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Project Design Document

Madre de Dios Amazon REDD Project

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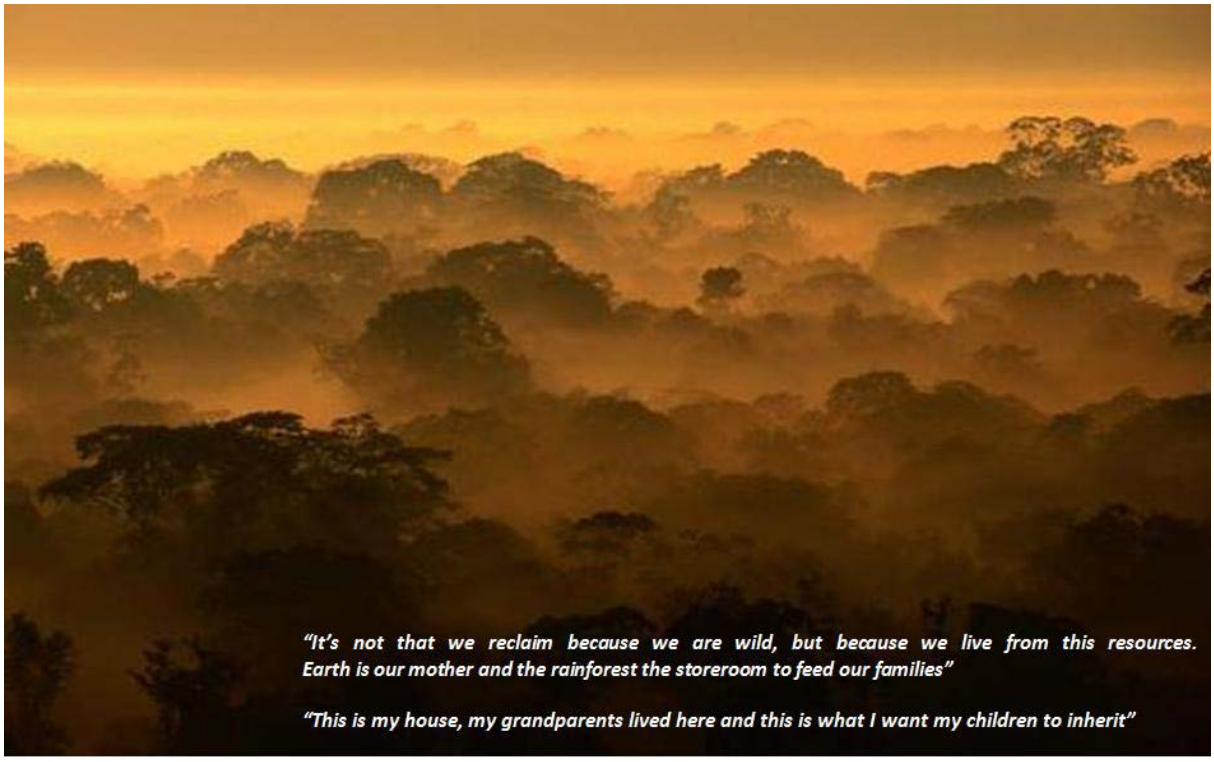

Quotes from Peruvian Amazon indigenous people

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A. General description of the proposed project activity

A. General description of the proposed project activity

A.1. General information

The proposed project activity consists on sustainable forest management in the forestry certified timber concessions “Maderera Río Acre S.A.C. and Maderera Río Yaverija S.A.C.” in Madre de Dios, Peru.

Location

The project is located in the hydrographic basin of the Acre River, Iñapari district, Tahuamanu province in the Madre de Dios department in the Peruvian Amazon.

The area is located 28 km to the side of the new inter-oceanic road that will join Brazil with the Peruvian ports, in the region that belongs to the Vilcabamba-Amboró Conservation Corridor in the Peruvian Amazon, one of the world biodiversity hotspots.

Fig. 1: General location of the proposed project activity.

Background

An environmental study of the Vilcabamba-Amboró Conservation Corridor was recently carried out by the Peruvian NGO AIDER[1]. Within the objectives of the report was the identification of potential avoided deforestation projects to be implemented in the area.

The studied area is located within 50 km to each side of the new inter-oceanic road that will join Brazil with the Peruvian ports, in the region that belongs to the Vilcabamba-Amboró Conservation Corridor, one of the world biodiversity hotspots.

The conclusion of this analysis is that obtaining revenue for the environmental services that the rainforest offers is the only way to preserve these areas. This approach has great potential to generate sources of additional income for local population with low income, contributing therefore to improve their way of life.

The construction of the inter-oceanic road that will join Brazil with the Peruvian ports in the Pacific Ocean, will generate a series of environmental and social impacts. A clear example of this is already happening in Brazil, where direct and indirect impact is observed on both sides of the road. This situation claims for actions that contribute to preserve the biodiversity and the environmental services that exist in the area of influence of this new road, benefiting the area and the whole country.

Fig. 2: The inter-oceanic road.

[1] Recavarren Estares, Percy; Torres Padilla, Jorge; Sánchez Santiváñez, Marioldy: "Identificación de potencialidad de proyectos de secuestro de carbono en las zonas de influencia de la Carretera Inter-oceánica Sur", Informe Final, AIDER NGO, Junio 2007.

Fig. 3: Picture of the inter-oceanic road.

In this sense, it is relevant to consolidate the sustainable management of the area, as it is the case of forestry concessions with timber and non timber destination, private areas and protected natural areas.

The area to be studied was defined as the located 50 km to both sides of the inter-oceanic road, in the Urcos – Puente Inambari and Puente Inambari – Iñapari sectors.

The information obtained (satellite images, maps, interviews, forestry inventories, etc.) was processed with the objective of identifying potential projects and afterwards evaluating their viability. Afterwards, the different elements were combined in a matrix: legal situation, location of the conservation corridors, average size and availability of biomass and costs information.

According to the results, the projects were selected taking into account an economical criteria (volume of existent carbon), a legal criteria (quantity of credit owners, type of ownership) and a social criteria (risk of deforestation, accessibility to the area), among the most important ones.

The area of influence where the inter-oceanic road is being constructed is characterized for still having areas of forests of great importance for their biodiversity and the environmental services they offer. The area is different from other areas next to roads, where the presence of a road has notoriously impacted in the landscape and natural resources. However, the presence of the inter-oceanic road represents a great risk due to a major pressure by the local population that will migrate looking for lands and the economical activities that will consequently be established.

As a result of the abovementioned selection of projects with greater potential in the area of study, the following project has been identified to be validated according to the CCB standards.

A.2. Original conditions of project site

The area of the project is completely covered by different rainforest types, mainly low hill highly dissected forests, as it is show in the following chart:

Chart 1: Types of rainforest covering the project area

Type of rainforest	Maderacre	Maderyja	TOTAL	%
Low terrace forest	647	1,832	2,479	3%
Low hill forest highly dissected	46,703	38,633	85,336	86%
Low hill forest highly dissected with “paca”		7,103	7,103	7%
Protected forests	2,026	1,988	4,014	4%
Total area of the concession	**49,376**	**49,556**	**98,932**	**100%**

It is remarkable that the whole area does not have degraded or deforested zones, thanks to the action of the project. Notwithstanding, it is not reliable that this situation could be maintained considering the imminent conclusion of a paved road that will join Brazil with the Pacific Ocean.

The following table shows the status of the forest in the concessions:

Chart 2: Status of the forest in the concessions

Status of the forest	Maderacre	Maderyja	TOTAL	%
Forestry production forest	47,350	47,568	94,918	96%
Protected forest (Conservation)	2,026	1,988	4,014	4%
Intervened forests (degraded or secondary = purma)	-	-	-	0%
Other forest formations (aguajales, pacales etc.)	-	-	-	0%
Protected areas (i.e. wetlands, cochas, steep slopes)	-	-	-	0%
Deforested areas (including areas with crops or grasslands)	-	-	-	0%
Total	**49,376**	**49,556**	**98,932**	**100%**

It is important to highlight that both timber concessions have achieved voluntarily the FSC Certification for the 100% of their forests and that one of the main reasons for obtaining said certification was the generation of carbon credits. According to the FSC Certification, the forests in the concession are wet subtropical forests with the following characteristics:

Low terrace forest: it develops on terrains closet of the rivers Acre and Yaverija, with a relative height over the level of the river lower than 10 meters, they are relatively plain with some depressions, with regular to bad drainage. It consists of a forest with not very vigorous trees, with a not very developed canopy, with a superior stratum that may reach 20 meters height. The crowns of the dominant trees reach diameters between 5 and 10 meters. Their volumetric content does not surpass 80m^3.

Low hill forest, strongly dissected: it is developed in areas of tectonic origin but all the same modeled by hydric erosion, fact that accidented even more its topography, with slopes up to 70%, with a relative height of the hills that could reach 80 meters. It consists of a forest with medium size trees, a canopy of average development, and a superior stratum that could reach up to 35 meters height. The crowns of the dominant trees reach diameters between 15 and 20 meters and have an average volumetric content between 100 and 150 m^3.

Besides this type of forests, Maderyja also presents low hill forests, strongly dissected with "paca". These develop in similar terrains to those of low hill forests, strongly dissected and are forests with a canopy with presence of "paca" (Guadua sp.) and medium vigor trees. The "paca" represents 25% of the forest cover, which makes difficult a free access and causes a strong competition among trees, in some sectors, to win space. The upper canopy is conformed by trees that may surpass the 30 meters height. The estimated volume of the trees with a DBH bigger than 30 cm is variable and may be between 80 and 140m^3/ha.

According to the General Forestry Management Plans of Maderacre and Maderyja timber concessions, carried out by the Maderacre and Maderyja team of forestry specialists[2], their forestry area is divided into four five-yearly blocks. The following charts show the area (ha) of each type of forest in said blocks.

Chart 3: Productive forestry area (PFA) in the five-yearly blocks of Maderacre

Block	Type of forest	PFA	
		Ha	%
I	Low terrace forest	53	0.5
	Low hill forest highly dissected	10712	99.5
	Total PFA of Block I	**10765**	**22.7**
II	Low terrace forest	93	0.8
	Low hill forest highly dissected	11755	99.2
	Total PFA of Block II	**11848**	**25.0**
III	Low hill forest highly dissected	12636	100
	Total PFA of Block III	**12636**	**26.7**
IV	Low terrace forest	501	4.1
	Low hill forest highly dissected	11600	95.9
	Total PFA of Block IV	**12101**	**25.6**
Total	**Total PFA of Blocks I – IV**	**47350**	**95.9**
	Total non productive areas	**2026**	**4.1**
	Total area of Maderacre concession	**49376**	**100**

[2] General Forestry Management Plan of Maderacre and Maderyja timber concessions: Eng. Roberto Kometter Mogrovejo (WWF), Oscar Melgarejo Lizama and Nelson Kroll Kohel (Forestry Manager of Maderacre). These documents have been available for the Verifier.

Chart 4: Productive forestry area (PFA) in the five-yearly blocks of Maderyja

Block	Type of forest	PFA	
		ha	%
I	Low terrace forest	466	4
	Low hill forest highly dissected	10930	96
	Total PFA of Block I	**11396**	**24**
II	Low hill forest highly dissected	12129	100
	Total PFA of Block II	**12129**	**25**
III	Low hill forest highly dissected	7916	69
	Low hill forest highly dissected with “paca”	3580	31
	Total PFA of Block III	**11496**	**24**
IV	Low terrace forest	1366	11
	Low hill forest highly dissected	7658	61
	Low hill forest highly dissected with “paca”	3523	28
	Total PFA of Block IV	**12547**	**26**
Total	**Total PFA of Blocks I - IV**	**47568**	**96**
	Total non productive areas	**1988**	**4**
	Total area of Maderyja concession	**49556**	**100**

It must be mentioned that some parts of the forests have suffered selective logging, mainly of high value timber species like mahogany or cedar. Since the starting date of the project, around 2-11 different timber species are being harvested annually at a rate of 2 cubic meters per hectare under a management plan that has determined a 20-year logging cycle and is using reduced impact extraction techniques.

The timber species are spread out all over the project area, varying in volume and frequency depending on the different types of forest involved.

The timber potential of these forests is enormous. Besides the wood production, they would also offer a variety of other products of high economic value as medicines, oils, aromatic substances, textile fibers, gums, resins, inks, tannins, among others.

In a more particular analysis of the concessions forests, it is important to mention that a Diagnostic Sampling[3] was carried out in order to determine their natural regeneration status after the development of certain exploitation activities and therefore if some forestry treatment is needed to allow the sustainable management of the forests in the long term.

This sampling consists on the registration of the best individual primary (fustal), latizal or brinzal, call "desirable excellent" (DE)[4], in a total of 800 square plots of 0.01 ha (10mx10m), 400 plots located in Maderacre concession and the other 400 plots in Maderyja concession. Only species of commercial interest for Maderacre and Maderyja timber concessions were evaluated.

First of all, in each plot the desirable excellent was selected. If there were fustales within the plot, the desirable excellent must be a fustal, but if there were no fustales the desirable excellent must be the best latizal and if there were no latizales the best brinzal must be selected. The DBH of the selected desirable excellent trees was measured. Then the lighting condition of the plot was determined, as well as the presence of lianas in it. The plots with no "desirable excellent" in it were called empty plots.

In summary, the conclusions and suggestions of said evaluation were the following:

A total of 800 plots of 100 m^2 each one were included in the evaluation.

The distribution of "desirable excellent" (DE) classes in the concession is the following: 34.8% of brinzales; 22.75% of fustales and 6% of latizales. That is to say that in 63.63% of the evaluated plots there are trees with desirable excellent qualities which is completely sufficient to guarantee the wood production for future harvests. In addition, this study carried out by WWF and the forestry teams of Maderacre and Maderyja timber concessions determined that no further actions are needed in order to assure the establishment of the new regeneration of the vegetation.

There are 36.38% of empty plots with no "desirable excellent" individual in it. These plots have plenty of "paca" and in some cases there are also some palm trees. Said "paca" should be affecting the entrance of light to the brinzales or latizales classes.

In relation with the lighting condition of the evaluated plots, 21% of them presented a well-lightened status; in 19.8% of them there is some degree of competition for the light and in the other 59.1% there is a strong competition for the light. The brinzales class is the most affected by said competition. In consequence, no releasing treatments are needed for the fustales class but it might be considered for brinzales class (i.e. "paca" treatment).

[3] Study carried out by the staff of Maderacre and Maderyja timber concessions with the technical support of WWF-MDD team. Said document has been available for the Verifier.

[4] In Spanish "Deseable Sobresaliente" (DS).

Regarding the presence of lianas on the evaluated plots, 88% of them have no problem related with this issue but there is a real problem with the presence of lianas and bejucos in the trunks of the fustales class. In this sense, an annual cut of lianas and bejucos must be scheduled at least in those trees with high commercial value for both timber concessions.

A.3. Project design & goals

The climate project has two main goals:

a) to reduce the pressure for lands with agricultural and cattle ranching purposes by the local population in the project area and its buffer zone;

b) to guarantee the sustainable forestry management of both timber concessions through the implementation of an avoided deforestation project that helps to generate higher economical resources for the management of the area.

The strategy to achieve these goals is supporting the development of environmentally friendly productive initiatives that will help the families to improve their livelihood conditions.

The activities considered to achieve these goals are the following:

Outcome 1: Contribute to the sustainable development of rural producers living in the buffer zone of the project.

1.1 Socialization and dissemination of the project goals.

1.2 Identification and selection of proposals for the environmentally friendly productive projects.

1.3 Development of the skills and capacities of the members of the associations linked to the selected projects.

1.4 Design of the project profiles of the selected projects.

1.5 Look for financing and/or co-financing for the approved profiles (funding).

1.6 Support on the implementation of the approved projects.

1.7 Monitoring of the projects.

In relation with the identification and support of the aforementioned productive projects, the Santa Rosa, La Vuelta, Villa Primavera, Nueva Esperanza y Noaya sectors of the Iñapari District were identified as the buffer area for the implementation of the project activities.

Outcome 2: Reduce the vulnerability of the project area from external factors of deforestation and degradation.

2.1 Review and update of the custody plan.

2.2 Installation of control posts PCA 5 Maderacre.

2.3 Delimitation of 100% of the concessions boundaries.

2.4 Installation of “Hitos” in the concessions vertexes.

2.5 Improve the signaling within the concessions.

2.6 Periodic and annual patrolling within vulnerable sectors.

2.7 Annual monitoring of possible invasions using satellite images.

2.8 In-field verification of sectors identified as potential points of invasion (due to deforestation).

2.9 Development and implementation of mechanisms for the dissemination of environmental education among children, adolescents and communities involved in the project.

Said activities are supposed to contribute to the reduction of the real deforested area, not only within the area of the project but in the buffer zone too, at least in a 80% rate as it is estimated in Peru that the 80% of the deforested area is caused by agriculture (slash & burn practices).

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B. Project participants

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There are several institutions directly or indirectly involved in this Project, each of them providing specific technical skills that are required to its implementation.

B.1. Participants directly involved with this Project

The institutions directly involved in this Project are the following:

Maderera Río Acre S.A.C. (Maderacre) and Maderera Río Yaverija S.A.C. (Maderyja)

Maderacre and Maderyja Forest Concessions[5]: Private companies specialized in timber harvesting and processing. The forest concession has been given by the Peruvian State to the company in 2002, in the framework of a public auction convoked by INRENA (National Office responsible of the conservation of the natural resources).

Maderacre and Maderyja are two forestry companies, which until the first quarter of 2008 had constituted the Maderacre & Maderyja group that owned the forestry concessions for timber production of a 100,000 ha area in the region "Madre de Dios". Since then, Maderyja was sold to a group of Chinese investors. Although currently both timber concessions belong to different companies, they are still managed in an almost identical manner. Furthermore, the General Forestry Management Plan and most of the other tools used for the company decision making are still the same for both timber concessions. That is the reason why both projects are presented in a unique document and most of the different items developed in the present project, present exactly the same characteristics for both companies.

It is considered that the companies that have the best conditions to develop this type of projects are those which count with FSC[6] Certification, since this guarantees that management will be sustainable, preserving the biodiversity of the forest. In this sense it is important to mention that both companies, Maderacre and Maderyja, have achieved the Forest Stewardship Council Certification in January 2007. One of the reasons for obtaining FSC certification was the generation of carbon credits.

Both, Maderacre as Maderyja timber concessions, have the following clearly defined entrepreneurial vision: "We are an entrepreneurial strength that contributes to the development of our dreamed Tahuamanu".

[5] The organizational structure of Maderacre and Maderyja concessions are attached in pages 29 and 30 respectively.

[6] Forest Stewardship Council.

Additionally, Maderacre & Maderyja are both leader companies recognized at the regional, national and international level for the quality of their wood products, characterized by the diversity of their timber and non-timber species and for the sustainable management of their forests, working under the highest forestry certification standards. They are also recognized for their contribution to improve the welfare and quality of life of their partners, workers and people in general, reinvesting some part of their profits in research and technology for the improvement of their entrepreneurial development.

Among their entrepreneurial values, it should be highlighted: leadership in quality, costs and caring for the environment; responsibility and discipline; honesty and loyalty; social responsibility and solidarity; commitment to the environmental sustainability.

Maderacre managing staff

Considering the Maderacre point of view, there are four key areas of responsibility in the structural organization of the concessions: the General Manager, the Forestry Manager, the Social Responsibility Manager and the Financing Manager.

Following, a brief description of the main responsibilities of each Manager of Maderacre timber concession and their technical profile is presented.

a) General Manager

Name: José Luis Canchaya

Among his main responsibilities it should be highlighted:

- Elaborate the Strategic Plan and the Management Plan of the enterprise for the medium term, to be approved by the Board of Shareholders.
- Elaborate the Annual Operative Plan with the definition of the entrepreneurial goals, to be approved by the Board of Shareholders.
- Direct the execution of the Annual Operative Plan of the company.
- Responsible for the selection, hire and lay off of the directive staff and permanent staff of the company.
- Supervise the financial health of the company.
- Determine performance standards for the personnel and according to them evaluate their work periodically. Make quarterly evaluations of the working plans of the different areas.
- Responsible for the signature of any kind of contracts between the company and other institutions or organizations.

- Negotiate and subscribe cooperation agreements with state and private institutions which are committed, as well as Maderacre timber concession, with the sustainable management of the forestry resources.
- Represent and negotiate all the company issues before INRENA and other public institutions.
- Implement mechanisms of control for the different areas of the company.
- Has the administrative, commercial, technical and legal representation of the company before the different entities, private and public, national and international organisms.
- Buy, sell, rent or donate all the company properties, subscribing the required private or public documents.

Profile: Economist of the Pacific University of Peru. He has been Maderacre's financial manager since 2005 and from November 2008 he is the current General Manager. He has demonstrated experience in the economic development of timber concessions, as well as in strategic planning, administrative and financing management of enterprises. He has also experience in researching and consultancies applied to the forestry sector. He has strong knowledge on strategic planning, financing, administration and commercialization issues, as well as on forestry management and other timber businesses.

b) Forestry Manager

Name: Nelson Kroll Kohel

Among his main responsibilities it should be highlighted:

- Elaborate the General Forestry Management Plan and execute the defined activities.
- Elaborate the Annual Operative Seasonal Plan and execute the defined activities.
- Design and supervise the execution of the Forestry Plan.
- Design and supervise the execution of the Custody Plan of the concession.
- Lead the development and implementation of agreements and projects related with forestry activities, researching and carbon dioxide sequestration with public and private institutions.
- Design and implement the rulebooks, manuals and any other regulations that act as a framework for the adequate development of the forestry operations.
- Organize and supervise all the forestry operations of the concession.
- Responsible for the maintenance of the FSC Certification, which is a priority for the concessions since, as it was previously mentioned, one of the reasons for obtaining said certification was the generation of carbon credits.

- Design and supervise the execution of the Environmental-Forestry Monitoring Program, which includes the monitoring of the forest dynamics, the natural regeneration, the changes in the composition and structure of the forest, the quality and efficiency of all the forestry operations and the environmental impacts caused by them.
- Monitor the work of all the hired companies in charge of some forestry operations of the concession, specifically in relation with the application of the rules defined in the company manuals.
- Guarantee the chain of custody of the whole timber production of the concession.
- Design and supervise the implementation of all the defined rules and proceedings related with the personal security, equipments and heavy machinery.
- Elaborate the correspondent annual reports of the forestry area of the concession.

Profile: Forestry Engineer of the National Agrarian University La Molina of Peru. He has an experience of more than 8 years in forestry management under the FSC standards. He acts also as an auditor in FSC certification and auditing processes.

c) Permanent Advisor

Name: Abraham Cardozo Mouzully

Among his main responsibilities it should be highlighted:

- Advise the General Manager on the strategic plan and managing plan of the company.
- Design business opportunities for Maderacre.
- Advise on the negotiation of commercial agreements.
- Advise on the negotiation of institutional agreements.
- Represent the company in all the actions that the General Board or the General Manager delegates on him.

Profile: He was the General Manager of Maderacre since 2003 until November 2008. He is a professor and was former Lieutenant Major of Iñapari Province and also former consultant of the Peruvian Republican Congress. He has vast experience in entrepreneurial management and communitarian development and strong knowledge of the socioeconomic reality of the province and the region. He also has knowledge on strategic business planning and negotiation tools.

d) Responsible of the Social Responsibility Area

Name: Marcela Aliaga Chahud

Among her main responsibilities it should be highlighted:

- Design and development of the Relationship with the Community Plan as part of their Social Responsibility Program. It includes: stakeholders mapping, analysis of the stakeholders-enterprise impact, analysis of the leadership of each detected stakeholder, definition of the policies for each defined stakeholder, programs for each stakeholder, acting protocols.

- Design and development of the protocol to undertake any conflictive situation among the company and its surrounding communities as Belgian Native Community and the neighbor concessionaires. With the Belgian Native Community an agreement on said protocol content was signed.

- Design and development of social programs. In this sense, the concessions with the advisory of the Consultative Committee have prioritized their social investment on health and educational subjects. At this time, the terms of an agreement between the concessions and the Iñapari's school are being evaluated, in order to improve the education in sustainable management of the forests subjects. Visits to the concessions nursery and woods are also considered within this agreement.

- Be part of the Consultative Committee on the Relationship with the Community, as its Technical Secretary.

- Monitor and evaluate the fulfillment of the defined objectives of the Social Responsibility Plan of Maderacre, through the indicators determined in the Community Monitoring Plan.

- A Dissemination Plan is being developed by the Social Responsibility Manager, which will include the internal and external communication strategy of the concessions. In this sense, the following formal lines of communication are taking into account:

  - Internal: shareholders meetings; meetings with the workers; mural journal and informative bulletins.

  - External: website; virtual bulletins; working meetings; participation in activities of territorial coordination.

Profile: Social Communicator, Master in Social Management and with a diploma in social responsibility. She has a vast experience in the design and implementation of development projects and communication strategies applied to small, medium and big size enterprises. She has also strong knowledge on strategic planning and monitoring and evaluation systems.

Maderyja managing staff

a) General Manager: LUYUN DING

The General Management Area is the highest level unit of executive body in the company. It is directly responsible for the control, monitoring and compliance of all the production and development policies outlined by the company, which are implemented through the Forest Operations and Industry Operations Areas.

Main responsibilities:

- Legal representation of the company for legal matters, agreements and contracts.
- Approval of annual plans and budgets for entrepreneurial management.
- Hiring of the direction staff of the company.
- Financial management of the budget for annual operations.
- Commercial management of the timber production of the company.
- Evaluation of the direction staff of the company.

Profile: Specialist in mechanical wood processing machinery, graduated from the University of Nanking, China. He has an eight years experience in the design and manufacture of machinery and a ten year experience in quality control in China. He has been dedicated to the timber industry in Peru since 2004, in various positions and locations within the Amazon: in A&A Peru SAC up to 2008 and since the beginning of 2009 he became the General Manager of MADERYJA SAC.

b) Forest Operations Manager: FERNANDO CALAMPA ZUTA

The Forest Operations Area is a unit of executive management reporting directly to the General Manager. It has the highest level authority of the company for forest operations. It is directly responsible for the compliance of the production and development policies outlined by the company, which are implemented through the Logistic and Management Sub-Managers.

Main responsibilities:

- Direct and supervise the compliance of the administration and production goals of the company, according to the forest management rules and forest certification.
- Propose to the General Manager the production plans and operation budgets.
- Report to the General Management the production progresses, inventories, financial performance, among others, that are under his responsibility.
- Constantly supervise the forest operations.
- Maintain a permanent coordination among the Sub-Managers.
- Propose to the General Manager the annual budget for human, material and financial resources to meet production goals.
- Issue periodic reports on progress of physic and financial targets.
- Propose to the General Manager improvements on the operation systems in order to reduce its costs.

Profile: Forestry Engineer, graduated from the National University of Ucayali, Pucallpa. He has a fifteen year experience in forest management and timber industry in both public and private companies. Since 2003 he has been working on forest management under FSC Certification in the following enterprises: Alpi Rosa, Consorcio Forestal Amazónico and MADERYJA SAC.

c) Community Relationship Coordinator: MANUEL VIA LIMA

The coordination of communal relationships is a support body for the company, reporting directly to the Operations Manager. It performs its functions in permanent coordination with the Logistic and Management Sub-Managers.

Main responsibilities:

- Implement the Relationship with the Community Plan.
- Establish cooperation relationships with the local population within the concession scope and its area of influence.
- Coordinate with public institutions internship training programs for local communities.
- Execute social productive and health programs for local communities.
- Monitor the performance of the social FSC indicators of the company.

Profile: Forestry Engineer, graduated from the National University of Ucayali, specializing in forest management under FSC Certification and social responsibility management of timber companies. He has experience in technical assistance, training and forestry executive functions in public and private institutions of Ucayali and Madre de Dios: since 2005 in the Regional Government of Ucayali, FONDEBOSQUE, Forestal Venao, A y A Peru and since 2008 in MADERYJA SAC.

d) Certification and Environment Coordinator: DAVID PEREZ SALINAS

The certification and environment coordination is a support body for the company, reporting directly to the Operations Manager. It maintains permanent coordination with the Logistic and Management Sub-Managers with the aim to ensure the compliance with all the FSC principles and criteria and the Peruvian standards of Forest Certification.

Main responsibilities:

- Planning and implementation of training activities related to responsible forest management in all the functional areas of the company.
- Monitor the performance of the financial and environmental FSC indicators of the company.
- Qualification of the staff performance and the compliance with certification standards.
- Periodically report to the Operations Manager the compliance status with the certification standards and recommend the necessary corrective actions.

Profile: Computer Technician, graduated from the Antonio Raimondi Institute, Pucallpa. He has experience in the implementation and operation of computing systems for monitoring and chain of custody of certified forests since 2006, in the Consorcio Forestal Amazónico and MADERYJA SAC.

e) Logistic Sub-Manager: SU ZHI QUIANG

The Logistic Area is one of the executive direction bodies of the company, reporting directly to the Operations Manager. It maintains permanent coordination with the Management Sub-Manager and is in charge of consolidating the acquisition and supply of the necessary requirements for all the working areas within the company. It implements its functions through two administrations: the storage and the fuel administrations.

Main responsibilities:

- Consolidate the material and human requirements for all the working areas of the company.
- Check the entry and outgoing of materials and supplies from the different stores.
- Carry out regular physical inventories for verifying the goods and supplies stocks within the stores.
- Consolidate the personnel assignments in the different working areas.
- Maintenance of the access roads.
- Reception and dispatch to Iñapari of the wood that arrives to intermediate pre-stocking areas.
- Issue regular reports correspondent to its area.
- Others responsibilities that are assigned to him.

Profile: Business Administration, graduated from the Guan Dong University, China. He has 2 years experience in the timber industry as the sawmill chief of A&A Peru SAC in Yurimaguas and plant chief of MADERYJA SAC in Iñapari.

f) Management Sub-Manager: LIU YONG LIANG

The Management Area is one of the executive direction bodies of the company, reporting directly to the Operations Manager. It maintains permanent coordination with the Logistic Sub-Manager and is directly responsible for directing and supervising the compliance of the production goals of the company, according to the forest management rules and forest certification. It implements its functions through 6 supervisions: commercial census, forest roads, logging, dragging, sawing in the forests and dispatch, with the support of a computer unit for forests.

Main responsibilities:

- Propose to the Operations Manager the production plans and operation budgets.
- Report the production progresses, inventories, financial performance, among others, that are under his responsibility.
- Constantly supervise the different forest operations.
- Maintain permanent coordination with the superior bodies.
- Supervise the compliance of the outlined goals of the different areas under his responsibility.
- Propose to the Operations Manger the budget requirements for human, material and financial resources necessary to meet the production goals.
- Issue regular reports on the progresses of the physical and financial targets.
- Propose to the Operations Manager the improvements on the operation system for the reduction of its costs.

Profile: Industrial Technician, graduated from the Technological Institute of Huanan, China. He has a six year experience in international commerce and a four year experience in the timber industry in Peru, as the administration manager of A y A Peru.

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AIDER NGO

AIDER NGO has been founded in 1986 with 17 years of experience in design, execution and evaluation of development projects. Its mission is to contribute to the improvement of life quality of rural population in harmony with the environment conservation, by means of sustainable proposals that rely on the applied research, the political action and the recovery of local knowledge, establishing inter-institutional synergies. At the present time, is executing eight projects in five regions of Peru, with financial resources from international cooperation, public and private entities.

AIDER team is multidisciplinary, integrated by professionals of forest, social, biological, economic and administrative sciences. AIDER human resources are 33 professionals, 10 technical personnel and 11 administrative officers in 4 offices located on Piura, Tumbes, Pucallpa and Puerto Maldonado cities.

AIDER expertises is in community forest management, FSC forest certification, degraded lands recovery and reforestation, carbon sequestration and REDD, agro forestry, sustainable business organizational enforcement and project planning, monitoring and evaluation.

AIDER action lines are (i) Sustainable forest management and Certification; (ii) Natural protected areas management; (iii) Environmental services; (iv) Degraded lands recovery, (v) Eco business; (vi) Human rights and natural resources; (vii) Research and; (viii) Political action for environment.
AIDER promoted the first FSC forest certification in Peru with timber production purposes in five indigenous communities from Ucayali - Peru and designed and implemented the first forest management plan for dry forests in a peasant community in Piura - Peru.

AIDER designed the first CDM forest project in Peru, with validation process concluded and on the way to be registered. Also has design and implemented a reforestation project in Peruvian Amazon degraded lands, with VCS validation process concluded.

At the present time, AIDER is designing a REDD project in Tambopata National Reserve and Bahuaja Sonene National Park, as one of the activities of the contract that have subscribed with the Peruvian State, for the administration of biological monitoring, research and environmental services components of both protected natural areas.

AIDER is member of the International Union for Conservation of Nature - IUCN, is accredited by the United Nations Convention to Combat Desertification and is the National Focal Point of the International NGOs Network on Desertification and Drought (RIOD). Also is member of the Peruvian Environmental Network, the National Forestry Chamber, the National Center Association and the REDD Peruvian Group.

AIDER's institutional policy is to establish strategic alliances for maximizing the impacts of its actions, its main partners are the Peruvian Catholic University (PUCP), Sustainable Forestry Management (SFM), Wildlife Conservation Society (WCS), GFA Consulting Group and the National Environment Fund (FONAM).

AIDER's main recognitions are the CAMBIE 2005 Prize to the Environmental Conservation, granted by the Scientific University of the South, in the category " Conservation of Wild Areas ", the Sustainable Development 2006 Prize granted by the National Council of the Environment-CONAM, the Bio commerce 2009 Prize granted by the Environment Ministry and the nomination as finalist of the Equatorial Prize 2006 promoted by the Program of the United Nations for the Development (UNDP).

AIDER staff has participated in environmental services training courses like the CDM Projects Design in CATIE - Costa Rica), Economic Tools for Conservation in Stanford University, CDM Projects Design First and Second International Course organized by the National Environmental Fund, Standard Procedures for carbon baseline by Winrock International and in REDD national and regional seminars and workshops organized by the Andean Community (CAN), WWF, TNC and CCBA.

Greenoxx NGO

Greenoxx NGO has a lot of experience in the development and marketing of carbon projects, especially in CCX mechanism.

The Greenoxx Global Environmental Program is an environmental and forestry program created in 2003 by engineer Rocco Cheirasco and engineer Silvia Gomez Caviglia. Both are forestry engineers, specialized in environment and commercial strategy and marketing, with vast experience in the Kyoto Protocol and the Voluntary Markets.

GGEP integrates these projects to the different markets such as the Clean Development Mechanism (CDM) of the Kyoto Protocol, regulated Voluntary Markets such as the Chicago Climate Exchange (CCX) and non regulated Voluntary Markets such as the CCB Standard, the VCS Standard, OTC, among others.

In consequence, through GGEP, Forestry Projects and Avoided Deforestation Projects would obtain important additional benefits as a result of their participation in Carbon Markets.

Greenoxx has been declared of National Interest by the Presidency of the Republic of Uruguay and of Ministerial Interest by the Ministry of Livestock, Agriculture and Fisheries and the Ministry of Foreign Affairs.

This innovative program has developed different areas, which carry out different activities such as Greenoxx Consulting and Greenoxx NGO.

Greenoxx Consulting is the integral consultancy area in everything related to Forestry and Avoided Deforestation within the Kyoto Protocol and the Voluntary Markets of emission reductions. Greenoxx Consulting was contracted in 2005 by MGM International, to act as the CDM forestry area of this international consultant, worldwide.

Currently, Greenoxx Consulting is working with the Dutch consulting firm 33 Asset Management, an integrant of the Nidera Group, in the identification and development of Forestry and Avoided Deforestation Projects for the Carbon Markets.

Greenoxx NGO is a non-governmental organization dedicated to combat Climate Change, an integrant of the Ammado Foundation, based in Dublin, Ireland, a network of more than 1800 non-profit organizations worldwide and a participant in the network of non-governmental organizations of the sustainable community, Wiser-Earth.

Also, Greenoxx NGO is Offset Aggregator of the Chicago Climate Exchange-CCX and an integrant of the CCX Forestry Committee and the CCX Technical Advisory Committee for Crediting Forest Conservation Projects, which are in charge of projects approval and of determining the rules and regulations of forestry projects.

As Offset Aggregator, Greenoxx has the capacity to submit forestry projects to the CCX and commercialize the offsets (carbon credits) which have been generated, through the electronic trading platform exclusive for CCX Members.

Among other studies, Greenoxx NGO has elaborated the Additionality Tool especially designed for CCX Forestry Projects that decide to go for standardization according to the CCBA principles and therefore obtain Verified Emission Reductions (VERs).

Greenoxx NGO is collaborating with McKinsey & Co to develop solutions to get investment and develop markets flowing at scale into forest carbon sequestration for the Clinton Climate Initiative.

Greenoxx NGO has registered and sold the first carbon credit project from Uruguay, the Banking Pension Fund forestry project. It is also the fourth forest project worldwide to be registered and sold in the CCX platform.

The main objectives of Greenoxx NGO are the following:

- The promotion, development, encouragement, research and support in all its forms of the development of activities related to the Environment, Sustainable Development, Climate Change, Clean Development Mechanism of the Kyoto Protocol, Mitigation of Greenhouse Effect Gases and Ecology in General.

- Contribute to the research, studies and projects in all its stages, to make feasible the obtaining of the previously stated objects.

- Make possible an adequate technical training in different areas of these subjects, by means of courses, events, seminars, post-graduate courses of all kinds in Uruguay as well as abroad.

- To provide any tools needed for the specific training which allow placing environmental products abroad.

- To encourage a permanent updating in the environmental - commercial area, so as to understand in an adequate way the best possibilities to enter into the international market of carbon credits and others of similar characteristics.

- To foster and make feasible the study of greenhouse gases neutralization mechanisms, as is the case of forestry. To foster and make feasible studies which tend to decrease emissions of greenhouse gases, through new technologies.

- To promote and make feasible the holding of forums, seminars, symposiums, events, meetings and all kinds of actions related to the previously mentioned items.

- To make possible all kinds of actions which directly or indirectly promote improvements in life conditions of present and future generations.

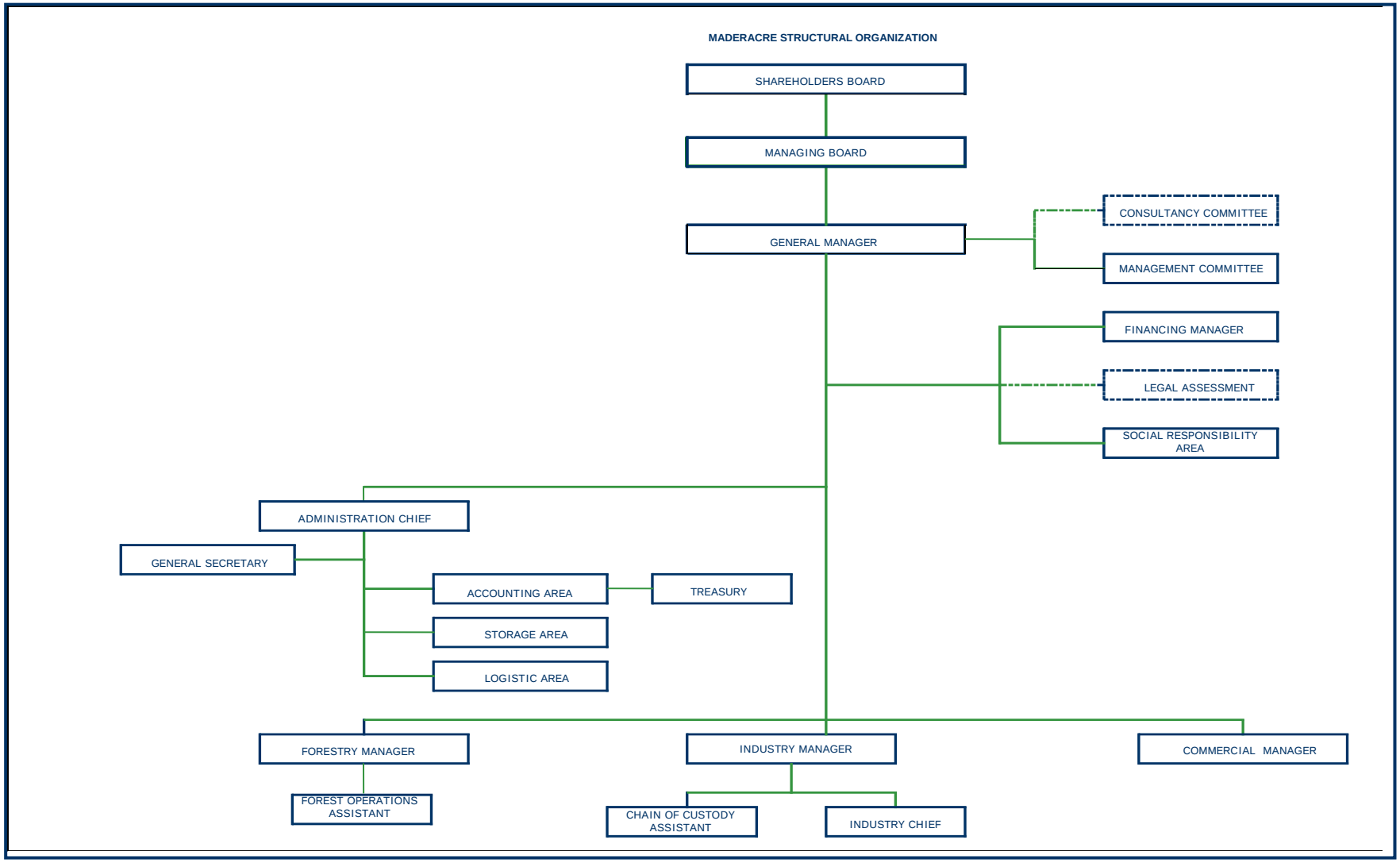

Fig. 4: Maderacre structural organization

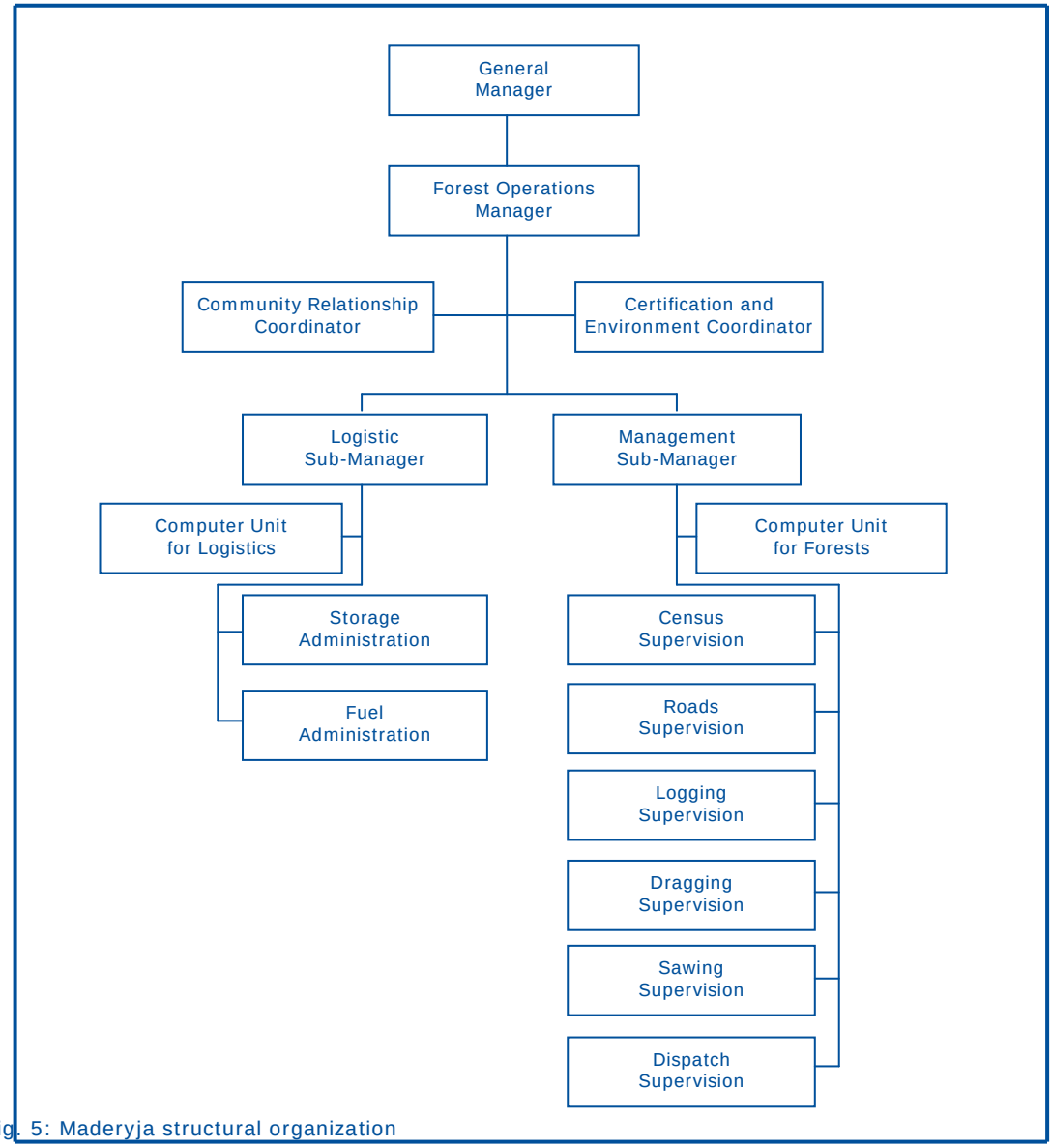

Fig. 5: Maderyja structural organization

B.2. Institutions indirectly involved with this Project

Maderacre has also signed cooperation agreements with other institutions, which are indirectly involved in the development of the present Project, providing their technical knowledge and assessment and in consequence improving the management capacity of the timber concessions. Said institutions and agreements are detailed below:

CESVI and WWF (World Wildlife Fund Inc.)

The Cooperation Agreement between Maderacre and Maderyja forest concessions and CESVI and WWF was signed in April 2005 with the main objective of working together to achieve the FSC Certification for both timber concessions.

CESVI is an independent humanitarian association, founded in 1985, which works for the worldwide solidarity and social justice through humanitarian actions that contribute to consolidate the human rights.

WWF is one of the largest environmental organizations worldwide and its hard work to make a healthy, happy, thriving, living and ultimately diverse and wonderful world is globally well-known.

Hereunder, a summary of the activities to be carried out by the signing parties of the agreement is presented:

- Participate in chain of custody diagnostic evaluations within the forests and the saw-mill and give the needed logistic support for the development of said actions.
- Implement the suggested corrective actions as a result of the aforementioned diagnostic evaluations within the established deadlines and designing the adequate personnel of the concessions to do that.
- Design the contracts to be signed with any third party, in which all the obligations of each party is clearly defined.
- Comply and make others comply with the internal rules of the concessions in relation with the sustainability of the forestry management. In this sense, an internal rulebook must be developed and implemented.
- Participate actively in the accomplishment of the Organization's Handbook, which includes posts, proceedings and responsibilities.
- Cooperate in all the training courses that will be given to Maderacre & Maderyja staff on the process of implementation of the certification and its importance for the concessions.

- Acquire and give the needed security equipments for all Maderacre & Maderyja personnel, according to the work they have to develop. In this sense, Maderacre and Maderyja commit themselves to train and make their personnel comply with all the rules related to prevention and to the use of the adequate security equipment.

- Implement the correspondent corrective actions suggested by the WWF experts with respect to the needed improvements in terms of health services and camping sites of the concessions.

- Identify all the social actors neighboring the operations areas and how are they affected by them. Develop, in cooperation with CESVI and WWF, a relationship strategy with all of them and especially with the Native Community Belgium. To this end, a diagnostic evaluation, consultation, mapping and census of the neighbor population will be carried out, in order to identify and give priority to the social actors related with the forestry operations.

- Participate actively in the design and execution of the exploratory inventories. To this end, Maderacre and Maderyja commit themselves to give the needed logistic support for the infield operations and to designate the adequate key personnel to assure the internalization of these proceedings by the concessions.

- Participate in the development of the General Plan for Forestry Management of the concessions.

- Participate in the execution of the forestry census and in the setting up of the permanent plots.

- Support and participate in the training courses on directed harvesting, designing the adequate personnel to carry them out. With this purpose, Maderacre and Maderyja should provide the needed logistic support for the whole infield operations and workshops to be developed.

- Implement an accountant registry for all the operative costs of each activity (planning, construction of roads, felling of trees, extraction, transport, etc.). A responsible should be designed to be trained in handling said registry.

- Carry out an accountant registry for each production unit, with the aim to use the data from the accountant registries in the budgetary planning.

- Implement the mitigation measures as a result of the fauna evaluation that will be carried out by WWF and CESVI, and include them within the General Plan for Forestry Management of the concessions.

- Cooperate with WWF and the correspondent authorities in decreasing the occurrence of illegal activities from third parties as illegal logging, non-authorized occupation, land use changes, illegal commercialization of fauna and flora and illegal cultures of “coca” leaves.

- Respect to the native and rural communities: the signing parties recognized the importance of the mutual respect between the concessions rights and the rights and costumes of the neighbor native communities and local populations. Said mutual respect implies the development of actions that promote a healthy and proactive interaction between them.

The aforementioned agreement also contains an action plan for the certification of the concessions, including the required actions and the processes to achieve each it. As an example, following some of these actions and its correspondent processes are listed:

- Required action: lobby INRENA Madre de Dios - Lima in order to enhance the administrative arrangements and the exploitation contract.

  Process: analysis and solution of the administrative obstacles for the wood commercialization in Madre de Dios (Iñapari). Lobby in INRENA Lima - Madre de Dios to implement improving solutions for those arrangements.

- Required action: compliance agreement between WWF Perú and Maderacre and Maderyja timber concessions.

  Process: design the correspondent document and sign it by the legal representatives of each party.

- Required action: General Plan for Forestry Management approved by the INRENA.

  Process: solve the observations.

- Required action: implementation of a chain of custody proceeding within the forests and within the saw-mill.

  Process: infield chain of custody evaluation; implementation of corrective actions; chain of custody evaluation of the saw-mill; implementation of corrective actions.

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World Wildlife Fund Inc. (WWF)

The Participation on the Global Forest Trade Network (GFTN) of Peru Agreement between Maderacre and WWF was signed in August 2006 and in August 2007 for Maderyja. As the forest concession changed their owners last year (2008) both of them updated their commitments on April 2009.

Among WWF main goals in the framework of this agreement, it should be highlighted:

- ✓ to combat and eliminate all illegal logging activities in the forests;
- ✓ to promote the sustainable and responsible purchasing of forest products.

From WWF's point of view, the sustainable and responsible purchasing of forest products may play a substantial role in the extinction of illegal logging activities and in the promotion of a better management of forestry resources. Due to that, WWF has established a GFTN, which will enhance commercial relationships between companies that are voluntarily committed with the sustainable and responsible forest management. GFTN will also state some market requirements looking after the conservation of the forests in the whole world. GFTN considers the independent forest certification as an extremely useful tool to achieve these objectives.

The Global Forest Trade Network (GFTN - Peru) is part of the GFTN and is managed as a WWF Program. The participation on the GFTN is voluntary and is open to all productive, processing and commercial enterprises who participate in Peru market and which have the capacity of getting significant benefits, through their business framework, on forest conservation in the most affected areas.

Maderacre and Maderyja have signed this participation agreement with WWF and they both comply with GFTN - Peru regulations. Therefore both concessions are participants of the GFTN - Peru. As a GFTN - Peru participant, Maderacre and Maderyja have committed to:

- ✓ State policies and practices to promote the sustainable and responsible purchasing of forest products in all its operations and activities.
- ✓ Design a strategic plan with clearly defined objectives within the project duration, stating the steps to follow in order to assure that all the produced or bought wood or wood products are from responsible managed sinks and also due to achieve forest certification or chain of custody certification.
- ✓ Develop said strategic plan, monitoring the achievement of the defined objectives within the project duration.
- ✓ Assign one person responsible for the fulfillment of this agreement.
- ✓ Report annually to GFTN - Peru the progress of the strategic plan and some other required information.

As a GFTN - Peru participant, Maderacre and Maderyja have the rights to:

- ✓ Participate on the GFTN - Peru and thus on the GFTN.
- ✓ Access to demand and supply and market trends information, training courses and technical support are also available for GFTN - Peru and GFTN participants.

Undoubtedly, WWF is one of the largest environmental organizations worldwide and its hard work to make a healthy, happy, thriving, living and ultimately diverse and wonderful world is globally well-known. As a result of that, any agreement signed with them implies sustainable and responsible management of the natural and human resources.

La Molina Agrarian National University - Management Forest Department (MFD)

The Cooperation Agreement between Maderacre and the Management Forest Department (MFD) of La Molina Agrarian National University was signed in May 2007.

The MFD is an educational institution of public service which carries on some social activities and projects, i.e. technical assessment of private and public enterprises, and therefore collaborates in the development of the whole country.

Nowadays, the MFD is conducting a research study on *Swietenia macrophylla* populations in Madre de Dios region. In order to get accurate data, they need to measure and evaluate periodically the selected individual of said specie within the Maderacre concession area.

The main goal of this Cooperation Agreement is to share institutional strengths due to enhance the knowledge on *Swietenia macrophylla* in Peru.

With the aim to achieve said goal, Maderacre allows free access to the technical team of MFD for the in-field measurement and evaluation of the specie within the concession area and MFD provides technical and financial support for the collection and subsequent processing and evaluation of the data.

Two Coordinators were assigned on the agreement, one for each party. The MFD Coordinator is Eng. Ignacio Lombardi, Forestry Engineer and Main Professor of La Molina University. The Maderacre Coordinator is Eng. Nelson N. Kroll, responsible for the forest management of the timber concession.

As a result of this agreement, Maderacre will have updated and accurate information about *Swietenia macrophylla* dynamics, one of the most valuable species in terms of productivity and biodiversity. This knowledge would result in a better decision making and planning of all Maderacre forest activities and in consequence in a more sustainable management of its forests.

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University of the Pacific - Faculty of Economy (FEUP)

The Cooperation Agreement between Maderacre and the Faculty of Economy of the University of the Pacific was signed in May 2007.

The University of the Pacific is a private educational and non-profitable institution, specialized in economics and management studies, with the aim to contribute to the development of Peru in the new extremely competitive global context.

Through its Faculty of Economy they pretend to give their students appropriate leadership skills, which would help them in the construction and development, on solid basis, of the companies for which they will work for. The FEUP also puts emphasis on the education of ethical and moral principles as justice, honesty and solidarity.

FEUP students are required to make a professional research study for the Economic Research Subject (compulsory subject of the Economy degree) and Forestry is considered as an area of interest for FEUP to develop said study.

At the same time, Maderacre is a company that requires all type of economic studies in order to enhance not only their management capacity, but also the responsible management of their woods.

The main goal of this Cooperation Agreement is to share institutional strengths and to make possible the development of useful research studies for the concession by FEUP students, in which they would be able to apply all the knowledge and skills learned during their University studies. The FEUP will support them through the whole process.

Two Coordinators were assigned on the agreement, one for each party. The University of the Pacific Coordinator is Prof. Juan Francisco Castro, Coordinator of the Economic Research Subject. The Maderacre Coordinator is Mr. José Luis Canchaya Toledo, Financing Manager.

As a result of this agreement, Maderacre would receive technical support by the students and their supervisors in relation with varied economic and financial issues, thus a permanent adjustment of their procedures and operations should be made in order to optimize all Maderacre resources.

It is important to mention that until Maderyja concession was sold to the Chinese investors, all of the aforementioned agreements were signed by Maderacre & Maderyja as a group. Currently all of them are valid for Maderacre concession and Maderyja is in process of signing some new agreements with WWF and the National Forestry Chamber, among others.

In conclusion, each one of the aforementioned agreements and institutions will contribute somehow in the improvement of the management capacity to undertake this Project. The combination of technical skills, knowledge, research and experience that each one of the involved institutions will provide for the development of the Project are a concrete demonstration of that.

B.3. Financial health of the concessions

As it was previously mentioned, both timber concessions have no current financial problems[7], but considering the construction of the inter-oceanic road and its associated risks it will be difficult for them to keep the necessary control and patrolling actions within the area in order to assure the maintenance of the original conditions of the project site in terms of environment, biodiversity and community. Therefore, the resulting income by means of the carbon credits generated by this project activity will be the only available option to achieve the preservation and conservation of the forest main goal.

In this sense, a cash flow analysis for both concessions was carried out and is presented following:

The financial flows developed for Maderacre and Maderyja timber concessions are based on the forestry exploitation and the environmental services of their area. According to these flows, two projections have been developed: WITH and WITHOUT Madre de Dios Amazon REDD project.

Main Assumptions:

Exchange rate (S/. / US$)	S/. 2.90
Maderacre Concession area	49,376 HAS
Maderacre Usable area	47,350 HAS
Maderyja Concession area	49,556 HAS
Maderyja Usable area	47,568 HAS

WITHOUT MADRE DE DIOS AMAZON REDD PROJECT Scenario

Maderacre and Maderyja have been operating since 2002. Despite their concession contracts entitle them to the use of wood products, non-timber products and environmental services, the concessions have dedicated so far only to forestry exploitation.

[7] This statement can be verified by means of the General Balance and the Income and Expenditure State of the concessions, documents that have been available for the Verifier.

Both concessions, as an enterprise, carry out forestry management operations, wood extraction and sawing. As for the forest concession, this Business Unit revenue consists of the sale of their standing trees and their costs/investments are the necessary activities to have these trees enabled to use under Forest Stewardship Council Certification (FSC).

The cash flow of the concessions without Madre de Dios Amazon REDD project covers the revenue of the sale of their standing trees, based on the data of the exploratory inventory[8] and local selling prices, considering an increasing of species and volumes over time, facilitated by the conclusion of the inter-oceanic road in 2010.

With respect to the expenses, the following productive activities are considered:

Concept
General Management Plan
Exploratory Inventory
Diagnostic Sampling
Fauna Study
Identification of Forests of High Conservation Value
Design of the Forestry Plan
Design of the General Management Forestry Plan
Forestry
Permanent sample plots for monitoring
Plot trees
Nursery
Enrichment
Certification
Certification
Forestry Pre-use
Commercial census
Payment for the use rights
Trainings
Forestry use
Dragging roads
Monitoring of exploitation activities
Chain of custody

[8] Inventories carried out with 95% of confidence on the total concession area. Study used for carbon calculations.

Concept
Custody of the Concessions
Delimitation of the concessions boundaries
Periodic and annual patrolling within vulnerable sectors
Social Responsibility
Administrative costs

The result is a cash flow with a positive Net Present Value (NPV) (in Spanish Valor Actual Neto VAN) for both concessions[9]. However, it can be appreciated within the results that the first years of operation have negative financial results, product of some costs on the entire concession area (regarding an exploitation model under the highest international standards) greater than the income from the wood of the portion of area corresponding to the Plot of Annual Cut of each year. Despite this, Maderacre and Maderyja concessions were able to certificate its operations in 2007, thanks to the funding from international cooperation and other sources. It is important to highlight that this sources are not sustainable over the time and could threaten the viability of holding the FSC Certification which allows a good control on the concession and a reduced impact logging of the forest.

Moreover, considering the finalization of the inter-oceanic road in the short-term, which will result on the one hand in benefits on the concession's timber business of the concession, but on the other hand will produce increased pressure on local forests and, therefore, will require a greater control and resource allocation by Maderacre and Maderyja to maintain the current status of the concessions. In practice, there will be a negative incentive to produce less expensive wood (meaning without Certification) if the Business Unit of each Concession is not profitable by itself.

WITH MADRE DE DIOS AMAZON REDD PROJECT Scenario

The development of the Madre de Dios Amazon REDD Project within the Maderacre and Maderyja concessions is compatible with the forestry exploitation activities, provided it is carried out under sustainable forest management, an element that is assured by the FSC Certification.

In this scheme, the Madre de Dios Amazon REDD Project demands the execution of the aforementioned activities and, additionally, the following:

[9] The Cash Flow without REDD Project for Maderacre and Maderyja concessions have been reviewed by the Verifier. Discount Rate used: 16.86%.

Madre de Dios Amazon REDD Project – Custody of the concession
Socialization and dissemination of the project goals
Identification and selection of proposals for the environmentally friendly productive projects
Development of the skills and capacities of the members of the associations linked to the selected projects
Design of the project profiles of the selected projects
Look for financing and/or co-financing for the approved profiles (funding)
Support on the implementation of the approved projects
Community monitoring REDD project
Monitoring of deforestation mitigation measures / leakage risks
Monitoring of land cover changes and leakage
Mitigation of community impacts
Review and update of the custody plan
Installation of control posts PCA 5 Maderacre
Delimitation of 100% of the concessions boundaries
Installation of “Hitos” in the concessions vertexes
Improve the signaling within the concessions
Periodic and annual patrolling within vulnerable sectors
Annual monitoring of possible invasions using satellite images
In-field verification of sectors identified as potential points of invasion (due to deforestation)
Development and implementation of mechanisms for the dissemination of environmental education among children, adolescents and communities involved in the project
Monitoring of changes in carbon stocks
Biodiversity monitoring
Mitigation of biodiversity impacts
Project developers costs

These activities are managed with the income obtained from the sale of carbon credits resulting from the implementation of the Madre de Dios Amazon REDD Project within the concessions. The assumptions for this calculation are the following:

Carbon stocked within Maderacre forests 2005 (tn)	10,684,473.0
Average carbon (tn/ha)	216.0
Average CO2 (tn/ha)	794.0
Deforested areas - roads and others (ha)	420.0

Carbon stocked within Maderyja forests 2005 (tn)	10,723,422.8
Average carbon (tn/ha)	216.0
Average CO2 (tn/ha)	794.0
Deforested areas - roads and others (ha)	420.0

The final result can be appreciated in the cash flow WITH Madre de Dios Amazon REDD Project[10]. With this revenue, which is additional to the wood, all the necessary activities to preserve the area under a sustainable forest management according to the FSC standards can be funded, as well as to be prepared to strengthen the control and care of the environment regarding the increased pressure on the forests that should be accelerated with the conclusion of the inter-oceanic road. The NPV is and the annual flows are self-financing, reflecting the financial health of the Project.

[10] The Cash Flow WITH REDD for both concessions has been reviewed by the Verifier. Discount rate used: 16.86%.

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C. Technical description of the proposed project activity

C. Technical description of the proposed project activity

C.1. Geographic location and project boundary

The project is located in the Amazonian Region of Madre de Dios, South East of Peru, in the boundary with Bolivia and Brazil.

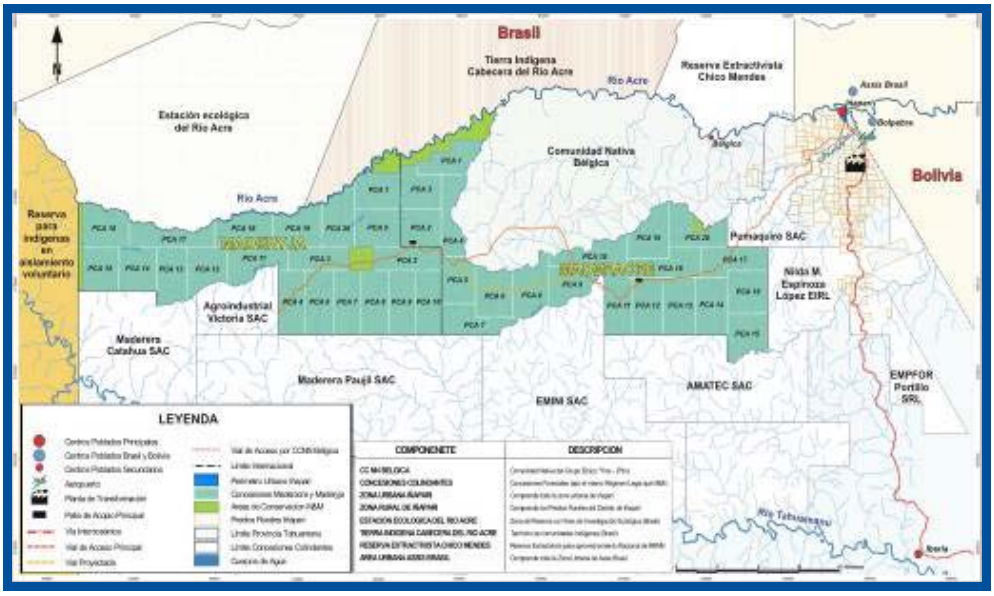

Fig. 6: Location of the proposed project activity and its boundaries.

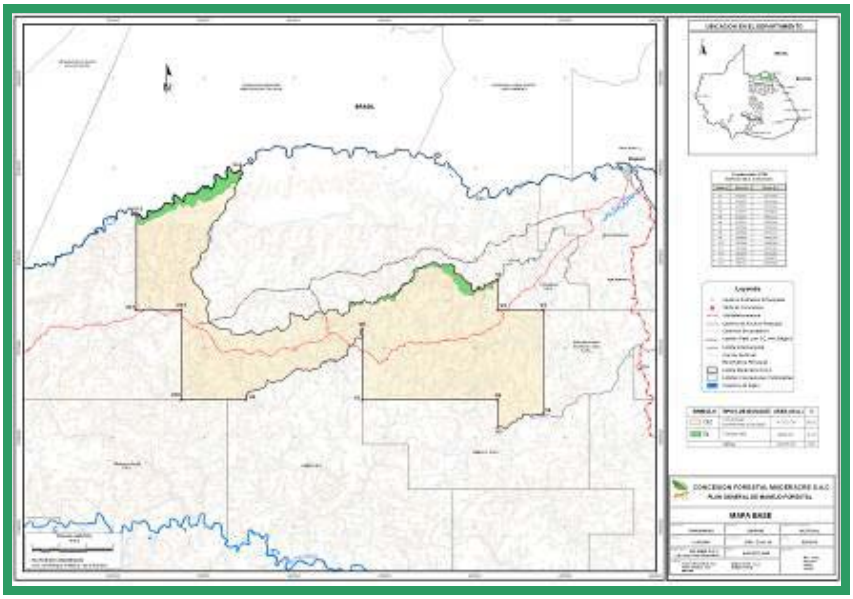

Fig. 7: Map of Maderacre

In the following chart the GPS coordinates of Madracre are presented.

Chart 5: Maderacre GPS coordinates

Point	East (E)	North (N)	Reference
38	422557	8774249	
39	427557	8774249	
35	422557	8761222	Over Noaya river
32	422557	8764249	
23	407548	8764249	
43	387549	8764249	
47	387548	8774249	
41	382557	8774249	
48	382557	8784837	Over Acre river
52	407548	8772112	Over Yaveryja river
54	422557	8777601	Over Yaveryja river
53	427557	8762676	Over Noaya river
49	394127	8789789	Over Acre river
51	394680	8764249	Over Yaveryja river

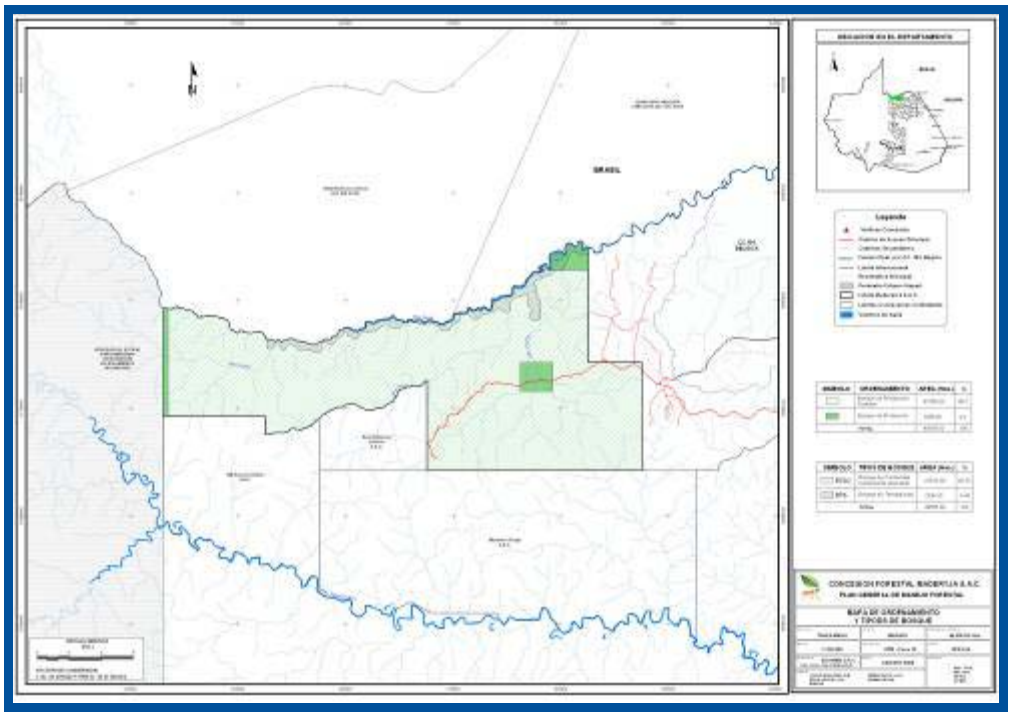

Fig. 8: Map of Maderyja.

In the following chart the GPS coordinates of Maderyja are presented.

Chart 6: Maderyja GPS coordinates

Point	East (E)	North (N)	Reference
6	382557	8774249	
33	387548	8774249	
46	387549	8764249	
35	367557	8764249	
21	352557	8769249	
17	343000	8769249	
27	367557	8772588	Over Mala stream
1	382557	8784837	Over Acre river
22	352557	8767584	Over Mala stream
15	343000	8779329	Over Acre river

C.2. Description of present environmental conditions of the project area

The description includes the Maderacre and Maderyja concessions area, which constitute the Madre de Dios Amazon REDD Project area, and also relevant information of the immediate surroundings of both concessions. As it was previously mentioned, the area is located in the Amazon region of Madre de Dios, in the southeast of Peru, in the tri-border area Peruvian, Brazilian and Bolivian. It is politically located within the Iñapari and Iberia Districts in the Tahuamanu Province.

The area includes over 100.000 hectares of Amazon tropical rainforest. Following, a brief description of the environmental conditions of the project area and its surroundings is presented:

Phisiography

The current topography of the Madre de Dios region is characterized for presenting two main biophysic units: the Cordillera Oriental Subandean Strip and the Madre de Dios Valley. These units are different due to their lithologic characteristics, earth shapes, pedogenetic development, height and types of vegetative cover. Accordingly with this type of topography, the main morpho-dynamic processes that most affect the area are land-slides, sliding and floods. The project area correspond to the Low Hills component of the Madre de Dios Valley unit, the more extensive of the region and developed to the east of the mountainous subandean alignment between 176 and 500 meters. It is characterized by a soft and undulated topography, where the alluvial plain dominates (complex of borders and terraces) and the High Hills from the Quaternary, where the main rivers of the region are born: Las Piedras river, Los Amigos river and Tahuamanu river (Barrios, 2008).

Climate

An analysis of the climatic elements or parameters has been carried out in the area, based on the data obtained from the Iberia and Iñapari meteorological stations in Peru, which comprehends variable periods of registration from 1954-1974 for temperature and 1952-1974 for rainfall; and the Assis and Brasilea stations in Brazil.

Temperature

According to the information obtained, the average medium annual temperature varies between 22ºC and 26ºC, with very low variation during the year, obtaining the highest average monthly registries during the months comprehended between September and April, while the lowest average monthly registries occur between May and August.

The hottest months are September and October and the coldest is July, also the driest month of the year. However, the registries of the highest absolute temperature have values of 41ºC in Iberia (22/08/59), 39ºC in Iñapari (31/03/70) and 38ºC in the Assis-Brasil Station. At the same time, the minimum absolute temperatures have values of up to 6ºC in Iberia (22/07/57); 6.4ºC in Iñapari (27/07/74) and 6ºC in the Assis-Brasil Station. Thermal decreases are produced due to the occurrence of cold air invasions from the Antarctic polar mass, which determine in this area the phenomenon called “Friaje” or “Surazo” that generally appears between the months of May and September (Barrios, 2008).

Rainfall

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

Based on the information obtained from the Assis and Brasileia meteorological stations in Brazil between 1980 and 1989, the total medium annual rainfall is 2000 mm. This same data amounts to 1837 mm in Iñaparí and to 1641 mm in the Iberia Station.

It can be appreciated that rainfall has less intensity during the months of May to September, where 20 to 25% of the total annual rainfall occurs. During the richest period, from October to April, 75 to 80% of the total annual rainfall occurs.

Medium rainfall in the area amounts to approximately 1800 mm annually. Rain tends to increase from the Southeast to the Northeast (Barrios, 2008).

Climatic classification

According to the Koppen Classification System, the climate of the region is of the type AM, that is to say tropical warm, season humid, characterized by presenting abundant rainfall and a short dry season, which has no significant influence on the development of the vegetation due to the abundance of rainfall during the rest of the year.

According to the climatic classification proposed by Dr. W. Thornthwhite it has been determined that the climate in the area is humid and warm.

In general terms, it can be concluded that the climate in the studied area allows the development of agricultural activities and cattle rising without major limitations. On the other hand, the forestry sector is limited during the rainy season with respect to wood supply, which leaves a maximum of 5 months appropriate for the efficient use of this resource (Barrios, 2008).

Soils

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

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

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

In the highly dissected hills and in lower proportion in the high terraces of the Madre de Dios River, soils present a franca texture in the superficial layer and an accumulation of clay in the subsoil, consequently they are very susceptible to erosion. This degradation is aggravated by deforestation, especially in the most dissected areas. Soils are moderately well drained, have low fertility and generally their saturation with aluminum is high (Barrios, 2008).

C.3. Possible endangered species and habitats

The forest where both concessions are located are very important in terms of biodiversity conservation since they are conformed by important populations of the specie *Swietenia macrophyla* (mahogany), and *Cedrela odorata* (cedar), which have been incorporated respectively to the Appendix II and III of CITES for being considered endangered and vulnerable species. For this reason, their use and commercialization should be rigorously supervised, allowing their use only in sustainable managed forests as the case of Maderacre and Maderyja timber concessions, both of them internationally accredited by their Managed Forest and Chain of Custody FSC Certificates.

