Advancing Sustainable Landscapes in the Andean Amazon

ENVIRONMENTAL ASSESSMENT

Net Zero Deforestation Zones

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Initiative for Conservation in the Andean Amazon, Advancing Sustainable Landscapes in the Andean Amazon

Net Zero Deforestation Zones, Reducing Land-use Emissions in Amazon Forests

ENVIRONMENTAL ASSESSMENT

Under Cooperative Agreements No. AID-OAA-A-11-00055/No. AID-OAA0A-11-00046

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LIST OF ACRONYMS

AFIMAD	Asociación Forestal Indígena Madre de Dios
ASLAA	Advancing Sustainable Landscapes in the Andean Amazon
BMP	Best Management Practice
CBO	Community-Based Organization
CFR	Code of Federal Regulations
CISAS	Centro de Investigaciones Agropecuarias de Sucumbíos
CN	Comunidad Nativa
CSFM	Community-based Sustainable Forest Management
EA	Environmental Assessment
ETD	Environmental Threshold Decision
FENAMAD	Federación Nativa del Rio Madre de Dios y Afluentes
FSC	Forest Stewardship Council
ICAA	Initiative for Conservation in the Andean Amazon
IEE	Initial Environmental Exam
MAE	Ministry of Environment
NTFP	Non-Timber Forest Product
NZDZ	Net Zero Deforestation Zone
OSINFOR	Organismo de Supervisión de los Recursos Forestales y Fauna Silvestre
PALSAMAD	Asociación de Palmicultores San Juan
PDOT	Plan de Desarrollo y Ordenamiento Territorial
PMI	Plan de Manejo Integrado
RNTMB	Reserva Nacional Tambopata
RPFC	Reserva de Producción Faunística Cuyabeno
TNR	Tambopata National Reserve
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

June 1, 2012, USAID/LAC BEO approved an Amended Initial Environmental Exam for the projects Advancing Sustainable Landscapes in the Andean Amazon (ASLAA) and the Net Zero Deforestation Zones (NZDZ) project, "Reducing Land-use Emissions in Amazon Forests (ReLEAF)". The Amended IEE issued an Environmental Threshold Decision (ETD) with a Positive Determination for commercial forest management, management planning, value-chain strengthening and harvesting activities, as well as activities that strengthen and harvest non-timber forest product value chains, management, and harvesting. Per the table annexed to the IEE, commercial reforestation, recuperation of degraded areas via reforestation, natural regeneration or enrichment, silvopastoral management, and agroforestry were also positively determined. In June, 2012, a team was fielded to carry out an Environmental Assessment per Code of Federal Regulations 216.

The project activities addressed in this environmental assessment will be carried out in two countries, Ecuador and Peru, by Rainforest Alliance and with partner organizations. The conservation of biodiversity in the two landscapes in Sucumbíos, Ecuador and Cusco/Madre de Dios, Peru is the goal of the Rainforest Alliance (RA) and its partners. These landscapes are characterized by globally significant tropical forests and protected areas: the Cuyabeno Reserve, Tambopata National Reserve, and the Megantoni National Sanctuary. These protected areas and their adjacent buffer zones, where project activities will take place, harbor high levels of biodiversity and critical habitats for threatened and endangered species.

Upon consideration of the alternatives, the Preferred Alternative - the project as designed - most completely addresses the key significant issues identified during stakeholder consultation and site visits. These include: impacts on watersheds, wetlands and water resources; impacts on biodiversity and critical habitats; integrity of neighboring protected areas; weak environmental governance, weak market connections for commercially viable sustainable products; local capacity to sustainably manage and control their lands/natural resources; sustainability of project results and best management practices, and alleviation of accumulation of impacts.

Specifically, the Preferred Alternative mitigates the impacts generated by project activities through the application of internationally-recognized environmental design and management standards and best management practices such as those promoted by the Forest Stewardship Council, Rainforest Alliance Sustainable Agriculture Network, and organic and Fair Trade certifiers.

However, the Preferred Alternative generates impacts on biodiversity and critical habitats and environmental governance institutions that are not completely mitigated by application of best management practices or the BMPs do not currently exist. These include impacts on the aguaje palm forests and increased workloads on Ministry of Environment staff in Ecuador. Also, in the absence of certification markets and strong environmental governance mechanisms to monitor these BMPS, the sustained application of best management practices is weak. The following table outlines identified impacts, and measures recommended to mitigate them.

Impact	Recommended Mitigation Measure
Aguaje harvesting and management can disrupt nesting sites, diminish fruit availability to wildlife and impact this sensitive wetland ecosystem. Best management practices are in development.	Incorporate safeguards in aguaje management plans which protect rare, threatened and endangered species and their habitats (e.g. nesting and feeding areas). Special focus will be placed on measures to protect macaws and parrots of the aguaje ecosystem, and the monitoring of impacts on these avian populations.
Impacts of harvesting of new, to be identified, forest products are unknown until the product assessed.	Upon identification of a new forest product to be harvested and commercialized the project will submit to the USAID Environmental Officer, for review: 1) *Environmental Monitoring Performance Report* (EMPR) format (for activities in Peru) or SIGA 's *Ficha Ambiental* (for activities in Ecuador), 2) mitigation measures and best management practices to be applied and where applicable climate change mitigations such as clean production practices, environmental design of infrastructure, and water conservation, 3) a training plan outlining a clear path to building capacity in these practices, and 4) market assessment of product.
Harvesting and extraction of even small parcels of timber stands on steeply inclined slopes, such as those found in the Sucumbíos project area, bring with it impacts to soil, watersheds and biodiversity.	Reforestation for commercial purposes should be integrated into agroforestry or silvopastoral systems, or as enrichment activities within sustainably harvested forests, using native species, and be managed per the guidance of FSC. In Ecuador, the Socio Bosque active and passive restoration pilot programs should be emphasized, where feasible. All reforestation activities will be designed per the guidance in the USAID/LAC *Environmental Issues and Best Practices for the Forestry Sector*.
Economically successful commercial reforestation can motivate conversion of standing forest into plantations which will decrease biodiversity.	Any monoculture groves or plantations should comply with FSC Criteria #10, and principally be designed and managed to "promote the protection, restoration and conservation of natural forests, and not increase pressures on natural forests". (FSC, 2002.)
Unmitigated impacts on biodiversity and the environment	As recommended in Annex V, adopt or adapt existing guides or develop guides and/or other audience- appropriate training tools that guide the user in the application of

Impact	Recommended Mitigation Measure
when best management practices are not sustained by local farmers and foresters beyond the life of the project.	activity-specific standards and Best Management Practices. Also, train local regents, farmers, foresters, agricultural extensionists and other appropriate land managers and authorities in their use.
Unmitigated impacts on biodiversity and the environment when best management practices are not sustained by local farmers and foresters beyond the life of the project.	Carry out annual audits of all project supported sustainable forest and agricultural practices. Audits will identify strengths and weaknesses in the application of BMPs and environmental design standards promoted by the project, their degree of implementation and monitoring of BMPs and their effectiveness in mitigating environmental impacts. Audits will serve as an adaptive management tool and the project will support the project participants to take corrective actions to meet the standards.
Project activities cumulatively impact already overwhelmed environmental governance institutions.	With appropriate environmental authorities and project participants, assess current mechanisms for the oversight, monitoring and evaluation of best management practices and identify actions that can be taken to improve policies and institutional capacities to strengthen the adoption and sustained application of project-promoted best management practices.
Transformation of standing forest to more lucrative albeit more sustainable practices, such as silvopastoral management.	Before implementing CSFM, sustainable agriculture/ agroforestry, and silvopastoral interventions receive signed agreements from appropriate landowners, representing their understanding of the environmental management objectives of project activities, and their commitment to the dedicated land uses as identified in project-generated farm and forest land use plans, as a requirement for participation in the project.

1 DESCRIPTION OF THE ICAA Y NZDZ RELEAF ACTIVITIES

Two USAID projects will be addressed in this Environmental Assessment (EA):

1) Advancing Sustainable Landscapes in the Andean Amazon (ASLAA), which is part of the Initiative for Conservation in the Andean Amazon (ICAA) Phase II, and

2) The US Department of State supported three-year Net Zero Deforestation Zones (NZDZ) project, "Reducing Land-use Emissions in Amazon Forests (ReLEAF)".

The project objectives and activities will be carried out in two countries, Ecuador and Peru, by Rainforest Alliance and with partner organizations. The ASLAA and NZDZ projects are closely related and complementary in terms of their objectives and activities, and in the case of Peru and Ecuador, implemented in the same geographic locations with the same beneficiaries. Sustainable forest management will be one of the principal components utilized in Peru and Ecuador to achieve the objectives of both projects, along with sustainable agriculture and non-timber forest product management.

1.1 Objectives and Activities – Advancing Sustainable Landscapes in the Andean Amazon initiative

The Advancing Sustainable Landscapes in the Andean Amazon (ASLAA) initiative was formed by the Rainforest Alliance (RA) and its two local partner organizations, Corporación Gestión y Derecho Ambiental (ECOLEX - Ecuador) and Asociación para la Investigación y el Desarrollo Integral (AIDER - Peru).

The conservation of biodiversity in the two landscapes in Sucumbíos, Ecuador and Cusco/Madre de Dios, Peru is the goal of the Rainforest Alliance (RA) and its partners. The principal threats to biodiversity include habitat degradation and habitat loss due to wholesale deforestation or land-use conversion due to expansion of the agriculture frontier, illegal or unsustainable logging, and cattle ranching, while the drivers or root causes of these threats can be grouped into three areas: a) limited institutional capacity by local governments and communities for natural resource management; b) limited participation in and access to programs by local groups for resource management and sustainable production chains; and c) weak organizational capacity and market linkages of local producers and operators to grow local economic opportunities. The project design focuses on addressing drivers that have the most significant impact and can be mitigated directly given the experience and expertise of RA and its partners in order to optimize impacts locally given the scope and level of project investments.

The project seeks to support the three broader objectives of the ICAA II program, including:

1. Reduce rates of deforestation and biodiversity loss;
2. Enhance effective performance in key aspects of natural resource governance; and
3. Increased livelihood quality and sustainability.

The strategy is premised on addressing the principal threats to biodiversity and their drivers identified in the two landscapes. The initiative principally supports ICAA's Intermediate Result 1: Selected Landscapes Managed Sustainably, and the following three Activity Results (AR):

- AR 1: Sound landscape planning and use of sustainable NRM practices
- AR 2: Improve environmental governance
- AR 3: Improved sustainable livelihoods and ecosystem resilience

1.1.1 Specific Activities Overview for Advancing Sustainable Landscapes in the Andean Amazon (AID-OAA0A-11-00055).

ACTIVITY RESULT 1 - Sound landscape planning and use of sustainable NRM practices
Ecuador – Sucumbíos
• Develop project environmental land use and conservation plan including REDD+ potential. • Develop a gender action plan to increase involvement of women in project activities in both landscapes • Update tourism and control and surveillance components of the Cuyabeno Wildlife Reserve.
Perú: Cusco / Madre de Dios
• Contribute to the process of land use planning started by local governments systematizing and analyzing existing data, and incorporating new information of key actors and environmental threats • Design and implement a monitoring system to measure the impacts of the land use planning • Strengthen tourism planning in areas of Tambopata National Reserve and Santuario Nacional of Megantoni

ACTIVITY RESULT 2 - Improve environmental governance
Ecuador – Sucumbíos
• Resolution of conflicts associated with indigenous groups in and near the Cuyabeno Wildlife Reserve • Design governance model/s with MAE, municipalities, Siona and Secoya indigenous groups, and civil society groups for biodiversity conservation and natural resource management (NRM) under principles of co-management
Perú: Cusco / Madre de Dios
• Develop a policy strategy that identifies and prioritizes areas/practices for governmental reform and presents a transparent, participative work plan with steps to improve governance that builds shared responsibility • Train community members in selected sites in the application of the self-assessment mechanisms of good governance of organization, incorporating all aspects of management (e.g. development of financial reporting template and protocols for sharing such information) • Incorporate (and support) project beneficiaries in existing policy dialogues to improve participation and strengthen linkages between local governments and producer organizations/communities

- Build stakeholder involvement and capacity in land-use planning (authorities, enterprises, communities)

ACTIVITY RESULT 3 - Improved sustainable livelihoods and ecosystem resilience

Ecuador - Sucumbíos

- Facilitate CBOs/indigenous group access to Socio Bosque and other conservation incentive programs
- Prepare assessment of best opportunities for community-based sustainable forest management plans in the buffer for commercial purposes; initiate community based forestry management
- Design and implement a conservation incentive model for forest management and legal logging together with the MAE
- Strengthen the competitiveness of Secoya community tourism model
- Define and implement models and options for commercial forest plantations and recuperation of degraded areas through feasibility analysis in the municipalities of Cuyabeno and Putumayo
- Define agriculture intervention plan through feasibility analysis for commercial agriculture operations in the municipalities of Cuyabeno and Putumayo

Perú: Cusco / Madre de Dios

- Design a marketing plan for tourism operations in Tambopata
- Establish links between existing tourism businesses engaged in sustainable activities with local community services providers and agricultural producers to increase household incomes
- Establish links between non timber forest producers (aguaje, castaña, ungurahui) and potential partners to improve value chains
- Develop management plans or improvement plans incorporating BMP in timber and non timber products
- Provide technical assistance to maximize quality, productivity and competitiveness in forestry, agriculture and tourism providers to enhance income generation
- Implement farming practices that increase adaptive capacity, enhance carbon storage and reduce emissions (e.g. SAN Climate Module) in buffer zone of Santuario Megantoni
- Prepare feasibility and cost-benefit analysis, identify market opportunities, supply-chains, buyers and clients for commercial forestry operations and support community based forestry activities

Over the life of the project, the ASLAA intends to result in the following achievements:

In Ecuador, Sucumbíos landscape,

- 600,000 hectares of biological significance and/or natural resources under improved natural resource management;
- 12,500 hectares with improved natural resource management practices;
- 420 people trained in improved productivity, land use management planning, and best practices for carbon-friendly production practices and adaptation to GCC;
- 12 natural resources management groups (government and civil society) with improved ability to manage natural resources in socially responsible and sustainable ways;
- 28 policies, regulations, legal agreements, or executive orders adopted that safeguard biodiversity conservation or strengthen local participation and rights;
- 12 NR-based and nontraditional enterprises with increased organizational and enterprise capacity;
- 20 land owner groups or individuals that submit application to PES markets
- 300 rural households benefiting directly from USG interventions

In the Perú, Madre de Dios/Cuzco landscape,

- 35,000 hectares of biological significance and/or natural resources under improved natural resource management;
- 80,000 hectares with improved natural resource management practices;
- 600 people trained in improved productivity, land use management planning, and best practices for carbon-friendly production practices and adaptation to GCC;
- 4 natural resources management groups (government and civil society) with improved ability to manage natural resources;
- 50 rural households benefiting directly from USG interventions.

1.2 Objectives and Activities - Net Zero Deforestation Zones (NZDZ) project, "Reducing Land-use Emissions in Amazon Forests (ReLEAF)"

The USAID and US Department of State supported three-year Net Zero Deforestation Zones (NZDZ) project, "Reducing Land-use Emissions in Amazon Forests (ReLEAF)", will be implemented by Rainforest Alliance in partnership with Fundación Natura in Colombia, Consorcio para el Desarrollo Sostenible de la Ecorregión Andina (CONDESAN) and ECOLEX in Ecuador, and the AIDER in Peru. NZDZ aims to support the objectives of the collaboration between USAID, the U.S. Department of State and the Gordon and Betty Moore Foundation by developing innovative demonstration projects in Ecuador and Perú that achieve the following objectives:

1. Farmers, foresters, local and regional land managers and government agencies reduce deforestation and mitigate climate change by adopting and implementing sustainable forest and land management.
2. A community-based forest monitoring system is established whereby forest and agricultural communities with forested lands can achieve and contribute to monitoring, reporting and verification of greenhouse gas emissions and removals.
3. Build stakeholder and institutional capacity for regional and national REDD+ systems that reward sustainable land management as a scalable platform to combat deforestation and climate change.

1.2.1 Specific Activities Overview for Net Zero Deforestation Zones: Reducing Land-Use Emissions in Amazon Forests (AID-OAA0A-11-00046)

ACTIVITY RESULT 1 - Farmers, foresters, local and regional land managers and government
Colombia – Caquetá
• Conduct feasibility analyses to identify priority sites for net zero deforestation pilots

ACTIVITY RESULT 1 - Farmers, foresters, local and regional land managers and government

- Identification and design of economic incentives models as strategy to promote local government, communities and farmers in applying sustainable land management
- Selection of tree species for reforestation, BMP's for cattle grazing lands and quantification of carbon storage potential from pilot activities in participatory fashion
- Trainings and publications of lessons learned through pilots on the concepts of BMP's in agricultural production systems
- Identification, promotion and establishment of market linkages with local and external niche markets for milk, meat, latex, cocoa and non-timber forest products

Ecuador – Sucumbíos

- Implement best management practices in agroforestal, silvopastoral and forestry pilot farms
- Develop market linkages to facilitate that the private sector rewards forest owners for their Carbon sequestration and emissions reduction activities

Perú: Madre de Dios

- Analysis of potential activities with impact on avoid deforestation and the maintenance or increase of carbon stocks
- Technical assistance and training in forest management (timber and palms) in two communities
- Experimental harvest of timber with learning purposes (according to approved management plan)
- Educative module on forests designed and adapted to Madre de Dios conditions

ACTIVITY RESULT 2 - A participatory forest monitoring system is established whereby forest

Tri National Level

- Workshops and meetings to develop criteria for standardization of monitoring approaches

Colombia - Caquetá

- Develop and implement tools for community and land-owner carbon stock assessment and monitoring of C storage and GHG emission reductions as result of implementing sustainable
- Estimate the carbon sequestration potential of up to 3,000 ha of silvopastoral and agricultural systems

Ecuador – Sucumbíos

- Develop and test a methodology for the measurement of carbon in aboveground biomass in agroforestry, silvopastoral, agriculture and forestry systems, integrating scientific and participatory methods
- Develop and carry out capacity building activities to train at least 10 local researchers and 10 landowners in the proposed monitoring activities
- Establish a baseline of carbon stocks in aboveground biomass in 10 pilot farms for each productivity systems
- Monitor changes in carbon stocks in above ground biomass related to sustainable practices in agriculture, forestry and cattle management in a set of pilot farms

Perú: Madre de Dios

- Acquisition and interpretation of mapping information to determine the deforested area at the beginning of the project in the selected settlement
- Development or adaptation, and testing of participatory monitoring methodologies to conduct MRV of climate-friendly forest management production sites
- Training activities for diverse stakeholders, including women, indigenous leaders, and farmers, to facilitate application and adoption of these methodologies and validation
- Inventory of biomass in the selected indigenous communities and/or settlements conducted to determine carbon stock
- Demonstration of the MRV system's benefits for forest protection and community vigilance committees trained to use the system

ACTIVITY RESULT 3 - Promote lessons learned and key strategies of project activities through

ACTIVITY RESULT 1 - Farmers, foresters, local and regional land managers and government
Tri National Level
• Conduct a regional workshop with policy makers, implementers and technical staff to analyze the social, environmental and political criteria of the different REDD+ initiatives.
Colombia-Caquetá
• Provide training to build local capacity of stakeholders to develop and monitoring of conservation strategies under REDD+ processes • Support the development of REDD+ strategy within government by participating in discussions on policies, laws and regulatory framework necessary for effective REDD
Ecuador: Sucumbíos
• Facilitate establishment of a regular space for dialogue for REDD+ program in the Sucumbíos • Develop guidance on low impact forest use, based on forest legislation of Ecuador through a participatory process analyze legal tools to implement REDD+ projects, resulting in a legal/regulatory analysis. • Legal and institutional analysis REDD+ issues including Social and Environmental Standards
Perú: Madre de Dios
• Implement strategy to raise local community awareness of REDD+ (case studies, adaptation of case studies into appropriate dissemination materials • Facilitate the inclusion of management plans of producers as part of REDD+ strategies and environmental services • Strengthen the organizational structure of producer organizations and native communities for the election of their representatives, development of assemblies, accountability, and control and monitoring of forest • Provide capacity building to strengthen the capacities of public and private stakeholders to develop project initiatives for the conservation of forests within the framework of the national • Conduct two cost-benefit analysis for different land management systems, to demonstrate financial viability of REDD+ results • Provide capacity building to strengthen local and regional government and civil society capacity to understand and support REDD+ activities, with particular emphasis on fostering understanding of new Peruvian forest law and relationship to REDD+ • Technical analysis conducted to facilitate nesting of MDD technical MRV products within subnational and national framework • Training on establishment of social and environmental safeguards systems in the MDD subnational jurisdiction

Over the life of the project NZDZ activities will result in:

- 2,437 people receiving training in REDD+ as a result of USG assistance;
- 20,750 hectares with improved forest sector governance and land use planning;
- 42 natural resources management groups (government and civil society) with improved ability to manage natural resources, including through improved capacity to support REDD+;
- 345 production units with improved natural resource management practices and adoption of climate-friendly practices;
- 14 climate mitigation and/or adaptation tools, technologies and methodologies developed, tested and/or adopted;

- 10 policies and incentives developed, proposed, adopted and/or implemented that encourage the reduction of deforestation, forest degradation and GHG emissions

1.3 Physical Interventions

June 1, 2012, USAID/LAC BEO approved an Amended Initial Environmental Exam for the two projects and issued an Environmental Threshold Decision (ETD) with a Positive Determination for commercial forest management, management planning, value-chain strengthening and harvesting activities, as well as activities that strengthen and harvest non-timber forest product value chains, management, and harvesting.

As outlined in Annex I and in compliance with the ETD the following ASLAA and NZDZ activities were identified in Ecuador and Perú as eligible for assessment: sustainable forest management, reforestation, agroforestry, silvopastoral management, and Brazil nut, *ungurahui* and *aguaje* harvesting.

Community-based sustainable forest management includes the active support and technical assistance in planning, harvesting and commercialization of timber products. This includes the following activities:

- Forest inventories and censuses; identification of seed trees.
- Forest management plan including defining harvesting areas, conservation zones, seed banks and ecological niches.
- Review and approval/licensing of plans by regional environment/forest management authorities.
- Establishment of camps for loggers (Perú only). Located near a water source, approximately 400m square. Includes sleeping quarters, kitchen, trash pit and latrines.
- Logging activities, including clearing of surrounding vegetation, directional felling of trees, and cutting felled trees into transportable trunks.
- Establishment of small extraction paths, 1m wide by est. 150 long (in Perú, connecting with Brazil Nut harvesting trails).
- Extract cut wood by mechanized carts or pulled by human or horse/mule.
- Establish a temporary center for stocking cut wood, approximately 15m X 10m
- Transportation of stocked wood to port (Perú) or road (Ecuador) for sale.
- Final inspection by regional forest management authorities.

Reforestation, especially of degraded lands, will be principally carried out in the project area in Ecuador, and includes:

- Identification of degraded areas appropriate for reforestation activity.
- Define purpose of reforestation: commercialization, conservation or agroforestry.
- Identify appropriate species based on market demand, soils and climatic conditions.

- Provide consistent management: e.g. weeding, pruning, disease control as appropriate.
- At maturity, commercially viable trees will be harvested and carried off farm for sale or use.

Sustainable agriculture/agroforestry activities include the following interventions:

- Definition, design and planning of agricultural/agroforestry systems based on farmer objectives, ecological assessment, farm plan and market analysis. (At the writing of this EA, coffee and cacao were principle target crops in Ecuador.)
- Nursery establishment and management for identified plants.
- Continued technical assistance and training in crop management, disease control, and harvesting.
- Transport of product to storage centers and buyers.
- Product transformation and quality control/improvement; marketing and sale.

Silvopastoral management activities can include the following interventions (the project will not engage in genetic improvements of livestock or improved pastures):

- Evaluation and planning of the silvopastoral systems and areas; identification of problems and solutions.
- Reforestation of cleared areas for shade, protection and forage.
- Restoration of degraded areas.
- Restriction of cattle from sensitive zones, such as riparian areas, and establishment of watering tanks.
- Application of management techniques such as rotational grazing and sustainable stocking rates.
- Transportation of livestock to buyers.

***Ungurahui* and *aguaje* (palm fruit) harvesting**, in Perú, include the following interventions in the forest area:

- Identification and harvest planning with community of the palm forests.
- Forest census and selection of productive palms, and distribution of palms among family-based harvesters.
- Elaboration of management plan and annual operational plan for official approval.
- Siting of temporary harvesting camp and stocking center. Located near a water source, approximately 400m square. Includes sleeping quarters, kitchen, trash pit and latrines.
- Clearing of foot paths of 1m wide for harvesters.
- Harvesters climb palms to harvest ripe fruit.
- Selection and transformation of fruit.
- Transportation of fruit to buyer.

Brazil Nut (*castaña*) harvesting also intervenes directly in tropical forests via the following activities:

- Community-based planning of Brazil Nut harvesting plan, and with harvesters, in compliance with organic and Fair Trade certification criteria.
- Training and organizational strengthening in certification standards and practices.
- Improvement of harvesting and extraction roads/trails.
- Siting of temporary harvesting camp and stocking center. Located near a water source, approximately 400m square. Includes sleeping quarters, kitchen, trash pit and latrines.
- Silvicultural practices: natural regeneration management and clearing of competitive plants from trees, such as lianas.
- Harvesting and training in harvesting and post-harvest management of nuts.
- Internal controls and monitoring of harvest camps, harvesting capabilities and compliance with certification requirements.
- Transport of nuts from forest to central embarking point. Carried out on shoulders of laborers or in carts.
- Transport of harvest by truck or boat to market/buyer.

Sections 4 and 5 of this report review and assesses the potential environmental impacts of these activities in more depth, contrasting different alternatives, identifying the preferred alternative and prescribing measures to be taken by the project when carrying out the preferred alternative, to avoid or remedy potential damage to the natural and human environment.

2 BACKGROUND AND METHODOLOGY OF THE ENVIRONMENTAL ASSESSMENT

2.1 Background and Purpose

According to section 216.6(c) of USAID's environmental procedures (22 CFR 216), activities that are financed by USAID are required to be reviewed for environmental impact. An Initial Environmental Exam is carried out to assess which proposed activities are categorically excluded, will not have environmental impact (negative determination), or could have impact and therefore require further assessment (positive determination). The Environmental Assessment is a detailed study of reasonably foreseeable environmental impacts of positively determined activities, both positive and negative, of a proposed USAID action. It includes alternatives that would avoid or minimize adverse effects or enhance the quality of the environment so that the expected benefits of development objectives can be weighed against any adverse impacts upon the human environment or any irreversible commitment of resources.

Code of Federal Regulations 216 defines USAID environmental compliance procedures for new activities to guarantee the integration of environmental factors and values into the decision-making, project planning and implementation process. In addition, it assigns responsibilities for evaluating the impact of activities on the USAID funded activities. In compliance with Regulation 216, the following actions were carried out and leading up to this EA:

- USAID/LAC Initial Environmental Exams - LAC-IEE-11-74 and LAC-IEE-10-30 – issued deferrals to all activities under both cooperative agreements that were not categorically excluded from additional environmental review [see 22 CFR § 216.3(a) (7) (iii) Environmental Review After Authorization of Financing]. This is documented in Environmental Threshold Decisions (ETDs) LAC-IEE-11-74 & LAC-IEE-10-30, which also require that an amended IEE and new ETD be issued for specific activities once such activities were better defined, for example at the work plan approval stage.
- In addition, LAC-IEE-10-30 states, "Under no circumstances will funds be used for: the procurement or use of pesticides; the purchase of equipment that could be used for commercial timber harvesting; nor activities, projects or programs involving commercial timber harvesting unless the appropriate environmental assessment is conducted and approved by the LAC Bureau Environmental Officer."
- On June 1, 2012, USAID/LAC BEO approved an Amended IEE for the two projects and issued an Environmental Threshold Decision with a Positive Determination for commercial forest management, management planning, value-chain strengthening and harvesting activities, as well as activities that strengthen and harvest non-timber forest product value chains, management, and harvesting.

In compliance with the ETD, a CFR 216-compliant Environmental Assessment was carried out by a team of consultants and Rainforest Alliance staff, in June, 2012. In further compliance with Code of Federal Regulations 216.3(a) (4) a Scoping Statement was written to outline the scope of the Environmental Assessment.

