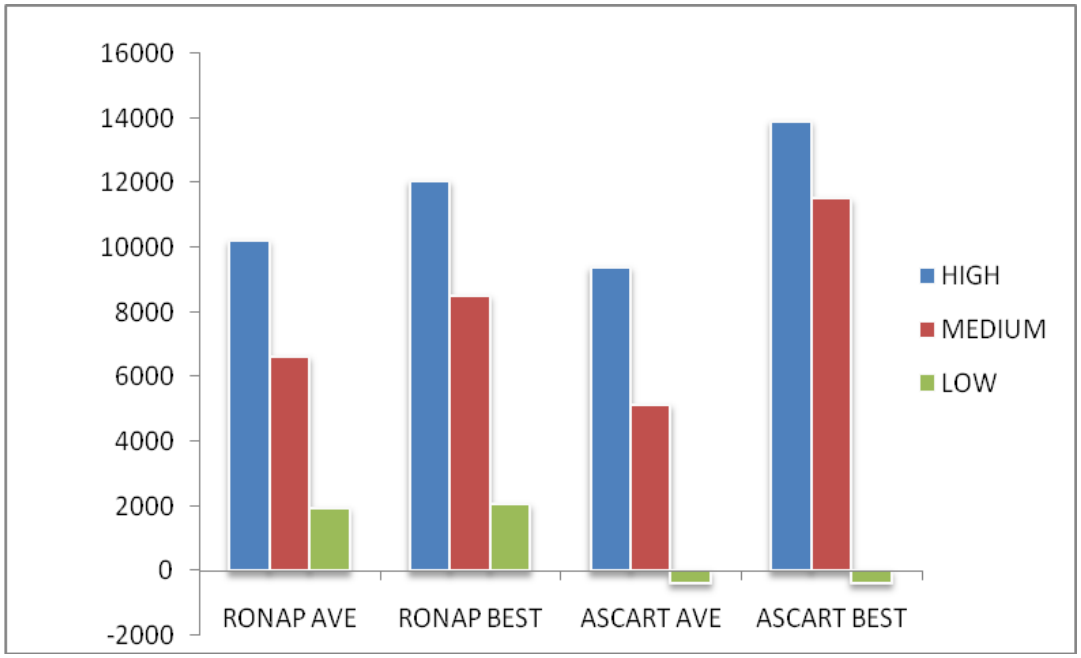

Figure A1.1: Profits accoridng to the economic scenarios.

21.2: Main assumptions

Table A16: Estimated data for the scenarios				
	RONAP (best)	RONAP (aver)	ASCART (best)	ASCART (aver)
Production (in bags)	100	100	100	100
Kg of peeled nuts per bag	20	20	22	22
% of the bags Sold Peeled Kg per bag	100	70	100	30
% of the bags Sold non Peeled	0	30	0	70
High Price (Peeled) Kg per bag	20	20	25	25
High Price (Non Peeled) per bag	250	250	250	250
Medium Price (peeled) per bag	15	15	18	18
Medium Price (Non peeled) per bag	25	250	250	250
Low Price (Peeled) Kg per bag	7	7	3	3
Low Price (Non peeled) per bag	250	250	250	250
Estimated Cost (Per bag)	83	80	85	85

21.3: Expected Rational economic Behavior

- Production estimated on an average 100 bags of 80kg, in order to compare different concessions, but it is extremely variable.
- The best case and an average case are used: the best cases are represented by producers with higher income. So they can afford to wait for the payment (Rivero pers. comm.).
- It is assumed that all the products not sold through the respective associations is commercialized as non peeled to local market.
- The prices are based on conversation with producers and members of the association, in order to evaluate realistically these prices.
- ASCART has on average higher prices because it can wait for the best annual price (Vera pers. comm.).
- The production of peeled nuts per bag is higher than average (22 instead of 20) according to the members of ASCART interviewed, owing to the higher control (ASCART 1, ASCART 2, ASCART 2 pers. comm..).
- The minimum price for RONAP is taken into account, for the low price scenario
- When the price is low, it is assumed that all the production is peeled. However, when this scenario happened, most of the nut concessionaires did not gather the nuts (the minimum price from FLO was not established yet) (Rivero pers. comm.).
- RONAP's best case has lower costs because she owns its own boat.
- Fees paid to the State are 0.05 and 0.03 soles per kilo respectively for peeled and non peeled nuts.
- The costs (excluding the fee) were estimated to be 85 soles per bag (estimated price in 2012) for ASCART, and 83 for RONAP (due to the support of Candela). However, the best case for RONAP has slightly lower coast, because she owns her own boat.
- Due to the lack of relevant data, this analysis does not take into account the possible production of oil or soap, this may increase the profits of ASCART
- This analysis is a snapshot, so it does not take into account previous investments
- It is expected a rational behavior from the gatherers, but this may not be truth

Appendix 22: Incompliance in timber harvesting

Figure A22.1: The logging of illegal timber (Ciriminna 2012)

Figure A22.2: Producing tables from illegal timber, without safety measures (Ciriminna 2012)

Appendix 23: Good Practices

Figure A23.1: Reforestation in on timber concession (Ciriminna 2012)

Figure A23.2: CoC in a processing plant (Ciriminna 2012)

Appendix 24: Nut concession

Figure A23.1: Transportation of Brazilian Nuts in the Tambopata Reserve (Ciriminna 2012)

Figure A23.2: Collecting Nuts (Ciriminna 2012)

Figure A23.3: Tools used to collect the nuts (Ciriminna 2012)

Figure A23.2: Nuts sun drier (Ciriminna 2012)