In addition to this forestry species, there are fauna species catalogued as vulnerable and with viable populations within the concessions area and for this reason both are considered as High Conservation Value Forests (HCVF). Additionally, the Maderyja concession is next to the buffer area of the Manu National Park, one of the Peruvian and worldwide most important conservation areas.

In the following chart the flora and fauna species that must be protected within the project area are presented.

Chart 7: Species to be protected

Species to be protected	Justification
Cedar (*Cedrela odorata*)	Law 27308, Forestry and Native Fauna Law (appendix III – CITES).
Mahogany (*Swietenia macrophylla*)	Law 27308, Forestry and Native Fauna Law (appendix II – CITES).
Leche caspi (*Galactodendron utilisima*)	Ministerial Resolution N° 01710-77-AG/DGFF
Ojé (*Ficus anthelmintica*)	Ministerial Resolution N° 01710-77-AG/DGFF
Oso Bandera (*Myrmecophaga tridactyla*)	D. S. No 034-2004-AG, 22nd September 2004
Yungururo (*Priodontes maximus*)	D. S. No 034-2004-AG, 22nd September 2004
Coto mono (*Alouatta seniculus*)	D. S. No 034-2004-AG, 22nd September 2004
Otorongo (*Panthera onca*)	D. S. No 034-2004-AG, 22nd September 2004
Sachavaca (*Tapirus terrestris*)	D. S. No 034-2004-AG, 22nd September 2004
Ardilla gris (*Sciurus sanborni / ignitus*)	D. S. No 034-2004-AG, 22nd September 2004
Pava campanilla (*Pipile cumanensis*)	D. S. No 034-2004-AG, 22nd September 2004
Paujil (*Mitu tuberosum*)	D. S. No 034-2004-AG, 22nd September 2004
Guacamayo ala verde (*Ara chloropterus*)	D. S. No 034-2004-AG, 22nd September 2004
Guacamayo rojo (*Ara macao*)	D. S. No 034-2004-AG, 22nd September 2004

Fig. 9: *Myrmecophaga tridactyla*

Fig. 10: *Priodontes maximus*

Fig. 11: *Alouatta seniculus*

Fig. 12: *Panthera onca*

Fig. 13: *Tapirus terrestris*

Fig. 14: *Mitu tuberosum*

Fig. 15: *Ara chloropterus*

Fig. 16: *Ara macao*

C.4. Description of present biodiversity conditions of the project area and its surroundings

Hereunder, a summary of the existent biodiversity conditions within the Maderacre and Maderyja timber concessions at the starting date of the Madre de Dios Amazon REDD Project, as well as the conditions in its immediate surroundings defined by the leakage belt determined in the present Madre de Dios Amazon REDD Project. It is based on the results of a series of studies related to the biophysical and biodiversity conditions of the area. Said documents represent a joint effort made by both concessions with the aim to achieve the sustainable management of their forests, using the accumulated knowledge of the biodiversity component of the project. Both concessions have participated in the achievement of said goal, as well as local international collaborating institutions as the NGOs WWF, CESVI and ProNaturaleza.

As it was mentioned before, the project area is located less than 50 km to the side of the new inter-oceanic road that will unite Brazil with the Peruvian ports, in the region that belongs to the Vilcabamba-Amboró Conservation Corridor in the Peruvian Amazon, one of the world biodiversity hotspots.

The area of influence where the inter-oceanic road is being constructed is characterized for still having areas of forests of great importance for their biodiversity and the environmental services they offer. The area is different from other areas next to roads, where its presence has notoriously impacted in the landscape and natural resources. However, the presence of the inter-oceanic road represents a great risk due to a major pressure of population from rural Andes regions that will migrate looking for lands, and the economical activities that will consequently be established.

In addition, these areas are under permanent risk mainly because of illegal loggers who are attracted by the abundance of forestry species of high commercial value, as mahogany. Illegal logging, even though does not deforest, but affects the value of the forest and opens roads that make accessibility easier, creating the conditions to future deforestation.

Fig. 17: “Madre de Dios” area

Fig. 18: “Madre de Dios” area

Fig. 19: Fauna species of the area

Fig. 20: View of the concessions area

Following, some pictures of the flora species within both timber concessions areas are enclosed:

Fig. 21: Flora species

Fig. 22: Flora species

Fig. 23: Flora species

Fig. 24: Flora species

C.4.1. Biological aspects of the concessions area and its surroundings

Life zones

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

Types of forests

The presence of associations and subtypes of forests within the major identified forest communities is caused by the heterogeneity that characterizes the tropical forests.

The Technical Unit in charge of the Ecologic Economic Zoning of the Tahuamanu Province, based on the interpretation of LANDSAT TMS satellite images, carried out a classification, verifying the presence of five forest communities within the Province, as is shown in the following chart:

Chart 8: Areas according to vegetation types

Type of Forest Coverage	AREA	
	ha	%
Open tropical forest with bamboo / Dense tropical forest	338,654	33.0
Open tropical forest with palms / Dense alluvial tropical forest	170,400	17.0
Open tropical forest with palms / Dense tropical forest	389,800	38.0
Dense tropical forest with emergent trees / Open tropical forest with palms	91,520	9.0
Open tropical forest with dominant bamboo	29,626	3.0
TOTAL	**1,020,000**	**100**

Source: Technical Units Map of Economic, Sociological and Ecological Zoning

Generally, the timber species are distributed within the whole area, varying in frequency and volume in each type of forest.

The forestry potential of these forests is huge. Besides being a fundamental source of timber, they can produce a great variety of other products of high economic value. Many species can produce medicines to be employed both in domestic and industrial medicine, oils, flavorings, fibers, gums, resins, inks, tannins and many other products as ferns and orchids (Barrios, 2008).

C.4.2. Fauna description

a) Wildlife in the Maderacre and Maderyja concessions surroundings

During the infield work, carried out as part of the Diagnosis for the Economic and Ecological Zoning of Yaco-Iñapari and Iberia study, diverse species of mammals, birds, reptiles and amphibians were observed, as well as numerous species of invertebrates. It should be mentioned that within Iberia and Iñapari over 160 mammal species, 324 bird species, 106 reptile species, 123 amphibian species exist, as well as many other species of invertebrates. Although the highest concentration occurs in the upper areas of the river beds to the western zone of the Iberia and Iñapari cities, they also occur in the areas bordering Brazil and Bolivia.

Among the most representative species present in the surroundings the following should be highlighted: sachavaca (*Tapirus terrestres*), venado colorado (*Mazama americana*), majaz (*Agouti paca*), añuje (*Dasyprocta variegata*), conejo silvestre (*Sylvilagus brasilensis*), oso hormiguero (*Myrmecophaga tridactyla*), armadillo gigante (*Priodontes maximus*), carachupa (*Dasypus novemcinctus*), puma (*Felis concolor*), otorongo (*Pantera onca*), mancos (*Eira barbara*), perro de monte (*Atelocynus microtis*), mono leoncito (*Cebuella pygmaea*), pichico de barriga naranjada (*Saguinus labiatus),* musmuqui (*Aotus nancymaae),* maquisapa (*Ateles paniscus),* as well as dangerous reptiles as shushupe (*Lachesis muta*), naca naca (*Micrurus sp*), mantona (*Boa constrictor*) and “quelónidos” as the motelo (Geochelone denticulada), taricaya (*Podonemis sp*), birds as the harpia (*Harpia harpia*), Cóndor de la selva (*Sarcoramphus papa*), Guacamayo (*Ara macao*), Paujil (*Mitu tuberosa*), Tucan (*Ramphastos cuvieri*), Paguana (*Crypturellus undulatus*), pucacunga (*Penelope jacquacu*) and manacaraco (*Ortalis guttata*) (Barrios,2008).

b) Current biodiversity scenario within the Maderacre and Maderyja timber concessions

With the objective of evaluating the status of wildlife populations within the Maderacre and Maderyja timber concessions, as well as to obtain preliminary information about the location of important sites for wildlife inside both concessions, an "Evaluation of Native Fauna"[11] was carried out by WWF NGO in 2005. As a result, a current characterization of the wildlife and thus the baseline for future evaluations was obtained. Likewise, an approach to the degree of usage of the native fauna by the human population was obtained and the presence or absence of bird species within the more sensitive taxonomic families regarding environmental disturbances was identified and will be used as indicators for the monitoring and surveillance system of both concessions.

Taking into account the statement that fauna species have positive influence in forest regeneration processes and thus are fundamental for the long-term sustainability of the woods, Maderacre & Maderyja have as one of their purposes to include the information, conclusions and recommendations of said study in their forestry management plan and monitoring system.

Following, a summary of the Rapid Evaluation of Native Fauna Process within the Maderacre and Maderyja concessions is presented:

In order to evaluate the impact of forestry activities over large wildlife, a baseline of indicators related to the presence of native fauna species was established, as well as to the abundance of some of the species found. Said baseline will be used in the future to make a comparison with equal evaluations that will be carried out every 5 years, after the forestry exploitation activities.

Considering that the type of forests existent in both concessions are exactly the same, as well as the forestry associations and habitats and that they are also under the same exploitation intensity, the baseline for both concessions was established over the Central and East area of the Maderyja concession. A total area of 271.1 km was evaluated during 13 days. Said area was covered with two independent brigades and two local guides that helped in moving through the paths and in the location of the native fauna.

The methodological criteria used in the aforementioned evaluation are presented following:

[11] The complete "Evaluation of Native Fauna within Maderacre & Maderyja concessions", carried out by Javier Barrio, consultant of WWF-PPO, has been available for the Verifier.

1. Estimation of sampling percentages

The following chart shows the sampling data within the evaluated areas

Chart 9: Sampling data within the evaluated areas

Net evaluation days	13
Total days including rainy days and settling and leaving the camping site	23
Total number of evaluations	51
Average length of each trail	5,315 m
Total added length of transects evaluated	271.1 Km
Total approximate evaluated length (without repetitions)	75 Km
Theoretical width of evaluation	50 m
Approximate evaluated area (without repetitions)	375 ha
Forestry managed area within evaluated plots (ACP 2, 3, 6, 7, 19, 20)	15,000 ha
Approximate evaluated percentage within managed area	2.5%

Due to the existence of few transects systematically arranged within the area, some existent trials were included in the assessment to avoid, where possible, evaluating the same transects. The calculation of the evaluated length without repetitions is approximate considering that in many occasions small sections of a transect were repeated. While this length without repetition may seem insufficient, given the homogeneity of forest types throughout the area, it can be assured that said length is representative of all the plots evaluated. The evaluated area is also approximate and is based on the evaluated length without repetitions (75 km), not in the total evaluated length (271.1 km). It means that only the sum of transects is considered, without including the repetitions (Barrio, 2005).

Transects were evaluated within six harvesting plots, two of them already harvested (harvesting plots 2 and 3) and the other four not harvested yet (harvesting plots 6, 7, 19 and 20). In general, so that the information is highly reliable, the area to be directly evaluated by the transects should cover approximately 5% of the area to be sampled (Buckland et *al.* 1993, appointed by Barrio, 2005), which in this case (2.5%) was not surpassed considering the 6 harvesting plots included in the evaluation. Nonetheless, the evaluation showed high homogeneity in the distribution of species of wild fauna, even in the already harvested plots. Harvesting plot 3 had already been harvested and some of its extraction roads were used for the evaluation. The rate of encounter of most of the native fauna species was even higher in this harvested plot than in the non harvested ones, due to the increased visibility provided by the extraction roads in comparison with the trials of the exploratory inventory. Only in the case of harvesting plot 3, the evaluated area did surpass the suggested 5%, assessing about 5.4% of said plot (Barrio, 2005).

The described evaluation will be repeated periodically every 5 years and thus a temporal series which enables a comparison and shows the continuous impact of the forestry harvesting activities will be obtained. Said comparison will allow the determination of the impact of the forestry extraction over wildlife in an ex-ante-ex-post design and therefore the correspondent adjustments and adaptations of the management plan can be done.

The weakness of this design relies in the difficulty of determining certain population changes not related to logging or hunting that may occur in some species. Theoretically, during the years following harvesting, the evaluations should find a decline in wildlife within the harvested area, caused mainly by the disturbances of the exploitation activities or by the increase in hunting of fauna species. This can be explained considering that any change on the ecosystem will result in a change on how the species are used in said ecosystem (Meijaard et *al.* 2005, appointed by Barrio, 2005), which will also result in an inevitable impact. Nevertheless, if the structural damage is slight (well directed selective logging) and the hunting is limited to those less susceptible species, the impact on wildlife will be small, and thus the populations of the affected species would recover in the short term (Barrio, 2005).

2. Evaluation of fauna abundance

Transects of evaluation were covered along established roads, partly including transects opened for the exploratory forestry inventory, partly following stream courses and partly including roads utilized for moving. The observations along the different ways described above were similar and even apparently lower within the inventory transects due to the difficulty to observe the superior stratum of the forest and the greater amount of obstacles found while walking. The structural differences or vegetation differences between the evaluated areas were very minor and thus it was not necessary to take them into account for the abundance analysis of any of the species (Barrio, 2005).

For the analysis of the information on abundance, the “Distance” Program was used (Buckland et *al.* 1993, appointed by Barrio, 2005) with the objective of estimating the densities of those species with a high number of sights. In this methodology, the necessary data for each species is the perpendicular distance from the transect to each individual or group of individuals sighted. In the case of species with few sights, the number of sights every 10 km travelled is used as an abundance indicator. The densities of the most abundant species and the number of sights for each species were analyzed. Said results will be compared with those of the same areas evaluated a period of time after logging has occurred (Barrio, 2005).

3. Additional observations

Reproductive data of some of the native fauna species found were taken. Observations were also made for food consumption, especially fruit, thus determining some important tree species for wildlife diet. However, we did not find a species that was more important than others, having found more than one species in fructification status and not having found a preference for any of them (Barrio, 2005).

Additionally, information on some wildlife species of interest for conservation was registered. Said species are based on the list of threatened species of the International Union for the Conservation of Nature (IUCN, 2004) and on the list of the National Institute of Natural Resources (Instituto Nacional de Recursos Naturales INRENA, 2004).

During the evaluation, critic sites for fauna species were identified and “collpas”, water sources, fruit trees of great production and caves or holes in trees were sought. All these formations are key to the existence of some wildlife species and, with their identification and conservation, Maderacre and Maderyja seek to reduce the negative effects of habitat alteration caused by logging. To preserve certain formations within the forest can be crucial to the survival of some wildlife species (Barrio, 2005).

In addition to this, during the evaluation and based on the experience of the specialist in charge on the conservation status of the species within the evaluated area and also regarding the available literature data, some species or groups of species whose better evaluation would reflect the fauna changes due to logging activities were identified.

Said species or groups of species have been proposed as indicators to be used for the monitoring of the quality of the forestry operations for both concessions. Among the proposed groups, primates and bats could be highlighted among mammals, and also numerous families of birds.

Within native fauna species, birds are among the best indicators of the status of the forests (Andrade y Rubio-Torgler 1994, appointed by Barrio, 2005). Bird families composed by insectivorous, mainly terrestrial and of intermediate level, are very affected by changes in the structure of the forests due to logging activities (Meijaard et al. 2005, appointed by Barrio, 2005).

Among bird families with the aforementioned characteristics, which make them very susceptible, Furnariidae (horneros, pijuis), Thamnophillidae (hormigueros) y Formicariidae (long-legged) could be highlighted. Another bird family affected by the changes in the forest structure is Picidae (woodpeckers). This last family is further composed of species that are essential for the reproduction of other species, because woodpeckers build nests that are used for nesting and abandoned after a time, being afterwards used by certain groups of birds and mammals that are seed dispersers. In this way, the species of Picidae family are vital to forest regeneration and to the adequate functioning of the entire ecosystem (Barrio, 2005).

4. Results of the Evaluation of Native Fauna

Within the Maderacre and Maderyja concessions boundaries, traces of 37 mammal species were observed and identified and 172 bird species were determined during the evaluation.

a) Mammals

Chart 10: Mammal species registered within the Maderacre and Maderyja concessions boundaries

ORDER	FAMILY	Scientific name	Common name
MARSUPIALIA	DIDELPHIDAE	*Philander opossum*	
XENARTHRA	MYRMECOPHAGIDAE	*Tamandua tetradactyla*	Hormiguero
XENARTHRA	MYRMECOPHAGIDAE	*Myrmecophaga tridactyla*	Oso bandera
XENARTHRA	BRADYPODIDAE	*Bradypus variegatus*	Pelejo
XENARTHRA	DASYPODIDAE	*Cabassous unicinctus*	Carachupa chica
XENARTHRA	DASYPODIDAE	*Priodontes maximus*	Yungunturu
XENARTHRA	DASYPODIDAE	*Dasypus novemcinctus*	Carachupa
CHIROPTERA	EMBALLONURIDAE	*Rynchonycteris naso*	Murciélago
PRIMATES	CALLITRICHIDAE	*Saguinus fuscicollis*	Pichico
PRIMATES	CALLITRICHIDAE	*Saguinus imperator*	Pichico barbón
PRIMATES	CEBIDAE	*Callicebus brunneus*	Tocón
PRIMATES	CEBIDAE	*Saimiri boliviensis*	Huasita
PRIMATES	CEBIDAE	*Cebus apella*	Mono negro
PRIMATES	CEBIDAE	*Cebus albifrons*	Mono blanco
PRIMATES	CEBIDAE	*Ateles chamek*	Maquisapa
PRIMATES	CEBIDAE	*Alouatta seniculus*	Coto
PRIMATES	CEBIDAE	*Aotus sp.*	Musmuqui
CARNÍVORA	CANIDAE	*Speothos venaticus*	Perro de monte
CARNIVORA	PROCYONIDAE	*Potos flavos*	Chozna
CARNIVORA	PROCYONIDAE	*Nasua nasua*	Achuni
CARNIVORA	MUSTELIDAE	*Eira barbara*	Manco
CARNIVORA	MUSTELIDAE	*Lontra longicaudis*	Nutria
CARNIVORA	FELIDAE	*Felis pardalis*	Tigrillo
CARNIVORA	FELIDAE	*Felis (Puma) concolor*	Puma, tigre colorado
CARNIVORA	FELIDAE	*Panthera onca*	Otorongo, Tigre
PERISSODACTYLA	TAPIRIDAE	*Tapirus terrestris*	Sachavaca
ARTIODACTYLA	TAYASSUIDAE	*Tayassu pecari*	Huangana
ARTIODACTYLA	TAYASSUIDAE	*Tayassu tajacu*	Sajino
ARTIODACTYLA	CERVIDAE	*Mazama americana*	Venado colorado

ORDER	FAMILY	Scientific name	Common name
RODENTIA	SCIURIDAE	*Sciurus spadiceus*	Ardilla roja
RODENTIA	SCIURIDAE	*Sciurus* cf. *pyrrhinus*	Ardilla roja
RODENTIA	SCIURIDAE	*Sciurus sanborni / ignitus*	Ardilla ceniza
RODENTIA	SCIURIDAE	*Sciurillus pusillus*	Ardillita ceniza
RODENTIA	DASYPROCTIDAE	*Agouti paca*	Picuro, Majaz
RODENTIA	DASYPROCTIDAE	*Dasyprocta variegata*	Añuje
RODENTIA	DASYPROCTIDAE	*Myoprocta pratti*	Punchana
RODENTIA	ECHYMIDAE	*Dactylomys dactylinus*	Pacamama

Hereunder, pictures of some mammal species within the concessions area:

Fig. 25: Mammal species

Fig. 26: Mammal species

b) Birds

The following chart shows the bird species found more frequently during the evaluation:

Chart 11: Bird species registered within the Maderacre and Maderyja concessions boundaries

ORDER	FAMILY	Scientific name	Common name
TINAMIFORMES	TINAMIDAE	*Tinamus major*	Perdiz azul
TINAMIFORMES	TINAMIDAE	*Tinamus guttatus*	Yungururo
TINAMIFORMES	TINAMIDAE	*Crypturellus cinereus*	Perdiz
TINAMIFORMES	TINAMIDAE	*Crypturellus* (peq. Rufa) ~ *C. soui*	------
TINAMIFORMES	TINAMIDAE	*Crypturellus undulatus*	Panguana
ANSERIFORMES	ANHIMIDAE	*Anhima cornuta*	------
ANSERIFORMES	ANATIDAE	*Cairina moschata*	Pato
GALLIFORMES	CRACIDAE	*Ortalis guttata*	Manacaraco
GALLIFORMES	CRACIDAE	*Penelope jacquacu*	Pucacunga
GALLIFORMES	CRACIDAE	*Pipile cumanensis*	Pava campanilla
GALLIFORMES	CRACIDAE	*Mitu tuberosum*	Paujil
GALLIFORMES	PHASIANIDAE	*Odontophorus gujanensis*	------
CICONIIFORMES	THRESKIORNITHIDAE	*Mesembrinibis cayennensis*	------

ORDER	FAMILY	Scientific name	Common name
CICONIIFORMES	CATHARTIDAE	*Cathartes melambrotus*	------
CICONIIFORMES	CATHARTIDAE	*Coragyps atratus*	------
CICONIIFORMES	CATHARTIDAE	*Sarcoramphus papa*	------
FALCONIFORMES	ACCIPITRIDAE	*Chondrohierax uncinatus*	------
FALCONIFORMES	ACCIPITRIDAE	*Elanoides forficatus*	------
FALCONIFORMES	ACCIPITRIDAE	*Rostrhamus sociabilis*	------
FALCONIFORMES	ACCIPITRIDAE	*Harpagus bidentatus*	------
FALCONIFORMES	ACCIPITRIDAE	*Ictinia plumbea*	------
FALCONIFORMES	ACCIPITRIDAE	*Leucopternis albicollis*	------
FALCONIFORMES	ACCIPITRIDAE	*Buteogallus urubitinga*	------
FALCONIFORMES	ACCIPITRIDAE	*Buteo magnirostris*	------
FALCONIFORMES	ACCIPITRIDAE	*Harpia harpyja*	------
FALCONIFORMES	ACCIPITRIDAE	*Spizastur melanoleucus*	------
FALCONIFORMES	FALCONIDAE	*Daptrius ater*	------
FALCONIFORMES	FALCONIDAE	*Ibycter americanus*	------
FALCONIFORMES	FALCONIDAE	*Micrastur gilvicollis*	------
GRUIFORMES	PSOPHIIDAE	*Psophia leucoptera*	Trompetero
GRUIFORMES	RALLIDAE	*Aramides cajanea*	------
GRUIFORMES	HELIORNITHIDAE	*Heliornis fulica*	------
GRUIFORMES	EURYPYGIDAE	*Eurypyga helias*	------
CHARADRIIFORMES	SCOLOPACIDAE	*Tringa solitaria*	------
COLUMBIFORMES	COLUMBIDAE	*Claravis pretiosa*	------
COLUMBIFORMES	COLUMBIDAE	*Patagioenas subvinacea*	------
COLUMBIFORMES	COLUMBIDAE	*Leptotila rufaxilla*	------
COLUMBIFORMES	COLUMBIDAE	*Geotrygon montana*	------
PSITTACIFORMES	PSITTACIDAE	*Ara ararauna*	------
PSITTACIFORMES	PSITTACIDAE	*Ara macao*	Guacamayo rojo
PSITTACIFORMES	PSITTACIDAE	*Ara chloropterus*	Guacamayo ala verde
PSITTACIFORMES	PSITTACIDAE	*Ara severus*	Aurora
PSITTACIFORMES	PSITTACIDAE	*Aratinga leucophthalma*	------
PSITTACIFORMES	PSITTACIDAE	*Aratinga weddellii*	------
PSITTACIFORMES	PSITTACIDAE	*Brotogeris cyanoptera*	------
PSITTACIFORMES	PSITTACIDAE	*Brotogeris sanctithomae*	------
PSITTACIFORMES	PSITTACIDAE	*Pionites leucogaster*	------
PSITTACIFORMES	PSITTACIDAE	*Pionus menstruus*	------
PSITTACIFORMES	PSITTACIDAE	*Amazona farinosa*	------
OPISTHOCOMIFORMES	OPISTHOCOMIDAE	*Opisthocomus hoazin*	------
CUCULIFORMES	CUCULIDAE	*Coccyzus americanus*	------
CUCULIFORMES	CUCULIDAE	*Coccyzus melacoryphus*	------
CUCULIFORMES	CUCULIDAE	*Piaya cayana*	------
CUCULIFORMES	CUCULIDAE	*Piaya melanogaster*	------
CUCULIFORMES	CUCULIDAE	*Crotophaga major*	------

ORDER	FAMILY	Scientific name	Common name
STRIGIFORMES	STRIGIDAE	*Lophostrix cristata*	------
STRIGIFORMES	STRIGIDAE	*Glaucidium brasilianum*	------
CAPRIMULGIFORMES	NYCTIBIIDAE	*Nyctibius griseus*	------
CAPRIMULGIFORMES	CAPRIMULGIDAE	*Nyctiphrynus ocellatus*	------
APODIFORMES	APODIDAE	*Chaetura* sp. (*brachyura*?)	------
APODIFORMES	TROCHILIDAE	*Glaucis hirsutus*	------
APODIFORMES	TROCHILIDAE	*Phaethornis ruber*	------
APODIFORMES	TROCHILIDAE	*Phaethornis* sp.	------
APODIFORMES	TROCHILIDAE	*Thalurania furcata*	------
TROGONIFORMES	TROGONIDAE	*Trogon curucui*	------
TROGONIFORMES	TROGONIDAE	*Trogon melanurus*	------
CORACIIFORMES	ALCEDINIDAE	*Chloroceryle americana*	------
CORACIIFORMES	MOMOTIDAE	*Electron platyrhynchum*	------
CORACIIFORMES	MOMOTIDAE	*Baryphthengus ruficapillus*	------
CORACIIFORMES	MOMOTIDAE	*Momotus momota*	------
GALBULIFORMES	GALBULIDAE	*Galbalcyrhynchus leucotis*	------
GALBULIFORMES	GALBULIDAE	*Brachygalba (goeringi?)*	------
GALBULIFORMES	GALBULIDAE	*Brachygalba* sp.	------
GALBULIFORMES	GALBULIDAE	*Galbula albirostris*	------
GALBULIFORMES	GALBULIDAE	*Galbula tombacea*	------
GALBULIFORMES	BUCCONIDAE	*Notharchus macrorhynchos*	------
GALBULIFORMES	BUCCONIDAE	*Malacoptila sp.*	------
GALBULIFORMES	BUCCONIDAE	*Monasa nigrifrons*	------
GALBULIFORMES	BUCCONIDAE	*Monasa flavirostris*	------
GALBULIFORMES	BUCCONIDAE	*Chelidoptera tenebrosa*	------
PICIFORMES	CAPITONIDAE	*Eubucco* (macho como *bourcierii*)	------
PICIFORMES	RAMPHASTIDAE	*Ramphastos tucanus*	------
PICIFORMES	RAMPHASTIDAE	*Ramphastos vitellinus*	------
PICIFORMES	RAMPHASTIDAE	*Aulacorhynchus prasinus*	------
PICIFORMES	RAMPHASTIDAE	*Pteroglossus azara*	------
PICIFORMES	RAMPHASTIDAE	*Pteroglossus castanotis*	------
PICIFORMES	PICIDAE	*Melanerpes cruentatus*	------
PICIFORMES	PICIDAE	*Veniliornis passerinus*	------
PICIFORMES	PICIDAE	*Celeus flavus*	------
PICIFORMES	PICIDAE	*Celeus torquatus*	------
PICIFORMES	PICIDAE	*Campephilus rubricollis*	------
PICIFORMES	PICIDAE	*Campephilus melanoleucos*	------
PASSERIFORMES	DENDROCOLAPTIDAE	*Sittasomus griseicapillus*	------
PASSERIFORMES	DENDROCOLAPTIDAE	*Xiphocolaptes promeropirhynchus*	------
PASSERIFORMES	DENDROCOLAPTIDAE	*Xiphorhynchus picus*	------
PASSERIFORMES	DENDROCOLAPTIDAE	*Xiphorhynchus guttatus*	------
PASSERIFORMES	DENDROCOLAPTIDAE	*Lepidocolaptes albolineatus*	------

ORDER	FAMILY	Scientific name	Common name
PASSERIFORMES	TYRANNIDAE	Mionectes oleagineus	------
PASSERIFORMES	TYRANNIDAE	Tolmomyias sp.	------
PASSERIFORMES	TYRANNIDAE	Colonia colonus	------
PASSERIFORMES	TYRANNIDAE	Myiozetetes similis	------
PASSERIFORMES	TYRANNIDAE	Myiozetetes granadensis	------
PASSERIFORMES	TYRANNIDAE	Pitangus sulphuratus	------
PASSERIFORMES	TYRANNIDAE	Myiodynastes maculatus	------
PASSERIFORMES	TYRANNIDAE	Empidonomus varius	------
PASSERIFORMES	TYRANNIDAE	Tyrannus melancholicus	------
PASSERIFORMES	TYRANNIDAE	Tyrannus savana	------
PASSERIFORMES	TYRANNIDAE	Sirystes sibilator	------
PASSERIFORMES	TYRANNIDAE	Myiarchus tuberculifer	------
PASSERIFORMES	TYRANNIDAE	Myiobius barbatus	------
PASSERIFORMES	TYRANNIDAE	Ramphotrigon ruficauda	------
PASSERIFORMES	COTINGIDAE	Tityra cayana	------
PASSERIFORMES	COTINGIDAE	Pachyramphus minor	------
PASSERIFORMES	COTINGIDAE	Lipaugus vociferans	------
PASSERIFORMES	COTINGIDAE	Gymnoderus foetidus	------
PASSERIFORMES	PIPRIDAE	Lepidothrix coronata	------
PASSERIFORMES	VIREONIDAE	Cyclarhis gujanensis	------
PASSERIFORMES	VIREONIDAE	Vireo olivaceus	------
PASSERIFORMES	HIRUNDINIDAE	Atticora fasciata	------
PASSERIFORMES	HIRUNDINIDAE	Stelgidopteryx ruficollis	------
PASSERIFORMES	TROGLODYTIDAE	Troglodytes aedon	------
PASSERIFORMES	TROGLODYTIDAE	Campylorhynchus turdinus	------
PASSERIFORMES	TROGLODYTIDAE	Henicorhina leucosticta	------
PASSERIFORMES	TROGLODYTIDAE	Cyphorhinus arada	------
PASSERIFORMES	POLIOPTILIDAE	Polioptila plumbea	------
PASSERIFORMES	TURDIDAE	Turdus sp.	------
PASSERIFORMES	THRAUPIDAE	Cissopis leverianus	------
PASSERIFORMES	THRAUPIDAE	Lamprospiza melanoleuca	------
PASSERIFORMES	THRAUPIDAE	Tachyphonus luctuosus	------
PASSERIFORMES	THRAUPIDAE	Lanio versicolor	------
PASSERIFORMES	THRAUPIDAE	Ramphocelus carbo	------
PASSERIFORMES	THRAUPIDAE	Thraupis episcopus	------
PASSERIFORMES	THRAUPIDAE	Tangara chilensis	------
PASSERIFORMES	THRAUPIDAE	Tangara schrankii	------
PASSERIFORMES	THRAUPIDAE	Tangara gyrola	------
PASSERIFORMES	THRAUPIDAE	Tangara cayana	------
PASSERIFORMES	THRAUPIDAE	Tangara callophrys	------
PASSERIFORMES	THRAUPIDAE	Tersina viridis	------
PASSERIFORMES	THRAUPIDAE	Cyanerpes caeruleus	------

ORDER	FAMILY	Scientific name	Common name
PASSERIFORMES	DENDROCOLAPTIDAE	*Campylorhamphus procurvoides*	------
PASSERIFORMES	FURNARIIDAE	*Furnarius leucopus*	------
PASSERIFORMES	FURNARIIDAE	*Synallaxis* sp.	------
PASSERIFORMES	FURNARIIDAE	*Philydor* sp.	------
PASSERIFORMES	FURNARIIDAE	*Philydor ruficaudatus*	------
PASSERIFORMES	THAMNOPHILIDAE	*Cymbilaimus lineatus*	------
PASSERIFORMES	THAMNOPHILIDAE	*Taraba major*	------
PASSERIFORMES	THAMNOPHILIDAE	*Thamnophilus amazonicus*	------
PASSERIFORMES	THAMNOPHILIDAE	*Myrmotherula brachyura*	------
PASSERIFORMES	THAMNOPHILIDAE	*Myrmotherula axillaris*	------
PASSERIFORMES	THAMNOPHILIDAE	*Myrmotherula longipennis*	------
PASSERIFORMES	THAMNOPHILIDAE	*Microrhopias quixensis*	------
PASSERIFORMES	THAMNOPHILIDAE	*Myrmoborus leucophrys*	------
PASSERIFORMES	THAMNOPHILIDAE	*Myrmoborus myotherinus*	------
PASSERIFORMES	THAMNOPHILIDAE	*Hypocnemis hypoxantha*	------
PASSERIFORMES	THAMNOPHILIDAE	*Myrmeciza atrothorax*	------
PASSERIFORMES	THAMNOPHILIDAE	*Myrmeciza hemimelaena*	------
PASSERIFORMES	THAMNOPHILIDAE	*Myrmeciza hyperythra*	------
PASSERIFORMES	THAMNOPHILIDAE	*Hylophylax naevius*	------
PASSERIFORMES	FORMICARIIDAE	*Formicarius colma*	------
PASSERIFORMES	FORMICARIIDAE	*Formicarius analis*	------
PASSERIFORMES	TYRANNIDAE	*Serpophaga hypoleuca*	------
PASSERIFORMES	THRAUPIDAE	*Chlorophanes spiza*	------
PASSERIFORMES	EMBERIZIDAE	*Sporophila castaneiventris*	------
PASSERIFORMES	EMBERIZIDAE	*Arremon taciturnus*	------
PASSERIFORMES	ICTERIDAE	*Psarocolius decumanus*	------
PASSERIFORMES	ICTERIDAE	*Psarocolius bifasciatus*	------
PASSERIFORMES	ICTERIDAE	*Cacicus cela*	------
PASSERIFORMES	ICTERIDAE	*Icterus icterus(jamacaii)*	------
PASSERIFORMES	ICTERIDAE	*Molothrus oryzivorus*	------
PASSERIFORMES	FRINGILLIDAE	*Euphonia* sp. (*chlorotica*?)	------
PASSERIFORMES	FRINGILLIDAE	*Euphonia cyanocephala.*	------
PASSERIFORMES	FRINGILLIDAE	*Euphonia xanthogaster / rufiventris*	------

Following, pictures of some of the aforementioned bird species within Maderacre and Maderyja concessions area are enclosed:

Fig. 27: Bird species

Fig. 28: Bird species

Fig. 29: Bird species

Fig. 30: Bird species

Fig. 31: Bird species

Fig. 32: Bird species

c) Reptiles

Chart 12: Major reptile species registered within the Maderacre and Maderyja concessions

ORDER	FAMILIY	Scientific name
		Bothriopsis bilineata
		Oxybelis
		Boa constrictor
		Corallus caninus
		PAUCAR MACHACO
		Paleosuchus
SAURIA	TEIIDAE	*Kentropyx altamazonicus*
CHELONIA	TESTUDINIDAE	*Geochelone MOTELO*
CHELONIA		*Podocnemis TARICAYA*
CHELONIA		*Podocnemis expansa*

Fig. 33: Reptile species

Fig. 34: Reptile species

Hereunder, pictures of some other fauna species within both concessions areas are presented:

Fig. 35: Other fauna species

Fig. 36: Other fauna species

Fig. 37: Other fauna species

Fig. 38: Other fauna species

Among the observed species the major species were evaluated, which are the most hunted. During the evaluation, 27 mammal species and 13 major bird species were found. Among them, 8 mammal species and 7 bird species were registered in more than 10 opportunities. Based on the amount of encounters, the density of this 15 species was calculated. The average of sights every 10 km of the evaluated transects travelled was calculated to 39 of the 40 evaluated species. In addition to this, the density was calculated to those species with at least 10 sights. All this information can be found within the Evaluation of Native Fauna within Maderacre and Maderyja concessions, developed by Javier Barrio in 2005 (WWF - Peru Program Office).

C.4.3. Hunting activities and identification of critic sites for any fauna species

a) Hunting activities within the project area

High rates of observed species that are rarely found in other Peruvian Amazon areas because of illegal hunting were determined as a result of the evaluation carried out in both concessions. Among these species we may highlight the presence of *Ateles chamek* (Maquisapa) and *Mitu tuberosum* (Paujil).

In Maderacre concession big groups of *Tayassu pecari* and *Tayassu tajacu* were also found, both species with great potential for meat and leather, registering high reproduction rates and largely abundant in the area. For that reason, these species should be eventually managed if a responsible management plan is developed. Nowadays, no one of the concessions is interested in any fauna species management and activities of this type are not included among its entrepreneurial objectives. In Maderyja area said species populations are lower than in Maderacre.

Despite the difficulty of determining the real hunting pressure within the area, it seems to be still low. This must be deducted by the presence of the species that are commonly searched and hunted all along their distribution areas. Among said species it should be highlighted: paujil (*Mitu tuberosum)*, mono aullador (*Alouatta seniculus*) and maquisapa (*Ateles chamek*), as well as *Mazama Americana* (Venado) and *Geochelone sp.* (Motelo). The presence of other species, as the monkeys of Cebus genus (*Cebus apella* and *Cebus albifrons*), also confirms a low hunting pressure both for their abundance and their behavior. Cebus populations are abundant in the evaluated areas and they are extremely trustful, behavior that is not observed under high hunting pressure conditions (Barrio, 2005).

The good current status of wildlife within the concessions apparently responds to the prohibition to hunting in both of them, the implementation of low impact exploitation techniques and the adequate surveillance and custody system. It should be highlighted that all hunting activities are strictly forbidden, even stating within the concessions rulebooks and manuals the prohibition of egg collecting, animal harassment and hunting of live specimens for pets. The concessions personnel is trained based on said rulebooks.

Despite the hunting pressure is very low or almost inexistent and the mechanisms of control that both concessions carry out, the availability of roads and paths used for wood extraction within the concession area and the upcoming inter-oceanic road will make easier the access for illegal hunters avid for said species. Moreover, taking into consideration the presence of species that are rarely find in other Peruvian Amazon zones. In consequence, a strong and permanent patrolling and control is and will be required to assure that no illegal hunting activity is or will be developed within the concession area, goal that should be completely achieved only by means of carbon finance.

b) Identification of critic sites for the development of native fauna species

Overmature trees of wood species with huge holes in their trunks, as well as hollow felled trees should be refuges or places where birds, mammals and insects make their nests and begin their colonies; being essential species for pollination and dispersion of seeds. For this reason, during the harvesting activities carried out by Maderacre and Maderyja concessions staff, it must be taken into account that no one of said identified trees is removed from their place. In this sense, one of the main exploitation policies of both timber concessions state that only trees of intermediate size and with good quality of their trunks are selected to be harvested.

Additionally to the maintenance of overmature trees with hugh holes or hollow trees, important sites for wildlife were identified, areas that have been categorized as areas under conservation and where no wood extraction or forestry operations are allowed.

During the evaluation, collpas[12] sites were also localized and defined as protected areas and therefore no wood extraction or forestry operations are allowed into them. Four of them were found on the banks of Sofia stream in Maderyja concession, three belonging to parakeets and macaws and the other one to peccaries. Their specific coordinates and species found in each one are presented in the following chart:

Chart 13: "Collpas" sites within the concessions

Collpa N°	Coordinates		Species found
1	376725 E	8773475 N	*Brotogeris cyanoptera "collpeando" and* *Ara chloropterus and Amazona farinosa* *Low areas apparently used by Tapirus terrestris*
2	376440 E	8771770 N	*Brotogeris cyanoptera "collpeando" and* *Brotogeris sanctithomae and Aratinga weddellii* *Low areas apparently used by Tapirus terrestris*
3	378890 E	8771820 N	*Brotogeris cyanoptera "collpeando" and* *Brotogeris sanctithomae* *Low areas apparently used by Tapirus terrestris*
4	374010 E	8777010 N	*Visited by Tayassu tajacu and* *Mazama americana* *Is the only collpa important for mammal species*

C.5. Tree species

Results of the flora evaluation

There are many flora species covering the project area. With the objective to know the timber potential of both concessions, an Exploratory Inventory was carried out in each one of them, based on a systematic unrrestricted sampling design, with an allowable sampling error above the mean of approximate 10% and a probability of 95%. Taking into account the results of this evaluation, the Forestry Management Plans for both concessions are developed, as well as the silvicultural system to be applied based on the requirements of the forests and the species selected to be managed.

[12] Collpa: places used for some fauna species to complement its mineral diet, i.e. eating clay or soil.

As a result of the exploratory evaluation of the forests, more than 126 tree species were reported, many of them with ability to use their wood as well as other products like fruits, seeds, fibers, gums, resines, latex, tannines, inks, oils, medicines, etc. More detailed information about this species and their abundance and dominance in the forest can be appreciated in Annex 3 of the Forestry Management General Plans of both concessions.

This large amount of tree species found within the concessions area, gives an idea of the great amount of species of other flora categories as palms, herbaceous, shrubs, lianas, bromelias and orchids that exist in the forests within the Madre de Dios Amazon REDD project. Said flora groups are distributed along the different strata of the forests. From this large group of tree species, both concessions have selected a portfolio of 29 species to be managed in the framework of the project. In the following chart, a list showing the amount of commercial trees by hectare and the merchantable cubic meters per hectare of each of the species selected for the first five years considered within the Forestry Management General Plans.

Chart 14: Tree species selected to be managed by the concessions

Species		DMC cm	IC%	Maderacre		Maderyja	
Common name	Scientific name			N° trees/ha	Vcp (m3/ha)	N° trees/ha	Vcp (m3/ha)
Ana caspi	*Copaifera sp.*	70	70	0.148	1.038	0.109	0.451
Azucar huayo	*Hymenaea oblongifolia*	70	80	0.064	0.510	0.050	0.233
Caoba	*Swietenia macrophylla*	75	80	0.030	0.253	0.044	1.141
Capirona	*Calycophyllum spruceanum*	70	80	0.024	0.151	0.213	2.144
Catahua	*Hura crepitans*	80	80	0.197	2.109	0.181	1.998
Catuaba	*Qualea sp.*	60	50	0.015	0.037	0.022	0.118
Cedro	*Cederla odorata*	70	50	0.030	0.148	0.016	0.063
Copaiba	*Copaifera reticulata*	70	50	0.073	0.666	0.134	1.086
Estoraque	*Myroxylon balsamum*	60	50	0.142	0.640	0.094	0.311
Huimba	*Ceiba samauma*	50	50	0.155	1.510	0.063	0.159
Huayruro	*Talissia sp*	80	80	0.112	0.533	0.297	2.061
Ishpingo	*Amburana cearensis*	70	50	0.097	0.688	0.075	0.525
Itauba	*Caesaria decandra*	70	50	0.045	0.190	0.031	0.092
Lupuna	*Bombacaceae*	80	80	0.648	7.047	0.472	6.912
Manchinga	*Brosimum lactescens*	80	80	0.345	2.794	0.253	1.924
Misa	*Eschweilera coriacea*	70	80	0.024	0.084	0.025	0.028
Moena	*Lauraceae*	50	70	0.127	0.253	0.066	0.145
Oje	*Ficus maxima*	80	75	0.086	0.683	0.242	1.935
Palo baston	*Crepidospermum goudotianum*	50	80	0.167	0.828	0.175	0.609
Pashaco	*Fabaceae*	70	70	0.297	1.789	0.109	0.641
Pumaquiro	*Aspidosperma macrocarpon*	60	50	0.012	0.039	0.038	0.373

Species		DMC cm	IC%	Maderacre		Maderyja	
Common name	Scientific name			Nº trees/ha	Vcp (m3/ha)	Nº trees/ha	Vcp (m3/ha)
Quillabordon	*Aspidosperma parvifolium*	50	50	0.061	0.146	0.075	0.384
Quinilla	*Manilkara bidentata*	80	75	0.086	0.873	0.069	0.350
Requia	*Ruagea insignis*	80	50	0.015	0.041	0.016	0.075
Shihuahuaco	*Dipteryx sp.*	80	70	0.552	5.550	0.350	3.370
Tahuari	*Tabebuia serratifolia*	55	80	0.085	0.229	0.172	0.865
Yacushapana	*Terminalia oblonga*	60	80	0.048	0.222	0.047	0.172
Yerno en prueba	*Dipterix alata*	60	70	0.042	0.161	0.088	0.589
Zapote	*Quararibea cordata*	60	65	0.121	0.834	0.066	0.126
TOTAL				**3.848**	**30.046**	**3.592**	**28.880**

As it was mentioned before, the forest where both concessions are located are very important in terms of biodiversity conservation since they are conformed by important populations of the specie Swietenia macrophylla (mahogany), which has been incorporated to the Appendix II of CITES for being considered an endangered species.

Hereunder, a brief description of the most important timber species managed by both concessions, developed by the forestry team of them, is presented.

a) *Swietenia macrophylla* - Mahogany

Habitat: sites with high rates and persistent rainfall; despite being intolerant to long term droughts, it also happens in areas with a remarkable dry season. Specie usually developed in light, loamy to sandy soils with good fertility conditions, well drained and medium stoned.

Fructification: usually near to the end of the year.

Seed dispersion: by means of the wind; medium distances of 32 to 36m and a maximum of 95 up to 100m.

Germination: 54 to 95% of germination for fresh seeds on average environmental conditions. Said rate is reduced to 30% within 60 days on average environmental conditions.

Growing/Mortality rate: 1.8m of height is reached by the trees since their plantation up to their first year; diameters of 6-27cm in 6-12 years respectively and 15-20m of height in 7-12 years respectively.

Fig. 39: Mahogany tree

Fig. 40: Mahogany tree

Fig. 41: Mahogany tree trunk

Fig. 42: *Swietenia macrophylla* (mahogany)

Fig. 43: *Swietenia macrophylla* (mahogany)

b) Cedrela odorata - Cedar

Habitat: sites with high rates and persistent rainfall but also in areas with a remarkable dry season. Specie usually developed in clayey to sandy soils with normal fertility conditions, well drained and sometimes highly stoned.

Fructification: near to the end of the dry season, but also during the whole year.

Seed dispersion: by means of the wind.

Germination: 60-70% of germination for fresh seeds on average environmental conditions. Seeds should be sowed directly in nursery beds with a mixed substrate of sand and soil, at half shadow.

Growing/Mortality rate: 2-4cm/year is the average growing rate; reaching 4-5m of height in 7-11 years respectively. This specie has showed a good survival rate in the in-field tests carried out by the concessions (70%).

Fig. 44: Cedar tree

Fig. 45: Cedar tree trunk

Fig. 46: *Cedrela odorata* (cedar)

Fig. 47: *Cedrela odorata* (cedar)

c) *Manilkara bidentata* – Quinilla

Habitat: sites with high rates and persistent rainfall. Specie usually developed in clayey to slimy soils, mainly acid, well drained and medium stoned.

Fructification: since the end of the dry season up to the start of the rainy one, between September and January.

Seed dispersion: by means of fauna species: monkeys and bats. Some rodents also disperse seeds of fallen fruits.

Germination: on the one hand this specie has a good germination rate, but on the other hand it germination power is low, reaching only a 20% and loosing it in 1 or 2 months.

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

Fig. 48: Quinilla tree trunk

Fig. 49: Quinilla tree

d) *Dipteryx spp.* – Shihuahuaco

Habitat: sites with high rates and persistent rainfall, but also in areas with a remarkable dry season. Specie usually developed in clayey to slimy soils, well drained, with good fertility conditions and medium stoned.

Fructification: at the end of the dry season.

Seed dispersion: mainly by means of bat species (*Artibeus jamaicensis, Artibeus lituratus and Carollia spp.)*, which get and then take the fruits to safe places to eat them quietly. Some monkey species (*Ateles spp.*) and large rodents (*Dasyprocta spp. and Myoprocta spp.)* could also act eventually as seed spreaders.

Germination: getting 79-80% of germination power.

Growing/Mortality rate: an average annual increase of 1m of height in a 3 year plantation was registered, on alluvial and well-drained soils. On the other hand, average annual increases of 0.57m of height in an 8 year plantation were registered in a Forest Reserve in Ducke, Manaus, Brazil.

Fig. 50: *Dypterix spp.* tree

Fig. 51: *Dypterix spp.*

e) *Amburana cearensis* - Ishpingo

Habitat: sites with high rates and persistent rainfall, but also in areas with a remarkable dry season. Specie usually developed in clayey to slimy soils, well drained and medium stoned.

Fructification: during the dry season, between July and August.

Germination: good rate.

Growing/Mortality rate: despite the growing rate is apparently slow, in a 3 year plantation established in the Pucallpa height growths of 1.5-1.6m were registered.

Fig. 52: Ishpingo tree

f) *Eschweilera coriacea* - Misa

Habitat: sites with high rates and persistent rainfall. Specie usually developed in clayey soils, mainly acid, well drained, sometimes with poor fertility conditions and low stoned.

Fructification: during the rainy season, between January and March.

Germination: good rate.

Growing/Mortality rate: slow growing rate; volumetric increases of about 1000m^3/ha/year.

g) *Apuleia leiocarpa* - Ana caspi

Habitat: sites with high rates and persistent rainfall, but also in areas with a remarkable dry season. Specie highly adaptable to different textures and fertility conditions of soils, well-drained and medium stoned.

Fructification: during the rainy season, between November and March.

Germination: good rate in seeds with a pre-germination treatment, reaching 90% of germination power. In fresh seeds without treatment the percentage is lower, around 20%.

Fig. 53: Ana caspi tree trunk

Fig. 54: Ana caspi tree

h) *Aspidosperma parvifolium* - Quillobordón

Habitat: sites with high rates and persistent rainfall. Specie usually developed in clayey to slimy soils, well drained and medium stoned.

Fructification: at the start of the rainy season, between November and December.

Seed dispersion: by means of the wind, winged seeds.

Germination: seed propagation is successful.

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

i) *Brosimum lactescens* - Manchinga

Habitat: sites with high rates and persistent rainfall. Specie usually developed in clayey to slimy soils, slightly acid, well drained and medium stoned.

Fructification: at the end of the dry season, in October.

Seed dispersion: by means of bird and mammal species, which eat the fallen fruits. Among them, it should be highlighted *Mozama Americana* (Venado), *Tayassu spp.* (Pecaríes) and some rodents.

Germination: reaching 98% of germination power for fresh seeds, but only 25% for seeds that had been collected 15 days before.

Growing/Mortality rate: the survival rate is medium, around 52% in-field and 55-73% under shadow.

Fig. 55: *Brosimum lactescens*

j) *Ruagea insignis* - Requia

Habitat: sites with high rates and persistent rainfall but also in areas with a remarkable dry season. Specie highly adapted to a varied range of soils in terms of texture, acidity and fertility conditions; sometimes temporarily flooded areas and also next to the rivers.

Fructification: there are flowers and fruits during the whole year, but it seems to be more fructification at the end of the rainy season, between March and April.

Seed dispersion: by means of bird species, which are attracted by the intense red color of the seeds. Also some monkey specie and maquisapas *(Ateles spp.)* eat said fruits and therefore participate in the seed dispersion.

Germination: reaching 40-58% of germination power in fresh seeds.

k) *Terminalia oblonga* - Yacushapana

Habitat: sites with high rates and persistent rainfall but also in areas with a remarkable dry season. Specie usually developed in loam to loam-sandy soils, neutral to acid, well drained and sometimes highly stoned.

Fructification: during the dry season up to the start of the rainy one, between May and December.

Seed dispersion: by means of the wind.

Germination: reaching 80% of germination power in fresh seeds.

Growing/Mortality rate: Costa Rica registers state a diametric increase of 13cm and a height increase of 12m in a 14 year plantation of Yacushapana.

Fig. 56: Yacushapana tree

Fig. 57: Yacushapana tree trunk

l) *Copaifera reticulate* - Copaiba

Habitat: sites with high rates and persistent rainfall. Specie usually developed in clayey to slimy soils with good fertility conditions, well drained and medium stoned.

Fructification: since the end of the dry season up to the start of the rainy one, between September to January.

Germination: reaching 31-78% of germination power in fresh seeds.

Growing/Mortality rate: registers made in Brazil for a congenus specie *Copaifera langsdorfii* show slow growth rates, with diameters of 9-11cm in average reached in 14-25 years and heights of 9-12m in the same period. The survival rate is very high, around 90%.

Fig. 58: Copaiba tree

Fig. 59: Copaiba tree trunk

m) *Myroxylon balsamum* - Estoraque

Habitat: sites with high rates and persistent rainfall but also in areas with a remarkable dry season. Specie developed in primary forests, on clayey to slimy soils with good fertility conditions, well drained and variably stoned.

Fructification: next to the end of the dry season, but also during the whole year.

Seed dispersion: by means of the wind; fruits are samaras. Additionally, some parrot species could also participate in the seed dispersion.

Germination: reaching 60-75% of germination power in fresh seeds.

Growing/Mortality rate: registers made in Brazil for a congenus specie *Myroxylon peruiferum* show slow growth rates, with diameters of 6-7cm in 14 years and heights of 6-7m in the same period. The survival rate is very high, around 90%.

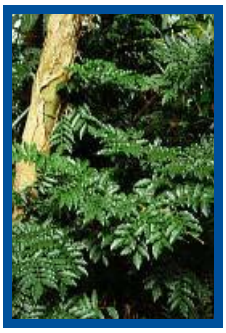

Fig. 60: Estoraque

Fig. 61: Estoraque tree trunk

Fig. 62: Estoraque

C.6. Carbon pools selected

Above and below ground biomass.

C.7. Description of legal title to land

According to the Peruvian Constitution, the forests are owned by the Peruvian State which gives them in concession to private companies by signing a long-term contract. A 2000 law has changed the terms of reference related with the conditions to access to a forest concession. Before 2000, the State used to give a concession for a specific natural resource, not for a certain area. After said law, the concessions are given for a certain amount of hectares and the concessionaire receives total rights on said area. The concessionaire needs to prepare and get DGFFS's approval of a management plan for each resource that the company is interested in harvest and trade.

In 2002, the Peruvian State launched a public auction to receive proposals to concede forest plots in most of the Peruvian Amazon Regions. Each interested company had to offer the best price to be paid to DGFFS yearly (US$/hectare) and also to comply with some other requirements explained in the respective terms of reference of the contest.

Specifically, Maderacre and Maderyja timber concessions have signed long term concession contracts with the Peruvian State in May 2002 for 40 years and for a total area of 96.906 hectares: 49.376 hectares for Maderacre and 49.556 hectares for Maderyja (contracts Nº 17-TAH/C-J-001-02 and Nº 17-TAH/C-J-004-02 respectively[13]). They explicitly give Maderacre and Maderyja the rights on all the environmental services included in the concession. Said contracts were accordingly registered in the Public Registration National Office. Both contracts were completely ratified in May 2006.

In relation with the approval of the project by the corresponding authority, it is important to take into account the following:

- The Forestry Law regulation indicates that the use of environmental services is a right of concessionaires (art. 87 item b), which is an indicative that the forestry authority will approve the project.

- As it was previously mentioned, the concession contracts explicitly state in their item 14.2 the right of the concessionaire of make use of the environmental services, also specifying in item 4.3 that the right to use environmental services is included in the use rights granted in the concession contracts.

- Both concessions have presented their Forest Management Plans adjusted considering the use of the environmental services (carbon credits) to the forestry authority[14], in order to use the carbon rights.

Highlights of the Maderacre and Maderyja Concession Agreements

- Both timber concessions, Maderacre and Maderyja, are expected to carry out a sustainable management of the forestry resources within the concession, according to the management plan annually approved by INRENA (National Institute of Natural Resources), now the DGFFS (General Direction of Forestry and Native Fauna / Dirección General Forestal y de Fauna Silvestre).

- Both timber concessions have the right, according to the concession contract to manage the native flora and fauna resources, as well as tourism and environmental services.

- The Government of Peru retains the concession area.

- The extent of each concession is for 40 years. Said contracts may be renewed after that period depending on the approval of five-yearly audits carried out by the DGFFS.

[13] Both contracts have been available for the Verifier.

[14] The letters of presentation of the adjusted Forestry Management General Plans to the forestry authority have been available for the Verifier.

- The concession contracts were signed on 31st May, 2002 and completely ratified on 31st May, 2006.

- Both concessions have exactly the same contracts.

Something important to take into account is that various concessions were granted by the Peruvian Government in 2006. Most of them have not complied with the agreement or have used the concession to practice illegal logging. Maderacre and Maderyja are one of the few concessions which has complied with the agreement and is doing sustainable management of all their forests.

In this sense, the FSC Certification determines that both, Maderacre as Maderyja timber concessions, have legal rights on the whole concession area and that no current or future conflicts with respect to the use of the land have been detected. Adjoining Acts with the neighbors are signed.

It is important to mention that no people are currently living within the concessions area, therefore no relocation will be required. In relation with the immigration of people it will be produced as a result of the construction of the new inter-oceanic road but not as a consequence of the proposed project activity. That is the main reason why the carbon finance is strongly needed by the concessions, in order to carry out the required monitoring activities to keep this situation under control and the planning settlement process of new immigrants without threatening the forest concessions.

C.8. Starting date of the project activity

The Project activity started in the 31st May 2006, according to the FSC certification process starting date (as it was previously mentioned Maderacre & Maderyja decided to start said FSC certification process regarding the generation of carbon credits).

C.9. Expected operational lifetime of proposed project activity

Time frame for the proposed project activity

A time frame for the proposed project activity was set in order to determine when the different activities will be carried out within the project duration. This time frame is presented below.

As it can be seen said time frame was set for the first 20 year logging cycle of the project (first rotation). For the second 20 years period (second rotation) a new time frame will be set taking into account all the lessons learned during this first rotation cycle.

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Chart 15: Time frame for the proposed project activity

Outcomes / Activities	1*	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Outcome 1 - Contribute to the sustainable development of rural producers living in the buffer zone																				
Socialization and dissemination of the project goals				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Identification and selection of proposals for the environmentally friendly productive projects				■					■					■					■	
Development of the skills and capacities of the members of the associations linked to the selected projects				■					■					■					■	
Design of the project profiles of the selected projects				■					■					■					■	
Look for financing and/or co-financing for the approved profiles				■					■					■					■	
Support on the implementation of the approved projects				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Monitoring of the projects				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Outcome 2 - Reduce the vulnerability of the project area from external factors of deforestation and degradation																				
Review and update of the custody plan				■					■					■					■	
Installation of control posts PCA 5 Maderacre				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Delimitation of 100% of the concessions boundaries	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Installation of “Hitos” in the concessions vertexes				■					■					■					■	
Improve the signaling within the concessions				■					■					■					■	
Periodic and annual patrolling within vulnerable sectors	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Annual monitoring of possible invasions using satellite images				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
In-field verification of sectors identified as potential points of invasion (due to deforestation)				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Development and implementation of mechanisms for the dissemination of environmental education among children, adolescents and communities involved in the project				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

* Each of these numbers corresponds to a year, beginning in 2006 (1) to 2025 (20).

C.10. Likely risks to climate, community and biodiversity

As indicated previously, the main risks of the project are:

- Illegal logging: Maderacre and Maderyja timber concessions will install control points in each vulnerable access via with a couple of permanent forest guards in each point.

- Forest fires caused by slash & burn practices: the core of the carbon project is focused to reduce the factors that forces people to burn forests as Maderacre and Maderyja will promote and fund sustainable local initiatives in order to give alternatives of income generation to local families without destroying the near forest.

  In relation with the risk of forest fires, on October 14th, 2008, an electronic bulletin denominated "Fire Observatory"[15] has published the following information of Madre de Dios region, where the project is located.

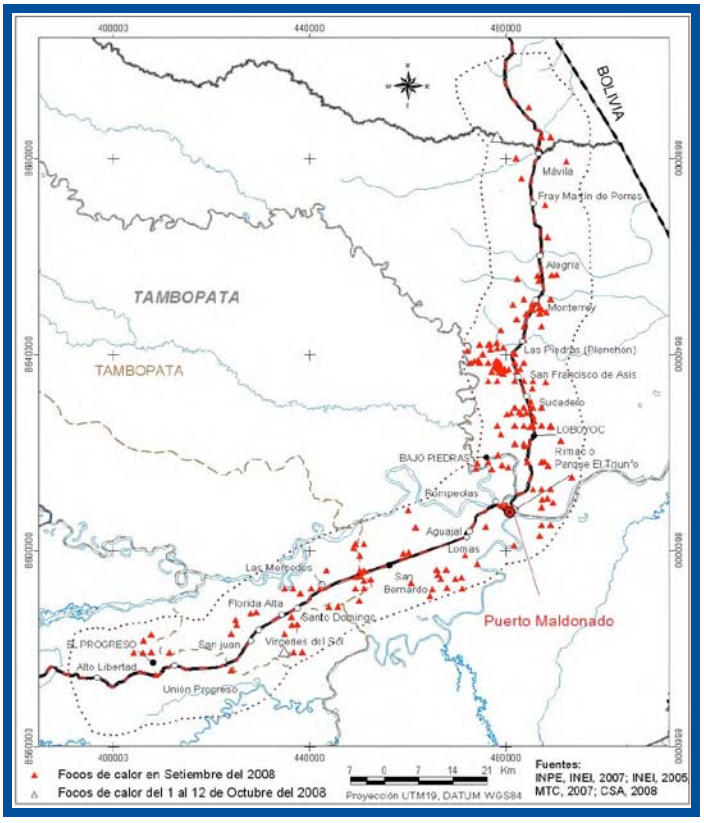

Fig. 63: Map showing the fire sources reported in September and the first 12 days of October, 2008, for an area of 4000km^2 in Madre de Dios region.

[15] "Fire Observatory Bulletin: area of influence of the new inter-oceanic road in Madre de Dios, Peru", Electronic Bulletin, Nº 1, 14th October 2008.

The enclosed map shows the fire sources reported in September and October, 2008, for an area of 4000km^2. Said area includes 10km of each side of the inter-oceanic road, along 200km, considering Puerto Maldonado as a center point, where the higher concentration of human population of Madre de Dios is located.

In September, the satellites have registered 103 fire sources and since the 1st of October up to the 12th only 2 sources were detected. The fire focus identified potential fires or burns. In the map, a higher concentration of the fire sources surrounding villages (El Progreso, San Bernardo, Bajo Piedras, Loboyoc and Planchón) in September can be observed. The priority must be given to these places for uncontrolled burns and potential forests fires.

In conclusion, it was September, 2008, where higher fire sources were reported, as it happened last year. In September, 2007, 205 fire sources were reported, almost twice as much than in 2008.

It is important to highlight, that the information in which the Fire Observatory Bulletin has based to write the aforementioned report belongs to the Center of Climate Forecasting and Climate Studies of the Space Investigation National Institute of the Science and Technology Ministry of Brazil[16]. The main objective of said Bulletin is to inform any person or organization where and when fires and burns occur, in order to avoid, mitigate or repair the environmental and social damages caused by the fire. This Bulletin focuses in the inter-oceanic road framework, within Madre de Dios region, especially next to Puerto Maldonado.

The publication informs about fires and burns detected by specific equipment that have been installed in some earth satellites which shall detect points of intense heat within the earth surface. If the fire is covered by clouds, lots of smoke or trees, sometimes it could not be detected. That is why the intention of the bulletin is to be permanently in touch with any people in the field, to receive from them the most precise and real information as possible of any detected fire source and in this way complement the information given by the satellites.

This Bulletin will be an extremely important tool to take into account by the concessions in relation with fire prevention and control.

- Invasions of human settlements: based in a permanent presence in the concession and with the support of local authorities, Maderacre as well as Maderyja will support the efforts to carry out a planned settlement process of new immigrants without threatening the forest concessions.

[16] http://sigma.cptec.inpe.br/produto/queimadas/

Even though the company has written procedures related with safety and health issues, we should list some potential risks in this sense:

- Soil erosion: both timber concessions have defined a low impact working scheme: the stump is left, specialized machinery such as forestry tractor with articulated wheels, dragging suspended by winche, litter and organic matter are not removed from the roads, in the dragging roads only canopy vegetation is removed and not mature trees in order to reduce the risk of torrents (FSC asks to minimize environmental impacts).

- Genetic Forest Material Loss: As indicated in the management plan of both timber concessions, Maderacre and Maderyja have decided not to harvest trees below a Minimum Logging Diameter (defined according to scientific researches) and also to leave some seeding trees.

- Water Contamination with Fuel Spread: Each fuel container has a capacity of only 200 liters and there is written procedures in case of spread. The personnel that operate these containers have been previously trained.

- Accidents of the machinery operators and wild animal attacks (snakes, etc.): Each worker must wear all the time that he is in the forest Personal Protection Equipment and each camp is implemented with a basic safety kit.

It is important to also highlight that Maderacre and Maderyja timber concessions deliver every year training workshops with all their personnel.

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D. Forest conservation measures

D. Forest conservation measures

D.1. Additionality

In order to demonstrate that the present project activity is effectively additional, the following analysis was made:

a) Regulatory surplus:

First of all, it is important to highlight that the present project activity is not mandated by any enforced law, statute or other regulatory framework.

b) Investment barriers:

As it was previously mentioned in item B.3. of this document, a cash flow analysis was carried out for the first 20 years cycle of the forests of Maderacre & Maderyja timber concessions, which shows the following results:

- **Without Madre de Dios Amazon REDD Project Scenario:** the result is a cash flow with a positive Net Present Value (NPV) (in Spanish Valor Actual Neto VAN) for both concessions. However, it can be appreciated within the results that the first years of operation have negative financial results, product of some costs on the entire concession area (regarding an exploitation model under the highest international standards) greater than the income from the wood of the portion of area corresponding to the Plot of Annual Cut of each year. Despite this, Maderacre and Maderyja concessions were able to certificate its operations in 2007, thanks to the funding from international cooperation and other sources. It is important to highlight that this sources are not sustainable over the time and could threaten the viability of holding the FSC Certification which allows a good control on the concession and a reduced impact logging of the forest.

  Moreover, considering the finalization of the inter-oceanic road in the short-term, which will result on the one hand in benefits on the concession's timber business of the concession, but on the other hand will produce increased pressure on local forests and, therefore, will require a greater control and resource allocation by Maderacre and Maderyja to maintain the current status of the concessions. In practice, there will be a negative incentive to produce less expensive wood (meaning without Certification) if the Business Unit of each Concession is not profitable by itself.

- **With Madre de Dios Amazon REDD Project Scenario:** the development of the REDD Project within the Maderacre and Maderyja concessions is compatible with the forestry exploitation activities, provided it is carried out under sustainable forest management, an element that is assured by the FSC Certification.

  The cash flow WITH Madre de Dios Amazon REDD Project shows that with the carbon credits revenue, which is additional to the wood, all the necessary activities to preserve the area under a sustainable forest management according to the FSC standards can be funded, as well as to be prepared to strengthen the control and care of the environment regarding the increased pressure on the forests that should be accelerated with the conclusion of the inter-oceanic road. The NPV is positive and the annual flows are self-financing, reflecting the financial health of the Project.

In addition to this it is important to highlight that, currently, most of the forestry companies, including Maderacre & Maderyja, only count with resources in order to carry out a sustainable forestry management in the areas to be harvested annually, but not in the whole concession. This situation represents a big risk, since the rest of the non-intervened area has a great possibility of being affected by illegal logging, transient agriculture, etc. Even though today the only villages established near the concession, are the Belgian native community and the frontier village of Iñapari, the presence of the new road will undoubtedly increment the migratory movement. If the companies do not achieve a greater presence in their concession, these areas could be invaded by migratory farmers, loosing as a consequence big areas of forest.

The timber extraction in the forestry concessions, when carried out applying sustainable management criteria, will generate positive impacts in the conservation of biodiversity and the development of local populations. The operations of companies such as Maderacre & Maderyja, generate permanent local employment and income for the region and the country, besides contributing to the recovery and conservation of the forests. The FSC Certification they have achieved in 2007 represents an additional guarantee that their actions are carried out respecting their management plans and also respecting the local populations and the environment. Additionally, said FSC Certification enables Maderacre & Maderyja the generation of carbon credits, which is the only option to continue and permanently improve the sustainable management of the whole concession forests.

This is the reason why the consolidation of a sustainable forestry management in these areas is so important for the development of the region. For this purpose, concession holders need to increase their economical and human resources with respect to their actual situation, mainly with the objective of guaranteeing the conservation of the whole area of forests of the concessions.

It has been estimated that the Maderacre & Maderyja concession have stocked 78.496.332 TM of CO_2 equivalent. The sale of carbon credits in the international markets, already existent and in process of creation, are an alternative for obtaining economical resources to finance control and surveillance actions that currently cannot be carried out with the required intensity but also, to enlarge their silvicultural management operations, investigation, recovery and enrichment of certain areas of forest. The final objective would be to increase the physical presence to all the concession area and the creation of a fund to support local development initiatives, with the objective of improving their relationship with the local communities and change the local productive pattern through the promotion of environmentally friendly economic activities, agreed with the population.

Because of that, the most likely scenario without the carbon income is that the area of the concession will be under pressure by illegal loggers and local farmers, at an increased rate as the IIRSA railroad is attracting many migrants searching for lands to live and work and, as most of cleaned lands are already owned, they (as traditionally, has occurred) will focus their attention in forest areas.

The following map shows the closeness between the concessions and IIRSA road and also other roads built by the company to carry the harvested timber:

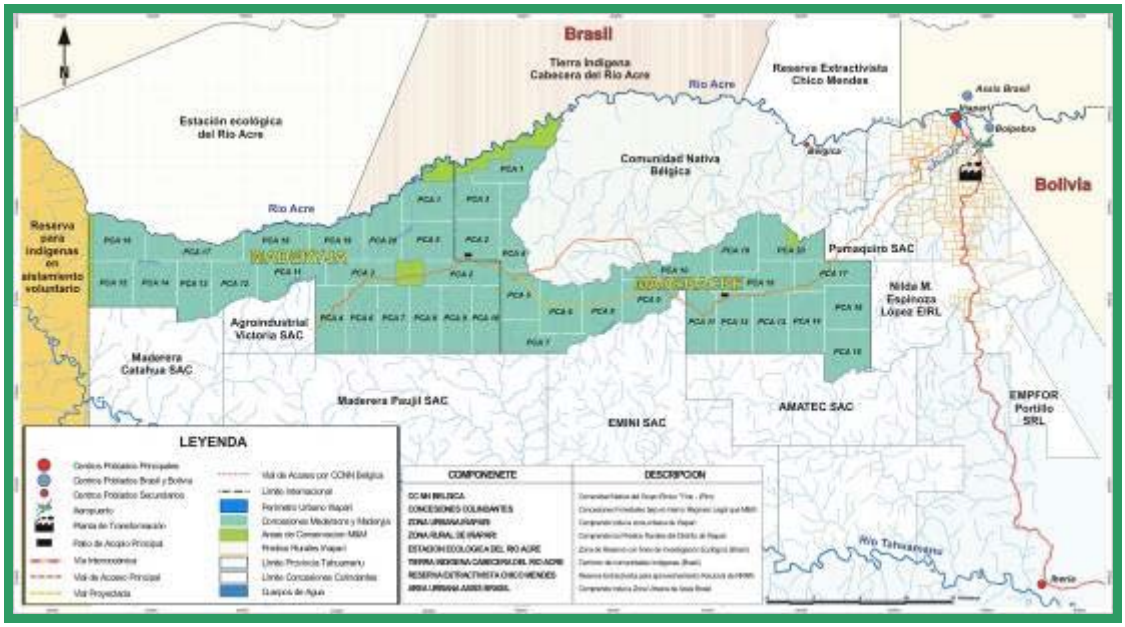


Fig. 64: Map showing the closeness between the concessions and the IIRSA road

The map also shows that lands near IIRSA road are already owned by rural peasants, one indigenous community or other forest concessions so new migrants arriving daily to the region will generate a real pressure over the forest lands even though the property rights are clearly given to, in this case, Maderacre & Maderyja.

D.2. Leakage

The understanding of the main causes of deforestation and degradation of the forests has achieved a renewed importance due to the recognition of politicians and public opinion over the fundamental role of forests on the mitigation and adaptation to climate change.

The effective strategies to decrease or stop significantly the deforestation in the long-term will be those that attack its causes. Additionally, some national causes of deforestation are caused by other sectors, such as the agricultural and livestock ones, infrastructure or energy sectors. Therefore, transectorial strategies must be designed, including international, national and local commitments and responsibilities.

In this sense, the present project activity, which has as one of its main objectives the sustainable management of the natural forests, has generated the conditions for the development of a reduced emissions from deforestation and degradation of the forests (REDD).

D.2.1. Methodology

The leakage belt area of the Maderacre and Maderyja timber concessions consists of 269,403.07 hectares and is located within the River Acre basin of the Iñapari District, Tahuamanu Province, Madre de Dios Department.

a. Leakage determination due to the pre-existent activities within the project area

The following map shows the land tenure in the surrounding areas of the project.

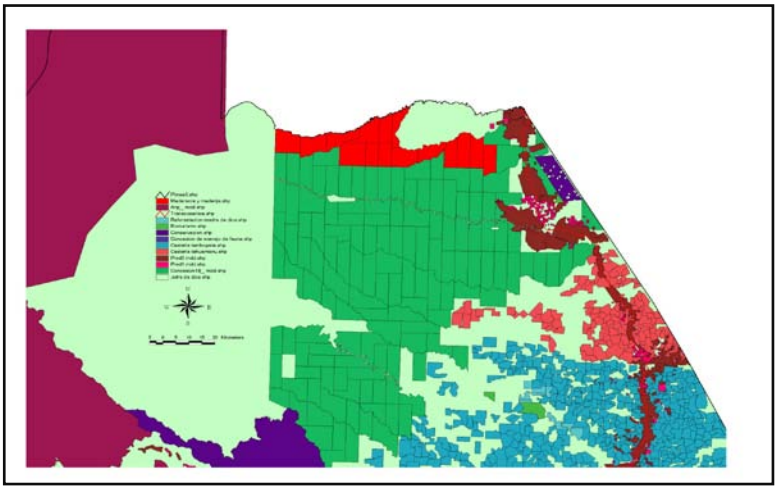


Fig. 65: Map showing the land tenure in the surrounding

As it can be seen in the previous map, there are no conflicts with other ways of land tenure.

- A displacement of the pre-existent activities within the project area is not attributable.