The environmental assessment is also informed by Sections 118 and 119 of the Foreign Assistance Act. The US Congress is especially concerned about the alteration, destruction and continuous and growing loss of tropical forests in developing countries, which pose serious threats to development and the environment. Tropical forest destruction and loss result in scarcity of wood, especially fuel wood; loss of biologically productive flooded lands; sedimentation of lakes, ponds and irrigation systems; invasions; destruction of indigenous settlements; extinction of species of flora and fauna; decreased food production capacity; and loss of genetic resources.

Section 118 also assigns "a high priority to the conservation and sustainable management of tropical forests" and requires that donor organizations "to the largest extent possible, support projects and activities" that:

(A) offer alternatives for employment and income to people who would otherwise cause forest destruction and loss, and

(B) help developing countries in identifying and implementing alternatives to settlement in forest areas.

Perhaps even more relevant to the purposes of this document is the following policy established in Section 118 (c)(14) which denies assistance for:

Acquisition or use of equipment for felling trees, unless the environmental assessment indicates that timber harvesting operations can be conducted in an environmentally appropriate manner, minimizing forest destruction and that the proposed activity produces economic benefits and sustainable forest management systems.

Section 118 (c)(15) also denies assistance under this chapter for the following activities, unless the environmental assessment indicates the proposed activity will contribute directly and significantly to improving the livelihoods of poor populations in rural areas and will be conducted in an environmentally healthy manner that supports the sustainable development of:

(A) Activities that would bring as consequence the transformation of forests to cattle pasturelands

Road construction, improvement or maintenance (including temporary clearings for felling or other industrial extraction activities that cross relatively not degraded forestlands)

Colonization of forestlands

Construction of reservoirs or other water control structures in flooded forestlands relatively not degraded

Section 119 stipulates activities that significantly degrade national parks, protected areas or similar, or that introduce exotic plants or animals, may not be funded

2.2 EA Methodology

In accordance with 22 CFR 216.3 (a) (4), after having determined a positive ETD, the action-originating entity must begin the process of identifying the significant issues related to the proposed action and determining the scope of the topics to be included in the Environmental Assessment. The scoping process:

- Determined the scope and importance of the issues to be analyzed in the Environmental Assessment, that includes the direct and indirect environmental effects of the project
- Identified and eliminated from the detailed study the topics that are not important or that have been included in previous environmental reviews

The standard approach to conducting an EA under the USAID environmental procedures is to assess the specific proposed interventions at the specific proposed locations for those interventions, along with reasonable alternatives to the proposed interventions and/or proposed locations. This approach is well-suited to a situation in which the proposed interventions and locations are well-defined.

Between May 29 and June 19, 2012, Rainforest Alliance fielded an Environmental Assessment team of five people to carry out the scoping, identify and compare alternatives and assess impacts of the positively determined activities of the Proposed Alternative to be carried out in Ecuador and Perú. In each country, the team consisted of the EA Team Leader, a Biodiversity Specialist and a Sustainable Forest Management Specialist. (Annex II.)

Some limits to the EA include:

- The project had not yet introduced itself formally to farmers or pre-cooperatives in the RPFC buffer zone in Ecuador, therefore consultations with farmers were very limited. (Three farms and two enterprises.)
- The Team Leader suffered a serious health problem upon arrival to Perú requiring medical attention and was only able to attend a few stakeholder consultations before having to return to the United States. Stakeholder consultations and site visits were carried out by the Biodiversity Specialist, Sustainable Forest Management Specialist and project team members. Notes were provided to the Team Leader.
- The EA team did not visit the project area in Cusco, Perú or meet with stakeholders in the region. All information on the region presented herein is from desk study and project experience.

Despite these limitations the objectives of the field study were met.

2.2.1 Description of the Scoping Process

Stakeholder consultation is one of the most important aspects of the scoping and EA process. As with many USAID initiatives, it is also extremely important politically; given the current political context in Ecuador, including challenges in bilateral relations, consultations had to be and must continue to be conducted with particular sensitivity. It was determined that, to the extent practical, stakeholder consultations carried out in the interest of the EA process would be conducted in individual or small group meetings and with project personnel to avoid multiple and/or duplicative meetings, and to ensure that the message delivered to stakeholders by the project is clear and consistent. In addition, USAID was invited to participate in the consultations however were unable to attend.

2.2.2 Scoping Methodology and Stakeholder Identification

The EA ensured thorough stakeholder consultation with regard to potential environmental impacts of project activities; therefore, the process involved a high degree of coordination with the EA team members as they conducted consultations with stakeholders and beneficiaries. Guiding questions were developed and reporting formats provided for team members to use to guide discussions and capture issues and concerns that were expressed. Consultations were made with actors who are directly affected by project activities, through their participation in the project, and indirectly affected, when they can be affected by the geographic, programmatic or economic proximity of project activities.

Prior to the start of the Environmental Assessment, stakeholder's were identified by the project team, via consultations by the EA Team Leader with other professionals working on conservation and development projects in the same regions, and review of literature. Annex III is the complete list of stakeholders consulted in Ecuador and Perú.

2.3 Scoping Results and Significant Issues

2.3.1 Scoping Results

Prior to fielding the Environmental Assessment team, a preliminary list of significant and excluded issues was identified by the project.

Excluded issues:

- Pesticide use and management. No pesticides will be used in the project activities.
- Road construction impacts. No roads will be constructed or improved by the project. However, forest paths will be cut and used by foot traffic or carts to transport products out of the forest, and forest harvesting activities will increase traffic on already established roads. Project activities will be applying environmental design and best management practices, per internationally recognized standards, to mitigate related potential impacts.

Significant Issues:

- Uncontrolled expansion of the productive activity into critical habitats or protected areas and/or unsustainable levels of production.
- Harvesting of NTFPs that do not have established environmentally sound best management practices or regulations. (E.g. palm fruit.)
- Sustained application of best management practices within socio-economic or socio-political context.
- Deforestation or forest fragmentation.
- Changes in forest composition; overharvesting of commercially viable species and/or over-competition by agroforestry crops.
- Degradation of water resources, floodplains and riparian zones.
- Soil erosion.
- Biodiversity loss; increased pressure on Endangered and Threatened species.
- Destruction of or degradation of sensitive and critical habitats.
- Health and occupational safety issues.
- Conflicts over land use or natural resource access and property rights.
- Benefit-sharing, equitable distribution of benefits among stakeholders.

Then, in consultation with the actors during the scoping process, and from direct observation by the Environmental Assessment team in the field, the following issues were identified.

2.3.2 Findings – Ecuador

Sustainability of Project Results

- There is no FSC certification experience in the region and certification is not an objective of the project. How will local capacity to meet FSC criteria and apply related practices continue to be developed and monitored after life of project?
- When land is sold in the RPFC buffer zone, new owners are required to sign agreements with the MAE, and adopt the Integrated Management Plan for the lot. At times new owners are either not aware of the Integrated Management Plan (PMI) that goes with the property, and their legal commitment to it, or do not respect it. Due to weaknesses in regulation and enforcement of these PMI, forest is being cut down by new owners for ranching. Also, new landowners are showing interest in buying multiple lots and planting African palm.

Environmental and Biodiversity Issues

Cumulative impacts on watersheds and water resources

- Project activities can accumulate pressures on the watershed and water resources, or can improve local and regional capacity in watershed

management and conservation and decrease those pressures: One objective of the Cuyabeno Reserve is to protect the Cuyabeno watershed. Cuyabeno Canton communities are eyeing Cabacera for drinking water sources. Meanwhile, climate change is drying up the downstream lagoons in shorter time periods, and petroleum activities are contaminating surface and groundwater. Key aquatic species important to tourism activities in the park - river dolphins, manatees, and river otters – are threatened by upstream, up-watershed activities. In addition, CISAS and the Cuyabeno Municipality is promoting pisciculture with tilapia, an aggressive invasive species that can be very damaging to the riverine ecosystem if let loose into it, with unknown impacts on key species such as dolphins, manatees, and river otters.

- Project activities may increase incentives to build roads into forested zones, increasing soil erosion and loss of forest cover if not constructed and maintained correctly. Also, paths will be cut into forests that may not have existed before. Forest roads and roads are highly impactful to surface water and soils, especially during the rainy season. Already, new roads will be built to the seven new platforms in Putumayo Canton. They will provide direct access to illegal logging intermediaries and facilitate poaching.

Maintaining the integrity of protected areas and the flora and fauna they protect

- Project activity site selection is based on forest cover. The corridor between the Cuyabeno Reserve "Cabacera" and RPFC is narrow and has a high level of intervention by human activity, including a road and agricultural and touristic activity. It is fragile and the only protected corridor of the two regions of the reserve. Project activities need to focus on consolidating reserve boundaries.
- Project activities, such as CSFM per FSC standards, will improve the control and management of human activity in the forests and will create new paths of access to the forest in some cases where they do not already exist. According to the Provincial MAE, Sucumbíos has one of the highest levels of illegal hunting in the country. Game is overhunted within buffer zone, and what is left is finding refuge in the Cuyabeno Reserve. The hunters are going into the reserve after them. There may also be significant game left in the remnants of forest in the "2nd line" of forests that may be impacted by the forest management activities.
- Project land use planning activities that do not take into account the interrelations between human activity and wildlife can lead to human/wildlife conflict: the buffer zone and farms are probably within the home range of large mammals such as jaguars which are hunting cattle. The buffer zone was established based on human settlement and human activity rather than on the wildlife that depended on this area.
- Connections between Cuyabeno Reserve and activities outside the reserve are weak. E.g. productive activities (pisciculture with tilapia), tourism development or environmental education. People living in the buffer zone are not connected to the reserve, instead separated from it by policies, history and uncollaborative jurisdictional authorities.

Weak Market Incentives for Applying Sustainable Practices

Changes in forest composition have decreased its commercial value.

- Forest resources do not currently have a high market value to the farmer and are being converted to more valuable uses such as cattle ranching.

- Much of the commercially valuable tree species have already been harvested out of the "1st line" farms, and what remains is small diameter trees.

Weak market connections for sustainable products.

- History of failed activities. If commercial activities are not connected to a market pull they will fail.
- What is the proper use for these tropical (oxisol) soils? Cacao yields low productivity, coffee is of poor quality, carrying capacity for cattle is low and poor quality meat is produced.
- CISAS has limited technical extensionists available to support agricultural production activities.
- Coffee producers and cacao need to improve product quality and capacity to market their products and find committed buyers.

FSC sustainable forest management standards and practices are more rigorous and costly than Ecuadorian licensing requirements.

- Cost of being a legal forest management operation is high for a small farmer. Cost of certification is even higher. Illegal extraction in the region is still very prevalent. Families draw partial income from petroleum companies and hand-over harvesting and management of their forests to a "middle man".
- MAE timber extraction plans are not long-term management plans. They do not adequately address sustained yield issues, and there are weaknesses in the verification system which allows for corruption (whitewashing): e.g. licenses are approved yet harvesting happens on a different plot hence illegal logging.

Institutional Capacities and Mandates

Weak institutional capacity to coordinate, sustain or monitor environmental best practices.

- Ministry of Environment will be overwhelmed by the activity created by the project. Currently it does not have the capacity to monitor the integrated management plans.
- Municipalities will see an increase in consultations with project beneficiaries, and will not be able to respond correctly if a project technician is not available on a regular basis to meet with people.
- Municipalities are now charged with reforestation and micro-watershed management, however they do not have the funds nor the technical capacity to do so.
- Some ministries or government programs are promoting activities that can foster expansion of the agricultural frontier, (e.g. MAGAP, CISAS) while others are promoting activities that seek intensification of activities and conservation. (MAE, SNAP).

- National standards and criteria for plantations are in development by MAGAP, thus not yet approved. MAE has sent environmental considerations to MAGAP to be included in the standards.
- Local level information and data is not very robust and does not easily feed up the institutional "food chain" and inform policy development or decision-making. There needs to be greater evidence from the ground that these activities are slowing deforestation.

Socio-economic and Cultural Issues

Is sustainable forest management compatible with existing socio-cultural and economic trends?

- Youth are not as involved in agriculture. Farms cannot be subdivided therefore the next generation is not assured a piece of their own property until they inherit it from their parents, making them less inclined to work the land. This can also cause conflicts within the family.
- Some farmers work part-time with petroleum companies. They will seek supplemental agricultural activities that are less time or labor intensive such as cattle. Still, they are not fully committed to improving their livestock or management practices. They will rent out their pasture land to other ranchers.
- Women and youth are often left to manage the farm when male head of household working with the petroleum sector.
- High level of "clientelism" and hand-outs by petroleum companies.

2.3.3 Findings – Perú

The following concerns were expressed by the actors consulted with in Perú.

Environmental and Biodiversity Issues/Forest Health

Impacts of unsustainable harvesting on biodiversity and water resources.

- Impacts of timber harvesting on fauna: Two eagles have been rescued from nests that were in cut trees. There are newly discovered, little understood and still to be discovered species. (Four new frog species for Perú, possibly for science were discovered in ACCA conservation area, recently.)
- Harvesting of NTFPs that do not have established environmentally sound best management practices or regulations, such as ungurahui and aguaje. Even within areas that are trying to operate under BMPs, there are serious transgressions. Brazil nut harvesters are illegally harvesting small diameter trees. Meanwhile, this uncontrolled logging can also influence pollinator nests and therefore the pollination and growth of the Brazil nut.
- Hydrobiological resources are of greatest concern, especially fish and turtles (taricaya). Growing impacts of unregulated commercial fisheries and turtle egg harvesting on these populations.
- Other sources of cumulative impacts: artisanal and industrial mining activities impact water resources and ecosystems scare off wildlife and impact culture

and health. Agricultural and oil development impacts on water resources, land conversion and health.

Maintaining the integrity of protected areas and the CCNNs.

- Trade in endangered and threatened species: The tourism corridor has become a biological corridor especially for large mammals. Hunting is controlled in tourism zones, however not outside of it and there is greater pressure closer to reserve. Brazil nut harvesters and indigenous are hunting for self-consumption and reducing game populations.

Land Management and Control

Weak community capacity to implement management plans and control their forests.

- There have been few good experiences with implementation of management plans in native communities. Education levels in CCNNs can be very low and influence their capacity to control their lands. Community members often are not harvesting wood themselves, but leaving it to third-parties who give them below market prices. Their capacity to negotiate pricing or control the amounts of wood that will come off their forests is low. Often, their plans are used by third-parties to "white wash" illegally harvested timber coming out of protected areas.
- Illegal forestry practices. Of the 31 CCNNs in Madre de Dios, only 3-4 are currently logging legally. Still, in CCNNs that are engaged in legal practices, trees are still being harvested that are below the minimum diameter size. Also, who is monitoring and controlling the extraction of wood from castañales?
- Conflicts over land tenure and property rights. For example, Native Community Infierno: They still experience conflicts over land invasión and colonization, and have high costs for legal help to help them resolve these conflicts and consolidate their land rights. Native communities are working on setting up clear boundaries to help keep out invasion. Still, in Madre de Dios there is currently approximately 1 million hectares of land with up to three different and conflicting property claims.

Institutional and Jurisdictional Issues

Weak and uncoordinated regional and local forest management governance.

- Centralized forest management and governance; how is it operational at local and regional levels? Leadership and roles are unclear or overlapping at regional and local levels. The Ministry of Environment's forest program is still gathering data to define their incentive program focus and interventions. Territorial management is the responsibility of the regional and municipal governments, yet they need capacity building.
- Potential for "beneficiary fatigue": Overlapping or redundancy of various projects in the region and outpacing one from other. Projects are promoting various activities - Brazil nut management, forestry and ungurahui. For example, ACCA and RA are both working in Tres Islas on similar activities. Native communities are carrying out their own activities per their daily lives

and traditions. Regional government is working with local groups (FENAMAD and AFIMAD, for example) to try to improve this coordination.

Indigenous Development

Indigenous self-determination

- Competing visions of development of indigenous communities and forests: "preservation" vs. modern development. What are the communities' primary needs? Food security vs. commercial production? Who decides? How? Who controls and receives the benefits ($$), how is it "re-invested" into the community? There is an effort to develop regional ethno-development polices or norms to help guide this.
- CNs would like to see more diversified projects that provide capital, not just technical assistance. For example, once a CN has forest management plan, they'd like to invest in machinery to add value to the wood.
- Very low educational levels in CNs can limit their participation in development activities. On the job training, or integrating indigenous into project structure, might help.
- Communities closer to road and with mestizo influence often experience greater land use change than those communities with less accessibility and more intact traditional land use patterns. (E.g. the "purma" system that leaves previously cultivated forest fallow for 30 years.)

Incentives vs. rewards

- What works better and where, incentives or rewards? Market incentives to conserve and reforest or rewards for conserving and maintaining ecosystem services? There needs to be less clearing of forest for cacao and coffee, and more application of Sustainable Forest Management, Ecotourism and Payment for Environmental Services.

Sustainability of best management practices

- These communities have roadmaps, life plans, management plans, etc, but they only apply them while the NGOS are present to help them. How will these practices continue? They have not necessarily been integrated into the agendas of the regional or municipal governments.

2.3.4 Significant Issues

Based on the issues identified in the previous two sections, by stakeholders and by project staff, the significant issues can be summarized in the following eight themes:

1. **Impacts on watersheds, wetlands and water resources:** activities need to protect and conserve soils and protect water quality and quantity both for human consumption and aquatic habitat.
2. **Impacts on biodiversity and critical habitats:** while harvesting in forest ecosystems activities need to protect biodiversity, especially critical habitats such as aquatic habitats, wetland, and nesting sites.

3. **Integrity of neighboring protected areas**: activities need to improve the conservation value of the buffer zone, decrease forest fragmentation in the buffer zone, and decrease hunting and timber extraction pressures on the protected area.
4. **Weak environmental governance:** activities need to strengthen and support local and regional governance institutions to monitor and enforce national policies and norms that have improved forest management and conservation.
5. **Weak market connections for commercially viable sustainable products:** activities need to increase the value of standing forest and decrease the motivation to convert forest to other uses, even if for production of more sustainable products.
6. **Local capacity to sustainably manage and control their lands/natural resources:** activities need to strengthen the knowledge and capacity of landowners and managers to control access and land use practices on their lands, and more sustainably manage their natural resources.
7. **Sustainability of project results and best management practices:** activities need to strengthen the sustained application of environmentally sound design and management even when markets and regulations are weak and competing unsustainable (and often illegal) practices are more profitable.
8. **Alleviation of accumulation of impacts:** design and implement activities that do not contribute to environmental degradation concurrently caused by other extractive activities.

3 ALTERNATIVES

This section reviews and compares various alternatives available to the project in Ecuador and Perú to meet project goals. It looks at how well the alternatives stand up to specific criteria that are derived from the significant issues and needs identified during the scoping process and taking into account current conditions and trends of the affected environments in Ecuador and Perú.

Based on the issues outlined in Section 2, the following criteria were used to analyze and compare alternatives. Does the alternative support:

1. Sound landscape planning that protects watersheds and water resources.
2. The protection of biodiversity and critical habitats
3. Integrity of neighboring protected areas
4. Improved environmental governance
5. Increase the value of standing forest/decrease forest conversion to unsustainable uses.
6. Strengthen local capacity to sustainably manage and control their natural resources.
7. Sustained application of best management practices by project participants.
8. Practices that alleviate cumulative impacts.

The following alternatives were compared for their capacity to meet the criteria and help achieve the goals of the proposed action with the minimal amount of environmental impact. No alternatives considered were eliminated from the analysis.

Alternatives Ecuador:

Alternative A: Proposed Action
Alternative B: Socio Bosque Only
Alternative D: No Action

Alternatives Perú

Alternative A: Proposed Action
Alternative C: Sustainable NTFP Harvesting Only
Alternative D: No Action

3.1 Description of Alternatives

3.1.1 Alternative A: Proposed Action

The Proposed Action focuses on the conservation of biodiversity in the two landscapes of Sucumbíos, Ecuador and Madre de Dios, Perú. It is premised on addressing the principal threats to biodiversity and their drivers as identified in the two landscapes. As written in the ICAA ASLAA Work Plan (Rainforest Alliance, et. al. 2011),

The principal threats to biodiversity include habitat degradation and habitat loss due to wholesale deforestation or land-use conversion, while the drivers or root causes of these threats can be grouped into three areas: a) limited institutional capacity by local governments and communities for natural resource management; b) limited participation in and access to programs by local groups for resource management and sustainable production chains; and c) weak organizational capacity and market linkages of local producers and operators to grow local economic opportunities.

ASLAA and NZDZ are conceived and designed to work with farmers, foresters, local and regional land managers and government agencies to improve,

1) sound landscape planning and use of sustainable NRM practices,
2) environmental governance, and
3) sustainable livelihoods and ecosystem resilience.

It will increase the application of environmentally sound practices to productive activities within the tropical forest environments. Specifically, to achieve the more sustainable planning, management and monitoring of these forests, reduce deforestation and promote more sustainable livelihoods.

In Ecuador, the proposed actions include:

With farmers, pre-cooperatives, municipalities and the MAE in the RFPC buffer zone (Ecuador):

- Farm-level and pre-cooperative land use and management planning.
- Pre-cooperative institutional and entrepreneur development and strengthening.
- Community-based sustainable forest management planning, best management practices, harvesting and commercialization.
- Identification of market opportunities, supply-chains, buyers and clients for commercial forestry operations.
- Promote value chain development of non-timber forest products if feasible.
- Engage farmers in government PES and conservation incentive programs such as Socio Bosque.
- Reforestation, natural regeneration or enrichment of degraded farm lands and forests.
- Sustainable agriculture: agro-environmental design, planning and management; environmental best management practices; productivity; quality control, product transformation and commercialization.
- Silvopastoral management: design, planning, and best management practices with a focus on reforestation.
- Strengthen legal logging control system in project area.

In the Tambopata Reserve buffer zone (Perú), with native communities and concessionaires, the proposed action will include:

With targeted native community forests and producer groups:

- Community-level land use and management planning and improvements.

- Sustainable forest management planning, harvesting and commercialization. .
- Identification of market opportunities, supply-chains, buyers and clients for commercial forestry operations
- Develop marketing and business plans for timber and non-timber forest products.
- Organic Brazil nut planning, management, harvesting and commercialization
- Sustainable ungurahui and aguaje management, harvesting, and commercialization.
- Establish links between non timber forest producers (aguaje, castaña, ungurahui) and potential partners to improve value chains.

In the Megantoni National Sanctuary buffer zone (Perú) the proposed action includes:

- Land use zoning and management planning and improvements at micro zones and farm level.
- Sustainable agriculture through best management practices in cocoa and coffee cultivations aimed to increase productivity and quality of these crops, considering biodiversity, water and soil conservation at farm level.
- Sustainable forest management of low intensity and agroforestry practices as complementary management of cocoa and coffee at farm level.
- Support to a local control system to reduce the illegal logging.
- Identification of market opportunities, supply-chains, buyers and clients for coffee and cocoa.

In both landscapes, the proposed action will "follow a multifaceted strategy addressing the need for improvements and changes at two levels: a) economic level, improving production and commercialization of a cluster of farms or community-based production forests and plantations in buffer zones or eco-tourism operations and the natural areas they are based on; b) structural level to address local governance, institutional capacities, small enterprise development, markets, and higher-level policy issues." (Rainforest Alliance, et.al, 2011.)

3.1.2 Alternative B: Socio Bosque Only (Ecuador)

Socio Bosque is an Ecuadorian conservation incentive program that rewards forest owners – individuals or indigenous groups – for protecting and conserving 1 hectare of forest or more. Upon approval of their applications, the applicant signs a contract with the Ministry of Environment of Ecuador to conserve the designated forest for 20 years, and receives an annual payment of up to $30/hectare, paid bi-annually. A minimum of 1 hectare and 5 meters tall of forest may be entered into the Socio Bosque program.

Forest owners apply to the Ministry of Environment to place their forest into conservation by submitting property ownership information, a geo-referenced map of the designated forest and an investment plan, and an application that outlines how the bi-annual stipend will be used by the recipient. (http://sociobosque.ambiente.gob.ec/) The investment plan includes all potential investment options an individual might have, including infrastructure, vehicles, family expenses, debts, savings, agriculture, ecotourism, and conservation activities.

Currently, the Socio Bosque program is for conservation only. However, the MAE is developing a pilot program that will also reward forest owners for passive and active restoration of forests. Passive restoration will apply to areas that are left to naturally regenerate. In this case, a forest owner who may have unsustainably harvested a section of forest can leave it to naturally regenerate for 5 – 20 years. While the forest is regenerating, the forest owner can receive an incentive from the Socio Bosque program. This option may also be applied to sustainably harvested forests that are left to regenerate.

Lands that are more actively restored to forest via reforestation for conservation can also be entered into Socio Bosque. Approved landowners receive an incentive for more actively regenerating and protecting the reforested area. This alternative would work with the MAE to pilot the passive and active restoration incentive options, developing a model to scale out to the rest of the country, testing restoration planning and management practices, and supporting the development of a monitoring and evaluation system.

This alternative would work with targeted farmers and pre-cooperatives in the RFPC buffer zone to develop their plans and place as much of the standing forest on their farms as possible, into the Socio Bosque program. Whether entering land into Socio Bosque for conservation only purposes or for passive or active restoration of tropical forest, this alternative will work with the landowner to enter their forests and lands to be restored into Socio Bosque:

- Identify and map forests on the farm, including those of high conservation value, to enter into Socio Bosque, to meet application requirements.
- Identify and map areas of farm designated for passive or active restoration and enter into Socio Bosque pilot program.
- Support landowners to develop and implement investment plans that will re-invest Socio Bosque payments into sustainable income-generating activities on designated productive zones of the farm, and into conservation monitoring and control activities.

3.1.3 Alternative C: Sustainable NTFP Management and Harvesting Only (Perú)

This alternative will increase the capacity of native communities and target concessionaires to more sustainably manage, harvest and commercialize NTFPs. (It would not work with commercial timber.) An assessment of viable NTFPs for market, and those locally consumed, will be carried out to identify products and improve their sustainable planning, management, harvesting and commercialization. Initially, Brazil nut and palm fruits, ungurahui and aguaje would be addressed.

Community-based planning and technical assistance of Brazil nut harvesting would be oriented to minimize the environmental impacts of harvesting and processing, and concurrent impacts of other resources that are harvested within the same area. This alternative would strengthen local capacity for communal land use zoning and strengthening community/organization norms and controls of each zone. Also, Brazil nut planning and harvesting practices would strengthen legal compliance and market

connections by improving compliance with organic and Fair Trade certification criteria and Peruvian norms and regulations, and implement the Brazil nut forest management plan approved by the Tambopata National Reserve,. This alternative would train Brazil nut harvesters and managers in organic certification standards and practices and strengthen their organizations to meet them. These include:

- Community-based planning of Brazil nut, in compliance with organic and Fair Trade certification criteria.
- Differentiation for areas of timber and Brazil nut harvesting according with community land use zoning and management plans of other products, such as timber or palm fruits.
- Develop or strengthen community-based systems of monitoring and control of land uses, and compliance with internal and external norms.
- Environmental design and management of harvesting and extraction roads/trails.
- Train harvesters in the environmental design of temporary harvesting camps and stocking centers, including latrines, kitchens, trash pits and sleeping quarters.
- Silvicultural practices: natural regeneration management and clearing of competitive plants from trees, such as lianas.
- Harvesting and post-harvesting of nuts; controls and monitoring.
- Transport of nuts from forest to central disembarking point.
- Transport of harvest by truck or boat to market/buyer.
- Improve product quality and strengthen market connections.

Improving *Ungurahui* and *aguaje* harvesting will diversify income sources in target native communities, and within concessions. It requires management planning, annual operational planning and harvest planning with communities of the palm forests. The marketing for this species and fruits would be carried out in partnership with Candela Perú, an enterprise dedicated to the marketing of Brazil nuts that is also interested in oil from ungurahui and looking for markets for aguaje. Candela Perú also works with organic certification standards and in the framework of sustainable value chain and production. This alternative would build capacity in more sustainable harvesting methods, and the adaptive management of these wetland-based palm forests.

Currently, there are no approved regulations governing the management and extraction of these palm fruits, but the organizations in Madre de Dios are using the norms proposed by the Regional Government and pending approval in the Direccion Forestal of the Ministry of Agriculture. More sustainable practices are in practice by PALSAMAD harvesters, which provides an opportunity for adaptive learning and communication of lessons learned. This alternative will build the harvester's capacities to more sustainably manage these wetland forests by:

- Identification and harvest planning with community of the palm forests.
- Complete forest censuses and select productive palms.
- Distribute harvestable palms among family-based harvesters.
- Develop management plans and annual operational plans for official approval.