- The leakage estimation method due to the displacement of pre-existent agricultural activities is not applicable.

b. Leakage belt determination

The leakage belt area determination was based on the REDD Frontier 2009 suggested methodology developed by IDESAM, Fundacion Amazonas Sustentable and Carbon Decisions. Some adjustments were made to said methodology which are detailed following:

- The presence of rivers was considered because this will not allow the deforestation to move forward.

- The existence of timber concessions and agricultural urban areas within the project boundaries.

- The northern area of the concessions was not taken into account because it crosses the frontier to another country.

c. Carbon stocked calculation

For the quantification of the carbon content of the leakage belt forests, only those forest types and areas included within said belt (buffer area) were taken into consideration. Afterwards, the carbon stocked estimation was carried out. For this estimation, bibliography references including carbon calculations in tn/ha for each type of forest were searced and reviewed and are detailed in the following chart:

Chart 16: Types of forest within the leakage belt area

Types of forest	Area (ha)	Carbon	Reference
Tropical Low Hill Wet Forest	11,693.6	225.2	*Recavarren, P. and Angulo, M; 2009*
Tropical Low Terrace Wet Forest	13,649.3	153.8	*Recavarren, P. el al.; 2009*
Tropical Low Hill Wet Forest with Bamboo	234,002.6	225.2	*Recavarren, P. and Angulo, M; 2009*
Agricultural and Livestock Activity / Secondary Forests	10.057.6	50	*Alegre, Julio et al.*

Source: AIDER, 2009

D.2.2. Results

a. Leakage belt area

The Maderacre and Maderyja timber concessios leakage belt area is 269,403.07 hectares.

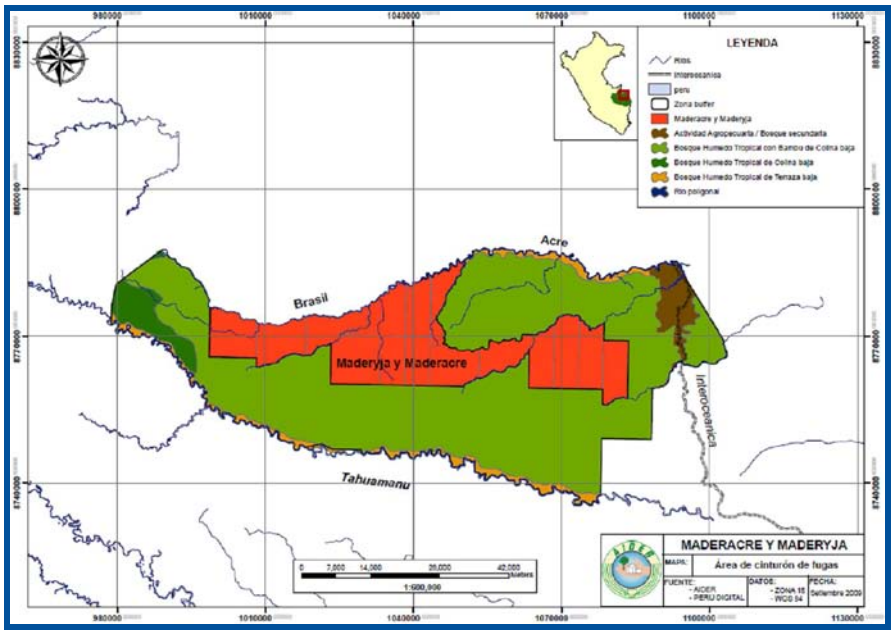


Fig. 66: Map of the leakage belt area of the Maderacre and Maderyja timber concessions

b. Carbon stocked

According to the obtained results, the existent amount of carbon (tn) stocked within the leakage belt of the Maderacre and Maderyja timber concessions can be determined.

In the following chart, the total amount of carbon (tn) stocked by each type of forest within the leakage belt area is presented:

Chart 17: Total amount of carbon stocked within the leakage belt area

Types of forest	Total amount of carbon (tn)
Tropical Low Hill Wet Forest	2,633,393.54
Tropical Low Terrace Wet Forest	2,099,390.19
Tropical Low Hill Wet Forest with Bamboo	52,697,375.61
Agricultural and Livestock Activity / Secondary Forests	502,882.10
TOTAL	**57,933,041.44**

Source: AIDER, 2009.

D.2.3. Conclusions

The concessions leakage belt area includes a total of 269,403.07 hectares of forests, which stocked a total of 57,933,041.44 tons of C and/or 212,421,151.96 tons of CO_2e within the whole leakage belt area.

D.2.4. Leakage estimation

The quantification of leakage is based on the adaptation to the modular methodology 14 "Estimation of emissions from activity shifting for avoided unplanned deforestation – LK ASU" developed by Climate Focus, Silvestrum, Winrock, Carbon Decisions, Terracarbon for Avoided Deforestation Partners and submitted to the Voluntary Carbon Standard (VCS), which is applied to the Madre de Dios Amazon REDD Project.

1. EX - ANTE ESTIMATION OF LEAKAGE

1.1. Estimation of potential leakage of the project: it is being assumed that the REDD project would cause 100% of the displacement of the deforestation baseline.

For these calculations, the deforestation modeling within the project area was used, as is shown in the following chart:

Chart 18: Potential leakage to 100% of MADERACRE and MADERYJA concessions

Year	Potential leakage MADERACRE (tn)	Potential leakage MADERYJA (tn)	Potential leakage MADERACRE and MADERYJA (tn)
2005	-	-	
2006	32,651	9,714	42,364
2007	31,637	26,554	58,192
2008	26,992	8,063	35,055
2009	14,600	13,198	27,799
2010	56,101	7,099	63,199
2011	74,478	32,327	106,805
2012	56,469	20,963	77,432
2013	39,525	8,851	48,376
2014	88,359	18,404	106,762
2015	104,228	29,523	133,752
2016	92,471	17,703	110,174

Year	Potential leakage MADERACRE (tn)	Potential leakage MADERYJA (tn)	Potential leakage MADERACRE and MADERYJA (tn)
2017	118,161	34,268	152,429
2018	145,677	38,900	184,576
2019	155,558	38,970	194,527
2020	172,330	74,496	246,826
2021	224,809	82,502	307,311
2022	289,689	109,305	398,994
2023	358,319	84,622	442,941
2024	436,942	94,513	531,455
2025	451,715	95,242	546,956
Total	2,970,711	845,216	3,815,927

1.2. Analysis of the types of agents of deforestation: two large groups of agents of deforestation were considered:

a. Local agents of deforestation: this group is constituted by rural families already settled within the reference region of the project. For determining the percentage of the total rural families that would be considered as locals, the source used was the database of the 2007 National Census of Population and Housing, which is the official source for the Peruvian population. We have crossed the question “have you lived here 5 years ago?” with the question “main economic activity” and considered as local rural families those who have reported that they lived here 5 years ago and their main economic activity was “farmer, skilled agricultural and fishery worker”, from which we obtained that 86.7% of total people that are engaged with the aforementioned activity are local. According to the LK - ASU methodology is left to the proposer criteria to suggest which percentage of leakage caused by these local agents cannot be avoided. In our specific case, we propose 5% due to the fact that the project will implement actions that, according to the LK - ASU methodology, are conducive to avoid leakage, such as activities aimed at generating alternative livelihoods for those local families who are constrained from exercising their traditional activities because of the project implementation.

b. Immigrant agents of deforestation: based on the same statistical calculation as the previous one, migrants are represented for those that have migrated to the countryside in the last 5 years, which represent 13.3% of the total. The LK - ASU methodology requires that this group of agents is considered with a leakage rate of 40%, regardless of the strategy that is designed to work with this group of actors.

1.3 Equation of the EX - ANTE estimation of the Madre de Dios Amazon REDD project leakage

$$L_{Ex\ Ante} = L_{LA} + L_{IA} \qquad (1)$$

$F_{Ex\ Ante}$ = Ex – ante leakage of the REDD project, tn C

F_{LA} = Ex – ante leakage caused by local agents of deforestation, tn C

F_{IA} = Ex – ante leakage caused by immigrant agents of deforestation, tn C

$$L_{LA} = L_{pp} * L_{DF\_local\ \_agent} * W_{local\_agent} \qquad (2)$$

L_{pp} = Potential leakage of the project

$L_{DF\_local\ \_agent}$ = Leakage factor due to the displacement of deforestation by local agent

W_{local_agent} = Weight of the local agent (from 0 to 1)

$$L_{IA} = L_{pp} * L_{DF} * W_{immigrant\_agent} \qquad (3)$$

L_{pp} = Potential leakage of the project

$L_{DF\_immigrant\ \_agent}$ = Leakage factor due to the displacement of deforestation by immigrant agents

$W_{immigrant\_agent}$ = Weight of the immigrant agent (from 0 to 1)

Applying equation 3:

L_{IA} = 3815,927 * 0.4 * 0.133 = 203,007 tn C

Applying equation 2:

L_{LA} = 3815,927 * 0.05 * 0.867 = 165,420 tn C

Applying equation 1:

$L_{Ex\ Ante}$ = 203,007 + 165,420 = 368,428 tn C

As a result of the previous analysis, the net leakage of the project is obtained and shown in the following graphic and chart:

Graph 1: Net leakage applicable to the MADRE DE DIOS AMAZON REDD PROJECT

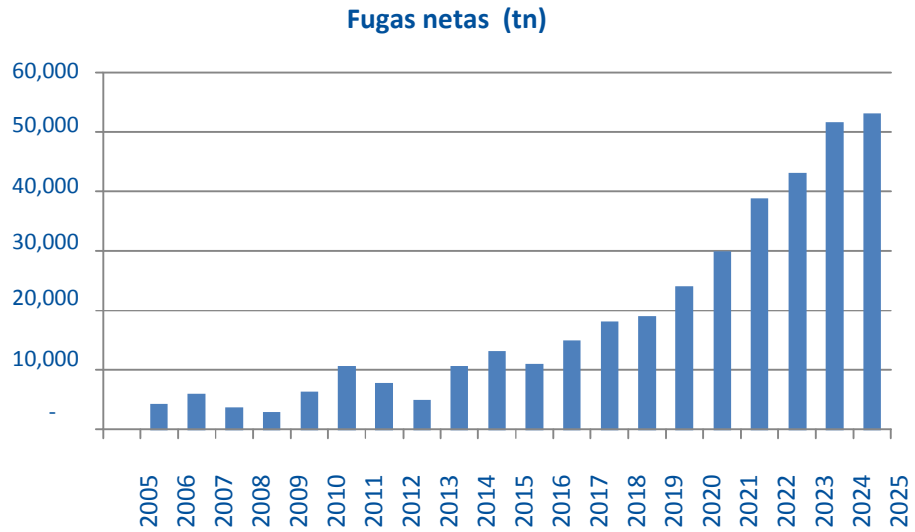


Chart 19: Net leakage applicable to the MADRE DE DIOS AMAZON REDD PROJECT

Year	Potential Leakage MADERACRE and MADERYJA (tn)	Net leakage (tn)
2005	-	-
2006	42,364	4,095
2007	58,192	5,625
2008	35,055	3,388
2009	27,799	2,687
2010	63,199	6,109
2011	106,805	10,323
2012	77,432	7,484
2013	48,376	4,676
2014	106,762	10,319
2015	133,752	12,928
2016	110,174	10,649
2017	152,429	14,733
2018	184,576	17,840
2019	194,527	18,802
2020	246,826	23,857
2021	307,311	29,703
2022	398,994	38,565
2023	442,941	42,812
2024	531,455	51,368
2025	546,956	52,866
Total	3,815,927	368,828

2. EX – POST ESTIMATION OF LEAKAGE

Leakage belt:

According to this method, the changes in carbon stocks and the CO2 emissions that would be produced in a without REDD project scenario in an area around or next to the project area (the leakage belt) will be estimated and a comparison with the changes in carbon stocks and CO2 emissions that would be produced during the REDD project implementation will be done. The steps to implement this methodology are the following:

a. Definition of the leakage belt boundaries:

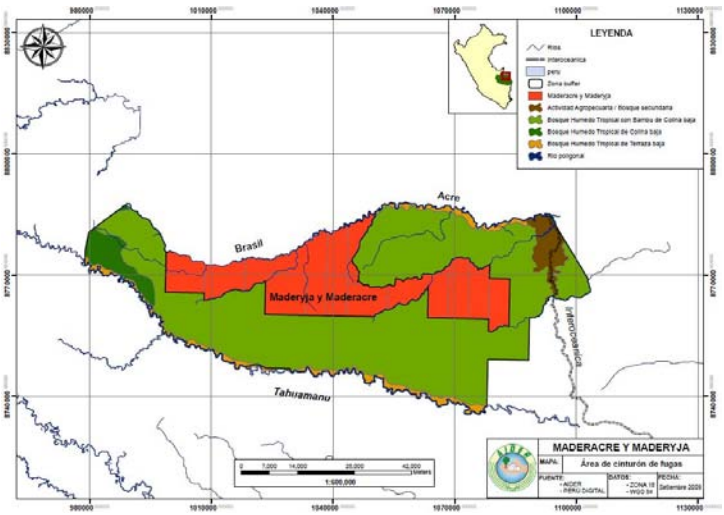
The main groups of local agents and drivers of deforestation are identified in order to define the boundary of the leakage belt, as can be appreciated in the following chart 4 and figure 5:

Chart 20: Agents and drivers of deforestation

Agents of deforestation	Drivers of deforestation
Farmers	Distance to main roads
Illegal loggers	Distance to secondary roads
Migrants	Distance to navigable rivers
Migrants	Distance to navigable rivers
Native communities	
Land speculators	
Timber concessionaires	

Source: Own development

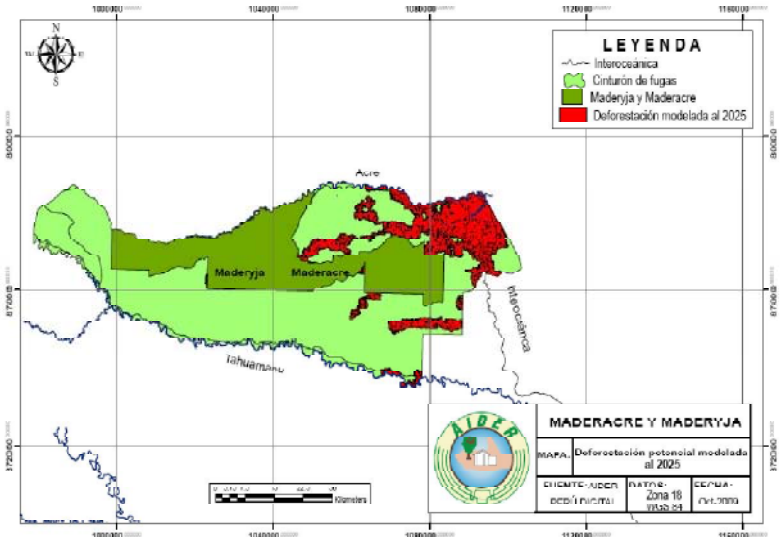
Fig. 67: Map of the leakage belt area



b. Estimation of the rate and location of the baseline of unplanned deforestation within the leakage belt area

The deforestation modeling up to 2025 was performed to determine the deforested area within the leakage belt, as can be appreciated in the following figure:

Fig. 68: Potential deforestation modeled up to 2025



D.3. Estimated amount of GHG removals by sinks over crediting period

D.3.1. Deforestation modeling

a) DINAMICA EGO

DINAMICA EGO is a software used to model land use / land cover changes. This software was developed by the Center of Remote Sensing (Centro de Sensoramiento Remoto) of the Federal University of Minas Gerais, Brazil. This is currently one of the best programmes to elaborate this kind of models. It was mainly applied in the urban growth modeling and deforestation modeling of the Brazilian Amazon.

The specialized models of land use / land change use a geographical database usually in raster format. The development of these models is based on three stages: calibration, simulation and validation.

DINAMICA allows the elaboration of very complex models based on nested iterations, dynamic feedbacks, multi-region approaches, the manipulation and combination of algebraic data in various formats as maps, charts, matrixes and constants. Said features make the software to promote the simplicity, flexibility and performance, optimizing the speed and the resources of the computer.

b) Procedure

Step 1: Selection of the methodological tool

For the determination of the deforestation baseline within the project area, the computing space-temporary modeling tool DINAMICA was used.

To determine the baseline according to this computing model, the deforested area in the initial year, the deforested area per year and the deforestation drivers together with their correspondent importance measured as a percentage must be included.

Step 2: Selection of the satellite images

The study area is based on the analysis of satellite images. Using Landsat images, with a pixel size of 30 m side, it is possible to distinguish the areas where the forest coverage had been lost from those that still maintain their forests. Said analysis was performed using images from 5 different years: 1990, 1995, 2000, 2005 and 2008, so as to assess trends and changes on land use over time.

Step 3: Analysis of the satellite images

As it was previously mentioned, 5 sets of satellite images were used in order to compare 5 different years: 1990, 1995, 2000, 2005 and 2008. For the year 2000, Landsat 7 images were used, while for 1990, 1995, 2000 and 2005 Landsat 5 images were used (see figures 69 to 73 below).

In the following chart, the characteristics of the Landsat images used for the analysis are presented:

Chart 21: Characteristics of the Landsat images used for the analysis

Path	Row	1990	1995	2000	2005	2008
02	68	1990-08-01	1995-05-27	2000-11-24	2005-09-11	2008-07-01
02	69	1990-08-01	1995-04-25	2001-08-23*	2005-09-11	2008-09-03
03	68	1990-09-25	1996-07-23*	2000-07-26	2006-05-16*	2008-05-05
03	69	1989-09-22*	1994-08-01*	2000-05-23	2006-05-16*	2008-08-25
04	68	1990-07-14	1995-04-23	2000-12-24	2005-01-12	2008-09-01
04	69	1990-06-28	1995-06-10	2000-10-05	2005-05-04	2008-09-01

* An alternative image was used, as closest to the correspondent date as possible.

The processing of the satellite images was carried out using the ENVI 4.5® and ArcGis 9.3® programs. The first step of the methodological sequence consists of the importing and union of bands, and thus obtaining a single file per image which, if necessary, will receive a particular treatment that allows its better classification. The second step of the sequence consists of the georeferencing of the images using the Projection UTM19, Datum WGS84.

Following, the classification and reclassification of the images was carried out considering the following categories: forests, clouds, rivers, sands and anthropic areas.

Said classification was adjusted by typing in the image of those areas that were not previously selected by the software due to clearness of the image in some cases and because of the low reflection of bare soils in others. Said adjustements were carried out thanks to the experience and knowledge of the study area of the team of specialists in charge of the analysis.

Fig. 69: Quantification of the deforestation using Landsat image 1990

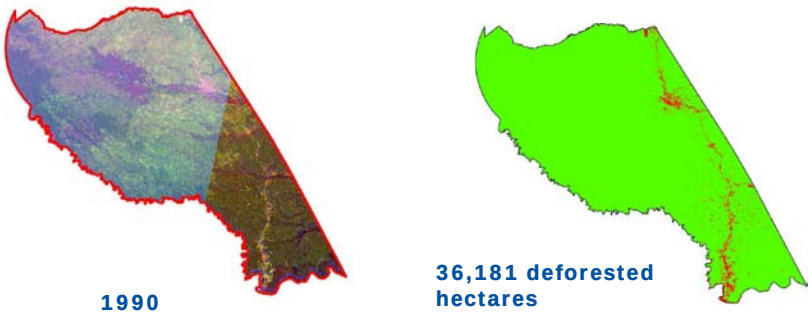


Fig. 70: Quantification of the deforestation using Landsat image 1995

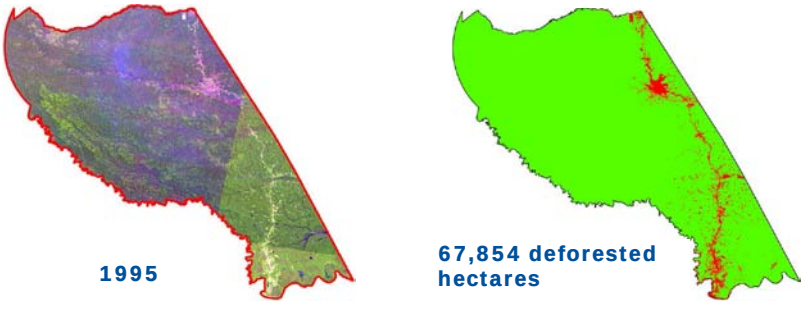


Fig. 71: Quantification of the deforestation using Landsat image 2000

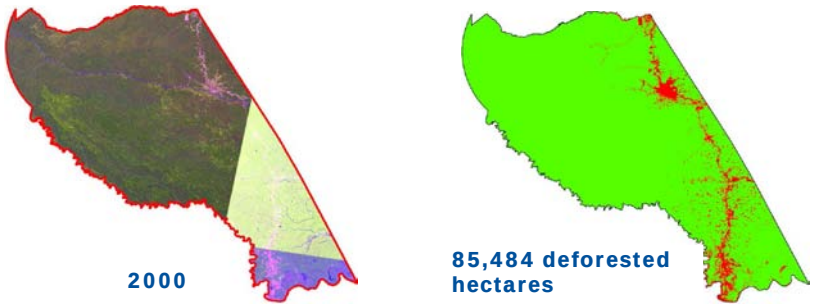


Fig. 72: Quantification of the deforestation using Landsat image 2005

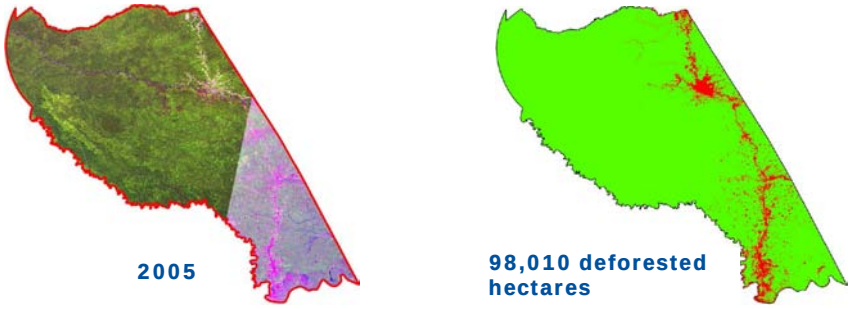
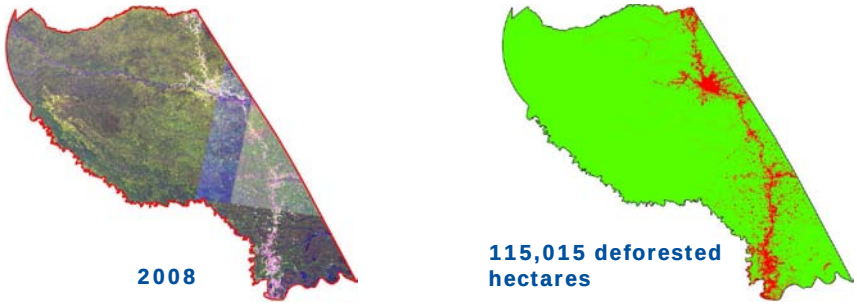


Fig. 73: Quantification of the deforestation using Landsat image 2008



As shown in the previous figures, the deforested area (ha) has been increasing year by year, losing in just 18 years 78,834 hectareas, a very considerable number.

Step 4: Determination of the deforestation rate

It is therefore necessary to estimate a deforestation rate for the selected period without using the tool. Based on the estimated deforestation rate, the deforested area during the whole life of the project can be calculated.

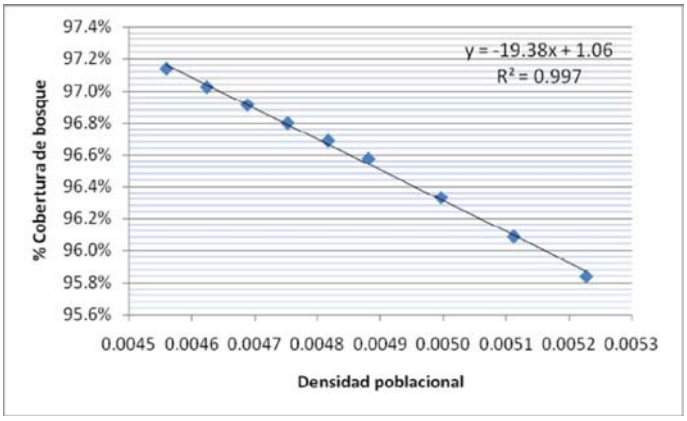
For said estimation, the population density as the independent variable was employed as well as the forestry coverage as the dependent variable for the years 2000 to 2008, as shown in the following chart:

Chart 22: Calculated and projected population density and forestry coverage

Year	Population Density	% forestry coverage	Observation
2000	0.00456	97.14%	Calculated
2001	0.00462	97.03%	Projected
2002	0.00469	96.91%	Projected
2003	0.00475	96.80%	Projected
2004	0.00482	96.69%	Projected
2005	0.00488	96.58%	Calculated
2006	0.00500	96.33%	Projected
2007	0.00511	96.09%	Projected
2008	0.00523	95.84%	Calculated

Taking into account these values, a linear relationship was determined as presented in the following graph:

Graph 2: Equation of the projected deforested area



With the generated equation, the projected deforestation for the years 2005 to 2037 was estimated, as shown in the following chart:

Chart 23: Projections of the deforested area for the years 2005 to 2037

Year	Forestry Coverage	Forestry Area (ha)	Annual Deforestation (ha)	Accumulated Deforestation (ha)	Rate
2005	96.2%	2,661,609		94,696	
2006	95.3%	2,637,542	24,067	118,763	0.009
2007	94.3%	2,607,166	30,376	149,139	0.012
2008	93.5%	2,587,668	19,498	168,637	0.008
2009	92.8%	2,566,998	20,670	189,307	0.008
2010	92.0%	2,545,088	21,910	211,217	0.009
2011	91.2%	2,521,864	23,224	234,441	0.009
2012	90.3%	2,497,246	24,618	259,059	0.010
2013	89.3%	2,471,151	26,095	285,155	0.011
2014	88.3%	2,443,492	27,659	312,813	0.011
2015	87.3%	2,414,172	29,320	342,133	0.012
2016	86.2%	2,383,093	31,079	373,212	0.013
2017	85.0%	2,350,148	32,945	406,157	0.014
2018	83.7%	2,315,228	34,920	441,078	0.015
2019	82.4%	2,278,213	37,015	478,092	0.016
2020	80.9%	2,238,977	39,237	517,329	0.018
2021	79.4%	2,197,388	41,589	558,918	0.019
2022	77.8%	2,153,301	44,087	603,005	0.020
2023	76.2%	2,106,571	46,730	649,734	0.022
2024	74.4%	2,057,035	49,536	699,270	0.024
2025	72.5%	2,004,527	52,508	751,778	0.026
2026	70.5%	1,948,868	55,659	807,437	0.029
2027	68.3%	1,889,873	58,996	866,433	0.031
2028	66.1%	1,827,335	62,538	928,971	0.034
2029	63.7%	1,761,045	66,290	995,261	0.038
2030	61.1%	1,690,780	70,265	1,065,526	0.042
2031	58.4%	1,616,296	74,483	1,140,009	0.046
2032	55.6%	1,537,345	78,951	1,218,960	0.051
2033	52.6%	1,453,657	83,688	1,302,648	0.058
2034	49.3%	1,364,947	88,710	1,391,358	0.065
2035	45.9%	1,270,915	94,032	1,485,390	0.074
2036	42.3%	1,171,241	99,674	1,585,065	0.085
2037	38.5%	1,065,587	105,654	1,690,719	0.099

Step 5: Stratification

Considering the different dynamics of the region, an ex-ante stratification of the region into 4 strata was made. Our reference region is the agriculture and livestock area with the inter-oceanic road, as shown in the following chart:

Chart 24: Stratification

Stratum	Districts
Agricultural with Inter-oceanic road	Iñapari
	Iberia
	Tahuamanu
	Las Piedras
Urban	Tambopata
Mining	Madre de Dios
	Huepetuhe
	Laberinto
	Inambari
Agricultural without Inter-oceanic road	Fitzcarrald
	Manu

The following areas were not taken into account in the stratification because they are not threatened by deforestation within the time frame of this project: the area reserved for the protection of voluntarily isolated and non-contacted indigenous people, the Alto Purús National Park and the Purús Communal Reserve. The following map shows the proposed stratification:

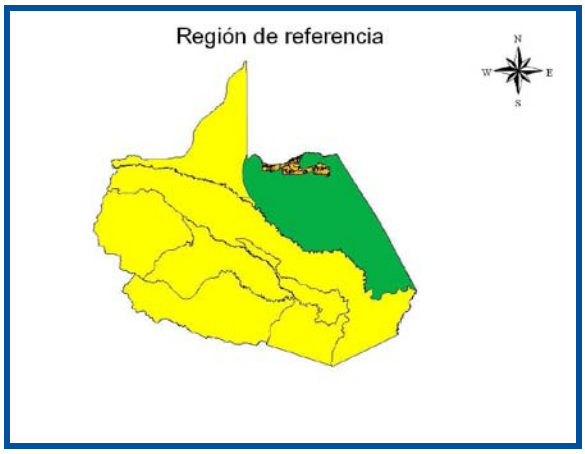


Fig. 74: Working area of reference

Step 6: Projection of deforestation in the baseline scenario

In this step of the modeling process, the 5 variables that better determine the future deforestation processes were selected. Said variables are:

Nº	Variable
1	Inter-oceanic
2	Secondary roads of first order
3	Secondary roads of second order
4	Roads of third order
5	Navigable rivers

In the next figure, a map of the working area including all the aforementioned variables can be appreciated. Then, figures 76 to 79 show respectively each one of the variables and their respective areas of influence.

Fig. 75: Variables used for the projection

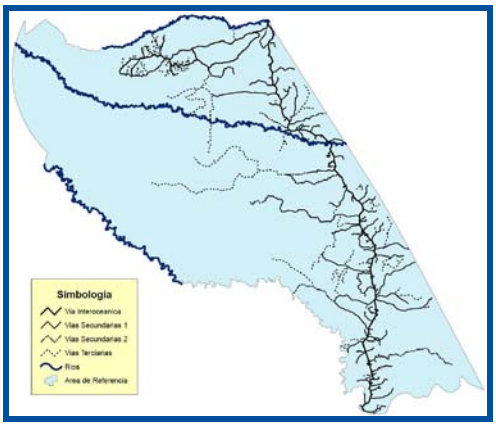


Fig. 76: Inter-oceanic variable with its ranges of influence

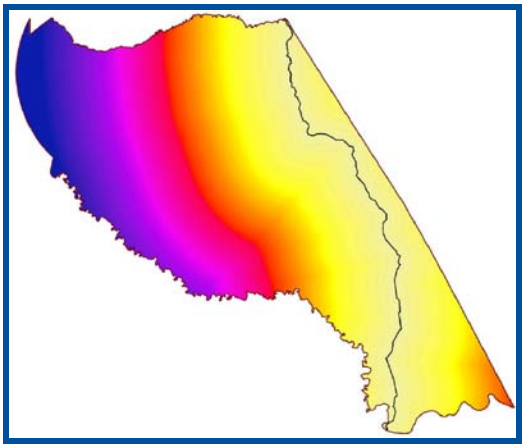


Fig. 77: Secondary roads of first order variable with its ranges of influence

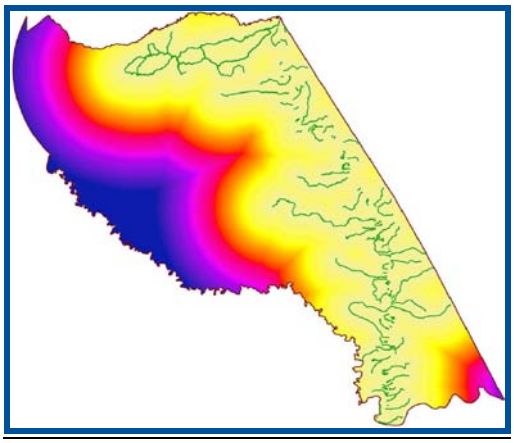


Fig. 78: Secondary roads of second order variable with its ranges of influence

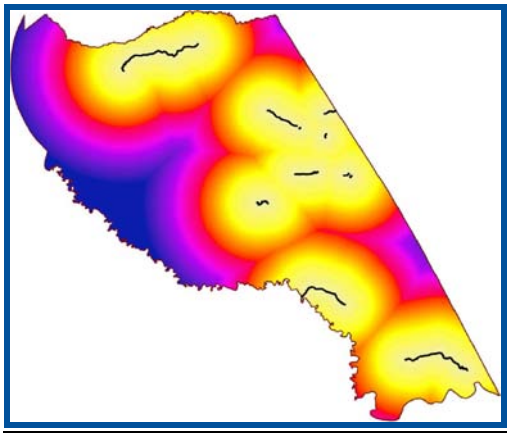
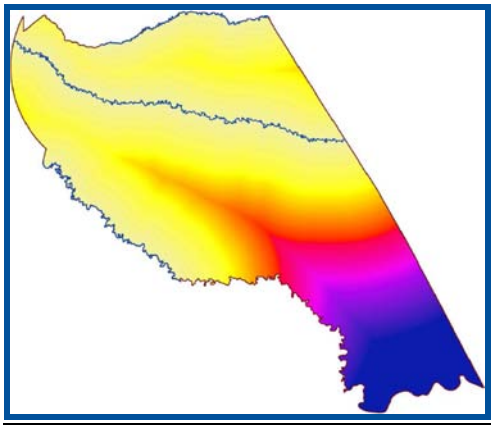
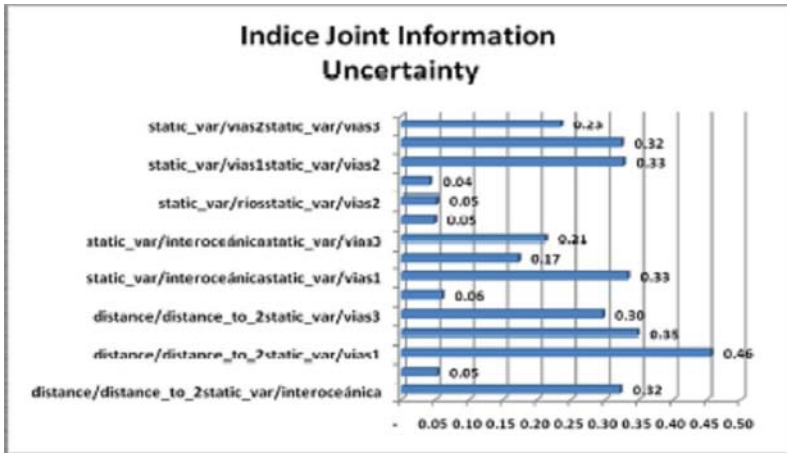


Fig. 79: Navigable rivers variable with its ranges of influence



Following, an analysis of the correlation of the variables with the Joint Information Uncertainty Index and Cramer Index were carried out to verify the correlation between drivers. As a result, it was determined that all the variables were different between them and each of them acts independently in the projection (see graphs 3 and 4).

Graph 3: Correlation of the variables with the Joint Information Uncertainty Index



Graph 4: Correlation of the variables with the Crammer Index

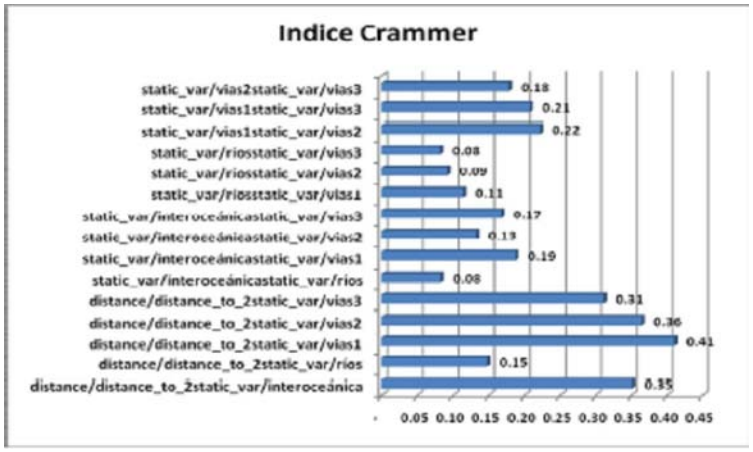
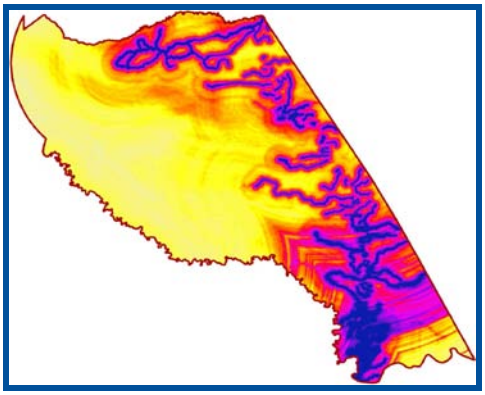


Fig. 80: Map of probabilities of the variables



Step 7: Estimation of the deforestation within the project area

Finally, the program was run with all the variables entered and the achieved results are shown in the following maps:

Fig. 81: Deforestation map interpreted up to 2005 (interpretation)

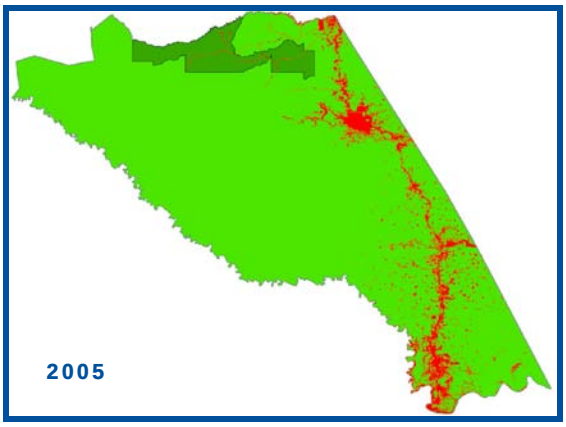


Fig. 82: Deforestation map interpreted up to 2008 (projected and modeled)

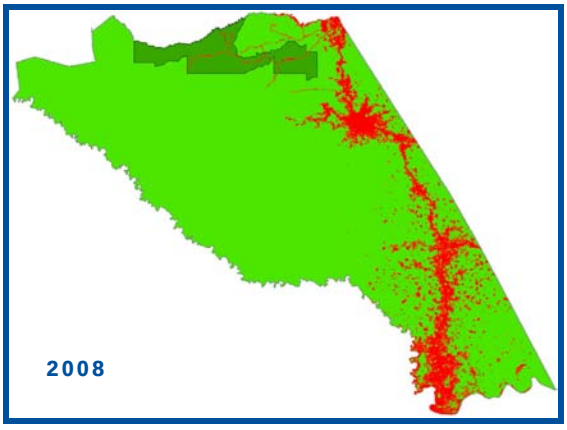


Fig. 83: Deforestation map interpreted up to 2010 (projected and modeled)

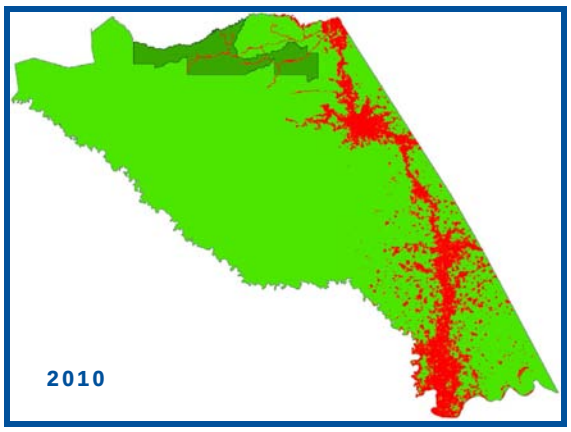


Fig. 84: Deforestation map interpreted up to 2015 (projected and modeled)

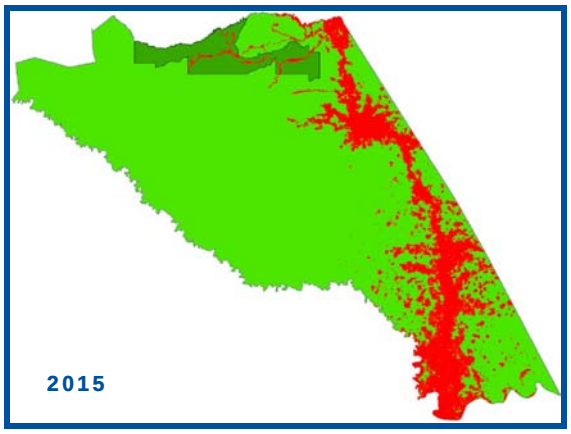


Fig. 85: Deforestation map interpreted up to 2020 (projected and modeled)

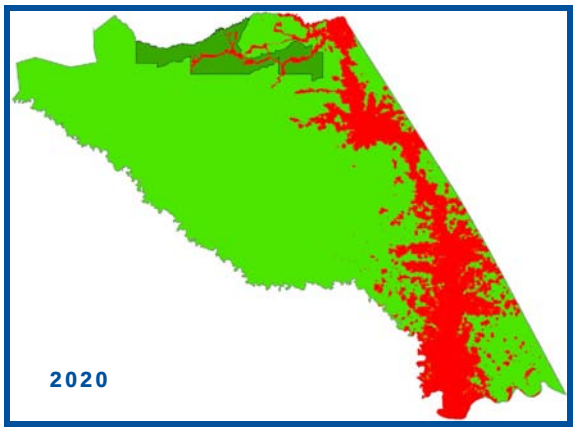


Fig. 86: Deforestation map interpreted up to 2025 (projected and modeled)

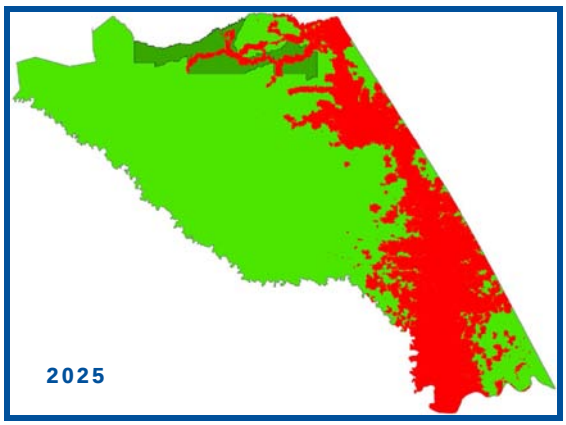


Fig. 87: Map of deforestation within Maderacre and Maderyja area up to 2008 (modeled)

Fig. 88: Map of deforestation within Maderacre and Maderyja area up to 2010 (modeled)

Fig. 89: Map of deforestation within Maderacre and Maderyja area up to 2015 (modeled)

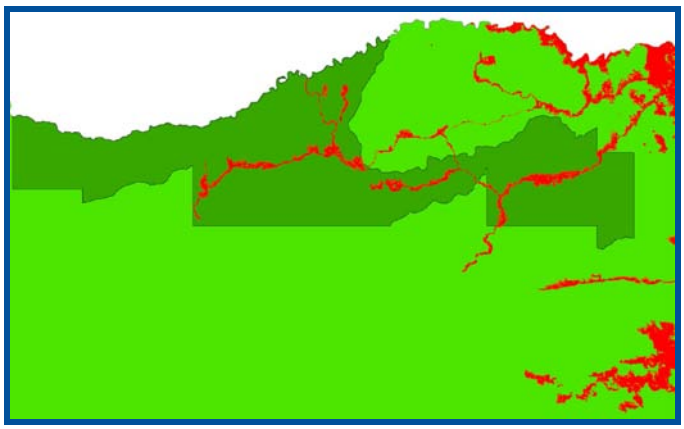


Fig. 90: Map of deforestation within Maderacre and Maderyja area up to 2020 (modeled)

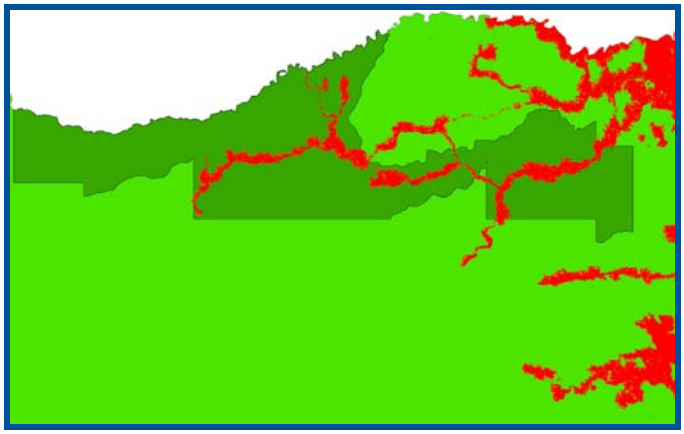
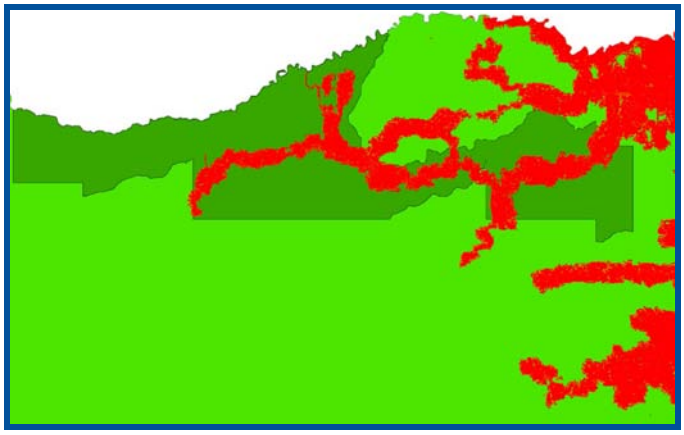


Fig. 91: Map of deforestation within Maderacre and Maderyja area up to 2025 (modeled)



c) Results

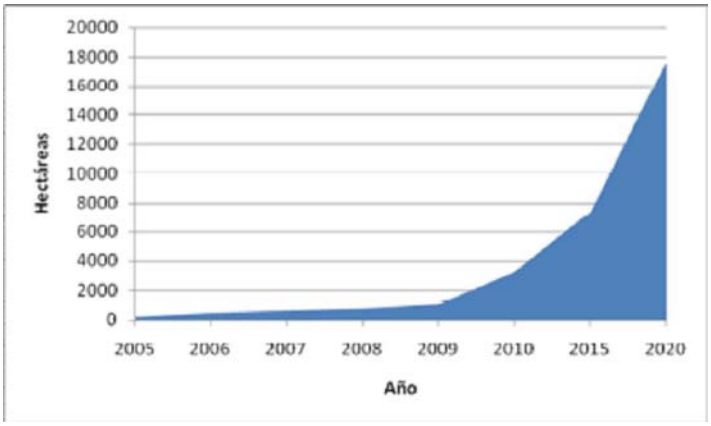
With the rate of deforestation and the deforestation modeling already determined by the software, the accumulated deforestation from 2005 and its respective projection till 2025 can be finally estimated (see chart 25).

According to the previous figures, it can be clearly observed that deforestation increases year by year. The following chart shows the difference of hectares that are deforested between the established periods of time.

Chart 25: Results of the modeling

Year	Deforested hectares (ha)				
	Total reference region	MADERACRE	MADERYJA	MADERACRE Effective annually	MADERACRE Effective annually
2005		419.996	211.089		
2006	114516.99	570.884989	255.978	150.89	44.89
2007	135450.63	717.089989	378.693	146.21	122.72
2008	148712.76	841.829989	415.953	124.74	37.26
2009	162928.26	909.302989	476.946	67.47	60.99
2010	177898.68	1168.56034	509.751	259.26	32.80
2011	193776.3	1512.74572	659.142	344.19	149.39
2012	210704.49	1773.70695	756.018	260.96	96.88
2013	28650.85	1956.36195	796.923	182.66	40.91
2014	247578.93	2364.69195	881.973	408.33	85.05
2015	267618.33	2846.35949	1018.4094	481.67	136.44
2016	288888.12	3273.69606	1100.2194	427.34	81.81
2017	311496.03	3819.75075	1258.5834	546.05	158.36
2018	335539.26	4492.96431	1438.3494	673.21	179.77
2019	360944.1	5211.84088	1618.4394	718.88	180.09
2020	387943.02	6008.22655	1962.7074	796.39	344.27
2021	416591.91	7047.13193	2343.9744	1,038.91	381.27
2022	447078.69	8385.86919	2849.10339	1,338.74	505.13
2023	479417.13	10041.7641	3240.16408	1,655.89	391.06
2024	513744.12	12060.9981	3676.93408	2,019.23	436.77
2025	550162.53	14148.5019	4117.07233	2,087.50	440.14

Graph 5: Projected accumulated deforestation within Maderacre and Maderyja (2005-2025)



D.4. Application of baseline methodology

As it was previously described, the Maderacre forestry concession occupies a total area of 49,376 hectares and the Maderyja concession occupies a total of 49,556 hectares and both are located in the basin of the River Acre, in the Province of Tahuamanu, Department of Madre de Dios.

AIDER NGO and its team of experts has carried out a study for the estimation of carbon stocked in the living biomass (above and below-ground biomass) of the forests belonging to the forestry concessions Maderacre and Maderyja, with the objective of establishing the baseline that will be considered for the development of the present Avoided Deforestation Project to be carried out within them[17].

96% of the area of both concessions is intended for forest production, while the remaining 4% of the area correspond to protection forest. Both timber concessions have the rights to the use of their wood for sawing and secondary transformation in their own industry and also for third parties.

In both concessions a polycyclic management system is developed, based on natural regeneration, which means they harvest what the forest will produce for the next cycle and thus maintain the productive capacity of the forest as well as the ecosystem stability. The cutting cycle is 20 years.

The extraction depends on the biometric structure, density and abundance of species, market potential and ecologic characteristics and the harvesting cycle which determines the division of the area into annual harvesting plots. According to this, the production is regulated based on an area destined for the annual production.

[17] "Estimation of Carbon Stocked in the Biomass of the Forestry Concessions of Maderacre and Maderyja, Madre de Dios, Peru", elaborated by the team of experts of AIDER NGO, May 2009. This document has been available for the Verifier.

The type of use is considered selective and a low impact technology is applied, directed felling and planning of the road network based on the distribution of the trees that will be exploited. The number and distribution of the seeding trees that will remain standing is also planned as well as the protection of all the individuals from future harvest and the protection of threatened species.

Following, a description of the methodology applied to quantify the carbon stocked in the forests and its results are presented.

D.4.1. Methodology

In order to quantify the carbon stocked in the forest, the data basis of the forestry inventory[18] was employed. Same data basis was used to elaborate the Forestry Management Plan of both concessions, which started in May, 2006.

Besides this, the interpretation of the satellite images of the area (Landsat) was carried out, to determine the different types of vegetation.

First of all, a stratification of the results of the zone by physiography and vegetation types was carried out. Afterwards, an estimation of the forest biomass employing the formulas included in chart 26 was done. Finally, the amount of carbon was estimated using a carbon fraction index of 0.5.

Chart 26: Formulas employed on the estimation of carbon stocked

Item to be evaluated	Allometric equation	Statistical values for the elaboration of the formula and notes	Source
Aboveground biomass palms	Biomass = 6.666 + 12.826 x height$^{0.5}$ x ln(height)	40 cm	Winrock
Belowground biomass palms	Y (biomass. Kg) = 10.0+6.4*total height (m)	R2=0.96 N=25	Fragi 1985
Aboveground biomass Cecropias	Biomass=12.764+0.2588*$dbh^{2.0515}$	Up to 40 cm DBH	Winrock
Aboveground biomass Huasai (palm)	Y = 6.666 + 12.826 * H 0.5 * LN (H)		Pearson *et al.*, 2005
Aboveground biomass Deciduous trees	Y=exp[-2,289+2,649*ln(DAP)-0.021*(ln(DAP))^2]		Brown 1997

[18] Kometter, R. "Planificación de la evaluación exploratoria del bosque de las concesiones Maderacre & Maderyja".

Item to be evaluated	Allometric equation	Statistical values for the elaboration of the formula and notes	Source
Belowground biomass Deciduous trees	Y=exp[-1,0587+0,8836*ln(BSS)]		Cairns *et al.*, 1997

D.4.2. Results of the estimation

a. Types of vegetation and physiography

As a result of the photo-interpretation carried out in both concessions, 4 types of vegetation[19] were found. Malleux defines each one of the identified vegetation types based on the forestry photo-interpretation for wet sub-tropical and tropical Peruvian forests. Said photo-interpretation showed also that the area has two physiographical formations: low hill forests and low terrace forests.

Chart 27: Types of vegetation found

Type of vegetation	Description
Forest of Vigor 2	Average volume: 100 m^3/ha.
Forest of Vigor 3	Average volume: 34,28 m^3/ha; their conditions are more adverse due to the existence of steep slopes.
Forest with “paca”	Mixed forest, presenting “paca” in less than a 30%.
“Pacal”	Completely covered by “paca”.

b. Quantification of the existent carbon

For the quantification of the carbon stocked, the eligible areas of both concessions were gathered, so that the results are differentiated only by the physiography and vegetation type. All the results are presented with their correspondent statistical analysis. The complete data used for the quantification is attached in Annex 1, page 218 of this document.

As a result of the evaluation of 142 plots, the average carbon stocked within the whole eligible area is 228.30 tn/ha, considering a sampling error of 8,68%.

[19] Classification according Malleux, J. 1982. Forest Inventories within Tropical Forests. Pags. 217-226. Lima, Peru. The “pacal” association was established during the in-field visit.

Chart 28: Results and statistical parameters of carbon stock for the whole eligible area

Parameter	Value
Nº of sample plots	142
Minimum (ton/ha)	49.10
Maximum (ton/ha)	813.56
Average (ton/ha)	228.30
Standard deviation	119.99
CV (%)	52.56
CV	0.53
Sample error (%)	8.68

Following, the carbon stocked was analyzed by the physiography type of the area. As it was previously explained, there were two types of physiography formations: low hill forests and low terrace forests. The latter was not taken into account because it was found only in two of the plots and that was statistically not representative.

Therefore, as a result of the evaluation of 14 plots, the average carbon stocked within a forest of the low hill type is 229.42 tn/ha, considering a sampling error of 8.85%, as shown in the following chart:

Chart 29: Carbon stocked within the eligible area regarding the low hill forest physiography type

Parameter	Value
Nº of sample plots	140
Minimum (ton/ha)	49.10
Maximum (ton/ha)	813.56
Average (ton/ha)	229.42
Standard deviation	120.06
CV (%)	52.33
CV	0.52
Sample error (%)	8.85

The carbon stocked in each of the vegetation types found within the concessions total area was also analyzed.

For the analysis of “Forests of Vigor 2” 60 plots were evaluated and an average carbon stocked of 240 tn/ha was obtained as a result, considering a sampling error of 14.35%, as shown in the following chart:

Chart 30: Carbon stocked within the eligible area regarding the Forest of Vigor 2 vegetation type

Parameter	Value
Nº of sample plots	60
Minimum (ton/ha)	49.10
Maximum (ton/ha)	712.80
Average (ton/ha)	240.05
Standard deviation	132.25
CV (%)	55.09
CV	0.55
Sample error (%)	14.35

For the analysis of “Forests of Vigor 3” 11 plots were evaluated and an average carbon stocked of 259.73 tn/ha was obtained as a result, considering a sampling error of 27.05%, as shown in the following chart:

Chart 31: Carbon stocked within the eligible area regarding the Forest of Vigor 3 vegetation type

Parameter	Value
Nº of sample plots	11
Minimum (ton/ha)	137.86
Maximum (ton/ha)	464.75
Average (ton/ha)	259.73
Standard deviation	98.21
CV (%)	37.81
CV	0.38
Sample error (%)	27.05

For the analysis of “Forests with Paca” 47 plots were evaluated and an average carbon stocked of 216.44 tn/ha was obtained as a result, considering a sampling error of 16.30%, as shown in the following chart:

Chart 32: Carbon stocked within the eligible area regarding the Forest with “Paca” vegetation type

Parameter	Value
Nº of sample plots	47
Minimum (ton/ha)	101.89
Maximum (ton/ha)	813.56
Average (ton/ha)	216.44
Standard deviation	118.88
CV (%)	54.93
CV	0.55
Sample error (%)	16.30

Finally, for the analysis of “Pacales” 24 plots were evaluated and an average carbon stocked of 207.74 tn/ha was obtained as a result, considering a sampling error of 20.15%, as shown in the following chart:

Chart 33: Carbon stocked within the eligible area regarding the Pacales vegetation type

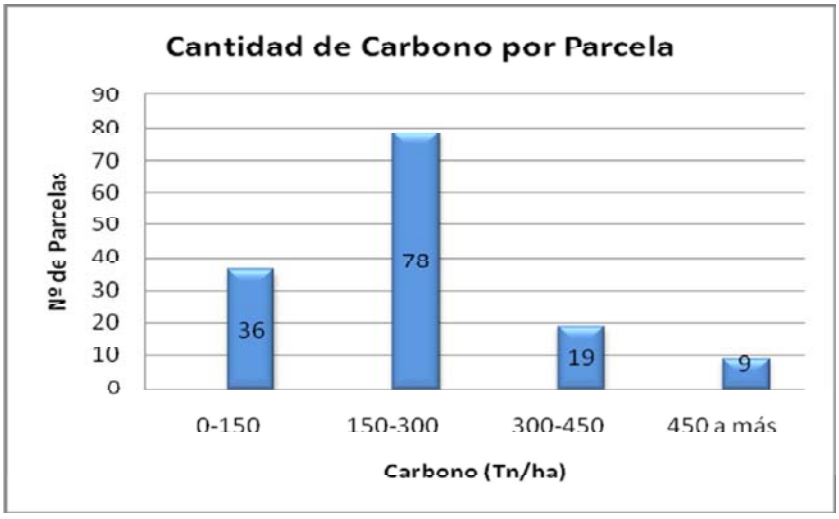
Parameter	Value
Nº of sample plots	24
Minimum (ton/ha)	66.61
Maximum (ton/ha)	381.28
Average (ton/ha)	207.74
Standard deviation	96.82
CV (%)	46.61
CV	0.47
Sample error (%)	20.15

The results obtained from all the evaluated plots were grouped in the following categories of carbon stocked/ha:

- From 0 to 150 ton/ha
- From 150 to 300 ton/ha
- From 300 to 450 ton/ha
- Up to 450 ton/ha

As it can be seen in the following graph, the majority of the plots has an average of 150 to 300 ton/ha of carbon stocked.

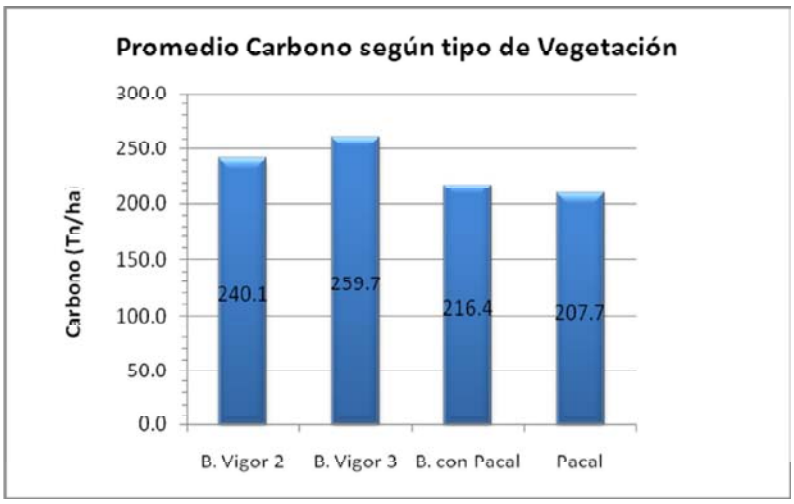
Graph 6: Distribution of plots by ranges of carbon stocked



A comparison between the amount of carbon stocked by vegetation type was also performed, showing that Forests of Vigor 2 and 3 have the highest values. However, the average of the four different types of vegetation is in a range between 207 and 260 tn/ha, which includes the overall average value of 228.30 tn/ha.

Said result can be compared to other results like the one from Kanninen (1999), mentioned values for the tropics between 60 and 230 tn/ha (primary forests), or result of 270.33 tn/ha from forests of the upper basin of the Yaracyacu River achieved by AIDER (2008). Therefore, the results are in a reliable range.

Graph 7: Distribution of plots by ranges of carbon stocked by vegetation type



D.4.3. Conclusions

- The Maderacre and Maderyja timber concessions occupy a total area of 98,932 hectares. Both concessions stocked in average 228.30 tn/ha of carbon.

- Maderacre and Maderyja stocked a total of 21.407.896 tons of C (10.684.473 tons of C stocked within Maderacre concession forests and 10.723.423 tons of C stocked within Maderyja concession forests). This results in a total of 78.496.332 tons of CO_2 equivalent (39.176.757 tons of CO_2e for Maderacre concession and 39.319.575 tons of CO_2e for Maderyja concession).

- The Maderacre and Maderyja concessions have four outstanding vegetation types in a single physiographic stratum. From each of these formations the results of the carbon stocked are very similar.

Hereunder, a map showing the location of the sample plots of both forestry concessions is enclosed.

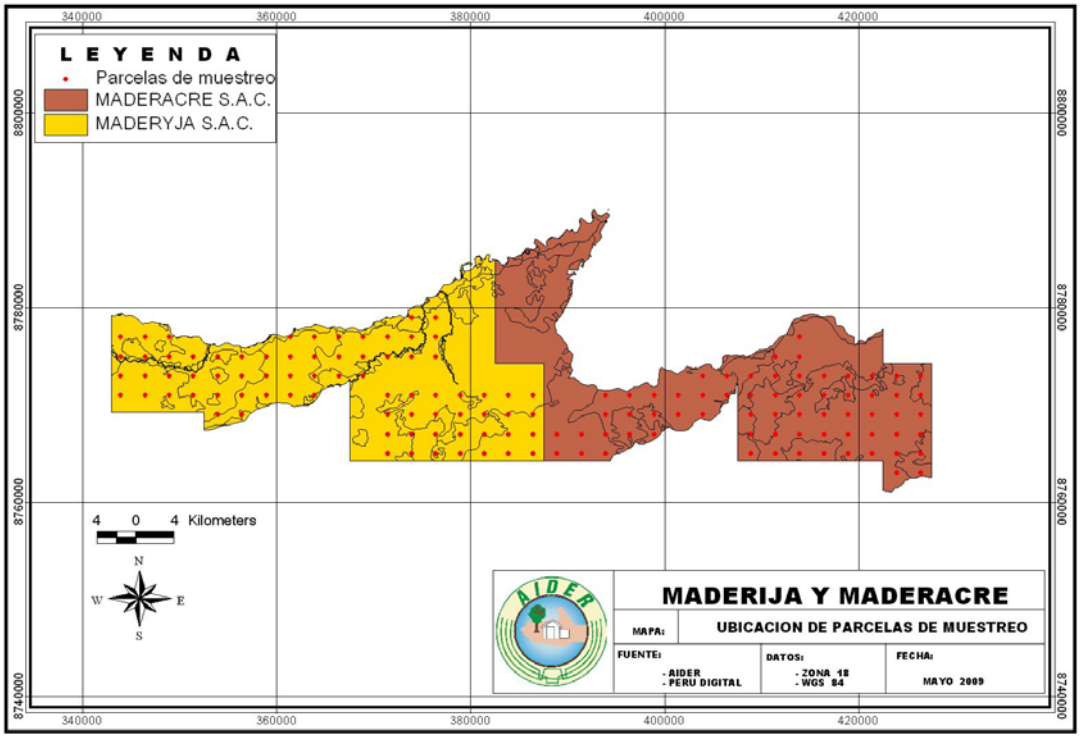


Fig. 92: Map showing the location of the sample plots of both concessions

D.4.4. Forestry Inventory

As an introduction, it is important to mention that a specialized team of professionals of Maderacre and Maderyja timber concessions, with the technical support of WWF[20] in the planning of the exploratory evaluation of the concession forests, have developed the Forestry Operations Manuals of them, which includes general and specific information related to all the operations carried out within the concessions area, based on the Annual Operative Plan (AOP - main planning tool of Maderacre and Maderyja timber concessions).

In it the areas to be harvested, the amount of wood to be extracted, the trees that will remain standing (i.e. seeding trees, reserve trees, etc.), the forestry methods and equipments that are needed, the required personnel, the organization and cost of all the activities, as well as other social and environmental activities to be developed in the area are defined in detail.

[20] Engs. Oscar Melgarejo Lizama and Nelson Kroll Kohel (Maderacre & Maderyja forestry team) and Roberto Kometter (WWF Consultant).

Said Forestry Operations Manuals contain also maps with the detailed localization of the forestry resources as well as the roads, storage areas, etc.

Both timber concessions apply the same forest inventory methodology which is based, as it was previously mentioned, in two different tools:

a) The forestry census, which is carried out a year before the harvesting of the correspondent PCA (plot to be cut annually) and is the base for the development of the Annual Operative Plan.

b) The exploratory evaluation of the forests, which consists on the collection of dasometric data of the whole forestry area of both concessions.

D.4.5. Forestry census of Maderacre and Maderyja timber concessions

The Annual Operative Plan of both timber concessions are based in the forestry census and its related maps. A year before the “zafra”, the forestry census is carried out within the correspondent PCA.

Base map of forestry exploitation

It includes spatial and geographic information of the exploitation components that will adequately guide the different activities of the teams in charge of the different forestry operations of the concessions.

The design and development of this map is made in scale 1:7500 and it contains:

- Types of vegetation and forestry strata of the PCA (plot to be cut annually).
- Distribution of the trees within the productive forest.
- Contour lines.
- Rivers and streams.
- Protection forests and protection areas.
- Main roads.
- Localization of special sites.
- Limits of the PCA.

The design of said map is based on the information obtained from geo-referenced satellite imageries, aerial photographs, data achieved on the forestry census, loans of the area, specific data from compass and GPS over paths and streams, etc.

a) *Types of vegetation and forestry strata of the PCA:*

It must be clearly defined the area of the productive forest, showing the specific localization of each tree that has been censed during the forestry census within the forest, including: the harvestable trees, the trees of future harvestings and the seeding trees. If other types of non-productive forests as secondary forests and other types of vegetation as purmas, pacales, etc. exist within the PCA, they must be shown in the map. Before the starting of the census, a map showing the localization of the productive forest to be censed is needed. In this sense, the map contained in the General Forestry Operations Manual is used as a reference.

b) *Distribution of the trees within the productive forest:*

The productive forest area is divided in sections of 25m x 70m, using a reference line ("línea madre o trocha base" in Spanish) from where the other inventory lines will start. Those inventory lines are marked every 25m and said point is denominated "station" ("estación" in Spanish), which is the reference point to cense its right and left trees. To determine the specific coordinates of each tree a compass is used to mark the "azimuth" of each tree with respect to the station point and said distance is defined. Then, with a specific program the UTM coordinates of the tree are calculated and consequently represented in a dispersion of species map. Once the census is finished, the map showing the precise localization of each censed tree within the productive forest shall be designed, regarding the different categories and species. Each category will be identified with a distinctive icon (harvestable trees, trees of future harvesting and seeding trees) and each species will be identified with a distinctive color.

c) *Contour lines:*

Said map shall include also the contour lines of the area to be censed, marked each 5m.

d) *Water courses and protection areas:*

The localization of the main water courses present within the area has already been determined in the maps of the General Forestry Operations Manual. The smaller ones shall be identified during the forestry census. The buffer zone over both river banks must be clearly defined in the map, as well as the forest that are non-exploitable as pacales, secondary forests, etc.

e) Roads network and storage areas:

The roads and paths network is based on the contour lines within the area and on the experience of the forestry team of both timber concessions of the PCA included soils. It is recommended that the roads, paths, storage areas, etc. are established in high areas, avoiding the areas next to any water course.

Methodology applied in the forestry census of Maderacre and Maderyja timber concessions

It is important to mention that both timber concessions apply the same methodology for the development of their forestry census. Said methodology consists on:

First of all, the coordinates of the starting point of the reference line are calculated, according to the base map for the forestry census. Said coordinates are introduced in the GPS system generating a point which is afterwards localized precisely in the field.

From said starting point, the operators open with machete the reference line and the inventory lines, which are marked infield with a stake every 25m. Each stake must have the identification of the line number, the station number and the accumulated distance till this point.

The trees included within the PCA are identified within each one of the following categories:

a) Trees for future harvesting (trees whose diameter is 10cm less than the minimum diameter for a tree to be harvested defined for the specie).
b) Harvestable trees (trees whose diameter is higher than the minimum diameter for a tree to be harvested defined for the specie).
c) Seeding trees.

The evaluation of the harvestable trees is made from the station point in plots of 25m x 70m. Every tree is identified using a metal plate of 3cm x 9cm, in which the number of PCA and the correlative number of the individual are registered. Said plate is placed taking the reference line at breast height. Extremely bad shaped individuals or with spiral grain shall be avoided, as well as those that are notoriously hollow.

Every 10 harvestable trees, one is selected as a seeding tree. The seeding trees are identified infield by means of an additional metal plate marked with the letter “S” in it. The selection of the seeding trees is based on the following criteria: well shaped phenotype, straight trunk, well developed canopy and good sanitary conditions. It is recommended the selection of individuals of average size, over the minimum diameter for a tree to be harvested defined for the species.

The minimum diameter of a tree to be included in the forestry census is 10cm less than the minimum diameter for a tree to be harvested defined for each species. Thus, the trees for future harvesting are included in the forestry census.

Every tree that was marked and included within the forestry census is geo-referenced and its dasometric parameters are measured (merchantable height and DBH). Regarding this data, the volume of each individual can be calculated and the results of the harvestable trees are grouped by specie, which allows the knowledge of the wood that this forest would offer in terms of number of trees and merchantable volume. Then, almost everything is planed according to these calculations: the commercialization, the forestry activities or operations, etc. for each “zafra” year.

Additionally, the slope of the terrain is measured during the forestry census every 25 or 50m. The points where the streams cross the inventory lines are registered and the PCA vertexes are localized and signalized with a stake placed on each vertex.

Volume estimations as a result of the forestry census

The volume of the standing trees used for the calculations in which the Annual Operative Plan is based is estimated through the measurements of the DBH or DAH (diameter at the buttresses height) and the estimations of the merchantable height of the trees. Said data is collected during the forestry census.

Nowadays, the following formula is used for volume calculations:

$Volume = 0{,}7854 * DBH^2 * H * 0{,}65$

Where:
V = volume of the tree trunk (m^3)
0,7854 = Π / 4
DBH or DAH = diameter at breast height or diameter at the buttresses height (m)
H = merchantable height (m)
0,65 = form factor

This formula tends to underestimate the real volume due to the use of 0,65 as a form factor. In addition to this, other two sources of error can be mentioned which are the inclusion of the merchantable height and the projection of the diameter in trees with buttresses that also are usually underestimated. Therefore and as a result of the aforementioned the volume calculated is significantly lower than the real one.

D.4.6. Exploratory evaluation of Maderacre and Maderyja forests

Following, the inventory system methodology applied for both, Maderacre as Maderyja concessions, is described in detail:

1. Complete mapping of the zone

When planning the evaluation of the forestry resources of both concessions, satellite imageries Landsat TM and the maps elaborated for the Forestry Management General Plan were used as a cartographic base.

2. Evaluation of the forestry resources within the concessions area

a) Sample design

According to the information required on the concessions forests, an unrestricted systematic sample design was selected, with an error of 10% over the mean and 95% of confidence.

b) Sample size

For the determination of the sample size, the following formula is used:

$$N = \frac{VC^2 * t^2}{E^2}$$

Where:

N= Number of required units.
VC= Estimated Variance Coefficient of the vegetation.
t = Tabular value of the t distribution, 2 according to the table.
E= Desirable sample error: 10%.

Regarding the aforementioned estimations, the number of the sample plots required to carry out a detailed evaluation of the vegetation, taking into account the desirable sample error is the following:

Chart 34: Number of sample plots required

CONCESSION	CV	N	N + 10%*
MADEREACRE	40%	64	71
MADERYJA	40%	64	71

* in order to obtain the most accurate results as possible, a 10% of additional sample plots is added

64 is the minimum number of sample plots that are needed to carry out the forests inventory of the concessions, regarding a maximum error of 10% over de mean. Additionally, in order to minimize the possibilities of error, another 10% of sample plots are added to the 64 plots previously estimated.

Said sample plots were distributed in a systematic and unrestricted manner. This distribution allows a better coverage within the forests and as a consequence their better characterization.

c) Sample units allocation

According to the determined design and the required sample size, the total forest area to be evaluated is divided into grids of 2 x 2.5 km, so as to locate a sample unit in the center of each square.

Thus, the distance between two sample units will be 2.5 km in east direction and 2 km in north direction.

d) Sample units size

A unit size of 0,5 ha allows a detailed and efficient characterization of the floristic composition and dispersion of the species, above all the characterization of the most important species because of their abundance.

e) Sample units shape

In relation with the sample units shape, previous studies have demonstrated that the rectangular, strip type, sample unit shape is the most efficient, for the evaluation of high variability tropical forests as those of Maderacre and Maderyja concessions. Therefore, the sample units will be rectangular of 10 meters wide and 500 meters long and will be divided in 20 registry units of 25 x 10 meters. In the next page, a figure showing the shape of the sample units is enclosed.