- Train harvesters in the environmental design of temporary harvesting camps and stocking centers, including latrines, kitchens, trash pits and sleeping quarters.
- Environmental design and management of harvesting and extraction roads/trails.
- Sustainable harvest techniques, such as climbing palms to harvest ripe fruit in the least damaging way to the palm.
- Select and transform fruit.
- Transport fruit to buyer.
- Adaptive management: monitoring and evaluation of ungurahui and aguaje mitigation measures and best practices; incorporation of lessons learned from M&E into management plans, and communication of findings to other harvesters and regional managers.

3.1.4 Alternative D: No Action (Ecuador and Perú)

Under this alternative, no project resources would be invested, and unsustainable, often illegal practices will continue to be rewarded in the market. Weak institutions would continue, on a limited basis, support the criteria, however current trends and conditions would persist.

3.2 Comparison of the Alternatives

The following table summarizes each alternative's capacity to meet the criteria.

Criteria/ Alternative	A: Proposed Action (Ecuador & Perú)	B: Socio Bosque	C: Sustainable NTFP Harvesting	D: No Action
Sound landscape planning/protect water resources	✓		✓	
Protection of biodiversity	✓-	✓	✓-	
Integrity of neighboring protected areas	✓	✓	✓	
Improve environmental governance	✓-		✓-	✓-
Increase value of standing forest/ decrease conversion	✓-	✓-	✓-	

Criteria/ Alternative	A: Proposed Action (Ecuador & Perú)	B: Socio Bosque	C: Sustainable NTFP Harvesting	D: No Action
Local capacity to sustainably manage & control their natural resources.	✓	✓	✓-	✓-
Sustain the application of BMPS	✓-		✓-	
Alleviate cumulative impacts.	✓	✓	✓	

✓ = fully meets criteria; ✓- = partially meets criteria; [no check] = does not meet criteria

3.2.1 Benefits of Alternative A, Proposed Action

The Proposed Action is founded on three basic tenets:

Sound landscape planning and use of sustainable NRM practices: Alternative A will build landowners and manager's capacities to plan and manage their land and resources for the short, medium and long term. It starts with farm or community forest-level planning, assessing appropriate land uses based on environmental, economic and social criteria. Alternative A will build capacity in the application of internationally recognized environmental design and best management practices, such as those promoted by the Rainforest Alliance Sustainable Agriculture Network, Forest Stewardship Council, organic and Fair Trade certifiers. These include measures that protect biodiversity, mitigate and monitor environmental impacts, and improve overall management and control of forests for sustained economic, social and environmental benefits.

Environmental governance: Alternative A intends to improve environmental governance of products such as timber, helping regional authorities to strengthen mechanisms to control and manage forests and forest harvesting, inside and outside protected areas. Improving local capacity to implement legally-required forest management plans and audits from local authorities can add value to timber and meet the growing international demand for legal and controlled wood in the timber markets. Working with local organizations and governments to meet these standards will build their capacity in control and management of their lands and borders, which can also support the control of illegal activities in adjacent protected areas by limiting access points.

Sustainable livelihoods and ecosystem resilience: Alternative A intends to strengthen connections with sustainable markets thus increasing income from the commercially valuable timber, NTFP and agricultural products on their land, which should increase

the value of standing forest and decrease motivations to convert it. Engagement of farmers in conservation incentive programs, in Ecuador, will also increase the value of standing forest. This alternative will also connect foresters with buyers who are interested in the legal or controlled wood they will be capable of providing. Sustainable agriculture, and specifically agroforestry practices, provides a way to cultivate commercially important crops, such as coffee and cacao, within a secondary forest system.

Alternative A also intends to restore lands, riparian areas and degraded hillsides either through silvopastoral measures, reforestation, or natural regeneration. For example, the Ecuadorian project area is hilly with steep inclines (25 – 50% slopes) with an abundance of wetlands and wet meadows. Reforestation for conservation or natural regeneration can improve these micro-watersheds by helping degraded soils and slopes recuperate. When sited correctly, reforested plots may also improve the landscape mosaic to provide forest cover on previously deforested land, and of course if commercially viable species are planted it can improve livelihoods. These activities can improve watershed and soil health and help to protect water resources from the cumulative pressures of harvesting activities and the already damaging extractive mining and petroleum industries. Enrichment, reforestation for conservation, and natural regeneration can support the survival of rare tree species subject to selective logging, and be a model for the conservation of rare or endangered species outside of protected areas, thus increasing the conservation value of the buffer zone.

3.2.2 Issues with Proposed Action

Sustain the application of BMPs: The success of Alternative A relies on the sustained application of BMPs and adherence to environmental management standards beyond the life of project. Much reliance will be placed on the incentives of market pull for more sustainable products, and the voluntary application of the BMPs by farmers and harvesters. Still, the project does not expect to develop farmers or foresters capacities to reach a level of certification over the life of the project (other than, perhaps, existing organic certification in Brazil nut). Therefore, how will BMPs continue to be audited or monitored? The deficiencies in application of certain BMPS, especially as related to biodiversity protection, are evident in the diagnostics carried out by Rainforest Alliance. Only one of the four native communities assessed apply practices that protect or conserve wildlife. In addition, it was noted by Peruvian stakeholders that the communities and forest management organizations tend to only apply the plans that are created when a project is around to motivate them to do so. In these areas of high conservation value forests where there are also high rates of illegal hunting - as experienced around the RPFC – sustained application of best management practices are imperative to mitigating impacts on biodiversity.

Environmental governance: Sustaining the application of BMPs is partially affected by local capacity to monitor and evaluate their practice. Certification programs provide monitoring and auditing mechanisms of environmental management standards that government or community institutions will be challenged to maintain on their own. Already local authorities are challenged to monitor and control illegal logging; this is

an issue the project will work to improve. In Ecuador, however, MAE contacts repeatedly expressed concern that the project will develop a workload (e.g. forest management plan approvals and licensing and monitoring activities) that their staff would not be able to keep up with, as required by MAE regulations. The project has the potential to cumulatively impact an already struggling institution working in an environment where illegal and unsustainably harvested wood persists; illegal hunting and wildlife trade is high; and coordination between RPFC management and communities in the RPFC buffer zone is minimal and often conflicted.

In the absence of market-based certification programs and strong governmental oversight and collaboration with local communities and farmers, motivation for monitoring and sustaining environmental design and management best practices will fall predominately on the landowner/manager.

Increase value of standing forest/decrease conversion: The successful increase in income and accumulation of capital from sustainable products can motivate landowners to clear standing forest for these new activities. As one Peruvian Ministry of Environment director said, "There needs to be less clearing of forest for cacao and coffee, and more application of Sustainable Forest Management, Ecotourism and Payment for Environmental Services" suggesting that improving the environmental management of cacao and coffee does not necessarily protect standing forest, on its own.

Similarly, improving cattle production in Ecuador, even under silvopastoral management, will most likely result in the conversion of forests to pasture. Vosti et al. (2001), Cattaneo (2001) and Roebling & Ruben (2001) show that, under various farm size and market scenarios, the continued deforestation of primary forest for pasture expansion is directly related to access to capital and labor. Kaimowitz (undated) concurs with these authors stating that better technology, such as that promoted in silvopastoral systems, can reduce deforestation in the short term; however, as capital accrues and labor becomes more abundant deforestation ensues. Vosti, et. al. (2002) find that in the western Amazon of Brazil, "the relative profitability of alternative crop, livestock and extractive activities, conditioned by labor scarcity, favors livestock production systems over other activities. Returns per labor unit to even low-technology livestock systems exceed by a ratio of 7 to 1 those generated by forest extractive activities (gathering Brazil nuts, for example). With such a large difference in profits, it seems clear that small farms will not retain natural forest in the long run."

While silvopastoral management has clear benefits, such as improving watershed protection and increasing tree cover in otherwise deforested pastures, cattle require significant inputs and management practices to produce a high quality product and more intensified production, which according to CISAS, few small ranchers adopt. If not adopting intensified approaches, ranching in the tropics require low stocking rates (approximately 2 head/ha) thus large extensions of pastures. The project area in Ecuador is made up of small farms where pre-existing pastures are limited (est. 13.3 ha.) and often located on hillsides or in flooded meadows.

It is also not difficult to envision that successful commercial reforestation can lead to the conversion of standing forest into plantations (which will eliminate these forests from REDD+ programs). The preparation and harvesting of even small parcels on lands that are steeply inclined bring with it cumulative impacts to soil, watersheds and biodiversity. And in Ecuador, government norms and regulations around reforestation and plantations are in negotiation between the Forestry Authority and Ministry of Environment, and is still being devolved to lower levels of government.

Protection of biodiversity: Aguaje palm grows in semi- or permanently flooded forests and the impacts of this activity on these sensitive wetland ecosystems and critical habitat are still under review. Silvicultural practices stated in the PALSAMAD management plan include selective cutting to improve natural regeneration, and especially of trees greater than 20 m, and of dead trees for larvae local consumption. Dead aguaje serve as nesting sites for the macaw, and

> *[Aguaje} is an important fruit in the diets of the lowland tapir and white-lipped peccary that roam the rainforest (Bodmer, 1990). It is also eaten by primates, rodents, and other mammals. These animals rely on aguaje when other fruits are scarce, making aguaje a keystone species in the forest (see Peres 1994). Each time an aguaje tree is destroyed there is less aguaje fruit available to these animals, lowering the rainforest's carrying capacity for these species. Long-term effects are not yet known, but pressure from hunting and the loss of food supply negatively affect animal populations.(Www.rainforestconservation.org)*

Anecdotal evidence and the PALSAMAD management plan (2011) identify direct impacts on wildlife, including threatened and endangered avian species, from the over harvesting of fruits, silvicultural practices, and hunting and fishing carried out by harvesters. The PALSAMAD management plan also recognizes the potential impacts these practices may have on other species. Still, the PALSAMAD management plan does not include biodiversity monitoring activities.

As mentioned earlier, regulations governing the management and extraction of these palm fruits are in development and pending approval by the Direccion Forestal of the Ministry of Agriculture. (One harvesting best management practice is known – climbing to harvest the fruits - and seemingly widely accepted if climbing gear can be acquired.) The project's contribution to the development and testing of these new norms would be of enormous benefit. The PALSAMAD management plan includes a research center for wetland development and management, recognizing the importance and uniqueness of this ecosystem. The preferred alternative could work with PALSAMAD to contribute to the research of the more sustainable management of these palm forests.

3.2.3 Benefits of Alternative B, Socio Bosque Only (Ecuador)

The Socio Bosque program protects forests for up to 20 years, and with the new active and passive restoration programs will support the recuperation of degraded soils and the regeneration of forest for the short, medium and long term. The protection and regeneration of forests ultimately improves biodiversity and

watershed health in this tropical forest ecosystem. Placing the remaining forests of the farms in the RPFC buffer zone, especially those along the narrow corridor between the Cabacera and the RPFC will increase the conservation value of the protected area, especially when individual farmers are adequately monitoring and controlling access to their forests.

According to the MAE *Preguntas Frecuentes* pamphlet, forests placed into the Socio Bosque system can still be managed by the landowner for non-timber forest products, such as seeds, medicinal plants, or fibers for artwork. Or be a source of other income generating activities, such as ecotourism. In some cases, Socio Bosque is enough of an incentive for landowners not to convert the forest to grazing and other forms of agriculture. This may especially be true for landowners who are otherwise employed or who are elderly as it provides a supplement to their income or a retirement income. For families with large pieces of land it provides a source of income from land that they might not have the resources to farm.

The Socio Bosque Investment Plan asks the applicant how much they will re-invest in the following land control activities: zoning, boundary demarcation and maintenance, payments to guards, signage, or other activities. (Although a threats assessment is not requested.) The forest needs to be protected and conserved in order to be and remain eligible for the incentive.

3.2.4 Issues with Alternative B, Socio Bosque Only

According to the application process presented on the website, (http://sociobosque.ambiente. gob.ec/) the Socio Bosque program does not require a larger landscape level analysis or planning for forests to be placed into the program. It asks for a geo-referenced map of the target forest, and does not provide specific criteria to guide their inclusion, whether environmental, ecological, or socio-economic, within the farm-scape. Also, a threats assessment is not required in the application. This Alternative would need to work with individual farmers to develop their Socio Bosque application within a larger farm plan that identifies productive and conservation goals and objectives of the farm, threats and opportunities to meeting those goals, and thus best identifying the forest to be entered into Socio Bosque.

On average forested areas of farms are 20 hectares, the maximum annual incentive an average farmer will receive for standing forest will be $600.00. According to the ECOLEX (2009) final report, 80% of the Tarapoa community thinks that to improve value chains there needs to be a focus on quality cacao and coffee, improve livestock ranching and "change the production of crops to palm which generates more revenue ($2,000/month)". Socio Bosque is a strict conservation program, allowing only NTFP harvesting within the program forests, an activity that would be relatively new for this population and whose returns are unknown. Will the value of the incentive be enough to motivate farmers to enter and maintain a significant portion of their standing forest into the program? This alternative may only be appealing to individuals and families who have sections of forest that they do not have the resources to farm, or those with obstacles preventing their use such as swampy areas.

This Alternative does not provide support to the farmer to carry out more sustainable agriculture, NTFP or timber harvesting on the rest of the farm. Environmentally damaging activities would continue, thus creating a mosaic of islands of protected forest within the RPFC buffer zone.

Anecdotal evidence from the EA scoping suggests that Socio Bosque forests have been cut down, especially when it has changed ownership, thus severing the conservation agreement with the landowner. (The Socio Bosque commitment stays with the land. If it is sold, the buyer will be required to enter into the agreement with the government. Whenever Socio Bosque agreements are not respected for the full term of the contract, the incentive must be returned.) Although significant support is being provided to this program by international development organizations, such as the GIZ, ONU, and KFW, there is still progress to be made in government oversight and monitoring of the forests in the program. Within the narrowly defined boundaries of individual farms in the RPFC buffer zone project area, deforestation within one property could have significant impacts on the quality of the forest, biodiversity and water resources of neighboring and downstream farms. (This is the case with or without the Socio Bosque program.) Long-term investment plans could be negatively impacted. Socio Bosque is part and parcel of a larger environmental governance issue that requires greater integrated planning, monitoring and oversight.

3.2.5 Benefits of Alternative C, Sustainable NTFP Management and Harvesting Only (Perú)

Diversifying commercially viable NTFPs collected and sold from CN and concessions will increase the value of standing forest, thus decrease the motivation for conversion. In addition, improving the planning, harvesting, and processing practices of those NTFPs, such as Brazil nut and palm fruit, will decrease the accumulation of social and environmental impacts on the forests. This Alternative will build capacity in the application of internationally recognized environmental design and best management practices, such as those promoted by Rainforest Alliance Sustainable Agriculture Network, FSC, organic and Fair Trade certifiers. These include measures that protect biodiversity, mitigate and monitor environmental impacts to watersheds and water resources, and improve overall planning and control of land uses within forests for sustained economic, social and environmental benefits. Bringing CNs and concessions into compliance with these standards will improve the conservation value of the Tambopata buffer zone.

Sustainable harvesting methods dedicated to protecting the sensitive wetlands in which the aguaje palm grows and the wildlife habitat that they create is important to ensure the palm grove's long-term survival. For example, one of the principle sustainable harvesting practices is the climbing of the palm tree to harvest fruits instead of cutting it down which could impact nesting sites and other wildlife habitats. They also require sanitary felling of diseased palms and regulation of density to reduce competition for nutrients.

The harvest season for ungurahui and aguaje is prior to Brazil nut harvest, thus, these activities are complementary and can use the same pathways, camps and roads to transport the production out of the forest.

Brazil nut harvesting is a principle activity taking place in the Madre de Dios region and accounts for 15 – 65% of the project native community's income. In Tres Islas, ungurahui and aguaje harvesting employs 20% of economically active community members. They have internal agreements about sharing part of the incomes with the community (according to the Tres Islas management plan, 5% of timber and 3% of Brazil nut, and the ungurahui and aguaje has not yet been decided) thus sharing the benefits of a standing forest to the whole community, not just the harvesters. Markets exist for these products, and this alternative strengthens connections with organic and Fair Trade markets, thus ensuring greater compliance and monitoring of best management practices beyond the life of the project.

3.2.6 Issues with Alternative C, Sustainable NTFP Management and Harvesting Only (Perú)

The success of Alternative C relies on the sustained application of BMPs, however in aguaje palm groves there is limited monitoring of impacts on wildlife and biodiversity and currently no government regulation and oversight of this activity. Aguaje groves grow in wetlands, which can be more sensitive to impacts such as soil erosion/compaction or improper disposal of solid and liquid wastes from the camps, thus creating cumulative impacts on water resources. Also, harvesting and sanitary felling can disturb nesting sites of key species nesting nearby, such as the guacamaya which nests in dead aguaje palm. And according to Rainforest Alliance diagnostic reports of the four project CNs, wildlife protection and conservation measures are not specifically being carried out.

Brightsmith (2005) identifies Mauritia *flexuosa* (Arecaceae) as a keystone plant resource used by nesting parrots; at least seven species of psittacids nest in Mauritia flexuosa. Brightman (2005) also identifies the local threats to these nesting sites, including overexploitation of the palm for its various products used by humans and larvae collection. In addition, the study discusses the importance of the dying palm swamp to the maintenance of these avian populations. Also, the San Diego Zoo study points out, "many animals depend on aguaje fruit as a major food source, including macaws, other parrots, primates, and tapirs. Even fish take advantage of floods to access fallen fruit." (Horn, 2010.)

Alternative C does not address unsustainable and sometimes illegal logging practices, an activity that tends to overlap and impact Brazil nut groves. In three of the four native communities logging already generates 25% - 60% of the total income of the population. It is a significant activity being carried out, and when not done applying BMPs it will impact NTFPs. As mentioned in Section 3,

> *Besides the impacts on soils and vegetation forest roads and paths, poorly executed felling can damage Brazil nut trees and impact pollinators by harvesting trees that have a symbiotic relationship within the Brazil nut ecosystem, such as Couratari a more recently discovered timber specie.*

It is also worth repeating that,

> *Cossio-Solano, et al (2011) estimate 3.19 – 3.81 m^3/ha per year has been harvested from Brazil nut concessions between 2004 - 2009. Many are reporting harvesting up to the 5m^3/ha limit, an amount that is rarely realized in forestry concessions, and suggesting that the additional amounts might be illicitly coming out of neighboring protected areas or lands undesignated for the use. (Cossio-Solano, 2011.)*

Strengthening land use controls in CNs and concessions will be instrumental to meeting international standards of environmentally sound design, management and harvesting of these NTFPs.

3.2.7 Benefits of Alternative D, No Action

Peruvian native communities and concessionaires, and some Ecuadorian farmers already have two assets: land title or concession agreements and management plans. Land title may make them eligible to receive credit and their agreements with the MAE may motivate them to comply with the PMIs and MAE laws and norms. With these assets and the growing international demand for legal wood, individuals may be motivated to more sustainably managing their forests and lands than they are doing now, with the limited support of Ecuadorian extension agents, such as CISAS.

Market pull for more sustainable products and therefore interventions into previously unharvested forest areas would potentially proceed at a slow rate. For example, certain forests in the "2nd line" of properties in Ecuador may not "open up" to greater levels of harvesting activities as quickly. (Although they might open up to other unsustainable uses.)

Project activities will not exert further pressures on already understaffed government institutions.

3.2.8 Issues with Alternative D, No Action

Without project interventions, forest planning and management will continue in its current unsustainable and weakly regulated forms. Illegal timber harvesting will continue and high value species will become rarer, thus increasing the farmer's incentive to convert the forest to a different use. Enrichment and reforestation would not occur in degraded areas. Farmers would not receive training or technical assistance in more sustainable practices such as silvopastoral management and agroforestry techniques and have little market incentive for protecting riparian areas, watersheds or sensitive forest areas. Harvesters of NTPFs such as Brazil Nut, Ungurahui and Aguaje would continue to struggle to carry out management plans, thus affecting their medium and long-term economic security, and the environmental services that support them.

Overall, current trends would continue, such as:

- Current deforestation rates in Amazonia Ecuador of estimated 2,164 ha/year (0.61% annually) and approximately 9,600 ha/year (1.1% annually) in Madre de Dios, Perú.
- Habitats and nesting sites will continue to be impacted by environmentally damaging and often illegal forestry and NTFP harvesting practices.
- Unsustainable and often illegal practices will continue to be carried out in the protected area buffer zones, and encroach into protected area boundaries.
- Water resources and the wildlife they support, already under pressure from extractive industries such as mining and petroleum, will suffer cumulative impacts from unsustainable timber or NTFP harvesting practices, and agricultural expansion.
- The institutions responsible for the monitoring and the regulation of forestry practices (Perú and Ecuador) or compliance with PMI's (Ecuador) are not able to meet the growing demand and ensure compliance with established norms and plans.
- Local and regional governments are tasked with watershed management, as in the case of Ecuador, however will continue to have limited capacity to manage their natural resources. Regional or landscape level planning or management is uncoordinated (Perú) allowing for an unorganized application of extractive activities and accumulation of impacts on soil and water resources.
- Market connections for sustainable timber do not currently exist, in Ecuador. Markets for other products, such as cacao and coffee in Ecuador, will continue to be weak and inconsistent due to inherent vagaries of the markets and inconsistency in product quality.
- Institutionally and market-wise, there will be little incentive to apply or sustain best management practices. There is limited experience or knowledge of the application of best management practices in the project areas in Ecuador or Perú.

3.3 Preferred Alternative

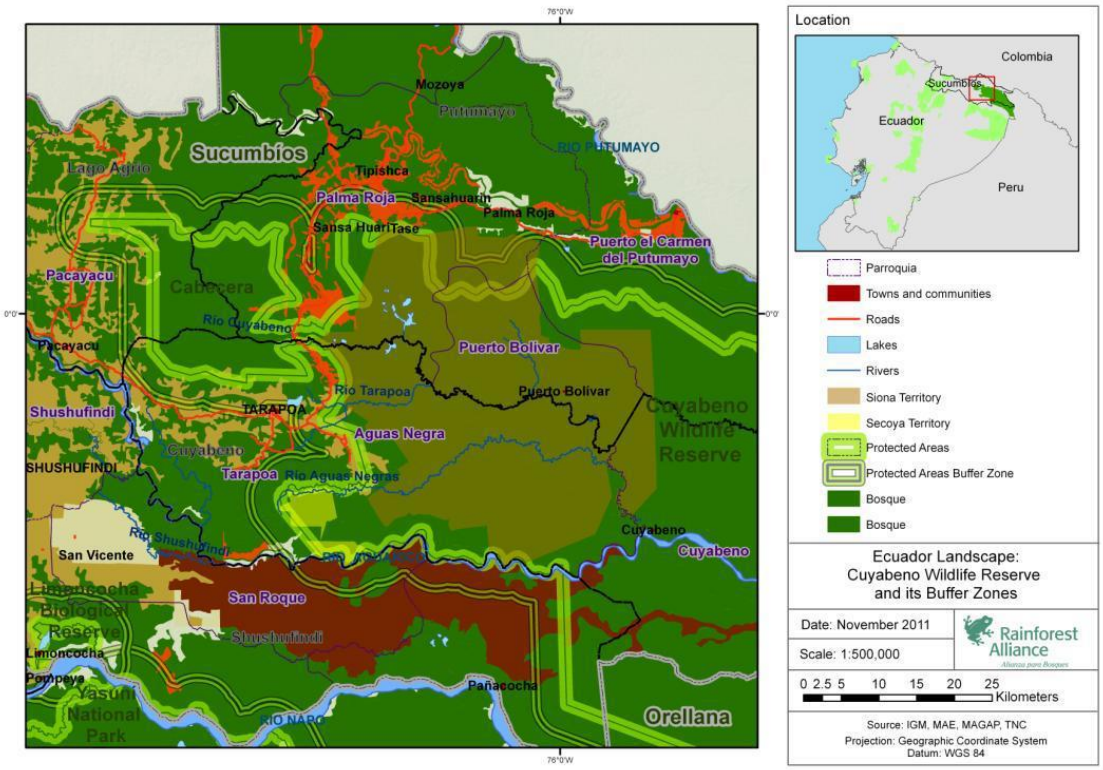
Alternative A, the Proposed Action, has the greatest capacity to more completely meet the criteria in Ecuador and Perú, addressing significant issues most completely. It is the preferred alternative; however it is not without its impacts. Sections 5 and 6 outline the environmental consequences of the preferred alternative, and measures to be taken to mitigate negative environmental consequences.

4 AFFECTED ENVIRONMENT

4.1 Ecuador

4.1.1 Geography

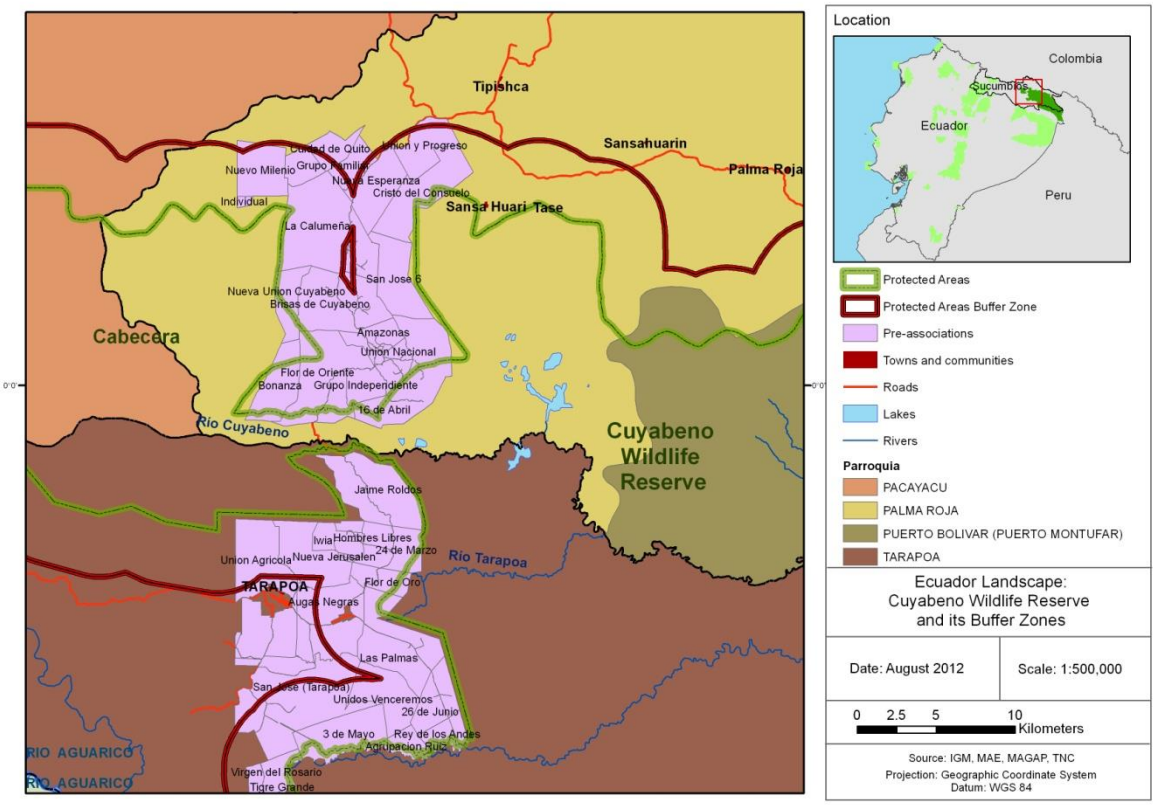
The Project activities assessed in this report will be carried out on farms in three parishes in the province of Sucumbíos, Ecuador – Tarapoa, Aguas Negras, and Palma Roja - within the cantons of Cuyabeno and Putumayo, respectively. Tarapoa is 1148.37 km^2 or 30% of the Cuyabeno Canton and Aguas Negras is 457.86 km^2 or 12% of the canton. (GADM Cuyabeno, 2012.) Palma Roja is 114,181.24 km^2 or 32.17% of the Putumayo Canton. (Agroprecision, 2012.) The target farms and associated communities occupy the hourglass-like area of the RPFC buffer zone located between the eastern and western sections of the protected area. A paved, well maintained, two lane road transects the project area north to south (see orange in map below). The Cuyabeno River and neck of the RPFC that provides a narrow corridor between the two sections of the protected area serve as a border between Tarapoa, Aguas Negras and Palma Roja. The history of the area pre-dates the Spanish, as indigenous territories, yet the current political units of Cuyabeno and Putumayo Cantons were officially incorporated in 1998 and 1969, respectively.



This region receives approximately 2,982.4 mm (117 inches) of rain annually; ranging from 160 mm to maximum 318 mm. At the Tarapoa airport an average annual humidity of 88% is recorded. (GADM Cuyabeno, 2012.) Temperature varies between 23.5 and 25.7 degrees Celsius and an average annual temperature of 24.7.