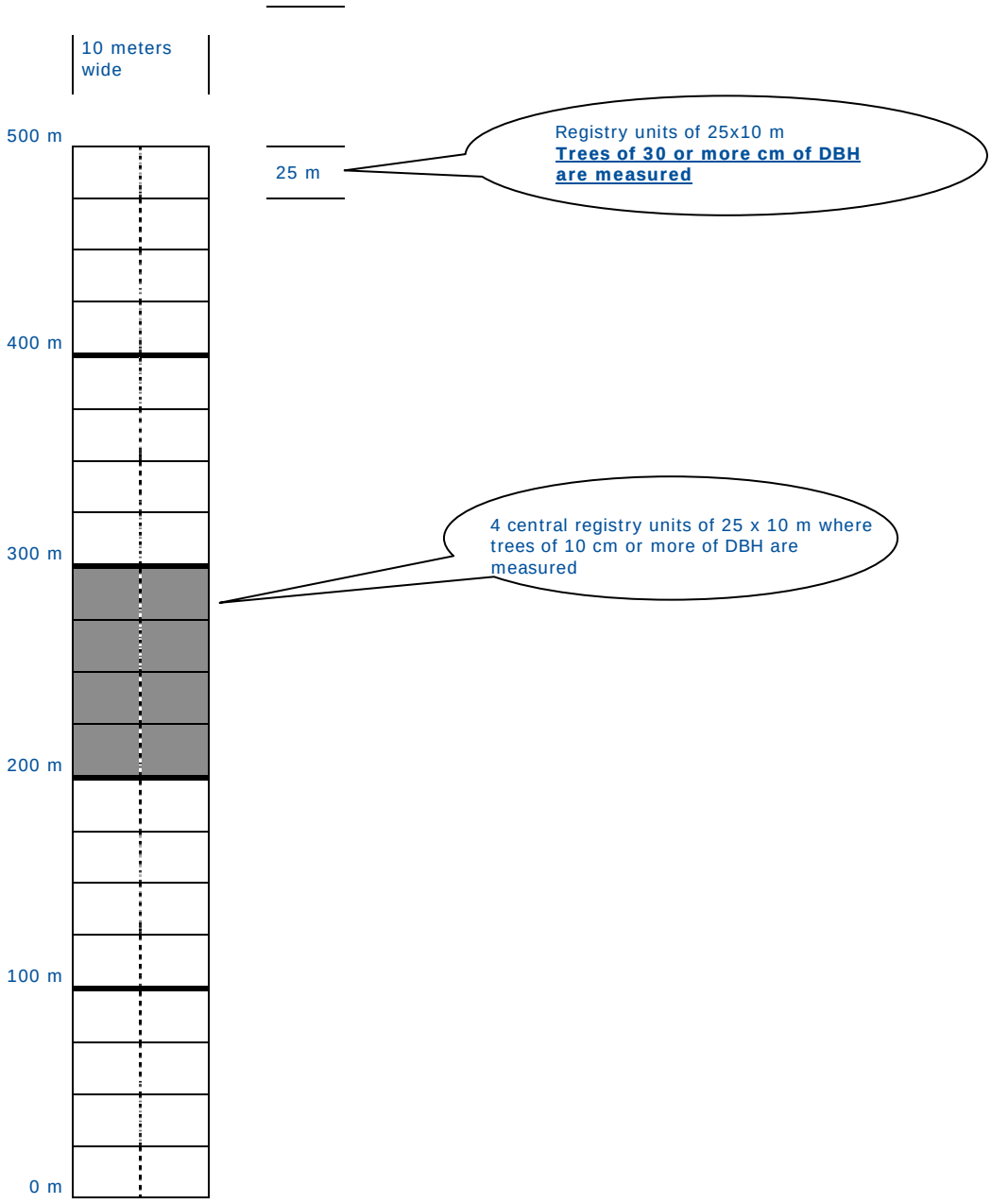


Fig. 93: Shape of the sample units

f) Parameters to be evaluated

In each sample unit the following parameters are evaluated:

- In trees of 30 cm or more of DBH: specie (common and scientific names), DBH (diameter at breast height), HF (tree trunk height), TH (total height) and Q (external quality of the tree trunk).

- In the 4 central registry units, all the trees of 10 cm or more of DBH are evaluated.

Some other aspects are also evaluated: physiographic, rippling level, topography, slopes, land use, types of vegetation, rivers and streams (drainage regime), past harvesting activities, exploitation rates and its impacts, fauna (general observations).

The infield data is registered in specially designed forms.

g) Expected results

Said infield data are analyzed and then organized in a database in order to be processed to obtain the following results:

- Number of trees, basal area and volume of the tree trunk per diametric class, per hectare and per type of forest of each one of the species.
- Percentages of tree trunk qualities of each one of the species.
- Parameters of the primary trees per diametric class and types of forests.
- Importance Value Index simplified for each species.
- Adjusted physiographic and types of forests maps.
- Definition of the areas where harvesting activities had been previously carried out.
- Report of the general observations of the fauna species.

h) Identification of species

For the identification of species, botanical samples are taken with the available equipment as telescopic scissors, pruning scissors, etc. These samples are treated with industrial alcohol for their conservation and later processed.

Said samples are kept on the Forestry Herbarium of the La Molina Agrarian National University for its analysis and identification.

Regarding the evaluation methodology to be employed and the availability of the Forestry Herbarium, a comparison is carried out to identify the species of the forests to be evaluated. The expected results related with the identification of the commercial species are the following:

- **Well-Known species**: they are the most common species, whose common name corresponds to only one species. In these cases, once the botanical sample is collected the scientific name of the specie is perfectly known.

- **Generic species**: they are mostly species of medium level of knowledge. In these cases, with the botanical samples collected the corresponding scientific genus of each species is determined.

- **Familiar species**: they are usually species of lower degree of knowledge. In these cases, with the botanical samples collected the corresponding scientific families of each species are determined.

3. Organization of inventory activities

a) Steps and activities

- **First step: previous planning activities**
  Activities:

  - Collecting of the basic and cartographic information (for the elaboration of the maps and the planning of the forestry evaluation).

  - Design of the maps (based on the basic and cartographic information, mainly from satellite imagery, a physiographic map and a map of forests types).

  - Planning of the evaluation (regarding the basic information obtained in the previous steps and based in a systematic and unrestricted design, the evaluation of the forestry resource is planned. The information to be collected during the inventory activities is also determined and the forms to be filled in with the corresponding data are developed. The required personnel as well as the equipments, materials, etc. are defined).

- **Second step: execution of the in-field activities**
  Activities:

  - Hiring and training of the personnel (it is organized in 5 brigades, 4 of them for the evaluation of the sample units and the other one for the collection of the botanical samples for the identification of the species).

  - In-field activities (regarding the distribution of the sample units to be evaluated, a strategy for carrying out the in-field activities defining the sample units corresponding to each brigade and the access to them).

- **Third step: processing and analysis of the obtained information**
  Activities:

  - Organization of the in-field collected data (once the in-field activities were finished, the collected data are classified, codified and organized as an input for the database).

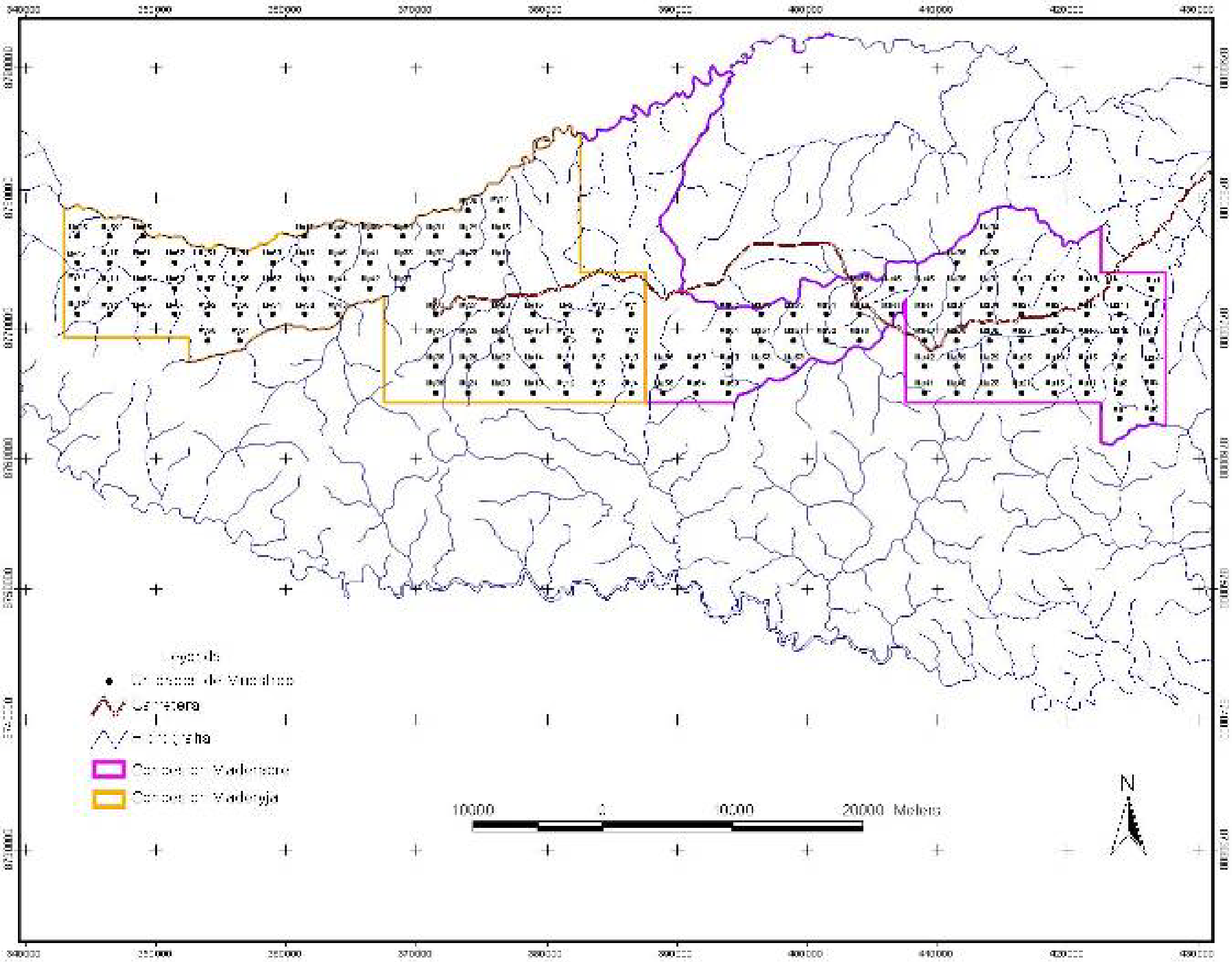
  - Digitalization of the in-field information.

  - Data processing (regarding the expecting results and based on the designed outputs of the system, the data processing is carried out).

  - Definite adjustment of the maps (based on the in-field information, the previously elaborated maps are accordingly adjusted).

  - Development of the final report.

MAPA DE UBICACION DE LAS UNIDADES DE MUESTREO DEL INVENTARIO FORESTAL EN LAS CONCESIONES MADERACRE Y MADERYJA



D.5. Carbon flow estimation

Hereunder, a description of the methodology and the obtained results of the carbon flow estimation[21] within the Maderacre and Maderyja timber concessions under both the with and the without REDD project scenarios, as a result of the forestry management activities are presented.

D.5.1. Carbon flow estimation under the without REDD project scenario

a. Methodology

For the quantification of the carbon flows within the concessions, in a without project scenario, those variables that emit and sequester carbon were identified:

- Emisions due to the use of fuels.
- Biomass loss (carbon) due to forest harvesting, without applying low impact extraction measures.
- Biomass loss (carbon) due to the opening of roads and paths.
- Biomass increase due to the natural regeneration of forests; without carrying out silvicultural activities.
- Deforestation in a without REDD project scenario.
- Carbon stocked within the concessions.

Emissions due to the use of fuels: the use of fuel for the different activities of forest management was quantified, including those activities related to traditional logging which increase 20% the use of fuel compared to a "with REDD project" scenario.

For the calculation of the fuel emissions and its carbon equivalent, the following values published by the IPCC[22] were used:

Net calorific value (NCV): 44.8TJ/tn
Emission Factor (EF) = 0.0693 Tn CO2/TJ

[21] Recavarrren, P. and Delgado, M.: "Estimation of the Carbon Flow of Maderacre and Maderyja Timber Concessions, Madre de Dios, Peru", AIDER NGO, 2009.
[22] IPCC, 2006

Forestry harvesting (extraction): the biomass extraction was calculated from 2006 up to 2008 and was projected from 2009 up to 2025, according to the concessions General Forestry Management Plans, with the aim of transforming the extracted biomass due to harvesting activities to carbon. In this scenario, the harvesting activity is not carried out through reduced impact logging and therefore the damage to biomass by unplanned roads and non-directed harvesting increases in 30% the biomass loss (adapted from Dykstra 2006[23] and internal working documents).

For the carbon calculation, the "Estimation of the carbon stocked in the biomass of Maderacre and Maderyja timber concessions"[24] report was used as a reference, in which the following formulas for broadleaf trees were used:

Chart 35: Formulas used for the biomass calculations

Evaluating item	Allometric equation	Source
Aboveground biomass broadleafs	$Y=\exp[-2{,}289+2{,}649*\ln(DAP)-0.021*(\ln(DAP))^2]$	Brown in Person 2005
Belowground broadleafs (roots)	$Y=\exp[-1{,}0587+0{,}8836*\ln(BSS)]$	Cairns *et al.*, 1997 en IPCC

Biomass loss due to the opening of roads: the forest area loss due to the opening of extraction roads is determined. The parameters to be taken into consideration are the following: for roads clearing, 8 m of road area are opened and 4 m to each side for forest clearing or maintenance of roads. With these data, the deforested area is determined taking into account the length of the roads.

The carbon of the wood extracted from the years 2006 to 2008 was calculated taking into account the data of the forestry census reported within the Annual Operative Plans of Maderacre and Maderyja[25]. From years 2009 up to 2025, projected calculations of the extractions were done, taking into account the allowed quantities annually reported within the General Forestry Management Plan of each concession.

Natural regeneration: according to growth rates of natural forests, diameter growth for broadleaf species is 0.5 cm per year, and they present a mortality of 1.5% per year for all diametric classes from a DBH of 10[26] cm.

[23] Dykstra, 2006. D. Aprovechamiento de Impacto Reducido: Convirtiendo los Resultados de la Investigación en Prácticas de Campo. Simposio Internacional "Posibilidades de Manejo Forestal Sostenible en América Tropical". Indonesia. Bolivia.

[24] RECAVARREN, P. and ANGULO, M. 2009

[25] Annual Operative Plans 2006, 2007 and 2008, Maderacre and Maderyja concessions.

[26] LOUMAN B. 2001

Considering the data reported within the exploratory inventory of Maderacre and Maderyja[27] concessions, the growth of the forest per year and the accumulated area by plot of annual harvest till 2025 were projected. On the other hand, regeneration registers a reduction in growth compared to a "with project" scenario because silvicultural activities and reduced impact logging are not applied and forestry arrangement is not respected. On the other hand, in this model illegal logging is not considered due to its complicated and unpredictable action, which makes extremely complicated its future quantification. Therefore, since illegal logging is not considered, the model becomes even more conservative.

Deforestation in a without REDD project scenario: for the deforestation within the project area we refer to the data included in the "Deforestation rate and modeling of Maderacre and Maderyja timber concessions"[28] report.

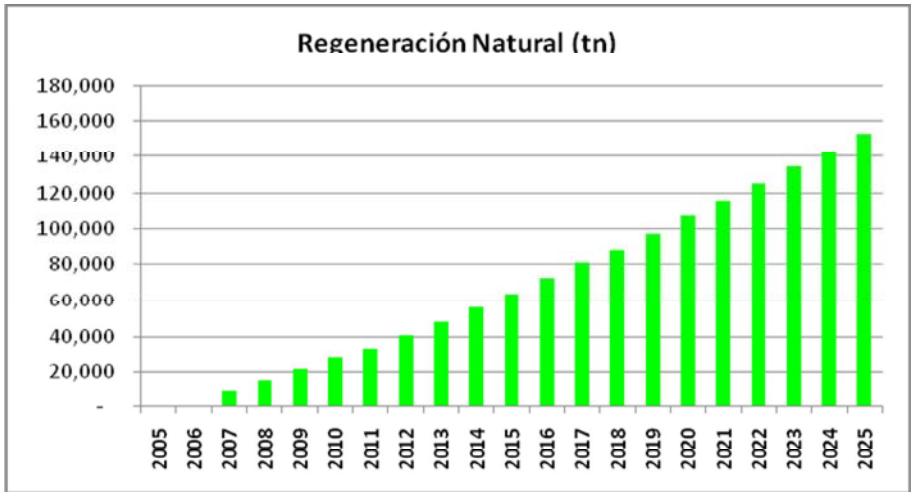
The total carbon flow is the result of the equation where the losses, increases and recovery of carbon are confronted, considering all the activities described above. For the total flow the following IPCC 2006 indexes were used:

1 tn of biomass:	0.5 tn of carbon
1 tn of carbon:	3.6667 tn of CO2 equivalent

b. Results

b.1. Carbon flow calculation in a without REDD project scenario for Maderacre concession

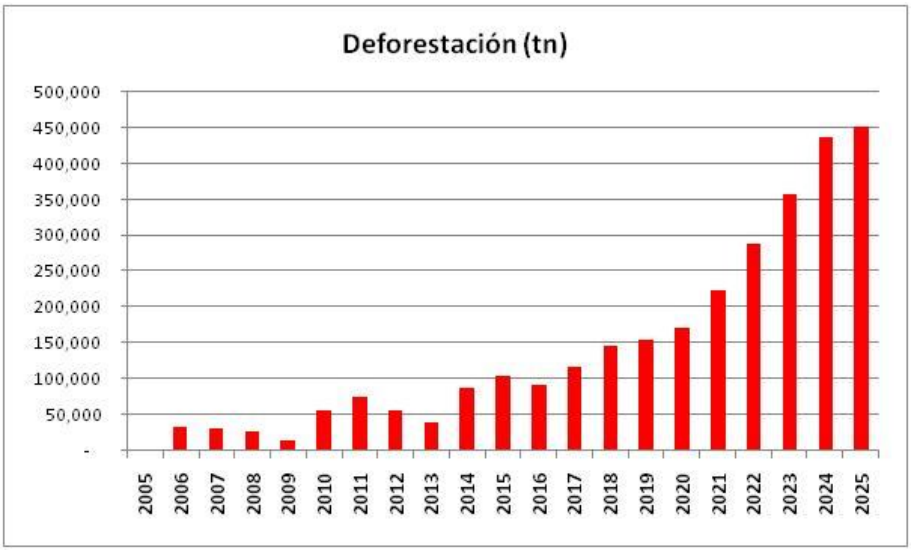
Graph 8: Carbon increment due to natural regeneration within Maderacre concession



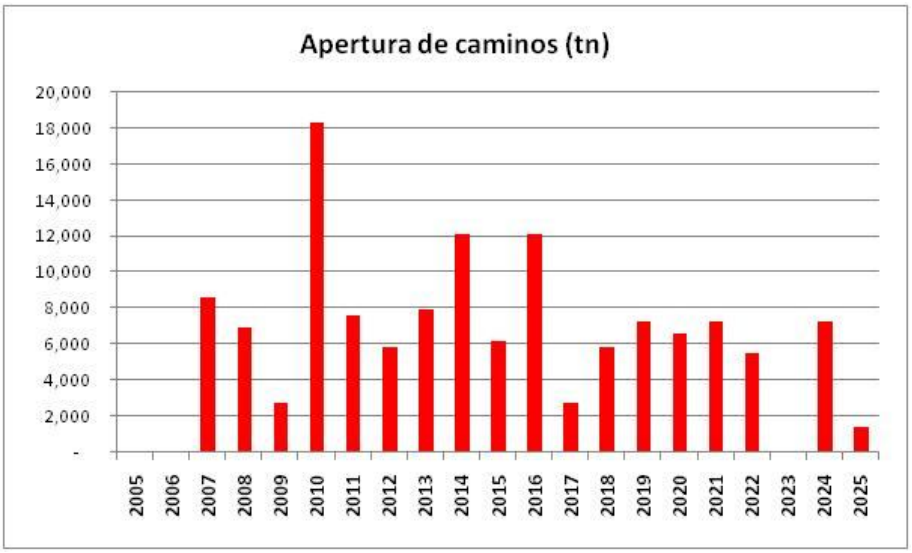
[27] KOMETER R. 2005

[28] RECAVARREN P. et al. 2009

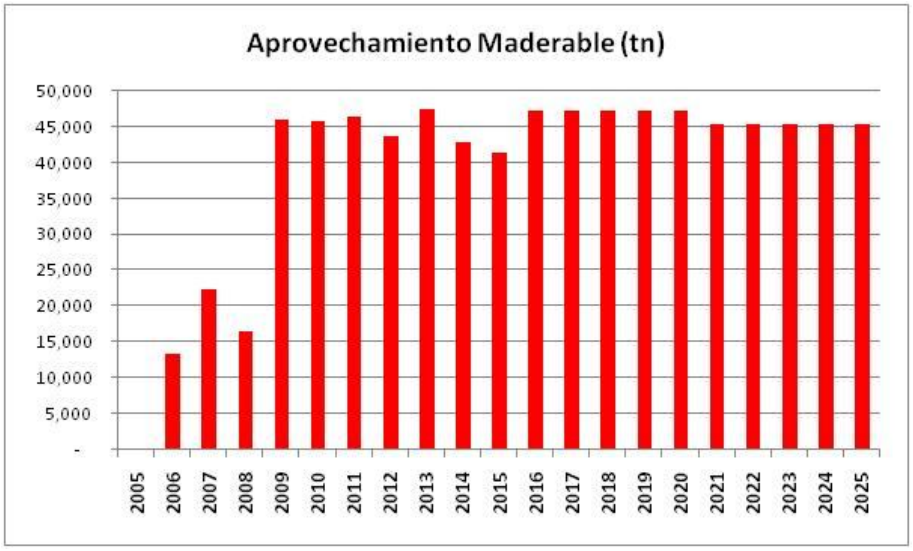
Graph 9: Carbon loss due to deforestation within Maderacre concession



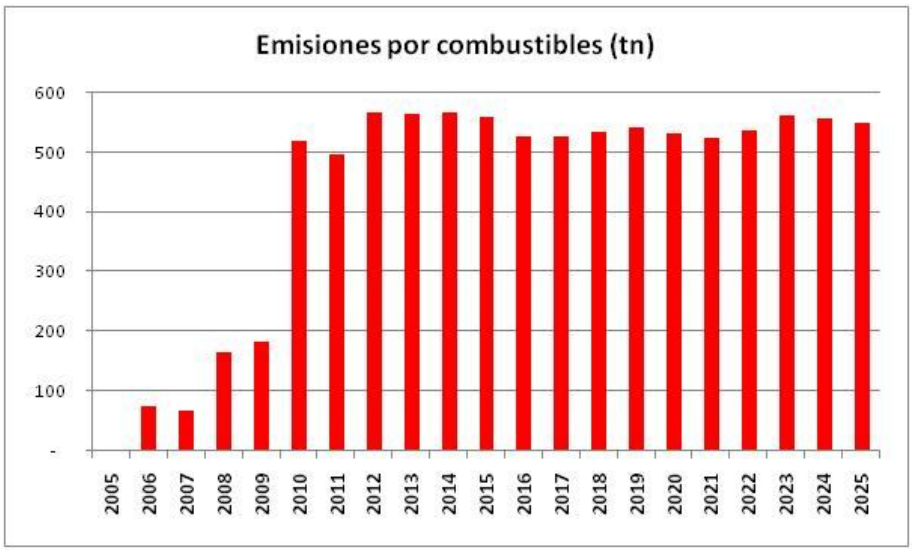
Graph 10: Carbon loss due to the opening of roads within Maderacre concession



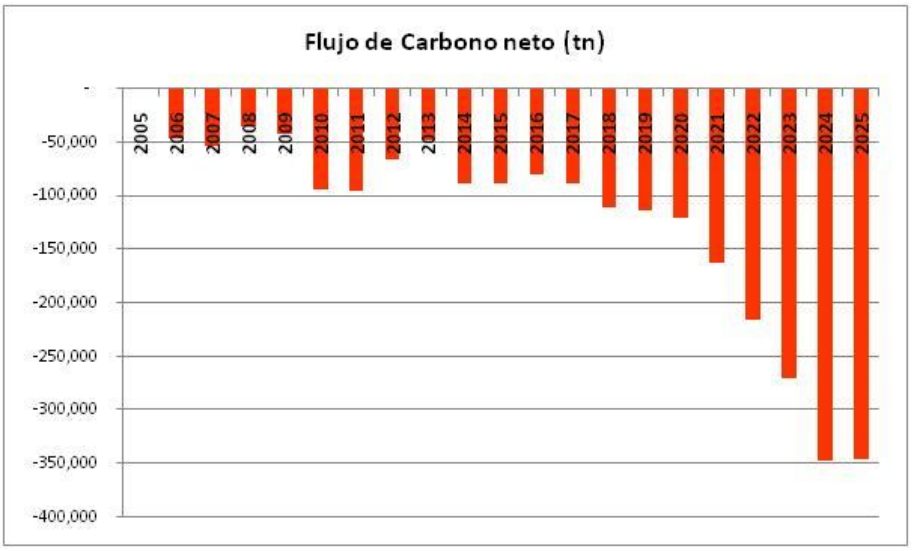
Graph 11: Carbon loss due to forestry harvesting activities within Maderacre concession



Graph 12: Carbon loss due to fuel emissions within Maderacre concession



Graph 13: Net carbon flow for Maderacre concession



Graph 14: Carbon stocked within Maderacre concession forests

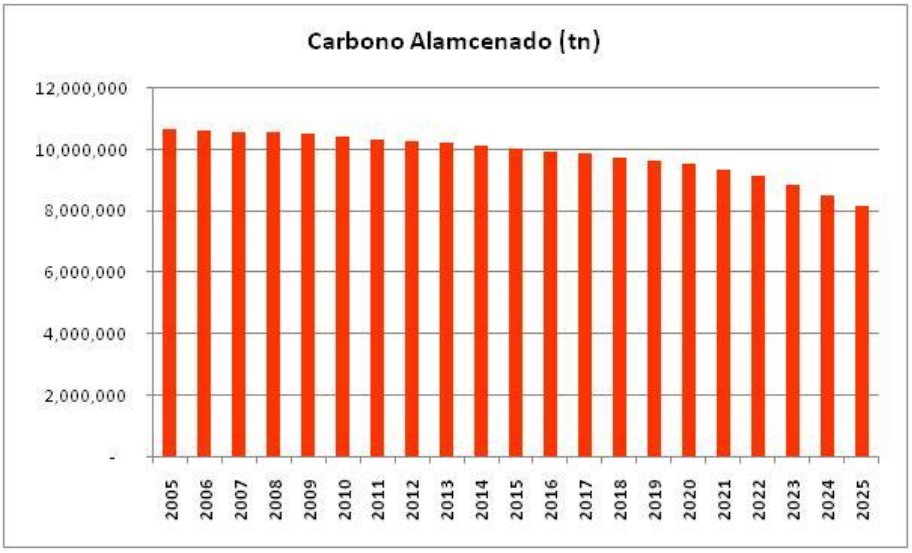
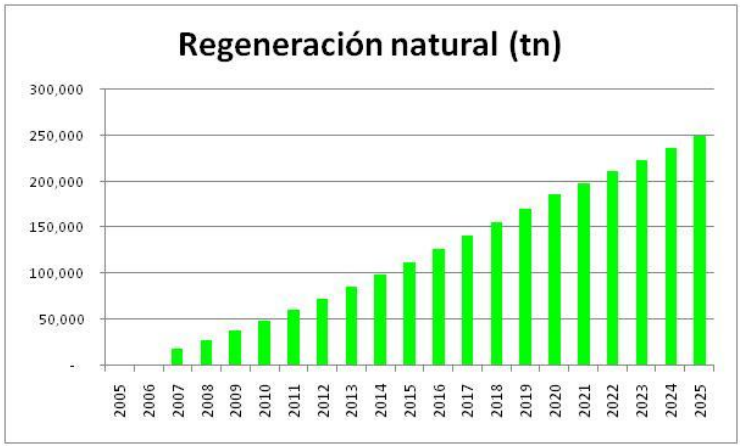


Chart 36: Results of the carbon flow for Maderacre concession

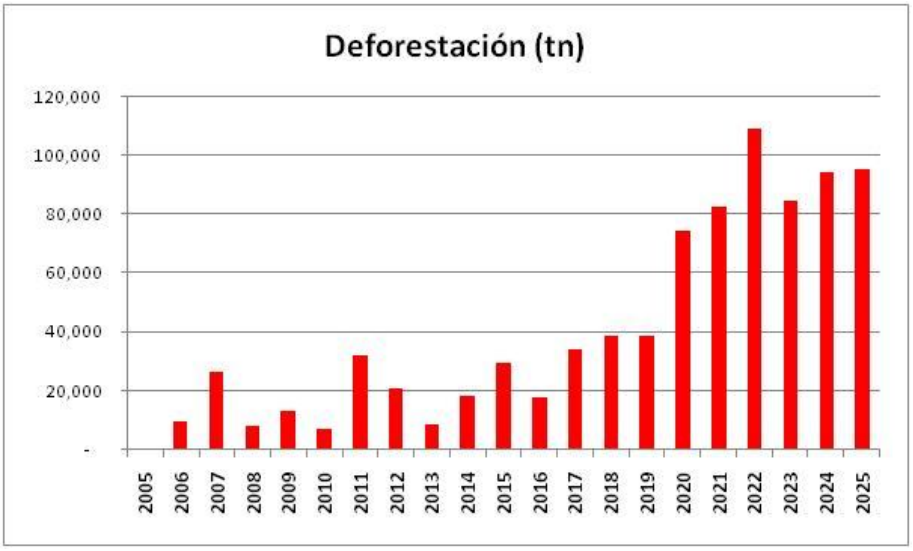
Year	Carbon stocked (tn)	Natural Reg. (C tn)	Deforest. (C tn)	Def. roads and others (C tn)	Wood extraction (C tn)	Emissions (C tn)	Net Carbon (tn)	CO2 (tn) - credits
2005	10,684,473				-			
2006	10,638,408	-	32,651	-	13,339	75	-46,065	-168,905
2007	10,585,592	9,981	31,637	8,656	22,435	69	-52,816	-193,661
2008	10,550,658	15,582	26,992	6,925	16,434	165	-34,934	-128,094
2009	10,508,602	21,442	14,600	2,770	45,943	184	-42,055	-154,204
2010	10,415,381	27,566	56,101	18,351	45,816	520	-93,221	-341,813
2011	10,320,276	33,957	74,478	7,617	46,470	496	-95,105	-348,721
2012	10,254,645	41,009	56,469	5,886	43,717	568	-65,631	-240,651
2013	10,207,538	48,352	39,525	7,964	47,407	565	-47,107	-172,728
2014	10,119,647	55,991	88,359	12,118	42,836	568	-87,891	-322,269
2015	10,031,068	63,928	104,228	6,232	41,488	559	-88,579	-324,794
2016	9,950,781	72,166	92,471	12,118	47,336	528	-80,287	-294,389
2017	9,862,402	80,414	118,161	2,770	47,336	526	-88,379	-324,059
2018	9,751,925	88,957	145,677	5,886	47,336	536	-110,477	-405,087
2019	9,639,018	97,799	155,558	7,271	47,336	542	-112,907	-413,996
2020	9,519,184	106,943	172,330	6,579	47,336	532	-119,833	-439,393
2021	9,357,640	116,392	224,809	7,271	45,332	524	-161,544	-592,334
2022	9,141,872	125,329	289,689	5,540	45,332	537	-215,768	-791,158
2023	8,872,203	134,545	358,319	-	45,332	563	-269,669	-988,795
2024	8,525,561	143,460	436,942	7,271	45,332	557	-346,642	-1,271,033
2025	8,179,593	153,014	451,715	1,385	45,332	550	-345,968	-1,268,561

b.2. Carbon flow calculation in a without REDD project scenario for Maderyja concession

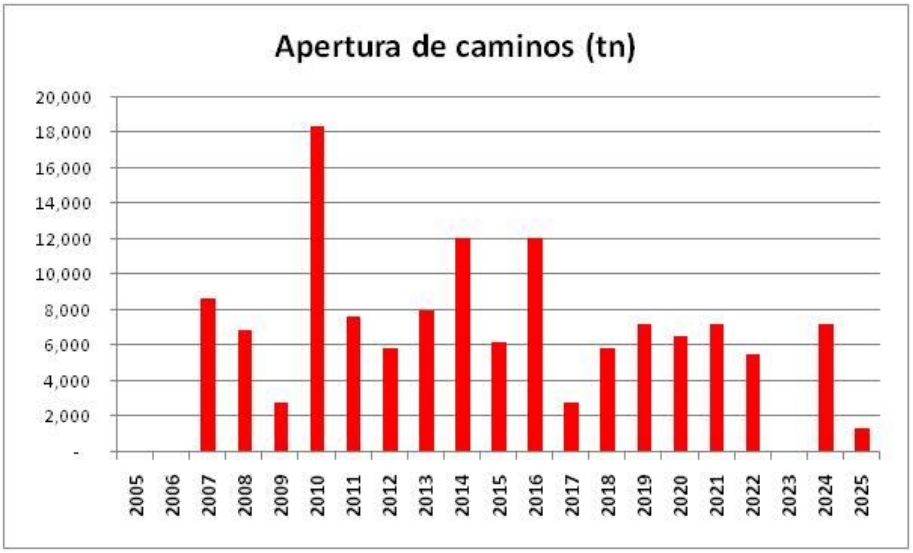
Graph 15: Carbon increment due to natural regeneration within Maderyja concession



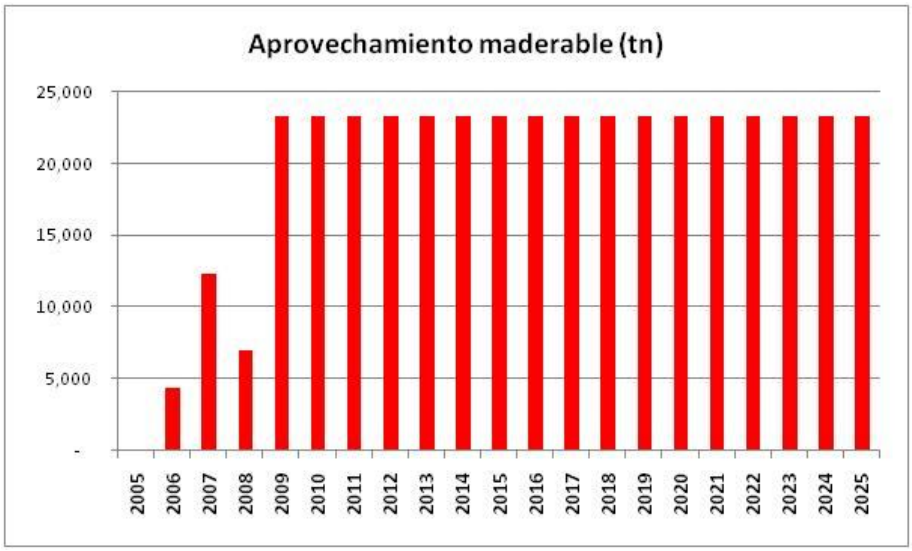
Graph 16: Carbon loss due to deforestation within Maderyja concession



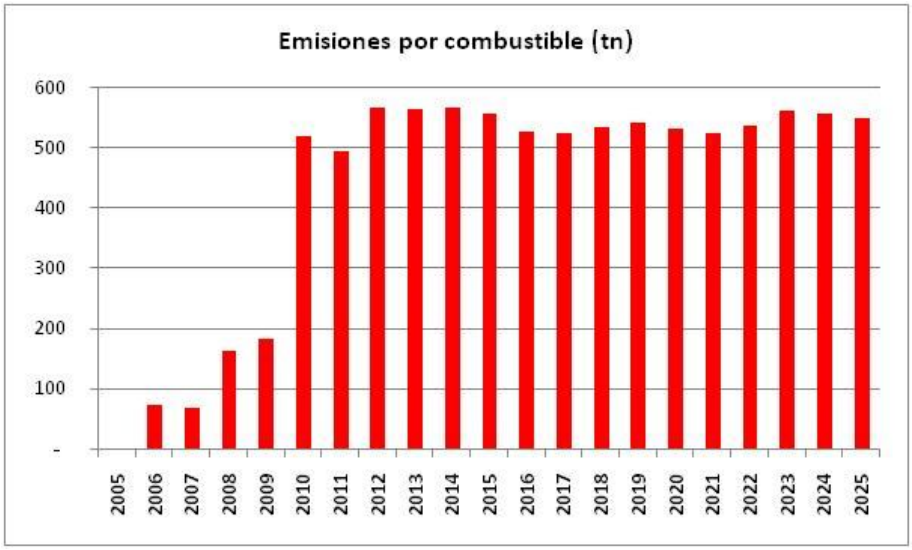
Graph 17: Carbon loss due to the opening of roads within Maderyja concession



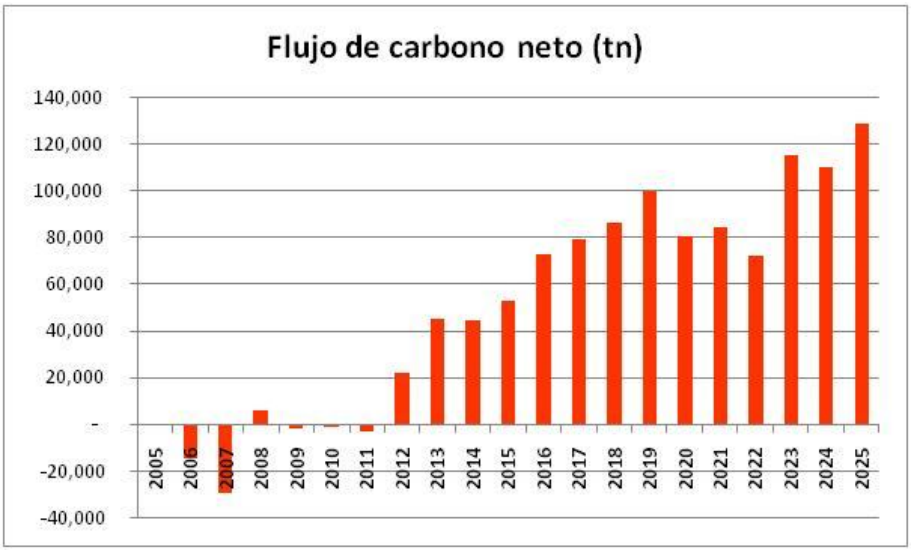
Graph 18: Carbon loss due to forestry harvesting activities within Maderyja concession



Graph 19: Carbon loss due to fuel emissions within Maderyja concession



Graph 20: Net carbon flow for Maderyja concession



Graph 21: Carbon stocked within Maderyja concession forests

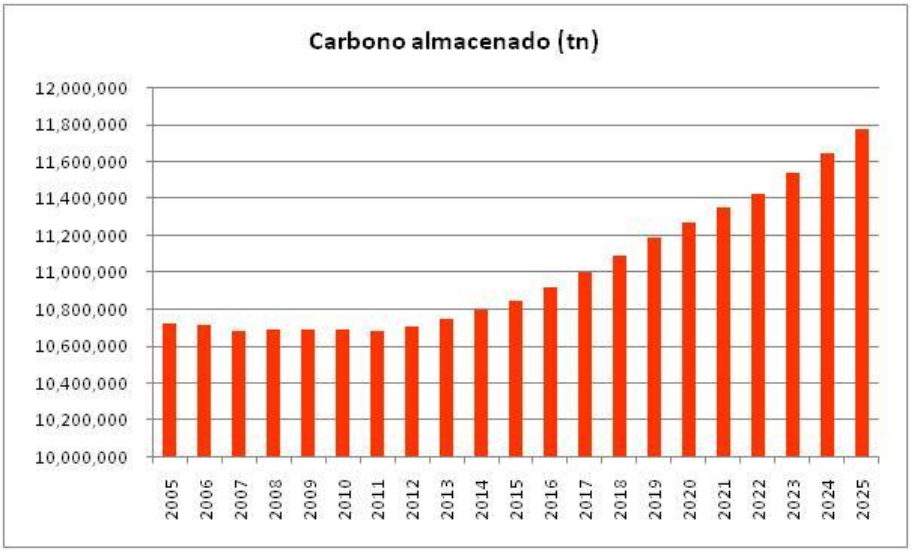
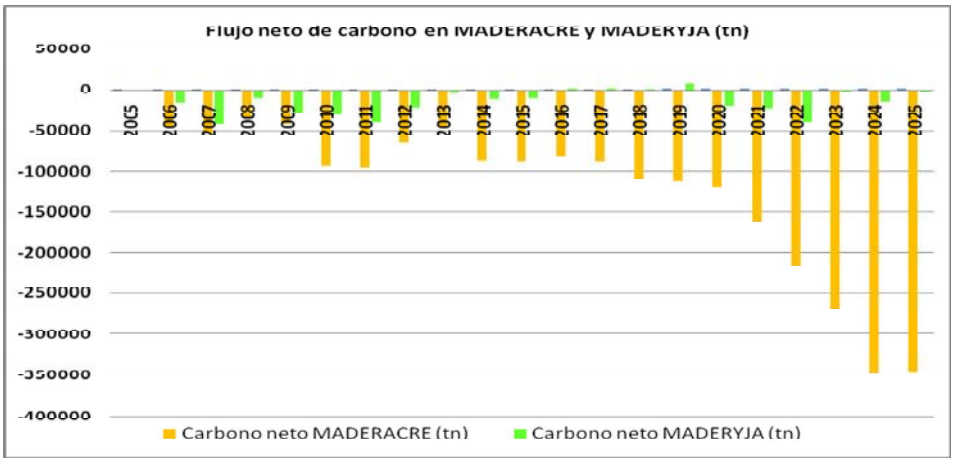


Chart 37: Results of the carbon flow for Maderyja concession

Year	Carbon stocked (C tn)	Nat. Reg. (C tn)	Deforest. (C tn)	Def. roads and others (C tn)	Wood extraction (C tn)	Emissions (Ctn)	Net carbon (tn)	CO2 (tn) credits
2005	10,723,423							
2006	10,738,858		9,714	-	5,647	75	-15,436	-56,597
2007	10,780,951	9,171	26,554	8,656	15,984	69	-42,092	-154,340
2008	10,791,142	14,079	8,063	6,925	9,117	165	-10,191	-37,367
2009	10,818,478	19,206	13,198	2,770	30,390	184	-27,337	-100,235
2010	10,850,284	24,555	7,099	18,351	30,390	520	-31,805	-116,620
2011	10,890,663	30,451	32,327	7,617	30,390	496	-40,379	-148,058
2012	10,911,880	36,590	20,963	5,886	30,390	568	- 21,218	-77,799
2013	10,916,677	42,973	8,851	7,964	30,390	565	-4,797	-17,588
2014	10,928,554	49,604	18,404	12,118	30,390	568	-11,876	-43,548
2015	10,938,772	56,486	29,523	6,232	30,390	559	-10,219	-37,469
2016	10,936,201	63,311	17,703	12,118	30,390	528	2,571	9,429
2017	10,933,777	70,379	34,268	2,770	30,390	526	2,424	8,888
2018	10,931,796	77,692	38,900	5,886	30,390	536	1,981	7,263
2019	10,923,715	85,254	38,970	7,271	30,390	542	8,081	29,632
2020	10,942,646	93,066	74,496	6,579	30,390	532	-18,931	-69,415
2021	10,964,142	99,192	82,502	7,271	30,390	524	-21,497	-78,822
2022	11,004,418	105,496	109,305	5,540	30,390	537	-40,276	-147,679
2023	11,008,010	111,983	84,622	-	30,390	563	-3,592	-13,172
2024	11,022,544	118,198	94,513	7,271	30,390	557	-14,534	-53,291
2025	11,025,230	124,881	95,242	1,385	30,390	550	-2,686	-9,850

b.3. Total carbon flow in a without REDD project scenario including both concessions

Graph 22: Net carbon flow for Maderacre and Maderyja concessions



Graph 23: Carbon stocked within the Maderacre and Maderyja concessions forests

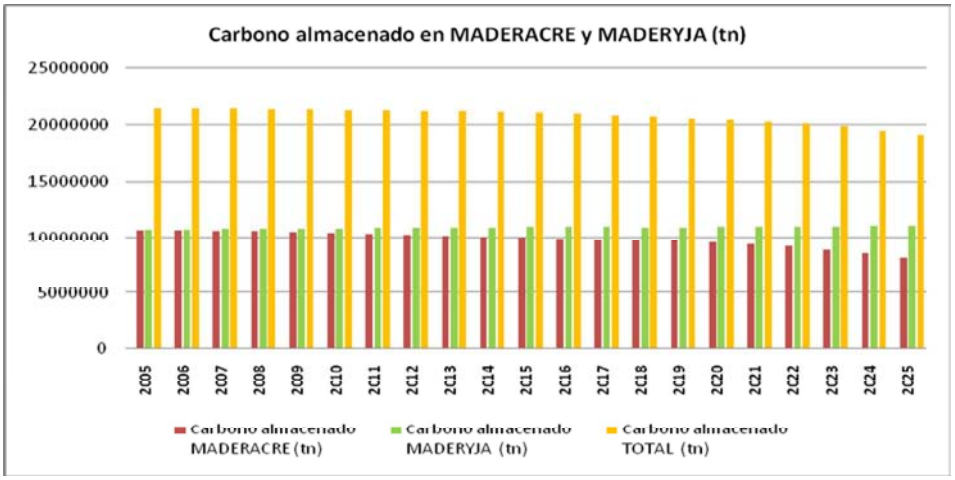


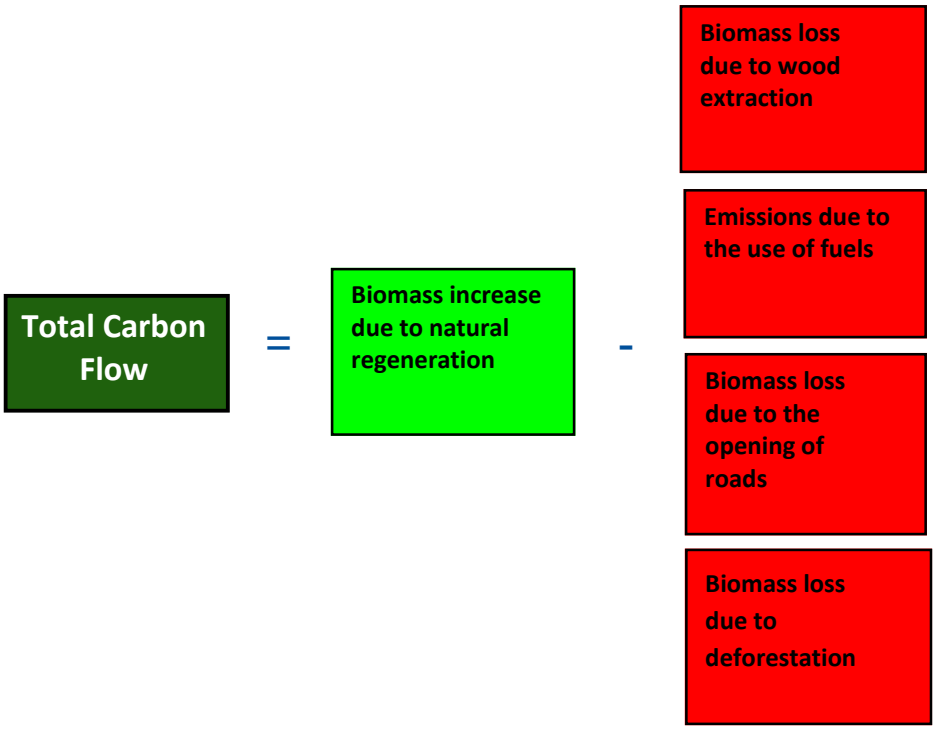
Chart 38: Result of the total carbon flow for both concessions

Year	Carbon stocked MADERACRE (tn)	Carbon stocked MADERYJA (tn)	TOTAL carbon stocked (tn)	Net carbon MADERACRE (tn)	Net carbon MADERYJA (tn)	TOTAL net carbon (tn)
2005	10,684,473	10,723,423	21,407,895			-
2006	10,638,408	10,738,858	21,377,266	-46,065	-15,436	-61,500
2007	10,585,592	10,780,951	21,366,543	-52,816	-42,092	-94,909
2008	10,550,658	10,791,142	21,341,799	-34,934	-10,191	-45,125
2009	10,508,602	10,818,478	21,327,081	-42,055	-27,337	-69,392
2010	10,415,381	10,850,284	21,265,665	-93,221	-31,805	-125,026
2011	10,320,276	10,890,663	21,210,939	-95,105	-40,379	-135,484
2012	10,254,645	10,911,880	21,166,525	-65,631	-21,218	-86,849
2013	10,207,538	10,916,677	21,124,215	-47,107	-4,797	-51,904
2014	10,119,647	10,928,554	21,048,201	-87,891	-11,876	-99,767
2015	10,031,068	10,938,772	20,969,840	-88,579	-10,219	-98,798
2016	9,950,781	10,936,201	20,886,981	-80,287	2,571	-77,716
2017	9,862,402	10,933,777	20,796,179	-88,379	2,424	-85,955
2018	9,751,925	10,931,796	20,683,721	-110,477	1,981	-108,496
2019	9,639,018	10,923,715	20,562,732	-112,907	8,081	-104,825
2020	9,519,184	10,942,646	20,461,830	-119,833	-18,931	-138,764
2021	9,357,640	10,964,142	20,321,783	-161,544	-21,497	-183,041
2022	9,141,872	11,004,418	20,146,290	-215,768	-40,276	-256,044
2023	8,872,203	11,008,010	19,880,213	-269,669	-3,592	-273,261
2024	8,525,561	11,022,544	19,548,105	-346,642	-14,534	-361,176
2025	8,179,593	11,025,230	19,204,823	-345,968	-2,686	-348,654

b.4. Conclusion of the estimation of the total carbon flow in a without REDD project scenario

According to graphs 22 and 23, we can conclude that in a “without project” scenario, the Maderacre and Maderyja forests suffer degradation over time, resulting in a negative net carbon flow.

As a result of the above report, it is concluded that the carbon flows for both concessions, in a without project scenario is the following:



D.5.2. Carbon flow estimation under the with REDD project scenario

a. Methodology

For the carbon flow quantification of the Madre de Dios Amazon REDD Project for the concessions, the variables which emit and sequester carbon were determined and are presented below:

- Emissions due to the use of fuels.
- Biomass loss (carbon) due to forest harvesting.
- Biomass loss (carbon) due to the opening of roads and paths.
- Biomass increase due to the natural regeneration of forests.

- Avoided deforestation due to the implementation of the Madre de Dios Amazon REDD project.
- Carbon stocked within the project area.

Emissions due to the use of fuels: the use of fuel for the forestry management activities was quantified, including those activities referred to the voluntary forest certification. Among the activities, the following were identified:

Chart 39: Use of fuels for the Maderacre and Maderyja timber concessions activities

Activity	Type of fuel
Logging	Gasoline
Dragging	Petroleum
Loading	Petroleum
Forestry transportation	Petroleum
Sawing	Petroleum
Opening of new roads	Petroleum
Reopening of roads	Petroleum
Road maintenance	Petroleum
Administration	Petroleum
Administration	Gasoline
Technical assistance	Petroleum
Monitoring and control	Petroleum
Monitoring and control	Gasoline

Source: Maderacre and Maderyja General Forest Management Plans

For the calculation of the fuel emission and its carbon equivalent, the values published by the IPCC[29] were used:

Net calorific value (NCV) = 44.8TJ/tn
Emission Factor (EF) = 0.0693 Tn CO2/TJ

Biomass loss due to forestry harvesting: the biomass extraction was calculated from 2006 up to 2008 and was projected from 2009 up to 2025, according to their General Forestry Management Plans. For the transformation to carbon of the extracted biomass, the "Estimation of the carbon stocked in the biomass of Maderacre and Maderyja timber concessions"[30] report was used as a reference, in which the following formulas for broadleaf trees were used:

[29] IPCC, 2006

[30] Recavarren, P. and Angulo, M., 2009.

Chart 40: Formulas used for the biomass calculations

Evaluating item	Allometric equation	Source
Aboveground biomass broadleafs	$Y=\exp[-2{,}289+2{,}649*\ln(DAP)-0.021*(\ln(DAP))^2]$	Brown in Person 2005
Belowground broadleafs (roots)	$Y=\exp[-1{,}0587+0{,}8836*\ln(BSS)]$	Cairns *et al.*, 1997 en IPCC

Biomass loss due to the opening of roads: the forest area loss due to the opening of extraction roads is determined, taking into consideration that for roads 8 m of road area are opened and 4 m per side for forest clearing or maintenance of roads, with which the forest clearing area according to the length of the roads is determined.

The carbon of the wood extracted from years 2006 up to 2008 was calculated taking into account the data of the forestry census reported within the Annual Operative Plans of Maderacre and Maderyja[31]. From years 2009 up to 2025, projected calculations of the extraction were done, taking into account the allowed quantities annually reported within the General Forestry Management Plans of each concession.

Natural regeneration: according to growth rates of natural forests of 0.5 cm per year, in diameter growth of broadleaf, and a mortality of 1.5% per year for all diametric classes from a DBH of 10 cm[32]. Additionally, with the data reported within the exploratory inventory of Maderacre and Maderyja concessions[33], the projected growth of the forest per year and the accumulated area by plot of annual harvest till 2025.

Avoided deforestation: referred to the data included within the "Deforestation rate and modeling of Maderacre and Maderyja timber concessions"[34].

The total carbon flow is the equation where the losses and recovery of carbon are faced, as well as the carbon gained from avoided deforestation. For the total flow the following IPCC 2006 indexes were used:

1 tn of biomass: 0.5 tn of carbon
1 tn of carbon: 3.6667 tn of CO2 equivalent

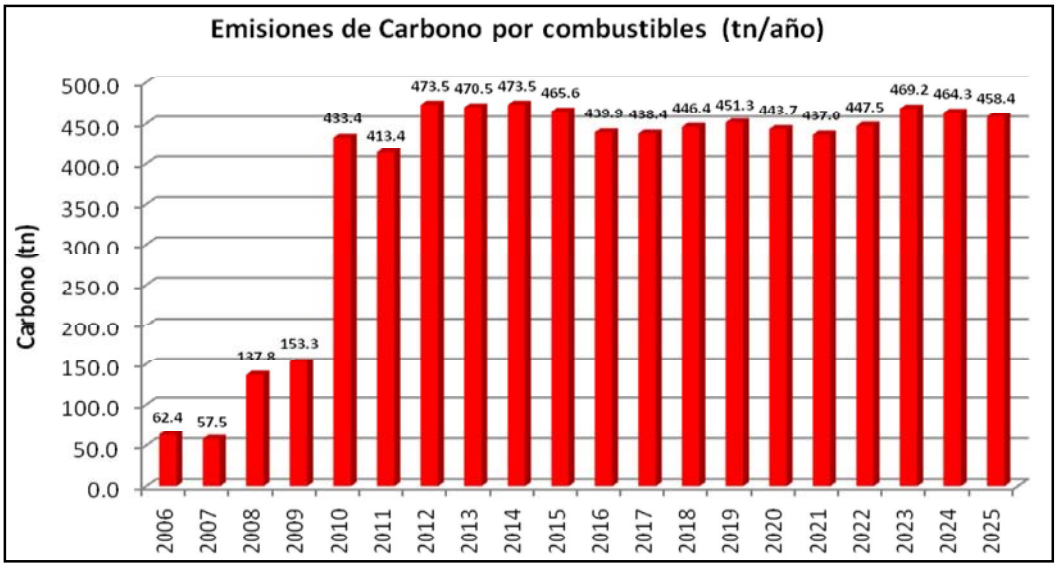
[31] Annual Operative Plan 2006, 2007 and 2008, Maderacre and Maderyja.
[32] Louman, B., 2001.
[33] Kometer, R., 2005.
[34] Recavarren, P. et al, 2009.

b. Results

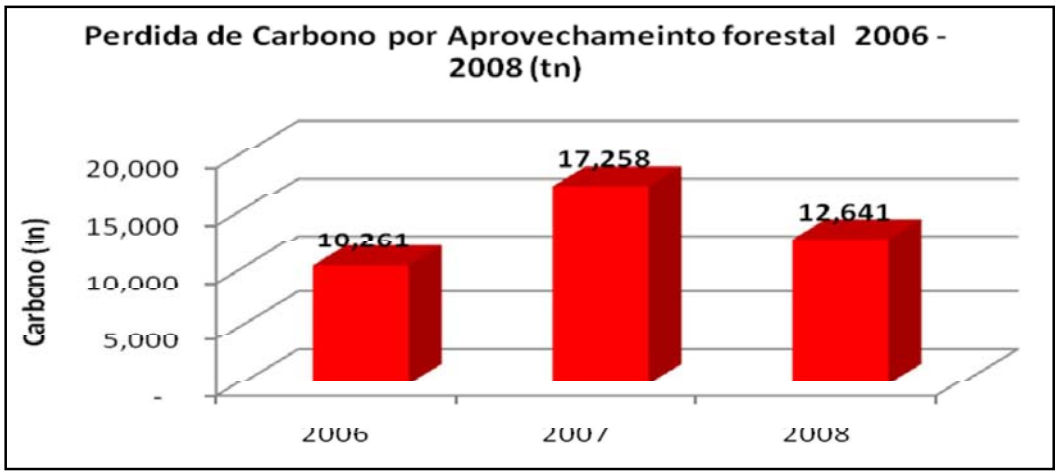
b.1. Carbon flow calculation in a with REDD project scenario for Maderacre concession

Carbon losses and emissions

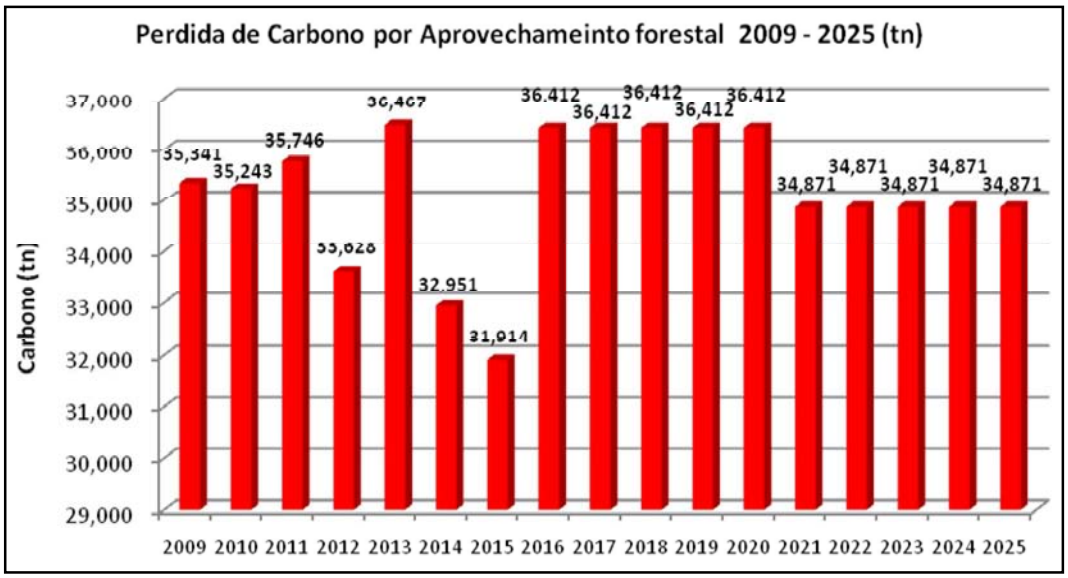
Graph 24: Emissions due to the use of fuels



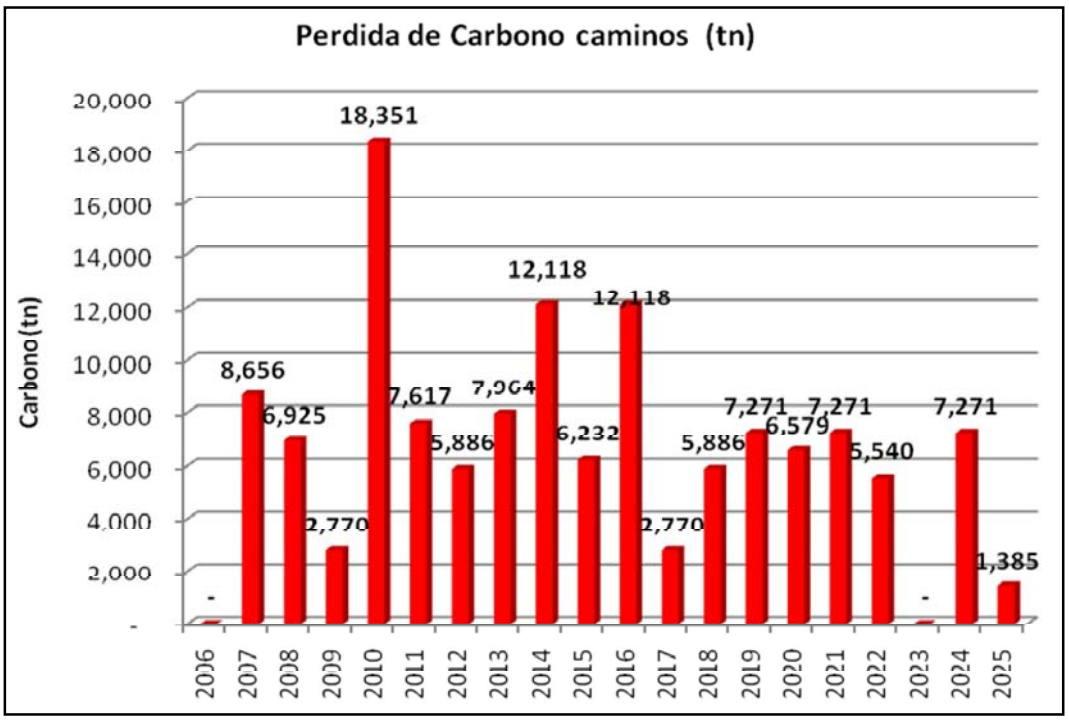
Graph 25: Carbon loss due to wood extraction (2006-2008)



Graph 26: Projected carbon loss due to wood extraction (2009-2025)

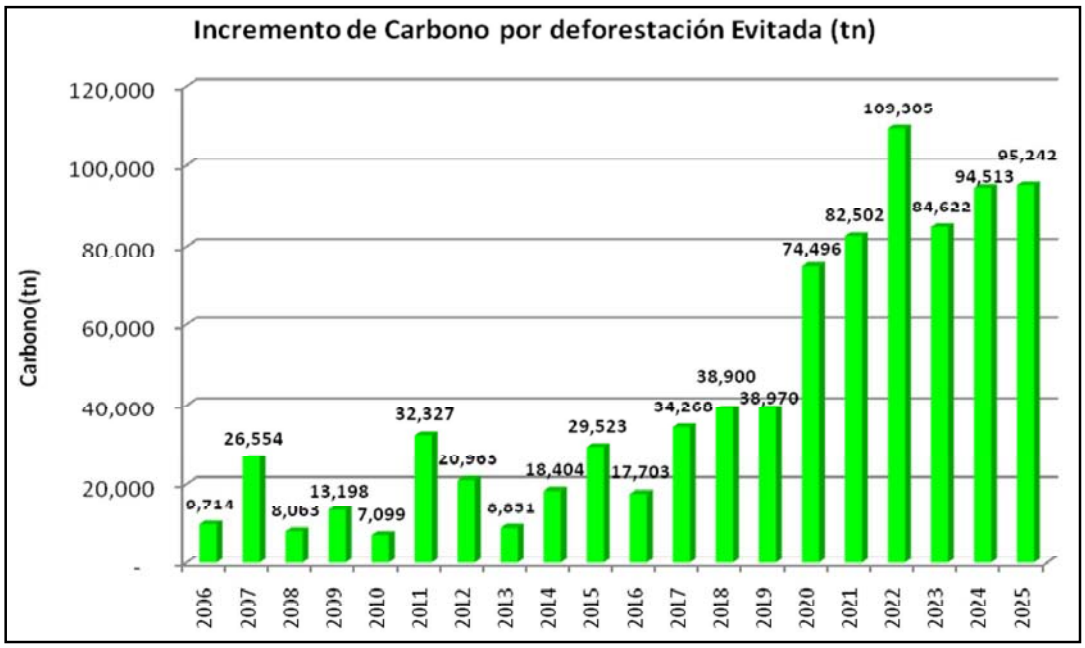


Graph 27: Carbon loss due to the opening of roads

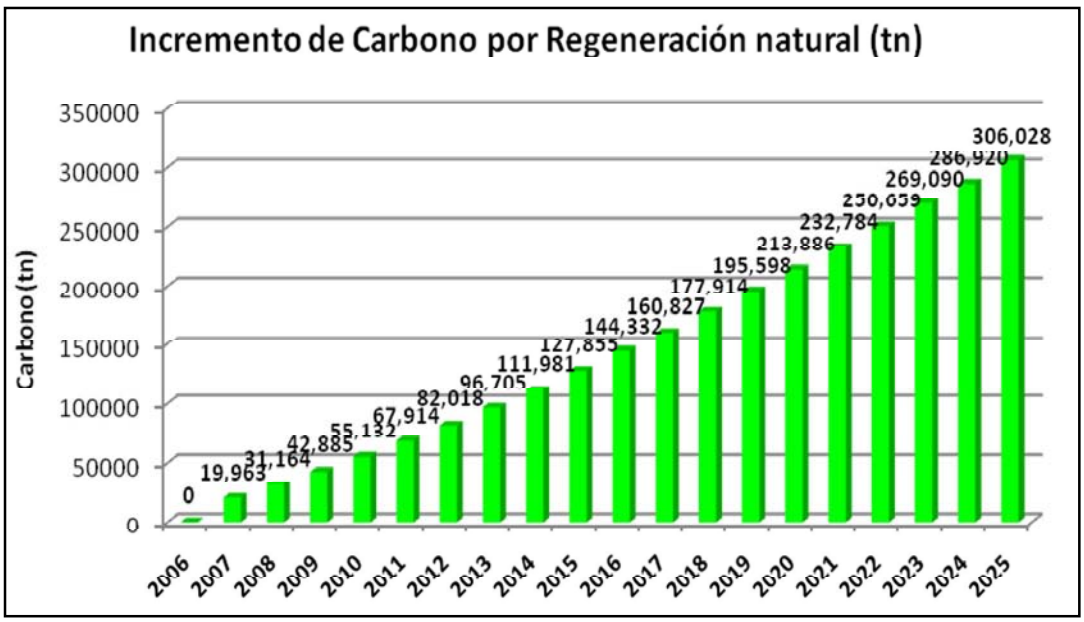


Carbon recovery

Graph 28: Carbon increase due to avoided deforestation



Graph 29: Carbon increase due to natural regeneration of the forests

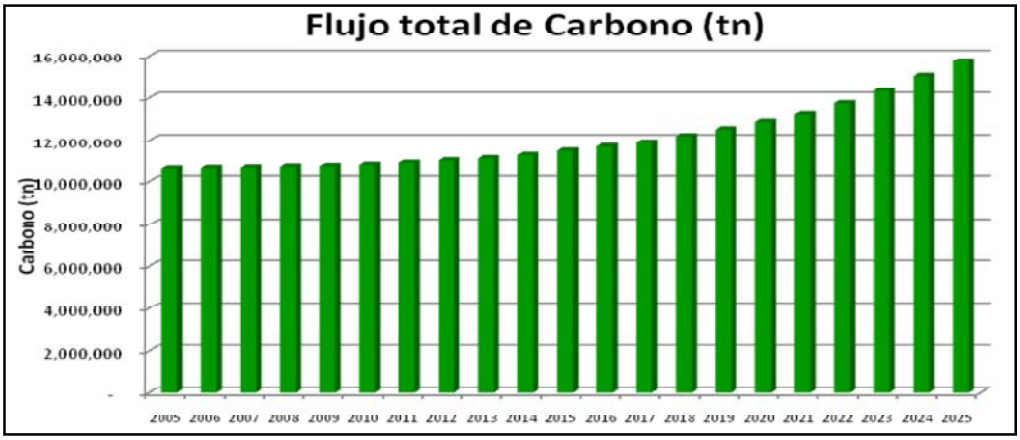


Carbon stocked

Chart 41: Total carbon flow for the Maderacre concession as a result of the previous variables analyzed

Year	Carbon stocked (tn)	Avoided Def. (C tn)	Natural Reg. (C tn)	Def. roads and others (C tn)	Wood extraction (C tn)	Emissions (C tn)	Net carbon (C tn)
2005	10,684,473						
2006	10,706,800	32,651		-	10,261	62	22,328
2007	10,732,429	31,637	19,963	8,656	17,258	58	25,629
2008	10,770,882	26,992	31,164	6,925	12,641	138	38,453
2009	10,790,103	14,600	42,885	2,770	35,341	153	19,221
2010	10,847,309	56,101	55,132	18,351	35,243	433	57,206
2011	10,945,924	74,478	67,914	7,617	35,746	413	98,615
2012	11,044,423	56,469	82,018	5,886	33,628	473	98,499
2013	11,135,752	39,525	96,705	7,964	36,467	471	91,329
2014	11,290,549	88,359	111,981	12,118	32,951	474	154,797
2015	11,484,021	104,228	127,855	6,232	31,914	466	193,472
2016	11,671,854	92,471	144,332	12,118	36,412	440	187,833
2017	11,911,222	118,161	160,827	2,770	36,412	438	239,368
2018	12,192,068	145,677	177,914	5,886	36,412	446	280,846
2019	12,499,089	155,558	195,598	7,271	36,412	451	307,022
2020	12,841,871	172,330	213,886	6,579	36,412	444	342,782
2021	13,256,885	224,809	232,784	7,271	34,871	437	415,014
2022	13,756,375	289,689	250,659	5,540	34,871	447	499,490
2023	14,348,445	358,319	269,090	-	34,871	469	592,070
2024	15,029,701	436,942	286,920	7,271	34,871	464	681,256
2025	15,750,729	451,715	306,028	1,385	34,871	458	721,028

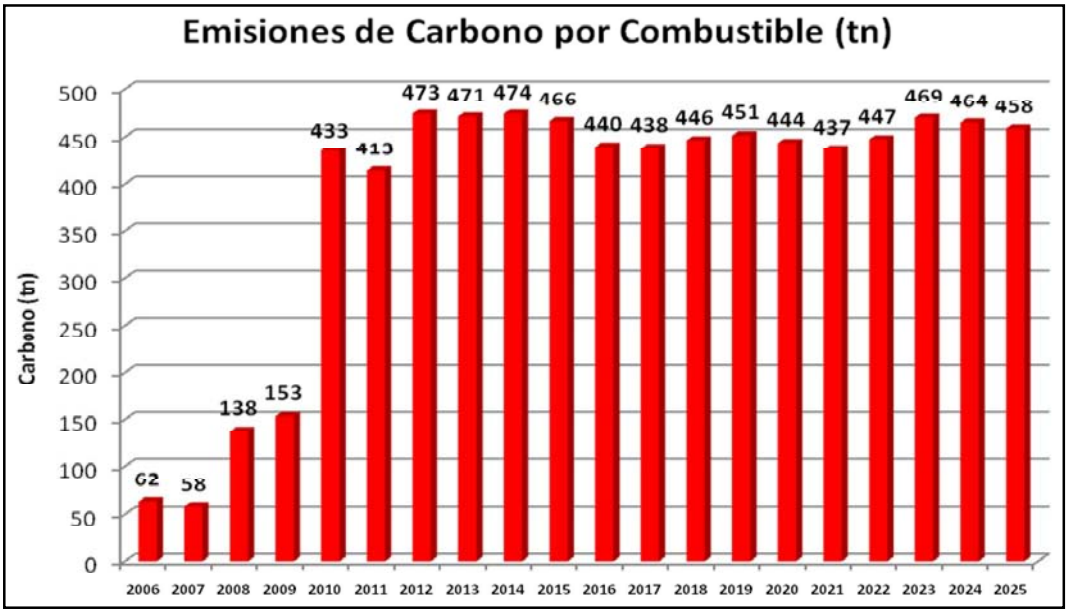
Graph 30: Total carbon flow of Maderacre concession



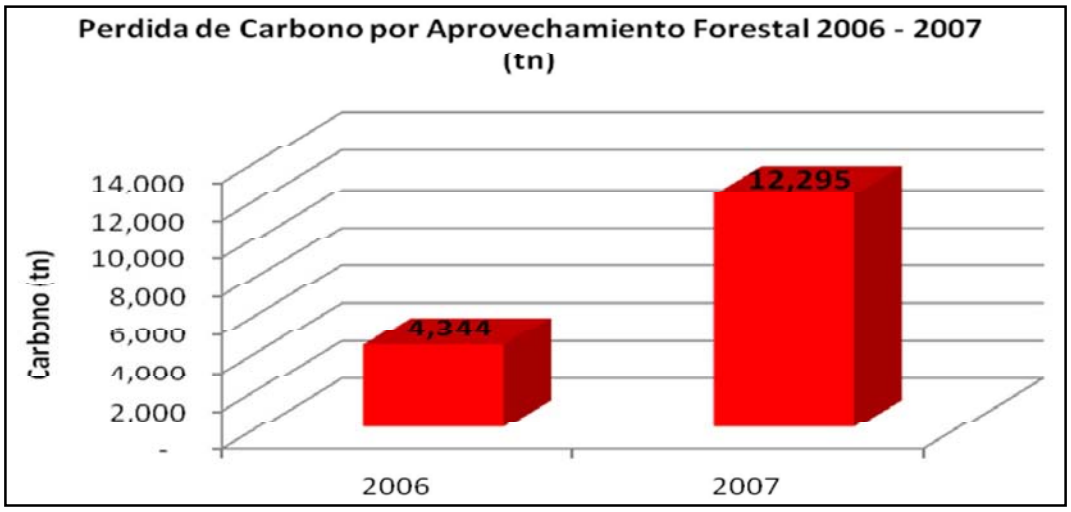
b.2. Carbon flow calculation in a with REDD project scenario for Maderyja concession

Carbon losses and emissions

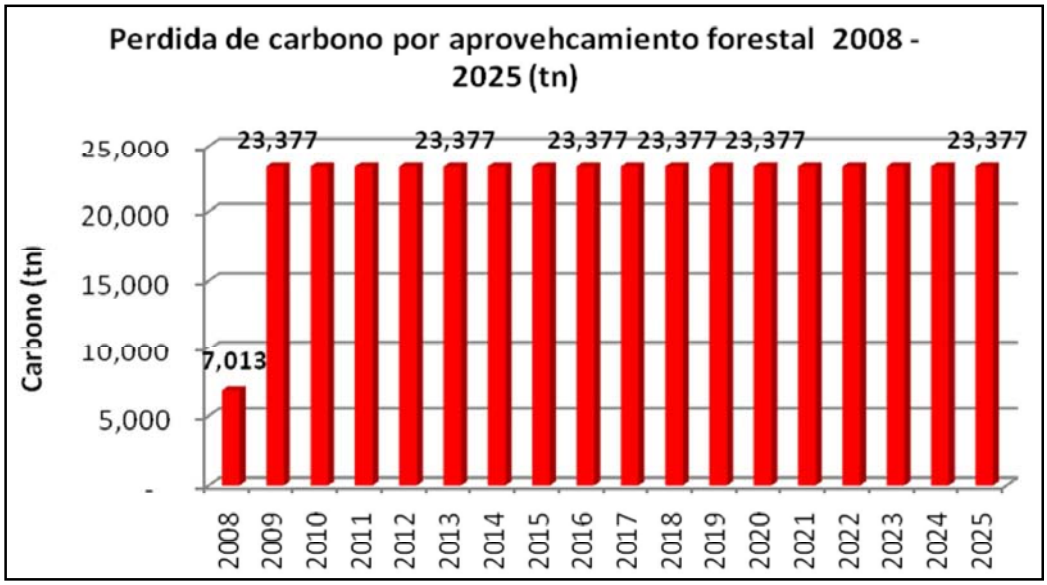
Graph 31: Emissions due to the use of fuels



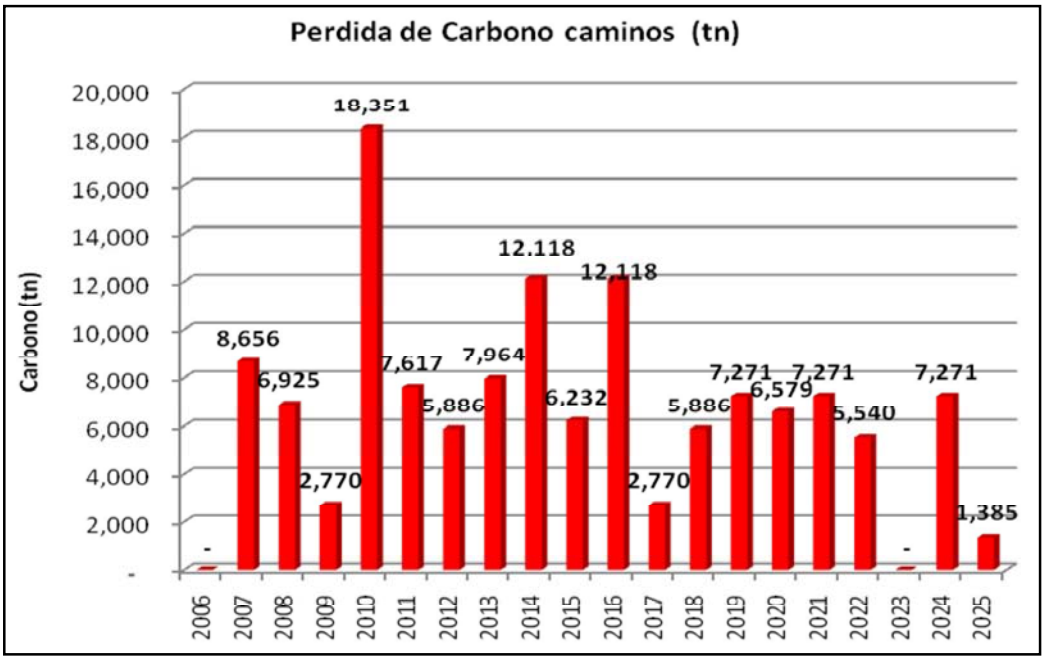
Graph 32: Carbon loss due to wood extraction (2006-2007)



Graph 33: Carbon loss due to wood extraction (2008-2025)

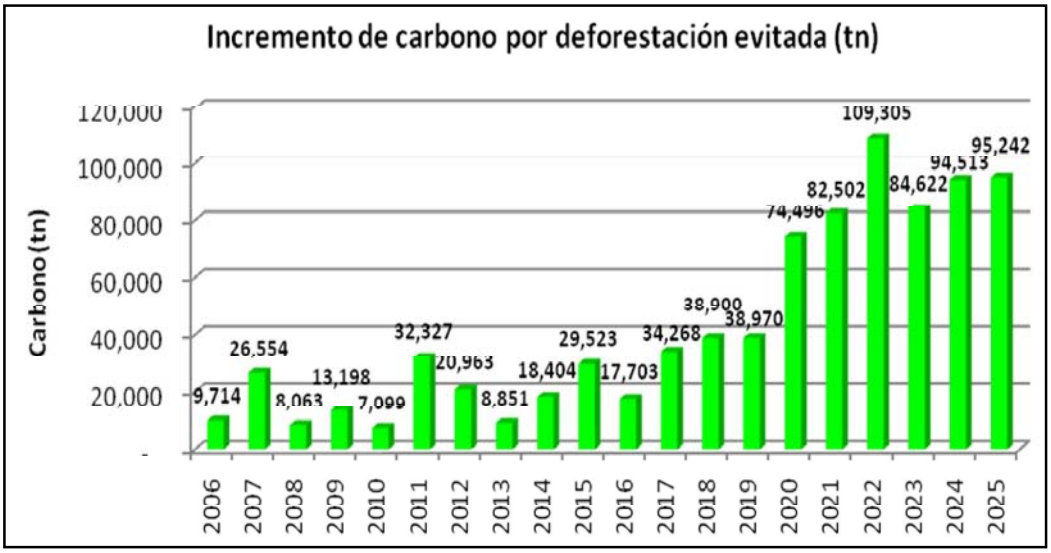


Graph 34: Carbon loss due to the opening of roads

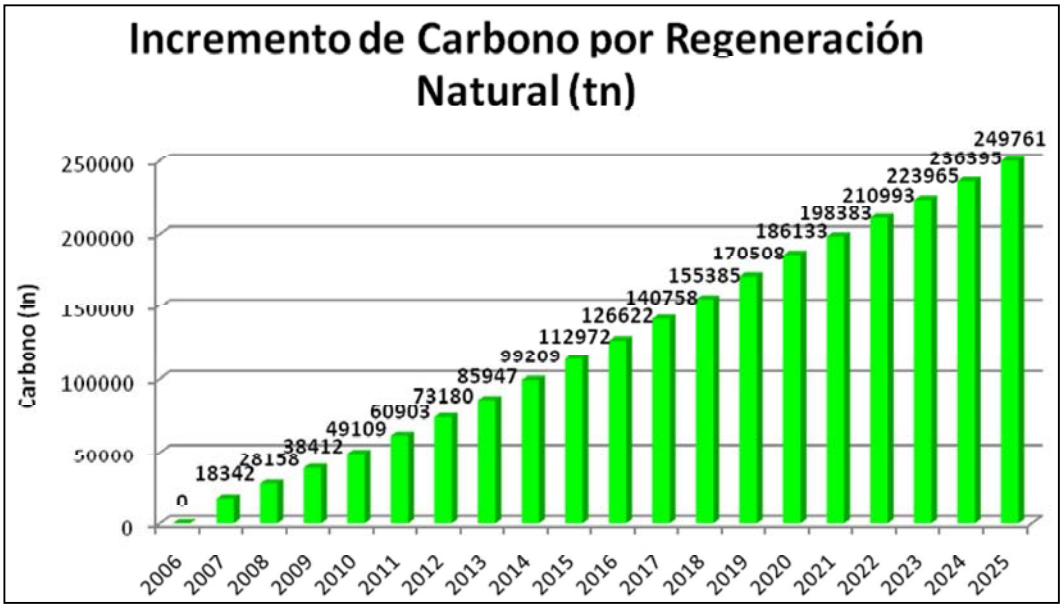


Carbon recovery

Graph 35: Carbon increase due to avoided deforestation



Graph 36: Carbon increase due to the natural regeneration of forests

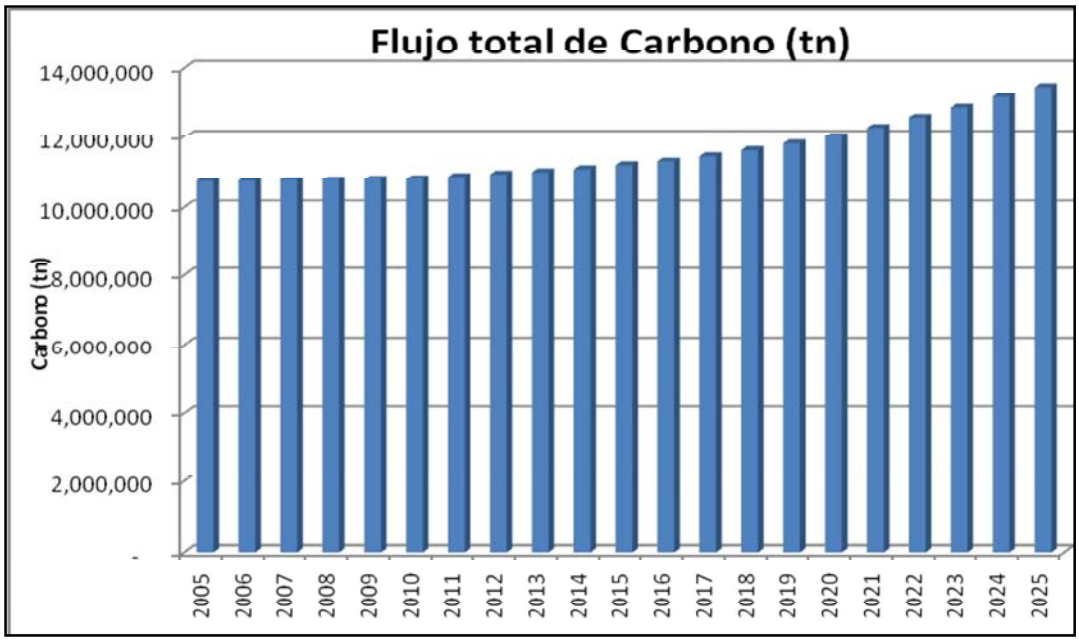


Carbon stocked

Chart 42: Total carbon flow for the Maderyja concession as a result of the previous variables analyzed

Year	Carbon stocked (tn)	Avoided Def. (C tn)	Natural Reg. (C tn)	Def. roads and others (C tn)	Wood extraction (C tn)	Emissions (C tn)	Net carbon (C tn)
2005	10,723,423						
2006	10,728,730	9,714		-	4,344	62	5,307
2007	10,752,617	26,554	18,342	8,656	12,295	58	23,887
2008	10,774,762	8,063	28,158	6,925	7,013	138	22,145
2009	10,800,072	13,198	38,412	2,770	23,377	153	25,310
2010	10,814,119	7,099	49,109	18,351	23,377	433	14,047
2011	10,875,940	32,327	60,903	7,617	23,377	413	61,821
2012	10,940,346	20,963	73,180	5,886	23,377	473	64,406
2013	11,003,333	8,851	85,947	7,964	23,377	471	62,987
2014	11,084,977	18,404	99,209	12,118	23,377	474	81,644
2015	11,197,397	29,523	112,972	6,232	23,377	466	112,421
2016	11,305,786	17,703	126,622	12,118	23,377	440	108,389
2017	11,454,227	34,268	140,758	2,770	23,377	438	148,440
2018	11,618,801	38,900	155,385	5,886	23,377	446	164,575
2019	11,797,180	38,970	170,508	7,271	23,377	451	178,378
2020	12,027,409	74,496	186,133	6,579	23,377	444	230,230
2021	12,277,210	82,502	198,383	7,271	23,377	437	249,800
2022	12,568,143	109,305	210,993	5,540	23,377	447	290,933
2023	12,852,883	84,622	223,965	-	23,377	469	284,741
2024	13,152,679	94,513	236,395	7,271	23,377	464	299,795
2025	13,472,461	95,242	249,761	1,385	23,377	458	319,782

Graph 37: Total carbon flow for Maderyja concession



b.3. Total net carbon flow in a with REDD project scenario including both concessions

Graph 38: Total net carbon flow for the Madre de Dios Amazon REDD Project

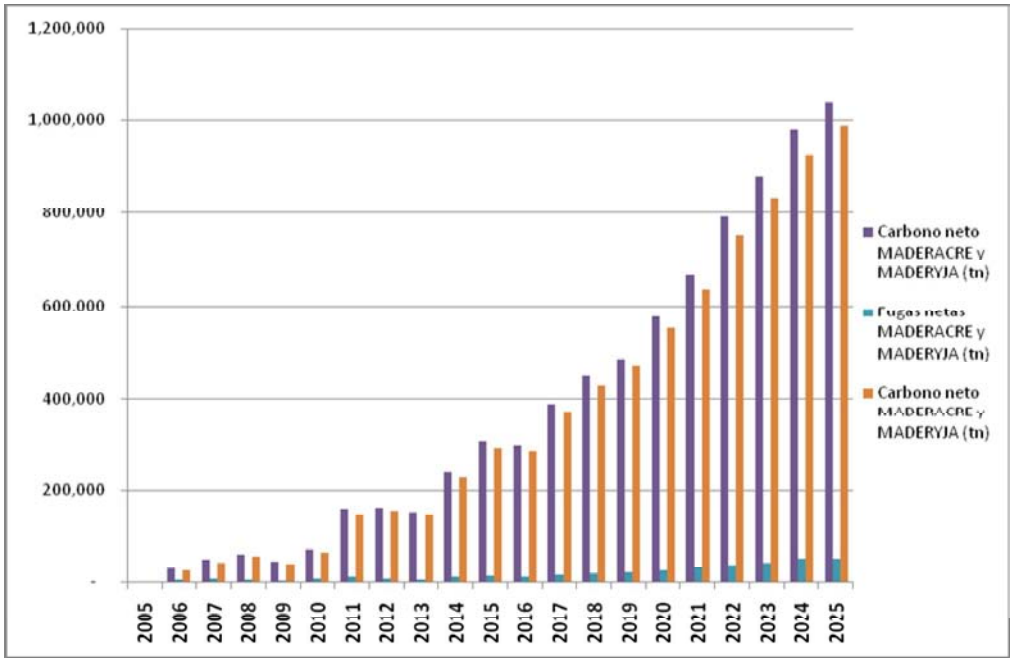
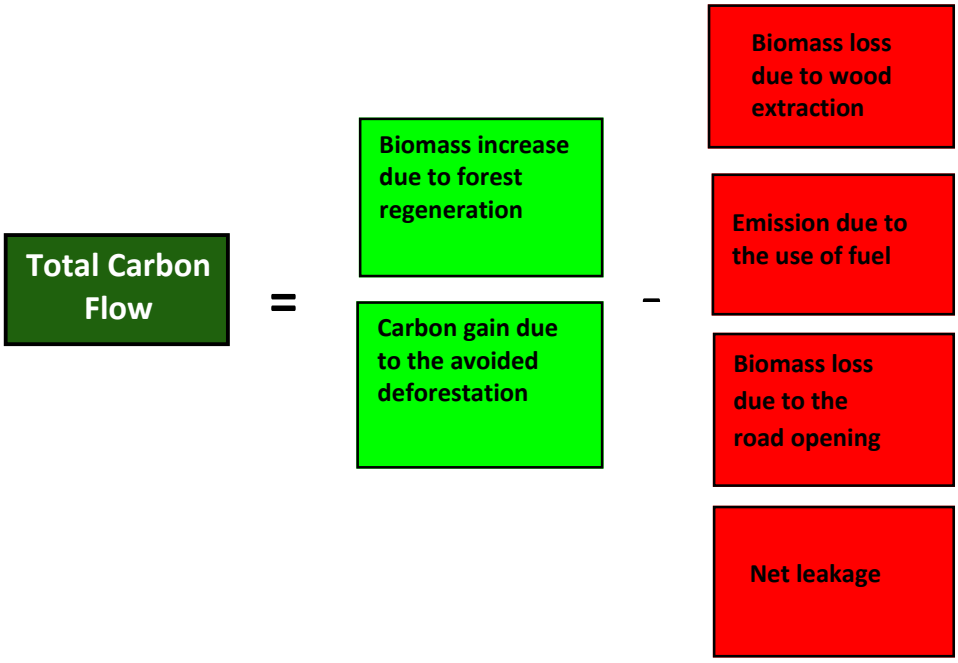


Chart 43: Total net carbon flow for the Madre de Dios Amazon REDD project

Year	MADERACRE NET CARBON (without leakage) tn C	MADERYJA NET CARBON (without leakage) tn C	MADERACRE and MADERYJA NET CARBON (without leakage) tn C	MADERACRE and MADERYJA NET LEAKAGE tn C	MADERACRE and MADERYJA NET CARBON tn C	CO2 (tn) - CREDITS
2005			-	-	-	
2006	22,328	5,307	27,635	4,092	23,543	86,324
2007	25,629	23,887	49,516	5,621	43,895	160,949
2008	38,453	22,145	60,598	3,386	57,211	209,776
2009	19,221	25,310	44,531	2,685	41,845	153,434
2010	57,206	14,047	71,253	6,105	65,148	238,877
2011	98,615	61,821	160,436	10,317	150,119	550,442
2012	98,499	64,406	162,905	7,480	155,425	569,898
2013	91,329	62,987	154,316	4,673	149,642	548,694
2014	154,797	81,644	236,441	10,313	226,128	829,142
2015	193,472	112,421	305,893	12,920	292,972	1,074,240
2016	187,833	108,389	296,222	10,643	285,580	1,047,135
2017	239,368	148,440	387,808	14,725	373,083	1,367,985
2018	280,846	164,575	445,421	17,830	427,591	1,567,847
2019	307,022	178,378	485,400	18,791	466,608	1,710,913
2020	342,782	230,230	573,012	23,843	549,168	2,013,634
2021	415,014	249,800	664,814	29,686	635,128	2,328,823
2022	499,490	290,933	790,423	38,543	751,881	2,756,921
2023	592,070	284,741	876,811	42,788	834,022	3,058,109
2024	681,256	299,795	981,051	51,339	929,712	3,408,977
2025	721,028	319,782	1,040,810	52,836	987,975	3,622,607

b.4. Conclusion of the estimation of the total net carbon flow in a with REDD project scenario

On the one hand and according to the information presented in graph 38 and chart 43 of the present report, we can conclude that the Madre de Dios Amazon REDD project has a net positive balance of carbon stocked. On the other hand and according to the whole analysis included in this report, it must be concluded that the carbon flow for both concessions, in the framework of a REDD project, consists of:



D.6. Application of monitoring methodology and plan

The monitoring plan describes the monitoring activities to be developed during the project crediting period and how these will be implemented. The activities are:

a) Baseline monitoring procedure

As indicated in REDD methodologies (frontier and mosaic), the baseline must be monitored if a modeling software has been used to its calculation. Drivers used in the modeling process must be monitored to find out if significant differences with projections have occurred.

Chart 44: Baseline monitoring activities and indicators

Activity description	Indicator	Frequency	Responsible
Demographic growth	Population per district stratum 1	Each 5 years	Logistic Area
Road expansion in project or buffer area	Kilometers of new roads (length and width) Classification of roads (paved, non-paved) Use of roads (timber, Brazil nut, agriculture, mining)	Annual	Logistic Area
Road improvement in project or buffer area	Kilometers of new paving Classification of roads paved Use of roads paved	Annual	Logistic Area

Activity description	Indicator	Frequency	Responsible
New settlements in project or buffer area	GPS location and area Type (native community, rural settlement, urban settlement) Population Main productive activities (crops/cattle, average extension)	Annual	Social Responsibility Area

b) Project monitoring procedure

b.1) Monitoring of measures to mitigate deforestation and reduce the risk of leakage

This task consists of registering and dating all measures implemented by the project to mitigate deforestation and leakage. Any deviation to the activities planned must be recorded and justified.

Chart 45: Monitoring of measures to mitigate deforestation and leakage

Activity description	Indicator	Frequency	Responsible
Apply surveys to local families that are being supported by the project to develop sustainable economic activities	Number of local families developing new sustainable economic activities	Annually	Social Responsibility Area
Apply surveys in local schools that are being supported by the project	Number of local students involved in environmental protection activities	Annually	Social Responsibility Area
Register the application of low impact logging practices and verify that it is according to the forest management plan and FSC standards	Number of practices developed according the FSC standards	During logging period	Forest Management Area
Register people entrance to the project area and record the occurrence of illegal activities. Use of formats at control stations	Number and type of illegal activities situations inside the project area	Permanent	Security Area

b.2) Monitoring of land-use and land-cover change

This task consists of recording all changes in the polygon boundaries of forest classes within the project area and leakage belt using remotely sensed data.

Chart 46: Monitoring of land-use and land-cover change

Activity description	Indicator	Frequency	Responsible
Landsat images interpretation to determine deforestation inside the project area	Deforestation in hectares inside the project area	Annually	Monitoring Area
Landsat images interpretation to determine deforestation in leakage belt	Deforestation in hectares in leakage belt	Annually	Monitoring Area

b.3) Monitoring of carbon stocks and non-CO_2 emissions

This task consists of recording the emissions and biomass losses as a consequence of the sustainably forestry management.

Chart 47: Monitoring of carbon stocks and non-CO_2 emissions

Activity description	Indicator	Frequency	Responsible
Register the use of fossil fuels in the project area, using paper formats during the different phases of the forest management	Gasoline gallons consumed Diesel gallons consumed	Permanent	Logistic Area
Register the logging activity, using paper formats defined for custody chain process	Volume of wood extracted in m^3	Permanent	Forest Management Area

c) Leakage monitoring

For each component, the indicators, monitoring frequency and the method to be used for collecting data are established, which shall complement the analysis and processing of the satellite images with the data collected through the infield work about the status of the forests.

Chart 48: Leakage monitoring

Activity description	Indicator	Frequency	Responsible
Landsat images interpretation to determine deforestation in leakage belt	Deforestation in hectares in leakage belt	Annually	Monitoring Area
Record the number and area of households and communities occupying land in the leakage belt at the beginning of the project	Hectares of households and communities in the leakage belt	Annually	Monitoring Area
Surveys to households and communities to determine land converted since the beginning of the project	Hectares converted in the leakage belt	Annually	Monitoring Area
Surveys to communities to determine the demand of land for agriculture because of the population growth (not migration)	Demand of new land for agriculture in communities	Annually	Monitoring Area

It is important to mention that the monitoring of the deforestation will be via satellite and the infield verification will be carried out in those areas of easier accessibility and if the owners of the land or concessionaires over said areas allow the access to the defined verification points. Otherwise, the verification will be carried out in selected points of the same characteristics identified during the interpretation of the satellite images.

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E. Environmental impacts of the proposed project activity

E. Environmental impacts of the proposed project activity

E.1. Description of the present environmental conditions of the project area

It is important to highlight that the maintenance of the environmental conditions is of the greatest importance for both timber concessions. In this sense, the achievement of the FSC Certification for both concessions is a concrete demonstration of that.

Furthermore, useful measures to protect valuable forest species and also species and areas of importance for the development of native fauna are taken into account in all the operations carried out by both concessions.

As a result of the Evaluation of Fauna carried out within the concession area and described in chapter C.4, complemented with the study of high conservation value forests, the evaluation made through the satellite imagery Landsat and with the highly detailed knowledge of the area by Maderacre and Maderyja personnel, important places to the preservation of the flora and fauna were defined as conservation areas. Into them all kind of exploitation activities are strictly forbidden.

The High Conservation Value Forests study, carried out as a requirement for the achievement of the FSC Certification by Fernando Canchanya, specialist on this type of evaluations, have identified the fish zones (rivers, streams and cochas) within the concession, as well as the aguajales as places of high conservation value. Additionally, it is recommended that all forestry activities near to fauna collpas shall be restricted.

Following, a summary of the process of identification of High Conservation Value Forests within Maderacre and Maderyja timber concessions is presented:

With the objective of identifying conservation attributes within and in the surroundings of the Maderacre and Maderyja timber concessions, studies for the identification of High Conservation Value Forests (HCVF) were carried out. Said studies, complemented with the Rapid Evaluation of Native Fauna, have enabled the definition of conservation areas within both concessions.

For the identification of sites with conservation attributes, the evaluation was focused on the biodiversity and community components. In this way, knowledge on the location of important sites for wildlife and the satisfaction of the basic needs of the indigenous communities and villages which could use the natural resources within the concession to satisfy their basic needs is improved. Also, to have an idea on the degree of usage of native flora and fauna by human beings.

In order to identify High Conservation Value Forests (HCVF) within the Maderacre and Maderyja concessions, the following definitions were considered:

- **HCVF 1.** Forestry areas containing globally, regionally or nationally significant concentrations of biodiversity values (i.e. endemism, endangered species, refuges).

  - HCVF 1.1. Area of influence and/or buffer zone within protected areas.
  - HCVF 1.2. Presence of threatened species or critically endangered species.
  - HCVF 1.3. Concentration of endemic species.
  - HCVF 1.4. Critical temporary concentrations.

- **HCVF 2.** Significant intact forestry areas at a landscape level.

- **HCVF 3.** Forestry areas that are or contain threatened or endangered ecosystems.

- **HCVF 4.** Forestry areas that provide essential services in critical situations (i.e. water basin protection, control of erosion).

  - HCVF 4.1. Unique sources of safe water.
  - HCVF 4.2. Forests that are critical for water collection.
  - HCVF 4.3. Forests that are critical for control erosion.

- **HCVF 5.** Forestry areas that are fundamental to the satisfaction of the basic needs of local communities (i.e. subsistence, health care).

- **HCVF 6.** Forests that are critical for the cultural identity of the communities (i.e. areas of cultural, economic or religious significance).

The data collection and its processing was done in the following phases:

1. **Desk Review:** written and digital information on the zone were collected, such as map of forest types, phisiography, satellite images, National Charts, General Forestry Management Plans, Annual Operative Plans, Social Diagnosis of communities adjacent to the concessions, Fauna Studies, categorization of Native Fauna species and information on protected natural areas.

   In this phase, information on the HCVF 1, HCVF 2 and HCVF 3 items was gathered.

2. **Field Visit:** by means of workshops, interviews and surveys with people that live in indigenous communities and villages adjoining the concessions.

   Target group: indigenous communities or local communities living within the forests to be certified or in their vicinity, and that are using any of the services provided by the forest.

   Within the indigenous community that was visited and in every village, local leaders were first contacted and the objectives, scopes and expected results of the study were explained to them. Afterwards they reunited the rest of the members of the community and presented the working team. Likewise, working hours were established in coordination with community leaders, so that the presence of evaluators did not interfere with the daily community routine.

   In the consultation processes, a variety of sub-groups were incorporated within the local organizational scheme (leaders, women, youths, elders, etc.). None of the groups was regarded as homogeneous.

   Following, a description of the information taken into account for the elaboration of the questionnaire guide to be used for the aforementioned tools (workshop, survey and thorough interview) is presented:

   2.1. **Workshop:** consisted of a group of people, men and women in equal number (if possible), who represented the feeling of the community. The group was also integrated by people of different ages, in order to have the largest possible quantity of criteria. In summary, men and women representing the will of the community participated in the workshop.

   During the workshop, the community and village members elaborated maps of the territory and the use of the resources from the forest by the local people. Then, said maps were digitalized and complemented with cartographic information, maps of types of forest, phisiography, satellite images and national charts to obtain the High Conservation Value Forests of both concessions and adjoining areas.

   2.2. **Survey:** is one of the most well-known and used tools, with the purpose of collecting general information from the population about certain subject. It must be easy to handle, that is to say, to contain accordingly structured questions which can be answered by means of Yes or No or Affirmative or Negative. In a survey, open questions can be also used, so as to allow the interviewee to incorporate value judgments in his answers.

2.3. **Thorough interview:** in the same way as the previously described tools, it aims to collect quality information that facilitates the understanding and interpretation of a social fact. It was applied to key people within the community or village, meaning people with leadership, representative or great experience (elders) characteristics, whose answers are relevant for the interpretation of the currently social reality of the community. In each community or village, their leaders were interviewed.

In this phase, information on HCVF 4, HCVF 5 and HCVF 6 was gathered.

Following, a summary of the information collected from communities and villages visited during the field visit is presented:

- **HCVF 4. Essential Services Provision:**

  - Source of freshwater for human consumption: the areas which provide the water used for human consumption by local populations were identified in the field. Additionally, and using maps of the area, the origin sources of said water were marked.

  - Forests that are critical for water collecting: local people were consulted about critical areas for the maintenance of reservoirs, irrigations, hydropower, etc.

  - Forests that are critical for control of erosion: land areas with forest / non forest with land instability problems were identified in the field (i.e. sensitive to erosion, landslides, dams, etc.). Also, and using satellite images and national charts, the phisiography of the terrains of the concessions was verified.

  - Forests that are critical for agriculture and fisheries: critical forests for agriculture and fisheries were located in the field.

- **HCVF 5. Satisfaction of the basic needs of local communities:** the areas from which local populations obtain their food, fuel, clothing (fibers, palms), medicines, apparels (pottery, weapons, etc.) and construction materials were identified in the field.

  A distinction between those resources that are fundamental (without which the quality of life is seriously deteriorated) from those that may be useful but eventually was made in consultation with the residents involved.

  Besides, the resources used locally or within the local economy were differentiated from those whose destiny is the external market.

- **HCVF 6. Areas of cultural, ecological, economic or religious importance for local communities:** in the field visit, a consultation on areas of importance such as sacred sites, cemeteries, prohibited places, initiation areas, shamanism areas, etc. was made.

  Areas with presence (presumably or real) of voluntarily isolated or non contacted indigenous were also identified in the field.

3. **Processing of information:** after gathering all the in-field and desk review information, it was processed. By means of the workshops, the location of the sites that provide the resources for the satisfaction of the essential needs to the Belgium Community and local populations were determined in consultation with their correspondent members. The surveys and interviews also helped to identify the resources and services provided by the forests to local populations for the satisfaction of their needs.

   Analyzing both outcomes, the High Conservation Value Forests, according to their importance to the community, within Maderacre and Maderyja timber concessions were identified.

According to this, within the concessions area, five protection or conservation areas were defined, two of them in Maderacre and the other three in Maderyja concession. Both concessions have been managing the identified conservation areas inside their territories. Said areas constitute refuges for wildlife and recovering areas for wildlife.

Conservation areas within Maderacre area

As it was mentioned, within Maderacre area two protection or conservation areas were defined with the following characteristics:

1. One zone for the conservation of high terrace forests, of bajío ecosystems (lowlands), “cochas” and native fauna refuges. This zone is localized in the north-west border of the concession, over the Acre River bank. In this case a conservation corridor is established with Maderyja concession, which amplifies the effect of the conservation area. This conservation area is denominated MRA AC1.

2. The other zone for the conservation of the only one “aguajal” ecosystem of the concession, which is refuge of endemic fauna and flora species. This zone is localized in the north-eastern border of the Maderacre concession. This conservation area is denominated MRA AC2.

In addition to this, the fiscal zone of 50m over both banks of any open river or stream within the concession area will be protected either.

Following, a chart showing the specific information of both conservation areas within Maderacre concession is enclosed:

Chart 49: Conservation areas within Maderacre concession

Conservation Area	Area (has)	Perimeter (m)	Vertexes			
			Vertex	East (x)	North (y)	References
MRA AC1	1792,09	38377,03	V-1	394127	8789789	Over Acre River
			V-2	392919	8786483	Over Yaveryja River
			V-3	388681	8786483	
			V-4	388681	8785170	
			V-5	386186	8785170	
			V-6	386186	8784132	
			V-7	384518	8784132	
			V-8	384518	8783555	
			V-9	382557	8783555	
			V-10	382557	8784837	Over Acre River
MRA AC2	227,41	9420,78	V-11	420464	8776507	Over Yaveryja River
			V-12	420464	8775924	
			V-13	418410	8775924	
			V-14	418410	8778074	Over Yaveryja River

Conservation areas within Maderyja area

As it was mentioned, within Maderyja area three protection or conservation areas were defined with the following characteristics:

1. One zone for the conservation of high terrace forests, of bajío ecosystems, cochas and native fauna refuges. This zone is localized in the northern border of the concession, over the Acre River bank. In this case a conservation corridor is established with Maderacre concession, which amplifies the effect of the conservation area. This conservation area is denominated MRY AC3.

2. Other zone for the conservation of Psitácidos collpas and low hills highly dissected forests. This zone is localized in the middle of the concession area in a zone with a high concentration of collpas (more than 3 have been detected). This conservation area is denominated MRY AC2.

3. The third one is a buffer zone in the boundary with the Reserve for Indigenous in Isolation conditions, localized in the west border of the concession, with the objective to reduce the impact over these human groups. This conservation area is denominated MRY AC1.

In addition to this, the fiscal zone of 50m over both banks of any open river or stream within the concession area will be also protected.

Following, a chart showing the specific information of the conservation areas within Maderyja concession is enclosed:

Chart 50: Conservation areas within Maderyja concession

Conservation Area	Area (has)	Perimeter (m)	Vertexes			
			Vertex	East (x)	North (y)	References
MRY AC1	695,29	13374,39	V-1	382557	8784837	Over Acre River
			V-2	382557	8782804	
			V-3	379013	8782810	Over Acre River
MRY AC2	803,54	11356,78	V-4	379229	8774249	
			V-5	379229	8771570	
			V-6	376230	8771570	
			V-7	376230	8774249	
MRY AC3	501,27	21098,72	V-8	343500	8779252	Over Acre River
			V-9	343500	8769249	
			V-10	343000	8769249	
			V-11	343000	8779329	Over Acre River

In addition to the conservation areas defined within the concessions, it is important to highlight that both of them have developed a sustainable forestry system based on:

- ✓ A minimum diameter required for a tree to be selected for harvesting.
- ✓ Harvesting intensity depending on: diametric structure, abundance of each specie, market requirements, ecological characteristics and rotation. Taking all these items into account the whole forested area is divided into annual harvesting plots. In these, types of vegetation and forest stratum; distribution of the trees within the forest to be harvested; contour lines; rivers and streams; protected forests and protected areas; roads and paths; localization of special sites if there is any; plot boundaries are clearly defined.

- ✓ The main criteria to determine the trees to be harvested is the replacement. It means that only what the forest will produce for the next cycle is allowed to be cut and in consequence the productive capacity of the woods is maintained and the stability of the ecosystem is forwarded. The defined productive forest area to be exploited annually includes those trees that will be harvested this year, but also those which are of the previous diametric class and thus kept for the next year harvest and those which are identified as seeding trees[35] (individuals with good shape, healthy, a straight tree trunk and a well developed canopy).

- ✓ The harvesting method is the directed felling, which implies selective harvesting with low impact technologies, and with a well-planned construction of roads based on the distribution of the remaining trees after harvesting.

- ✓ With said harvesting method the tree falling direction is determined in order to protect the status of the remaining trees, giving priority to the protection of the most valuable timber species as mahogany, cedar, shihuahaco, estoraque and azúcar huayo and ecological species (i.e. for fauna species) as those from Sapotaceae, Moracea, Lecythidaceae, Bombacaceae and Leguimonosae families. This harvesting method also allows the protection of any fauna specie during the felling of trees.

- ✓ With the aim to maximize the exploitable volume of the felling trees a very low cut is made.

Besides the sustainable forestry system mentioned before, both concessions have designed also other general measures to protect the environment:

- Definition of strict conservation areas: with the objective to protect habitats and vulnerable species (i.e. wetlands).

- Protection of the river banks: all the water courses within the concession area, from the largest to the smallest one, are localized during the forest census and marked in a map. A buffer area along both sides of the river is defined as a protected area and clearly signalized in the map used as a guide for all the exploitation activities.

- Protection of flora species that play an important role in the development of native fauna i.e. collpas, hollow trees.

[35] Seeding trees: at the beginning of the forest operations a proportion or 1/10 trees of each timber specie was defined to be kept as a seeding tree. Said number will be opportunely adjusted taking into account all the lessons learned about species dynamics and reproduction, in order to assure the adequate development of all Maderacre & Maderyja timber species in the long term.

- Protection of all its non-productive forests: i.e. pacales, secondary forests, which are defined as non-productive are also clearly identified during the forest census and marked in the guiding map.

As it was mentioned above, no one of both timber concessions has the capacity to harvest, process and add value to the total volume that the forest produces annually. That is the reason why a capitalization and re-inversion process is being carried out by the companies and a centre where all the forest wood production should be processed will be constructed as soon as possible.

In order to protect all the concession forests and other natural resources, a protection plan was designed. However, the company has not got enough economic resources to carry out the totality of the protection plan. It is expected that the revenue from the sale of carbon credits will allow the project to contract specialized forest guards who will be in charge of patrolling and controlling the project area.

E.2. Potential biodiversity impacts within the project area

Following, a brief description of the positive and negative biodiversity impacts that would occur within the concessions area under both the with and the witout REDD project scenario is presented.

E.2.1. Biodiversity impacts within the project area under the without REDD project scenario

The absence of the REDD project will have a negative influence on the different biodiversity components, as they currently exist within the Maderacre and Maderyja concessions area. In this sense, the implementation of the REDD project would have a net positive benefit.

Following, a description of the biodiversity risks or impacts that would occur within the concessions in a without REDD project scenario is presented. A without REDD project scenario means a scenario where no forestry management guidelines, custody plans, training plans, skills development and monitoring activities would be carried out due to the lack of financing, fact that would be configured in a scenario without the revenue of carbon credits that are required for the implementation of the REDD project.

Impacts on Flora Component:

NEGATIVE:

- Loss and degradation of the genetic variability of the forest species caused by:

  - The implementation of forestry operations (selective logging, collateral damage by the exploitation) without applying the adequate guidelines stated within the Forestry Management Plans. This due to the lack of training of the staff (harvesting without the application of reduced impact logging criteria) and the lack of monitoring of the quality of forestry operations.
  - The deforestation caused by invaders for the installation of shifting agriculture and pastures for livestock in the absence of an adequate custody system.

- Extinction of local populations of timber species that are currently included within the appendixes II and III of CITES, as the case of Mahogany (*Swietenia macrophylla*) and Cedar (*Cedrela odorata*), and other species that are currently gaining commercial importance within the region, as is the case of hardwood species for flooring (Cumaru - *Dipteryx spp.* and Estoraque - *Myroxylon balsamun,* among others). This due to the invasion of the area by illegal loggers in the absence of sufficient funds for implementing the Custody Plans of the concessions.

- Total loss of the vegetation coverage in certain sectors caused by deforestation by invaders for the installation of human settlements, shifting agriculture and pastures for livestock.

- Alterations in the forest natural regeneration processes after its exploitation due to invasions of the area by illegal loggers.

- Increase in herbaceous and/or weed species invasions due to the deforestation for the installation of crops or pastures, as well as the excessive forest clearing by illegal loggers.

- Increase in the occurrence of pests due to changes in microclimates caused by deforestation and the reduction of fauna controller populations due to illegal hunting and the loss of habitats.

Impacts on Wildlife:

NEGATIVE:

- Loss and degradation of the genetic variability and local extinction of wildlife by the impacts of illegal hunting (dead animals, displacement of wildlife populations) carried out by the people of areas within the concessions surroundings and by illegal loggers which would entry into the area due to the inability of the concessions to apply their Custody Plans without the revenues of the carbon credits.

- Loss and degradation of habitats and critical sites for wildlife, as “collpas”, wallows, fruit trees and caves or tree hollows, caused by:
  - The implementation of forestry operations without an adequate application of the guidelines stated within the Forestry Management Plans, this by the lack of training for the personnel (harvesting without applying reduced impact logging criteria) and the lack of monitoring of the quality of the forestry operations.
  - The deforestation caused by invaders for the installation of shifting agriculture and pastures for livestock.

- Loss and degradation of habitats for fish, caused by:
  - The increase of sediments and filling of superficial water courses due to soil erosion during the implementation of forestry operations without applying reduced impact logging criteria and by the deforestation caused by invaders for the installation of shifting agriculture and pastures for livestock.
  - The pollution of superficial water courses with fuel traces and lubricants, due to a poor waste management when carrying out forestry operations and the presence of invaders or illegal loggers within the area.

- Increase in the loss of forest connectivity due to the construction of forestry roads without applying reduced impact logging criteria and thus making difficult the displacement of wildlife.

Impacts on the Physical Component:

Climate Component:

NEGATIVE:

- Increment in the levels of temperature alteration in microclimates caused by the increase in areas of land with direct exposure to sunlight. This due to the increase of those sectors where infrastructure for harvesting without applying reduced impact logging criteria would be installed and by the deforestation caused by invaders for the installation of shifting agriculture and pastures for livestock.

Air Component:

NEGATIVE:

- Emission of smoke and dust into the air by the poor management of the machinery and burning practices caused by invaders within the timber concessions area before the lack of an adequate monitoring system.

Landscape Component:

NEGATIVE:

- Landscape degradation caused by:
  - The implementation of forestry operations without applying reduced impact logging criteria.
  - Forest fires caused by anthropogenic activities within the camping sites and operation sectors.
  - Forest fires caused by anthropogenic activities of invaders in their slash & burn processes for the installation of shifting agriculture and pastures. The exposure of soils to sunlight facilitates the invasion by herbaceous or weed species which with the increase in the temperature of microclimates favors the occurrence of forest fires.

Soil Component:

NEGATIVE:

- Land degradation due to erosion, compaction and pollution caused by a poor management of machinery and fuels and the application of high impact exploitation techniques.

Water Component:

NEGATIVE:

- Water pollution due to the increase of eroded sediments and traces of fuels carried by currents due to a poor management of machinery and fuels.

E.2.2. Biodiversity impacts within the project area under the with REDD project scenario

Following, a brief description of the positive and negative biodiversity impacts that would occur within the concessions area as a result of the implementation of the REDD project is presented.

Impacts on the Flora Component:

POSITIVE:

Decrease in the loss and degradation of the genetic variability of the forest species as a result of the implementation of forestry operations applying low impact criteria, according to the guidelines stated within the Management Plans of the concessions, as well as by the implementation of an adequate custody system which will result in avoiding deforestation caused by invaders for the installation of human settlements and/or shifting agriculture and pastures for livestock.

- Minimize the risk of extinction of local populations of timber species that are currently included within the appendixes II and III of CITES, as the case of Mahogany (*Swietenia macrophylla*) and Cedar (*Cedrela odorata*), and other species that are currently gaining commercial importance within the region, as is the case of hardwood species for flooring (Cumaru - *Dipteryx spp.* and Estoraque – *Myroxylon balsamun,* among others). This due to the implementation of an adequate custody system of the area, which will avoid the invasion of the area by illegal loggers.

- Minimize the total loss of the vegetation coverage due to the deforestation caused by invaders for the installation of human settlements, shifting agriculture and pastures for livestock.

- Minimize the risk of alterations in the forest natural regeneration processes as a result of invasions by illegal loggers.

- Reduction of the forestry pests that might occur due to changes in the microclimate caused by a decrease in deforestation and the conservation of fauna controller populations.

Impacts on Wildlife:

POSITIVE:

- Reduction of the loss and degradation of the genetic variability of wildlife species thanks to the hunting prohibition and the implementation of an adequate custody system within the concessions area.

- Minimize the loss and degradation of habitats and critical sites for wildlife, as “collpas”, wallows, fruit trees and caves or tree hollows, thanks to the implementation of low impact forestry operations and the implementation of an adequate custody system, which will also avoid the invasion of the area for the installation of shifting agriculture and pastures for livestock.

- Reduction of the loss and degradation of habitats for fish fauna thanks to the implementation of low impact forestry operations and the implementation of an adequate custody system, which will also avoid the invasion of the area for the installation of shifting agriculture and pastures for livestock that could reduce the quality of the water.

- Minimize the risk of loss of forest connectivity due to the application of a forestry exploitation system and construction of forestry roads including the use of low impact criteria and therefore favoring the displacement of wildlife.

Impacts on the Physical Component:

Climate Component:

POSITIVE:

- Reduction of the levels of temperature alteration in microclimates due to the higher conservation of forest areas that reduce the direct exposure of soils to sunlight.

Air Component:

POSITIVE:

- Reduction of the smoke and dust emissions into the air due to an adequate management of the machinery and the reduction of emissions by the absence of burning practices thanks to the implementation of an adequate custody system.

Landscape Component:

POSITIVE:

- Conservation of landscapes due to the implementation of low impact forestry operations, the prohibition of burnings within the exploitation operations of both concessions, as well as the implementation of an adequate custody system that avoids the invasion for the installation of shifting agriculture and livestock.

Soil Component:

POSITIVE:

- Soil conservation, reduction of the erosion, compaction and pollution thanks to an adequate management of the machinery, fuels and the application of reduced impact logging practices.

Water Component:

POSITIVE:

- Water conservation, reduction of water silting and pollution as a result of an adequate management of the machinery and fuels and the application of reduced impact logging practices.

E.2.3. Quantification of the biodiversity impacts within the project area

For the quantification of the impacts, the following scale of values was used. It is important to take into account that in assigning values to the impacts, the magnitude or intensity and the scale to achieve it were considered:

Considering the intensity of the impact

Value	Description
3	High positive impact
2	Medium positive impact
1	Low positive impact
0	No impact
-1	Low negative impact
-2	Medium negative impact
-3	High negative impact

Considering the scope of the impact

Level	Description
3	Large positive impact
2	Intermediate positive impact
1	Focused positive impact
0	No impact
-1	Focused negative impact
-2	Intermediate negative impact
-3	Large negative impact

Following, the quantification matrixes of the biodiversity impacts within the project area are presented for both scenarios without REDD and with REDD project scenario.

Chart 51: Quantification matrix of the biodiversity impacts within the project area under the without Madre de Dios Amazon REDD project scenario

Biophysical Component	Impact	Intensity of the impact	Scope of the impact	Total value
Native flora	Loss and degradation of the genetic variability of the forest species	-2	-2	-2
	Extinction of local populations of timber species that are currently included within the appendixes II and III of CITES and other species which are gaining commercial importance within the region	-2	-2	-2
	Total loss of the vegetation coverage in certain sectors due to the deforestation caused by invaders for the installation of human settlements, shifting agriculture and pastures for livestock	-3	-2	-2.5
	Alterations in the forest natural regeneration processes after its exploitation due to invasions of the area by illegal loggers	-2	-1	-1.5
	Increase in herbaceous and/or weed species invasions due to the deforestation for the installation of crops or pastures, as well as the excessive forest clearing by illegal loggers	-1	-1	-1
	Increase in the occurrence of pests due to changes in microclimates caused by deforestation and the reduction of fauna controller populations due to illegal hunting and the loss of habitats	-2	-1	-1.5
SUB TOTAL		**-12**	**-9**	**-10.5**
Wildlife	Loss and degradation of the genetic variability and local extinction of wildlife species due to the impacts of illegal hunting	-2	-2	-2
	Loss and degradation of habitats and critical sites for wildlife, as “collpas”, wallows, fruit trees and caves or tree hollows.	-2	-2	-2
	Loss and degradation of habitats for fish fauna	-2	-2	-2
	Increase in the loss of forest connectivity	-1	-1	-1
SUB TOTAL		**-7**	**-7**	**-7**

Biophysical Component	Impact	Intensity of the impact	Scope of the impact	Total value
Climate	Increase in the levels of temperature alterations in microclimates due to deforestation	-1	-1	-1
SUB TOTAL		**-1**	**-1**	**-1**
	Smoke and dust emissions into the air due to a poor management of the machinery and burning practices by invaders within the timber concessions before the lack of an adequate monitoring system	-2	-1	-1.5
SUB TOTAL		**-2**	**-1**	**-1.5**
Landscape	Landscape degradation due to the implementation of high impact forestry practices and the occurrence of forest fires	-2	-2	-2
SUB TOTAL		**-2**	**-2**	**-2**
Soil	Soil degradation by erosion, compaction and pollution caused by a poor management of machinery and fuels and the application of high impact exploitation techniques	-2	-2	-2
SUB TOTAL		**-2**	**-2**	**-2**
Water	Water pollution by the increase in eroded sediments and traces of fuels carried by currents, due to a poor management of machinery and fuels	-2	-2	-2
SUB TOTAL		**-2**	**-2**	**-2**
TOTAL		**-28**	**-24**	**-26**

Chart 52: Quantification matrix of the biodiversity impacts within the project area under the with Madre de Dios Amazon REDD project scenario

Biophysical Component	Impact	Intensity of the impact	Scope of the impact	Total value
Native flora	Reduction of the loss and degradation of the genetic variability of timber species	2	2	2
	Minimizing of the risk of extinction of local populations of timber species that are currently included within the appendixes II and III of CITES and other species which are gaining commercial importance within the region	3	2	2.5
	Minimizing of the total loss of the vegetation coverage due to the deforestation caused by invaders for human settlements, shifting agriculture and pastures for livestock	3	2	2.5
	Minimizing of the risk of alterations in the forest natural regeneration processes due to invasions of the area by illegal loggers	3	2	2.5
	Reduction of the increasing rate of forestry plagues by changes in the microclimate due to the reduction of deforestation and the conservation of species of fauna controllers	2	2	2
SUB TOTAL		**13**	**10**	**11.5**
Wildlife	Reduction of the loss and degradation of the genetic variability and the local extinction of wildlife species	2	2	2
	Minimizing of the loss and degradation of habitats and critical sites for wildlife such as “collpas”, wallows, fruit trees and caves or tree hollows	3	2	2.5
	Reduction of the loss and degradation of habitats for fish fauna	2	2	2
	Minimizing of the risk of loss of forest connectivity	2	2	2
SUB TOTAL		**9**	**8**	**8.5**
Climate	Reduction of the levels of temperature alteration in microclimates due to the higher conservation of forest areas that reduce the direct exposure of soils to sunlight	2	2	2
SUB TOTAL		**2**	**2**	**2**

Biophysical Component	Impact	Intensity of the impact	Scope of the impact	Total value
Air	Reduction of the smoke and dust emissions into the air due to an adequate management of the machinery and the reduction of emissions by the absence of burning practices thanks to the implementation of an adequate custody system	2	2	2
SUB TOTAL		**2**	**2**	**2**
Landscape	Conservation of landscapes due to the implementation of reduced impact logging forestry operations, the prohibition of burnings within the exploitation operations of both concessions, as well as the implementation of an adequate custody system that avoids the invasion for the installation of shifting agriculture and livestock.	2	2	2
SUB TOTAL		**2**	**2**	**2**
Soil	Soil conservation, reduction of the erosion, compaction and pollution thanks to an adequate management of the machinery, fuels and the application of reduced impact logging practices.	2	2	2
SUB TOTAL		**2**	**2**	**2**
Water	Water conservation, reduction of water silting and pollution as a result of an adequate management of the machinery and fuels and the application of reduced impact logging practices.	2	2	2
SUB TOTAL		**2**	**2**	**2**
TOTAL		**32**	**28**	**30**

The following charts show a comparative summary between the different scenarios previously analyzed:

Value of the biodiversity impacts within the project area under the with REDD project scenario	
Total biodiversity impact with REDD project	**30**

Value of the biodiversity impacts within the project area under the without REDD project scenario	
Total biodiversity without REDD project	**-26**

In summary and considering also the offisite biodiversity impacts (see Annex item D, page 65) the total offsite and within the project area biodiversity impacts in a with and without project scenario can be appreciated in the following charts:

Value of the biodiversity impacts under a with REDD project scenario	
Offiste impacts	13
Impacts within the project area	30
Total impacts in a with project scenario	**43**

Value of the biodiversity impacts under a without REDD project scenario	
Offiste impacts	-32.5
Impacts within the project area	-26
Total impacts in a without project scenario	**-58.5**

Taking into account the above charts, it can be appreciated that the net biodiversity benefit of the project is positive, showing that the impact under a without project scenario is negative, while under a with project scenario the impact is not only positive but also the negative impacts under a without project scenario would be minimized or avoided through the implementation of the project.

E.3. Environmental impacts of the proposed project activity

The timber extraction in the forestry concession, when carried out applying sustainable management criteria, will generate positive impacts in the conservation of biodiversity and the development of local populations. The operations of project developers, generate permanent local work posts and income for the region and the country, besides contributing to the recovery and conservation of the forests. The FSC Certification they have achieved in 2007, represents an additional guarantee that their actions are carried out respecting their management plans and also respecting the local populations and the environment.

This is why, the consolidation of a sustainable forestry management in these areas is so important for the development of the region and for this purpose concession holders need to increase their economical and human resources with respect to their actual situation, mainly with the objective of guaranteeing the conservation of the whole area of forests of the concessions they have been granted the administration.

Fig. 95: Timber extraction in the area

Hereunder and based on the "Environmental Impacts Evaluation" carried out as a requirement for the achievement of the FSC Certification by the WWF Consultant[36], there is a list of the operations carried out by both timber concessions that have the greater impact on the environment:

1. Construction of camping sites.
2. Construction of roads.
3. Felling and cutting up of trees.
4. Extraction of trees.
5. Terrestrial transportation of the wood.
6. Forestry operations.
7. Maintenance of protection and conservation areas.

[36] Said study, carried out by Roberto Kometter, WWF Consultant, has been available for the Verifier.

Following an analysis considering the positive and the negative impacts that these operations produce on the environment is presented.

E.3.1. Positive environmental impacts of Maderacre and Maderyja operations

a) Related with the additional sequestration of CO_2 from the atmosphere

First of all, it is very important to mention that most of the operations aforementioned require a total removal of the covering vegetation from the area. As a result of it, secondary woods and herbaceous vegetation of rapid initial growth will cover these clearing areas, thus representing an additional sequestration of CO_2 from the atmosphere.

In the specific operation of roads construction, where the area that will be removed from its covering vegetation is higher, the growth of the surrounding woods will be stimulated because of the entrance of more light inside them. Therefore, an additional sequestration of CO_2 from the atmosphere is also achieved.

It is important to also consider as a positive impact the selected method of felling trees used by both concessions and stated in their Forestry Manuals. Said method consists on the selective felling of trees which result in a diminishing of the tree density which allows a higher entrance of light inside the forest. In consequence, the growth and regeneration of the wood is forwarded, representing an additional sequestration of CO_2 from the atmosphere.

b) Related with the presence of workers in the forests

Another positive impact is related with the permanent presence of workers that said operations imply. In this sense, the risk of illegal logging within the concession area is reduced, as well as the risk of migratory agriculture.

Said risks are also minimized considering the availability of roads to allow permanent patrolling inside the forests in order to prevent and control any illegal logging and agricultural activities within the concession area.

c) Related with the maintenance of protection and conservation areas

The maintenance of protection and conservation areas as fiscal strips, gorge heads and representative areas of the different types of forests, produce positive impacts on the soil. The maintenance of the covering vegetation protects the soil from erosion. River beds are also protected in order to avoid the disturbance of water courses.

The maintenance of the forest without disturbances decreases the surface drainage and in consequence reduces the erosion and improves above surface water quality. Furthermore, the forests enhance water infiltration, increasing the quantity and quality of below surface water.

It should be added that said maintenance of protection and conservation areas looks forward to the preservation of the genetic resources of the area. Moreover, they function as a barrier for fires, plagues and the invasion of exotics species and weeds.

Fauna natural habitats are also preserved because of the existence of said protection areas, thus their reproduction and development is assured. In addition, they represent a refuge for the species that have to migrate as a result of the operations carried out within the productive area.

E.3.2. Negative environmental impacts of Maderacre and Maderyja operations

a) Related with the removal of the covering vegetation

As it was mentioned before, most of the operations carried out require a total removal of the covering vegetation from the correspondent area. Some negative impacts related to this specific operation have been detected and are listed below:

- ✓ The soil is directly exposed to the rainfall causing its erosion. The soil removed due to the erosion will be transported to the water courses producing accumulation of sediments on the river banks.

- ✓ There is an increasing of the surface drainage because of a lower retention of water by the roots that had been removed from the area. In addition, as a result of the anthropogenic activities carried out in the camping sites, high quantities of waste are produced and might be transported by said surface drainage increasing the risk of above and below surface water pollution.

- ✓ An important loss in genetic resources because of the disappearance of individuals is produced as well as a negative impact in sensitive fauna species due to the fact that their natural habitats are modified and some of them are forced to migrate to other sites.

- ✓ There is an increasing of the soil and environment temperature which affects directly the microclimate, the vegetation and the sensitive fauna of the area. The risk of fires because of these is also higher.

- ✓ Weed species should cover the clearing areas.

b) Related with the anthropogenic activities and the use of heavy machinery and equipments

Impacts related with the anthropogenic activities carried out by the workers that are living temporarily inside the forests and also with the use of equipments and machinery for constructing roads and other forestry operations:

- ✓ Some smoke emissions are produced and the air should be polluted.
- ✓ The use of oils and other toxic substances for the equipments increases the risk of accidental spillovers and in consequence of soil pollution.
- ✓ There is a higher risk of illegal hunting by the operators leaving in the camping site.
- ✓ Because of the presence of human beings and the noise that the machinery produces, a disturbance of the natural habitats of some fauna species occur and some of them are forced to migrate to other sites.
- ✓ The use of heavy machinery for some operations produces the compression of the inner layers of the soil.
- ✓ Because of their size, said heavy machinery may injure the standing trees by friction and the presence of fungus and any other diseases would be forwarded.

c) Related to the felling of trees

The impacts related to the felling of trees operation are listed below:

- ✓ Tree falling produces a removal of the surface soil of the area where the tree has fallen down, which may be transported by means of rainfall and surface drainage.
- ✓ Because of their important weight and height, the felled trees of both timber concessions produce the compression of the inner layers of the soil when they fall down. In addition to this, the remaining trees may be injured forwarding the presence of fungus and any other diseases.

E.3.3. Mitigation measures for the detected negative impacts

The measures to minimize the negative impacts listed before, that Maderacre and Maderyja operations caused on the environment, are the following:

- ✓ Reduce the camping site size to 0.25 ha at the most, but always taking into account that all the needs for the people who will live there are present.
- ✓ Allow the construction of only 2 camping sites for each AHP (annually harvesting plot).
- ✓ Construct the camping sites in areas with zero degree of slope or very close to zero.
- ✓ Construct the roads with low degree of slope.
- ✓ Stimulate the development of secondary vegetation in the adjacent areas in order to cover the soil and reduce the erosion.

As a result of these measures, the negative impacts will affect only a very small proportion of the soil and the erosive potential of rainfall water will be highly reduced.

- ✓ Selective harvesting method.
- ✓ Cutting up of trees considering techniques and quality criteria in order to reduce the waste because of errors in the cutting points.

As a result of these measures, the protection of the remaining trees after any harvesting operation is assured and in consequence the wood productivity of the forests is guaranteed.

- ✓ Definition and protection of natural areas of high conservation value and high conservation value forests.

As a result of these measures, the protection of high conservation value habitats and flora and fauna species and in consequence the maintenance of the biodiversity conditions of the project area is also assured.

In the following chart, a detailed analysis including all the impacts mentioned before and their respective mitigation measures is presented.

Chart 53: Environmental impacts and mitigation measures

Operation	Impact produced	Mitigation measures
Construction and management of camping sites	Erosion	Selection of areas with low slope degree, determination of a maximum camping site size allowed; leveling; construction of canals for taking out the water; re-planting with native species in areas free of constructions if it is necessary. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Soil pollution	Camping sites design considering the establishment of specific areas dedicated to: throwing out the waste, storage of food, garage, bathrooms, etc. In the food and materials storage and garage area, a wood platform on the soil will be set in order to prevent spillovers. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Air pollution	Maintenance of machinery and other equipment engines in good conditions. The landfill and the waste deposit will be covered with soil after each evacuation. Maintenance of toilets. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Increase in pathologies	Adequate clothes should be provided to the personnel. Promotion of self-hygiene. Maintenance of the camping site always clean. Keep the medical kit well provided. Maintenance of the toilet sites. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
Construction of roads	Removal of the covering vegetation from the surface	Well-planned and efficient construction of roads in order to minimize the area to be affected. Technical definitions should be taken into account for said construction. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Erosion	Construction of roads regarding the defined degree of slope allowed. Maintenance of ditchs. The roads will be closed when it rains. Adequate design of bridges and sewers are taken into account. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Disturbance of water courses	Planning of paths and roads construction in order to disturb as less water courses as possible. Adequate design of bridges and sewers must be taken into account. Permanent cleaning of riverbeds. No removing material will be placed along the roads. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.

Operation	Impact produced	Mitigation measures
	Soil compression	Paths and roads will be closed when it rains; natural regeneration will be stimulated. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Disturbance of natural habitats of endangered species	During the monitoring study, said areas will be identified and accordingly signalized thus to prevent them from the disturbance of constructing roads operations. Maintenance of the contact points of the forest canopy to allow the free movement of the fauna species. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Injury of standing trees and natural regeneration	The selected harvesting method of directed felling must be applied in the construction of roads operations. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Increase in migratory agriculture	Adequate signing of the roads. Permanent control of the transit through them and patrolling within the area.
Felling and cutting up of trees	Erosion	Directed felling is used as the selected harvesting method to avoid the trees falling down on hillocks and in consequence the removal of the soil. Also the felling of non selected to be harvested trees is avoided. Leave on site as much felled tress biomass as possible in order to protect the soil. No harvesting operations will be carried out in areas with high slope degree. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Soil pollution	Chain saws must be always in good conditions for their use and any possible oil leakage will be avoided. Oil spillovers must be prevented when chain saws are recharged. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Disturbance of water courses	In the case of big brooks, no trees are allowed to be felled from their edge up to 50 m. In the case of small brooks, with the selected harvesting method the risk of trees falling down into the water courses is minimized. The riverbeds must be maintained clean. No removing material will be placed along the paths and roads. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Water courses pollution	No oil recharging will take place next to water courses and no chain saw will be cleaned with said water. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.

Operation	Impact produced	Mitigation measures
	Loss of vegetation	Directed felling to avoid the felling of non-expected to be harvested trees. Selective cut up of lianas must be carried out. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Loss of genetic resources	A minimum diameter is required for a tree to be selected for harvesting and the harvesting intensity, stated in the forestry operations manuals of both concessions, will be adjusted to the data produced in each monitoring study in order to preserve the viability of each specie. A minimum of 10% of seedling trees will be identified and marked during said study. Those trees will represent proportionally all the exploitable diametric classes. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Disturbance of natural habitats of endangered species	During the monitoring study mentioned before, the protection and conservation areas will be identified as well and marked to keep them free of any human intervention. Also, measures will be determined in order to protect and preserve trees with fruits that represent food to other native fauna species. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Decrease in fauna populations because of illegal hunting	Hunting and fishing is forbidden, either for self-consumption purposes or commercial ones. Control actions will be carried on as well as sanctions will be applied. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
Wood extraction	Erosion	Well-planned and efficient construction of roads and paths as a way out for wood production having as a priority to affect the smallest possible area. Transportation of wood pieces with one of their ends suspended thus to avoid the removal of the soil. The size and the minimum accepted slopes of the places where the wood will be temporarily stored are defined. If necessary, some canals can be constructed due to the drainage of rainfall water. Wood extraction and transportation must be avoided in rainy days. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Soil compression	Wood extraction and wood storage operations must be carried out regarding the sites accordingly defined to said operations, therefore the compression of any other areas is avoided. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.

Operation	Impact produced	Mitigation measures
	Total loss of covering vegetation	The size of the sites where the wood will be stored will be determined taking into account the impacts that this operation could cause on the environment. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Partial loss of covering vegetation	Well-planned and efficient construction of roads and paths as a way out for wood production so as the smalles possible area is affected. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Increase in diseases, plagues (fungus) because of adjacent vegetation injuries	Efficient use (by means of training the personnel) of heavy machinery and equipments in order to minimize the injury of the remnant trees and adjacent vegetation. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
Terrestrial transportation	Erosion	Efficient use of heavy machinery used for wood extraction so as the removal of the soil is reduced. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Soil compression	Wood extraction operations must be carried out by means of the defined roads and paths, therefore the compression of other areas is avoided. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Fauna displacement	Well-planned transportation network.
	Decrease in fauna populations due to illegal hunting	The transportation of people from outside the concessions area by the Maderacre and Maderyja trucks is not allowed. All hunting activities are forbidden within the concession area. In this sense, truck drivers and their assistants are not allowed to hunt as well as to transport any animal specie. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Increase in migratory agriculture	The transportation of people from outside the concessions area by the Maderacre and Maderyja trucks is not allowed.
Forestry operations	Partial loss of vegetation	Selective cut up of lianas should be carried out. Training courses for all the personnel with respect to the forestry management plan.
	Weed and herbaceous species invasion	Selective cut up of lianas should be carried out. Training courses for all the personnel with respect to the forestry management plan.

Operation	Impact produced	Mitigation measures
Maintenance of conservation areas	Illegal logging	Adequate signs, the maintenance of all the concession borders, a permanent patrolling and a systematic monitoring will help to avoid illegal logging activities. Training courses for all the personnel with respect to the forestry management plan and the rulebook of forestry operations.
	Migratory agriculture	Adequate signs, the maintenance of all the concession borders, a permanent patrolling and a systematic monitoring will help to avoid illegal logging activities.
All the operations	Water and soil pollution	Establishment of precise regulations for the handling of any oil and other toxic substances, as well as for the repairing of any machinery that is out of order. Training courses for all the personnel with respect to the forestry management plan, the rulebook of forestry operations and industrial security.
	Emission of gases (smoke)	Maintain in good conditions all the engines and carburization systems to reduce toxic gases emissions and the minimize oil consumption. Training courses for all the personnel with respect to the forestry management plan, the rulebook of forestry operations and industrial security.
	Sound pollution	Maintain into the allowed limits the sounds produced because of the operations carried out, considering the use of silencers if necessary. Training courses for all the personnel with respect to the forestry management plan, the rulebook of forestry operations and industrial security.
	Accidents	Establishment of precise regulations for all the operations carried out in the concession area. Provide the personnel with all the required tools for carrying out said operations. Give adequate training courses to the responsible personnel. Permanent control and monitoring of the development of the operations. A sanction plan must be established and well-known by all the involved personnel. Operation areas must be well signalized. Training courses for all the personnel with respect to the forestry management plan, the rulebook of forestry operations and industrial security.
	Rejection by the neighbor populations	Establishment of precise regulations regarding the relationship of both concessions staff with all their neighbors. Alcohol drinks are not allowed among the staff within the concession area and its surroundings. Promotion of the active participation and involvement of the surrounding population by means of the Forestry Management Committee. Keep said population permanently informed of all the activities that are being carried out within the concession area. Training courses on the performing of the Relationship Plan.
	Illegal logging	Permanent control, promotion of the functioning of the Forestry Management Committee and the fluent communication with all the forestry authorities.

E.4. Monitoring activities and frequency

E.4.1. Monitoring biodiversity

As a result of the Fauna Evaluation carried out by WWF (described in item C.3), those species which population or absence can reflect structural changes of the woods and/or the hunting pressure, were identified and defined as fauna indicators for future monitoring activities.

a) Fauna indicators that reflect the effects of wood extraction operations:

1. Primates: *Ateles chamek* is a largely affected by hunting and logging specie, therefore its presence is an accurate indicator of a good conservation status of the forests.

2. Rodentia: big squirrels as *Sciurus spadiceus* and *Sciurus sp.*, among others, are also susceptible to the structural changes of the woods, specially related to wood extraction operations.

3. Birds: are the best indicators of the wood status. Bird families composed of insectivorous as Furnariidae, Thamnophilidae and Formicariidae are the most affected ones. Another affected family is Picidae (woodpeckers), which plays an important role in other species reproduction processes by abandoning their nests that are later used by other bird and mammal species. Within the concession 6 species of Picidae, 4 of Furnariidae, 14 of Thamnophilidae and 2 of Formicariidae were found.

b) Fauna indicators that reflect the impact of illegal hunting activities:

The change in susceptible fauna species populations in a determined period of time is the best indicator of the future hunting pressure.

1. *Alouatta seniculus* (red howler monkey or “mono coto” in Spanish): less affected specie by selective logging, that is the reason why is a perfect indicator of the hunting pressure. Any decrease in *Alouatta seniculus* population is undoubtedly consequence of an excessive hunting pressure in the area.

2. *Cebus paella* (capuchin monkey) and *Cebus albifrons* (white-fronted capuchin)*:* when the group has been affected by hunting, they start to behave distrustful and fearfully before any human presence in the area. Thus, Cebus behavior is another accurate indicator of the hunting pressure.

Considering the defined indicator species, both timber concessions carry out native fauna sights within the operation areas, which allow the determination of the evolution of the most valuable fauna species in terms of biodiversity along the time. Additionally, the native fauna baseline, determined as a result of the Rapid Evaluation of Native Fauna carried out by WWF and described in item C.3, will be used in the future to make a comparison with equal evaluations, applying exactly the same methodology, that will be carried out every 5 years, after the forestry exploitation activities.

In this sense and regarding the future generation of carbon credits as a consequence of the present project activity, other fauna monitoring activities and better technologies to carry out them shall be implemented within the concession area in order to assure the greater preservation of the biodiversity conditions of the area as possible.

E.4.2. Of the identified environmental impacts

Following there is a chart including all the planned monitoring activities of the negative impacts listed above, its frequency and the responsible person in charge. It is expected that Maderacre and Maderyja timber concessions would not have enough resources to carry out the whole planned monitoring activities unless other incomes are guaranteed. In this sense, the carbon finance would play a fundamental role to accomplish with all the monitoring plan of both timber concessions and thus assure the maintenance of the sustainable management of the forests and of the environment.

Chart 54: Planned monitoring activities

Monitoring measure	Frequency	Responsible
Abundance of potentially harvestable trees/specie/ha (Nº of harvestable trees by specie in a determined area)	Annually	Forestry Management Area
Total abundance/specie/diametric class/ha (total number of individuals by specie in a determined area, arranged by diametric class)	Annually	Forestry Management Area
Total abundance/specie/ha (total number of individuals by specie in a determined area)	Annually	Forestry Management Area
Frequency/ha (existence or absence of a specie within a determined sub-plot)	Annually	Forestry Management Area
Dominance of harvestable trees/specie/ha (area occupied by the harvestable trees of each specie within a certain area)	Annually	Forestry Management Area

Monitoring measure	Frequency	Responsible
Total dominance/specie/diametric class/ha (area occupied by each specie, arranged by diametric class within a certain area)	Annually	Forestry Management Area
Total dominancy/specie/ha (area occupied by each specie within a certain area)	Annually	Forestry Management Area
Capacity of the forest of increasing the number of trees as a result of the survival and growth of the juvenile individuals. Number of individuals that surpasses the minimum limit of a determined diametric class annually	Annually	Forestry Management Area
Mortality/specie/ha (number of dead individuals within a certain period of time and area)	Annually	Forestry Management Area
Nº of individuals/specie/vertical strata of the forest (nº of individuals classified by their total height regarding the vertical strata of the forest)	Annually	Forestry Management Area
Annual growth/specie (measurement of the annual increase of the tree's DBH in individuals with DBH's higher than 10cm, using sample trees)	Annually	Forestry Management Area
Nº of native fauna sights/specie (measures the annual evolution of native fauna sights within the exploitation areas)	Annually	Forestry Management Area
Deforested area due to the establishment of camping sites, leading areas, construction of roads and dragging paths within the PCAs	Annually	Forestry Management Area
Number of water courses affected by the roads and paths of a PCA	Annually	Forestry Management Area
Area impacted by the felling of trees (allows to measure the efficiency of the directed harvesting method used by Maderacre and Maderyja timber concessions)	Annually	Forestry Management Area
Total Nº of affected individuals/harvested tree (DBH >30cm)	Annually	Forestry Management Area
Nº of affected individuals/interest species/harvested tree (DBH >10cm)	Annually	Forestry Management Area
Nº of affected seeding trees/harvested tree	Annually	Forestry Management Area
Nº of affected trees of future harvest/harvested tree	Annually	Forestry Management Area

Monitoring measure	Frequency	Responsible
Nº of affected trees/dragging tree (DBH >10cm / injuries by a blow or friction)	Annually	Forestry Management Area
Nº of drains which end directly on water courses within the PCA.	Annually	Forestry Management Area
Nº of extracted non-wood products (measures the diversification of products of the forests)	Annually	Forestry Management Area
Nº of CARs generated annually (measures the compliance with the FSC standards; all new CARs are considered and also those from the previous year that were not solved)	Annually	Forestry Management Area
Evaluations of DGFFS/Osinfor that were approved (measures the compliance with the state regulations)	Annually	Forestry Management Area
Censed has/year Amount of censed species Cost/censed ha Cost/censed m^3	Annually	Forestry Management Area
Nº of the identified non-wood resources Nº of the non-wood resources that were inventoried	Annually	Forestry Management Area
Volume (m^3) extracted annually	Annually	Forestry Management Area
Extracted volumen vs. censed volume/PCA. Extracted volumen /censed ha (efficacy in the extraction operation and in the quality of the forestry census)	Annually	Forestry Management Area
% of decreasing de non working days per activity (efficacy in the logistics and planning of the infield work)	Quarterly	Forestry Management Area
Cost/m3/activity/month (commercial census, felling of trees, dragging and transport)	Biannual	Forestry Management Area
Evaluation of sampling points. Use of satellite imagery to identify deforested points as a result of migratory agriculture.	Once a year Once a year	Forestry Management Sub-Manager
Evaluation of any use by the people living in the camping sites of water from water courses.	Once a year	Harvesting Manager

Monitoring measure	Frequency	Responsible
Number of illegal hunting events detected. Number of illegal hunting complaints. Number of native fauna confiscations on traffic vehicles.	Once a month	Forestry Management Sub-Manager and Harvesting Manager
Number of places with nest and collpas presence that have been disturbed by the exploitation activities (exploitation impacts report)	Once a year	Forestry Management Sub-Manager
Evaluation of a sampling of the machinery used for the forestry operations in order to determine its good working condition.	Once a year	Harvesting Manager
Number of public events. Number of workers that drink alcoholic beverages in the camping sites or other working areas.	Once a year	Administration Manager
Measurement of the erosion degree. Set up of sampling plots in camping sites, roads and paths areas, felling and cutting up areas, wood extraction areas, as well as in areas without any kind of intervention as a tester.	Once a year after the rainy season	Forestry Management Sub-Manager
The existence of each one of the stated areas in the design of the camping site will be evaluated, as well as the installation of the wood platform in the correspondent places.	Annually	Forestry Management Sub-Manager
A sample of the machinery will be evaluated to determine if they are maintained in good working conditions. Evaluation of landfills and toilets.	Once a year Once a month	Harvesting Manager
Number of sick people.	Once a month	Health Chief
Measurement of roads, wood storage sites and camping site sizes in sampling points.	Once a year during the dry season	Harvesting Manager
Evaluation of selected water courses. Number of felled trees in the river edges.	Once a year	Forestry Management Sub-Manager
Verify that the roads are closed when it rains. Verify that temporary paths are accordingly closed.	Sampling per event Once a year during the dry season	Forestry Management Sub-Manager
Registration of volumes and species that are illegally logged.	Once a year	Forestry Management Sub-Manager
Number of contact points of the forestry canopy over the roads	Once a year during the dry season	Forestry Management Sub-Manager

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F. Socioeconomic impacts of the proposed project activity

F. Socioeconomic impacts of the proposed project activity

F.1. Description of the present community conditions of the project area

Following, a description of the communities located in and around the project is presented, including basic socioeconomic information[37]:

1. The areas of direct (buffer area) and indirect influence of the project

The definition of the areas of direct and indirect influence of the project is carried out according to a set of criteria that trascend the geographical proximity and, on the contrary, assume a group of aspects related to the characteristics of its operations and the type of interaction that is expected to be created with the different stakeholders of the project.