The activities are restricted to 1o pre-cooperatives or pre-associations located in the area of influence of the 603,308 hectares Cuyabeno Fauna Production Reserve (RPFC) which covers part of the provinces of Sucumbios and Orellana. The name of its river or main tributary in Secoya language (Paicoca) means "benevolent river". The RPFC was created in 1979.

The pre-associations from which ten will be selected are: 1) Rey de los Andes, 2) 3 de Mayo, 3) Las Palmas, 4) Unión Agrícola, 5) Nueva Manabí, 6) 26 de Junio, 7) Flor de Oriente, 8) 24 de Marzo, 9) Nueva Jerusalén, 10) Agrupación Ruiz, 11) Cristo del Consuelo, 12) Calumeña, 13) Flor del Oriente, 14) Brisas del Cuyabeno, 15) Jaime Roldos, 16) Nueva Esperanza, 17) Ciudad de Quito, 18) San José de Sansahuari, 19) 16 de Abril, 20) Amazonas, 21) Cristóbal Colón, 22) Juan Montalvo, 23) San José, 24) Plantaciones, 25) 17 de abril and 26) Fronteras del Cuyabeno. Depending on interest and potential for sustainable forest management, it may be necessary to expand the pool of pre-associations. The boundaries of pre-associations encompass an estimate of 25 - 65 landowners, and have management plans that include land use distribution or zoning specifying restricted or conditional uses areas.



Three percent of the farms (ECOLEX, 2009) are accessed via first order (asphalted) roads, 30% via second order roads (improved, gravel), and 42% by third order (unimproved) roads. Farms without road access (24%), or "second line farms" are accessed by footpaths. This will allow the project to reach the areas or sites designated for extraction. It may also increase access to the forests and create impacts on existing roadways, especially third order, unimproved roads.

The topography of the buffer zone of the project is irregular, with some slopes of approximately 30 degrees. According to the PDOT Cuyabeno (2012) 38.53% of the parish is dominated by slopes of 25 – 50 %. However, Tarapoa is known for its flat (0

– 5%) floodplains and wetlands. Average altitude is 250 meters above sea level. Soils are usually clayish – slimy, reddish in color; black soils are seldom found, only superficially and next to water sources. Swampy soils are even less common, but have high contents of organic matter (ECOLEX, 2009).

4.1.2 Baseline Conditions

The RPFC buffer zone includes different land uses; the most significant include (ECOLEX, 2009):

- Tropical forests in saturated lands. Also known as lowland evergreen forests, with significant representation and varying degrees of human intervention.
- Persistently flooded forests. Or flooded forests, mainly in the sector occupied by the organizations of Brisas de Cuyabeno and Flor de Oriente.

In 2009, ECOLEX determined the existence of a total of 13,750.29 hectares of forest in good state of conservation, 19,082.18 hectares of secondary or intervened forest and a total of 25,230.53 hectares of pastures and agriculture lands, in the RPFC area of influence.

Before the formal division and handout of lands by the State, the level of deforestation in the Napo region of the Amazon Basin increased from 7.2% to 13.4% between 1986 and 1996 , or 0.61% per year. (Sierra, 2000). Stern and Kernan (2011) estimated that "During the latter period, 2000-2008, the highest rates of deforestation occurred in the Amazon (19,779 ha/yr), reflecting an increase of 2,164 ha/yr (12.3 %) over the first period." Specifically in the RPFC buffer zone, the level of degradation is high and continuous, as well as the pressure over the natural resources. Inside the RPFC, the annual deforestation rate is estimated to be 0.46% (Programa De Conservación Del Águila Harpía En Ecuador- P, undated.)Transformation and subsequent abandonment was common and repetitive.

As mentioned above, the area of intervention of the projects is part of the RPFC buffer zone. This area is particularly important because it borders two large conservation areas inside the Reserve: an area known as Cuyabeno River headwaters, known as the "Cabacera", toward the west, and to the east the main hydrological system of the Reserve, which includes a lagoon complex and river tributaries. Therefore, water production in the headwater of the Reserve receives the intervention of the buffer zone that later reaches the lagoon complex.

The existence of what could be called a "corridor" should be noted; it was intentionally left to connect these two conservation areas in the reserve. The "corridor" is not very effective since it is only about 1000 m wide and it is crossed by a paved road. A high degree of intervention is evident. There is no mechanism to prevent fragmentation caused by this road.

Regional ecosystem and watershed(s)

The ecosystems present in the RPFC are of particular environmental importance and very fragile. The reserve itself is a complex compound of ecosystems that combines forests and wetlands. There are two types of forests inside the RPFC:

- Flooded forests: marshy forest (moreto palm), igapó (seasonal flooding of black water rivers) and várzea (seasonal flooding or white water rivers).

- Terra firme forests: normal density is 200 species of trees/ha, in Cuyabeno up to 473 species/ha can be found. (Ministerio del Ambiente, 2012.)

This particular structure enables the existence of important plant communities, which serve as habitat for many unique and threatened species.

When visiting the buffer zone or the area of intervention of the project, the presence of a large number of streams is evident, which in the end run into the Cuyabeno, Napo or Putumayo Rivers. There are six principle micro watersheds in Tarapoa and according to the PDOT Cuyabeno (2012) these watersheds are 70% - 90% conserved, however, the plan does not define what constitutes conservation. The PDOT Cuyabeno (2012) also identifies that the Rio Tarapoa is contaminated with human effluent and oil and other chemicals from vehicles.

It is important to highlight the presence of marshes with moreto palms and other wetland systems along their course. Also, in the PDOT Cuyabeno (2012) it is estimated that 10.35% of Tarapoa and 4.7% of Aguas Negras is susceptible to flooding. Tarapoa is especially dominated by, flood zones and wetlands. (GADM Cuyabeno, 2012.) In this regard, project activities should be strongly directed at decreasing the pressure over sensitive wetland systems.

Critical habitats

The area of influence of the project is part of the Cuyabeno river basin. This is important from a conservation standpoint because it supports ecosystems of extreme environmental fragility. This is the case of wetland ecosystems such as “moretales” or marshes where “moreto” (*Mouritia flexuosa*) prevails, a palm species well adapted to flooded areas. Other ecosystems include lagoons of considerable size fed by what is known as “black waters” due to their particular reddish black color, like strong tea, caused by the high concentration of plant waste substances they contain. Rivers are also of particular importance, not only because they feed the lagoons but also because they are the means for genetic exchange between animal stocks, including manatees and several species of river dolphins. These and other ecosystems are strongly impacted by this area of influence, which is now a development area for human populations.

In the areas managed by communities, there is a large presence of:

- Forests in better state of conservation in San José, located in Tarapoa Parrish, followed by the organization 16 de Abril and in the third place the organization Tigre Grande.

- Secondary or intervened forests in Cristóbal Colón, Flor de Oriente, Plantaciones Ecuatorianas, San José, Unión Agrícola, among the main ones that show a degree of forest conversion.
- Flooded forests are prominent in Brisas de Cuyabeno and Flor de Oro (ECOLEX 2009).

Threatened and Endangered Species

Lack of knowledge about the fauna and its conservation status is common among farmers in the area of influence. They know about the fauna that was used by their ancestors and that continues to be used for meat, but almost nothing about other species that have no use or interest. It is important to highlight what can be potentially found or is present in these areas.

Several threatened species of trees are found in these forests, such as: *Cedrela odorata* (VU)*, Cedrelinga catanaeformis, Pollalesta bicolor, Caryodendron orinocense, Mauritia fl exuosa,* among others. Historically, caoba (*Swietenia macrophilla*), laurel(*Cordiaalliodora sp),* cedro*(Cedrela odorata),* ceibo (*Ceiba spp,)* guayacan pechiche (minquartia guianensis), roble (Quercus robur), moral (Morus nigra), guayacan (Caesalpinia paraguariensis), balsam (Myroxylon balsamum) and others were exploited as roads were cut into virgin forest for petroleum development. Many of these species have been overharvested rendering many farmers forest deficient of high value timber. Also, loggers are entering the RPFC to illegally extract these high value, yet endangered, species. (See Annex IV for a complete list of trees identified as endangered by Cuyabeno community members in the PDOT Cuyabeno.)

Over 500 species of birds have been recorded in the Cuyabeno Reserve, making it one of the protected areas with highest diversity of species. Among them, however, few species have a restricted range or are threatened with extinction. There is a record of *Crax globulosa*, a vulnerable species whose presence in Ecuador has not been confirmed with absolute certainty. Cuyabeno shelters significant populations of some endemic species of the Endemism Area of Alto Napo, like *Thamnophilus praecox*, or threatened in Ecuador, such as *Ara chloroptera*.

Regarding mammals, primates are the most representative: *Cebuella pygmaea*, *Saguinus nigricollis*, *Cebus albifrons*, *Aotus vociferans, Alouatta seniculus*, *Pithecia monachus* and *Lagothrix lagotricha*.

Carnivores include *Panthera onca* (NT), *Pteronura brasiliensis* (EN), *Lontra longicaudis* (DD), *Puma concolor* (NT), *Speothos venaticus* (VU), *Herpailurus jaguarondi*, among others. In addition, it is an important site for aquatic mammals *Trichechus inunguis, (*VU) and *Inia geoffrensis, (*VU), as well as for *Tapirus terrestris* (VU), *Mazama americana* (DD), *Tayasu pecari, Microsciurus alfaroi*, *Ciclopes didactylus, Tamandua mexicana*, *Bradypus variegatus* and *Noctilio albiventris*.

The diversity of herpetofauna and fish is also noteworthy and includes several large species such as *Eunectes murinus*, *Podocnemis expansa* (LR/cd)*, Melanosuchus niger* (LR/cd), *Corallus caninus*, *Arapaima gigas* (DD)*, Osteoglossum* sp., *Colossoma*

macropomum, among others (BirdLife International, 2012; IUCN conservation status acronyms in parenthesis).

4.1.3 Human Environment

Demographic & socio-economic conditions

The target parshes are dominated by men and the parish's age distribution charts present a steeply inclined curve in the first 15 years and a gradual decline in age. For example, a little over a third of Tarapoa's population is between the ages of 1 and 14 years old; 15 – 64 year olds make up 58.3% of the population. (GADM Cuyabeno, 2012.) Palma Roja is dominated by 15 – 64 year olds (55.88%); 0 – 14 year olds make up 40.40% of the population. (Agroprecision, 2012.) The average age of farmers in the project area is 48.1 years old. (ECOLEX, 2009.) Still, from interviews with local actors, it is apparent that youth are not staying in farming, and according to the current property adjudication arrangements, farmers are not able to parcel their lands, which means sons and daughters acquire their parent's property through informal agreements, until death or formal transfer/sale.

Parish	Population	% Men	% Women
Tarapoa[1]	5278	57.6%	42.4%
Aguas Negras[1]	1463	10.8%	9.7%
Palma Roja[2]	3954	55.0%	45.0%

[1] PDOT Cuyabeno, 2012
[2] Agroprecision PDOT, 2011

The majority of farmers are of mestizo, or Spanish/indigenous heritage; migrants from other Ecuadorian provinces. The second largest ethnic group is of the areas indigenous communities, most of which are located inside the RPFC.

Very few households are connected to drinking water systems. Tarapoa has higher indices of basic infrastructural support such as garbage collection and electricity most likely due to its larger urbanized population. Still, 95.8% of households in Palma Roja and 67.9% in Tarapoa have difficulty meeting their basic needs. In Palma Roja, 44.13% live in extreme poverty; 88% of Aguas Negras. (Agroprecision, 2012; GADM Cuyabeno, 2012.)

Indicators	**Parroquia**		
	Palma Roja	Tarapoa	Sucumbios Province

Access to a public water system	0.00%	5.80%	13.90%
Human waste disposal	27.50%	35.10% *	60.40%
Garbage collection	6.9%	26.90%	43.20%
Electricity	7.2%	47.60%	71.10%
Telephone service	0.50%	1.3%	10.60%
Unsatisfied Basic Needs	95.80%	67.90%	81.70%
Schooling (years)	5.20	6.9	6.00
Literacy	88%	91.6%	91.5%

Table 3.1.1: Adapted from ECOLEX, 2009, by Henry Quiroz. Comparable information for Aguas Negras is not available.
*25% have no human waste disposal system.

Economic activities

The Putumayo PDOT (2012) reports that 90% of the canton's population generates income from agricultural or livestock production. These activities, on average, generate less than $100 per month. Five percent of the population is employed by the petroleum companies in non-professional, non-technical jobs that generate around $300 per month.

The principle income generating activities of the Cuyabeno canton are (GADM Cuyabeno 2012):

- 37.8% - agriculture, livestock, acuaculture, hunting and fishing,
- 10.65% - mining and quarrying
- 10.34% - undeclared
- 7.66% - administrative services
- 6.84% - construction
- 4.74% - education

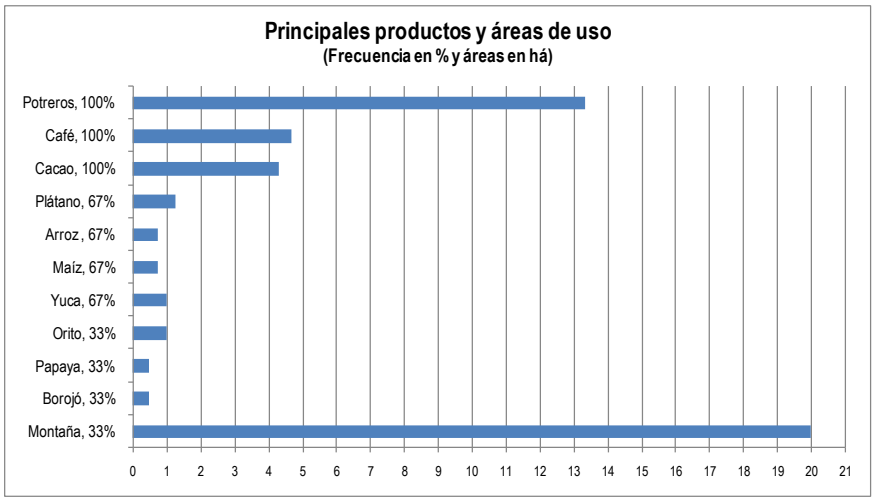
Timber is also a source of income for the landowners in the RPFC buffer zone, albeit minimal, undervalued and often illicit. Often, landowners receive submarket value for their standing timber from a middle man who harvests the valuable species, unsustainably, and often without legal permissions. This has resulted in many farms of the "first line" (located along the principle roadways) to be devoid of traditionally commercially valuable timber. Still, today, new species have risen in commercial importance such as jacaranda (Jacaranda mimosifolia), tamburo (Guarea kunthiana), jigua (Nectandra sp), guarango (Prosopis pallid), aguacatillo (ersea caerulea), and caimito (Chrysophyllum caimito), among others. (GADM Cuyabeno 2012.)

According to the 2009 ECOLEX Final Report, 65% of the farms in the buffer zone of the RPFC are being managed for agricultural production. Forty-eight percent are producing for self-consumption and 46% for self-consumption and sale of surplus.

Each farm can count on 3.8 workers, and 47% of the farms have permanent labor, while 76% employ temporary labor. (ECOLEX, 2009.) Availability of on-farm labor to participate in additional productive activities and competition with more rewarding jobs or activities, even when temporary such as with petroleum companies, needs to be taken into account.

Land Use and Management

Land use data specific to the parish of Palma Roja and Aguas Negras is not available, therefore data from surveys taken by Ecolex in 2009 in Tarapoa will be used, although this data is limited by a less than 50% response rate, as mentioned in the *Informe Final de Consultoria*. According to Ecolex (2009), in Tarapoa, 100% of the respondents have their lands in pasture (13.33 ha), coffee (4.67 ha) and cacao (4.3 ha). Sixty seven percent of the communities have land under harvest for plantain (1.25 ha), rice (0.75 ha.), manioc (1.0 ha) and corn (.75 ha). Thirty three percent have identified land dedicated in "montaña" or unconverted forest; up to 20 ha, the largest area of land use for the parish, as represented in the graph below. The size of the farms is variable between 7 and 200 ha.



Source: Ecolex, 2009, community workshops

Land tenure and property rights

In the past, land division in the buffer zone was the result of continuous pressure by colonists, translating into informal and illegal possession of the land. With the opening of roads for oil extraction, this process increased, causing massive, uncontrolled and destructive colonization. According to ECOLEX (2009), the year 2000 witnessed "countless possessions" and the existence of 58 pre-cooperatives.

From January 2007 to October 2009, a component of the AMAZNOR project in Ecuador carried out activities to consolidate the RPFC, focusing on the buffer zone around the "Cabacera" unit of the reserve. Prior to AMAZNOR, farms in this area, especially those within the Patrimonial Forest, could not be titled (or bought or sold) unless landowners could show possession of the land prior to the Patrimonial Forest

designation. The lands and forests were considered property of the state and under the administration of the Ministry of Environment (MAE) or the National Institute of Agricultural Development (INDA). (STPE/ECOLEX, 2010.) In addition, these lands were poorly regulated and controlled, therefore treated as open access creating land use conflicts, invasion into the RPFC and encouraging unsustainable and illegal activities.

The communities within the parishes of Tarapoa and Palma Roja have a history of conflicts and deep seated feelings of deception with the state, the oil companies and their elected officials. It was the experience of the Environmental Assessment team that farmers in the region are reserved and suspicious, hesitant to allow people on their property. ECOLEX (2009) reports that 50% of the communities in Tarapoa were not willing to provide information to the project. Among other reasons, the report quotes inhabitants of Tarapoa being disillusioned with participating in studies for government programs and then receiving nothing in the end. They also are tired of the government ignoring their claims against the oil companies or undermining their efforts to protect their environmental rights by labeling them "terrorists" when they protest the oil company's contamination of their soil and water. Farmers in Tarapoa and Palma Roja interviewed by ECOLEX (2009) claim they have not seen the benefits of petroleum production but are witness to the negative impacts such as divisions within society, water and soil contamination, and over-consumption of scarce water supplies. Also, historically farmers were not allowed to own lands within Patrimonial Forests, and this contributed to their discontent.

The challenge of the AMAZNOR project was the development and implementation of a legal path down which individuals and native groups living within the buffer zone of the RPFC could adjudicate their property rights, titling their lands while also guaranteeing the biological and cultural conservation of the protected area. (STPE/ECOLEX, 2010.) The result of the project was the delimitation and legalization of more than 1619 farms, and the award of 865 titles, as well as the resolution of conflicts over park and farm boundaries and organizational development of the "pre-cooperatives" of which the farmers are constituents.

The land tenure panorama is not complete. There are still untitled lands without PMIs and these forested lands are being sold and transformed into pastures. Land trafficking is prevalent. The purchase of several farms by a single new owner is also evident and as mentioned earlier, new owners are not always respecting the PMIs and agreements between the original owners and the MAE.

Land Management

The AMAZNOR project also resulted in the development of 1049 Integrated Management Plans of the farms in the communities of the buffer zone. These straight forward management plans identify the area and percent of each farm to be dedicated to the following uses: permantent protection, native forest management, plantations, other uses such as agroforestry, livestock, and infrastructure, and for legal conversion. In addition, these pre-associations or communities have management plans that include land use distribution or zoning specifying restricted or conditional uses areas. The land use guidelines considered include (ECOLEX, 2009):

A. In rivers, streams, marshes and watersheds

1. No pollution.
2. Controlled use of "barbasco" for fishing (a toxic root).
3. Maintaining a minimum of 15 meters of vegetation along both banks of rivers, streams and other bodies of water.
4. In areas with streams, estuaries, marshes and rivers whose banks lack vegetation, allowing natural regeneration or starting plantations using native tree or shrub species in order to protect them.

B. In crop areas

5. Seeking alternative pest control options.
6. Conducting controlled burns.
7. Promoting the use of organic fertilizers.
8. Improving crop and pasture lands with timber, forage and fruit trees.

C. In fallow areas

9. Rotating the areas.
10. Allowing fertilization of the soil.
11. Promoting improvements with fruit and timber trees.

D. Forest/Mountain

12. No changing of land use and when the owner so decides, felling of mountain will be in accordance with the forest standards in force, i.e., no more than 30% of the total area surface.
13. Managing forests by harvesting in accordance with forestry standards.
14. Controlling hunting and fishing in order to turn them into sustainable activities.
15. Preserving feeding and drinking areas used by wildlife.

The Integrated Management Plans are part of an overall agreement between the buffer zone landowners and the MAE and a requirement for receipt of title to plots in *Patrimonio Forestal*. The plans are tied to the land, and sales must be approved by the MAE. However, MAE monitoring and control over this process and compliance with the IMPs by landowners has come into question, and suggests an overall institutional deficiency, both by communities and the MAE to enforce them.

4.1.4 Ecuadorian Institutional and Policy Framework

With the establishment of the National Strategy for Sustainable Forest Development in 2000, a new forest management model emerged in Ecuador, focused on maintaining and restoring the environmental goods and services they provide to local communities and to society at large, without losing sight of biodiversity conservation.

The evaluation of the Strategy in 2005 reviewed the achievements in sustainable forest management resulting from reforms to the legal framework that establish shared responsibility in forest management and the implementation of standards for sustainable forest harvesting including criteria, indicators and sources of verification.

In addition, the assessment showed progress in obtaining funding for forest conservation and valuation.

The approval of the Constitution of the Republic (2008), established a new paradigm in natural resource and biodiversity management. Nature was recognized as a subject of legislation, including its conservation, sustainable use and recovery. Forest ecosystems were declared to be fragile ecosystems, in addition to moors, wetlands and mangroves and "Sumak kawsay" or "good living" was established as a fundamental principle for development of the Ecuadorian society.

For full implementation of these constitutional mandates, it is necessary to strengthen forest policies and the specific legal framework, in order to generate a forest culture in the country. In addition, within the global context, concern for climate change and its consequences for mankind have repositioned forest conservation and sustainable management, generating growing demand to rapidly strengthen these processes.

This situation has motivated the Ministry of Environment to undertake efforts in recent years to collect baseline information to enable better decision-making regarding forest conservation and sustainable management, as well as to seek funding under mechanisms such as Reduction of Emissions from Deforestation and Degradation (REDD+).

The forest governance model under implementation by the Ministry of Environment focuses on five main elements:

1) Improving the efficiency of the forest management and control system to increase legal trade of forest products;
2) Strengthening the systems to provide incentives for sustainable forest management and conservation;
3) Generating information to facilitate timely decision-making;
4) Promoting reforestation processes in degraded and protected areas; and
5) Implementing research, training and dissemination processes.

The Environmental Management Law establishes that the National Environmental Authority rests in the Ministry of Environment, the entity that governs, coordinates and regulates the national decentralized system for environmental management, without prejudice to the attributions that other State institutions may exercise, within the scope of their competencies and in accordance with the laws that regulate them.
The law that regulates forests is the Law on Forests and Conservation of Natural Areas and Wildlife, incorporated in 2004.

The forestry regime is regulated by Book III of the Unified Text on Secondary Environmental Legislation of the Ministry of Environment. Forest management regulations applicable to project execution include:

- Forest Management System Regulations: Forest management is an activity in which the State endorses Forestry Engineers to plan, verify and supervise the execution of forest extraction plans and programs on behalf of the State, in order to guarantee the sustainable management of forests. A native forest, as

is the case of the forests located in the area of intervention of the project, must have a forest manager whose work is governed by these regulations.

- Administrative procedure regulations to authorize timber harvesting and extraction: This standard regulates all administrative procedures to be fulfilled to receive State approval of a timber harvesting plan or program.
- Regulation for harvesting timber in cultivated forests and agroforestry systems: When trees are outside a forest or in a plantation, authorization for harvesting should follow this regulation. (The project has identified systems with these characteristics in the farms.)
- Sustainable forest management regulation for extracting timber in tropical forests: In Ecuador, different regulations apply according to the type of forest (Andean forest, dry forest); in the area of intervention of the project, tropical forests prevail and therefore harvesting is regulated by this standard.

In general, it could be said that the regulations include the following sustainable forest management principles:

- Sustainable production
- Maintaining a forest cover
- Biodiversity conservation
- Shared management responsibility
- Reducing negative environmental and social impacts

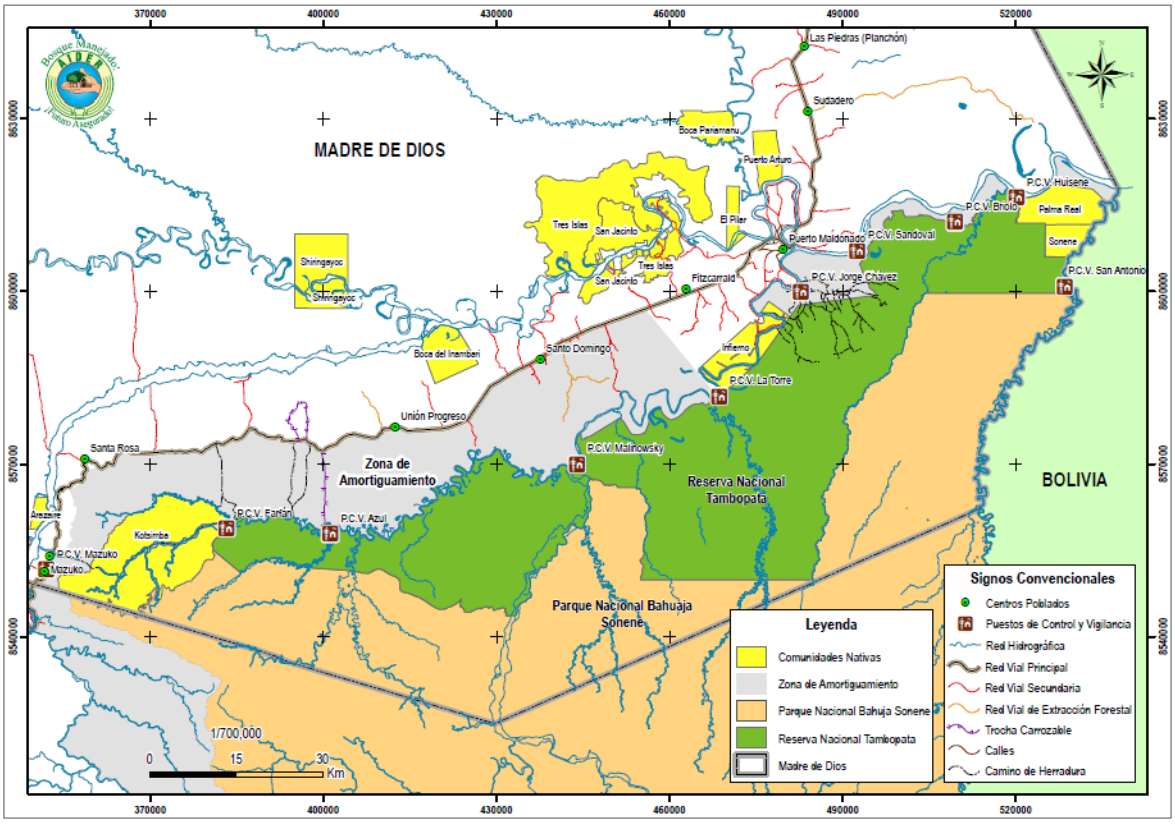
4.2 Perú – Madre De Dios

4.2.1 Geography

Project activities will take place in the region of Madre de Dios in southeast Perú, near the border with Bolivia. Politically, the project area lies within the Madre de Dios region, in the southern part of the Tambopata province and comprises the districts of Tambopata and Laberinto.

The study area lies in the lower portion of the Madre de Dios River and involves the watersheds of the Madre de Dios, Tambopata and Heath rivers. The Madre de Dios river flows west-east towards Bolivia, and joins the Tambopata river, coming from the south. The city of Puerto Maldonado, which is the capital of the region, lies by the junction of these two major rivers. Parallel and east of the Tambopata River there are the Palma Real and Heath rivers. The Heath River is the limit between Perú and Bolivia.

The Tambopata National Reserve (TNR) is 274,690.00 hectares and lies east of the Tambopata River up to its joining with the Malinowski River and from there east and south of this river up to the join of the latter with the Manuani River. On its northern edge, the TNR is located south of the Madre de Dios River. Between the TNR and the Bolivian border is the Bahuaja-Sonene National Park. In the northern extreme of the reserve it reaches the Heath River up to the Bolivian border.