The following chart shows the criteria applied by the company for the establishment of its areas of direct and indirect impact:

Chart 55: List of criteria applied for the establishment of the areas of direct and indirect impact of the project

CRITERIA	AREA OF DIRECT IMPACT	AREA OF INDIRECT IMPACT
Territorial Proximity	Villages, communities, localities and/or human settlements, urban and/or rural, that are located within a radius of 5 km around of the concession, in all directions: Iñapari (capital city and surrounding villages: Villa Primavera, Nueva Esperanza); Assis Brazil.	Villages, communities, localities and/or human settlements, urban and/or rural, that are located within the radius between 5 and 10 km around of the concession, in all directions.
Linking roads	Villages, communities, localities and/or human settlements located on each side of the inter-oceanic road, in the sections that will be travelled in a major intensity by vehicles due to the project operations: Iñapari, Iberia.	Villages, communities, localities and/or human settlements located on each side of the paths and secondary roads where vehicles will travel, in a moderate or low density, as a consequence of the project operations.

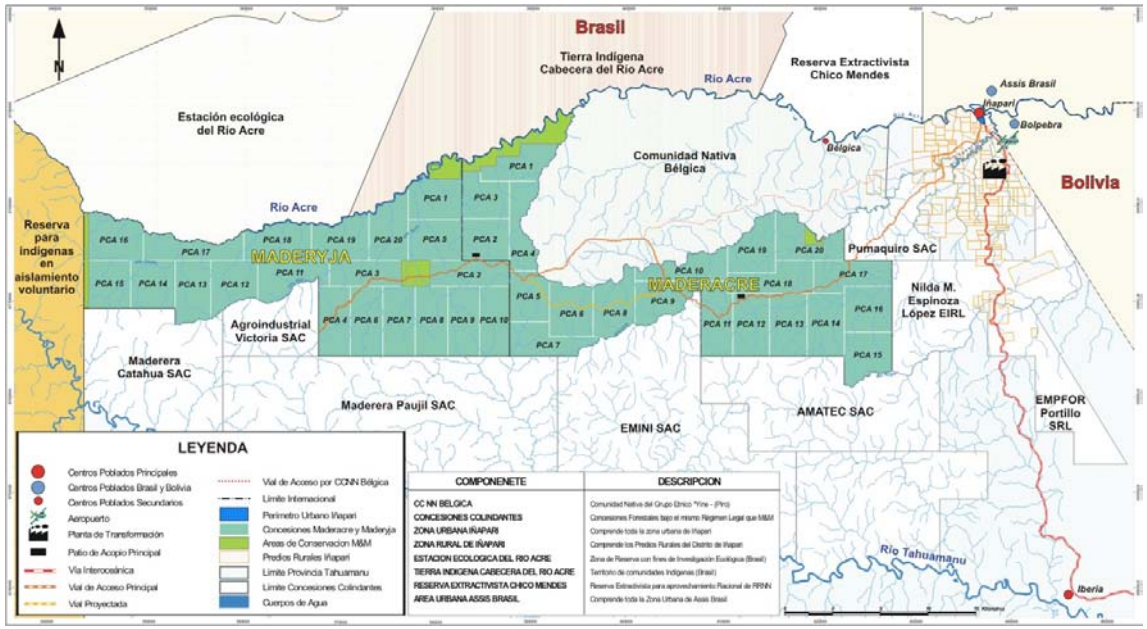
[37] Based on the document "The Stakeholder Community", developed by the Maderacre and Maderyja technical staff, 2009. This document has been available for the Verifier.

CRITERIA	AREA OF DIRECT IMPACT	AREA OF INDIRECT IMPACT
Commercial interaction	Villages, communities, localities and/or human settlements, with whom the project management will establish commercial relationships needed for the provision of goods and services (within the region, province and district): Iñapari and Assis Brazil	Villages, communities, localities and/or human settlements, with whom the project management will establish sporadic commercial relationships (within the region, province and district): Iberia
Institutional interaction	Cities and localities where the descentralized offices of governmental agencies and NGOs are located, before whom the managers of the project require to perform procedures related to the management of the project and the concession.	Intermediate cities in which there are descentralized offices of public and private organisms with whom sporadic interinstitutional relationships are established.
Population expectations	Villages, communities, localities and/or human settlements, whose inhabitants have developed high expectations, interests or claims related to the potential impacts of the project on their lives, whether in economic, cultural and social aspects, among others.	
Environmental vulnerability	Villages, communities, localities and/or human settlments, whose natural resources can be altered or affected by the operations of the company.	

Fig. 96: Map of the Maderacre and Maderyja timber concessions

According to the proposed criteria, the area of direct influence of the project / concession is constituted by Iñapari (both in its urban area and administrative center and in its rural lands), the villages located to each side of the inter-oceanic road: Villa Primavera, Nueva Esperanza, the Belgium Native Community and the adjoining timber concessions (🩸). Special consideration must be given to the potential non-contacted tribes of native communities that would live within the concession area or next to them. If it is the case, they are also part of the area of direct influence of the project and the company.

The area of indirect influence is constituted by the cities of Assis in the Brazilian border; Iberia within the Tahuamanu Province and the populations located to both sides of the inter-oceanic road in the Iberia – Puerto Maldonado section (🩸)



2. The security of livelihood approach for the community analysis

The community description that is presented in the following pages, is based on a quantitative study that was carried out according to the security of livelihood approach. Said approach guides the analysis of the study findings and was considered since the tools were designed (questionnaire for the rapid survey of households, interview guideline, among others). The security of livelihood approach has the following characteristics:

1. Centrality of people:
   - Starts with the analysis of livelihoods of people and how they change over the time.
   - Foresees an active participation of the target population during the whole cycle of the project.

2. Be holistic:
   - Recognizes that people adopt multiple strategies to achieve their livelihoods.
   - It is applied through different sectors, geographic areas and social groups.
   - Recognizes multiple actors (the private sector, ministries, community-base organizations and international organisms).

3. Be dynamic:
   - Understands the dynamic nature of the livelihoods and the influences on them.

4. Based on the potentials:
   - It is based on the potentials and opportunities that people perceive, rather than focusing on their problems and needs. They support and strengthen the livelihood strategies of poor people and their mechanisms to satisfy their needs (even the poorest households have potential).

5. Use micro and macro links:
   - Examines the influence of policies and institutions over the livelihood options and highlight the need for policies to be shaped by perceptions from the local level and the poor people priorities.

6. Orientate to social sustainability:
   - Sustainability is important to achieve a lasting reduction in poverty. The livelihoods sustainability is based on several dimensions.
   - It is an analytical tool to understand livelihood systems and strategies and their interaction with policies and institutions.

3. Human capital

The human development index (in Spanish “índice de desarrollo humano - IDH”) is a development indicator made from life expectancy at birth, educational attainment (a combination of literacy and enrollment) and the per capita gross domestic product. The IDH for Madre de Dios region is 0.6010 for 2005, which situates it in the post 9 of the list sorted by human development, from a total of 25. According to the ranges in the level of human development of the country, it is an IDH of “medium high” level for the whole region, “high” level for the Province of Tambopata, “medium high” for Tahuamanu, “medium high” for Inambari, “high” for Iberia and “medium” for Iñapari, all of them for the year 2003.

a. Demographic and families characteristics

Madre de Dios is the less populous region within the country, the third largest in land area after Loreto and Ucayali (corresponds to 6.6% of the whole national territory) and is home to native populations and populations of settler origin. The region has three provinces (Manu, Tahuamanu and Tambopata) and a total of 24 native communities officialy registered belonging to different ethnic-linguistic groups. In 2007, the Population Census recorded a total of 102,178 inhabitants in the Madre de Dios region.

The Tahuamanu Province registered 9,176 inhabitants, which reaches an 8.98% of the total of the region. The total population of the districts included within the area of influence of the project is 6,792 people, being Iberia the most populous district.

Chart 56: Madre de Dios region population

	Heigth (m.s.n.m.) / (masl)	Surface (km^2)	Population 1	Demographics (inhab / km^2)
Madre de Dios		**85,300.54**	**102,178**	**1.20**
Tambopata		**36,268.49**	**74,895**	**2.07**
Tambopata	186	22,218.56	58661	2.64
Inambari	305	4,256.82	6432	1.51
Las Piedras	260	7,032.21	5266	0.75
Laberinto	200	2,760.90	4536	1.64
Manu		**27,835.17**	**18,088**	**0.65**
Manu	365	8,166.65	2,710	0.33
Fitzcarrald	330	10,955.29	1,156	0.11
Madre de Dios	330	7,234.81	7,984	1.10
Huepetuhe	400	1,478.42	6,238	4.22

	Heigth (m.s.n.m.) / (masl)	Surface (km^2)	Population 1	Demographics (inhab / km^2)
Tahuamanu		**21,196.88**	**9,176**	**0.43**
Iñapari	365	14,853.66	1,157	0.08
Iberia	348	2,549.32	5,635	2.21
Tahuamanu	320	3,793.90	2,384	0.63

Results of the Census of Population and Housing, 2007

Source: National Institute of Statistic and Computing (in spanish "Instituto Nacional de Estadística e Informática INEI").

The Iñapari district has had a negative growth rate caused by the expulsion of the population to urban areas (such as Puerto Maldonado) for employment search and the access to services. It is the farthest district and the one who was conected belatedly to the road network, probably due to the debacle in the shiringa extraction business which was one of its main sources of income.

b. Educational level

It is clearly shown that there is a higher level of education of children and adolescents. While in adults there is a high percentage of people that had accessed only to primary school (33%), the population group between 5 and 16 years old reflects that the educational policies were concerned for the global enrollment coverage, in the extent that almost 100% of said population is currently taking initial, primary school or secondary school courses. Most of the adults, meanwhile, have some level of primary school or have concluded it, trend that is interrupted at a secondary school level, possibly due to the lack of this service within the area.

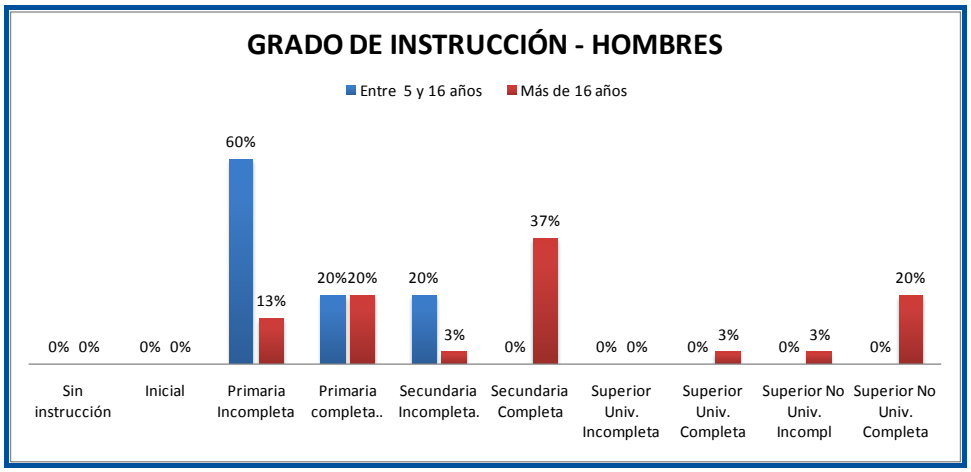
By differentiating between the educational level of young men and woumen, the gap is glaring. In the case of adults, 13% of women do no report any level of education compared to a 0% for men. 11% of women have completed primary school compared to an 18% for men. However, male adults have achieved a lower level of labor education, while there are 26% who has taken higher education courses (technical or university) compared to a 29% of women.

The educational offer of the region, for the year 2005, reaches 440 educational centers of initial level, primary school and secondary school. From this total, 241 (55%) are located in the Province of Tambopata, being mostly primary school level. Just a 12% of said educational centers are secondary school level.

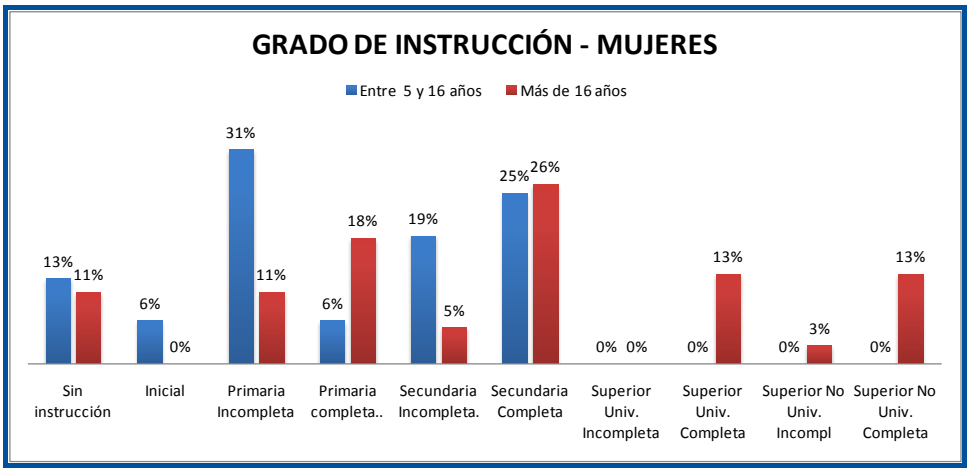
Within the region, the educational offer for University level and superior non-university level is very low. There is only one occupational school and an institute for higher education for forming teachers, located in Puerto Maldonado city. There are two universities, a national one and a private one, located in the regional capital.

Within Iñapari, the educational offer covers 9 educational institutions of different levels, but they are mostly primary school. The district of Iberia counts also with three educational centers for adult education and technical education. However, despite the existence of said educational offering, the Ministry of Education qualifies several of said institutions as temporarily closed. That means thay are not working. This situation directly affects the rights for education of boys and girls of the area.

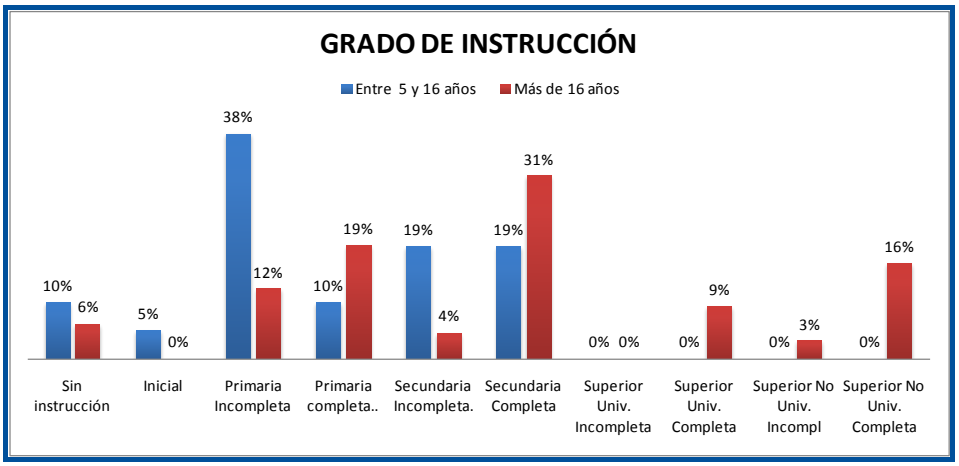
Graph 39: Level of instruction for men



Graph 40: Level of instruction for women



Graph 41: Overall level of instruction



c. Levels of malnutrition and food security

Between both districts, Iberia presents a higher rate of chronical malnutrition, which is associated with the lack of water and sanitation services and poor practices of nutrition and hygiene. In the other hand, there are alarming levels of anemia in pregnant women, which in the case of Iñapari amounts 50%, situation that is closely linked to problems of maternal mortality.

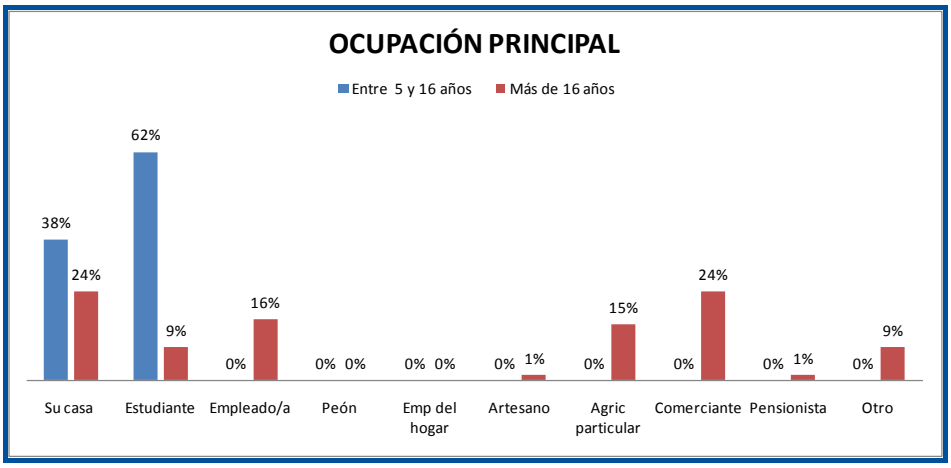
Chart 57: Anemia in pregnant women and chronical malnutrition

	Population 0 - 14 years	% of anemia in pregnant women	% of chronical malnutrition 0 - 59 months
Iñapari	76	50%	9.66%
Iberia	527	47.69%	16.54%

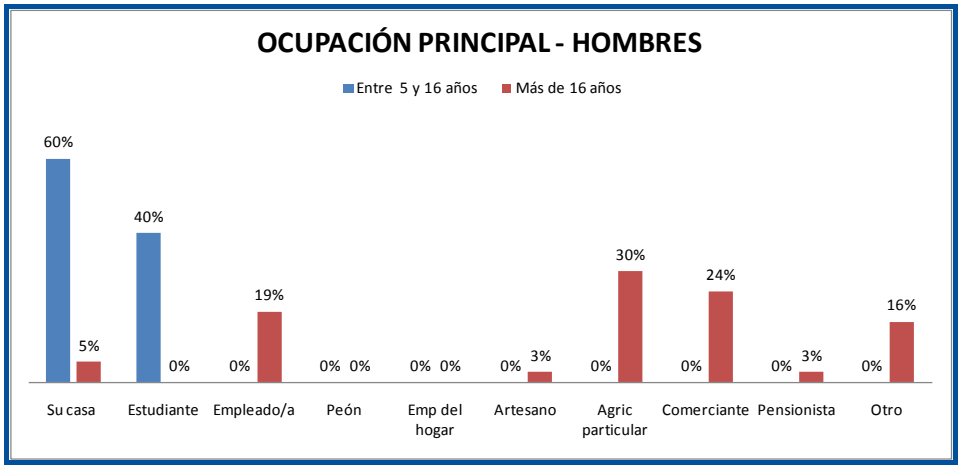
d. Main occupation of household members

Regarding the occupation of family members, a rapid survey of households revealed that in rural areas patterns of rural life are broadly maintained combined with urban patterns. The main occupation of the family fathers is agriculture and the trade of its products and of the family mother the housework, while their children attend school and contribute, according to their age, with the housework and cultivation.

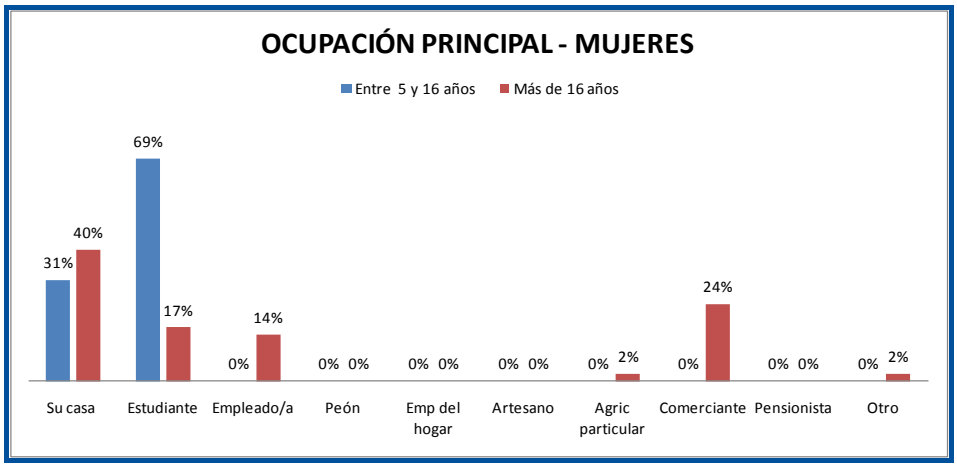
Graph 42: Main occupation



Graph 43: Main occupation for men



Graph 44: Main occupation for women



4. Physical capital

a. Characteristics of homes

The home ownership fits, in all the villages in the area of direct influence of the project, with the owner or possessor mode; meaning the occupation of a communal land by a family to whom its ownership is recognized, even if the property is not legalized. According to the rapid survey of households, 84% of the families own their homes.

Graph 45: Home ownership

The characteristics of the houses have shown slight changes with respect to the traditional forest dwelling. The replacement of some traditional materials like the “shapaja” by the combination of other type of materials such as “calamina” has been occurring because of the current accessibility of local people to said materials due to a relatively stable income in recent years. Despite such changes are evident when there is greater proximity of the houses to roads and bigger villages, in general, most of the houses still maintain the use of wood for the construction of their walls (79%) and floors (77%), while for roof construction the use of “calamina” reaches 74%.

On the other hand, 74% of the households have electricity, although the service is poor and restricted to daytime hours. Likewise, a 56% of households have gas stoves.

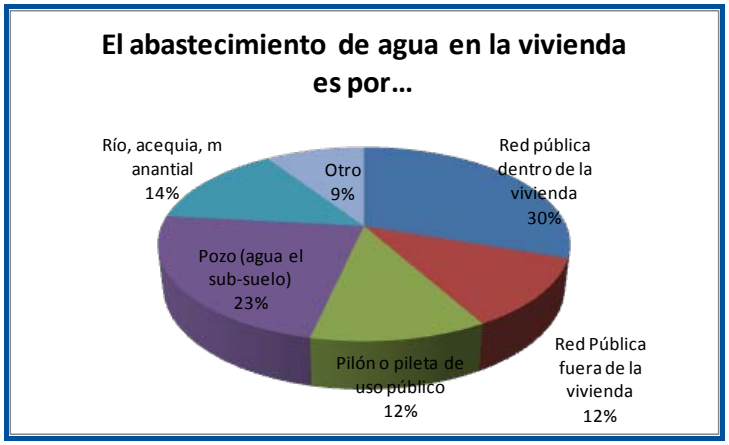
b. Access to water and sanitation

The drinkable water service that different entities provides, does not fully meet the needs of the people settled at regional level, mainly in rural areas where inhabitants get their water supply directly from rivers, wells, streams, springs and other sources.

In Puerto Maldonado, capital city of the region, the company which provides the water service is "Empresa Municipal de Agua Potable y Alcantarillado de Tambopata S.R. Ltda (EMAPAT)". Said company currently provides water for a population of 43 126 inhabitants through 6487 connections. In the remaining capital cities of districts and provinces, the service is provided by the municipality but with certain limitations in water treatment and service coverage.

In Iberia, the service is provided by the Municipality of the District, covering a 44,26% (355 domiciliary connections). In the case of Iñapari, inhabitants are supplied with water in the following manner:

Graph 46: Water supply in housing



The accessibility to sanitation services is also poor within the district of Iñapari. Most of the houses have septic tanks, 7% do not have any kind of hygienic service, 27% use letrines and 2% ditches or channels. Only 32% have an internal or external connection to drainage networks in their houses.

c. Health infrastructure

The services of health care are organized into networks and micronetworks with the aim to comply with their diverse functions. In the following chart, the organization of the Madre de Dios health care network can be appreciated. As it can be seen, the micronetworks corresponding to the project area of influence are Iñapari and Iberia, which provide their services through health centers and posts.

It must be mentioned that said health posts constitute a system of primary health care. In most of the cases they do not count with a doctor, but they do count with health professionals (midwife or nurse) in best cases, or health technicians. Health centers generally count with a doctor and also provide different levels of helth care (for example, some of them are certified for performing surgeries).

Chart 58: Health care institutions within Iñapari and Iberia

District	Health Care Institutions
Iberia	San Martín Hospital
	Chilina Health Post
	Arrozal Health Post
	Abeja Health Post
	Portillo Health Post
	San Martín de Porres Health Post
	Oceanía Health Post
	Flor de Acre Health Post
Iñapari	Iñapari
	Iñapari Health Center
	Bélgica Health Post
	Primavera Health Post
	Nueva Esperanza Health Post

5. Economical capital

The working age population (15-64 years) represents the 56% of the total population of the region. At a district level, the PEA (Economically Active Population in Spanish) of 15 years or more varies according to its percentage importance. Within Iberia it represents 37.2% of the total and within Iñapari 46.9%.

On the other hand, the Human Development Report, 2005, shows that in Madre de Dios region and specifically in the districts within the area of direct influence of the project, the household income per capita ranges between 323,5 nuevos soles (Iñapari). Apparently, the population with the highest level of income belongs to Iberia, with an average income higher than the regional.

Chart 59: Monthly average income by province and district

Region / Province / District	Family income per capita (S/ month)
Madre de Dios Region	281,4
Tambopata Province	299,9
Inambari District	236,8
Tahuamanu Province	295,7
Iberia District	323.5
Iñapari District	274.7

Source: UNDP, Human Development Report, Peru 2005. Make competitiveness an opportunity for everybody. Developed by: Socio-environmental Management Team, Walsh Peru, S.A., 2005

Low income levels in the rural areas of Iñapari are related to the predominance of agriculture for subsistence. The limited development of other activities such as tourism and the lack of processess that add value to activities such as wood extraction, also reduce the possibilities of increasing revenues.

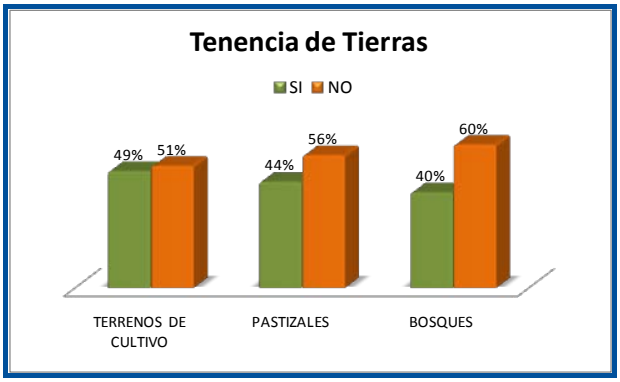
a. Main economical activities

The economy is based mainly on primary extractive activities, where agriculture, hunting and forestry represent the 32% of the PBI of the department, while mining contributes with 15% of the regional internal gross product. Other major activities in the regional conomic dynamics are tertiary activities, whose contribution to the internal gross product reaches 41%. At a regional level, activities such as farming, livestock and forestry are the most important from an occupational point of view since it involves almost 25% of the population of the region.

b. Land tenure

In the area of direct influence of the project, approximately 50% of the families have a land to cultivate (although, as it will be seen afterwards, not the same proportion is devoted to agriculture as its main activity). The size of these lands usually ranges from 1 to 25 hectares. Likewise, and related to cattle raising, 44% have grassland, of greater size (37% between 26 to 50 hectares). In addition to this, 40% indicated to have forests within their properties, in areas between 1 and 50 hectares. Probably due to the size, grasslands are the most valued by these families.

Graph 47: Land tenure

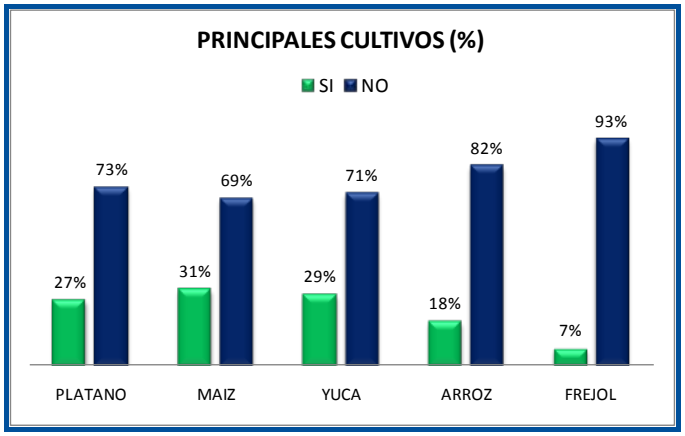


c. Agriculture

The area suitable for agriculture at a department level covers 15% of the territory (lands currently used represent 6%). The agricultural activities are carried out applying traditional technologies, primarily shifting agriculture.

The main crops are: rice, corn, yuca, beans, grass, papaya and bananas, among others. The cultivated area with these products reached a total of 11,535 has in 2001 within Tahuamanu Province (7398 has in Iberia and 2702 has in Iñapari). Agricultural production only reaches subsistence levels and does not cover the local demand. Therefore, a cyclical shortage during the fourth quarter is produced and the people are supplied with rice, hard yellow corn, soybean and vegetables from other regions.

Graph 48: Main crops



In general, production volumes are low scale, basically conditioned by single-family farming practices, which usually uses workforce from their own family. According to this, the value of its production is not significant to the family budget (they usually combined diverse economic activities). In the case of yuca and rice, 67% consider that their value is less than S / 1,000.

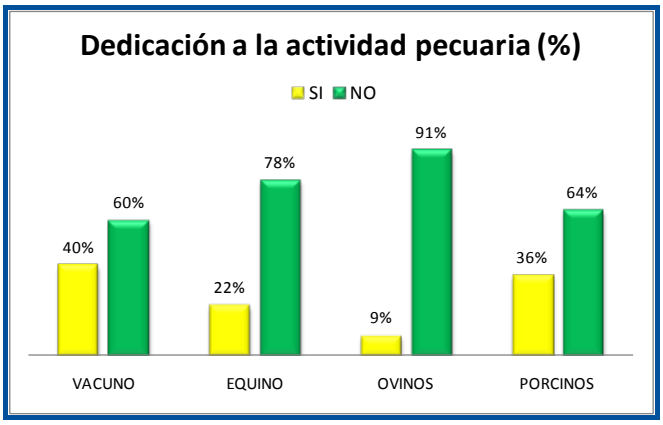
With respect to the destiny of the production and despite the low volumes, a clear linkage with regional and local markets can be observed. Except for the rice, most of the products are sold in percentages that mostly exceed 50%, mainly yuca and corn.

d. Cattle raising

The livestock business develops the raising of cattle, pigs, sheeps and poultry, but without taking care of the management and recovering of pastures. Regarding the value of their cattle, a weakness in the commercial or entrepeneurial approaches of families is evidenced. In general, there is much difficulty to establish the productive costs and even the value of their livestock, despite of recognizing the investment and efforts made for the genetical improvement. 54% believes that the value of their cattle ranges from 10.000 and 40.000 nuevos soles.

With respect to the sheep and according to the size of the herd, most values it between 1.000 and 5.000 nuevos soles. Said valuations show that there is awareness of the higher levels of capitalization and, on the other hand, visualization of the opportunity of an economic activity which allows them to articulate to markets (considering the lack of competitiveness of livestock within these communities due to the poor conditions of the road).

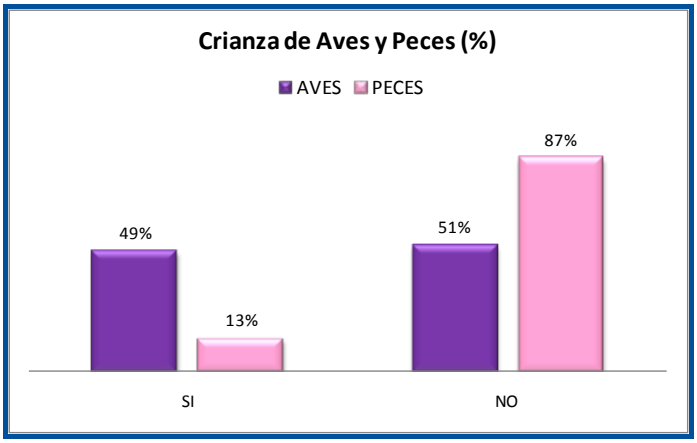
Graph 49: Cattle raising



e. Small livestock

The bird valuation is still difuse, while it is not a massed practice nor performed necessarily orientated to sale or market. Fish bredding, though, does constitute a larger economic activity for the small group of families that have been devoted to it, and has have a clear orientation to some province or regional market. Regarding the valuation of fish farms, 33% believe that they may cost between 80 and 100 thousand of nuevos soles.

Graph 50: Small livestock (birds and fishes)



f. Perspectives of family and local economy

Introducing the following set of questions (presented on the following graphs) is when it is found the best evidence of a positive perception with respect to the presence of private investments within the area. In general, there is an optimistic attitude about the future, in the evaluation of their own resources and in their survival and development strategies. In 2009, approximately 53% of household heads that evaluate the previous year as “best” in terms of revenue and 42% indicating that they have had better/bigger food consumption. This confirmed, in fact, that there have been economic opportunities (this statement considering that this higher consumption is not related with the agricultural production itself).

In relation to the future, a major proportion of household heads believe that their situation will improve, whether in income, food consumption or production.

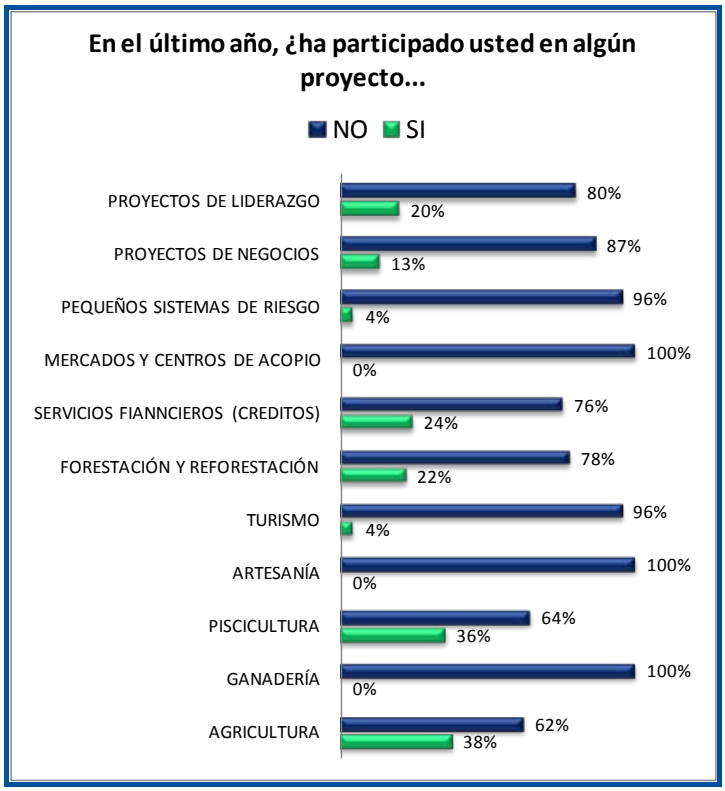
This optimistic attitude towards the future constitute a huge relational value that the company could capitalize on, striving to know to which investment strategies they would direct their resources in order to effectively accompany the efforts made by the inhabitants to develop themselves, and not to replace their enterprise or establish functional actions to the immediate interests of both parties.

g. Participation in projects of economic promotion

In general, the participation in economic promoting projects is very low in productive families of Iñapari. A major percentage (36%) indicates they participated in fisherie projects, probably motivated by the business opportunity they see in said activity. There were no projects executed for irrigation, storage and markets, tourism and handicrafts activities and no one of the respondents has participated in such projects. It attracts the attention that none of the interviewed people says they have participated in livestock projects, being this one of the most important activities, mainly for rural properties.

The offer of projects comes primarily from the residents’ own initiatives, which have some capital and decide to invest and innovate their subsistence means.

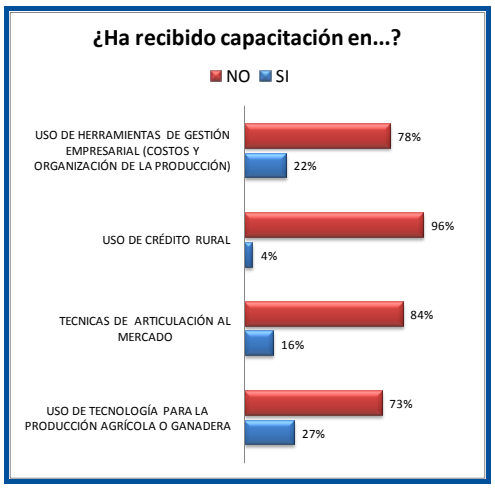
Graph 51: Participation in projects



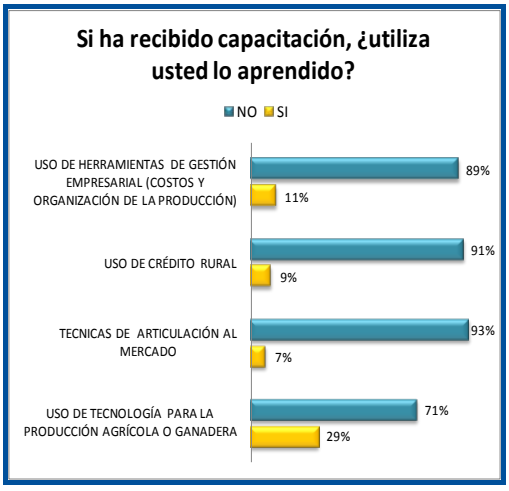
h. Access to technical assistance

As it can be seen in the following graphs, training and technical assistance is also scarce for Iñapari inhabitants.

Graph 52: Training activities



Graph 53: Applyication of the leasons learned



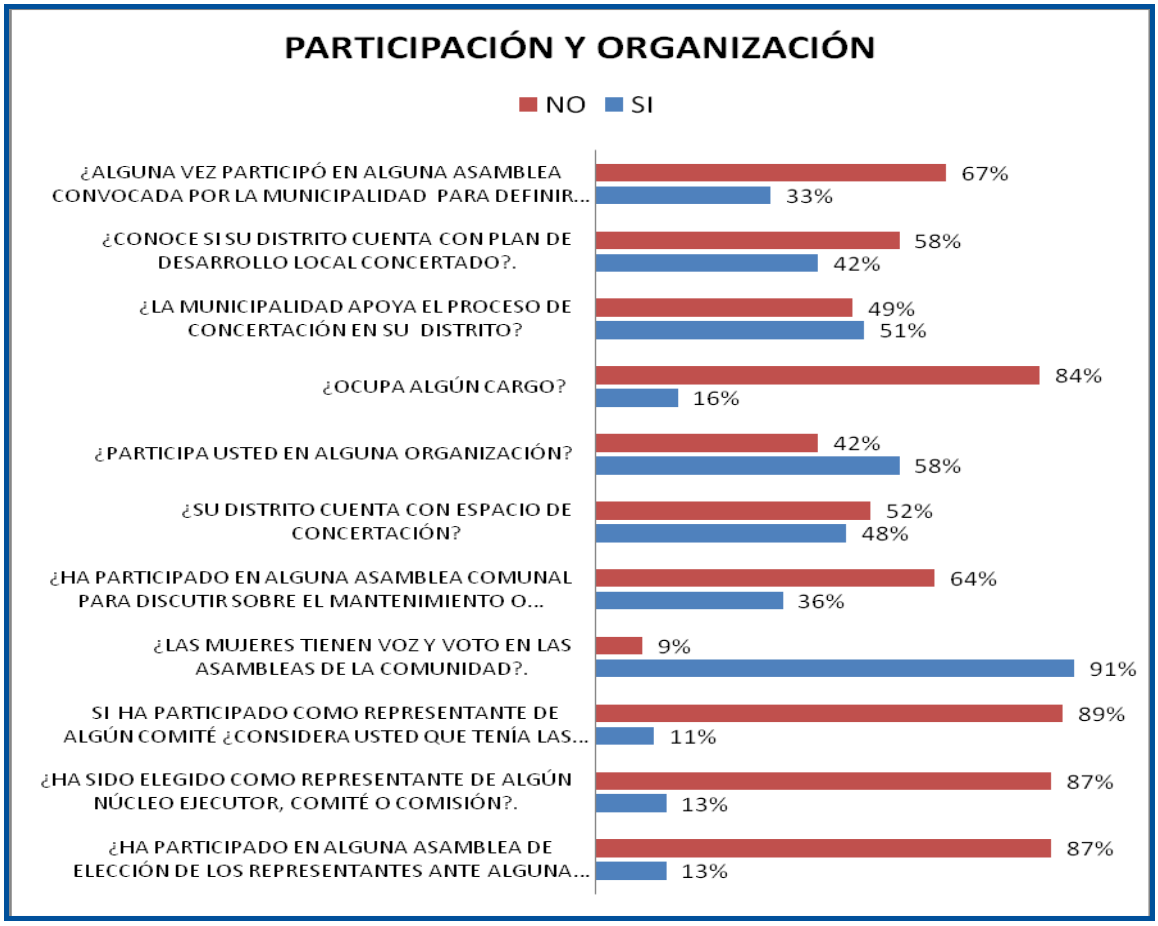
6. Participation and consultation processes

With respect to the participation of residents in instances of co-management and joint decision between them and public institutions such as the municipality or private as mixed forums, certain dynamism can be observed:

- Greater participation in deciding and organizing the care and maintenance of social and productive infrastructure: 36%.
- High perception of equal rights between men and women: 91%.

However, it is interesting to observe and interprete that other types of demands are emerging in relation to the quality of their participation. Although there is a higher dynamism, the perception that their participation is not given equal opportunities is very large (only 11% referred so). Said perception is related, probably, to mistrust of public institutions, the presence of new private enterprises and the thought that the other party will not comply with their commitments.

Graph 54: Participation and organization



F.2. Information about communities specific for Maderyja timber concession

1. Communities within the project area

Within the project area belonging to Maderyja timber concession there are no settled communities. However, it must be considered that the Maderyja concession area may be part of some areas resource use for the communities, especially indigenous peoples in voluntary isolation, for whom a territorial reserve has been defined, bordering with the Maderyja concession.

2. Communities within the surrounding area of the project

Within the project surroundings, correspondent to the leakage belt sector of the area of influence of the Maderyja concession, the Belgium Native Community is established and also one or more groups of families of indigenous peoples in voluntary isolation within the Madre de Dios Territorial Reserve, which have no permanent settlings.

3. Belgium Native Community

The Belgium Native Community is a community of the Yine indigenous tribe, established on the border between Peru and Brazil, at the site of the former ancient rubber farm of the same name. The nearest major village is Iñapari, capital city of the district. The permanent population of said community is 70 inhabitants, distributed among 16 families. The settlement pattern is scattered and sedentary. These community families are located in three sites or areas called Japan, Belgium and High Belgium (Japón, Bélgica and Alto Bélgica in Spanish). The most populous site is Belgium, where 11 families are settled and the services for the community are concentrated.

Fig. 97: Native Community Belgium area

Fig. 98: Native Community Belgium

Fig. 99: Native Community Belgium

Fig. 100: View of the Native Community Belgium area

Setting of the Community Resources

HUMAN CAPITAL	
Health	Low level of health and insufficient medical care. The most important diseases are: parasitism, respiratory infection and diarrhea. The cases registered during one year within the 70 residents' population of the community were: 185 of parasitism, 94 of respiratory infections and 37 of diarrhea. Another health problem is the high consumption of alcohol by men, starting at the age of 12. The medical care is provided in a makeshift and temporary local, with insufficient equipment and staffed by only one person (health technician). The dispersion of the population requires long journeys for medical visits that are usually done on foot because the health post is not equipped with a vehicle and fuel. This also hinders the transfer of critically ill patients to higher level medical care.
Education	The population of the community has a low level of education. 70% of household heads are illiterate and there are few residents who have finished primary school education. There community has two primary schools located in the Belgium and High Belgium sites, with Spanish language teachers. There is no bilingual education nor facilities for initial or secondary school education. The families give priority to subsistence activities rather than class attendance, and therefore the levels of school absenteeism are high.
Knowledge and skills	The adult population of the community has knowledge and skills to develop their traditional activities, including knowledge on the activities that are common for the indigenous peoples: subsistence agriculture, collecting of forest products (especially rubber), hunting, fishing, development of tools and crafts, forestry extraction, rustic breeding of chicken, pigs and cattle; emphasizing knowledge for survival within the forests and hunting. Currently training activities on forestry management are being developed, although related to operational working capabilities for forestry workers.

NATURAL CAPITAL	
Land and production	The territorial scope of the community is 53,394 hectares that are legally distributed in 17,620 hectares with ability for agriculture and livestock, 31,502 hectares with forestry potential and 4,272 hectares for protection. The community's agricultural production is rice, beans, bananas and yuca, mainly for household consumption. Annually, each family slashes and burns a plot of up to two hectares in order to install their crops, without taking into account the aptitude of the land in the site selection. Agricultural products are sold due to the necessity for extra money, for school supplies, medicines and medical care for example. Said sales are carried out in the Brazilian village of Assis, where higher prices than in the Peruvian village of Iñapari are paid.
Water & aquatic resources	The community lands are abundant in resources, such as various permanent and temporary water courses. The main water courses are the Acre and Yaveryja rivers, northern and southern boundaries of the village area and the Japón and Josefina streams, which are its east and west boundaries. The fishing provides an important part of its diet to the population. Currently, a decrease in the amount of fishes attributed to the illegal fishing by brazilians can be observed.
Trees and forest products	The community has 31,502 hectares of lands with forestry potential, where logging takes place with timber purposes under contracts with a lumber company. Likewise, within the forest there are a great amount of rubber trees which previously held a significant production of latex, but this activity is currently suspended due to the lack of demand for this product. Additionally, there are stands of chestnut, which currently are not commercially exploited.
Wildlife	Wildlife within the community lands is the typical of low lands wet tropical forests and still maintains significant populations. There are large and medium mammals, as well as birds and reptiles that are traditionally employed as food.
Wild food & fibers	The forest provides palm fruits and wild tree fruits which are used as food, as well as fibers and other materials for varied uses, ranging from housing construction to the tool and craft development.
Environmental services	The community lands still have much of its natural cover of primary forest, maintaining thus its water regulation, carbon storage, biodiversity conservation and landscape beauty role.

SOCIAL CAPITAL	
Networks and connections - Patronage	The community is currently supported by the timber company associated in the logging of the forest, as well as by the technical assistance and funding for the development of its social infrastructure and productive capacities from organizations such as the Madre de Dios Special Project, CESVI and WWF.
Networks and connections - Neighbourhoods	In the community surroundings, within the Peruvian territory, the timber concessions of the companies Pumaquiro SAC and Maderacre SAC, as well as an agricultural property are established; and within the Brazilian territory, the Head of the Acre River Indigenous Land (in Spanish Tierra Indígena Cabecera del Río Acre) and the Chico Mendes Extractive Reserve are established. The community has no relationship with the Pumaquiro SAC timber concession. Both Maderacre SAC and Maderyja timber concessions are developing cooperation relationships related to the certification process of the concessions and currently have an agreement allowing the transit of vehicles through the community territory. Within the Head of the Acre River Indigenous Land and the Chico Mendes Extractive Reserve there are established indigenous communities of the Yaminahua and Manchineri tribes. The people from the Belgium Native Community do not maintain stronger linkages with Yaminahua people due to cultural differences, but they have developed strong linkages with the Manchineri communities.
Networks and connections - Kinship	The families of the community are of ancient permanence in the Acre River and are related to families of the Brazilian Manchineri indigenous people. Men from the Belgium Native Community go to start their families in the Manchineri communities and from these communities women come to join Yine families.
Formal and informal groups	The communal organization includes four formally constituted committees: the production committee, the committee of the glass of milk, the health committee and the sports committee. The goal of the production committee is to audit the timber activity of the company within the community forests and the accounting of the wood volumes and the revenues corresponding to the community. The committee of the glass of milk's main goal is the management of the State food assistance for the community children. The health committee was constituted to promote the community involvement in improving the public health service that is provided to the community. The sports committee's main goal is to organize and coordinate sporting activities within and outside the community area and it is the busiest. The production committee, as well as the health and sport one, are led by males and only the committee of the glass of milk is headed by a woman, who nevertheless requires much support for the fulfillment of her duties.

SOCIAL CAPITAL	
Collective representation	The collective representation of the community is defined by legal standards of rural communities, according to which the Head of the Community is the legal representative, who serves on the Board with the Secretary, the Treasurer, the Prosecutor and, in the case of the Belgium Native Community, the Production and Commercialization Secretary. The Members of the Board are elected by vote of the Communal Assembly.
Mechanisms for participation in decision-making	The community is conducted according to the law of native communities, which establishes the organization of the communities and the formal decision making mechanisms. According to this law, the Communal Assembly, integrated by people registered as “comuneros”, is the decision making body and the mechanism of participation includes the submission of proposals and voting. Decisions are taken by majority vote. The assistance and participation of women in the assemblies is reduced.

PHYSICAL CAPITAL	
Infrastructure - Transport - Roads, Vehicles	Transportation from the village of Iñapari to the Belgium site of the community takes place through land and river roads. Land transportation has two pathways. The first one is a logging road of 30 km, which starts in the inter-oceanic road. This road can be used by all types of vehicles during the dry season, when its crossing takes up to 2 hours. Its use is however limited during the rainy season, when it is sometimes even close. The second one is a trial parallel to the Acre River, to be done on foot, which starts in the village of Iñapari and takes at least 5 hours to cross it and requires fording the Acre river several times. This pathway is used particularly by indigenous people. The waterway is the Acre river, from the international bridge. This is the pathway mostly used by indigenous people and is crossed by canoe or motorboat. The rout from the bridge to the Belgium site of the community takes 4 hours using a motorboat. In the dry season the transit is limited due to the low water levels. The transportation to the other two sites of the community is also via land and river, although the terrestrial pathway is a trial that can only be done on foot.
Infrastructure - Secure shelter & buildings	The community infrastructure, within its three sites, is made up of family homes, communal buildings and school and health centers. All the housing and communal buildings are built of wood and other local materials: wood floors and walls palm leave roofs. Wood has replaced the whipped “pona” since the beginning of the agreement with the company, which gave the necessary lumber to the families. The school and health centers are brick and concrete buildings, with “calamina” roofs and built by the Madre de Dios Special Project.

PHYSICAL CAPITAL	
Infrastructure - Water supply & sanitation	The water that is consumed in the community belongs from a well or river, without previous treatment. The water supply service is concentrated in the Belgium site of the community and is limited. A well, a bomb and an elevated tank are used for supplying untreated well water to some homes and to the health post. There are no sanitation services available for the community.
Infrastructure - Energy	A power generator with diesel engines is available for the community and located in the Belgium site of the community, which provides with daily electricity, from 6 pm up to 9 pm, for street lighting and domestic use of the 11 families of the site. Fuel costs are paid by the community itself. In addition to this, the community has solar energy equipments (panels, batteries), which are used for telephone, radio and television services.
Infrastructure - Communications	The community has telephone, radio and television services, concentrated in the Belgium site. It has also a satellite telephone device for the whole community, which is in the house of a villager. The radio service is especially for radio communication in the health care network and has a communication equipment at the health post. The television is satellite and the community has a satellite dish which allows the reception of two channels. The most used service within the community is the telephone.
Tools and techology - Seed, fertiliser, pesticides	Local agriculture, which is mainly for family consumption, does not use external inputs (fertilizers, pesticides). The seed used for agriculture is part of the previous harvest, which is stored.

FINANCIAL CAPITAL	
Incomes	Since 2005, the largest community income is derived from logging in the forests of its territory, which is developed under the Mutual Cooperation Agreement between the Native Community Belgium and the Forestry Operators of Iñapari, effective till 2010. The community receives the value of 20% of the roundwood production that is extracted annually from the forest, which is exploited by the associated timber company according to a General Management Forestry Plan for 42,609 ha. According to the aforementioned agreement, each member of the community should receive 400 soles per month, in advance and on account of the 20% of the total profits of the timber production. If at the end of the campaign there is a positive balance, it is spend on community interest. Families also obtain additional revenue from the sale of other forest products (wildlife meat), sale of agricultural and livestock products and salaries, especially for working in forestry activities developed within the community lands.

FINANCIAL CAPITAL	
Savings	Saving money is not a local practice. The reserves or sources of money for special and emergency expenses are the forest (wood and wildlife meat), the stored agricultural products (rice, beans) and the domestic animals, particularly chicken, pigs and cattle.
Credit/debt - formal, informal, NGOs	Credit is not a necessity for the community due to the absence of commercial activities that require investment. The forestry activity that is developed within the community forests is carried out with the exclusive investment of the associated timber companies. In the future, if a commercial production of rubber latex, chestnut fruit or other products is developed as an initiative directly led by residents of the community, credit will be necessary.
Wages	Family income regarding salaries is currently originated from the employment of young men in forestry activities, where they work as forestry workers (woodcutters, loggers, assistants, guides) and receive a daily wage of 20 soles.

4. Indefinite community of indigenous people in voluntary isolation

Maderyja concession is adjacent to the Madre de Dios Territorial Reserve, established to protect populations of indigenous people in voluntary isolation of Mashco Piro tribe and other tribes not yet identified, estimated at around 600 people, distributed in familiar groups of indeterminate size. The area of the territorial reserve that is located within the leakage belt of the project is considered area of temporary use of one or more family groups which are temporarily established and carry out hunting, fishing and gathering activities, according to their costumes and with their own and unknown notions of territoriality that may affect the scope of the project.

Given the ignorance of the characteristics of this community, the schedule for initiating contacts that should be determined by their own choice and according to the established rules for their defense, the project objectives must be stated in terms of contributing to maintain their isolation, protecting the integrity of the reserve, until they decide, by their own choice, to join the regional society. In addition to this, it must be considered that these groups can cross the boundaries of the territorial reserve, of which they have no conscience, entering into the concession area. According to this, appropriate protocols should be developed, taking particularly into account the high vulnerability of this population to diseases, which could cause high mortality.

F.3. Inclusion of the genus component and the Belgium Native Community in the implementation of the Madre de Dios Amazon REDD Project

a. Belgium Native Community and the REDD Project

The relationship between the Belgium Native Community and the REDD Project (compose by the two forestry concessions) is described in the following chart:

Chart 60: Double way impacts between the project – concessions and the Belgium N.C.

Dimension	Towards the REDD Project - concessions	Towards the Belgium NC
Economic / Logistic	- There is no commercial bond between both parts, however, the inhabitants of the Belgium NC are potential workers for the concessions and potential Wood suppliers. - In addition, a common access road is shared and maintained by the concessions and their commercial allies.	- The Belgium NC, at the same time, has not formalized an interest to work jointly. In previous years the company represented a job opportunity for the community population. Currently, this possibility still exists. - It has a surveillance role in the Access road.
Social	- These are based in many years living together relationships between the community families and the families of the partners of the concessions. - The concessions have opted for an approach of intercultural respect, which determines protocols and attitudes towards the situation of the indigenous population.	- The implementation of the REDD Project will allow the support to information programs, education and promotion of opportunities for the development of the neighbor population.
Cultural / Communication	- The communication between the Project and neighbor community has been strengthened in the last years as demonstrated through the Agreement signed with Maderacre and to be signed with Maderyja in the very short term.	- The Project will try to have a positive influence in the culture of the community in terms of conservation and management of its forests and decrease in the pressure towards their rainforest.

Dimension	Towards the REDD Project - concessions	Towards the Belgium NC
Cultural / Communication	- Due to the aforementioned, the concessions have the policy to maintain the most absolute respect towards the decisions and the course to be taken by the Belgium NC, since the latter is totally autonomous. - An organizational culture of intercultural respect and permanent investigation is generated.	- The Belgium NC counts with an extent area and a population density of 0.11 individuals per km2, which allows them to supply themselves without the necessity to establish 'formal' communications with the project for that purpose. Therefore, the need to establish a coordination to grant hunting permits, entering the areas or traditional rites of the "comuneros" is on the companies' side.
Organizational	- Currently, the project and the Belgium NC are united on the management of the forestry resources, since the community is participating of the FORIN Project. Said project is in its beginning stage, and the project is already in process of maintaining the sustainable management certification. - It implies the establishment of policies, acting and organization strategies that should be assumed by directors and workers of the company.	- In terms of social organization for production, the preoccupation for the sustainable use of the forestry resources is shared. The Belgium NC is been influenced by the good management practices of the project, which operates as a learning "show case" for this community.

The way to incorporate the implementation has different levels.

First, in the framework of the Cooperation Agreement signed between the Community and Maderacre and to be signed between the Community and Maderyja[38], to strengthen the following activities:

1. Revision and updating of the Management Documents for the management and use of the forest of the Community, including the Forest Management General Plan.

[38] Agreement subscribed on October 11th 2008 between Maderacre and the Belgium Native Community and Agreement to be subscribed in the short term between Maderyja and said Community, with similar characteristics to that already signed between Maderacre and the Community.

2. Elaboration of an agreement for the transfer of experiences, use of tools and knowledge for the planning, use and transformation of the timber resources of the community, through a gradual process of every day training.

3. Elaboration of the regulation for the use of the access road and an agreement for the re-opening and annual maintenance of said road.

4. Preferential contract of the community inhabitants that have participated and approved the training process of the companies.

5. Signing of joint agreements with other institutions of international cooperation, institutios for investigation, national and foreing Universities, to carry out investigation activities that contribute to the management and use of the natural resources.

6. Agreement to provide legal, administrative and management of forestry resources assessment to the community.

Additionally, to strengthen the role of the Native Community in the implementation of the objectives of the REDD Project, through the following specific actions:

Chart 61: Actions to strengthen the role of the Belgium N.C. in the implementation of the project objectives

Activities of the REDD Project	Specific action with the Belgium NC
Objetive 1: Support the development and implementation of productive and environmentally friendly projects in the sectors of the Iñapari District identified in the buffer area	
Socialization and diffusion of the objectives of the project	Include the Native Community in the Workshops and other diffusion media
Identification and selection of the proposals for environmentally friendly productive projects	Include the Community within the potential beneficiaries. Offer assessment for the formulation of their proposals.
Development of competences of the members of the associations related to the selected projects.	Give priority in training to the members of the Native Community.
Elaboration of the project profiles of the selected projects.	Active participation of the Native Community in the formulation of the selected profiles.

Activities of the REDD Project	Specific action with the Belgium NC
Look for financing and / or co-financing of the approved profiles (funds)	
Support for the implementation of the approved projects.	Permanent assessment.
Monitoring of the projects.	Establish the potential impacts of the selected projects on the Native Community as a key element to monitor.
Objetive 2: Strengthen the surveillance and control of the forestry concessions	
Revision and update of the custody plan.	Coordinate the Native Community Plan in the shared boundaries with the forestry concessions.
Installation of a control post PCA5 Maderacre	Inform the Native Community of the installation of the Control Post in the Maderacre Concession.
Delimitation of 100% of the boundaries of the concessions.	Coordinate with the Native Community the delimitation of the shared boundaries.
Installation of “Hitos” in the vertexes of the concessions.	Coordinate with the Native Community the installation of hitos shared with the forestry concessions.
Improve the signaling of the concessions.	Include the Native Community in the signaling of the road section that is shared by the users.
Carry out periodic and annual patrolling in vulnerable sectors.	Inform the Native Community of the patrolling and if necessary of any abnormal situation that could affect their area.
Annual monitoring of possible invasions with the use of satellite images.	Inform the Native Community of any results that could affect their area.
Ocular verifying of sectors potentially identified as invasion points (due to deforestation).	Inform the Native Community of any results that could affect their area.
Development and implementation of mechanisms for the diffusion of Environmental Education to children, teenagers and communities involved in the project.	Include the Native Community and its School as a beneficiary of the program.

b. The genus component in the REDD project and how this is included

The genus approach is very important in the implementation of the REDD project, as well as in the preferential hiring policies and other mechanisms that the concessions currently apply.

Genus inequality is manifested in the results of the survey to the question: ¿Women have voice and vote in the Community Assemblies? To which only 9% answered affirmatively[39].

The REDD Project will include the genus approach in the activities to develop in the following manner:

Chart 62: Genus approach in the activities to develop

Activities of the REDD Project	Specific action with women
Objective 1: Support to the development and implementation of environmentally friendly projects in the sectors of the Iñapari District identified in the buffer area	
Socialization and diffusion of the objectives of the project	Emphasis in the diffusion and assistance to Workshops of women: employees, housewives, students, , etc.
Identification and selection of the proposals for environmentally friendly productive projects	Establish the participation of women in the projects proposed as an important qualification factor.
Development of competences of the members of the associations related to the selected projects.	Give priority to the training of feminine personnel.
Elaboration of the project profiles of the selected projects.	Inclusion of genus indicators in the profiles.
Look for financing and / or co-financing of the approved profiles (funds)	
Support for the implementation of the approved projects.	Permanent assessment.
Monitoring of the projects.	Include the genus component amongst the indicators to monitor.

F.4. Relationship between Maderacre and Maderyja concessions and the community

One of the main management tools used by both timber concessions is their Relationship with the Community Plan[40]. It orientates the social responsibility of the concessions in their relationships with other involved social and institutional actors of the environment. These documents are permanently reviewed and adjusted to the constant social and environmental changes with influence on the concessions and are available for all the staff of both concessions.

[39] Rapid Household Survey. See graph 54, page 225 of the present document.

[40] Said documents have been available for the Verifier.

The relationship with the community policies defined for both concessions and stated in their Relationship with the Community Plans are almost the same and consist briefly of:

- **Support to the local development:**
  Giving priority to the following areas of activity: strengthening of social organizations; improving the quality of basic education (particularly of boys and girls of Iñapari and Belgian Native Community); making possible the access to technical-productive training courses for young people (mostly considering the future job opportunities for all of them into the forestry sector); territorial arranging for the best use of the localization advantages in a care of the environment framework.

- **Support to the creation of an environmental conservation culture:**
  Giving priority to the following areas of activity: information and environmental education strategies, in order to sensitize local communities on the importance of caring for the environment; disseminate the forest management plan of the concessions and best practices considered in the exploitation of their natural resources; support to local initiatives for environmental education; support to local initiatives related with waste management; create the concept of an ecological country.

- **Transparency and permanent communication in both ways, from and to local communities:**
  Giving priority to the following areas of activity: design of a communication plan to disseminate all the information related to the operations carried out by the concessions; design and development of a system for responding opportunely to any social actor consultation and complain; take part in all the dialog and coordination activities among social citizens; apply and monitor the entrepreneurial policy of hiring preferably local people for the forestry operations.

  In this sense, a protocol for the opportunely response to any citizen, organization or institution consultation and complain is also attached in the Relationship with the Community Plan of the concessions. Said protocol consists on:

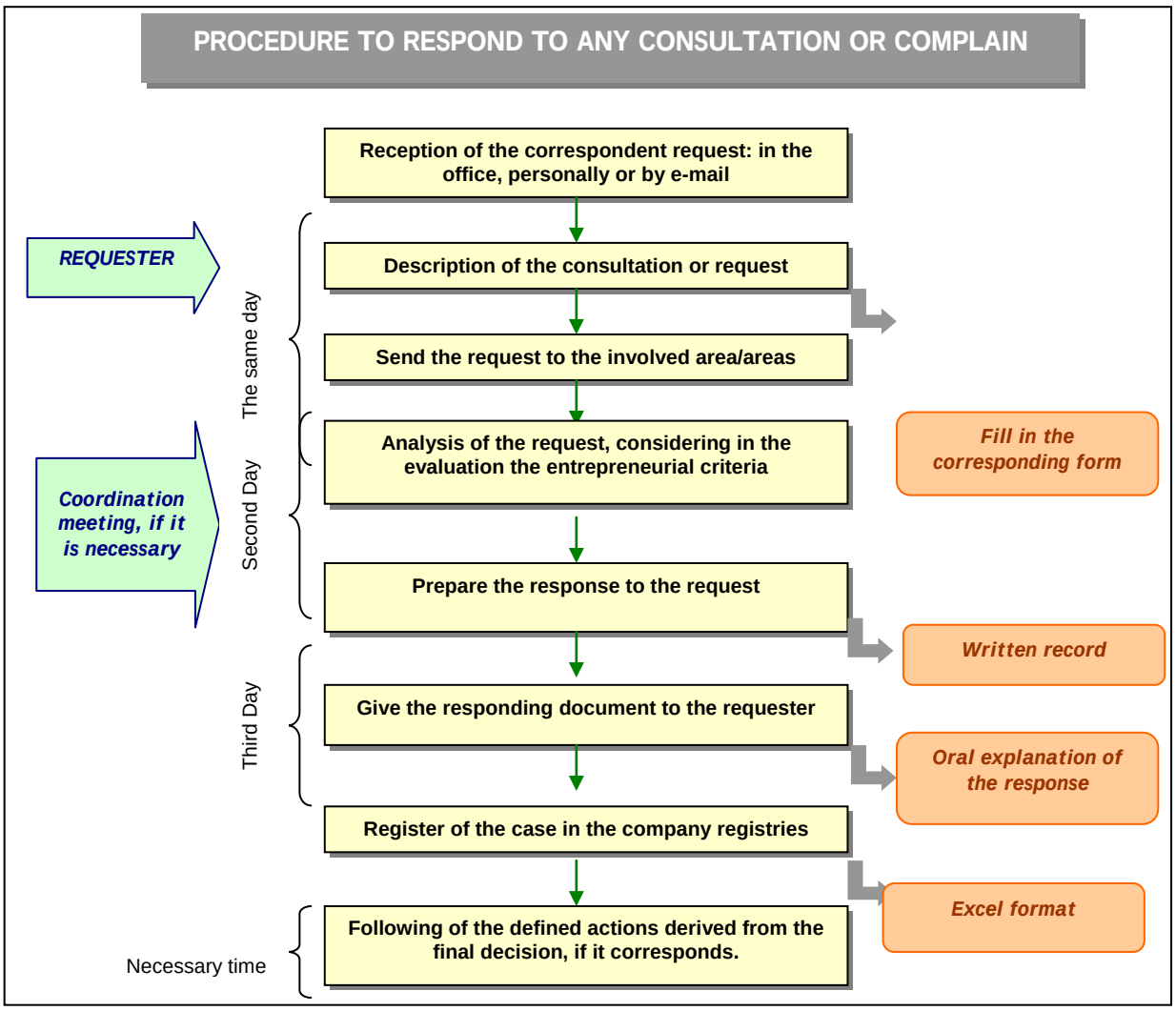


Fig. 101: Procedure to respond to any consultation or complain

Additionally, both concessions have a clearly defined protocol or procedure to inform all the involved stakeholders about any unusual operations that the concessions should have to carry out. Said procedure consists on:

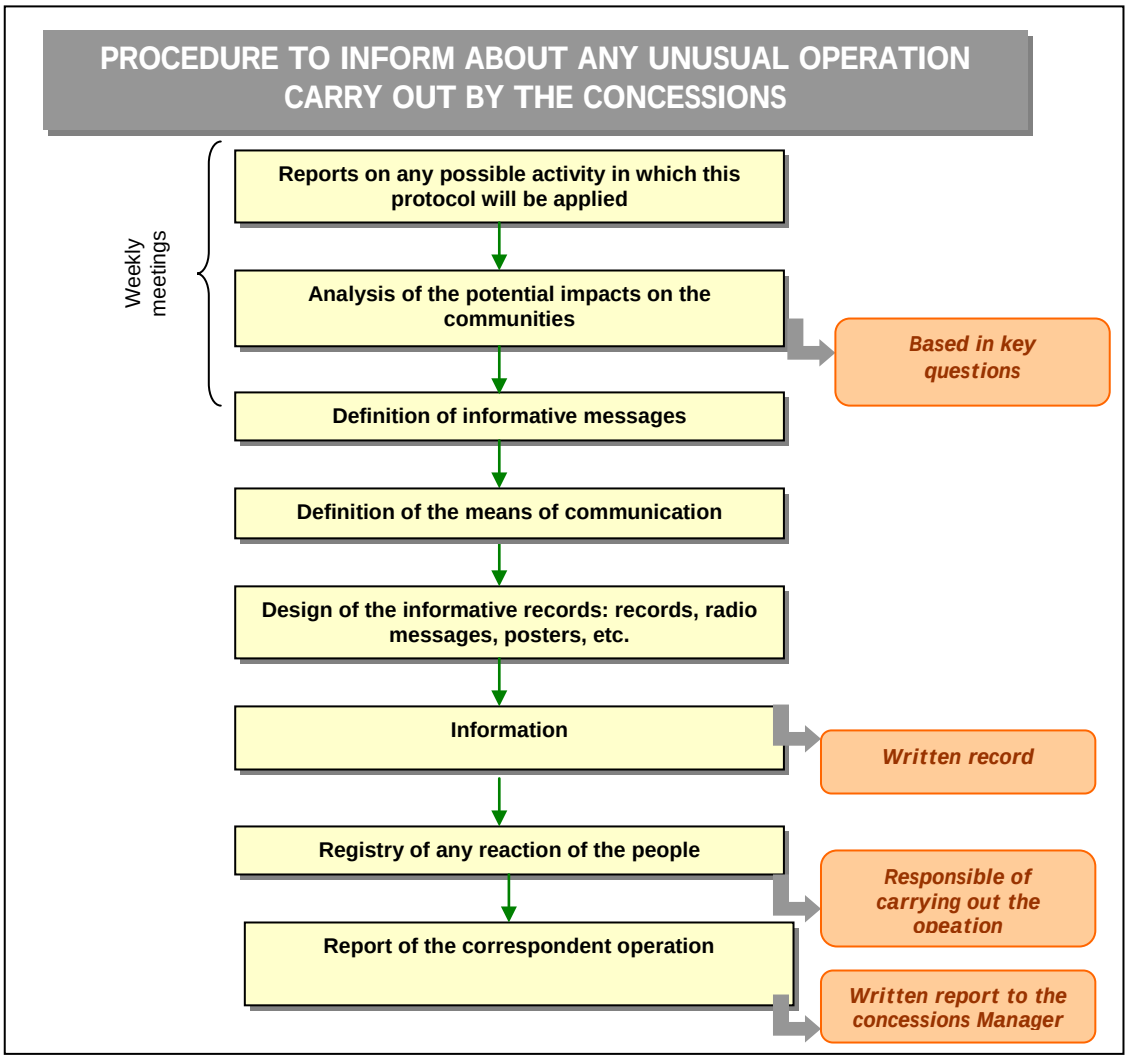


Fig. 102: Procedure to inform about any unusual operation

- **Process of handling conflicts:**

  Prioritizing the following areas of activity: a protocol to define said process will be designed, giving special priority to the dialog between the involved parties and the search for creative solutions; establish the needed agreements with the aim to collaborate in any conflictive situation; establish agreements for the use, maintenance, control and custody of any way of terrestrial communication.

In this sense, Maderacre and Maderyja have set specific protocols with the aim to clearly define the procedure to follow before any conflictive situation that the concessions should have to face and they are presented following. Maderacre procedure to handle any conflictive situation:

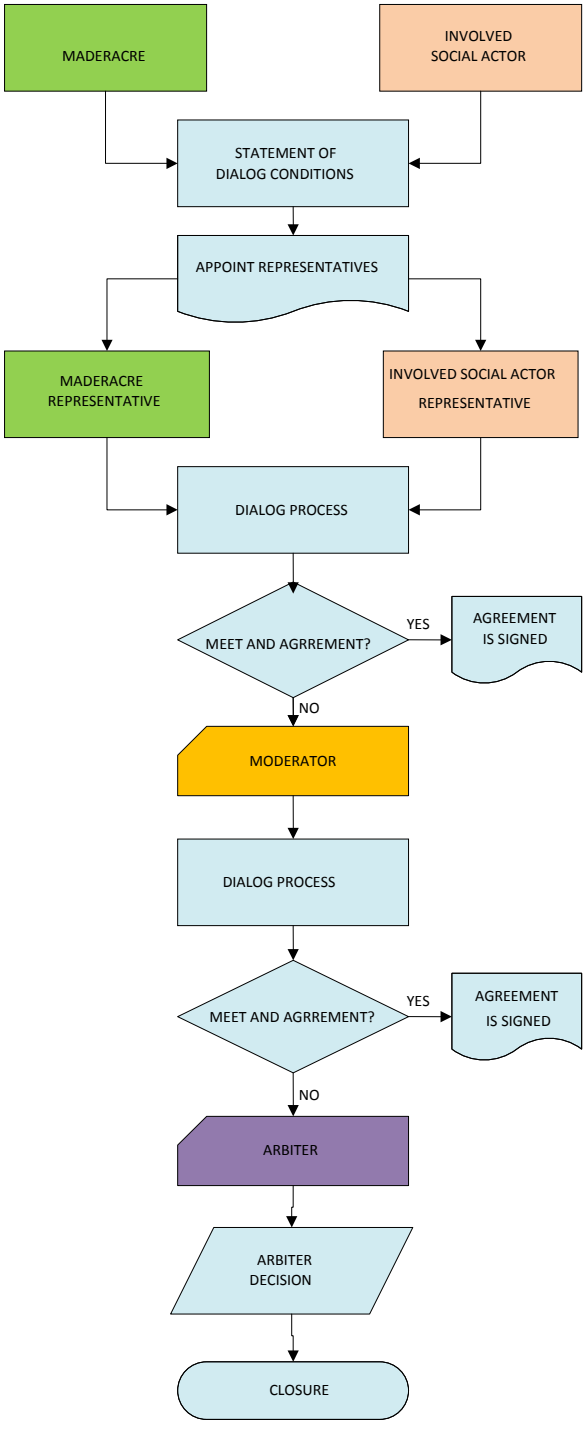


Fig. 103: Maderacre procedure to handle conflictive situations

Maderyja procedure to handle any conflictive situation:

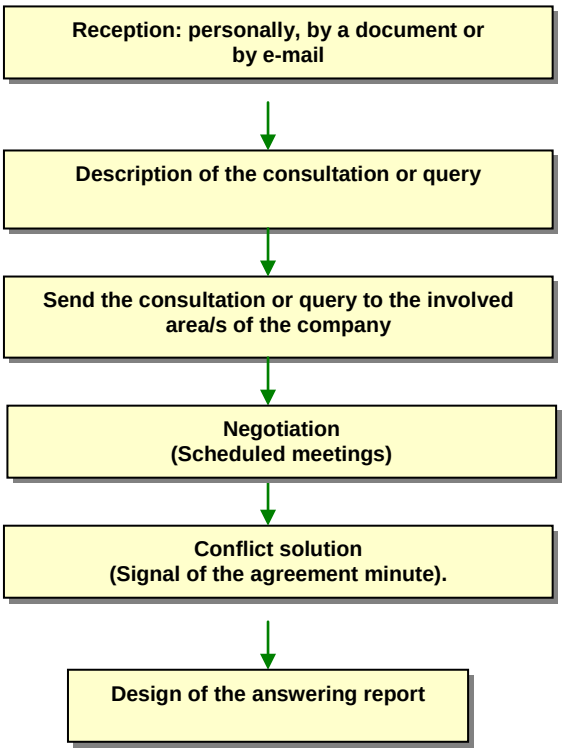


Fig. 104: Maderyja procedure to handle conflictive situations

The Maderyja concession protocol for handling any conflictive situation is based on a permanent and active communication in order to identify the problems, interests and questions of all the involved parties. In case a negotiation process is needed to solve a conflictive situation, a negotiation based on the interests of all the involved parties will be developed.