The project Native Communities of Sonene and Palma Real are located in the extreme corner on the junction of the Madre de Dios and Heath rivers and adjoin with TNR. Infierno Native Community lies on both sides of the Tambopata River before it joins the Madre de Dios and it also adjoins the TNR on its middle – west part. Tres Islas is located at both sides of The Madre de Dios River before it joins the Tambopata River. The size of these native communities is shown in the table below:

Native Community	**Area (hectares)**
Infierno	9 558.0
Palma Real	9 491.0
Sonene	3 857.60
Tres Islas	31 423.71
Total	**54 330.31**

The project will also be working with the *Asociacion de Palmicultores San Juan* (PALSAMAD). PALSAMAD, a non-profit organization of 15 farmers and harvesters of San Juan is dedicated to forest product harvesting - aguaje and urungahui palm fruits - some timber, and ecotourism. (PALSAMAD, 2011.) They work a concession of 2,364.03 hectares located in the San Juan sector, District of Laberinto, Tambopata Province, in the TNR buffer zone.

The portion of land between the Madre de Dios and Tambopata rivers is bisected by the Inter-oceanic highway, that comes from Cuzco, passes Puerto Maldonado, crosses

the Madre de Dios river and heads north up to Iñapari, to the border with Brazil. The buffer zone of TNR extends from the protected area's west border up to the highway.

The inter-oceanic highway started as an unpaved road was first built from Quincemil in Cusco up to Puerto Maldonado in the early 1960s. This produced the first wave of people migrating from Cuzco and Puno to the region, and the expansion of extractive activities and agriculture and cattle ranching.

Later, Perú began developing the Interoceanic highway, with the aim of connecting the Atlantic Ocean (in Brasil) with the pacific, in the Peruvian coast in order to connect markets from northern Brasil and Bolivia and southern Perú. This project included the paving or improvement of some 2586 km between Iñapari, close to the Brazilian border; and the south Peruvian coast docks (Fleck *et al*. 2010). The paving started in 2008 and ended in July 2010 with the inauguration of the bridge over the Madre de Dios River. This fact increased the migratory process of people towards Puerto Maldonado and Madre de Dios, which has been carried out in a very chaotic and unplanned way, increasing the pressure over the resources, due to easier accessibility.

4.2.2 Baseline Conditions

Ecosystem

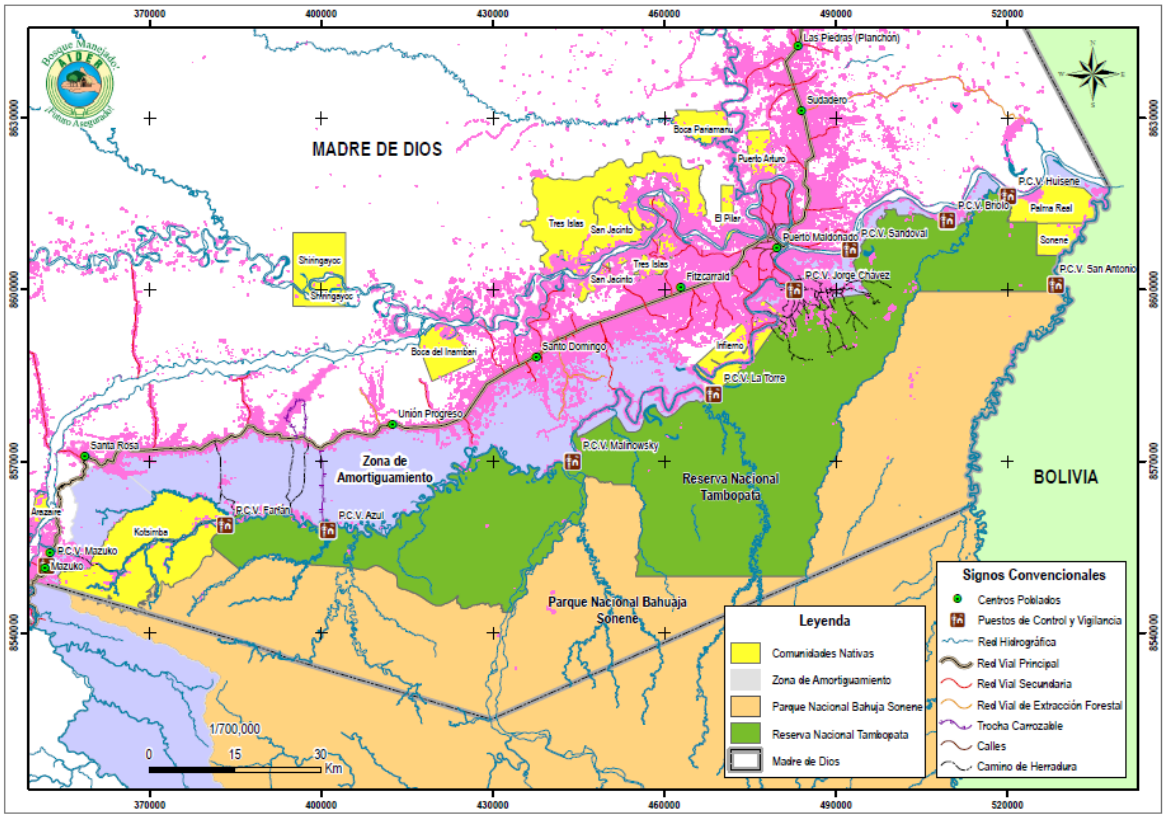
The study area lies in the Moist Forests of the Southwestern Amazon eco-region. The southern part of this eco-region has two seasons, the dry and the rainy. Mean year precipitation varies between 1500 and 2100 mm. Temperature along the year varies between 22 and 27° C (CDC-UNALM 2006). According to Dinerstein *et al*. (1995) these forests are relatively stable, outstanding at global level and they have maximum priority at the regional level.

According to the Mapa Forestal (type of forests) (INRENA 2000), the study area has the following forest types: *Bosque humedo de terrazas medias* (Bh-tm), *Bosque humedo de llanura meandrica* (Bh-llm), *Bosque humedo de terrazas bajas* (Bh-tb) and Deforested areas (Df). Bh-tm are the most extended forest type in this region. According to the Ecological map (INRENA 1995), there are the following Life Zones in the project area: *Bosque Húmedo Subtropical, Bosque Muy Húmedo subtropical* and *Bosque Muy Húmedo* (transition to *Bosque Pluvial Subtropical*).

According to the Ecological Systems map (Josse *et al*. 2007), the study area is conformed of at least six Ecological Systems within four categories. In the category of Amazonian moist forest, two Ecological Systems: Piedemont forests of the southwest Amazon and seasonal evergreen forests of the peneplain of southwest Amazon. In the category of Amazonian white water floodplain forests, there is one Ecological System: flooded forests of the alluvial plane of white water rivers of the southwest Amazon. In the category of Amazonian white or black water flooded vegetation, there is one Ecological System: complex savannahs of southern Amazon. Beside this, there are areas on the category of Otros (others), such as Water bodies and converted areas.

The most extended Ecological Systems in the study area is the seasonal evergreen forests of the peneplain of southwest Amazon. Forest that occupies large areas in between both major rivers Madre de Dios and Tambopata.

Deforestation in Madre de Dios increased from 79,268 to 203,879 hectares from 1990 to 2000 (An increase of 124,611 hectares, representing an 8.33% increase over the decade.) (Ministerio del Ambiente 2009). By the year 2010, deforested area in Madre de Dios was 270, 701 hectares (an annual rate of 1.1%) mostly located along the Interoceanic highway. Some 33,850 hectares are from illegal gold mining activities (Gobierno Regional de Madre de Dios 2009).



Critical Habitat

An ecosystem of ecological and economic importance includes the aguaje *(Mauritia flexuos)* or mixed palm swamps found in the region. Aguaje fruit is harvested and sold to a large national market, and its palm fronds and wood is used locally. Larvae found in the dead palms are eaten locally. Brightsmith (2005) identifies *Mauritia flexuosa* (Arecaceae) as a keystone plant resource used by nesting parrots; at least seven species of psittacids nest in Mauritia flexuosa. Brightman (2005) also identifies the local threats to these nesting sites, including overexploitation of the palm for its various products used by humans and larvae collection. In addition, the study discusses the importance of the dying palm swamp to the maintenance of these avian populations. Although one of the most wide-spread palms in South America (Horn, 2010), aguaje has been unsustainably harvested since the 1990s which means that the female trees in areas of these palm forests have been cut down to reach the fruit.

According to the San Diego Zoo Institute for Conservation Research (Horn, 2010), male palms now outnumber female palms by almost four to one, and

> *A decline in female aguaje affects more than the palm population. Many animals depend on aguaje fruit as a major food source, including macaws, other parrots, primates, and tapirs. Even fish take advantage of floods to access fallen fruit.*

Endemism

The project area is located within the Endemic Bird Area "Southeast Peruvian Lowlands" (EBA 068), which is considered an urgent conservation priority with moderate habitat loss and incomplete knowledge. (Stattersfield *et al*. 1998). There are 12 restricted-range birds on this EBA, being all present in Perú. Those species primarily occupy the tall floodplain and riverine forest with a number apparently being undergrowth, thicket, scrub and/or bamboo specialists. From all those species, the Selva Cacique (*Cacicus koepckeae*) is the only threatened one (Endangered).

The area has several endemic plant species to the forests on the Amazonia at the base of the Andes (Naturserve 2012). At least 18 species are endemic to this area, belonging to 10 families. In mammals, there are few endemic species that occur in the lowlands, but in densities that are an order of magnitude lower than at higher elevations (Young 2007).

Flora

There are a total of 63 threatened plant species. According to national categorization (D.S. N° 043-2006-AG), there are 21 in the following categories: 2 Critically Endangered (CR), 10 Vulnerable (VU), and 9 Near Threatened (NT). According to global categorization (IUCN), there are 23 in the following categories 3 Endangered (EN), 8 Vulnerable (VU), 11 Lower Risk (LR) and 1 Data Deficient (DD). According to CITES, there are 26 species in Appendix II and 1 in Appendix III. It is important to note that two of the three traditionally harvested timber species – caoba and cedro – are considered vulnerable and listed in IUCN Appendices II and III, respectively.

Fauna

There are 1260 species of vertebrate fauna. From this total, 93 are amphibians, represented by 31 genera and 9 families, 648 are birds represented by 388 genera and 60 families, 108 mammals represented by 85 genera and 28 families and 323 species are fish represented by 205 genera and 39 families. There are 32 threatened species according to the national categorization (D.S. N° 034-2004-AG): One bird species is Critically Endangered (CR), 3 birds, 2 mammals and 2 reptiles as Endangered (EN), 5 birds, 6 mammals and 2 reptiles as Vulnerable (VU), and 1 amphibian, 9 birds and 1 reptile as Near Threatened (NT).

According to the global categorization (IUCN), there are 830 threatened species, being 57 amphibian, 629 birds, 102 mammals, 16 fish and 26 reptiles. From this

numbers, 15 are under CR, VU or NT categories: 1 amphibian, 2 birds and 2 mammals are Endangered (EN), 2 birds, 4 mammals and 2 reptiles are Vulnerable (VU), and 10 birds and 5 mammals are Near Threatened (NT). Also, there is 88 species listed in CITES Appendixes, being 2 birds, 7 mammals and 1 reptile in Appendix I and 6 amphibian, 59 birds, 6 mammals and 76 reptiles in Appendix II.

Complete lists of threatened and endangered species of the Tambopata National Reserve can be found at http://www.sernanp.gob.pe/sernanp/archivos/biblioteca/planes_maestros_2012/PM%20RNTAMB%202011-2016.pdf .

4.2.3 Human Environment

Demographic and Socio Economic Conditions

In the past, the study area was one of the most remote areas of Perú, due to its bad connectivity and small population. In fact, it was one of the least populated regions of Perú, and also the one with the lowest population density. This density augmented from 0.29 hab/km^2 in 1972 to 1.17 hab/km^2 in 2002. By 2008 density was 1.3 hab/km^2.

According to project socio-economic baseline surveys carried out in 2011 and 2012, the target Native Communities are predominately female, and have population growth rates between 22 – 26%, as reflected in the table below. It is important to note that many of the CN inhabitants may live in neighboring urban centers, such as Puerto Maldonado.

Native Community (CN)	**Population**	**Male**	**Female**	**Population Growth Rate**
Tres Islas	217	103	114	22%
Infierno	*	*	*	*
Palma Real	340	168	172	26%
Sonene	118	58	60	26%

* Reported at provincial level.
Source: Rainforest Alliance

The target Native Communities have limited access to potable water, electricity or basic sanitation, although access to education and facilities is prevalent.

Native Community (CN)	Potable water	Letrine or Toilet	Education Facility in CN	Electricity
Tres Islas	Partial	Yes	Pre-K, Primary, Secondary	Yes
Infierno	*	*	*	*
Palma Real	No	**	Pre-K, Primary, Secondary	Partial, solar
Sonene	No	**	Pre-K, Primary	Partial, solar

* Reported at Provincial level only.
** Unreported

Economic Activities

The economic activities in the study area are principally agricultural and natural resource based and highly dependent on the biological diversity of this forest ecosystem. These are timber harvesting, oil exploitation, gold mining, Brazil Nut extraction, palm fruits extraction, hunting and fishing. Also, there is agriculture (rice, beans, soy, manioc, banana and papaya) and cattle ranching, mainly cows and poultry (chicken farms). Other important activities include trade and ecotourism in the several lodges along the Tambopata and Madre de Dios Rivers.

Logging is a principle economic activity in Madre de Dios, employing almost 65% of the economically active population. (Cossio – Solano, et. al. 2011.) Traditionally, three principle timber species have been extracted from Madre de Dios forests: *Swietenia marcophylla* (caoba), *Cedrela adorata* (cedro), and *Cedrelinga catenaeformis* (tornillo) and represents almost 60% of all wood harvested in the region. New species are gaining place in the timber market, however.

As evidenced by the table below, the principle economic activities in the target Native Communities are Brazil Nut and timber harvesting, followed by agriculture.

Productive Activities in CNs as percentage of total income of local population

Native Community (CN)	Brazil Nut	Madera	Agriculture	Ungurahui	Fishing	Crafts	Commercial	Tourism	Other
Tres Islas	45%	35%	8%	5%	1%	0.1%	1%	0.9%	4%
Infierno	*	*	*	*	*	*	*	*	*
Palma Real	52%	25%	11.9%	**	4.0%	4.0%	0.1%	0	3.0%
Sonene	15%	60%	15%	**	3%	2.9%	0.1%	0	4%

Source: Rainforest Alliance, *Diagnostico Socioeconomico* (of each community), 2011 & 2012
***** Data reported at district level only. ** Unreported.

Land Use and Management

There are two types of managed areas in the project area, the protected areas and the concessions.The two national protected areas in the study area are the Bahuaja –

Sonene National Park and the Tambopata National Reserve, described above. The only buffer zone in the study area is of the TNR, which is located between its west border and the Interoceanic highway and has an extension of 186,450 hectares. Beside these two protected areas, which are managed by the Peruvian Government though the agency for protected areas SERNANP (*Servicio Nacional de Areas Naturales Protegidas*), there are 10 Private Conservation Areas (PCA), which are designated by SERNANP but managed by their owners.

Occupation category	Area (Hectares)	Percentage of Madre de Dios
Protected Areas	3,767,942	44.2
Parque Nacional Alto Purús	1,255,347	14.7
Parque Nacional Bahuja Sonene	294,682	3.5
Parque Nacional del Manu	1,532,806	18
Parque Nacional Tambopata	274,690	3.2
Reserva Comunal AMARAKAERI	402,336	4.7
Reserva Comunal Purus	8,081	0.1
Indigenous reserves	829,941	9.7
Reserva del Estado "Pueblos Indígenas en Aislamiento Voluntario" Reserva Indígena 343	829,941	9.7
Forestry concessions	2,387,021	28
Wood	1,159,239	13.6
Conservation	164,568	1.9
Ecotourism	42,251	0.5
Reforestation	108,687	1.3
Brazil Nut	894,795	10.5
Rubber	17,480	0.2
Native Communities	399,820	4.7
Native Communities *	399,820	4.7
TOTAL	7,384,724	86.6

Source: Ministerio de Agricultura, Dirección General Forestal y de Fauna Silvestre (cited in PIP FORESTAL MDD ULTIMA VERSION - Diciembre 2009, Pág. 51) and * FENAMAD - Revista Intitucional "Avance Indigena" Diciembre 2007 Pág. 24.

From the 8,518,200 hectares of Madre de Dios, there is a total of 7,384,724 hectares under concession, property of native communities and/or under protected area status.

For the national protected areas, major challenges are maintaining connectivity with other protected areas on the other side of the Tambopata River. Between Bahuaja – Sonene National Park and the Tambopata National Reserve and the other national parks in Madre De Dios, Reserva Comunal Amarakaeri and Manu National Park, lie the Interoceanic Highway and the mining zone.

Native Community Tenure and Property Rights

Native Communities in Perú are regulated under 1974 special legislation that recognizes the legal status of the native community and grants them inalienable rights to their lands. Their land is titled communally. Four years later, the Ley de

C.C.N.N. (May 1978) modified their property rights significantly limiting them to areas of agricultural use, while forestry uses are subject to rules of concession. Therefore, native communal lands are zoned by soil capacity and land use, and rights to harvest forest lands are ceded to the community by the state. (Rainforest Alliance, 2012.) Further laws and regulations of 1997, 2000 and 2001 outline licensing and management planning requirements for commercial timber extraction purposes. These regulations and those guiding Brazil nut harvesting are further described in Section 4.2.4.

To meet these requirements, the project Native Communities have management plans in development. Besides quantifying timber and NTFP volumes, they also outline land use zones: timber and NTFP harvesting zones, community lands, protected zones, and intervened zones for agricultural, livestock and mining uses. In addition, the Native Communities are working toward managing their forests and harvesting to meet organic, Fair Trade or sustainable certifications:

Forest Product Certification Status

Certification	Tres Islas	Infierno	Palma Real	Sonene
Brazil Nut – organic	Yes	NA	Yes	Yes
Ungurahui – organic	Yes	NA	NA	NA
Madera – COC/FSC	No	No	No	No
Tourism - sustainable	**	**	NA	NA

NA = Not Applicable
** Unreported

Rainforest Alliance socio-economic diagnostic studies carried out in 2011 and 2012 of the four communities indicate the various levels at which certain best management practices are already put into practice by the local forest management organization to meet certification standards.

Forest Management Practices in Target Native Communities

Practice	Tres Islas	Infierno	Palma Real	Sonene
Natural regeneration of Brazil Nut &/or timber species	Y	**	Y	Y
Selection of seed trees	Y	**	Y	Y
Pruning of lianas from Brazil Nut trees	Y	**	Y	Y
Wildlife	**	N	**	**

protection/ conservation				
Protection of natural vegetation	Y	N	Y	Y
Protection of riparian areas, rivers and other water bodies.	Y	N	Y	Y
Preserve 10% of census trees and respect minimum diameter.	Y	**	Y	Y
Directional felling	**	**	Y	Y

Source: Rainforest Alliance, *Diagnostico Socioeconomico* (of each community), 2011 & 2012
** Unreported

Land Use Conflicts

The trends of land use along the study area have acquired a pattern for deforestation along arterial roads, since access is easy and the demand for products from Puerto Maldonado has increased substantially as the population has grown. The demand for meat (both from poultry and livestock such as cows, pigs and others) can demand large areas for pastures. Also, vegetables and fruits require large-scale deforestation for cultivation. There are also some productive projects seeking space in the study area for developing crops such as papaya, which is increasing its extension especially in the Infierno native community.

Several conflicts arise from this new scenario: land uses that protect forest cover versus uses that eliminate it are common. Conflicts arise from overlapping designated land uses, such as mining in protected areas, buffer zones or native communities, hunting in protected areas, and logging in areas not designated for forestry, such as in Brazil Nut concessions.

Gold mining has dramatically increased in the last five years in the area, due to an increase in the price of this metal. This activity is affecting the environment by destroying some 320,000 hectares of forest and contaminating rivers and air with mercury. Ninety nine per cent of this activity is illegal and involves 30000 miners that produce a mean of 16000 – 18000 kg of gold per year in Madre de Dios region (Brack *et al*. 2011).

According to Mosquera, et al (2009) the following project Native Communities have mining rights superimposed on their lands. Resulting conflicts are characterized by internal to the native community and among individuals with overlapping and contested use rights, or where mining activities impact neighbors; or external between the native community and competing miners.

Native Community	**Área of Native Community**	**Nº of superimposed**	**Área de overlap (ha)**	**% of Native Community with**

	(ha)	mining		superimposed mining rights
Tres islas	33731	570	1840	**5%**
Infierno	10434	1	308	**3%**

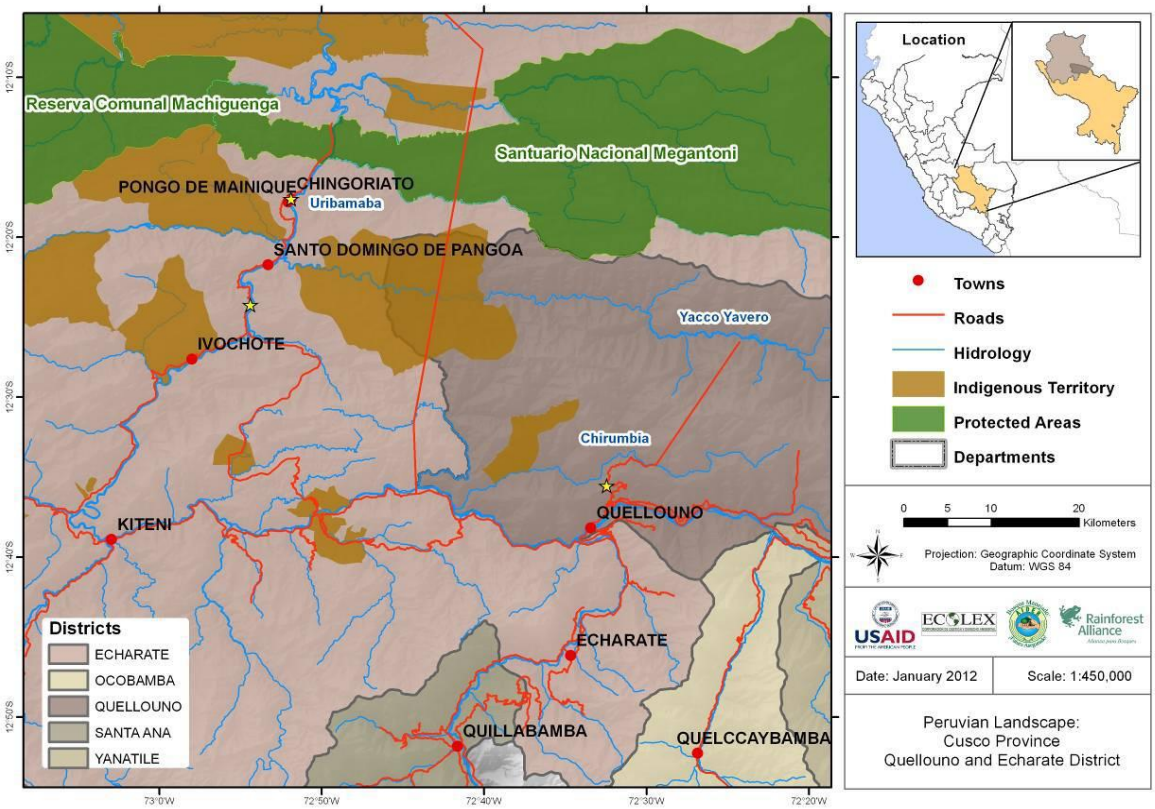
Timber extraction within Brazil nut concessions is also a source of conflict because the forestry activity can have significant impacts on Brazil nut production and sustainability. Besides the impacts on soils and vegetation f forest roads and paths, poorly executed felling can damage Brazil nut trees and impact pollinators by harvesting trees that have a symbiotic relationship within the Brazil nut ecosystem, such as *Couratari* a more recently discovered timber specie. Cossio-Solano, et al (2011) estimate 3.19 – 3.81 m^3/ha per year has been harvested from Brazil nut concessions between 2004 - 2009. Many are reporting harvesting up to the 5m^3/ha limit, an amount that is rarely realized in forestry concessions, and suggesting that the additional amounts might be illicitly coming out of neighboring protected areas or lands undesignated for the use. (Cossio-Solano, et.al. 2011.)

Considering existing overlapping use rights, and potential impacts of timber harvesting on NTFP uses, it is important that all concessions are managed with the impacts and interests of multiple uses in mind, to ensure the long term production of the products and sustainability.

4.3 Perú – Cusco

4.3.1 Geography

In Cusco, the project area is located in the southern zone of the Megantoni National Sanctuary buffer zone, in the districts of Echarate, Quellouno y Yanatile, province of La Convención, department of Cusco. These districts are characterized by large areas of limited human intervention, an average of 20 km2 per inhabitant. In the last ten years agricultural expansion has increased considerably, and with it the slash and burn of primary and secondary forests for agricultural plots. These practices, along with new roads, have been carried out without environmental impact studies and constitute the principle threat to biodiversity in the region.



The Megantoni National Sanctuary was established in 2004 to conserve the Megantoni Mountains and is the largest national sanctuary in Perú – 215, 868.96 hectares. (SERNANP, 2007.) The national sanctuary conserves 10 life zones in the Megantoni Mountains, the headwaters of the Limpia and Ticumpinia rivers, and cultural and biological values such as the "Pongo de Mainique" a sacred place for the Machiguenga indigenous peoples and threatened and endangered species such as the spectacled bear (*Tremarctos ornatos),* river otter (*Lontra longicaudi),* and *Propyrrhura couloni,* the blue-headed macaw. The Megantoni Sanctuary is an important protected area between Manu National Park and the protected areas of Vilcabamba. It also serves as a highly important corridor for the migration of species such as jaguars (*Panthera onca)* and mountain lions (*Puma concolor*).

This region is characterized by hilly and mountainous topography, with altitudes between 416 and 3,960 meters above sea level. According to the Megantoni Master Plan (2007) mean annual temperatures in the region are around 25°C and can reach up to 34°C or plummet to 15°C a 18°C. Above 1,000 meter above sea level, for each 100 meters of elevation there is a loss of approximately 0,7°C. Above 2,000 meters asl temperature loss decreases.

Annual mean precipitation can reach 3,000 mm, principally received during the rainy season, November – April. Rainfall increases with elevation. In the dry season, it is not uncommon to experience "friajes", or cold fronts that originate from the south Atlantic and can drop daily temperatures to 10°C. (SERNANP, 2007.)

4.3.2 Baseline

The information presented below is taken principally from the *Plan Maestro del Santuario Nacional Megantoni.* (http://www.sernanp.gob.pe/sernanp/archivos/biblioteca/publicaciones/SN_Megantoni/Plan%20Maestro%202007%20-%202011%20SN%20Megantoni%20ver%20aprob.pdf)

Ecosystem

The Megantoni Master Plan recognizes 10 different life zones within the protected area.

Zonas de Vida del Santuario Nacional Megantoni	**Extensión (Has)**	**%**
1. Bosque muy húmedo Premontano Tropical 2. Bosque muy húmedo Subtropical	14 941,82	6,9
3. Bosque muy húmedo Montano Bajo Tropical 4. Bosque muy húmedo Montano Bajo Subtropical	12 038,64	5,6
5. Bosque pluvial Premontano Tropical 6. Bosque pluvial Subtropical	116 563,80	54,0
7. Bosque pluvial Montano Bajo Tropical 8. Bosque pluvial Montano Bajo Subtropical	35 614,43	16,5
9. Bosque pluvial Montano Tropical 10. Bosque pluvial Montano Subtropical	36 710,27	17,0
Total	215 868,96	100,0

The results of the rapid biological inventory carried out between April and May 2004, for the Megantoni Master Plan, generated the majority of knowledge about the biodiversity of the protected area, to date. Including the following:

Cuadro Nº 8. Resumen de los resultados del Inventario Biológico Rápido (2004) **Grupo**	**Especies estimadas**	**Especies observadas**	**Especies nuevas para la ciencia**
Plantas	3000 – 4000	1 428	85-95
Mamíferos	45	32	-
Aves	600	378	-
Reptiles	35-40	19	5
Anfibios	50-60	32	7
Peces	70	22	3-5
Insectos peloteros	120	71	10-30

Flora

As stated in the Master Plan, "Like other western slopes of the Andes, the floristic richness within Megantoni is high", especially of orchids and ferns. These two plant groups represented at least a quarter of the species observed during the rapid

biological inventory. (Pteridophyta, approximately 190 species, Orchidaceae, some 210 species). More than 25 species of plants are only found in Megantoni National Sanctuary. (SERNANP, 2007).