- **Researching and Publications:**

  Giving priority to the following areas of activity: 1% of the concessions profits will be invested in the development of researching activities within the concession area; promote the development of agreements between the concessions and other educational and researching institutions as educational organizations, researching centers and NGOs.

  In this sense and as it was described in chapter B, Maderacre has signed cooperation agreements with educational institutions, as the Management Forest Department of La Molina Agrarian National University and the Faculty of Economy of the University of the Pacific.

Each of these agreements give benefits to both involved parties, as well as to the whole local and national communities regarding to the results of the researches that are being carried out on *Swietenia macrophylla* within the concession area that will be opportunely disseminated and available to everybody, and the opportunity for the Economy students to comply with the requirements of their University career and apply all their knowledge in an in-field situation.

The agreement signed with WWF, as it was previously mentioned, implies a sustainable and responsible management of the natural and human resources by Maderacre, thus the preservation and conservation of them is assured minimizing the possible impacts for local communities.

As it was also previously mentioned, it is important to add that currently Maderyja is in process of signing agreements with WWF and with the National Forestry Chamber.

- **Suitability with the FSC principles and criteria:**
  Take into account the permanent suitability between Maderacre and Maderyja social policies and the FSC social principles and criteria, in order to maintain the voluntary FSC forest certification achieved by both concessions.

Four Community Development Programs are defined in the Relationship with the Community Plans of Maderacre and Maderyja timber concessions and are presented in the following chart:

Chart 63: Community Development Programs

Program	Activities
Strengthening of social organizations	• Strengthening of social local coordination networks for the improvement of the regional productivity. • Influence the local government for the design of policies forwarding the development of sustainable economic activities. • Give training courses and technical support basically in relation with the main entrepreneurial management tools to social organizations. • Design and implementation of a system which includes prices and market information.
Improvement of the quality of basic education	• Establishment of alliances with educational institutions. • Curricular enrichment. • Activities within the concession area.

Program	Activities
Technical-productive training courses for young people	• Establishment of alliances with educational and technical institutions. • Carry out the training program. • Allow students to work or carry out researching activities within the concession area. • Working experiences.
Support to territorial arrangement	• Agreements with the local government. • Integration of a responsible commission. • Information collecting. • Visits to prioritized zones. • Arrange actions with any other involved institution or organization. • Carry out the workshop “Basic proposal for territorial arrangement”. • Design and development of the territorial arrangement defined plan.

It is important to also mention that in the Relationship with the Community Plans, a detailed timeframe was set for the aforementioned social programs and its correspondent activities that both concessions have been carrying out.

Additionally, Maderacre concession has created a Consultative Committee on the Relationship with the Community activities, which provides the necessary transparency to the whole timber concessions activities and in consequence to this specific project activity. The main purpose of this Committee is to give the correspondent advice to the staff in the design and implementation of its social policies.

As it was mentioned before, both timber concessions have a strong commitment with the sustainable development of all its forestry activities, in order to significantly contribute to the growth and welfare of the surrounding communities and in the medium term become a model enterprise of reference in the forestry sector of the whole country.

To this aim, this Consultative Committee must assure:

- that all the different stages of the project comply with the economical, ethical, environmental and social higher standard levels and also with the principles and criteria of the FSC;

- that the relationship between all the involved regional, local and community parties that are somehow impacted by the operations of the concessions is fare and transparent and respectful to the legitimate interests of each of them.

Said Consultative Committee will be integrated by experienced people, with a high degree of sensitiveness on social, environmental and community subjects. They must have strong knowledge of the current challenges that all the forestry enterprises working in the Peruvian Amazon area face and also they have to be locally representative. For the achievement of the defined goals, this Committee will be independent of the Maderacre structural organization but the definition of its integration will be decided together by the concession and the committee.

As a result of the work of this Committee, an annual public report will be developed, which will include: the activities carried out by it, including the meetings with third parties; the identification of the crucial social aspects that the concession has to deal with, including a detail of the recommendations given to Maderacre. The concession commits to disseminate this information by means of its websites or any other available.

Some operating rules were defined for this Committee. Among them, it should be highlighted:

- A coordinator should be elected between all it members, who will last in said function for a year.
- It will meet regularly at least four times a year, with a required minimum presence of the half of its members every time. The agreements approved at each meeting will be stated in the correspondent acts.
- Maderacre commits to give the required administrative support to the Committee in all its activities. To this aim, the Social Responsibility Chief of the concession was indicated as it Technical Secretary.

In this sense and in order to implement its Relationship with the Community Plan, Maderyja has designed the following structure:

- Technical Committee of Relationship with the Community: integrated by the Administrative Manager, the Forestry Operations Manager and the Responsible of Relationship with the Community. Its main responsibilities are:
  a) Propose the general policies related to the relationship with the community to be approved by the entrepreneurial board.
  b) Establish the operative actions to be developed related to the relationship with the community area.
  c) Review the Annual Operative Plan of the Relationship with the Community area.
  d) Approval of any protocol or procedure related with the relationship with the community area.

e) Establish a timeframe for the economic support of the activities that will be carried out.
f) Analysis and approval of the requests for social support.

- Relationship with the Community area within the structural organization of the concession: is the area in charge of the planning of the social strategies and activities of the concession and giving support and advice to the other management areas of Maderyja. The main objective is to be involved as an enterprise in the social and economic dynamic of the environment, designing the actions that Maderyja should carry out to support the development of local communities.

F.5. Present labor conditions of Maderacre and Maderyja personnel

As it was previously mentioned, both concessions take special care of the labor conditions of its personnel and its well-being. To this end and according to the FSC Certification, it must be said that both concessions fulfilled with all the laws and regulations related with human resources rights and duties. Furthermore, the salaries paid by them are into the average range of the regional and national forestry sector.

In order to assure that all the concessions staff knows clearly the main objectives, policies, practices and regulations of the companies, as well as forestry methods and techniques applied in the concessions operations, the Forestry Operations Manual and the Forest Management Practices Rulebook[41] are given to all of them when they join the company.

One of the main objectives of the timber concessions is their personnel safety. Thus, all the Peruvian regulations related with this issue are taken into account and security equipments are available for all the people who work in any risky operation. In addition to this, training courses on occupational security and first aid are given to their personnel. Moreover, a First Aid Manual[42] was developed by the concession and is also given to all their workers when they start working at the company. They must keep it always with them as a guidance to make the needed consultations in case of an in-field accident or illness. It includes all the necessary information to handle the wide range of situations that should occur during the forestry operations. Among its contents, it should be mentioned:

- First evaluation of the victim.
- The priorities of the first aid.
- Vital signs.
- Injuries classification.
- What to do?

[41] Both documents, the Forestry Operations Manual and the Forest Management Practices Rulebook, have been available for the Verifier.

[42] This First Aid Manual has been available for the Verifier.

- Bleedings.
- Brakes and traumatisms.
- Bandages and bandaging.
- Victims transport.
- Shock status and types of shocks.
- Cardiorespiratory stroke and basic revival.
- Choking.
- Epilepsy.
- Sea, river and pool rescue.
- Bites, stings, burns, electrocution, intoxication, women in labor.
- Geographic distribution of transmissible illnesses.
- Vaccination scheme (WHO - World Health Organization)
- First aid kit (content and precautions).

All the issues related with their personnel safety (protection equipments, protection measures, etc.), responsibilities of each one, measures to undertake and penalties in case of not compliance are stated in the Security Rulebook of the concessions. It has special items related with care for the environment and relationship with others communities population. This Rulebook will be also available for the Verifier during his visit.

Both timber concessions believe that some changes in the people attitude with respect to the forest and its valuable resources are needed in order to make them really respect, appreciate and take care of it. By means of adequate training courses this could be achieved. Some training courses on low impact forestry methods and techniques are given to the concessions personnel as well, among them:

- Low impact exploitation activities (directed felling, forestry roads and paths, dragging of wood, etc.).
- Waste management.
- Occupational security and first aid.
- Sustainable forestry management principles.
- Forestry systems.
- Use of geographical assistance equipments (GPS, compasses, clinometers).

Hereunder, some pictures of a training course on the selective harvesting method carried out for Maderacre and Maderyja's personnel are enclosed:

Fig. 105: Training course

Fig. 106: Training course on selective harvesting

Fig. 107: Training course

Fig. 108: Training course

Both concessions believe that all the labor conditions have a strong influence in workers productivity. Therefore, both timber concessions make a great effort to give their people the best working conditions as possible. In this sense, Maderacre and Maderyja regard carefully to their workers nutrition and rest, trying to make their diet as balanced as possible and scheduling the operations taking into account the big physical effort required for them and the resting time that is needed in consequence. Among the measures outlined by the timber concessions regarding this issue, it should be highlighted: to install the camping sites as close as possible to the working place; to take into consideration the number of workers that will live there in order to design the required services in an according size; to develop some living together rules giving priority to the mutual respect between people and the environmental care; to maintain the security equipments and the first aid kit in good conditions so as to assure the health and safety of all their workers.

F.6. Socio economic impacts of the proposed project activity

Obtaining revenue for the environmental services that the rainforest offers is the only way to preserve these areas. This approach has great potential to generate sources of additional income for local population with low income, contributing therefore to improve their way of life.

Even though today there are no villages established near the concession, with the exception of the Belgian native community and the frontier village of Iñapari, the presence of the new road will undoubtedly increment the migratory movement. If the company does not achieve a greater presence in its concession, these areas could be invaded by migratory farmers, loosing as a consequence big areas of forest.

Strategic alliances with the Iñapari Municipality and the Native Community Belgium will favour the social sustainability of the project, since the population will be identified with the proposal and being indirectly benefited by the sale of the carbon credits, will contribute to the protection of the concession.

Fig. 109: Local populations of the “Madre de Dios” area

Considering the local authorities and local population’s point of view, the concessions play a fundamental role not only in the generation of employment in the area but also in the maintenance of roads and in the support to local people making some donations when are necessary.

According to the FSC Certification, among the positive impacts of the present project activity it is important to highlight the dynamism of the local economy and the generation of employment.

F.7. Monitoring variables and indicators

As it happens with all the planned monitoring activities of Maderacre and Maderyja timber concessions, the fulfillment of the whole plan depends mostly on the available economic resources to carry it out. In this sense, two different charts are presented below. The first one is the Social Monitoring Program of the concessions, which includes all the monitoring activities that both concessions can certainly carry out. The second one is also a Social Monitoring Program which includes other social monitoring activities that both concessions would like to carry out but they could not do it without an external finance (carbon credits).

Chart 64: Social Monitoring Program

Indicator	Means of verification	Frequency	Responsible
% of local workers with respect to the foreign ones	Workers' registries	Annual	Social Responsibility Area
% of workers that have access to a training opportunity during the year	Results of the labor climate poll applied to them	Annual	Social Responsibility Area
N° of training activities carried out by the concessions	Reports of the activities carried out by the different areas	Annual	Social Responsibility Area
N° of hours dedicated to the personnel training	Reports of the activities carried out by the different areas	Annual	Social Responsibility Area
N° of workers that count with complete and adequate equipment of protection for the development of their work	Reports of the visits, inspecting the use of said equipment	Bi-monthly	Social Responsibility Area
N° of institutions in which Maderacre and Maderyja concessions count with a formally designed representative	Copies of the documents related to the introduction of these representatives before other institutions	Bi-monthly	Social Responsibility Area
% of local suppliers with respect to the national ones	Databases of all the suppliers of the concessions	Annual	Social Responsibility Area
% of the prices paid to the local suppliers with respect to the national suppliers	Financial reports from the Financing Area	Annual	Social Responsibility Area

Indicator	Means of verification	Frequency	Responsible
N° of suppliers that adopt at least one of the positive practices promoted by the concessions related to the social responsibility	Results of the poll applied to the concessions suppliers	Annual	Social Responsibility Area
N° of guided visits organized within the social responsibility program framework, to the sawmill and to the concessions	Reports of the activities from the Relationship with the Community Area and photographic registers	Bi-monthly	Social Responsibility Area
N° of signed or ratified agreements with public or private universities	Copy of the agreements	Anual	Social Responsibility Area
N° of researches carried out within the agreements with universities framework	Copy of the researchers reports	Bi-monthly	Social Responsibility Area
N° of publications made, reporting the main results of the researches carried out	Copy of the publications	Bi-monthly	Social Responsibility Area
N° of written dissemination or promotion documents elaborated	Copy of the produced documents List of the distribution of them	Bi-monthly	Social Responsibility Area

As it was previously mentioned, hereunder a chart is presented including the social monitoring activities that both concessions would like to carry out but currently they could not do due to the lack of economic resources. Said activities can only be carried out with the income of the carbon credits.

Chart 65: Social Monitoring Plan including activities that currently the concessions could not do due to the lack of economic resources

Group of interest	Policies	Social Responsibility Program according each policy	Indicators of effect (annual measuring) and Indicators of process (twice-monthly or monthly measuring)	Means of verification	Management of the information	Frequency
Shareholders	Guarantee the transparency, access and opportunity of the information referred to the management of the company	***ENTREPRENEURIAL BALANCE:*** *Making of periodic reports about operational, financing, legal and social aspects of the company.*	1.1. Level of satisfaction of the shareholders in relation with the entrepreneurial management	Report of poll applied to shareholders	Social Responsibility Manager	Annual
			1.1.1. Number of reports on the status of the company made and distributed to the shareholders	Copy of the letter giving the status of the company report to the shareholders	Social Responsibility Manager	Bi-monthly

Group of interest	Policies	Social Responsibility Program according each policy	Indicators of effect (annual measuring) and Indicators of process (twice-monthly or monthly measuring)	Means of verification	Management of the information	Frequency
			1.1.2. Number of indicators reported in the status of the company records	Copy of status of the company reports	Social Responsibility Manager	Bi-monthly
	Promote a brotherhood culture among shareholders	***WORKING BREAKFASTS:*** *Organization of bi-monthly actions with the aim to promote the brotherhood and informed participation of the company shareholders in relation with social and community aspects.*	1.2. Number of actions to promote the brotherhood and mutual Exchange with the presence of at least 80% of the company shareholders	Pictures of the activities and a list of its participants	Social Responsibility Manager	Bi-monthly
Workers	Disseminate the concern with the workers families, in terms of health and welfare.	***FAMILY WELFARE PROGRAM:*** *concern with life conditions of the workers families. A database of the families of all the workers will be developed and a family union culture, as well as a health protection and children education culture. Brotherhood activities among both concessions personnel and their families are planned.*	2.1. Entrepreneurial image of workers families.	Results of the poll applied on workers families	Social Responsibility Area	Annual
			2.1.1. Financial income destined to carry out social actions to help Maderacre and Maderyja workers families.	Financial report of the Relationship with the Community Area	Relationship with the Community Area	Bi-monthly
			2.1.2. N° of brotherhood and recreation activities organized for workers and their families	Report of activities and fotographic records of them	Relationship with the Community Area	Bi-monthly
	Foresee, in a strongly strict way, the adoption of industrial security measures	***TRAINING ON SECURITY MEASURES PROGRAM:*** *for workers in charge of any forestry operation, as well as sawmill workers, to improve their knowledge, attitudes and good practices in relation with security measures of said operations. A system to award the strict compliance of all the security rules of the concessions is also part of this program.*	2.2. Days with no labor accident both in the forests as in the sawmill	Forestry Manager Report Sawmill Chief Report	Social Responsibility Area	Annual
			2.2.1. N° of training activities on security measures of the concessions	Report from the Forest Manager Report from the Sawmill Chief	Social Responsibility Area	Monthly

Group of interest	Policies	Social Responsibility Program according each policy	Indicators of effect (annual measuring) and Indicators of process (twice-monthly or monthly measuring)	Means of verification	Management of the information	Frequency
		PRODUCTION OF INFORMATION MATERIALS AND SECURITY ADVICES: *information reports and motivational advices in relation with labor security will be developed. Security campaigns will be programmed both at the forests and at the sawmill*	2.2.2. N° of training activities and information and diffusion reports about security practices developed by the concessions.	Copy of said reports and a list of their distribution among workers	Social Responsibility Area	Bi-monthly
Government	Strict compliance with the national legislation in terms of forestry exploitation, labor and tributary.	***COMPLIANCE WITH LEGAL REQUIREMENTS PLAN:*** *each area of the concessions will have a controlling list with all the procedures and activities to carry out in order to comply with all the legal requirements*	3.1. % of procedures and activities carried out opportunely	Controlling list of each area	Social Responsibility Area	Annual
	Establishment of coordination relationships with local government, particularly with the Municipality and DGFFSs offices.	***DELEGACY TO REPRESENT THE ENTERPRISE BEFORE OTHER INSTITUTIONS:*** *a group of workers will have the responsibility of the representation of the concessions before different Institutions, with concretely defined roles and responsibilities.*	3.2. N° of interaction schedules with public institutions were elaborated	Approved copies of said interaction schedules with public institutions	Social Responsibility Area	Monthly
	Proactive participation in planning and territorial agreement activities	***FORMALIZATION OF THE PARTICIPATION IN TERRITORIAL COORDINATION ACTIVITIES:*** *any participation in territorial coordination (planning, local agreements) must be formalized, sending official documents including the identification of the representative person who will participate in the concessions name.*	3.3. N° of institutions where the concessions count with a formally designate representative	Copy of the official documents with the representative identification sent to different institutions	Social Responsibility Area	Bi-monthly

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Group of interest	Policies	Social Responsibility Program according each policy	Indicators of effect (annual measuring) and Indicators of process (twice-monthly or monthly measuring)	Means of verification	Management of the information	Frequency
Customers	Carry out proactive measures to assure a total quality service that surpass the customer expectations of both concessions	***PERMANENT ANALYSIS OF THE QUALITY OF THEIR SERVICES AND MARKET TRENDS:*** *the commercial area must permanently analyze the quality and standardization of the commercialized products and also determine the current market demands*	4.1. N° of new standardized products of the concessions	Reports of the commercial area	Social Responsibility Area	Bi-monthly
			4.1.1. N° of market analysis reports and discussed within the different areas of the enterprise	Reports of the commercial area	Social Responsibility Area	Bi-monthly
	Establishment of measuring mechanisms in relation with customer satisfaction, in order to improve the decision making process forwarding a continuous enhancement of the company	***APPLYING OF A CUSTOMER SATISFACTION POLL:*** *it will be applied to all the customers of the company, with the aim to obtain accurate information about product quality, service quality and any other useful information related with the additional value that the company desires to give to their products.*	4.2. Customer satisfaction level	Results of the customer satisfaction poll	Social Responsibility Area	Annual
			4.2.1. N° of polled customers	Results of the customer satisfaction poll	Social Responsibility Area	Annual
Suppliers	Forward the development of small and medium sized local enterprises, giving them business opportunities	***CALL FOR LOCAL SUPPLIERS TO PROVIDE THEIR SERVICES AND PRODUCTS:*** *a calling for local suppliers program will be developed, with the aim to give to small and medium size local suppliers the opportunity of training and capitalization. Opportunely communication actions will be established in order to allow said providers to be prepared to assume this responsibility.*	5.1. Nº of agreements signed between the concessions and the suppliers, in which favorable mechanism for them are included	Administration Area reports / Logistics Areas	Social Responsibility Area	Bi-monthly

Group of interest	Policies	Social Responsibility Program according each policy	Indicators of effect (annual measuring) and Indicators of process (twice-monthly or monthly measuring)	Means of verification	Management of the information	Frequency
	Contribute to the adoption of good social and environmental practices by all the small and medium suppliers of the concessions	***PROGRAM FOR THE PROJECTION OF SOCIAL RESPONSIBILITY POLICIES TO THE SUPPLIERS:*** *workshops and talks will be organized for the concessions suppliers with the aim to help them to understand and incorporate the key social responsibility practices in order to make the whole productive chain of the concessions environmentally friendly and respectful with the community development and with the more vulnerable groups' rights.*	5.2. N° of training, motivation or dissemination activities carried out by the concessions with the aim to promote its good social and environmental practices among its suppliers.	Reports of activities from the Relationship with the Community Area and photographic records of them	Relationship with the Community Area	Bi-monthly
	Establish the rules for a fair commercial exchange for the concessions as well as for the suppliers	***PLAN FOR THE PROMOTION OF LOCAL BUSINESSES:*** *a group of measures for the financial and organizational strengthening of their small and medium suppliers will be determined, if compatible with the efficiency and efficacy of its operations.*	5.2.1. N° of adopted mechanisms to improve the services or sales opportunities and conditions for the local suppliers.	Reports from the Administrative Area / Logistics Area	Social Responsibility Area	Bi-monthly
Community	Support to local development	***INCORPORATION OF THE FORESTRY MANAGEMENT CONCEPTS TO THE STUDY PLANS OF PRIMARY AND SECONDARY LEVEL OF EDUCATIONAL INSTITUTIONS PROJECTS:*** *in agreement with educational institutions of Iñapari, a program to develop the educational contents to be incorporated to the study plan will be designed, which will include guided visits to the forests and the development of educational reading material about the forestry exploitation model for kids and young people.*	6.1. N° of educational institutions that incorporate to their curricular contents those referring to the forestry exploitation model.	Copy of the approved curricular contents	Social Responsibility Area	Annually
			6.1.1. N° of guided visits organized in the framework of the program, to the sawmill as well as to the concession.	Reports of activities from the Relationship with the Community Area and photographic records	Relationship with the Community Area	Bi-monthly
			6.1.2. N° of students participating in the guided visits, according to their level of studies.	Reports of activities and photographic records of them	Relationship with the Community Area	Bi-monthly

Group of interest	Policies	Social Responsibility Program according each policy	Indicators of effect (annual measuring) and Indicators of process (twice-monthly or monthly measuring)	Means of verification	Management of the information	Frequency
		PROJECT TO SUPPORT ORGANIZATIONS OF PEOPLE WITH DISABILITIES: *as a direct supportive action towards the most vulnerable groups, the concessions will contribute with the necessary productive equipment to said organizations to allow them to develop economic activities and the consequent income for the improvement of their quality of life.*	6.2. % of economic income increase of the members of those associations as a result of the development of the project	Results of the poll applied to the members of the associations	Social Responsibility Area	Annually
			6.2.1. Financial costs employed in the acquisition of the necessary productive machinery	Financial reports from the Relationship with the Community Area and photographic records of the developed activities	Relationship with the Community Area	Bi-monthly
	Support to the generation of an environmental conservation culture	***COMMUNICATIONAL CAMPAIGNS FOR THE PROMOTION OF THE GOOD ENVIRONMENTAL PRACTICES:*** *two media campaigns for the promotion of the good environmental practices will be planned annually, determining for each of them the public to whom it will be directed*	6.3. N° of public and private institutions involved in the communicational campaigns developed by the concessions	Final report when the campaign finishes	Relationship with the Community Area	Annually
			6.4. N° of campaigns carried out, classified by subject	Final report when the campaign finishes	Relationship with the Community Area	Annually
			6.4.1. N° of designed reading material for dissemination or promotion	Copy of the elaborated reading material and list of the distributed materials	Social Responsibility Area	Bi-monthly
			6.4.2. N° of audiovisual emissions made as part of the communicational campaign	Report of the radio or television emissions	Relationship with the Community Area	Bi-monthly

Group of interest	Policies	Social Responsibility Program according each policy	Indicators of effect (annual measuring) and Indicators of process (twice-monthly or monthly measuring)	Means of verification	Management of the information	Frequency
	Transparency and communication from and to the community	***INTEGRAL STRATEGY OF COMMUNICATION:*** *for each group of interest, a communicational strategy will be developed. Said strategy will include: key messages, means of communication, communicational style, monitoring of the reception and assimilation of the messages.*	6.5. Level of knowledge and acceptance of the concessions among its main groups of interest	Results of the poll applied to the main groups of interest of the concessions	Social Responsibility Area	Annually
			6.5.1. N° of communicational actions carried out, according to the selected mean of communication and the group of interest to whom it is directed	Reports of the activities from the Relationship with the Community Area and photographic records of them	Relationship with the Community Area	Bi-monthly
	Handling of conflictive situations	***APPLIANCE OF THE PROTOCOL FOR HANDLING WITH ANY CONFLICTIVE SITUATION:*** *it will be fundamental that any conflictive situation is managed regarding the dialogue and constructive negotiations between the involved parties. With this aim the concessions staff will be appropriately trained on said principles.*	6.6. N° of conflicts solved as a result of the dialogue between the involved parties	Final report of the solved conflictive situation	Social Responsibility Area	Bi-monthly

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Annex: Estimation of carbon stocked in the biomass

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Annex: Estimation of carbon stocked in the biomass of the Maderacre and Maderyja forestry concessions

The whole data used for said estimation is attached in the following charts:

a) Carbon stocked per sample plot in the whole eligible area

Concession	Plots	Carbon (tn/ha)	Physiography	Vegetation
Maderacre	1	220.7	Colina baja fuerte	Bosque de Vigor 3
Maderacre	2	257.9	Colina baja fuerte	Bosque de Vigor 3
Maderacre	3	425.9	Colina baja fuerte	Bosque con Paca
Maderacre	4	184.2	Colina baja fuerte	Bosque con Paca
Maderacre	5	192.2	Colina baja fuerte	Bosque de Vigor 2
Maderacre	6	179.0	Colina baja fuerte	Bosque de Vigor 2
Maderacre	7	187.0	Colina baja fuerte	Bosque con Paca
Maderacre	8	169.6	Colina baja fuerte	Bosque con Paca
Maderacre	9	358.5	Colina baja fuerte	Bosque con Paca
Maderacre	10	230.2	Colina baja fuerte	Bosque con Paca
Maderacre	11	135.9	Colina baja fuerte	Bosque con Paca
Maderacre	12	139.7	Colina baja fuerte	Bosque con Paca
Maderacre	13	132.1	Colina baja fuerte	Pacal
Maderacre	14	385.6	Colina baja fuerte	Bosque con Paca
Maderacre	15	266.7	Colina baja fuerte	Bosque con Paca
Maderacre	16	246.7	Colina baja fuerte	Bosque con Paca
Maderacre	17	217.9	Colina baja fuerte	Bosque con Paca
Maderacre	18	188.8	Colina baja fuerte	Bosque con Paca
Maderacre	19	324.1	Colina baja fuerte	Bosque con Paca
Maderacre	20	813.6	Colina baja fuerte	Bosque con Paca
Maderacre	21	182.4	Colina baja fuerte	Bosque de Vigor 2
Maderacre	22	107.1	Colina baja fuerte	Bosque con Paca
Maderacre	23	177.0	Colina baja fuerte	Bosque con Paca
Maderacre	24	200.1	Colina baja fuerte	Pacal
Maderacre	25	219.4	Colina baja fuerte	Bosque con Paca
Maderacre	26	254.8	Colina baja fuerte	Bosque con Paca
Maderacre	27	464.7	Colina baja fuerte	Bosque de Vigor 3
Maderacre	28	238.7	Colina baja fuerte	Bosque de Vigor 3
Maderacre	29	115.5	Colina baja fuerte	Bosque con Paca
Maderacre	30	179.4	Colina baja fuerte	Bosque con Paca
Maderacre	31	259.6	Colina baja fuerte	Bosque con Paca

Concession	Plots	Carbon (tn/ha)	Physiography	Vegetation
Maderacre	32	268.7	Colina baja fuerte	Bosque de Vigor 2
Maderacre	33	156.4	Colina baja fuerte	Bosque de Vigor 2
Maderacre	34	171.6	Colina baja fuerte	Bosque de Vigor 2
Maderacre	35	173.4	Colina baja fuerte	Bosque de Vigor 2
Maderacre	36	229.8	Colina baja fuerte	Bosque de Vigor 2
Maderacre	37	129.1	Colina baja fuerte	Pacal
Maderacre	38	117.1	Colina baja fuerte	Pacal
Maderacre	39	119.5	Colina baja fuerte	Bosque con Paca
Maderacre	40	101.9	Colina baja fuerte	Bosque con Paca
Maderacre	41	429.0	Colina baja fuerte	Bosque de Vigor 3
Maderacre	42	286.9	Colina baja fuerte	Bosque con Paca
Maderacre	43	144.9	Colina baja fuerte	Bosque con Paca
Maderacre	44	190.9	Colina baja fuerte	Pacal
Maderacre	45	206.8	Colina baja fuerte	Bosque de Vigor 2
Maderacre	46	208.0	Colina baja fuerte	Bosque con Paca
Maderacre	47	159.6	Colina baja fuerte	Bosque de Vigor 2
Maderacre	48	465.9	Colina baja fuerte	Bosque de Vigor 2
Maderacre	49	379.7	Colina baja fuerte	Bosque de Vigor 2
Maderacre	50	219.5	Colina baja fuerte	Bosque de Vigor 2
Maderacre	51	207.4	Colina baja fuerte	Bosque de Vigor 2
Maderacre	52	512.7	Colina baja fuerte	Bosque de Vigor 2
Maderacre	53	496.8	Colina baja fuerte	Bosque de Vigor 2
Maderacre	54	137.9	Colina baja fuerte	Bosque de Vigor 3
Maderacre	55	163.6	Colina baja fuerte	Bosque de Vigor 2
Maderacre	56	239.0	Colina baja fuerte	Bosque de Vigor 2
Maderacre	57	177.5	Colina baja fuerte	Pacal
Maderacre	58	321.3	Colina baja fuerte	Pacal
Maderacre	59	144.5	Colina baja fuerte	Pacal
Maderacre	60	363.4	Colina baja fuerte	Pacal
Maderacre	61	136.6	Colina baja fuerte	Bosque de Vigor 2
Maderacre	62	221.4	Colina baja fuerte	Bosque de Vigor 2
Maderacre	63	193.2	Colina baja fuerte	Pacal
Maderacre	64	97.4	Colina baja fuerte	Pacal
Maderacre	65	102.4	Colina baja fuerte	Pacal
Maderacre	66	125.2	Colina baja fuerte	Pacal
Maderyja	1	248.3	Colina baja fuerte	Bosque de Vigor 2
Maderyja	2	177.6	Colina baja fuerte	Pacal
Maderyja	3	220.2	Colina baja fuerte	Pacal
Maderyja	4	210.0	Colina baja fuerte	Pacal

Concession	Plots	Carbon (tn/ha)	Physiography	Vegetation
Maderyja	5	200.6	Colina baja fuerte	Pacal
Maderyja	6	320.7	Colina baja fuerte	Pacal
Maderyja	7	328.5	Colina baja fuerte	Pacal
Maderyja	8	242.4	Colina baja fuerte	Bosque de Vigor 2
Maderyja	9	194.8	Colina baja fuerte	Bosque de Vigor 2
Maderyja	10	343.5	Colina baja fuerte	Bosque de Vigor 2
Maderyja	11	205.7	Colina baja fuerte	Bosque con Paca
Maderyja	12	381.3	Colina baja fuerte	Pacal
Maderyja	13	153.6	Colina baja fuerte	Bosque con Paca
Maderyja	14	146.1	Colina baja fuerte	Bosque con Paca
Maderyja	15	360.8	Colina baja fuerte	Bosque de Vigor 2
Maderyja	16	289.4	Colina baja fuerte	Pacal
Maderyja	17	269.6	Colina baja fuerte	Bosque de Vigor 2
Maderyja	18	265.0	Colina baja fuerte	Bosque de Vigor 2
Maderyja	19	162.9	Colina baja fuerte	Bosque de Vigor 2
Maderyja	20	245.9	Colina baja fuerte	Bosque de Vigor 2
Maderyja	21	152.2	Colina baja fuerte	Bosque de Vigor 2
Maderyja	22	194.1	Colina baja fuerte	Bosque de Vigor 3
Maderyja	23	172.6	Colina baja fuerte	Bosque con Paca
Maderyja	24	242.4	Colina baja fuerte	Bosque de Vigor 3
Maderyja	25	105.4	Colina baja fuerte	Bosque de Vigor 2
Maderyja	26	212.9	Colina baja fuerte	Bosque de Vigor 2
Maderyja	27	232.9	Terraza baja	Bosque de Vigor 3
Maderyja	28	84.3	Colina baja fuerte	Bosque de Vigor 2
Maderyja	29	250.3	Colina baja fuerte	Bosque con Paca
Maderyja	30	66.6	Terraza baja	Pacal
Maderyja	31	111.6	Colina baja fuerte	Bosque con Paca
Maderyja	32	73.8	Colina baja fuerte	Bosque de Vigor 2
Maderyja	33	144.5	Colina baja fuerte	Bosque de Vigor 2
Maderyja	34	118.4	Colina baja fuerte	Bosque de Vigor 2
Maderyja	35	562.4	Colina baja fuerte	Bosque de Vigor 2
Maderyja	36	151.3	Colina baja fuerte	Bosque de Vigor 2
Maderyja	37	712.8	Colina baja fuerte	Bosque de Vigor 2
Maderyja	38	253.5	Colina baja fuerte	Bosque con Paca
Maderyja	39	107.6	Colina baja fuerte	Bosque con Paca
Maderyja	40	238.1	Colina baja fuerte	Bosque con Paca
Maderyja	41	229.7	Colina baja fuerte	Bosque con Paca
Maderyja	42	117.2	Colina baja fuerte	Pacal

Concession	Plots	Carbon (tn/ha)	Physiography	Vegetation
Maderyja	43	379.3	Colina baja fuerte	Pacal
Maderyja	44	335.4	Colina baja fuerte	Bosque con Paca
Maderyja	45	99.0	Colina baja fuerte	Bosque de Vigor 2
Maderyja	46	207.7	Colina baja fuerte	Bosque de Vigor 2
Maderyja	47	186.8	Colina baja fuerte	Bosque de Vigor 2
Maderyja	48	206.8	Colina baja fuerte	Bosque de Vigor 2
Maderyja	49	162.7	Colina baja fuerte	Bosque de Vigor 2
Maderyja	50	278.7	Colina baja fuerte	Bosque de Vigor 2
Maderyja	51	205.9	Colina baja fuerte	Bosque de Vigor 2
Maderyja	52	322.5	Colina baja fuerte	Bosque de Vigor 2
Maderyja	53	374.6	Colina baja fuerte	Bosque de Vigor 2
Maderyja	54	196.3	Colina baja fuerte	Bosque con Paca
Maderyja	55	151.4	Colina baja fuerte	Bosque con Paca
Maderyja	56	468.2	Colina baja fuerte	Bosque de Vigor 2
Maderyja	57	115.3	Colina baja fuerte	Bosque con Paca
Maderyja	58	128.8	Colina baja fuerte	Bosque de Vigor 2
Maderyja	59	115.1	Colina baja fuerte	Bosque con Paca
Maderyja	60	232.4	Colina baja fuerte	Bosque de Vigor 3
Maderyja	61	206.3	Colina baja fuerte	Bosque de Vigor 3
Maderyja	62	149.9	Colina baja fuerte	Bosque con Paca
Maderyja	63	335.2	Colina baja fuerte	Bosque con Paca
Maderyja	64	165.4	Colina baja fuerte	Bosque con Paca
Maderyja	65	232.7	Colina baja fuerte	Bosque de Vigor 2
Maderyja	66	185.9	Colina baja fuerte	Bosque de Vigor 2
Maderyja	67	147.3	Colina baja fuerte	Bosque con Paca
Maderyja	68	49.1	Colina baja fuerte	Bosque de Vigor 2
Maderyja	69	150.6	Colina baja fuerte	Bosque de Vigor 2
Maderyja	70	144.2	Colina baja fuerte	Bosque con Paca
Maderyja	71	172.7	Colina baja fuerte	Bosque de Vigor 2
Maderyja	72	534.2	Colina baja fuerte	Bosque de Vigor 2
Maderyja	73	269.1	Colina baja fuerte	Bosque de Vigor 2
Maderyja	74	312.6	Colina baja fuerte	Bosque de Vigor 2
Maderyja	75	127.2	Colina baja fuerte	Bosque de Vigor 2
Maderyja	76	113.5	Colina baja fuerte	Bosque de Vigor 2

b) Carbon stocked per sample plot by physiography type

Plots	Carbon (tn/ha)	Physiography	Vegetation
1	248.320225	Colina baja fuerte	Bosque de Vigor 2
2	177.649071	Colina baja fuerte	Pacal
3	220.21473	Colina baja fuerte	Pacal
4	210.013243	Colina baja fuerte	Pacal
5	200.646788	Colina baja fuerte	Pacal
6	320.720077	Colina baja fuerte	Pacal
7	328.507985	Colina baja fuerte	Pacal
8	242.416552	Colina baja fuerte	Bosque de Vigor 2
9	194.825393	Colina baja fuerte	Bosque de Vigor 2
10	343.488084	Colina baja fuerte	Bosque de Vigor 2
11	205.707078	Colina baja fuerte	Bosque con Paca
12	381.278197	Colina baja fuerte	Pacal
13	153.589314	Colina baja fuerte	Bosque con Paca
14	146.133639	Colina baja fuerte	Bosque con Paca
15	360.81139	Colina baja fuerte	Bosque de Vigor 2
16	289.376809	Colina baja fuerte	Pacal
17	269.571961	Colina baja fuerte	Bosque de Vigor 2
18	264.99683	Colina baja fuerte	Bosque de Vigor 2
19	162.911765	Colina baja fuerte	Bosque de Vigor 2
20	245.854264	Colina baja fuerte	Bosque de Vigor 2
21	152.155399	Colina baja fuerte	Bosque de Vigor 2
22	194.06065	Colina baja fuerte	Bosque de Vigor 3
23	172.551706	Colina baja fuerte	Bosque con Paca
24	242.414632	Colina baja fuerte	Bosque de Vigor 3
25	105.355341	Colina baja fuerte	Bosque de Vigor 2
26	212.870855	Colina baja fuerte	Bosque de Vigor 2
27	84.2893716	Colina baja fuerte	Bosque de Vigor 2
28	250.340847	Colina baja fuerte	Bosque con Paca
29	111.561025	Colina baja fuerte	Bosque con Paca
30	73.8261975	Colina baja fuerte	Bosque de Vigor 2
31	144.541002	Colina baja fuerte	Bosque de Vigor 2
32	118.440678	Colina baja fuerte	Bosque de Vigor 2
33	562.44072	Colina baja fuerte	Bosque de Vigor 2
34	151.349416	Colina baja fuerte	Bosque de Vigor 2
35	712.796707	Colina baja fuerte	Bosque de Vigor 2

Plots	Carbon (tn / ha)	Physiography	Vegetation
36	253.522289	Colina baja fuerte	Bosque con Paca
37	107.606237	Colina baja fuerte	Bosque con Paca
38	238.108562	Colina baja fuerte	Bosque con Paca
39	229.70626	Colina baja fuerte	Bosque con Paca
40	117.157654	Colina baja fuerte	Pacal
41	379.308304	Colina baja fuerte	Pacal
42	335.384002	Colina baja fuerte	Bosque con Paca
43	99.0213064	Colina baja fuerte	Bosque de Vigor 2
44	207.745248	Colina baja fuerte	Bosque de Vigor 2
45	186.814469	Colina baja fuerte	Bosque de Vigor 2
46	206.829466	Colina baja fuerte	Bosque de Vigor 2
47	162.73139	Colina baja fuerte	Bosque de Vigor 2
48	278.68589	Colina baja fuerte	Bosque de Vigor 2
49	205.857717	Colina baja fuerte	Bosque de Vigor 2
50	322.469786	Colina baja fuerte	Bosque de Vigor 2
51	374.645352	Colina baja fuerte	Bosque de Vigor 2
52	196.276055	Colina baja fuerte	Bosque con Paca
53	151.392633	Colina baja fuerte	Bosque con Paca
54	468.153488	Colina baja fuerte	Bosque de Vigor 2
55	115.273743	Colina baja fuerte	Bosque con Paca
56	128.760973	Colina baja fuerte	Bosque de Vigor 2
57	115.106438	Colina baja fuerte	Bosque con Paca
58	232.352866	Colina baja fuerte	Bosque de Vigor 3
59	206.340859	Colina baja fuerte	Bosque de Vigor 3
60	149.902447	Colina baja fuerte	Bosque con Paca
61	335.162109	Colina baja fuerte	Bosque con Paca
62	165.364128	Colina baja fuerte	Bosque con Paca
63	232.665675	Colina baja fuerte	Bosque de Vigor 2
64	185.859135	Colina baja fuerte	Bosque de Vigor 2
65	147.293033	Colina baja fuerte	Bosque con Paca
66	49.1018831	Colina baja fuerte	Bosque de Vigor 2
67	150.628787	Colina baja fuerte	Bosque de Vigor 2
68	144.214598	Colina baja fuerte	Bosque con Paca
69	172.698106	Colina baja fuerte	Bosque de Vigor 2
70	534.199502	Colina baja fuerte	Bosque de Vigor 2
71	269.082156	Colina baja fuerte	Bosque de Vigor 2
72	312.644713	Colina baja fuerte	Bosque de Vigor 2
73	127.166725	Colina baja fuerte	Bosque de Vigor 2

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Plots	Carbon (tn / ha)	Physiography	Vegetation
74	113.522827	Colina baja fuerte	Bosque de Vigor 2
75	220.736198	Colina baja fuerte	Bosque de Vigor 3
76	257.932896	Colina baja fuerte	Bosque de Vigor 3
77	425.880689	Colina baja fuerte	Bosque con Paca
78	184.16443	Colina baja fuerte	Bosque con Paca
79	192.19418	Colina baja fuerte	Bosque de Vigor 2
80	179.02506	Colina baja fuerte	Bosque de Vigor 2
81	187.004891	Colina baja fuerte	Bosque con Paca
82	169.641488	Colina baja fuerte	Bosque con Paca
83	358.466264	Colina baja fuerte	Bosque con Paca
84	230.234987	Colina baja fuerte	Bosque con Paca
85	135.942728	Colina baja fuerte	Bosque con Paca
86	139.731415	Colina baja fuerte	Bosque con Paca
87	132.130914	Colina baja fuerte	Pacal
88	385.60519	Colina baja fuerte	Bosque con Paca
89	266.68291	Colina baja fuerte	Bosque con Paca
90	246.704493	Colina baja fuerte	Bosque con Paca
91	217.937697	Colina baja fuerte	Bosque con Paca
92	188.772518	Colina baja fuerte	Bosque con Paca
93	324.11529	Colina baja fuerte	Bosque con Paca
94	813.559586	Colina baja fuerte	Bosque con Paca
95	182.382011	Colina baja fuerte	Bosque de Vigor 2
96	107.07727	Colina baja fuerte	Bosque con Paca
97	177.009114	Colina baja fuerte	Bosque con Paca
98	200.102251	Colina baja fuerte	Pacal
99	219.413105	Colina baja fuerte	Bosque con Paca
100	254.805969	Colina baja fuerte	Bosque con Paca
101	464.74797	Colina baja fuerte	Bosque de Vigor 3
102	238.668628	Colina baja fuerte	Bosque de Vigor 3
103	115.537549	Colina baja fuerte	Bosque con Paca
104	179.376602	Colina baja fuerte	Bosque con Paca
105	259.580778	Colina baja fuerte	Bosque con Paca
106	268.741119	Colina baja fuerte	Bosque de Vigor 2
107	156.398827	Colina baja fuerte	Bosque de Vigor 2
108	171.595082	Colina baja fuerte	Bosque de Vigor 2
109	173.418555	Colina baja fuerte	Bosque de Vigor 2
110	229.83283	Colina baja fuerte	Bosque de Vigor 2
111	129.126251	Colina baja fuerte	Pacal

Plots	Carbon (tn/ha)	Physiography	Vegetation
112	117.050304	Colina baja fuerte	Pacal
113	119.487395	Colina baja fuerte	Bosque con Paca
114	101.893279	Colina baja fuerte	Bosque con Paca
115	429.023554	Colina baja fuerte	Bosque de Vigor 3
116	286.913426	Colina baja fuerte	Bosque con Paca
117	144.903449	Colina baja fuerte	Bosque con Paca
118	190.889756	Colina baja fuerte	Pacal
119	206.8074	Colina baja fuerte	Bosque de Vigor 2
120	207.968285	Colina baja fuerte	Bosque con Paca
121	159.601292	Colina baja fuerte	Bosque de Vigor 2
122	465.940348	Colina baja fuerte	Bosque de Vigor 2
123	379.746201	Colina baja fuerte	Bosque de Vigor 2
124	219.451949	Colina baja fuerte	Bosque de Vigor 2
125	207.418668	Colina baja fuerte	Bosque de Vigor 2
126	512.689589	Colina baja fuerte	Bosque de Vigor 2
127	496.776328	Colina baja fuerte	Bosque de Vigor 2
128	137.86416	Colina baja fuerte	Bosque de Vigor 3
129	163.550768	Colina baja fuerte	Bosque de Vigor 2
130	238.991441	Colina baja fuerte	Bosque de Vigor 2
131	177.510118	Colina baja fuerte	Pacal
132	321.33255	Colina baja fuerte	Pacal
133	144.463935	Colina baja fuerte	Pacal
134	363.426577	Colina baja fuerte	Pacal
135	136.583189	Colina baja fuerte	Bosque de Vigor 2
136	221.422781	Colina baja fuerte	Bosque de Vigor 2
137	193.17125	Colina baja fuerte	Pacal
138	97.3946787	Colina baja fuerte	Pacal
139	102.435447	Colina baja fuerte	Pacal
140	125.219921	Colina baja fuerte	Pacal

c) Carbon stocked per sample plot - “Forest of Vigor 2” vegetation type

Concession	Plots	Carbon (tn / ha)	East	North	Physiography	Vegetation
MADERACRE	5	192.2	426500	8765000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	6	179.0	426500	8763000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	21	182.4	419000	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	32	268.7	414000	8773000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	33	156.4	414000	8775000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	34	171.6	414000	8777000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	35	173.4	411500	8775000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	36	229.8	411500	8773000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	45	206.8	409000	8773000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	47	159.6	406500	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	48	465.9	404000	8769000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	49	379.7	404000	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	50	219.5	404000	8773000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	51	207.4	401500	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	52	512.7	401500	8769000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	53	496.8	399000	8767000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	55	163.6	399000	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	56	239.0	396500	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	61	136.6	394000	8769000	Colina baja fuerte	Bosque de Vigor 2
MADERACRE	62	221.4	394000	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	1	248.3	386500	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	8	242.4	384000	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	9	194.8	381500	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	10	343.5	381500	8769000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	15	360.8	379000	8769000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	17	269.6	376500	8779000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	18	265.0	376500	8777000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	19	162.9	376500	8775000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	20	245.9	376500	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	21	152.2	376500	8769000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	25	105.4	374000	8767000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	26	212.9	374000	8769000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	28	84.3	374000	8775000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	32	73.8	371500	8775000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	33	144.5	371500	8771000	Colina baja fuerte	Bosque de Vigor 2

Concession	Plots	Carbon (tn/ha)	East	North	Physiography	Vegetation
MADERYJA	34	118.4	371500	8769000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	35	562.4	371500	8767000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	36	151.3	371500	8765000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	37	712.8	369000	8773000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	45	99.0	364000	8775000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	46	207.7	364000	8777000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	47	186.8	361500	8777000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	48	206.8	361500	8775000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	49	162.7	361500	8773000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	50	278.7	361500	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	51	205.9	359000	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	52	322.5	359000	8773000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	53	374.6	359000	8775000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	56	468.2	356500	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	58	128.8	354000	8769000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	65	232.7	349000	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	66	185.9	349000	8773000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	68	49.1	349000	8777000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	69	150.6	346500	8777000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	71	172.7	346500	8773000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	72	534.2	346500	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	73	269.1	344000	8771000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	74	312.6	344000	8773000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	75	127.2	344000	8775000	Colina baja fuerte	Bosque de Vigor 2
MADERYJA	76	113.5	344000	8777000	Colina baja fuerte	Bosque de Vigor 2

d) Carbon stocked per sample plot - “Forest of Vigor 3” vegetation type

Concession	Plots	Carbon (tn/ha)	East	North	Physiography	Vegetation
MADERACRE	1	220.7	426500	8773000	Colina baja fuerte	Bosque de Vigor 3
MADERACRE	2	257.9	426500	8771000	Colina baja fuerte	Bosque de Vigor 3
MADERACRE	27	464.7	416500	8765000	Colina baja fuerte	Bosque de Vigor 3
MADERACRE	28	238.7	414000	8765000	Colina baja fuerte	Bosque de Vigor 3
MADERACRE	41	429.0	409000	8765000	Colina baja fuerte	Bosque de Vigor 3
MADERACRE	54	137.9	399000	8769000	Colina baja fuerte	Bosque de Vigor 3
MADERYJA	22	194.1	376500	8767000	Colina baja fuerte	Bosque de Vigor 3
MADERYJA	24	242.4	374000	8765000	Colina baja fuerte	Bosque de Vigor 3
MADERYJA	27	232.9	374000	8771000	Terraza baja	Bosque de Vigor 3
MADERYJA	60	232.4	354000	8773000	Colina baja fuerte	Bosque de Vigor 3
MADERYJA	61	206.3	354000	8775000	Colina baja fuerte	Bosque de Vigor 3

e) Carbon stocked per sample plot - “Forest with Paca” vegetation type

Concession	Plots	Carbon (tn/ha)	East	North	Physiography	Vegetation
MADERACRE	3	425.9	426500	8769000	Colina baja fuerte	Bosque con Paca
MADERACRE	4	184.2	426500	8767000	Colina baja fuerte	Bosque con Paca
MADERACRE	7	187.0	424000	8763000	Colina baja fuerte	Bosque con Paca
MADERACRE	8	169.6	424000	8765000	Colina baja fuerte	Bosque con Paca
MADERACRE	9	358.5	424000	8767000	Colina baja fuerte	Bosque con Paca
MADERACRE	10	230.2	424000	8769000	Colina baja fuerte	Bosque con Paca
MADERACRE	11	135.9	424000	8771000	Colina baja fuerte	Bosque con Paca
MADERACRE	12	139.7	424000	8773000	Colina baja fuerte	Bosque con Paca
MADERACRE	14	385.6	421500	8771000	Colina baja fuerte	Bosque con Paca
MADERACRE	15	266.7	421500	8769000	Colina baja fuerte	Bosque con Paca
MADERACRE	16	246.7	421500	8767000	Colina baja fuerte	Bosque con Paca
MADERACRE	17	217.9	421500	8765000	Colina baja fuerte	Bosque con Paca
MADERACRE	18	188.8	419000	8765000	Colina baja fuerte	Bosque con Paca
MADERACRE	19	324.1	419000	8767000	Colina baja fuerte	Bosque con Paca
MADERACRE	20	813.6	419000	8769000	Colina baja fuerte	Bosque con Paca
MADERACRE	22	107.1	419000	8773000	Colina baja fuerte	Bosque con Paca
MADERACRE	23	177.0	416500	8773000	Colina baja fuerte	Bosque con Paca
MADERACRE	25	219.4	416500	8769000	Colina baja fuerte	Bosque con Paca
MADERACRE	26	254.8	416500	8767000	Colina baja fuerte	Bosque con Paca
MADERACRE	29	115.5	414000	8767000	Colina baja fuerte	Bosque con Paca
MADERACRE	30	179.4	414000	8769000	Colina baja fuerte	Bosque con Paca
MADERACRE	31	259.6	414000	8771000	Colina baja fuerte	Bosque con Paca
MADERACRE	39	119.5	411500	8767000	Colina baja fuerte	Bosque con Paca
MADERACRE	40	101.9	411500	8765000	Colina baja fuerte	Bosque con Paca
MADERACRE	42	286.9	409000	8767000	Colina baja fuerte	Bosque con Paca
MADERACRE	43	144.9	409000	8769000	Colina baja fuerte	Bosque con Paca
MADERACRE	46	208.0	406500	8773000	Colina baja fuerte	Bosque con Paca
MADERYJA	11	205.7	381500	8767000	Colina baja fuerte	Bosque con Paca
MADERYJA	13	153.6	379000	8765000	Colina baja fuerte	Bosque con Paca
MADERYJA	14	146.1	379000	8767000	Colina baja fuerte	Bosque con Paca
MADERYJA	23	172.6	376500	8765000	Colina baja fuerte	Bosque con Paca
MADERYJA	29	250.3	374000	8777000	Colina baja fuerte	Bosque con Paca
MADERYJA	31	111.6	371500	8777000	Colina baja fuerte	Bosque con Paca
MADERYJA	38	253.5	369000	8775000	Colina baja fuerte	Bosque con Paca
MADERYJA	39	107.6	369000	8777000	Colina baja fuerte	Bosque con Paca

Concession	Plots	Carbon (tn/ha)	East	North	Physiography	Vegetation
MADERYJA	40	238.1	366500	8777000	Colina baja fuerte	Bosque con Paca
MADERYJA	41	229.7	366500	8775000	Colina baja fuerte	Bosque con Paca
MADERYJA	44	335.4	364000	8773000	Colina baja fuerte	Bosque con Paca
MADERYJA	54	196.3	356500	8775000	Colina baja fuerte	Bosque con Paca
MADERYJA	55	151.4	356500	8773000	Colina baja fuerte	Bosque con Paca
MADERYJA	57	115.3	356500	8769000	Colina baja fuerte	Bosque con Paca
MADERYJA	59	115.1	354000	8771000	Colina baja fuerte	Bosque con Paca
MADERYJA	62	149.9	351500	8775000	Colina baja fuerte	Bosque con Paca
MADERYJA	63	335.2	351500	8773000	Colina baja fuerte	Bosque con Paca
MADERYJA	64	165.4	351500	8771000	Colina baja fuerte	Bosque con Paca
MADERYJA	67	147.3	349000	8775000	Colina baja fuerte	Bosque con Paca
MADERYJA	70	144.2	346500	8775000	Colina baja fuerte	Bosque con Paca

f) Carbon stocked per sample plot - “Pacal” vegetation type

Concession	Plots	Carbon (tn/ha)	East	North	Physiography	Vegetation
MADERACRE	13	132.1	421500	8773000	Colina baja fuerte	Pacal
MADERACRE	24	200.1	416500	8771000	Colina baja fuerte	Pacal
MADERACRE	37	129.1	411500	8771000	Colina baja fuerte	Pacal
MADERACRE	38	117.1	411500	8769000	Colina baja fuerte	Pacal
MADERACRE	44	190.9	409000	8771000	Colina baja fuerte	Pacal
MADERACRE	57	177.5	396500	8769000	Colina baja fuerte	Pacal
MADERACRE	58	321.3	396500	8767000	Colina baja fuerte	Pacal
MADERACRE	59	144.5	394000	8765000	Colina baja fuerte	Pacal
MADERACRE	60	363.4	394000	8767000	Colina baja fuerte	Pacal
MADERACRE	63	193.2	391500	8767000	Colina baja fuerte	Pacal
MADERACRE	64	97.4	391500	8765000	Colina baja fuerte	Pacal
MADERACRE	65	102.4	389000	8765000	Colina baja fuerte	Pacal
MADERACRE	66	125.2	389000	8767000	Colina baja fuerte	Pacal
MADERYJA	2	177.6	386500	8769000	Colina baja fuerte	Pacal
MADERYJA	3	220.2	386500	8767000	Colina baja fuerte	Pacal
MADERYJA	4	210.0	386500	8765000	Colina baja fuerte	Pacal
MADERYJA	5	200.6	384000	8765000	Colina baja fuerte	Pacal
MADERYJA	6	320.7	384000	8767000	Colina baja fuerte	Pacal
MADERYJA	7	328.5	384000	8769000	Colina baja fuerte	Pacal
MADERYJA	12	381.3	381500	8765000	Colina baja fuerte	Pacal
MADERYJA	16	289.4	379000	8771000	Colina baja fuerte	Pacal
MADERYJA	30	66.6	374000	8779000	Terraza baja	Pacal
MADERYJA	42	117.2	366500	8773000	Colina baja fuerte	Pacal
MADERYJA	43	379.3	364000	8771000	Colina baja fuerte	Pacal

g) Location of sample plots with UTM coordinates (zone 19 WGS 84)

Concession	Sample plot	East	North
Maderacre	1	426500	8773000
Maderacre	2	426500	8771000
Maderacre	3	426500	8769000
Maderacre	4	426500	8767000
Maderacre	5	426500	8765000
Maderacre	6	426500	8763000
Maderacre	7	424000	8763000
Maderacre	8	424000	8765000
Maderacre	9	424000	8767000
Maderacre	10	424000	8769000
Maderacre	11	424000	8771000
Maderacre	12	424000	8773000
Maderacre	13	421500	8773000
Maderacre	14	421500	8771000
Maderacre	15	421500	8769000
Maderacre	16	421500	8767000
Maderacre	17	421500	8765000
Maderacre	18	419000	8765000
Maderacre	19	419000	8767000
Maderacre	20	419000	8769000
Maderacre	21	419000	8771000
Maderacre	22	419000	8773000
Maderacre	23	416500	8773000
Maderacre	24	416500	8771000
Maderacre	25	416500	8769000
Maderacre	26	416500	8767000
Maderacre	27	416500	8765000
Maderacre	28	414000	8765000
Maderacre	29	414000	8767000
Maderacre	30	414000	8769000
Maderacre	31	414000	8771000
Maderacre	32	414000	8773000
Maderacre	33	414000	8775000
Maderacre	34	414000	8777000
Maderacre	35	411500	8775000
Maderacre	36	411500	8773000
Maderacre	37	411500	8771000

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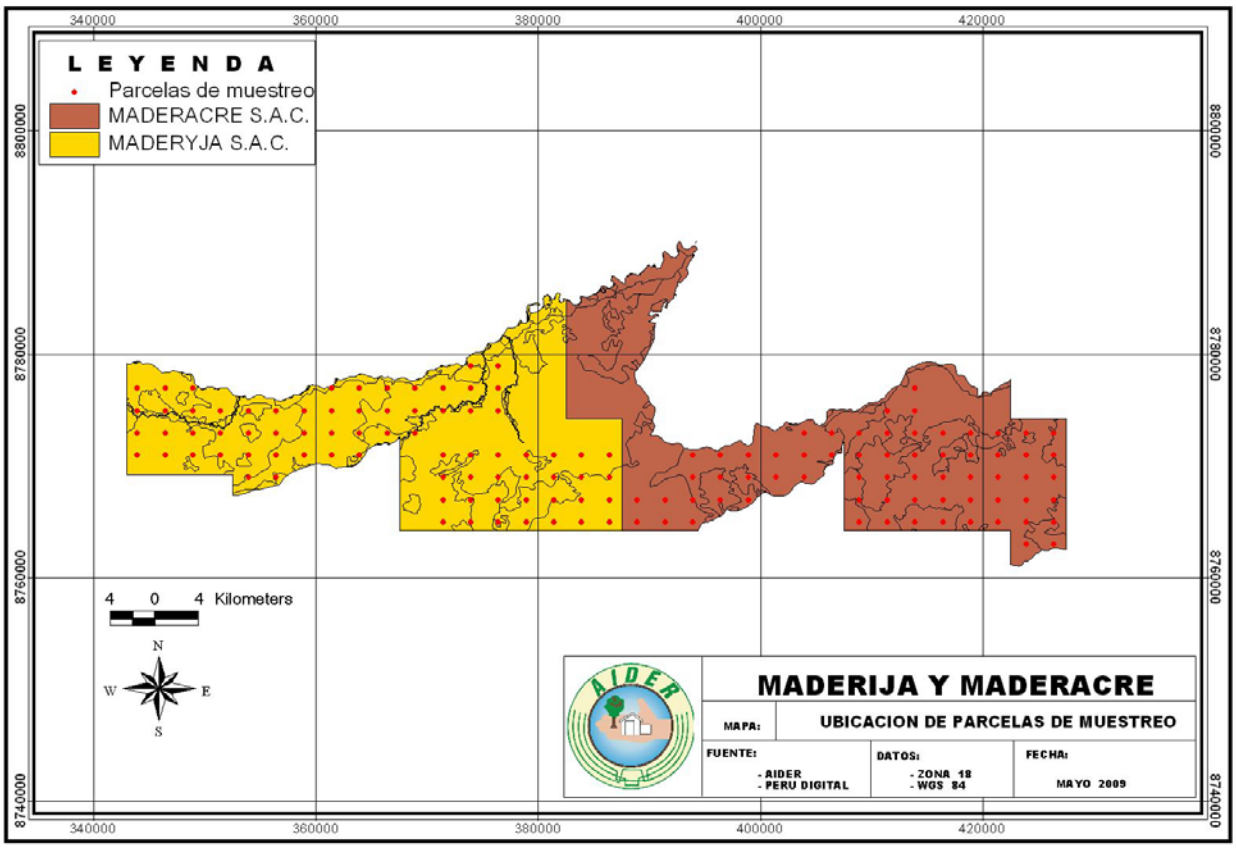
Concession	Sample plot	East	North
Maderacre	38	411500	8769000
Maderacre	39	411500	8767000
Maderacre	40	411500	8765000
Maderacre	41	409000	8765000
Maderacre	42	409000	8767000
Maderacre	43	409000	8769000
Maderacre	44	409000	8771000
Maderacre	45	409000	8773000
Maderacre	46	406500	8773000
Maderacre	47	406500	8771000
Maderacre	48	404000	8769000
Maderacre	49	404000	8771000
Maderacre	50	404000	8773000
Maderacre	51	401500	8771000
Maderacre	52	401500	8769000
Maderacre	53	399000	8767000
Maderacre	54	399000	8769000
Maderacre	55	399000	8771000
Maderacre	56	396500	8771000
Maderacre	57	396500	8769000
Maderacre	58	396500	8767000
Maderacre	59	394000	8765000
Maderacre	60	394000	8767000
Maderacre	61	394000	8769000
Maderacre	62	394000	8771000
Maderacre	63	391500	8767000
Maderacre	64	391500	8765000
Maderacre	65	389000	8765000
Maderacre	66	389000	8767000
Maderyja	1	386500	8771000
Maderyja	2	386500	8769000
Maderyja	3	386500	8767000
Maderyja	4	386500	8765000
Maderyja	5	384000	8765000
Maderyja	6	384000	8767000
Maderyja	7	384000	8769000
Maderyja	8	384000	8771000

Greenoxx
Greening the future

Concession	Sample plot	East	North
Maderyja	9	381500	8771000
Maderyja	10	381500	8769000
Maderyja	11	381500	8767000
Maderyja	12	381500	8765000
Maderyja	13	379000	8765000
Maderyja	14	379000	8767000
Maderyja	15	379000	8769000
Maderyja	16	379000	8771000
Maderyja	17	376500	8779000
Maderyja	18	376500	8777000
Maderyja	19	376500	8775000
Maderyja	20	376500	8771000
Maderyja	21	376500	8769000
Maderyja	22	376500	8767000
Maderyja	23	376500	8765000
Maderyja	24	374000	8765000
Maderyja	25	374000	8767000
Maderyja	26	374000	8769000
Maderyja	27	374000	8771000
Maderyja	28	374000	8775000
Maderyja	29	374000	8777000
Maderyja	30	374000	8779000
Maderyja	31	371500	8777000
Maderyja	32	371500	8775000
Maderyja	33	371500	8771000
Maderyja	34	371500	8769000
Maderyja	35	371500	8767000
Maderyja	36	371500	8765000
Maderyja	37	369000	8773000
Maderyja	38	369000	8775000
Maderyja	39	369000	8777000
Maderyja	40	366500	8777000
Maderyja	41	366500	8775000
Maderyja	42	366500	8773000
Maderyja	43	364000	8771000
Maderyja	44	364000	8773000
Maderyja	45	364000	8775000
Maderyja	46	364000	8777000

Concession	Sample plot	East	North
Maderyja	47	361500	8777000
Maderyja	48	361500	8775000
Maderyja	49	361500	8773000
Maderyja	50	361500	8771000
Maderyja	51	359000	8771000
Maderyja	52	359000	8773000
Maderyja	53	359000	8775000
Maderyja	54	356500	8775000
Maderyja	55	356500	8773000
Maderyja	56	356500	8771000
Maderyja	57	356500	8769000
Maderyja	58	354000	8769000
Maderyja	59	354000	8771000
Maderyja	60	354000	8773000
Maderyja	61	354000	8775000
Maderyja	62	351500	8775000
Maderyja	63	351500	8773000
Maderyja	64	351500	8771000
Maderyja	65	349000	8771000
Maderyja	66	349000	8773000
Maderyja	67	349000	8775000
Maderyja	68	349000	8777000
Maderyja	69	346500	8777000
Maderyja	70	346500	8775000
Maderyja	71	346500	8773000
Maderyja	72	346500	8771000
Maderyja	73	344000	8771000
Maderyja	74	344000	8773000
Maderyja	75	344000	8775000
Maderyja	76	344000	8777000

h) Map of location of the sample plots of the Maderyja and Maderacre forestry concessions.



Complementary Design Document

Madre de Dios Amazon REDD Project

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A. Project design & goals

A. Project design & goals

A.1. Local stakeholders

Local stakeholders have been already identified as part of the process of getting FSC certification for Maderacre and Maderyja forest concessions, which include local authorities, neighbors (other concessions, an indigenous community, small farmers & agriculturists, etc.), local organizations (productive, social, etc.), State offices, among others.

Stakeholders consulted by the Smartwood staff when carrying out the correspondent verification: official entities, environmental NGOs, scientific entities, indigenous organizations, indigenous communities, forestry enterprises, civil organizations, researchers that had worked in the project area, local political and civil authorities (of Iñapari Distric).

To be able to do the total identification of the local stakeholders involved in any way with both concessions operations and based on the Smartwood list of consulted ones, a stakeholders mapping was designed and is presented below.

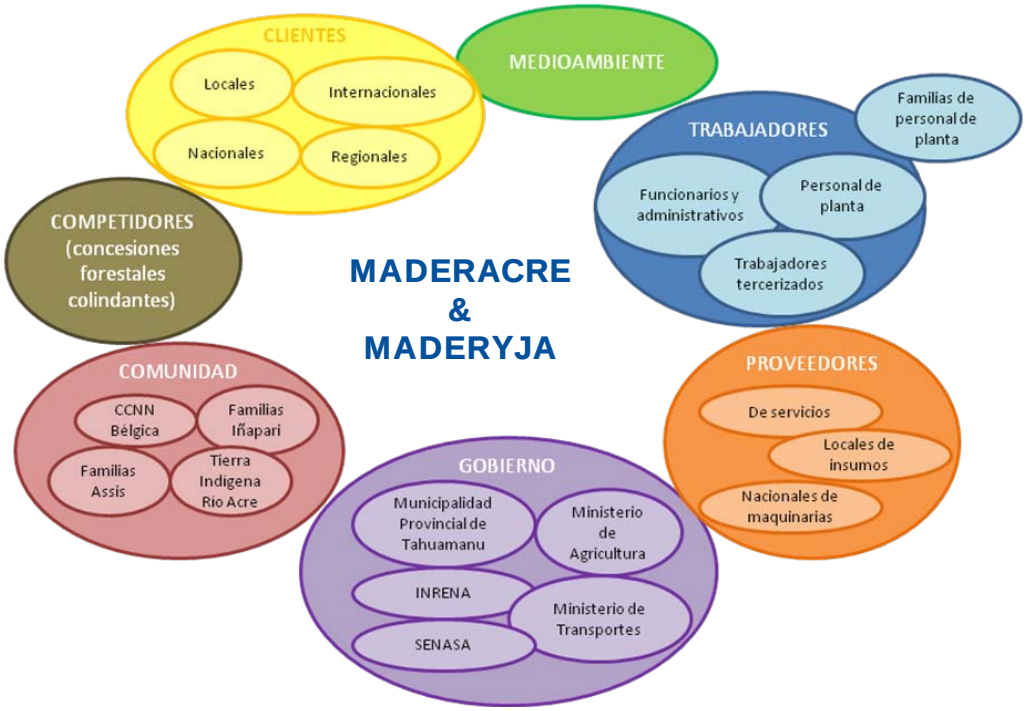


Fig. 1: Stakeholders mapping

Hereunder, the detailed list of the local stakeholders that have been identified by the concessions as a result of the aforementioned mapping is presented:

a) Socio-communitarian groups or local organizations that are influenced by the concessions operations:

Chart 1: Groups and organizations influenced by the concessions operations

Organization, Institution, Company	Person to contact	Position	Localization
Native Community Belgium	Ilzon López Añez	Chief	Madre de Dios - Tahuamanu - Iñapari
Nueva Esperanza Community	Teófila Huamán	President	Madre de Dios - Tahuamanu - Iñapari
Villa Primavera Community	Vanesa Chura	President	Madre de Dios - Tahuamanu - Iñapari
La Colonia Neighborhood Inhabitants Association	Verónica Cardozo	President	Madre de Dios - Tahuamanu - Iñapari
Consult Comity Iñapari	Marlene Besada	President	Madre de Dios - Tahuamanu - Iñapari
Cattle-raisers Association of Iñapari	Samuel Elías Roca	President	Madre de Dios - Tahuamanu - Iñapari
Farmer and fishers Association	Elías Cardozo Mouzully	President	Madre de Dios - Tahuamanu - Iñapari
Chamber of Commerce, Industry and Tourism Association of Iñapari	Jorge Barra Gonzales	President	Madre de Dios - Tahuamanu - Iñapari
Club of Mothers of Iñapari	Eva Leonor Flores Ríos	President	Madre de Dios - Tahuamanu - Iñapari

b) Researching Institutions or Universities that are familiar with the concessions operations:

Chart 2: Researching Institutions or Universities familiar with the concessions operations

Organization, Institution, Company	Person to contact	Position	Localization
Peruvian Amazon Researching Institute	Eng. Cesar Chia	Manager	Madre de Dios - Tambopata - Maldonado Port
Peruvian Amazon Researching Institute	Eng. Telesforo Vasques	Researcher	Madre de Dios - Tambopata – Puerto Maldonado
Interethnic Association for the Development of the Amazonian Forest	Anth. Beatriz Huertas Castillo	Researcher in indigenous subjects of Madre de Dios	Lima
Florida University	Andrea Birgit Chávez	PhD Candidate Department of Geography	Florida, USA
La Molina Agrarian University	Ignacio Lombardi	Professor and Researcher	Lima
University of the Pacific	Elsa Galarza	Professor and Researcher	Lima

c) Governmental Agencies that are familiar with the concessions operations:

Chart 3: Governmental Agencies familiar with the concessions operations

Organization, Institution, Company	Person to contact	Position	Localization
General Direction of Forestry and Native Fauna (DGFFS)	Gustavo Suarez de Freitas	Intendance	Lima

Organization, Institution, Company	Person to contact	Position	Localization
Forestry and Native Fauna Technical Administration of DGFFS - Tahuamanu	Eng. Jorge Cardozo Soarez	Technical Manager	Madre de Dios - Tahuamanu - Iberia
Forestry and Native Fauna Technical Administration of DGFFS - Tahuamanu - Iñapari's Control Office	Sra. Lila Quispe	Responsible	Madre de Dios - Tahuamanu - Iñapari
Forestry and Native Fauna Technical Administration of INRENA - Tambopata	Eng. Carlos Alberto Ortiz Chavez	Technical Manager	Madre de Dios – Tambopata – Puerto Maldonado
Regional Government of Madre de Dios	CPC. Santos Kawai Comori	President	Madre de Dios - Tambopata - Puerto Maldonado
Ministry of Labor and Social Promotion - Madre de Dios	Oscar Vizcarra Ramos	Director	Madre de Dios - Tambopata - Puerto Maldonado
Provincial Municipality of Tahuamanu	Alfonso Bernardo Cardozo	Mayor	Madre de Dios - Tambopata - Puerto Maldonado
Prefecture Assis Brasil	Maria Eliani Gadelia Carius	Prefect	Accre - Assis Brazil

d) Social and environmental organizations that are familiar with the concessions operations:

Chart 4: Organizations familiar with the concessions operations

Organization, Institution, Company	Person to contact	Position	Localization
WWF - Peru	Fred Prins	Peruvian Representative	Lima

Organization, Institution, Company	Person to contact	Position	Localization
WWF - Madre de Dios	Alipse Varela	Certification FSC Project Coordinator	Madre de Dios - Tambopata - Puerto Maldonado
CESVI - Madre de Dios	Eng. Mario Quevedo	Coordinator	Madre de Dios - Tambopata - Puerto Maldonado
Peruvian Society of Environmental Law / DED German Service of Socio - Technical Cooperation - Amazonian Program	Thomas Müller	Responsible	Lima
Promotion Fund for the Development of the Forest - Madre de Dios Office	Eng. Alonso Cordova	Regional Coordinator	Madre de Dios - Tambopata - Puerto Maldonado
Acre River Forest Management Committee	Elías Cardozo Mouzully	President	Madre de Dios - Tahuamanu - Iñapari

A public summary of the forest management plan and other relevant documents have been distributed between stakeholders and are available.

Workshops have been carried out to explain the main characteristics and the results of the forest project.

In addition to this, an analysis of the most involved social actors of the concessions is included in the Relationship with the Community Plans of the companies. Following, a brief description of said analysis is presented.

a) Neighbor timber concessions:

Maderacre:

Northeast boundary:	Pumaquiro S.A.C. (14900 ha).
South boundary:	Maderera Catahua S.A.C. (18100 ha). Agroindustrial Victoria S.A.C. (6300 ha). Maderera Paujil S.A.C. (46900 ha). EMINI S.A.C. (43800 ha). AMATEC S.A.C. (20900 ha).
East boundary:	Maderyja S.A.C. Nilda Madeleine Espinoza López (7000 ha).

Maderyja:

North boundary:	River Acre Ecological Station Head of Acre River Indigenous land
South boundary:	Maderera Catahua S.A.C. (18100 ha). Agroindustrial Victoria S.A.C. (6300 ha). Maderera Paujil S.A.C. (46900 ha).
East boundary:	Maderacre S.A.C.

b) Reserve for Indigenous People in Voluntary Isolation Conditions of the Peruvian State:

The isolated or non-contacted indigenous are a sector of the whole indigenous Peruvian population, supposedly part of Mashcopiro, Yora and Amahuaca ethnic groups, who have voluntarily decided to live out from the major society.

This isolating situation keeps them in a highly vulnerable condition as the lack of antibodies for virus and bacteria infections. For this reason, the Native Federation of Madre de Dios River promotes the protection and respect of the decision made by this indigenous people and has developed a contingency plan in order to mitigate the effects in any case of contact with other populations.

c) Belgian Native Community:

Said community is composed of 16 families of Yine and Huitoto origin. The whole area of Belgium Native Community represents approximately 50000 ha and timber extraction is their most important economic activity. All their wood production is commercialized in the local market. Additionally they develop agricultural activities to produce their own food, as well as fishing and hunting.

Fig. 2: Sight of the Belgian Native Community

d) Rural farms:

They are localized in the rural communities of Nueva Esperanza, Villa Primavera y Noaya of Iñapari District. Said farms belong mostly to immigrants of the south mountain range of Peru. The average size of each farm is of 40 ha and the productive activities carried out by them are mostly agricultural and cattle activities.

e) Iñapari Urban Population:

People mainly engaged in activities of secondary and tertiary sector and less in activities of primary sector on their own rural farms. As it was mentioned before, Iñapari population has been growing as a consequence of the construction of the inter-oceanic road and the dynamism of the local economy. Said construction increases the labor demanding, thus the immigration will continue over the time.

f) Head of Acre River Indigenous land:

Involves a total area of 188 km^2 and an approximate population of 200 inhabitants, mostly belonging to Yaminahua ethnic group and in a low degree to Machineri group.

Although the land is part of the Brazilian territory (Assis), it constitutes a stakeholder of great importance for both concessions as the management of said lands is shared with the Brazilian government.

g) Extracting Reserve Chico Mendes:

It was created in 1990 with social, economic and environmental objectives. It consists on 970,570 ha where the living people carry out economic activities in a controlled way.

h) River Acre Ecological Station:

It was created in 1981 with the main goal of carry out conservation, scientific researching and educational activities. It consists on a territory of 77,500 ha, located 71 km from Assis, Brazil.

i) Assis Brazil:

It corresponds to the urban side of Assis, Brazil. Strong commercial, familiar, cultural and social relationships have been developed between the rural populations near Brazil and the other communities that were previously described.

In the last few years, Assis Brazil has been rapidly growing and nowadays it counts with better services than Iñapari urban area, i.e. electric light all day long, governmental offices, business establishments with greater variety of products and a bank.

In the following graph, the analysis carried out by the concessions considering the whole social actors and their influence on the entrepreneurial activities is presented.

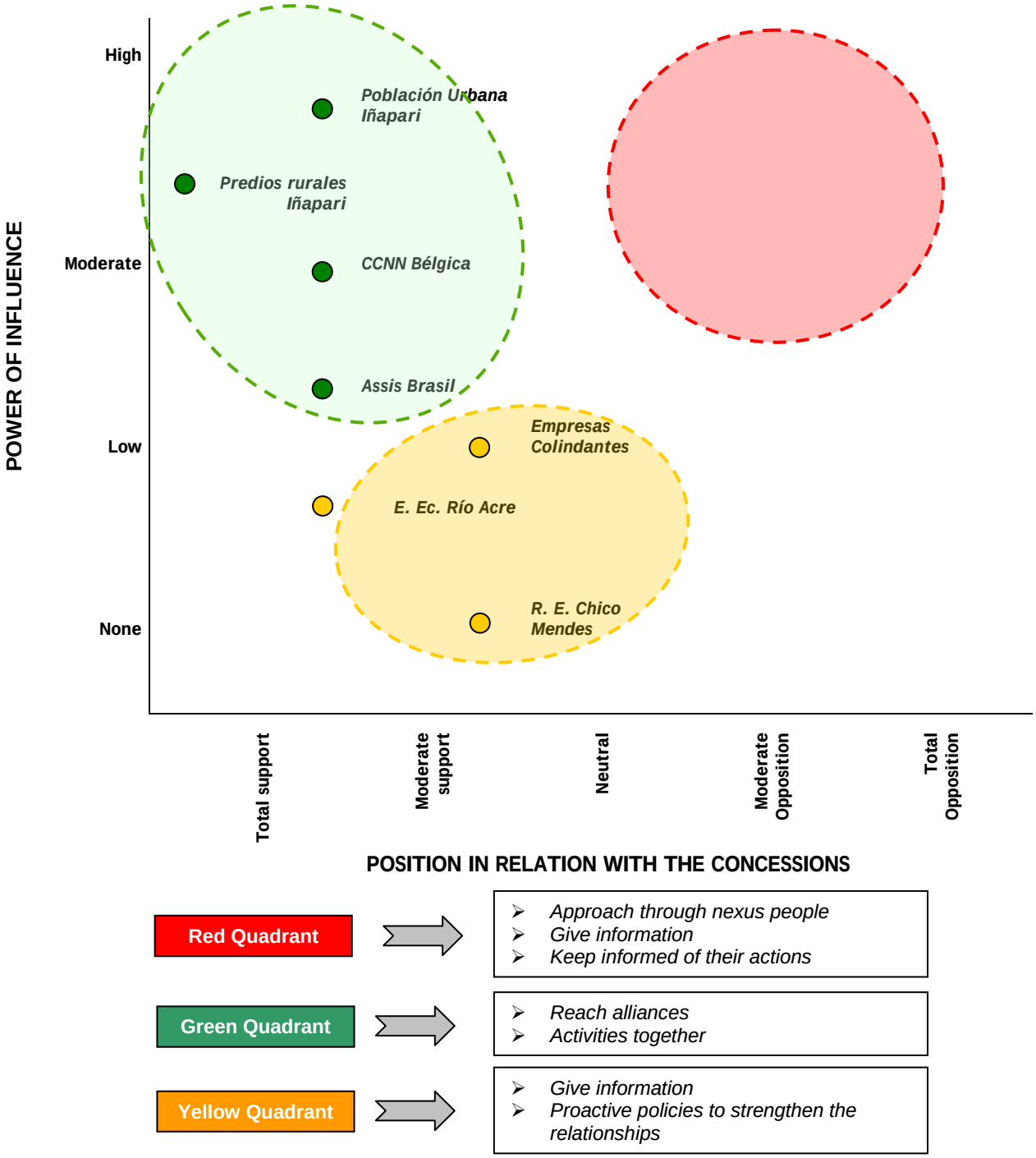


Fig. 3: Analysis of social actors and their influence on the entrepreneurial activities

Undoubtedly, Maderacre and Maderyja concessions have a genuine concern for all the social actors involved in some way with the companies and concrete actions and procedures to assure their participation in relation with all the operations and projects carried out by the concessions are determined in the social documents elaborated by them.

A.2. Legal status

Both timber concessions have a strict respect of the whole legal framework including laboral and environmental issues, as it has been confirmed for the international certifier company Smartwood (responsible for the evaluation made in order to give Maderacre & Maderyja the FSC certification).

According to the aforementioned FSC Certification, no illegal activities are detected in the concessions and both are totally up to date with all their legal obligations (salaries, payment of the annual rate for the concession rights to the Peruvian State, etc.). Furthermore, the forestry management system of them complies with all the P & C regulations of the FSC.

A.3. Adaptive management for sustainability

The project has designed and implemented the following tools to achieve a long-term sustainability of the initiative:

- Permanent training to workers and staff.
- Integral monitoring plan (social, environmental and economic issues).
- A monitoring system of impacts and quality of training through an evaluation of performance during the operations.
- Annual monitoring reports.
- A command table.
- An inter-temporal comparative analysis.
- A participative process for developing the annual operational plan of the company.

A.3.1. Integral Monitoring Plan of Maderacre and Maderyja

Description and contents

The Integral Monitoring Plan[43] developed by both timber concessions enables a permanent control of the efficiency of all the activities carried out by them in the short term, as well as the impacts and effects on the medium and long term. The resulting feedback allows not only the improvement of the concessions results in the short term, but also the review and re-design of the medium and long term policies.

The monitoring and evaluation system of the concessions consists of the systematic collection of information which is after carefully analyzed to make the decision making process as precise and efficient as possible in the strategic and also in the operative level.

The Maderacre and Maderyja monitoring and evaluation system includes three levels of analysis:

a) Related with the mission, vision and objectives of the concessions.
b) Related with the environment.
c) Related with the results of the concessions and the management of the activities defined in the Annual Operative Plan.

In the following chart, the monitoring and entrepreneurial evaluation levels of the concessions are shown.

Chart 5: Monitoring and entrepreneurial evaluation levels

Monitoring and evaluation of the entrepreneurial environment

Monitoring and developing of the entrepreneurial vision, mission and strategic objectives	Impacts over the time	Strategic definition of the vision and mission
	Direct effects of the actions	Definition of strategic objectives
Monitoring and evaluation of the entrepreneurial results	Accomplished results	Results
Monitoring and evaluation of the entrepreneurial general management system	Achieved goals / Management of the resources	Activities

[43] The Integral Monitoring Plan will be available for the Verifier during his visit.

For all the monitoring activities, some indicators are defined. Two types of indicators are included in the monitoring and evaluation system:

a) Indicators of activity: they refer to direct actions that the managers and operative teams carry out i.e. inventory, felling, training courses.

b) Indicators of mission, vision and strategic objectives: they refer to substantial results that not only depend on the activities carried out, but also on the actions of other involved actors, markets evolution, national policies, etc.

The planning actions are carried out in three different levels:

a) Strategic Plan - for the long term planning (5 years).
b) Managing Plan - for the medium term planning (3 years).
c) Operative Plan - for the short term planning (1 year).

At a specialized level, Maderacre and Maderyja have designed the following plan:

a. General Forestry Management Plan: gives a general framework of the strategic planning and entrepreneurial projections in the long term, regarding all the forest resources. It is updated every 5 years.

At an operative level, they have designed the following plans:

a. Management Plan: in between of the strategic plan and the annual operative plan. It contains the projection of the economic, social and management results for the next 3 years, regarding any possible scenario and the company policies.

b. Annual Operative Plan for the season: gives instructions for the planning of the operations in the short term.

c. Annual Operative Entrepreneurial Plan: integrates all the planning annual activities of all the specialized plans aforementioned.

The following graph shows how the monitoring and evaluation system of both concessions works.

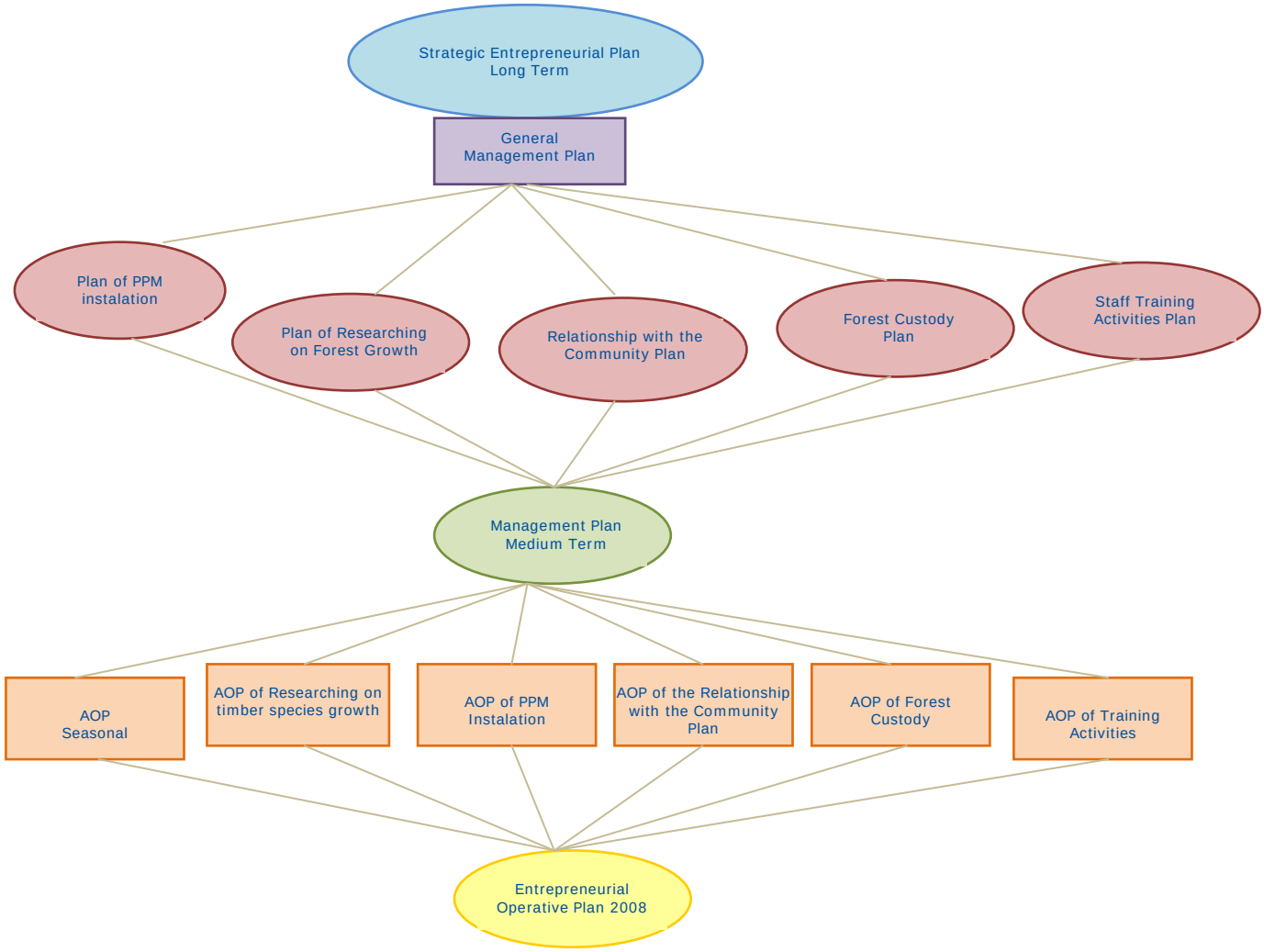


Fig. 4: Monitoring and evaluation system

Indicators to be measured

In the Integral Monitoring Plan of the concessions and with the aim to permanently evaluate the quality of the decisions made by each responsible team and the status of the companies at a certain time, a list of indicators is defined.

a) Financing indicators:
- Net utility over patrimony
- Net utility over total assets
- Net sales over total assets
- % of increment in the utilities distributed to partners

b) Social responsibility and development indicators:

- Quantity of resources destined to social projection
- Generation of direct employment
- Generation of indirect employment
- Number of new businesses in the area of influence

c) Environmental responsibility indicators:

- Changes in the DBH of trees with more than 10cm of DBH, changes in structure and floristic composition and changes in the regeneration and mortality over the time.
- Results of the approved FSC evaluations
- Approved DGFFS, OSINFOR and CITES evaluations
- Number of fauna species observations

d) Customer suppliers / strategic alliances indicators:

- Customers satisfaction level
- New customers / Total customers
- Quota rate in the regional market

e) Internal proceeding indicators:

- New products / Total products
- Real production / productive capacity

f) Learning and growing indicators:

- Workers motivation (salaries increase + participation in the company profits / total forms)
- % of increase in profits vs % increase in salaries
- Total production / number of workers

Strategic objectives per line of action and its respective measurement indicators

1) Line of action inventory and management plan:

a) Commercial census of 40 species to 60% of the area. Indicators:

- Censed Ha / year
- Quantity of species censed
- Cost / censed ha
- Cost / censed m^3

b) Resources management plan for non-wood Project (in application). Indicators:

- Number of non-wood resources identified
- Quantity of non-wood resources inventoried
- Number of non-wood economic activities developed

c) Voluntary Forestry Certification achieved and maintained. Indicators:
   - Number of certification audits approved during the period
   - % of observations and recommendations implemented and of recommendations in the certification audits

2) Line of action for harvesting:

a) Harvesting of at least 25 forestry species, at competitive costs. Indicators:
   - m^3 moved annually
   - m^3 moved annually with own machinery
   - Relationship moved volume vs. censed volume per plot to be harvested annually
   - Average volume moved per censed hectare
   - % of decrease of non-active days per person per activity
   - Cost per m^3 per month per activity
   - Size of cleared areas bigger than necessary in the forests

b) Achieved diversification of products extracted from the forests. Indicators:
   - Number of harvested non-wood products

3) Line of action for transformation:

a) Primary and secondary transformation of products from 25 wood species according to the quality standards of national and international markets. Indicators:
   - Sawn PT / year
   - Cost per sawn foot in average / year
   - PT yield / m^3 (per specie)
   - Monthly productivity of the personnel
   - Number of evaluations of chain of custody approved during the period
   - PT with secondary transformation produced per year
   - Average cost per PT produced with secondary transformation

b) System of profit of wood residues working and generating income. Indicators:
   - Kg of coal produced
   - Quantity of fuel wood produced

4) Line of action for commercialization and marketing:

a) Commercialization of 25 species of Wood in different grades of transformation. Indicators:
   - Number of commercialized species
   - Volume of commercialized sawn wood, per specie and annual quality
   - Volume of commercialized saw logs, per specie and per year
   - Average profit of the commercialized saw logs /year
   - Average profit per m^3 of commercialized sawn wood
   - Profit margin between the achieved quarterly prices and the local market prices
   - Average profit of the products with a secondary transformation
   - Volume of exported wood / month
   - Average profit of each exports operation

b) Commercialization of the products of the "triplayera", laminating and parketing businesses. Indicators:
   - Sales of each business unit

c) Development of a commercialization line for the wood residues. Indicators:
   - Sales
   - % of commercialized residues

d) Disseminated ecotourism resources of the area. Indicators:
   - Working businesses units related with the ecotourism
   - Sale of services

5) Line of action of entrepreneurial enhancement and social responsibility:

a) Consolidated teams of workers, identified with the mission, vision and strategic objectives of the company. Indicators:
   - % of achievement of the productive and financial goals / year
   - % of achieved products / profits per management area
   - Level of satisfaction of the permanent workers
   - Level of satisfaction of the temporal workers
   - % of permanent workers with more than 12 months within the company staff

b) Profitability of the company, which guarantees the distribution of profit among the partners and the reinvestment in technology, research and social support. Indicators:
   - Minimum annual profit
   - % of the profits distributed among the partners
   - % of the profits reinvested in assets
   - % of the profits reinvested in social projection

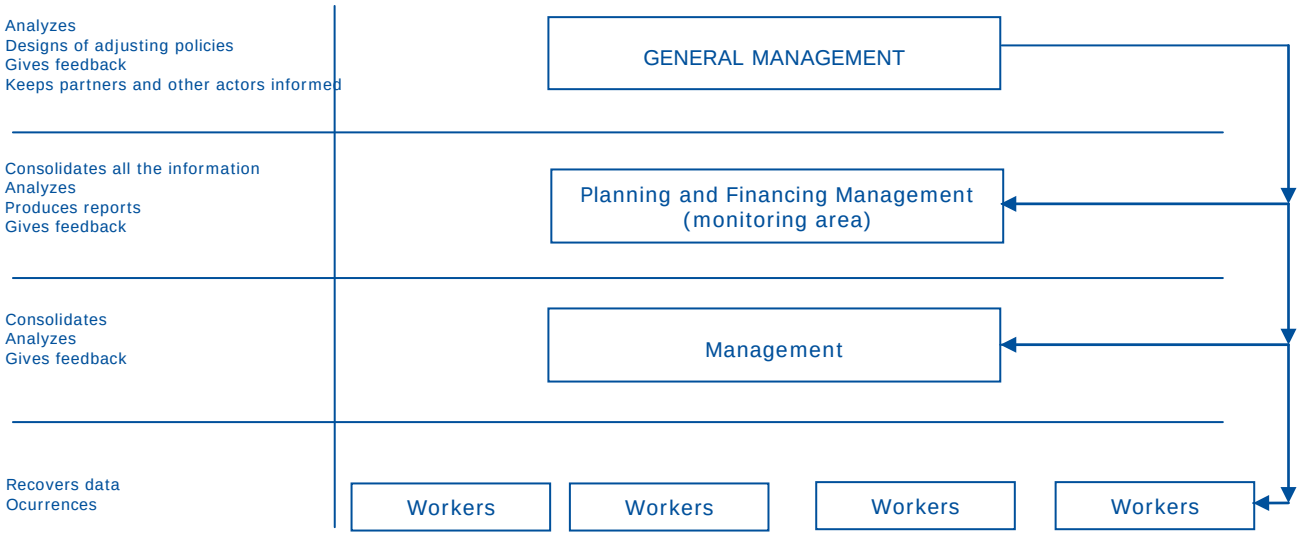
- % of the profits reinvested in research and studies
- Number of dialogue meetings between the concession and local actors in order to prevent any conflictive situation

Monitoring and environmental evaluation

Both timber concessions also include, within their evaluation and monitoring system, the evaluation and monitoring of the following variables of the entrepreneurial environment:

a) Changes in policies and legislation of the sector.
b) The evaluation of possible access to any promotion regime for timber enterprises.
c) Evolution of international prices of wood products and main consumptions of the forestry sector.
d) Social and political climate of the region (including the evolution of the relationships between the concessions and other actors of its environment).

Chart 6: Information flowchart of the monitoring and evaluation system



This monitoring and evaluation system of the concessions is integrated by two different types of reports: global reports and reports of actions, activities and areas.

The global reports include the strategic and operative advance of the company and they are the following:

a) Quarterly reports: include the comparison between the planning activities vs the executed ones.
b) Half-yearly reports: include the comparison between the planning result vs the executed. It also evaluates executed activities vs planning activities.

c) Annual reports: evaluates the accomplishment of the defined goals for each entrepreneurial strategic objective, mission and vision. The included indicators must give a clear evidence of the current economic, social and environmental status of the concessions, with accurate data to set policies for the forthcoming years.

Said monitoring and evaluation system of the concessions will be implemented by stages, as it is described below:

1. **First stage:** improvement of the management and results reports. During 2009, all the formats, indicators and information flows for said reports will be validated. The data processing support will be Excel.
2. **Second stage:** validation of the formats, information flows, baselines and indicators. It will be developed in mid-2010.
3. **Third stage:** once the indicators, formats and information flows are validated, the board of command will be developed with computing support.

A.4. Knowledge dissemination

A plan to disseminate the nature of the Madre de Dios Amazon REDD project will be implemented between local stakeholders and other concessions in order to generate synergies with them and strengthen a barrier against deforestation and illegal logging (which is having a worrying threat over isolated non-contacted indigenous tribes) in the area.

In addition to this and as it was mentioned in chapter B of the Forestry Template document, a Dissemination Plan is being developed by the Social Responsibility Manager, which will include the internal and external communication strategy of the concessions. In this sense, the following formal lines of communication are taking into account:

- Internal: shareholders meetings; meetings with the workers; mural journal; bulletins and informative papers.

- External: website; virtual bulletins; working meetings; participation in activities of territorial coordination.

By means of any of this lines of communication, all relevant information achieved as a result of any activity, project or operation carried out by the concessions will be adequately disseminated and thus accessible for anyone who could need it.

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B. Climate

B. Climate

B.1. Adapting to climate change and climate variability

An analysis of the impacts of climate change over the Madre de Dios Amazon REDD Project was carried out[44] and the results are presented following:

Approximately 20% of the whole human emissions of CO2 are caused by the deforestation of tropical forests (Bonan, 2008. Science), which constitutes a significant contribution to climate change, mostly taking into consideration that this CO2 emissions into the atmosphere have increased notoriously worldwide over the last decades (Houghton 2006, cited by Timothy B., 2009).

Although it could be considered that the rate of deforestation of the Peruvian Amazon was historically low (Oliveira et al. 2007), this trend is currently subject to a potential significant increase, mostly taking into account the construction of new roads that increasingly articulate the Peruvian regions and thus facilitates the migration processes and the settlement of human populations into new Amazonian sectors. Currently some even greater infrastructure constructions are being developed, as is the case of the inter-oceanic road that will unite Brazil with the Asian market, one of the largest and more dynamics in the world. This Inter-oceanic road crosses the south macroregion of Peru, including the Amazonian forests regions of Madre de Dios, Cuzco y Puno, where rates of deforestation can be estimated as the lowest compared with other regions, mainly due to the absence, until a few years ago, of a road network in good condition.

Climatic changes, fundamentally characterized in tropical regions by increases in the temperature and changes in water regimes (such as more severe droughts like the 2005 Amazonian drought), can produce significant impacts on the structure and dynamics of tropical forests, as well as other changes in the ecology of the forests as a whole and in the ecology of some species in particular. The main effects that can be inferred, some of them still at hypothesis level, are the following:

1. Increase in the mortality rate and decrease of forest species growth, resulting in significant changes in the dynamics and structure of the forests (Phillips et al., 2009, Science).

[44] Kroll, N.: "Impacts of Climate Change over the Maderacre and Maderyja REDD Project", Technical Document, 2009. This document has been available for the Verifier.

2. Changes in the composition and spatial distribution of forest species within the forests, due to the decline or exit of some species in certain sectors of the forest (Phillips et al., 2009, Science). The tropical forest species used to more humid conditions and less seasonal variations are those least able to withstand a moisture stress, that is to say a decreased availability of water. A similar effect can be seen in the fast-growing tree species with lower densities, where mortality is increased during droughts. It seems that droughts in the Amazon (low water availability and increments in temperature) kill in a selective way, and therefore can alter the species composition of the forest and consequently the general biodiversity of the area (Phillips et al., 2009. Science).

3. Changes in the reproductive processes of forest species, as well as changes in temperature conditions and water availability can alter the phenological cycles of the different forest species, which would affect directly to those wildlife populations responsible for the pollination and dissemination processes and indirectly to the other components of the food chain (Peñuelas et al., 2009. Science).

4. Increase risk of forest fires because of the frequency of warmer and drier seasons.

The Madre de Dios Amazon REDD project, developed by Maderacre and Maderyja, is based on the sustainable use of their forests under the implementation of the FSC principles and criteria and on the obtaining of payments for the environmental services. This intervention in the forest seeks to ensure the perpetuity the generation of income for the local population, the conservation of the forest and thereby the reduction of greenhouse gas emissions caused by the degradation of the ecosystems and the land use changes.

In this sense, it can be considered that the changes or impacts on the forests attributable to global climate change also constitute impacts over the present Madre de Dios Amazon REDD project, since, as specified in the above paragraph, is based on the sustainable use of the forest.

Following, a description of how the aforementioned changes would impact on the present Madre de Dios Amazon REDD project and the mechanisms that would be implemented for their mitigation is presented:

1. Increase of the mortality rate and decrease of the growth of forest species.

Said phenomenon would cause:

- Decrease in the amount of wood available to be exploited, which would also impact the timber industry that is dependent on the resources provided by the Maderacre and Maderyja concessions.

- Decrease in the carbon stocked within the forest.

- Changes in the abundance and distribution of the wildlife populations due to the changes in their food sources and the physical conditions of its habitats.

Mitigation measures:

- Establishment of a management system based on the Adaptive Management in which the Planning, Monitoring and Feedback processes constitute the fundamental pillars of the model. This will allow making the necessary changes or adjustments in the management plans and silvicultural systems that are being implemented, as well as at the processing industry level.

- Periodical monitoring of:
  - The dynamics and structure of the forests through the installation of Monitoring Permanent Plots, with the aim of monitoring those changes attributable to the implementation of activities as well as to the global climate change.
  - The natural regeneration of the species of interest under management, in their pre and post usage condition, through the installation of temporary sample plots band type, in order to differentiate the causes attributable to the implementation of the exploitation activities from those attributable to global climate change.

2. Changes in the composition and spatial distribution of species within the forest.

This phenomenon would cause:

- Changes in the type of timber supply from the forest. It is possible that changes in the size of population of the different tree species would occur, thus increasing or decreasing the supply of the different species that currently constitute the list of species of interest to be used, or that even new timber species come to occupy important places of said list.

- Changes in the carbon stocked within the forest.

- Changes in the abundance and distribution of the wildlife populations due to the changes in their food sources and the physical conditions of their habitats.

Mitigation measures:

- Establishment of a management system based on the Adaptive Management in which the Planning, Monitoring and Feedback processes constitute the fundamental pillars of the model. This would allow making the necessary changes or adjustments in the management plans and silvicultural systems that are being implemented, as well as at the level of the processing industry.

- Periodical monitoring of the natural regeneration of the species of interest under management, by setting up of temporary plots "band type", seeking to identify changes in the abundance of species of interest attributable to global climate change. If the possibility of the occurrence of this phenomenon is identified, the monitoring of the abundance of other species that show significant differences in their normal abundance patterns would be initiated.

3. Changes in the phenological stages of the different forest species.

This phenomenon would cause:

- Changes in the abundance of seeds necessary to continue with the natural regeneration processes of the forests, increasing or decreasing the seed supply of the different forest species. For the present project the species that currently constitute the list of species of interest to be used are particularly sensitive.

- Changes in the phenological cycle, which would alter the periodic supply of seeds of the forest species.

- Changes in the abundance and distribution of the wildlife populations that are directly responsible for the pollination and dissemination processes and indirectly to the other components of the food chain.

Mitigation measures:

- Establishment of a management system based on the Adaptive Management in which the Planning, Monitoring and Feedback processes constitute the fundamental pillars of the model. This would allow making the necessary changes or adjustments in the management plans and silvicultural systems that are being implemented, as well as at the level of the processing industry.

- Periodical monitoring of the natural regeneration of the species of interest under management, by the setting up of temporary plots “band type”, seeking to identify changes in the abundance of species of interest attributable to global climate change.

- Five-yearly monitoring of wildlife, which will provide information over a temporary series to allow a comparison and show the continuous impact on wildlife. Said comparison will help to determine the impact of implementing the present project over wildlife in an ex-ante / ex-post design and will allow making the correspondent adjustments and adaptations to the management plans for the mitigation of the identified impacts.
  The weakness of this design lies in the difficulty of distinguishing the causes of certain population changes of some species, as they may be related to logging, hunting or global climate change. In that sense, areas subject to logging and areas not subject to logging should be evaluated.

4. Increased risk of forest fires because of the increased frequency of warmer and drier seasons.

This phenomenon would cause:

- Decrease in the amount of timber that is available to be used, which would impact the timber industry dependant on the wood provided by the Maderacre and Maderyja concessions.

- Increase in the carbon emissions of the project.

- Lost in the carbon stocks of the forests.

- The higher entrance of light will accelerate the forest dynamics through the natural processes of succession and regeneration, provided an adequate availability of water exists.

- Changes in the abundance and distribution of the wildlife populations due to the changes in their food sources and the physical conditions of their habitats.

Mitigation measures:

- Prohibition of burning of wood residues and others, ban the use of fire.
- Implementation of the forestry operations taking into account the reduced impacts criteria and under adequate conditions of industrial security.
- Adequate management of fuels.
- Monitoring of the quality of the forestry operations, including the management of fuels.
- Implementation of the Custody Plan: construction of control posts, periodical patrolling within critic sectors, delimitation of the boundaries, demarcation of vertexes, signaling of the access points, vertexes and critic sectors, thus reducing the risk of trespassers and the non-authorized use of fire.
- Provide periodic training to the concessions personnel in the implementation of the Operations Manual and the Forestry Management Practices Rulebook in the Operations of the Workers and Contractors within the Concessions Area.

In addition to this, it is important to highlight that Maderacre and Maderyja are in progress of establishing an agreement with the Acre University, in order to help the concessions to identify climate changes and develop adaptive strategies to climate impacts.

The idea of the agreement is to allow some Acre University students to make specific researches within the concessions in relation to climate change and climate variability.

Although currently said contacts are delayed due to changes in the University professors, Maderacre and Maderyja understand clearly the importance of carrying out this kind of researches not only for themselves but also for the whole Madre de Dios region benefit and therefore they have the intention to make them effective in the short term.

B.2. Carbon benefits withheld from regulatory markets

REDD Projects are not eligible under regulatory schemes. Therefore, the project intends to sell the offsets generated in the Over the Counter (OTC) market. These could be achieved through different mechanisms such as auctions or direct contact with financial institutions or companies.

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C. Community

C. Community

C.1. Offsite community impacts

a. Offsite community impacts under a without REDD project scenario

The absence of the REDD project will produce a negative influence in the different offsite community components. In this sense, the implementation of the project would have a net positive benefit.

Following, a brief description of the community risks or impacts that would occur in a without project scenario is presented. A without REDD project scenario means a scenario where the different social programs and plans would not be executed due to the lack of financing, fact that would be configured in a scenario without the revenue of carbon credits that are required for the implementation of the REDD project.

Impacts on the Social Components:

1. The supply of opportunities to access to information and mechanisms of social education related to models of sustainable use of the forest will be smaller, limited mostly to the strategies of some governmental institutions, NGOs whose presence is itinerant and other timber concessions, among whom Maderacre and Maderyja are leaders. There is evidence that the aforementioned information efforts are still insufficient and will be even more in a scenario of increase immigration.

2. As it can be seen in the community description, mainly with respect to social participation, the dynamism of the population - public institutions relationships is based on the necessity of developing some work or the traditional dialogue mechanisms around an agenda that is not necessarily looking at the social and economic processes occurring within the region as a consequence of the construction of the inter-oceanic road and the economic growth of the latest years. In the absence of this REDD project, there will be fewer opportunities to enrich this dialogue and direct it to issues of sustainable development, protection culture, sustainable management, etc.

3. In addition to this, and considering the direct impact, the lack of a strategy oriented to promote the formality of the ownership of the lands, determine boundaries, establish control posts, etc., could be the missing factor to trigger the perpetuation of informal practices of production and employment in the area of direct impact of the project and the concession.

4. Even though the companies will keep their efforts to strengthen the local and regional institutionalism through the promotion of association mechanisms with private entities, the dynamism of the bilateral dialogue and the participation on the planned mechanisms, there is no guarantee that the commercial and fiscal constraints of the concession - State relationship can be surpassed. The REDD project development would contribute with the concessions efforts but from a perspective of development project-State relationship, which usually and by its nature is a less conflictive relationship.

5. The increase in the coverage and quality of the basic services will be based on the natural rhythm of the public and service enterprises investment. Although the inter-oceanic road could speed up this expansion, there is no guarantee that it will be made taking into account protection and sustainable management of natural resources considerations. The REDD project would help to incorporate said criteria when planning the service provision.

Impacts on the Socioeconomic Components:

1. Employment opportunities will be increased due to the territorial dynamism that the inter-oceanic road will generate. However, and considering the disorderly growing that is being observed, there will be a lack of skilled, responsible and focused on the conservation of forest resources labor offer.

2. Discount of the investment and/or local and provincial spending that would have result from the implementation of the REDD project. Considering that this is a long-term project, the injection of an important amount of financial resources that would have contributed to the sustainability of many small and medium businesses would not exist.

3. The alternative economic activities will emerge as practical experimentation of families that require more diversified livelihood strategies. It is possible that the failure of these practices turn them to apply dependant and aggressive survival mechanisms towards the forests.

b. Offsite community impacts under a with REDD project scenario

Following, a brief description of the offsite positive and negative community impacts that would occur as a result of the implementation of the REDD project is presented. In the case of the identified negative impacts, the prevention or mitigation measures that the project will implement are also described.

Impacts on the Social Components:

POSITIVE:

1. The opportunities to access to information and communication for building a culture of sustainable management and conservation of the forests would be expanded. Said opportunities are a result from the companies' efforts in both the managing of their timber concessions and the implementing of the REDD project. With appropriate communication strategies and having the support and management transparency of the public institutions, the creation of a culture favorable to the principles of sustainable forest management can be foreseen.

2. There will be a direct impact on the strengthening of the social capital of diverse organizations of the Iñapari District, particularly those who include the Local Economic Development and the protection of the natural resources in their agendas.

3. With the development of sustainable productive projects, promoted by the REDD project, the feasibility of the sustainable economic activities that reduce the pressure on the forests could be considered demonstrated. From these model experiences, innovative chain reactions that build sustainable productive chains can be generated, and in the long-term, give economic opportunities for the livelihoods of families, mainly immigrants.

4. The corresponding governmental sectors will be institutionally strengthen, particularly those corresponding to decentralized offices, through a dynamic interaction and the demonstration that a responsible business model is feasible, serious and respectful of the highest standards in relation to forest management.

5. The opportunities and resources for research on forestry practices will be extended. The resources from the REDD project will be added to those that are already devoted by the concessions to research and forest monitoring (based on their demonstration plots) in order to empower them.

6. The population of the geographically closest area will be benefited by the extension and investment on basic services that the companies have planned helped by the REDD project. Despite these actions may be complementary to other public and private investments, they are extremely important as they require coordination and convergence of resources and efforts for the provision of basic services in areas of high demographic dispersion, as the Iñapari District.

NEGATIVE:

1. Oversized demands for support and social assistance from the population

Mitigation measures:

- Information and communication programs that are already currently undertaken, to inform about the nature of the project and the sustainable forest management approaches.
- Identifying, prioritizing and seeking funding local development projects, particularly supporting sustainable and environmentally friendly economic chains.
- Programs to attract local labor, both skilled and unskilled.
- Development of the skills and capacities of the members of the associations linked to the selected projects.

2. Immigration flow increase as a consequence of knowing the existence of a project that can use workforce or take actions for social investment.

Mitigation measures:

- Programs to attract local labor, skilled and unskilled.
- Support to business initiatives to absorb the immigrant families both as work labor and socially.
- Signalizing and protection programs of the boundaries of the concessions.
- Coordination and supporting actions with adjoining concessions to protect concessioned forests in general.

3. Increase of the car flow through the inter-oceanic road, as well as through paths, due to the project operations.

Mitigation measures:

- Training courses for the project personnel and also for the different actors linked to the productive chain of MADERACRE and MADERYJA and to the REDD project to ensure the strict compliance with all the road and environmental safety measures for the use of the roads.
- Road signalizing and citizenship education programs in relation to road traffic.

4. Entrance of foreign people with practices and cultural expressions that differ from the local ones.

Mitigation Measures:
- Induction programs on principles of interculturalism and respect to local populations, for all the employees of the company and the project. - Permanent review and training for workers, contractors and general population about the relationship with the community protocols.

5. Increased demand for supervision, control and coordination actions by public institutions that could generate extra workload or overflow of the installed capacity.

Mitigation Measures:
- Participation in forums for coordination and consultation with the State, to establish efficient mechanisms of supervision and control. - Development of modern and transparent management tools which help in providing information and the relationship with public institutions. - Programs to support the local institutionalism, particularly with respect to the training of their staff on the project and the approaches that sustain it, as well as on forestry management.

Impacts on the Socioeconomic Components:

POSITIVE:

1. Increase in the generation of work posts, with competitive salaries with the province and the region.

   In this sense, the employment projection figures for the execution of the REDD project are presented in the following chart. The project will increase local employment opportunities currently offered by the concessions, both for skilled and unskilled labor, rising from 08 workers in 2006 to 30 from the second year. That means an increase of almost 400%. It is important to mention that from the second year, the demand for local workers was prioritized.

Chart 7: Projection of employment demand in the following years

	Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 - 10
Skilled (technical college or university studies)	12	15	15	15	15	15
Unskilled	5	15	15	15	15	15
Total	17	30	30	30	30	30

	Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 – 10
Local workers (from the Province)	04	19	19	19	19	19
Foreign workers	13	11	11	11	11	11
Total	17	30	30	30	30	30

2. Dynamism of the regional and local economy, from a supplier system that favors small and medium-size entrepreneurs and direct them to productive chains linked to timber and other environmentally friendly economic activities.

   In this sense, the demand of goods and services projection figures within the REDD project area are presented in the following chart. Likewise, significant financial resources will be injected to small and medium-size entrepreneurs from the Province, particularly of Iñapari, Iberia and Puerto Maldonado.

   This in response to the logistic needs of the project and the management of the concessions. At a provincial level, a Fund for the promotion of local initiatives will be established, where cash will enter as fresh capital for the required businesses and services. In a regional scenario, annual acquisitions will raise from the current S/ 150,000 “nuevos soles” to S/ 300,000.

Chart 8: Projection of goods and services demand in the following years

GOODS AND SERVICES THAT WILL BE ACQUIRED WITHIN THE PROVINCE	AVERAGE MONTHLY PURCHASE AMOUNT s/					
	Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 - 10
1. Basic food	24,000	36,000	36,000	36,000	36,000	180,000
2. Transport	6,000	12,000	12,000	12,000	12,000	60,000
3. Lodging	4,800	7,200	7,200	7,200	7,200	36,000
4. Food	6,000	10,000	10,000	10,000	10,000	120,000
5. Qualified service	0	36,000	36,000	36,000	36,000	180,000
6. Workforce	96,000	210,000	210,000	210,000	210,000	1,050,000
7. Desk and office materiales	4,200	4,800	4,800	4,800	4,800	24,000
8. Fuels and lubricants	24,000	30,000	30,000	30,000	30,000	150,000
GOODS AND SERVICES THAT WILL BE ACQUIRED FROM OTUSIDE OF THE PROFINCE	**AVERAGE MONTHLY PURCHASE AMOUNT s/**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 - 10
1. Equipment	3,000	5,000	5,000	5,000	5,000	25,000
2. Transport	10,000	15,000	15,000	15,000	15,000	75,000
3. Lodging	6,000	10,000	10,000	10,000	10,000	50,000
4. Food	7,500	12,000	12,000	12,000	12,000	60,000
5. Qualified service	100,000	150,000	150,000	150,000	150,000	750,000
6. Workforce	6,000	50,000	50,000	50,000	50,000	250,000
7. Desk and office materials	5,000	10,000	10,000	10,000	10,000	50,000
8. Fuels and lubricants	6,000	45,000	45,000	45,000	45,000	225,000

3. Strengthening of alternative economic activities for families living in the areas closest to the concessions and for immigrant families. From projects promoted by the REDD project, new factors of competitiveness and market linkage will be identified.

4. In terms of competitiveness, there will be a contribution from the project on creating greater opportunities of technical and working training, and therefore better performances of the families in their economic activities will be achieved.

c. Quantification of the offsite community impacts described above

For the quantification of the impacts, the following scale of values was used. It is important to take into account that in assigning values to the impacts, its magnitude or intensity was considered:

Considering the intensity of the impact

Value	Description
3	High positive impact
2	Medium positive impact
1	Low positive impact
0	No impact
-1	Low negative impact
-2	Medium negative impact
-3	High negative impact

In the following page, the quantification matrixes of the community impacts are presented for both the with REDD and the without REDD project scenarios, showing that the net community benefit of the project is positive:

Chart 9: Quantification matrix of the offsite community impacts under a without Madre de Dios Amazon REDD Project

Component	Impact	Itensity of the impact
Social	The supply of opportunities to access to information and mechanisms of social education related to models of sustainable use of the forest will be smaller, limited mostly to the strategies of some governmental institutions, NGOs whose presence is itinerant and other timber concessions, among whom Maderacre and Maderyja are leaders. There is evidence that the aforementioned information efforts are still insufficient and will be even more in a scenario of increased immigration	-2
	In the absence of this REDD project, there will be fewer opportunities to enrich this dialogue and direct it to issues of sustainable development, protection culture, sustainable management, etc.	-2
	In addition to this, and considering the direct impact, the lack of a strategy oriented to promote the formality of the ownership of the lands, determine boundaries, establish control posts, etc., could be the missing factor to trigger the perpetuation of informal practices of production and employment in the area of direct impact of the project and the concession	-3
	Even though the companies will keep their efforts to strengthen the local and regional institutionalism through the promotion of association mechanisms with private entities, the dynamism of the bilateral dialogue and the participation on the planned mechanisms, there is no guarantee that the commercial and fiscal constraints of the concession - State relationship can be surpassed.	-1
	The increase in the coverage and quality of the basic services will be based on the natural rhythm of the public and service enterprises investment. Although the inter-oceanic road could speed up this expansion, there is no guarantee that it will be made taking into account protection and sustainable management of natural resources considerations	-3
	SUBTOTAL	**-11**

Component	Impact	Itensity of the impact
Socioeconomic	Employment opportunities will be increased due to the territorial dynamism that the inter-oceanic road will generate. However, and considering the disorderly growing that is being observed, there will be a lack of skilled, responsible and focused on the conservation of forest resources labor offer	-2
	Discount of the investment and/or local and provincial spending that would have result from the implementation of the REDD project. Considering that this is a long-term project, the injection of an important amount of financial resources that would have contributed to the sustainability of many small and medium businesses would not exist	-3
	The alternative economic activities will emerge as practical experimentation of families that require more diversified livelihood strategies. It is possible that the failure of these practices turn them to apply dependant and aggressive survival mechanisms towards the forests	-1
	SUBTOTAL	**-6**
TOTAL		**-17**

Chart 10: Quantification matrix of the offsite community impacts for the implementation of the Madre de Dios Amazon REDD Project

Component	Impact	Intensity of the impact
Social	The opportunities to access to information and communication for building a culture of sustainable management and conservation of the forests would be expanded	3
	There will be a direct impact on the strengthening of the social capital of diverse organizations of the Iñapari District	2
	With the development of sustainable productive projects within the community, promoted by the REDD project, the feasibility of the sustainable economic activities that reduce the pressure on the forests could be considered demonstrated	2
	The corresponding governmental sectors will be institutionally strengthen, particularly those corresponding to decentralized offices, through a dynamic interaction and the demonstration that a responsible business model is feasible, serious and respectful of the highest standards in relation to forest management	2
	The opportunities and resources for research on forestry practices will be extended	3
	The population of the geographically closest area will be benefited by the extension and investment on basic services that the companies have planned helped by the REDD project	2
	Oversized demands for support and social assistance from the population	-2
	Immigration flow increase as a consequence of knowing the existence of a project that can use workforce or take actions for social investment	-1
	Increase of the car flow through the inter-oceanic road, as well as through paths, due to the project operations	-1
	Increased demand for supervision, control and coordination actions by public institutions that could generate extra workload or overflow of the installed capacity	-1
SUB TOTAL		**9**

Component	Impact	Intensity of the impact
Socioeconomic	Increase in the generation of works posts, with competitive salaries within the province and the region	3
	Dynamism of the regional and local economy, from a supplier system that favors small and medium-size entrepreneurs and direct them to productive chains linked to timber and other environmentally friendly economic activities	3
	Strengthening of alternative economic activities for families living in the areas closest to the concessions and for immigrant families	2
	In terms of competitiveness, there will be a contribution from the project on creating greater opportunities of technical and working training, and therefore better performances of the families in their economic activities will be achieved	2
SUB TOTAL		**10**
TOTAL		**19**

The following charts show a comparative summary between the different scenarios previously analyzed:

Value of the community impact under the without REDD project scenario	
Total community impact without REDD project	-17

Value of the community impact under the with REDD project scenario	
Total community impact with REDD project	19

Taking into account the above charts, it can be appreciated that the net community benefit of the project is positive, showing that the impact under a without project scenario is negative while under a with project scenario the impact is not only positive but also the negative impacts under a without project scenario would be minimized or avoided with the implementation of the project.

C.2. Community impact monitoring

As indicated in chapter F of the Forestry Template document, the company has a social monitoring plan, designed to have an updated knowledge of the social situation to prevent potential conflicts within the local communities and in its relationship with the company.

Additionally, specific procedures defining the steps to follow before any social consultation or complaint and any possible conflictive situation are also stated in the Relationship with the Community Plan and attached in the previously mentioned chapter of the Forestry Template document. A procedure for communicate uncommon operations or actions to be carried out by the concessions to the stakeholders is also defined in it.

C.3. Capacity building

Both concessions, as it was stated in the specific Community chapter of the Forestry Template document (F), have designed a Relationship with the Community Plan in which specific social programs that will be carried out by the concessions are determined. The correspondent activities of each social program for the fulfillment of the defined social goals of both concessions are also clearly appointed. For controlling the achievement of said social objectives, a monitoring system of specific community variables is under the responsibility of the Social Responsibility Management Area.

Among said social programs, it must be highlighted that a specific training plan addressed to local families will be designed to strengthen local capacity in issues as:

- Organizational Strengthening.
- Leadership.
- Environmentally friendly productive activities (agroforestry, ecotourism, non timber forest products as Brazilian nuts, rubber among others, fish farming, etc.).
- Entrepreneurial management (marketing, economic analysis, financial issues, legal formalization, etc.).

This training plan will include a post-training follow-up plan to evaluate the level of learning of knowledge shared and the impacts in their quality of life (mainly but not only, income).

C.4. Best practices in community involvement

According to FSC Principles & Criteria, the concessions are committed with the following best practices in community involvement:

- Respect to local traditions.
- A preference hiring policy for local families.
- International Labour Agreements and National Legal Framework are physically accessible to workers.
- A copy of the contracts is sent to the Labour Ministry.
- Permanent trainings to workers on industrial security, first aid, hygiene & health.
- The workers are forced to wear personal protection equipment during operations and during their permanence in the forest. This component is monitored with specific formats.
- Permanent workers are registered in Social Security National System. The company has signed an agreement with local health center for temporary workers.

Detailed information on the social programs carried out by both concessions is attached in the respective chapter of the Forestry Template document (chapter F). Among the whole list of monitoring indicators, it is important to mention that there are some of them related with hiring policies regarding local people (specific indicator that evaluates local personnel / total personnel) and with the hiring of female personnel (specific indicator that evaluates female personnel / total personnel).

In addition to this, they have demonstrated their permanent concern with the full compliance with all the social and labor laws and regulations and also with their staff welfare and good labor conditions.

To this aim, and as it was mentioned in the Community chapter of the Forestry Template document, permanent training courses on security, first aid and use of adequate protection equipment are given to all the concessions workers, written procedures and manuals explaining the potential risks of the forestry operations and how to proceed in case of accidents are also available for the workers, among other actions detailed in said document.

Specific indicators are designed to evaluate the complete fulfillment of said social objectives. Among them, it must be highlighted: average hours of training activities received by each worker and the number of accidents occurred among the concessions workers by the lack of use of safety equipments.

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D. Biodiversity

D. Biodiversity

D.1. Offsite biodiversity impacts

a. Offsite biodiversity impacts under a without REDD project scenario

Following, a description of the offsite biodiversity risks or impacts that would occur in a without REDD project scenario is presented. A without REDD project scenario means a scenario where no forestry management guidelines, custody plans, training plans, skills development and monitoring activities would be carried out due to the lack of financing, fact that would be configured in a scenario without the revenue of carbon credits that are required for the implementation of the REDD project.

Impacts on Flora Component:

NEGATIVE:

- Loss and degradation of the genetic variability of the forest species caused by the highly selective illegal logging and the deforestation of forests by private landowners for the installation of shifting agriculture, permanent agriculture and pastures for livestock.

- Local extinction of timber species that are currently gaining commercial importance within the region, as the case of hardwood species for flooring, this due to illegal logging.

- Total loss of vegetation coverage caused by deforestation of private properties for the installation of shifting agriculture, permanent agriculture and pastures for livestock.

- Invasions of intact and residual forests containing exotic species of grains and other herbaceous species used as forage for cattle feed.

- Increase of pests that might occur due to changes in the microclimate caused by deforestation and the reduction of fauna controllers populations due to illegal hunting and habitat loss.

Impacts on Wildlife:

NEGATIVE:

- Loss and degradation of the genetic variability of wildlife species due to the impacts of illegal hunting on species moderately demanded by the local population.

- Extinction of local wildlife species caused by the impacts of illegal hunting on species highly demanded by the local population.

- Loss and degradation of habitats and critical sites for wildlife, as “collpas”, wallows, fruit trees and caves or tree hollows, as a consequence of deforestation within private properties for the installation of shifting agriculture, permanent agriculture and pastures for livestock.

- Loss and degradation of habitats for fish fauna caused by:
  - The increase of sediments and filling of superficial water courses due to soil erosion in deforested areas in which cultures free of cover and pastures for livestock have been or would be installed.
  - The pollution of superficial water courses with fuel traces, lubricants, nutrients incorporation and toxic waste from fertilizers and insecticides used in agricultural and livestock production.

- Fragmentation and loss of forest connectivity due to the construction of roads and the deforestation of large and small areas in a disorderly manner and thus reducing the availability of habitats and resources needed for the existence and development of viable wildlife populations.

- Changes in nourishing patterns and habitat use of some wildlife species with a greater adaptability to changes in their habitats. This is because there are some wildlife species that feed on agricultural crops and tend to increase their populations in areas surrounding said crops cover.

Impacts on the Physical Component:

Climate Component:

NEGATIVE:

- Increase in the levels of temperature alteration in the region by the increasing in the areas of land with direct exposure to sunlight, this due to the increasing in deforestation.

Air Component

NEGATIVE:

- Increase in the pollution levels of smoke and dust in the air due to agricultural and livestock activities and the annual burning of new forest areas and pastures already installed for cattle.

Landscape Component:

NEGATIVE:

- Landscape degradation caused by:
  - The fragmentation and loss of forest connectivity due to the construction of roads and the deforestation of large and small areas o land in a disorderly manner.
  - Forest fires caused by anthropogenic activities, favored by large areas without forest coverage destined to the installation of pastures, places where high temperature and low humidity conditions facilitate their occurrence.

- Increase in the levels of noise pollution due to the productive activities carried out within the area.

Soil Component:

NEGATIVE:

- Soil degradation due to erosion, compaction and pollution caused by the application of slash and burn practices, overgrazing and the poor management of machinery and fuels.

Water Component:

NEGATIVE:

- Water pollution due to the increase of eroded sediments carried by currents because of poor management of machinery and fuels, as well as the increase in nutrients by the establishment of livestock.

b. Offsite biodiversity impacts under a with REDD project scenario

Impacts on the Flora Component:

POSITIVE:

- Decrease in the loss and degradation of the genetic variability of the forest species caused by highly selective illegal logging and the deforestation of forests by private landowners for the installation of shifting agriculture, permanent agriculture and pastures for livestock.

- Reduction of the probabilities of extinction of local populations of timber species that are currently gaining commercial importance within the region due to illegal logging, as is the case of hardwood species for flooring. This due to the dissemination work of environmental education and the promotion of the installation of more environmentally friendly land use systems.

- Decrease in the rate of deforestation due to the total loss of the vegetation coverage within private properties for the installation of shifting agriculture, permanent agriculture and pastures for livestock, as a consequence of promoting the installation of more environmentally friendly land use systems.

- Decrease in the risk of invasions of intact and residual forests containing exotic species of grains and other herbaceous species, as a consequence of the reduction of the establishment of livestock that usually uses said species as forage for cattle feed.

- By the reduction of the deforestation and hunting outside the project area, a reduction of pests that might occur due to changes in the microclimate caused by deforestation and the reduction of fauna controllers populations due to illegal hunting and habitat loss would occur.

NEGATIVE:

- Loss and degradation of the genetic variability of timber species caused by deforestation by private landowners for the purpose of installation of new land use systems outside the REDD project area, in the framework of its implementation.

Mitigation measures:

- The project has as one of its objectives the strengthening of existing initiatives and the development of productive projects for an efficient use of the land or environmentally friendly projects. Although said projects may imply a change in the use of the land, this objective will be oriented to the implementation of low-impact systems and to reduce deforestation and forest degradation in the communities or sectors located outside the project area. It is intended that the rate of deforestation or degradation by implementing the project is less than the projected in the modeling. In this sense, those projects that use less land area for wealth production (used hectares / dollar earned) will be prioritized.

Mitigation measures:

- Support in strengthening the Environmental Education with the implementation of:
  - Talks in the village schools within the buffer area of the REDD project, focused on the development of environmental awareness and with emphasis on alternatives for the reduction of climate change through reducing deforestation, degradation and burning of pastures. The target audience will be children and adolescents.
  - Workshops to strengthen an environmental awareness, with emphasis on the reduction of deforestation, degradation and burning of pastures as alternatives for the reduction of climate change. The target audience will be communities and villages within the buffer area of the REDD project.
  - Dissemination of audiovisual communications, containing ecologic information, at provincial level.

Impacts on the Wildlife Component

POSITIVE:

- Reduction of the loss and degradation of the genetic variability of wildlife species due to the impacts of illegal hunting on species moderately demanded by the local population.

- Decrease in the risk of extinction of local wildlife species caused by the impacts of illegal hunting on species highly demanded by the local population.

- Reduction of the loss and degradation of habitats and critical sites for wildlife, as “collpas”, wallows, fruit trees and caves or tree hollows, as a consequence of deforestation within private properties for the installation of shifting agriculture, permanent agriculture and pastures for livestock. This due to the dissemination work of environmental education and the promotion of the installation of more environmentally friendly land use systems.

- As a result of the environmental education dissemination work and the promotion of more environmentally friendly land use systems, a reduction of the loss and degradation of habitats for fish fauna would occur. These currently suffer from:

- The increase of sediments and filling of superficial water courses due to soil erosion in deforested areas in which cultures free of cover and pastures for livestock have been or would be installed.
- The pollution of superficial water courses with fuel traces, lubricants, nutrients incorporation and toxic waste from fertilizers and insecticides used in agricultural and livestock production.

- Reduction of the fragmentation and loss of forest connectivity due to the planned construction of new roads and the reduction of the size of deforested areas for the implementation of REDD projects and thus favoring the availability of habitats and resources needed for the existence and development of viable wildlife populations outside the project area.

NEGATIVE:

- Loss and degradation of habitats and critical sites for wildlife, as "collpas", wallows, fruit trees and caves or tree hollows, as a consequence of deforestation within private properties for the installation of new land use systems in the framework of the implementation of the REDD project.

Mitigation measures:

- The project has as one of its objectives the strengthening of existing initiatives and the development of productive projects for an efficient use of the land or environmentally friendly projects. Although said projects may imply a change in the use of the land, this objective will be oriented to the implementation of low-impact systems and to reduce deforestation and forest degradation in the communities or sectors located outside the project area. It is intended that the rate of deforestation or degradation by implementing the project is less than the projected in the modeling. In this sense, those projects that use less land area for wealth production (used hectares / dollar earned) will be prioritized.

- If the implementation of land use systems, in the framework of the REDD project, involves the installation of agricultural crops, they could generate changes in nourishing patterns and habitat use of some wildlife species with a greater adaptability to changes in their habitats. This is because there are some wildlife species that feed on agricultural crops and tend to increase their populations in areas surrounding said crops cover. Among these species, the most frequent and those whose existence has been reported within and outside the project area, are the following: majaz (*Agouti paca*), añuje (*Dasuprocta spp.*), conejo silvestre (*Sylvilagus brasiliensis*), sajino (*Tayassu tajacu*), huangana (*Tayassu pecari*), etc.

Mitigation measures:

- If the productive projects to be implemented within the framework of the REDD project involve the installation of agricultural crops, the installation of those crops that imply a permanent and diversified agroforestry system and whose species are not of high interest for wildlife will be prioritized.

Impacts on the Physical Component

Climate Component

POSITIVE:

- Reduction of the levels of temperature alteration in certain sectors caused by the decreasing in the size and distribution of areas of land with direct exposure to sunlight, this due to the reduction of deforestation by the implementation of projects of more efficient use of the land.

Air Component

POSITIVE:

- Decrease in the pollution levels of smoke and dust in the air due to the reduction of the installation of agricultural and livestock systems and the annual burning of new forest areas and pastures already installed for cattle.

NEGATIVE:

- Emission of smoke and dust into the air by the installation of processing industries of the inputs from systems of land use installed, in the framework of the implementation of the REDD project.

Mitigation measures:

- If the productive projects to be implemented outside the project area involve the installation of plants or industries, the installation of those showing a lower impact on air emissions, in comparison with similar systems or by the use of modern technologies will be prioritized.

Landscape Component:

POSITIVE:

- Reduction of landscape degradation caused by the fragmentation of the forests due to the construction of planning new roads and the decrease in the deforestation of large areas.

- Reduction of landscape degradation by the absence of the use of burning practices for the installation of new land use systems, which will also reduce the risk of forest fires in the areas surrounding the new productive projects.

NEGATIVE:

- Landscape degradation by the installation of plants or processing industries of inputs from systems of land use installed in the framework of the implementation of the REDD project.

Mitigation measures:

- If the productive projects to be implemented outside the project area involves the installation of plants or industries, those that will be installed in areas already deforested prior to the start of the REDD project and preferably classified as of industrial use will be prioritized.

- Increase in the levels of noise pollution due to the productive activities and the processing industries that will be installed in the framework of the implementation of the REDD project.

Mitigation measures:

- If the productive projects to be implemented outside the project area involve the installation of plants or industries, the installation of those showing a lower impact on the environment due to noise emissions, in comparison with similar systems or by the use of modern technologies will be prioritized.

Soil Component

POSITIVE:

- Reduction of soil degradation by the decrease in deforestation due to the installation of poorly managed agricultural and livestock systems.

NEGATIVE:

- Land degradation due to erosion, compaction and pollution caused by the implementation of land use systems which imply changes on forest coverage.

Mitigation measures:

- If the productive projects to be implemented outside the project area involve changes on soil coverage, the installation of those systems that minimize changes on forest coverage, which imply the installation of agroforestry systems, as well as those which imply the recovering of degraded areas that currently have coverage other than the forest will be prioritized.

Water Component

POSITIVE:

- Reduction of the water pollution from eroded sediments, nutrients, fertilizers and pesticides carried by currents by reducing deforestation for the installation of poorly managed agricultural and livestock systems.

NEGATIVE:

- Water pollution due to the increase in eroded sediments, nutrients, fertilizers and pesticides carried by currents by the installation of new land use systems in the framework of the implementation of the REDD project.

Mitigation measures:

- If the productive projects to be implemented outside the project area involve changes on soil coverage, the implementation of those systems which imply the installation of appropriate coverage to reduce the drainage of superficial water, as well as those which minimize changes on forest coverage or imply the installation of agroforestry systems, the recovery of degraded areas that currently have coverage other than the forest and those not involving the use of fertilizers and pesticides highly toxic and difficult to breakdown, will be prioritized.

- Water pollution by dumping of wastes of the transformation processes in the industry installed as part of implementing the REDD project.

Mitigation measures:

- If the productive projects to be implemented outside the project area involve the installation of industries or transformation or processing plants, the installation of those which involve measures of waste management or treatment, sewage and those not involving the use of highly toxic and difficult to breakdown inputs will be prioritized.

c. Quantification of the offsite biodiversity impacts described above

For the quantification of the impacts, the following scale of values was used. It is important to take into account that in assigning values to the impacts, the magnitude or intensity and the scale to achieve it were considered:

Considering the intensity of the impact

Value	Description
3	High positive impact
2	Medium positive impact
1	Low positive impact
0	No impact
-1	Low negative impact
-2	Medium negative impact
-3	High negative impact

Considering the scope of the impact

Level	Description
3	Large positive impact
2	Intermediate positive impact
1	Focused positive impact
0	No impact
-1	Focused negative impact
-2	Intermediate negative impact
-3	Large negative impact

Following, the quantification matrixes of the offsite biodiversity impacts are presented for both scenarios without REDD and with REDD project scenario.

Chart 11: Quantification matrix of the offsite biodiversity impacts under the without Madre de Dios Amazon REDD project scenario

Biophysical Component	Impact	Intensity of the impact	Scope of the impact	Total value
Native flora	Loss and degradation of the genetic variability of the forest species caused by the highly selective illegal logging and the deforestation of forests	-2	-2	-2
	Local extinction of timber species that are currently gaining commercial importance within the region	-3	-2	-2.5
	Total loss of vegetation coverage caused by deforestation of private properties for the installation of shifting agriculture, permanent agriculture and pastures for livestock	-3	-2	-2.5
	Invasions of intact and residual forests containing exotic species of grains and other herbaceous species used as forage for cattle feed	-1	-2	-1.5
	Increase of pests that might occur due to changes in microclimates caused by deforestation and the reduction of fauna controllers populations	-1	-2	-1.5
SUB TOTAL		**-10**	**-10**	**-10**
Wildlife	Loss and degradation of the genetic variability of wildlife species due to the impacts of illegal hunting on species moderately demanded by the local population	-2	-2	-2
	Extinction of local wildlife species caused by the impacts of illegal hunting on species highly demanded by the local population	-3	-2	-2.5
	Loss and degradation of habitats and critical sites for wildlife, as “collpas”, wallows, fruit trees and caves or tree hollows, as a consequence of deforestation within private properties for the installation of shifting agriculture, permanent agriculture and pastures for livestock	-2	-2	-2
	Loss and degradation of habitats for fish fauna caused by sedimentation and filling and the dumping of fuel traces, lubricants, pesticides and fertilizers	-1	-2	-1.5

Biophysical Component	Impact	Intensity of the impact	Scope of the impact	Total value
	Fragmentation and loss of forest connectivity due to the construction of roads and the deforestation of large and small areas in a disorderly manner	-2	-2	-2
	Changes in nourishing patterns and habitat use of some wildlife species with a greater adaptability to changes in their habitats	-1	-2	-1.5
SUB TOTAL		**-11**	**-12**	**-11.5**
Climate	Increase in the levels of temperature alteration in the region by the increasing in the areas of land with direct exposure to sunlight	-2	-2	-2
SUB TOTAL		**-2**	**-2**	**-2**
Air	Increase in the pollution levels of smoke and dust in the air due to agricultural and livestock activities and the annual burning of new forest areas and pastures already installed for cattle	-2	-2	-2
SUB TOTAL		**-2**	**-2**	**-2**
Landscape	Landscape degradation by fragmentation, loss of forest connectivity and forest fires	-2	-2	-2
	Increase in the levels of noise pollution due to the productive activities carried out within the area	-1	-1	-1
SUB TOTAL		**-3**	**-3**	**-3**
Soil	Soil degradation due to erosion, compaction and pollution caused by the application of slush and burn practices, overgrazing and the poor management of machinery and fuels	-2	-2	-2
SUB TOTAL		**-2**	**-2**	**-2**
Water	Water pollution due to the increase in eroded sediments carried by currents due to a poor management of machinery and fuels, as well as the increase in nutrients by the establishment of livestock	-2	-2	-2
SUB TOTAL		**-2**	**-2**	**-2**
TOTAL		**-32**	**-33**	**-32.5**

Chart 12: Quantification matrix of the offsite biodiversity impacts for the implementation of the Madre de Dios Amazon REDD project scenario

Biophysical Component	Impact	Intensity of the impact	Scope of the impact	Total value
Native flora	Reduction of the loss and degradation of the genetic variability of timber species	2	2	2
	Reduction of the probabilities of extinction of local populations of timber species that are currently gaining commercial importance within the region due to illegal logging	1	2	1.5
	Decrease in the rate of deforestation due to the total loss of the vegetation coverage within private properties for the installation of shifting agriculture, permanent agriculture and pastures for livestock	1	2	1.5
	Decrease in the risk of invasions of intact and residual forests containing exotic species of grains and other herbaceous species	1	2	1.5
	Reduction of the increasing rate of plagues by changes in the microclimate	1	1	1
	Loss and degradation of the genetic variability of timber species caused by the deforestation of forests by private landowners for the installation of new land use systems outside the REDD project area, in the framework of its implementation	-1	-1	-1
SUB TOTAL		**5**	**8**	**6.5**
Wildlife	Reduction of the loss and degradation of the genetic variability of wildlife species	2	2	2
	Decrease in the risk of extinction of local wildlife species	1	2	1.5
	Reduction of the loss and degradation of habitats and critical sites for wildlife	1	2	1.5
	Reduction of the loss and degradation of habitats for fish fauna	1	1	1
	Reduction of the fragmentation and loss of forest connectivity	1	2	1.5

Biophysical Component	Impact	Intensity of the impact	Scope of the impact	Total value
Wildlife	Loss and degradation of habitats and critical sites for wildlife caused by deforestation and forest degradation within private properties for the installation of new land use systems in the framework of the implementation of the REDD project	-1	-1	-1
	Changes in nourishing patterns and habitat use of some wildlife species	-1	-1	-1
SUB TOTAL		**4**	**7**	**5.5**
Climate	Reduction of the levels of temperature change in certain sectors caused by the decreasing in the size and distribution of areas of land with direct exposure to sunlight	1	1	1
SUB TOTAL		**1**	**1**	**1**
Air	Decrease in the pollution levels of smoke and dust in the air due to the reduction of the installation of agricultural and livestock systems and the annual burning of new forest areas and pastures already installed for cattle	1	1	1
	Emission of smoke and dust into the air by the installation of processing industries of inputs from systems of land use installed in the framework of the implementation of the REDD project	-1	-2	-1.5
SUB TOTAL		**0**	**-1**	**-0.5**
Landscape	Reduction of landscape degradation caused by the fragmentation of the forests	1	1	1
	Reduction of landscape degradation by the absence of the use of burning practices for the installation of new land use systems	1	2	1.5

Biophysical Component	Impact	Intensity of the impact	Scope of the impact	Total value
	Landscape degradation by the installation of plants or processing industries of inputs from systems of land use installed in the framework of the implementation of the REDD project	-1	-1	-1
	Increase in the levels of noise pollution due to the productive activities and the processing industries that will be installed in the framework of the implementation of the REDD project	-1	-1	-1
SUB TOTAL		**0**	**1**	**0.5**
Soil	Reduction of soil degradation by the decrease in deforestation for the installation of poorly managed agricultural and livestock systems	1	1	1
	Land degradation due to erosion, compaction and pollution caused by the implementation of land use systems which imply changes on forest coverage, in the framework of the implementation of the REDD project	-1	-1	-1
SUB TOTAL		**0**	**0**	**0**
Water	Reduction of the water pollution from eroded sediments, nutrients, fertilizers and pesticides carried by currents by reducing deforestation for the installation of poorly managed agricultural and livestock systems	2	2	2
	Water pollution due to the increasing in eroded sediments, nutrients, fertilizers and pesticides carried by currents by the installation of new land use systems in the framework of the implementation of the REDD project	-1	-1	-1

Biophysical Component	Impact	Intensity of the impact	Scope of the impact	Total value
	Water pollution by dumping of wastes of the transformation processes in the industry installed as part of implementing the REDD project	-1	-1	-1
SUB TOTAL		**0**	**0**	**0**
TOTAL		**10**	**16**	**13**

The following charts show a comparative summary between the different scenarios previously analyzed:

Value of the offsite biodiversity impacts under the without REDD project scenario	
Total biodiversity without REDD project	**-32.5**

Value of the offsite biodiversity impacts under the with REDD project scenario	
Total biodiversity impact with REDD project	**13**

Taking into account the above charts, it can be appreciated that the net offsite biodiversity benefit of the project is positive, showing that the impact under a without project scenario is negative while under a with project scenario the impact is not only positive but also the negative impacts under a without project scenario would be minimized or avoided with the implementation of the project.

In addition to this, the impacts described in the Forestry Template document are also valid for offsite biodiversity impacts as an increase in deforested area will have impacts in wildlife for whom these ecosystems are crucial for its survival. It should be mentioned that some of them are endangered species, according to the Red List of UICN and CITES. In the baseline scenario (without project), this scenario also threatens the project and surrounding area at a higher degree.

In this sense, a list of the endangered species present within the project and buffer zone areas is attached following:

Flora endangered species:

- *Swietenia macrophyla* (mahogany) - Appendix II of CITES.
- *Cedrela odorata* (cedar) - Appendix III of CITES.
- *Galactodendron utilisima* (leche caspi) - Ministerial Resolution.
- *Ficus anthelmintica* (ojé) - Ministerial Resolution.

Fauna endangered species:

- *Myrmecophaga tridactyla* (oso bandera).
- *Priodontes maximus* (yungururo).
- *Alouatta seniculus* (coto mono).
- *Panthera onca* (otorongo).
- *Tapirus terrestris* (sachavaca).
- *Sciurus sanborni / ignites* (ardilla gris).

- *Pipile cumanensis* (pava campanilla).
- *Mitu tuberosum* (paujil).
- *Ara chloropterus* (green wing guacamayo).
- *Ara macao* (red guacamayo).

D.2. Biodiversity impact monitoring

An Environmental Impact Study of the area and buffer zone will be implemented in order to choose indicators species of environmental health and a methodology to monitor their situation.

It will be based in an update of the existing Environmental Impact Study developed in the framework of FSC certification process.

In this sense, it is important to mention that in chapter E of the Forestry Template document a complete list of environmental and biodiversity monitoring variables and their measurement frequency is attached. The concessions consider into their Integral Monitoring Plan the permanent observation and registry of any fauna species within the concession area during the forestry operations. There are also specific species of fauna defined as indicator species which are monitored in order to evaluate the status of the whole fauna species of the area and guarantee their protection and conservation.

D.3. Native species use

As mentioned previously, the forest enrichment component of the project will be made with native species, whose seeds have been only collected from the same concessions as the forest inventories have found and recorded.

In this sense, the native species to be used for the enrichment of Maderacre and Maderyja forests are *Swietenia macrophylla* (mahogany), *Cedrela odorata* (cedar) and *Dipteryx odorata / Dipteryx micrantha* (sihuahuaco).

The whole list of the existing native species of the concessions forests and a brief description of them is attached in chapter C.5. of the Forestry Template document.

D.4. Water and soil resource enhancement

As it was stated in the correspondent chapter of the Forestry Template document (E), all the water courses within the concession area, from the largest to the smallest one, are localized during the forest census and marked in a map. A buffer area along both sides of the river is defined as a protected area and clearly signalized in the map used as a guide for all the exploitation activities. By means of this specific action, the protection of the whole water courses of the project area is guaranteed. Additionally, measures to avoid the disturbance of water courses by forestry operations and water courses pollution by the usual anthropogenic activities in the camping sites are also stated in the Forestry Management General Plan. In consequence, the quality of the surrounding communities below surface and above surface water is also assured.

In relation with the soil resource, it is well-known that this specific natural resource is the base of the tree productivity and if it is not sustainably managed the long-term productivity of the forest is under serious risk. Taking this statement into account, Maderacre and Maderyja have determined a list of measures to undertake with the aim to prevent soil erosion and degradation and to assure the sustainable management of this significant natural resource. Said list is detailed in the aforementioned chapter of the Forestry Template document.

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