Endemism

The topographic variability of this region contributes to a high level of endemism. Many species, especially beetles, found in the region are characterized by altitudinal restrictions, and therefore endemic to the region. Many beetles found during the biologically inventory were rare or new to science. Endemic fish species were also encountered (*Astroblepus* y *Trichomycterus*) and adapted to the torrential, cold, clean and oxygenated waters of the mountains. In addition, at least one third of the herpafauna of Megantoni National Sanctuary is not found in any other protected area. Twelve new reptiles and amphibians were found.

Megantoni National Sanctuary also protects a high density of doves and macaws, such as the Black Tinamou (*Tinamus osgoodi*), Scimitar-winged piha (*Lipaugus uropygialis*) and the Selva cacique (*Cacicus koepckeae*), all of which are considered vulnerable to extinction by Birdlife International and are found in very few other places in the world.

Fauna

The rapid biological inventory registered 32 species of large and medium size mammals, belonging to 7 orders and 17 families. A little over half of them are CITES listed; five are threatened with extinction and 12 are potentially threatened:

- CITES Appendix I - *Tremarctos ornatus, Panthera onca, Leopardus pardalis, Lontra longicaudis* y *Priodontes maximus*

- CITES Appendix II - *Myrmecophaga tridactyla, Dinomys branickii, Herpailurus yagouaroundi, Puma concolor, Tapirus terrestris, Alouatta seniculus, Cebus albifrons, Cebus apella, Lagothrix lagothricha, Tayassu pecari* y *Pecari tajacu.*

4.3.3 Human Environment

Demographic and Socio Economic Conditions

Target project communities in the south of the Megantoni National Sanctuary buffer zone are native communities and colonists. According to project staff, there are 60 rural communities of colonists in Alto Urubumba, accounting for approximately 20,465 inhabitants. These colonists originate principally from the Cusco provinces and departments of Apurimac, Puno, and Ayacucho, among others. Four native communities have been identified by the project in Alto Urubumba, while two more are in Bajo Urubumba.

Comunidades nativas en el Alto Urubamba

Nº	Comunidad Nativa	Etnía	Superficie (ha)	Población
1	Matoriato	Machiguenga	27,619.00	500

2	Yoquiri	Machiguenga	3,390.12	69
3	Poyentimari	Machiguenga	15,603.04	323
4	Monte Carmelo	Machiguenga	16,877.43	501

Fuente: Línea base de la cuenca Alto Urubamba. 2007.

According to the Megantoni Master Plan (2007) "the native communities along the tributaries of the Urubamba River are the most traditional" and subsistence living prevails. Those communities located along the river are more connected to markets and public services and are relatively larger.

Economic Activities

Economically, the native communities are oriented to subsistence agriculture, hunting, fishing and harvesting of forest products. Colonists, on the other had are predominately involved in market oriented agricultural production. According to the Megantoni National Sanctuary Master Plan, 80% of colonists are in agriculture and 5% in commercialization of products between Quillabamba and Sepahua, by boat. (SERNANP, 2007.)

Information gathered from surveys administered by Rainforest Alliance in 2012 indicates that the average size of farms in the two watersheds prioritized for the ICAA Project (Laco Yavero and Quellouno) is 15 hectares, and 50% of these are still covered with natural forest.

Coffee, cacao, citric fruits and achiote are the principle crops in the Megantoni buffer zone landscape. Coffee and cacao generate more than 85% of the income. Recently, farmers are establishing papaya plantations on new soils, which produce for 3-5 years and then are abandoned due to phytosanitary reasons that are difficult to control. (Project staff communication, 2012.)

Still official data from the Ministry of Agriculture and information from local cooperatives and businesses indicate that coffee productivity and quality is not the best. Cusco is one of the least productive regions of Perú; around the Urubamba River the larger coffee farms are 4-5 hectares (SERNANP, 2007) and the farms in this region rarely produce more than 320 kg of cacao/hectare and 450 kg of coffee/hectare. Regions such as San Martin produce more than 800 kg/ha of cacao, and Cajamarca also produces more than 800kg/ha of coffee. Still, according to the Project analysis, coffee and cacao will generate sufficient income to help meet family economic needs in Cusco.

According to the Megantoni Master Plan (SERNANP, 2007), other economic activities include:

- Cattle: an activity principally employed by colonists, in the Megantoni National Sanctuary buffer zone the most extensive pastures are 40 - 60 hectares.
- Small livestock: native communities raise them to compliment their family income.
- Forestry: periodically, high value timber is selectively cut without planning for a sustained yield or supervision by forest authorities. Reforestation or

enrichment activities are practically non-existent. The Urubamba River watershed supports a high level of commercially viable timber.

- Tourism: still very nascent, the principal attractions are the scenic natural landscape, hydrologic features, the biodiversity, fishing and agrotourism.
- Employment in the Camisea Gas project: it is not clear how many local people are employed, however the Megantoni Master Plan postulates that increase in incomes from project employment contributes to local capacity to buy guns, chainsaws, boats and other equipment that make access to and extraction from the protected area easier.

Land Use and Conflicts

This zones topographic variability, its pattern of colonization and poor farming practices has contributed to erosion of farms on steep hillsides, sometimes resulting in landslides. Poor soil fertility and land trafficking motivates colonists to periodically move to new areas.

On the other hand, native communities employ other subsistence strategies that maintain forest cover and diversity. Although principally of subsistence nature, they will also produce crops for the market, although "these are not greater in area than subsistence crops" (SERNANP, 2007.)

The Megantoni Master Plan identifies the following top threats to the protected area:

1. Negative impacts of the Camisea Gas project: spills from the pipeline, oil and gas contamination of rivers, increased river and air traffic, and unmanaged solid waste makes this one of the principle threats to this region. It negatively impacts fish and wildlife populations thus impacting native communities' nutrition and health.
2. Unplanned road construction: new roads are being cut into the region without the requisite environmental impact studies and approvals.
3. Unplanned colonization, principally in the southern sector of the sanctuary: With the roads and the Camisea Gas project have come the colonists, loggers and other unsustainable uses of the forest. Also, there are overlapping and conflicting land uses such as between forestry concessions and colonist communities.
4. Illegal timber extraction: Although there isn't evidence of illegal extraction inside the Megantoni Sanctuary, timber extraction is intense in neighboring communities.

Other threats to the integrity of the Megantoni National Sanctuary identified in their Master Plan include: excessive hunting, introduction of new species that bring disease, forest fires, natural phenomena, contamination of rivers, challenges by miners to operate in the sanctuary, land trafficking, indiscriminate fishing with poisons and explosives, and poorly organized tourism activities.

4.4 Perú Institutional and Policy Framework

4.4.1 Applicable National Policies

According to the Constitution of Perú (1993), natural resources –including forest resources – are considered national heritage and their use and management by private entities or individuals is regulated by organic laws, as is the case of the Forestry and Wildlife Law for all forests and the plants and animals they contain.

In Perú, enforcement of forest legislation is mainly the responsibility of the national forestry authority, namely the General Direction of Forestry (DGFF) of the Ministry of Agriculture (MINAG)

Since the creation of the Ministry of Environment (MINAM) in 2008, some of the functions more closely related with forest conservation, biodiversity and environmental services, such as protected area management, forests and climate change, land use planning, appraisal of forest heritage and of environmental services, among others, have been transferred to that Ministry.

Simply stated, it could be said that productive activities in forests are under the responsibility of MINAG, while their conservation falls to MINAM. In reality, both ministries include important components and activities related to forest production and conservation.

The forest and wildlife law currently in force is Law No. 27308, approved in July 2000, although it is going to be replaced by a new law approved in 2011 that will not be enforced until its regulations are completed.

Under the current Forest Law, forest is classified under the following categories: production forests (permanent and in reserve); forests on protected land; forests for future use (forest plantations, secondary forests and degraded forests for restoration); natural protected areas; forests in Indigenous and rural communities; and local forests. Permanent production forests are intended for timber and non-timber production and the conservation of forest resources. This type of forests are handed over to the private sector in the form of concessions, in minimum areas of 5,000 ha and renewable periods of 40 years.

In the case of native communities, the legislation differentiates treatment. Forests inside community territories classified as production lands or protected lands may not be handed over in property to the community, but rather their use is transferred with certain restrictions, such as impossibility of changing the land use and, in case of commercial exploitation, approval by the forest authority upon submission of the management plan.

This law also establishes that all commercial harvesting of forest resources requires a management plan, for which standards have been issued to approve terms of reference regarding the contents of forest management plans for timber and non-timber products (some forest species for medicinal use, latex or resins such as rubber and Brazil nut). In the case of non-timber products, the level of sustainable management guidelines and information is less known or developed than for timber products, where there is more experience and analysis of management plan implementation, despite implementation beginning in the country in 2003, when the first forest concessions were given.

Some standards were published in 2006 to regulate the specific case of wood harvesting in native and farmer communities, through RJ 232-2006-INRENA, which has distinct requirements for low, medium and high volume marketing levels. The low level establishes an annual harvesting level of 600 m3 of wood per year per community, medium scale is 2,500 m3, while high volume is for management areas larger than 5,000 ha and volumes depend on forest inventory results.

As mentioned, the formulation of policies, standards and guidelines for sustainable forest management, according to the forest law, is the responsibility of the national forest authority (DGFF of MINAG); however, in recent years the country has been implementing a gradual decentralization process, so several authorization, supervision and even standard issuing functions has been transferred to some regional governments, including Madre de Dios, Ucayali, Loreto, San Martin and Amazonas.

In Madre de Dios, authority over forests falls on the Forest and Wildlife Resource Regional Management Program (PRMRFFS) of the regional government which, as is the case in other regions, lacks the human and economic resources necessary to conduct its work and therefore its scope is very limited. Regardless of these limitations, PRMRFFS has developed some standards to guide the harvest of non-timber products such as palm fruit, which are being used as reference for management plans for this type of products and have been submitted to DGFF of MINAG for approval.

4.4.2 The Case of Brazil Nuts and Rubber

Brazil nuts and rubber (also known as shirring) are two especially important non-timber products in the forests of Madre de Dios. In 2000, the Peruvian State declared the sustainable harvest and commercial and industrial transformation of these products to be of national interest.

Both species can be harvested under forest concessions without timber exploitation purposes that are granted for up to 10,000 ha and renewable periods of 40 years, or through community land permits, always upon application of management plans.

In the specific case of Brazil nuts, there is even the possibility of harvesting in protected areas, such as the Tambopata National Reserve, where it occurs in significant volumes and densities for commercial exploitation. In this case, the Reserve's administration has developed a management plan for application in the entire protected area, where the main guidelines are enforced by the authorized Brazil nut concession holders and where monitoring is conducted by the administration of the protected area in cooperation with NGOs, such as AIDER and Fauna for Ever.

Since 2010, MINAM started an ambitious program called National Forest Conservation for Climate Change Mitigation Program (PNCB), aimed at preserving 54 million hectares of natural forests in the country. Innovations in this program include

a component of incentives for forest conservation called Conditional Direct Transfers, applied to native and farmer communities that voluntarily implement and accept the commitment to preserve their primary forests, and in exchange receive an incentive of S/10 / ha / year for use in productive projects to improve community income.

The PNCB implemented a pilot phase of the incentives payment system in some regions of the central jungle (the region of the Apurimac, Ene y Tambo River Valleys – VRAE), where drug trafficking has caused an increased in production and illegal trade of coca in recent years. They plan to expand the incentives program to Madre de Dios, however the timing is uncertain.

5 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES OF THE PREFERRED ALTERNATIVE

5.1 Introduction

The activities of the Preferred Alternative that intervene directly in the forest ecosystem generate direct and indirect impacts. These include community-based sustainable forest management; sustainable non-timber forest product management and harvesting, such as Brazil nut and the palm fruits ungurahui and aguaje; reforestation, natural regeneration and enrichment; sustainable agriculture and agroforestry and silvopastoral management. This section summarizes the direct and indirect impacts, positive and negative, generated from these activities. Additional detail can be found in Annex V, Environmental Consequences of the Preferred Alternative. The issues and recommended mitigation measures in this section can be characterized by the following categories:

- Significant issues and impacts that will be addressed by internationally recognized environmental design and management standards and best management practices.
- Significant issues and impacts that are not addressed by internationally recognized environmental design and management standards and best management practices.

5.2 Significant Issues and Impacts addressed by Best Management Practices

The project draws from various environmental management standards and best management practices to guide the environmental design and management of the more sustainable practices that are being promoted. These are outlined in Annex VI. The principle standards and BMPs that will guide the activities below are from the Forest Stewardship Council, the Rainforest Alliance Sustainable Agriculture Network (SAN), organic and Fair Trade standards, and national regulations as defined by the Ecuadorian Ministry of Environment (MAE) and the Peruvian Ministry of Agriculture and OSINFOR.

5.2.1 Community-based Sustainable Forest Management (CSFM)

CSFM can have direct and indirect negative consequences on soils, vegetation composition, flora, fauna and ecological functions, including biodiversity conservation and water resources, as outlined in Table 1, Annex V, especially when harvesting practices, the construction of camps, or extraction paths are poorly designed and managed. To address many of the direct impacts, Forest Stewardship Council standards will apply, and the project will work with farmers and local institutions to

build capacity to comply with national norms and establish mechanisms to monitor and audit the application of the sustainable forestry best management practices.

Additional considerations

CSFM will be taking place in forests of High Conservation Value, designated such for the levels of biodiversity that they harbor. In the project area in Ecuador, the application of sustainable forest management best practices is very nascent, meanwhile illegal hunting is one of the highest levels in the country and local knowledge of fauna has decreased over the years with the wildlife. In Perú, CSFM BMPs are better known yet still incompletely applied, especially as related to wildlife monitoring and conservation. (As evidenced in the Rainforest Alliance diagnostics of the four CNs.) OSINFOR standards require confirmation of adherence to national hunting laws through interviews, and FSC standards (6.2) require "Safeguards shall exist which protect rare, threatened and endangered species and their habitats (e.g., nesting and feeding areas). Conservation zones and protection areas shall be established, appropriate to the scale and intensity of forest management and the uniqueness of the affected resources. Inappropriate hunting, fishing, trapping and collecting shall be controlled." And FSC criteria 8.2 requires "forest management to include research and data collection needed to monitor at a minimum….c) Composition and observed changes to flora and fauna."

Market demand and the overharvesting of traditionally sought-after hardwoods has put greater commercial emphasis on new, lesser known species such as jacaranda (Jacaranda mimosifolia), tamburo (Guarea kunthiana), jigua (Nectandra sp), guarango (Prosopis pallid), aguacatillo (ersea caerulea), and caimito (Chrysophyllum caimito). It is difficult to say what the impacts from harvesting of these new species will have on biodiversity, endemics, and the forest ecosystem on a whole. For this reason, the FSC monitoring requirements are critical, and this environmental assessment emphasizes biodiversity monitoring in the forested areas. As mentioned earlier, monitoring and auditing by local authorities is weak. Forest management organizations and authorities need to be strengthened to monitor and adapt their management strategies as learning takes place.

Recommendation: Include appropriate local and regional regents, technicians and extensionists from Ministries of Environment, Forestry authorities, and agricultural development authorities in the training, practice, monitoring and auditing of CSFM.

The FSC standards and practices should mitigate potential impacts to biodiversity when applied, and build local capacity to monitor and protect wildlife in their forests, and the impacts of their hunting activities on the game populations. Simple visual tools that help forest managers identify and monitor threatened and endangered species, and key indicator species, should be developed, and build their capacity in adaptive management. (This is also an opportunity to engage youth and build their skills in applied science.)

Recommendation: Develop simple species identification and biodiversity monitoring tools and build local capacity in identifying and monitoring endangered and threatened species and appropriate indicator species, and the application of the monitoring information to their forest management practices. (See also Annex VI.)

Other possible impacts of community-based sustainable forest management and value chain strengthening are secondary. An increase in production and processing can increase traffic on roads, and encourage their expansion. The project has the opportunity to support regional infrastructure development authorities to design, develop and manage low-impact roads.

Recommendation: Provide training and capacity building workshops in low-impact road design and maintenance. (See also Annex VI.)

Some of the project areas, in Ecuador, were selected for their abundance of forests; it is important to take other elements into consideration such as the local vocation for other livelihoods that do not necessarily involve timber. On the other hand, there are areas where the pressure for timber and illegal access to protected areas for hunting and other illicit extraction activities is greater. It is also possible these may be related to high conservation value sites, as is the case of the farms adjacent to the corridor inside the RPFC.

Recommendation: In Ecuador, identify high conservation value sites, such as those adjacent to the RPFC corridor, and prioritize pre-associations and farms that will strengthen the integrity of the protected area boundary, and the role of the buffer zone.

5.2.2 Non-Timber Forest Products

Non-timber Forest Products share a common set of activities, including planning, management, collection, processing or transformation of the product, storage and transportation. Significant impacts resulting from NTFP (Brazil nut and palm fruits) harvesting and management include soil compaction and erosion, water contamination, changes in vegetation composition and disruption of wildlife. (See Table 2, Annex V.) NTFP management and harvesting activities will be guided by standards and practices identified by the Forest Stewardship Council, Rainforest Alliance, and Organic and Fair Trade certifiers. (See Annex VI.)

Additional Considerations

A significant issue with NTFP harvesting that deserves special attention is the impacts on wildlife and biodiversity during the management and harvesting of aguaje fruits. This activity occurs in a sensitive ecosystem and critical habitat, yet Peruvian-sanctioned best management practices are still in development.

Its importance as critical habitat is already accepted. Brightsmith (2005) identifies aguaje, or *Mauritia flexuosa* (Arecaceae), as a keystone plant resource used by nesting parrots; at least seven species of psittacids nest in Mauritia flexuosa. Brightman (2005) also identifies the local threats to these nesting sites, including overexploitation of the palm for its various products used by humans and larvae collection. In addition, the study discusses the importance of the dying palm swamp to the maintenance of these avian populations. Also, the San Diego Zoo study points out, "many animals depend on aguaje fruit as a major food source, including macaws,

other parrots, primates, and tapirs. Even fish take advantage of floods to access fallen fruit." (Horn, 2010.) Impacts on wildlife from the more sustainable management of these ecosystems should be of special importance and well monitored.

Direct impacts on wildlife can occur from the over harvesting of aguaje fruits, silvicultural practices that damage nesting sites, and hunting and fishing carried out by harvesters. Adherence to FSC standards will support the mitigation of impacts, especially identifying nests in trees or controlling hunting and fishing by harvesters.

Mitigation measure 1: Incorporate safeguards in aguaje management plans which protect rare, threatened and endangered species and their habitats (e.g. nesting and feeding areas). Special focus will be placed on measures to protect macaws and parrots of the aguaje ecosystem, and the monitoring of impacts on these avian populations.

Recommendation: Create an alliance with an appropriate research organization that will develop and implement a monitoring program that will monitor the impacts of more sustainable aguaje management and harvesting on the aguaje ecosystem and key wildlife species.

The project also intends to assess the opportunities for the development of sustainable harvesting and commercialization of other currently unidentified NTFPs in the target Peruvian and Ecuadorian forests. The environmental consequences of harvesting, management and marketing of these unidentified products are unknown, for the purposes of this EA.

Mitigation measure 2: Upon identification of a new forest product to be harvested and commercialized the project will submit to the USAID Environmental Officer, for review: 1) *Environmental Monitoring Performance Report* (EMPR) format (for activities in Perú) or SIGA 's *Ficha Ambiental* (for activities in Ecuador), 2) mitigation measures and best management practices to be applied and where applicable climate change mitigations such as clean production practices, environmental design of infrastructure, and water conservation, 3) a training plan outlining a clear path to building capacity in these practices, and 4) market assessment of product.

5.2.3 Sustainable agriculture/agroforestry

These activities will focus on incorporating and strengthening current cacao and coffee farms into a more integrated agroforestry system, including native timber species, fodder, fuelwood, and other NTFPs, within the farm and forest landscape. Impacts include changes to vegetation composition with potential impacts on critical habitat, soil erosion, and surface water contamination especially from processing activities. (See Table 3, Annex V.) Environmental design of these agricultural and agroforestry systems, and monitoring of impacts, will be guided principally by the Rainforest Alliance Sustainable Agriculture Networks standards which address the direct negative impacts outlined below.

Additional Considerations

Special emphasis will be placed on increasing productivity and improving the quality of the products for markets looking for more sustainable products. When value increases and farmers realize greater profits from their work motivations to increase area under agroforestry or sustainable agricultural systems can increase, potentially expanding into primary forests. This issue is addressed in the next section, 5.3.

5.2.4 Silvopastoral Management

Silvopastoral management can be a complimentary management tool within the farm landscape with the principle objective of mitigating the impacts of grazing on the watershed. The principle impacts from cattle production include deforestation and forest conversion to pasture (including emission of carbon when vegetation is burned to convert to pasture), soil erosion and compaction, and degradation of surface waters. Silvopastoral management includes improvements and protections to riparian areas and wetlands and reforestation for cattle forage and shade, therefore limiting the application of silvopastoral management practices to existing competent pastures, and moving toward the recuperation of degraded lands through agroforestry, natural regeneration or reforestation. Direct negative impacts from silvopastoral management activities, as outlined in Table 4, Annex V, include changes to vegetation composition, soil erosion/compaction and socio-economic impacts. Rainforest Alliance Sustainable Agriculture Network Cattle Production systems standards will be applied to manage and mitigate the impacts.

This activity will focus on the mitigation of the impacts of grazing, such as protecting wetlands, the protection and restoration of riparian zones and soils, and reforestation within pastures to improve soils and provide shade for cattle, among others. Project leadership has confirmed that the project will not invest in improvements to cattle stock, cattle health or pastures, nor purchase livestock in Ecuador or Peru.

5.2.5 Reforestation, enrichment and natural regeneration

These active and passive regeneration activities will support the recuperation of degraded soils, improve habitats and increase the number of commercially viable trees on farms within an integrated agroforestry, silvopastoral or sustainable forest management system. Negative consequences principally result from the harvesting of commercial reforestation plots and include soil erosion and compaction and degradation of surface waters from run-off. (See Table 5, Annex V.) Also, non-native species can out-compete natives. The project will ensure that native trees of commercially high value will be planted and harvested on small scales and according to environmental design standards and best management practices outlined by the Forest Stewardship Council and USAID/LAC Environmental Guidelines for Forestry.

Additional Considerations

The harvesting and extraction of even small parcels of timber stands on steeply inclined slopes, such as those found in the Sucumbíos project area, bring with it impacts to soil, watersheds and biodiversity. Successful commercial reforestation can motivate farmers to expand and convert standing forest into plantations which will decrease biodiversity and exclude them from REDD incentives.

A plantation is defined by the Forest Stewardship Council as "forest areas lacking most of the principal characteristics and key elements of native ecosystems, which result from the human activities of planting, sowing, or intensive silvicultural treatments." In the case of this project, it refers to forests that have been artificially regenerated (e.g. via seeds, seedlings or cuttings), and are managed for commercial purposes. Plantations should be discouraged in these high conservation value forests.

In some instances agroforesty and silvopastoral management can achieve the same goals as reforestation as well as diversify income generating land uses and create habitat. Commercial reforestation should be used in concert with other activities and strictly adhere to international environmental standards such as those outlined by the Forest Stewardship Council, and only after receiving a solid commitment to the land use plan from the farmer.

***Mitigation Measure 3*:** Reforestation for commercial purposes should be integrated into agroforestry or silvopastoral systems, or as enrichment activities within sustainably harvested forests, using native species, and be managed per the guidance of FSC. In Ecuador, the Socio Bosque active and passive restoration pilot programs should be emphasized, where feasible. All reforestation activities will be designed per the guidance in the USAID/LAC *Environmental Issues and Best Practices for the Forestry Sector*.

***Mitigation Measure 4**:* Any monoculture groves or plantations should comply with FSC Criteria #10, and principally be designed and managed to "promote the protection, restoration and conservation of natural forests, and not increase pressures on natural forests". (FSC, 2002.)

5.3 Significant Issues and Impacts not addressed by Best Management Practices

There are indirect, or secondary, impacts generated by the Preferred Alternative that are not necessarily addressed by the application of the environmental standards, or are incompletely addressed. These coincide with the following significant issues identified in Section 3:

- The sustained application of the BMPs beyond the life of the project.
- Impacts on environmental governance institutions
- Increasing the value of standing forest/decreasing conversion

The sustained application of the BMPs beyond the life of the project.
In these areas of high conservation value forests where there are also high rates of illegal hunting and poor environmental monitoring and control, the sustained application of best management practices by local farmers and foresters is imperative to mitigating impacts on biodiversity. The focus is on meeting, at minimum, legal requirements, connecting producers to buyers looking for more sustainable products, building capacity of farmers and foresters to apply best management practices, and reliance on their motivation to continue applying BMPs. To facilitate the application

of BMPs, practical guides or manuals need to be available to the farmer/forester to use. (See Annex VI.)

Impacts on environmental governance institutions
As outlined in Section 3, project activities will increase the workload on already struggling institutions. In Ecuador, for example, MAE contacts expressed concern that the project will develop a workload (e.g. forest management plan approvals and licensing and monitoring activities) that their staff would not be able to keep up with, as required by MAE regulations. The project has the potential to cumulatively impact an already struggling institution, during and beyond the life of the project. The continued application of best management practices will be influenced, in part, by the MAE's capacity to monitor and control activities as they are mandated to do.

Therefore, it is recommended that the project take the following measures to further support the sustained application of BMPS beyond the life of the project.

Mitigation Measure 5: As recommended in Annex VI, adopt or adapt existing guides or develop guides and/or other audience- appropriate training tools that guide the user in the application of activity-specific standards and Best Management Practices. Also, train local regents, farmers, foresters, agricultural extensionists and other appropriate land managers and authorities in their use

Mitigation Measure 6: The project will carry out annual audits of all project supported sustainable forest and agricultural practices. Audits will identify strengths and weaknesses in the application of BMPs and environmental design standards promoted by the project, their degree of implementation and monitoring of BMPs and their effectiveness in mitigating environmental impacts. Audits will serve as an adaptive management tool and the project will support the project participants to take corrective actions to meet the standards.

Mitigation Measure 7: With appropriate environmental authorities and project participants, assess current mechanisms for the oversight, monitoring and evaluation of best management practices and identify actions that can be taken to improve policies and institutional capacities to strengthen the adoption and sustained application of project-promoted best management practices.

Increasing the value of standing forest/decreasing conversion
Converting standing, primary forests to more sustainable practices, such as coffee, cacao or silvopastoral management undermines the goals of both the ASLAA and NZDZ. There are conceivable and documented scenarios under which this could occur.

The hypothesis on which silvopastoral systems have been established, that silvopastoral management will reduce conversion of natural forest to pastures, has not been validated in the literature. As outlined in Section 3, Vosti et al. (2001), Cattaneo (2001) and Roebling & Ruben (2001) show that, under various farm size and market scenarios, the continued deforestation of primary forest for pasture expansion is directly related to access to capital and labor. Vosti et.al. (2002) point out that, "Returns per labor unit to even low-technology livestock systems exceed by

a ratio of 7 to 1 those generated by forest extractive activities (gathering Brazil nuts, for example)."

Still, the literature on silvopastoral systems underscores the adaptability of these production systems to varying environmental and socioeconomic context. For example;

1. Silvopastoral systems in extensive livestock ranches
2. Forest plantations with grazing livestock
3. Live fences, wind breaks, hedges, biological corridors, and shade trees for livestock
4. Silvopastoral systems with exploitation of a managed succession of vegetation
5. New systems for intensive ranching and other livestock such as: silvopastoral systems with high density forests, cutting grass, protein banks, and intercropping and stratification of multiple-use trees.

From a landscape perspective, the smaller farms of the project area in Ecuador will not support extensive livestock ranches, nor would they be allowed under current PMI agreements with the MAE. And option 2 would bring with it potential expansion of plantations into primary forest. Options 3 – 5, however can contribute to transforming pastures between the two sections of the RPFC into a more diverse biological and economic corridor. Overall, cattle production should be limited in this area, while the silvicultural elements of silvopastoral systems along with soil and riparian conservation measures, as well as other agroforestry practices can be promoted.

In addition, the Preferred Alternative needs to strengthen landowner's commitment and adherence to the PMI, a condition of landownership in the *Patrimonio Forestal*.

Mitigation Measure 8: Before implementing CSFM, sustainable agriculture/ agroforestry, and silvopastoral interventions receive signed agreements from appropriate landowners, representing their understanding of the environmental management objectives of project activities, and their commitment to the dedicated land uses as identified in project-generated farm and forest land use plans, as a requirement for participation in the project.

6 MITIGATION MONITORING PLAN

6.1 Mitigation and Monitoring Schedule

The following table outlines the mitigation measures recommended by this Environmental Assessment, indicators to be used to monitor their application, the timing of verification of the mitigation, and cost items per mitigation.

Impact	No.	Mitigation Measure	Monitoring Indicator	Timing
Aguaje harvesting and management can disrupt nesting sites, diminish fruit availability to wildlife and impact this sensitive wetland environment. Best management practices are in development.	1	Incorporate safeguards in aguaje management plans which protect rare, threatened and endangered species and their habitats (e.g. nesting and feeding areas). Special focus will be placed on measures to protect macaws and parrots of the aguaje ecosystem, and the monitoring of impacts on these avian populations.	Safeguards identified in annual plans.	Annually
			Monitoring plan, findings and corrective actions taken.	Annually
Impacts of harvesting of new, to be identified, forest products are unknown until the product assessed.	2	Upon identification of a new forest product to be harvested and commercialized the project will submit to the USAID Environmental Officer, for review: 1) *Environmental Monitoring Performance Report* (EMPR) format (for activities in Peru) or SIGA 's *Ficha Ambiental* (for activities in Ecuador), 2) mitigation measures and best management practices to be applied and where applicable climate change mitigations such as clean production practices, environmental design of infrastructure, and water conservation, 3) a training plan outlining a clear path to building capacity in these practices, and 4) market assessment of product.	Reports submitted.	One month from new product identification.
Harvesting and	3	Reforestation for commercial	Landscape	Reporte

Impact	No.	Mitigation Measure	Monitoring Indicator	Timing
extraction of even small parcels of timber stands on steeply inclined slopes, such as those found in the Sucumbios project area, bring with it impacts to soil, watersheds and biodiversity.		purposes should be integrated into agroforestry or silvopastoral systems, or as enrichment activities within sustainably harvested forests, using native species, and be managed per the guidance of FSC. In Ecuador, the Socio Bosque active and passive restoration pilot programs should be emphasized, where feasible. All reforestation activities will be designed per the guidance in the USAID/LAC *Environmental Issues and Best Practices for the Forestry Sector*.	level maps of planned reforestation plots and lands to be placed under Socio Bosque pilot program; standing primary and secondary growth forest, and streams and rivers.	d annually.
Economically successful commercial reforestation can motivate conversion of standing forest into plantations which will decrease biodiversity.	4	Any monoculture groves or plantations should comply with FSC Criteria #10, and principally be designed and managed to "promote the protection, restoration and conservation of natural forests, and not increase pressures on natural forests". (FSC, 2002.)	Plantation management plans, per the guidance of FSC criteria #10. Subject to annual audits.	Reported annually.
Unmitigated impacts on biodiversity and the environment when best management practices are not sustained by local farmers and foresters beyond the life of the project.	5	As recommended in Annex VI, adopt or adapt existing guides or develop guides and/or other audience- appropriate training tools that guide the user in the application of activity-specific standards and Best Management Practices. Also, train local regents, farmers, foresters, agricultural extensionists and other appropriate land managers and authorities in their use.	Guides and/or training tools per activity area. Training records	Annual progress reports. Quarterly reporting.
Unmitigated impacts on biodiversity and the environment when best	6	Carry out annual audits of all project supported sustainable forest and agricultural practices. Audits will identify strengths and weaknesses in the application of	Baseline and annual audits reports.	Annually.

Impact	No.	Mitigation Measure	Monitoring Indicator	Timing
management practices are not sustained by local farmers and foresters beyond the life of the project.		BMPs and environmental design standards promoted by the project, their degree of implementation and monitoring of BMPs and their effectiveness in mitigating environmental impacts. Audits will serve as an adaptive management tool and the project will support the project participants to take corrective actions to meet the standards.		
Project activities cumulatively impact already overwhelmed environmental governance institutions.	7	With appropriate environmental authorities and project participants, assess current mechanisms for the oversight, monitoring and evaluation of best management practices and identify actions that can be taken to improve policies and institutional capacities to strengthen the adoption and sustained application of project - promoted best management practices.	Approved action plan	Action plan drafted one year from date of EA approval .
Transformation of standing forest to more lucrative albeit more sustainable practices, such as silvopastoral management.	8	Before implementing CSFM, sustainable agriculture/ agroforestry, and silvopastoral interventions receive signed agreements from appropriate landowners, representing their understanding of the environmental management objectives of project activities, and their commitment to the dedicated land uses as identified in project-generated farm and forest land use plans, as a requirement for participation in the project.	Signed agreements	End of each fiscal year.
			Maps presenting and quantifying dedicated land uses over time.	Year one; Year four.

6.2 Costs of Mitigation Measures

The mitigation measures are already within the scope of the project and incur no additional costs.

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ANNEX I: POSITIVE DETERMINATIONS OF THE AMENDED INITIAL ENVIRONMENTAL EXAM

Specific Activity	Potential Environmental Impact	Recommended Threshold Determination
ACTIVITY RESULT 3		
Ecuador – Sucumbíos		
Prepare assessment of best opportunities for community-based sustainable forest management plans in the buffer for commercial purposes; initiate community based forestry management	Commercial harvesting of timber or other forest products can be source of degradation process, fragmentation of habitats, species extinction, loss of soils and alteration of water courses; Activities will be of small scale and low intensity but of undetermined impacts on ecosystems	Positive Determination
Design and implement a conservation incentive model for forest management and legal logging together with the MAE	The conservation incentive model could generate positive impacts, but also indirect and Unexpected impacts linked to forest management; Commercial harvesting of timber or other forest products can be source of degradation process, fragmentation of habitats, species extinction, loss of soils and alteration of water courses	Positive Determination
Define and implement models and options for commercial forest plantations and recuperation of degraded areas through feasibility analysis in the municipalities of Cuyabeno and Putumayo	Forests plantations for restoration of degraded areas could have positive environmental impacts associated with inadequate planning, incorrect choice of species or sites can affect local biodiversity or biological corridors, and plantation harvesting activities can negatively impact soils, surface water, and biodiversity	Positive Determination
Implement best management practices in agroforestal, silvopastoral and forestry pilot farms	Activities will be of small scale and low intensity and with potential positive impacts on ecosystems by agroforestry systems; Commercial harvesting of timber or other forest products can be source of degradation process, fragmentation of habitats, species extinction, loss of soils and alteration of water courses; Successful adoption of practices can result in increased deforestation, change in land cover and negative impacts on biodiversity.	Positive Determination
Perú: Cusco / Madre de Dios		
Develop management plans or improvement plans incorporating BMP in timber and non timber products	Commercial harvesting of timber or other forest products can be source of degradation process, fragmentation of habitats, species extinction, loss of soils and alteration of water courses; Activities will be of small scale and low intensity but of undetermined impacts on ecosystems	Positive Determination
Define models and options for	Forests plantations for restoration of	Positive Determination

commercial forest plantations and agroforestry systems in reforestation concessions	degraded areas could have positive environmental impacts associated with inadequate planning, incorrect choice of species or sites can affect local biodiversity or biological corridors, and plantation harvesting activities can negatively impact soils, surface water, and biodiversity	
Prepare feasibility and cost-benefit analysis, identify market opportunities, supply-chains, buyers and clients for commercial forestry operations and support community based forestry activities.	Commercial harvesting of timber or other forest products can be source of degradation process, fragmentation of habitats, species extinction, loss of soils and alteration of water courses	Positive Determination
Technical assistance and training in forest management (timber and palms) in two communities Experimental harvest of timber with learning purposes (according to approved management plan)	Commercial harvesting of timber or other forest products can be source of degradation process, fragmentation of habitats, species extinction, loss of soils and alteration of water courses	Positive Determination

ANNEX II: ENVIRONMENTAL ASSESSMENT TEAM

Team Leader, Marsha Kellogg
Ms. Kellogg is a Community and Regional Natural Resources Planner and has more than ten years' experience supporting the design and implementation of projects, assessing environmental and social impacts, and strengthening groups to meet conservation and development goals. She has managed and provided technical assistance to USAID-funded biodiversity conservation activities and non-governmental organizations in Africa and the Americas that more sustainably manage forests, strengthen land use and property rights, and improve livelihoods and agricultural production. She has lead CFR 216 environmental assessment teams in Bolivia and contributed to CFR 216 EAs in Ecuador. She's carried out sustainable forest assessments per FSC criteria in Guatemala and New Mexico.

Biodiversity Specialist (Ecuador), Mario P. Larrea Leon
For fifteen years Mario Larrea has applied his skills as a biologist to biological monitoring, agroecology, landscape ecology, sustainable forest management and biodiversity project design throughout Ecuador. Working principally for Ecociencia his work has also contributed to initiatives such as Ecobana and GTZ and UNDP-funded biodiversity conservation and bio-commerce programs. He's been responsible for developing criteria for environmentally friendly practices in agroforestry systems and has authored related guides such as "Manual de campo para la implementación de prácticas amigables con la Biodiversidad en cultivos de Cacao Nacional" and "Un bosque productivo de café: Manual de campo para la implementación de prácticas amigables con el ambiente en cultivos de café de sombra".

Biodiversity Specialist (Peru), Fernando Raul Angulo Protalongo
An ornithologist, Fernando holds a Master degree in Forest Resource Conservation from the National Agrarian University La Molina. For more than 15 years he has been carrying out inventories, assessments and evaluations for protected area design and recognition, conservation concessions, environmental assessments, wildlife rescue planning, and tourism initiatives. He began his career in the Madre de Dios region researching long term forest dynamics in Tambopata and Amazonia Cuzco and the Harpy eagle in Infierno Native Community. He is currently the Coordinator of the process of re-categorization of threatened wildlife species of Peru with Grupo AVES and in coordination with the Ministry of Agriculture and Forestry Directorate.

Sustainable Forest Management Specialist (Ecuador), Christian Velasco
The former National Forestry Director at the Ministry of Environment, Ecuador, Christian Velasco has broad experience in the forest management. Christian received his Bachelor's Degree in Forestry Management from the Escuela Nacional de Ciencias Forestales in Honduras, a Bachelors Degree as Forestry Engineering from the Universidad Nacional of Costa Rica, a Postgraduate diploma in Environmental Management from the Maastricht School of Management in Netherlands and his Master's Degree in Tropical and International Forestry from the Georg-August University in Germany. Currently, Christian Velasco is Manager in Ecuador for the Rainforest Alliance TREES Program where he is responsible for the overall

management of the program including guidance and leadership on country level work planning and the development of strategies to geographically expand the impact of the TREES program and its contribution to achieving Rainforest Alliance's overall mission.

Sustainable Forest Management Specialist (Peru), Javier Arce

The Deputy Director of Rainforest Alliance in Peru, Javier Arce has extensive experience in formulation, coordination and monitoring of forest management projects, analysis and monitoring of forestry policies and national forest legislation. He has participated in the analysis and evaluation of the sustainability of forest management, especially as relevant to the application of criteria and indicators. Javier is committed to the design and monitoring of forest management certification in Peru and other Latin American countries participating as an auditor of certification bodies in the Amazon Region (Peru, Brazil and Bolivia). Previously, he served as the Technical Manager for the implementation of projects in the NGO CANPRODEM (Cámara Nacional de la Producción y el Emprendimiento), which includes projects financed by the Fund of the Americas (FONDAM), Conservation International (CI) and the Embassy of Finland, carrying out baseline studies, diagnosis of the use of natural resources, reforestation, forest management and improvement of traditional production in native communities in the valley Asháninkas Pichis (Pasco), Tambo and Pangoa (Junín). He also served as a Professor of Forest Management at the Faculty of Forest Sciences at the Universidad Nacional Agraria La Molina (2003-2011). Javier received his Master's degree in Management and Conservation of Tropical Forests and Biodiversity from the Tropical Agriculture Research and Education Center (CATIE) in Costa Rica.

ANNEX III: STAKEHOLDERS CONSULTED

Ecuador

Date	Type	Name/Title	Institution/Organization	Geographic Influence/Location
5/31/12	Government	Oswaldo Sarango	Ministerio de Agricultura, Ganadería, Acuacultura y Pesca MAGAP	Ecuadorian National Forests Plantations
6/6/12	Government	Marco Robles, Asesor de la Subsecretaria del Patrimonio Forestal	Ministerio del Ambiente MAE	Ecuadorian National Forests
6/1/12	Government	Pablo Carpio, Director Provincial, y Soledad Prado; Jefa de la Unidad de Patrimonio Natural	Ministerio del Ambiente MAE	Provincia de Sucumbíos
6/4/12	Government	Luis Borbor, Jefe de la Reserva de Producción FaunisticaCuyabeno	Ministerio del Ambiente MAE	Reserva de Producción FaunisticaCuyabeno
6/4/12	Government	Lidio Villaroel, Director Centro de Investigaciones Agropecuarias de Sucumbíos	Centro de Investigaciones Agropecuarias de Sucumbíos	Provincia de Sucumbíos
6/4/12	Government	Edwin Herrrera, Jefe del Departamento del Plan de Desarrollo y Ordenamiento Territorial	Gobierno Provincial de Sucumbíos	Provincia de Sucumbíos
6/4/12	Local government	Carlos Quintana, Vici-Alcalde del municipio Putumayo Mauricio Yanes, Director de DIDESA	; Gobierno Autonomo Descentralizado de Putumayo	Putumayo Canton
6/2/12	Community	Enrique Diaz	Precoperativa Rey de	Cantón Cuyabeno

Date	Type	Name/Title	Institution/Organization	Geographic Influence/Location
			los Andes, Espreso del Oriente	
6/1/12	Otro	Santiago Rosero	Regente Forestal	Provincia de Sucumbíos
6/4/12	Local government	Emilio Gaibor, Alcalde del municipio Cuyabeno	Gobierno Autonomo Descentralizado de Cuyabeno	Cuyabeno Municipality
6/2/12	Farmer	Augusto Chicaiza	La Calumeña	Putumayo Canton
6/2/12	Farmer/musician	Son of Augusto Chicaiza	Not affiliated; sold his land	Sansahuari
6/2/12	Farmer	Ana Flores Chicaiza (wife of Augusto)	San Jose 6	Cuyabeno Canton
6/2/12	Farmer	Obdulia Terrema	Pre-cooperativa 16 de Abril	Cuyabeno Canton
6/2/12	Farmer	Fabian Robalino (Son of Obdulia Terrema)	President, Asociacion Amazonas (not a pre-selected association).	Cuyabeno Canton
6/2/12	Chocolate processors	Nelly Rojas	Asociacion de Mujeres, "Porvenir de Pacayacu" Microempresa de Chocolate Aroma Nacional	Cuyabeno Canton
5/31/12	ONG	Fernando Bajaña, Rafael Yunda	Fundación Natura/WWF	Reserva de Producción FaunisticaCuyabeno
6/6/12	ONG	Adriana Burbano	WCS	Provincia de Orellana, Parque Nacional Yasuny
6/6/12	ONG	Sigrid Vasconez	Grupo Faro	Bosques nacionales
5/31/12	Donor	Damian Villacres, Arecely Salazar Anton	GIZ	Sucumbios
6/7/12	Donor	Mario Añazco	FAO	Nationally and Sucumbios
6/8/12	Donor	Monica Siquilanda	USAID	Nationally and Sucumbios

Peru

Date	Type	Name/Title	Institución/Organization	Geographic Influence/ Location
11 – Jun - 12	Gobierno - USA	Ryan Knight, Regional Environmental Officer	USAID/Peru	Peru & Ecuador
11-Jun-12	Gobierno-Ministerio del Ambiente	Elvira Gomez, Coordinadora Ejecutiva Programa Nacional de Conservación de Bosques para Mitigación del Cambio Climático	PNCB - MINAM	Nacional, trabajando con comunidades nativas (Amazonia). Iniciando evaluaciones para ingresar a Madre de Dios
12-Jun-12	ONG	Juan Loja, Sub Director Madre de Dios	ACCA	Región de Madre de Dios (rio Los Amigos) y Cuzco (Wayquecha y Villa Carmen)
12-Jun-12	Comunidad	Vilma Payaba, Presidenta	CN Tres Islas	Provincia y Distrito Tambopata, (Río Madre de Dios)
12-Jun-12	Gob Regional,	Julio Cusurichi	Sub Gerencia de Participación Ciudadana y CCNN	Región de Madre de Dios
13-Jun-12	Gob Regional,	Edward Watangare	Subgerencia de Acondicionamiento Territorial	Región de Madre de Dios
13-Jun-12	SERNANP	Jhon Flores, Jefe de la Reserva Nacional de Tambopata	Reserva Nacional de Tambopata	Provincia y Distrito Tambopata
13-Jun-12	ONG	Alonso Córdova	WWF	Región de Madre de Dios
14-Jun-12	Comité de Gestion	Victor Zambrano, Presidente	Zona de Amortaguimiento de Reserva Nacional de Tambopata	Provincia y Distrito Tambopata
14-Jun-12	Junta Directiva CN Infierno	*Santos Elias. Durand Torres (Predidente de la Comunidad) *William Inuma	CN Infierno	Provincia y Distrito Tambopata, (Río Tambopata)

		(Secretario) *Eusebio Mamani (Vocal) *Federico Durand (Coordinador proyectos)		
15-Jun-12	Consultores	* Mauro Vela Da Fonseca * Carlos Salazar Carhuancho *Gilber Martinez Maceda	Consultores y especialistas en planes de manejo, certificación y comercio justo de Madera, Palmeras y Castaña	Región de Madre de Dios
16-Jun-12	Comuneros de CN Palma Real	Lucio Yojajé Chaeta	CN Palma Real	Provincia y Distrito Tambopata, (Río Bajo Madre de Dios)
18-Jun-12	Gobierno regional	Abg. Percy Raschid Assen Guerra - Director	Programa Regional de Manejo de Recursos Forestales y Fauna Silvestre (PRMRFFS)	Región de Madre de Dios
18-Jun-12	Extractor de recursos	Pedro Centeno	PALSAMAD	Provincia de Tambopata y Distrito de Laberinto.
19-Jun-12	Gobierno regional	Cesar Huisa	Gerencia de RRNN – GOREMAD	Región de Madre de Dios
19-Jun-12	Investigador	Antonio Fernandini	Independiente	Región de Madre de Dios
19-Jun-12	Gobierno central	Ing. Iris Plaza Arce - Coordinador de OSINFOR	Organismo de Supervisión de los Recursos Forestales y de Fauna Silvestre (OSINFOR)	Región de Madre de Dios
19-Jun-12	Investigador	Cris Kirkby	Fauna Forever	Región de Madre de Dios (varias localidades de estudio en la región)

ANNEX IV: THREATENED OR ENDANGERED TIMBER SPECIES IN THE CUYABENO CANTON.

NOMBRE COMÚN	NOMBRE CIENTIFICO	FAMILIA
Aguacatillo	***Nectandra membranácea***	Lauraceae
Arabisco-jacaranda	***Jacaranda copaia***	Bignoniaceae
Arenillo	***Erismauncinatum***	Vochysiaceae
Balsa	***Ochromapiramidale***	Bombacaeae
Balsamo	***Miroxilumbalsamun***	Fabaceae
Bella maria	***Vochysiaspp***	Vochysiaceae
Cabo de hacha – clavo	***Farameaspp***	Rubiaceae
Caimitillo	***Mycropholischrysophyllum***	Sapotaceae
Caimito	***Pouteriaspp***	Sapotaceae
Canelon-piedrita	***Aspidospermaspp***	Apocynaceae
Canelo	***Nectandraspp***	Lauraceae
Canelo - jigua – tinchi	***Nectandraspp.***	Lauraceae
Capirona	***Calycophyllumspruceanum***	Rubiaceae
Ceibo	***Ceiba spp***	Bombacaeae
Chanul	***Humiriastrumspp***	Houmiriaceae
Chirimoyo	***Annonaspp***	Annonaceae
Chontacaspi	***Mouririoligantha*** ---	
Chuncho	***Cedrelingacateniformis***	Fabaceae
Coco	***Virola spp.***	Myristicaceae
Colorado balsa	***Alchorneatriplinervia***	Meliaceae
Colorado fino	***Guarea macrophylla***	Meliaceae
Colorado manzano	***Guarea kuntiana***	Meliaceae
Camahua	***Poulseriaarmata*** ---	
Dormilon- guarango	***Cojobaarborea***	Fabaceae
Guabillo	***Inga spp***	Mimosaseae
Guarango	***Acacia glomerosa***	Fabaceae
Guarango de espinas	***Piptademiapteroclada***	Fabaceae
Guarumo	***Cecropiaspp***	Cecropiaceae
Guayabillo-yuyun	***Terminalia oblonga***	Combretaceae
Guayacan pechiche	***Minquartiaguianensis***	Olacaceae
Higueron	***Ficus spp.***	Moraceae
Jigua	***Ocoteaspp***	Lauraceae
Lano- ceibo rojo	***Chorisiainsignis***	Bombacaceae
Laurel	***Cordiaalliodora***	Boraginaceae
Lechero / higuerón	***Ficus spp***	Moraceae
Limoncillo	***Calyptranthesplicata*** ---	
Loteria	***Anacardiumexcelsum***	anacardiaceae
Manglillo	***Leguncularia racemosa***	araliaceae
Manglillo	***Simiracordifolia***	
Mani de arbol	***Caryodendronorinocense***	euphorbiaceae
Mascarey	***Hyeronimaalchornoides***	euphorbiaceae
Matapalo	***Ficus spp***	moraceae

Mate	Mecha / intachi / variable	***Chimarrisglabriflora***
Rubiaceae	Moral bobo	***Clarisiaracemosa***
Moraceae	Moral fino	***Macluratinctoria***
Moraceae	Naranjito	***Zanthoxylumsp.*** ---
	Peine de mono	***Apeibaaspera***
Tiliaceae	Roble / yumbingue	***Terminaliaamazonica***
Combretaceae	Sabroso	***Licania glauca*** ---
	Sande	***Brosimunspp***
Moraceae	Sangre de gallina	***Otoba spp***
Myristicaceae	Sapote colorado / sapote de	Montaña
Sterculiaspp	Sterculiaceae	Tamburo
Vochysiaspp	Vochysiaceae	

Fuente: Diagnostico comunitario. 2011
Elaboración: Equipo técnico GAD-MC

ANNEX V ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE

Table 1: Environmental Consequences of community-based sustainable forest management and harvesting

ACTIVITY	***IMPACTS***	
	POSITIVE	**NEGATIVE**
Community assemblies and forest management planning and zoning.	Direct: Participatory planning meetings at which all stakeholders are represented to define and approve harvesting zones and land uses will minimize potential for internal and external conflicts as well as help to meet community, national and international standards for prior consultation, planning and communications. Indirect: A watershed perspective from the initial stages of planning will help define zoning of land uses to have the least amount of impact on soils and water resources.	None.
Forest census & inventory to define harvesting areas, conservation zones, seed banks and ecological niches.	Direct: Identifies quantity and quality of trees to be harvested and calculates sustainable yieldIdentifies and marks seed trees. . Sets baseline for monitoring purposes. Generates information about critical habitat especially for T&E species, nesting or feeding sites and sensitive areas to be conserved (e.g. riparian areas and wetlands).	Direct: Census teams can cause minor impacts to soils and surface waters, and disrupt wildlife movement. In Peru, where teams stay in camps they will generate solid and liquid waste and hunt and fish impacting local wildlife and habitats. Indirect: Census activities may provoke conversion of standing forest to other use on Ecuadorian farms already over-harvested of commercially valuable trees (generally 1st line farms).

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**
Inspections and approval/licensing of plans and harvested timber by regional environment/forest management authorities.	Direct: Management organizations and plans are in compliance with national norms and standards and harvested wood is inspected and marked as legally cut, improving access to markets requiring legally harvested and controlled wood.	Direct: In Ecuador especially, an increase in applications from project activities can place additional pressure on MAE staff and regents, stressing an already weak institution that is challenged to stay on top of their licensing and monitoring process. (Not addressed by BMPs; see section 5.3.)
Siting and construction of temporary camps for loggers (Peru only). Located near a water source, est. 400m square. Sleeping quarters, kitchen, trash pit and latrines.	Direct: Establishes site where settlement of forestry team is contained, managed and impacts of the camp are mitigated.	Direct: Approximately 400 m2 is cleared of trees and vegetation impacting soils, habitats or adjacent surface waters. Garbage is generated creating litter if not carried out and properly disposed of and human waste is generated in latrines, potentially impacting ground wáter. Activity can interrupt wildlife behavior and movement and loggers will hunt and fish for self-consumption.
Establishment of small extraction paths, 1m wide by est. 150 long (in Peru, connecting with Brazil Nut harvesting trails)	Direct: Paths can be sited and maintained to decrease impacts on soils, surface waters and wildlife habitat and movement. Permits foot or cart access to harvesting zones helping to extract products. In Peru, will utilize existing paths within Brazil Nut harvesting zones, thus not creating more paths.	Direct: Have to clear vegetation and can create soil erosion, especially during rainy seasons. Indirect: Creates easy access for illicit and unregulated users.
Logging activities, including clearing of surrounding vegetation, directional felling of trees, and cutting felled trees into transportable	Direct: Low-impact logging techniques decrease impact on surrounding vegetation, and can direct a tree fall along the least damaging path. Enables transportation of felled trees along paths by humans or carts.	Direct: Can impacts soils – erosion and compaction. Can hurt surrounding trees and vegetation, as well as habitats or nesting sites. The chainsaw creates noise and air pollution, and can chemical contamination from oil and gas to operate it. Risk of human health impacts from accidents. Some waste of wood when cut into trunks for

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**
trunks		transport.
Extract cut wood by mechanized carts or pulled by human or horse/mule.	Direct: Enables the transport of the cut trunks to stocking center. Neither humans nor draft animals create the air pollution of motorized vehicles.	Direct: Soil compaction or erosion, especially during rainy periods. Noise and transportation can disrupt wildlife movement.
Establish a temporary center for stocking cut wood, approximately 15m X 10m	Indirect: Enables inspection by authorities.	Direct: Clearing of vegetation of site; soil compaction and erosion that can impact surface water when adjacent to stocking site.
Transportation of stocked wood to port (Peru) or road (Ecuador) for sale.	Direct:: Sale of cut timber economically benefits loggers and community.	Direct: Noise pollution form engines. Water and soil contamination from oil and gas leaks. Increase in traffic can further degrade roads, especially secondary or tertiary roads.

Table 2: Environmental Consequences of Brazil nut management and palm fruits.

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**
Community-based planning of Brazil Nut harvesting plan, and with harvesters, in compliance with organic and Fair Trade certification criteria.	Direct: Minimize potential for conflicts as well as help to meet community, national and international standards for prior consultation, planning and communications. Overlapping and multiple land uses (e.g. Brazil nut and timber harvesting) can be planned and managed. Indirect: A watershed perspective from the initial stages of planning will help zone land uses to have the least amount of impact on soils and water resources.	Direct: Positive impacts can be limited if affected stakeholders are not consulted in the decision-making process and planning activities do not look beyond the boundaries of the property, or up/downstream, taking into account threats and opportunities of neighboring or overlapping land uses.
Training in organic and Fair Trade certification requirements, including internal controls: monitoring of harvest camps, harvesting capabilities and compliance with certification requirements.	Direct: Strengthens forest management organization capacities to manage and govern the forest and activity. Improves harvesters capacities to implement best management practices thus mitigating impacts of activities on natural and human environment. Indirect: Meeting certification requirements opens up alternative markets to the harvesters, rewarding them for their sustainable use.	None.
Forest census/inventory, define harvesting areas, conservation zones, and ecological niches.	Direct: Identifies quantity and quality of trees to be harvested and calculates sustainable yield. Can set baseline for monitoring purposes. Generates information about critical habitat especially for T&E species, nesting or feeding sites and sensitive areas to be conserved (e.g. riparian areas and wetlands).	Direct: Census teams can cause impacts to soils and surface waters, especially in the wetland environments that ungurahui and aguaje palms are found in. Their activities disrupt wildlife movement, and contaminate the air when using motorcycles. Teams stay in camps and will generate solid and liquid waste and hunting and fishing impacting local wildlife and habitats.

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**
Elaboration of management plan and annual operational plan for official approval.	Direct: Management organizations, plans and practices are in compliance with national norms and standards.	None.
Inspections and approval/licensing of plans by regional environment/forest management authorities.	Direct: Management organizations, plans and practices are in compliance with national norms and standards.	None.
Siting and construction of temporary camps for loggers (Peru only). Located near a water source, approximately 400m square. Includes sleeping quarters, kitchen, trash pit and latrines.	Direct: Settlement is contained to one area and impacts managed and mitigated. Some camps are co-utilized by Brazilnut and palm fruit harvesters.	Direct: Approximately 400 m2 is cleared of trees and vegetation impacting soils, habitats or adjacent surface waters. Garbage is generated creating litter if not properly managed in camp, and human waste is generated potentially impacting water resources if latrines are not sited correctly. Activity can interrupt wildlife behavior and movement and hunters will hunt and fish for self-consumption.
Improvement of harvesting and extraction roads/trails	Direct: Permits foot or cart access to harvesting zones helping to extract products. Environmental design and mitigations paths can decrease impacts on soils, surface waters and wildlife habitat and movement.	Direct: Have to clear vegetation up to 1m tall; can create soil erosion, especially during rainy seasons. Snakes are killed when discovered. Creates easy access for illicit and unregulated users. In some Brazil Nut concessions/ zones, paths may be co-utilized for extraction of timber and palm fruits causing cumulative impacts.
Silvicultural practices: natural regeneration management and clearing of competitive plants from trees, such as lianas.	Direct: Supports growth and regeneration of commercially important trees for current and future harvesting.	Direct: Makes changes in vegetation composition. Can damage surrounding non-commercial trees and vegetation, as well as habitats or nesting sites.

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**
Harvesting: Palm Fruit Harvesters climb palms to harvest ripe fruit. Brazil nuts are collected.	Direct: BMPs minimize impacts on surrounding natural resources from harvesting, improve sustained yields, and quality of product. Climbing is the harvesting BMP of aguaje, versus cutting down the female tree.	Direct: Climbing or cutting down trees can disturb nesting sites, such as of macaws that nest in the dead palms. Garbage is generated creating litter if not carried out and properly disposed of and human waste is generated, potentially impacting ground water and human health. Activity can interrupt wildlife behavior and movement and hunters will hunt and fish for self-consumption.
Transport of nuts from forest to central distribution point. Carried out on shoulders of laborers or in carts.	Direct: Enables the transport of fruits to stocking center. Neither humans nor draft animals create the air pollution of motorized vehicles.	Direct: Distribution point creates similar impacts as camps create, however smaller scale. Soil compaction or erosion, especially during rainy periods. Noise and transportation can disrupt wildlife movement. If vehicles are used, air pollution, water pollution from gas and oil leaks, and noise pollution.
Post-harvest handling and transformation	Direct: Prepares product for sale, adding value to the product.	Direct: Generates solid and liquid wastes. Safety issues working with product and equipment.
Transport of harvest by truck or boat to market/buyer.	Direct: Sale of Brazil nuts economically benefits harvesters and communities.	Direct: Increase in traffic can further degrade roads. Noise pollution from engines along roads and rivers. Water and soil contamination from oil and gas leaks from trucks.

Table 3: Environmental consequences of sustainable agriculture/agroforestry

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**
Design and planning of agricultural/agroforestry system based on farmer objectives, ecological assessment, farm plan and market analysis.	Indirect: Should improve farmer's capacity to site, select and manage agricultural system based on ecological and economic analysis of the farm. In Ecuador, plans will take into account PMIs and support farmer's compliance with them and MAE. Diversify farm production and vegetation cover. Add value to standing forest.	Direct: Improper siting of agricultural or agroforestry areas can create soil erosion and impact surface waters, as well as critical habitats or threatened species. Indirect: PMIs that designate primary forest as agricultural, those forests will be transformed. If labor, and it's availability on the farm, is not taken into account, this could have direct impacts on the family, and gender-based roles and responsibilities. This activity could place greater pressure on government institutions with limited human resources.
Nursery establishment and management for identified plants.	Direct: Establishes plants for agroforestry systems. Builds capacity and practice in establishing them from seed to planting.	Direct: Nurseries can create soil erosion and impact adjacent surface waters. Also, they need to be controlled and protected from damage or theft.
Technical assistance and training in crop management, disease control, and harvesting.	Direct: More sustainable practices will have less impacts on soils, water and biodiversity; in the case of agroforestry production, can create habitat that the traditional agricultural system did not support. Indirect: Improving farmer's practices in crop management will produce greater yields from plot size, thus improving income and family self-sufficiency.	Direct: Improper or incomplete application of BMPs can create soil erosion and impact surface waters, as well as critical habitats or threatened species. Indirect: If successful, activity may expand into primary forest, transforming it to sustainable agricultural/ agroforestry production. Place greater pressure on government institutions with limited human resources, after life of project.

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**
Transport of product to storage centers and buyers.	Indirect: Generates income for farmer.	Direct: Noise pollution from engines on roadways. Water and soil contamination from oil and gas leaks from trucks. Increase in traffic can further degrade roads, especially secondary or tertiary roads, causing soil erosion and siltation of surface waters.
Product transformation and quality control/improvement; marketing and sale.	Direct: Adds value to raw material, thus increasing price in market to seller. Generates spin-off companies and employs local people in plants, such as the Asociacion de Mujeres Porvenir de Pacayacu which employs 12 local women in transforming cacao to chocolate paste.	Direct: Can generate solid and liquid wastes from hulling, roasting or grinding product. Siting and construction of plant can impact local soils and surface waters. Health and safety concerns when operating machines or handling product.

Table 4: Environmental consequences of silvopastoral management

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**
Evaluation and planning of the silvopastoral system and areas; identification of problems and	Direct: Prioritization of degraded pastures and sensitive lands. Increased awareness of environment management of livestock and pastures in tropical ecosystem Indirect: More rational exploitation	Indirect: Deforestation or vegetation burning in anticipation of project benefits. Increase forest conversion through activities that promote and improve livestock

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**
solutions.	of farm resources and sustained yield of wood.	production.
Reforestation of pastures for shade, protection, forage and timber.	Direct: Increased awareness and practice of pasture and forest management. cattle protected from the elements. diversification of forage. Increase tree cover. Increase on-farm sustainable sources of timber for medium and long term.	Direct: Changes in vegetation composition. Soil erosion/compaction from harvesting of timber.
Restoration of degraded areas.	Direct: Improve soils; decrease erosion and compaction. Decrease siltation of surface waters and improve vegetation cover and diversity of riparian zones and degraded hillsides.	None.
Restriction of cattle from sensitive zones, such as riparian areas, and establishment of watering tanks.	Direct: Diminish grazing impacts on rivers, streams and wetlands; decrease impacts on riparian habitats;	Direct: Increase in costs of cattle production from investments in fencing and water tanks.
Application of management techniques such as rotational grazing and sustainable stocking rates.	Indirect: Decrease land area required for production; intensify production thus increasing incomes from smaller pasture area.	Indirect: As economic benefits accrue, potential to increase forest conversion to pastures. Increase in labor.
Transportation of livestock to buyers.	Indirect: Increase family income.	Direct: Noise pollution from engines on roadways. Water and soil contamination from oil and gas leaks from trucks. Increase in traffic can further degrade roads, especially secondary or tertiary roads.

Table 5: Environmental consequences of reforestation, natural regeneration, enrichment

ACTIVITY	*IMPACTS*	
	POSITIVE	**NEGATIVE**
Identification of degraded areas appropriate for reforestation, enrichment or natural regeneration.	Direct: As part of an over-all farm/forest management planning activity, identifies degraded areas that need support.	None.
Define purpose of regeneration activity: commercialization, conservation or agroforestry.	Indirect: Commercial reforestation and enrichment with commercially value species can increase incomes in the medium to long term. Reforestation for conservation can improve environmental conditions, protecting soils, riparian areas, surface waters and creating habitat.	Indirect: Even-age stand commercial reforestation in small plots will require harvesting that approximates small clear-cuts. (See below for harvesting impacts.)
Identify appropriate species based on purpose, market demand, soils and climatic conditions.	Direct: Improves yield of reforested plot.	Direct: Non-native species can out-compete natives, invade sensitive ecosystems or change habitats.
Provide consistent management: e.g. weeding, pruning, disease control as appropriate.	Direct: Cultivates healthy, marketable trees. Tree cover, habitat creation, and carbon capture. Manages recuperating area for specific habitat or conservation objective.	Direct: small changes to vegetation composition, disturbs wildlife, impacts soils.
At maturity, commercially viable trees will be harvested and carried off farm for sale or use.	Direct: Income generation from a previously degraded plot of land with low yields.	Direct: Changes to habitat, and vegetation composition. Harvesting of plots can leave slopes unprotected and susceptible to erosion from heavy rains. Dragging trunks off land and traffic generated to plot can cause soil erosion and siltation of surface waters.

ANNEX VI: ENVIRONMENTAL DESIGN AND MANAGEMENT GUIDANCE DOCUMENTS AND RECOMMENDATIONS

Activity	Standards/Guidance	Manual/Guide	Recommendation
Land use planning for farm/community forest			
	Rainforest Alliance Sustainable Agriculture Network, *Sustainable Agriculture Standard,* July 2010. http://sanstandards.org/sitio/subsections/display/9 *Asuntos y Mejores Practicas Ambientales para el Manejo de Agricultura y Cuencas* en el Guía Ambiental por Actividades de Desarrollo en América Latina y El Caribe USAID, 2002 http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html *Asuntos y Mejores Practicas Ambientales para el Sector Forestal, en La Guía Ambiental Por Actividades de Desarrollo en América Latina y El Caribe, USAID, 2002.* http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html	Plataforma de capacitación online para agricultura sostenible http://translate.googleusercontent.com/translate_c?depth=1&hl=es&langpair=en%7Ces&rurl=translate.google.com.pe&u=http://www.sustainableagriculturetraining.org/&usg=ALkJrhi3UwAMlKG3T-zeK-Iyby3bPSIDUw Guía de Implementación Norma para Agricultura sostenible Normas Red de Agricultura Sostenible (hardcopy document only) REHABILITACION DE CAFETALES Bases para la transición hacia una agricultura empresarial sostenible Documento Impreso de SCAN PERU Sustainable Commodity Assistance Network http://sustainablecommodities.org/front	None.
Sustainable Forest Management			

Activity	Standards/Guidance	Manual/Guide	Recommendation
Management Planning	*FSC Principles and Criteria for Forest Stewardship,* Forest Stewardship Council, FSC-STD-01-001 (version 4-0) EN, 2002, as amended. www.fsc.org Forest Stewardship Council Technical Notes for Small, Low Intensity and Community Forests, http://www.fsc.org/technical-guidance.168.htm MAE, *Normas para el manejo forestal sustentable para aprovechamiento de madera en bosques húmedos.* Ministerio del Ambiente Ecuador. http://saf.ambiente.gob.ec/images/saf/legislacionForestal/Normasparaelmanejoforestalsustentable_paraaprovechamientodemadera_enbosqueh%C3%BAmedo.pdf *Asuntos y Mejores Prácticas Ambientales para el Sector Forestal,* en la Guía Ambiental por Actividades de Desarrollo en América Latina y El Caribe USAID, 2002 http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html Perú specific: Estándares de Certificación del Manejo Forestal para Productos Maderables en Bosques de la Amazonía Peruana. http://www.fsc.org.pe/documentos.php RJ 232-2006– INRENA Términos de referencia para la formulación del Plan de Manejo Forestal en bosques de comunidades nativas y campesinas. (Perú) http://dgffs.minag.gob.pe/index.php/politicas-y-	None for Ecuador. Peru specific: *Manual de Procedimiento para la Supervisión de Concesiones Forestales con fines Maderables,* OSINFOR, 2010 (Perú) Guías de Disminución De La Extracción Ilegal De Especies Maderables, Con Fines Comerciales De La Reserva De Biosfera Oxapampa - Asháninka - Tanesha (Perú),	Develop practical guides, per country or adopt/adapt existing guides that consolidates technical guidance and standards and directs the target audience in the design and planning of their farm or community land for sustainable forest management.

Activity	Standards/Guidance	Manual/Guide	Recommendation
	normativas/normatividad-forestal-y-de-fauna-silv/142 Directiva 029-2007-INRENA. TDR para el otorgamiento de permisos forestales en bosques de comunidades nativas y campesinas de selva y ceja de selva (Perú) http://dgffs.minag.gob.pe/index.php/politicas-y-normativas/normatividad-forestal-y-de-fauna-silv/134 Guía para la Identificación de Bosques de Alto Valor de Conservación http://www.fsc.org.pe/pdf/Mapas_clasificados.rar	IUCN: http://www.pronaturaleza.org/archivos/pdf/GUIA1.pdf http://www.pronaturaleza.org/archivos/pdf/GUIA2.pdf http://www.pronaturaleza.org/archivos/pdf/GUIA3.pdf http://www.pronaturaleza.org/archivos/pdf/GUIA4.pdf Guía para la aplicación del Sistema de Aproximación Gradual al Manejo y Certificación Forestal Independiente (SAGC) en Peru. WWF-Peru. 31pp (PDF document)	
Camp construction/ management	*Environmental Issues and Best Practices for Small Scale Infrastructure*, en el Guía Ambiental por Actividades de Desarrollo en América Latina y El Caribe USAID, 2002. http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html *MAE, Normas para el manejo forestal sustentable para aprovechamiento de madera en bosques húmedos.* Ministerio del Ambiente Ecuador. http://saf.ambiente.gob.ec/images/saf/legislacionForestal/Normasparaelmanejoforestalsustentable_paraaprovechamientodemadera_enbosqueh%C3%BAmedo.pdf	None.	Incorporate best management practices into guides and/or checklists that direct the target audience in the environmentally sound design, planning and management of camps.

Activity	Standards/Guidance	Manual/Guide	Recommendation
Census/ inventory	*FSC Principles and Criteria for Forest Stewardship,* Forest Stewardship Council, FSC-STD-01-001 (version 4-0) EN, 2002, as amended. www.fsc.org Forest Stewardship Council Technical Notes for Small, Low Intensity and Community Forests, http://www.fsc.org/technical-guidance.168.htm *Normas para el manejo forestal sustentable para aprovechamiento de madera en bosques húmedos. Ministerio del Ambiente Ecuador.* http://saf.ambiente.gob.ec/images/saf/legislacionForestal/Normasparaelmanejoforestalsustentable_paraaprovechamientodemadera_enbosqueh%C3%BAmedo.pdf	None.	Develop guides or incorporate technical guidance into existing guides to direct the target audience in census and inventory activities.
Harvesting (logging/felling)	*MAE, Normas para el manejo forestal sustentable para aprovechamiento de madera en bosques húmedos.* Ministerio del Ambiente Ecuador. http://saf.ambiente.gob.ec/images/saf/legislacionForestal/Normasparaelmanejoforestalsustentable_paraaprovechamientodemadera_enbosqueh%C3%BAmedo.pdf	Guías de Disminución De La Extracción Ilegal De Especies Maderables, Con Fines Comerciales De La Reserva De Biosfera Oxapampa - Asháninka - Tanesha (Perú), IUCN: http://www.pronaturaleza.org/archivos/pdf/GUIA3.pdf	Develop practical guides, per country or adopt/adapt existing guides that consolidates technical guidance and standards and directs the target audience to carry out low-impact logging and meet FSC standards for this activity.
Transportation of wood (skid trails/paths/ roads)	*MAE, Normas para el manejo forestal sustentable para aprovechamiento de madera en bosques húmedos.* Ministerio del	Guías de Disminución De La Extracción Ilegal De Especies Maderables, Con Fines Comerciales De La Reserva De Biosfera Oxapampa - Asháninka - Tanesha (Perú),	Develop practical guides, per country, or adopt/adapt existing guides that consolidates

Activity	Standards/Guidance	Manual/Guide	Recommendation
	Ambiente Ecuador. http://saf.ambiente.gob.ec/images/saf/legislacionForestal/Normasparaelmanejoforestalsustentable_paraaprovechamientodemadera_enbosqueh%C3%BAmedo.pdf *Environmental Issues and Best Practices for Rural Roads* en el Guía Ambiental por Actividades de Desarrollo en América Latina y El Caribe USAID, 2002. http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html	IUCN: http://www.pronaturaleza.org/archivos/pdf/GUIA3.pdf	technical guidance and standards and directs the target audience in the environmental design and management of skid trails, paths and roads.
Monitoring & Evaluation	FSC, Small, low intensity and community forests, *Simple Monitoring Methods*. http://www.fsc.org/simple-monitoring-methods.214.htm *MAE, Normas para el manejo forestal sustentable para aprovechamiento de madera en bosques húmedos.* Ministerio del Ambiente Ecuador. http://saf.ambiente.gob.ec/images/saf/legislacionForestal/Normasparaelmanejoforestalsustentable_paraaprovechamientodemadera_enbosqueh%C3%BAmedo.pdf *Monitoreo de Operaciones de Manejo Forestal en Concesiones con Fines Maderables de la Amazonia Peruana* *http://www.cifor.org/online-library/browse/view-publication/publication/2570.html*	FSC, Métodos simples de monitoreo, Nota Informativa 5 http://www.fsc.org/simple-monitoring-methods.214.htm	Develop simple species identification and biodiversity monitoring tools and build local capacity in identifying and monitoring endangered and threatened species, and other appropriate indicator species.
Wood processing / wood product manufacturing	Estándar FSC para Certificación de Cadena de Custodia FSC-STD-40-004-V2-1 http://us.fsc.org/chain-of-custody-certification.201.htm Environmental Issues And Best Practices For Microfinance Institutions And Micro And Small-Scale Enterprises,	None.	Consolidate technical guidance into a simplified guide or training tool in environmental management of wood processing businesses and

Activity	Standards/Guidance	Manual/Guide	Recommendation
	Environmental Guidelines For The USAID Latin America And Caribbean Bureau, USAID http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/chap4/lac-guidelines-4-micro-small-enterprises.pdf		clean production. (Or adopt/adapt existing guides.)
Socio Bosque			
Planning, Management, and Monitoring	Sociobosque, Gestión de Socios, Socios Individuales HTTP://SOCIOBOSQUE.AMBIENTE.GOB.EC/?Q=NODE/232 MANUAL OPERATIVO UNIFICADO HTTP://SOCIOBOSQUE.AMBIENTE.GOB.EC/FILES/MANUAL%20OPERATIVO%20SB%20UNIFICADO%202012.PDF Metodologia De Monitoreo Para Las Areas Bajo Conservacion De Socio Bosque HTTP://SOCIOBOSQUE.AMBIENTE.GOB.EC/FILES/MONITOREOMETODO2011.PDF	Formato de Plan de Inversión, Socios Individuales, MAE, http://sociobosque.ambiente.gob.ec/?q=node/232 Folleto de Preguntas Frecuentes http://sociobosque.ambiente.gob.ec/files/preguntasfrecuentesfinal.pdf	None.
Agroforestry and Silvopastoral Management			
Agroforestry	Rainforest Alliance Sustainable Agriculture Network, *Sustainable Agriculture Standard,* July 2010. http://sanstandards.org/sitio/subsections/display/9 *Criterios de Comercio Justo FairTrade para Cacao para Organizaciones de Pequeños Productores,* Fairtrade Labeling Organizations International, 2009. *Asuntos y Mejores Practica por el Sector Forestal* en el Guía Ambiental por Actividades de Desarrollo en América Latina y El	Plataforma de capacitación online para agricultura sostenible http://translate.googleusercontent.com/translate_c?depth=1&hl=es&langpair=en%7Ces&rurl=translate.google.com.pe&u=http://www.sustainableagriculturetraining.org/&usg=ALkJrhi3UwAMlKG3T-zeK-Iyby3bPSIDUw	Consolidate technical guidance and standards into practical guides that instruct farmers in BMPs. (Or adopt/adapt existing guides.)

Activity	Standards/Guidance	Manual/Guide	Recommendation
	Caribe USAID, 2002. http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/spanish_version/Cap_9.pdf *Asuntos y Mejores Practicas Ambientales para el Manejo de Agricultura y Cuencas* en el Guía Ambiental por Actividades de Desarrollo en América Latina y El Caribe USAID, 2002. Environmental Issues And Best Practices For Microfinance Institutions And Micro And Small-Scale Enterprises, Environmental Guidelines For The USAID Latin America And Caribbean Bureau, USAID http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/chap4/lac-guidelines-4-micro-small-enterprises.pdf		
Silvopastoral Management	Standard for Sustainable Cattle Production Systems, Sustainable Agriculture Network, Rainforest Alliance, July 2010. http://sanstandards.org/userfiles/SAN-S-4-1%20SAN%20Standard%20for%20Sustainable%20Cattle%20Production%20Systems%20July%202010.pdf *Environmental Issues and Best Practices for Small Scale Infrastructure*, en el Guía Ambiental por Actividades de Desarrollo en América Latina y El Caribe USAID, 2002. http://www.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html	None.	Consolidate technical guidance into a practical guide or training tool in silvopastoral management practices, and related small infrastructure environmental design and management.
Reforestation, Natural Regeneration and Enrichment			
Reforestation	*Asuntos Y Mejores Prácticas Ambientales Para El Sector Forestal,* En La Guía Ambiental Por Actividades De Desarrollo En América Latina Y El Caribe USAID, 2002 http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html	None.	Consolidate technical guidance into a practical guide in the environmental design and management of reforestation. (Or adopt/adapt existing

Activity	Standards/Guidance	Manual/Guide	Recommendation
	Normas para el manejo forestal sustentable para aprovechamiento de madera en bosques húmedos. Ministerio de Ambiente Ecuador. http://saf.ambiente.gob.ec/images/saf/legislacionForestal/Normasparaelmanejoforestalsustentable_paraaprovechamientodemadera_enbosqueh%C3%BAmedo.pdf *Manual de Procedimiento para Supervisión de Concesiones de Forestación y/o Reforestación*. OSINFOR, 2010 (Perú)		guides.)
Natural Regeneration	*Asuntos Y Mejores Prácticas Ambientales Para El Sector Forestal,* En La Guía Ambiental Por Actividades De Desarrollo En América Latina Y El Caribe USAID, 2002 http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html	None.	Consolidate technical guidance into a practical guide in the environmental design and management of natural regeneration. (Or adopt/adapt existing guides.)
Enrichment	*Asuntos Y Mejores Prácticas Ambientales Para El Sector Forestal,* En La Guía Ambiental Por Actividades De Desarrollo En América Latina Y El Caribe USAID, 2002 http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html	None.	Consolidate technical guidance into a practical guide in the environmental design and management of enrichment activities. (Or adopt/adapt existing guides.)
Brazil Nut and Palm Fruit Harvesting			
Management Planning	*Estándar para la Certificación del Manejo Forestal con Fines de producción de Castaña (Bertholletia excelsa HBK) en el Perú* http://www.fsc.org.pe/pdf/EstandaresPeruanosFSC/EstandarparalaCertificaciondelManejoForestalconfinesdeProducciondeCastana.pdf *Manual de Procedimiento de Supervisión de Concesiones y Permisos*	Manual de castañero 5, *Manual para la Elaboración del Plan General de Manejo para el aprovechamiento de castaña Bertholletia excelsa.* Serie Manuales para el Castañero de la Asociación para la Conservación de la Cuenca Amazónica – ACCA	Develop practical guides or adopt/adapt existing guides that direct forest managers in the planning and management of palm forests and palm fruit harvesting.

Activity	Standards/Guidance	Manual/Guide	Recommendation
	para Castaña (Bertholletia excelsa HBK), OSINFOR, 2010. (Peru) *Rainforest Alliance, Smartwood Global Non Timber Forest Product Certification Addendum.* http://www.rainforest-alliance.org/sites/default/files/uploads/3/FM-33-SW-NTFP-addendum-May-2011.pdf *Criterio de Comercio Justo Fairtrade para Organizaciones de Pequeños Productores*, Fairtrade, 2011 http://www.fairtrade.net/fileadmin/user_upload/content/2009/standards/documents/2012-07-11_SPO_SP.pdf *Criterio de Comercio Justo Fairtrade para Nueces para Organizaciones de Pequeños Productores,* Fairtrade, 2011. http://www.fairtrade.net/fileadmin/user_upload/content/2009/standards/documents/2011-08-09_SP_Nuts_SPO_v2.pdf *Reglamento NOP USDA, Programa Orgánico Nacional. Hardcopy.* *Reglamentos Productos Orgánicos Unión Europea,* REGLAMENTO (CE) NO 834/2007 DEL CONSEJO, de 28 de Junio *2007. Hardcopy.* *(No existen TDR para manejo forestal de palmeras en el Perú ni manuales para elaboración de Planes de Manejo.)*	Manual del castañero 6. *Manual de Gestión Empresarial.* Serie Manuales para el Castañero de la Asociación para la Conservación de la Cuenca Amazónica - ACCA.	
Camp construction/ management	*Environmental Issues And Best Practices For Small Scale Infrastructure*, En El Guía Ambiental Por Actividades De Desarrollo En América Latina Y El Caribe USAID, 2002. http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html	None.	Incorporate best management practices into guides and/or checklists that direct the target audience in the environmentally sound design, planning and management of camps.

Activity	Standards/Guidance	Manual/Guide	Recommendation
Census/inventory	*Manual de Procedimiento de Supervisión de Concesiones y Permisos para Castaña (Bertholletia excelsa HBK)*, OSINFOR	Manual de castañero 5, *Manual para la Elaboración del Plan General de Manejo para el aprovechamiento de castaña Bertholletia excelsa.* Serie Manuales para el Castañero de la Asociación para la Conservación de la Cuenca Amazónica – ACCA	Incorporate census and inventory BMPs into practical guides for the ungurahui and aguaje harvesting
Harvesting	*RJ 224 – 2002- INRENA Términos de Referencia para la formulación del Plan General de Manejo Forestal de Castaña (Bertholletia excelsa HBK) y Plan Operativo Anual.* *Manual de Procedimiento de Supervisión de Concesiones y Permisos para Castaña (Bertholletia excelsa HBK)*, OSINFOR, 2010	Manual del Castañero 1 *Técnicas para la Recolección de Castaña, Bertholletia excelsa en el Bosque Amazónico* Serie Manuales para el Castañero de la Asociación para la Conservación de la Cuenca Amazónica – ACCA Manual del castañero 4, *Atención Básica e Inmediata de Accidentes en la Actividad Castañera.* Serie Manuales para el Castañero de la Asociación para la Conservación de la Cuenca Amazónica – ACCA *Uso De Subidores Para La Cosecha Sostenible De* *Frutos De Palmeras (Aguaje Y Ungurahui),* Benjamín Chambi Pacompía, Agosto 2010.	None. (Incorporate existing aguaje harvesting practice into new guides.)
Transportation	*Manual de Procedimiento de Supervisión de Concesiones y Permisos para Castaña (Bertholletia excelsa HBK)*, OSINFOR, 2010	None.	Develop practical guides, per country or adopt/adapt existing guides that

Activity	Standards/Guidance	Manual/Guide	Recommendation
			consolidates technical guidance and standards and directs the target audience in the environmental design and management of skid trails, paths and roads.
Processing	*Environmental Issues and Best Practices for Microfinance Institutions and Micro and Small Scale Enterprises,* in Environmental Guidelines for Latin America/USAID, 2002. http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html *Environmental Issues and Best Practices for Small Scale Infrastructure*, en el Guía Ambiental por Actividades de Desarrollo en América Latina y El Caribe USAID, 2002. http://transition.usaid.gov/locations/latin_america_caribbean/environment/docs/epiq/epiq.html	Manual del castañero 2, *Construcción de Payoles y Secadores para Mejorar el Almacenamiento y Secado de Castaña, Bertholletia excelsa, en las Concesiones Forestales Castañeras.* Serie Manuales para el Castañero de la Asociación para la Conservación de la Cuenca Amazónica – ACCA. Manual del Castañero 3, *Manual de Buenas Prácticas de Manufactura (BPM), para el Manejo de Castaña, Bertholletia excelsa, en Planta Procesadora.* Serie Manuales para el Castañero de la Asociación para la Conservación de la Cuenca Amazónica – ACCA Plan de Sistema Orgánica, ParaRecolección de Cultivos Silvestres: Post-cosecha Manejo, Almacenamiento y Ventas aplicable para Certificación de acuerdo con la regulación UE 2092/91 (834/2007). NOP Norma Final orgánica JAS Hardcopy	Consolidate into a practical guide or adopt/adapt existing guides in the best management practices and clean production guidance as related to the processing of ungurahui and aguaje fruits
Monitoring &	*Manual de Procedimiento de Supervisión de Concesiones y Permisos*	Manual de castañero 5, *Manual para la Elaboración del Plan General de Manejo*	None. (See recommendation under

Activity	Standards/Guidance	Manual/Guide	Recommendation
evaluation	*para Castaña (Bertholletia excelsa HBK)*, OSINFOR, 2010	*para el aprovechamiento de castaña Bertholletia excelsa.* Serie Manuales para el Castañero de la Asociación para la Conservación de la Cuenca Amazónica – ACCA	monitoring and evaluation of Sustainable Forest Management and mitigation measures for aguaje palm forests.)