UNLOCKING FOREST FINANCE

Financing Sustainable Landscapes: San Martin, Peru

FINAL REPORT 2016

GCP GLOBAL CANOPY PROGRAMME

CEDISA Centro de Desarrollo e Investigación de la Selva Alta

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Please cite as: Peñaherrera, T., Rengifo, M., Sánchez, L., Pinzon, A., and Lima, G. 2016. Financing Sustainable Landscapes: San Martin, Peru. Final report. Global Canopy Programme and CEDISA, UK.

Acknowledgements
This publication is the end product of collaborative work of the Unlocking Forest Finance partnership. We thank CEDISA, the Unlocking Forest Finance partners in San Martin, Peru for collecting the data and writing the report.

We also appreciate the support of all our technical partners and consultants who provided significant contributions for the analyses that led to this report. Special thanks to Julian Rode of the Helmholtz Centre for Environmental Research (UFZ) for his contribution to the Safeguarding Chapter of this report and Alvaro Iribarrem of the International Institute for Sustainability (IIS) and Johannes Pirker of the International Institute for Applied Systems Analysis (IIASA) for their contribution to the "ESA" chapter.

The report was edited by Arthur Girling at GCP and designed by Yannis Meletios.

Funding
This project is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) supports this initiative on the basis of a decision adopted by the German Bundestag.

Supported by:

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

based on a decision of the German Bundestag

About UFF
Unlocking Forest Finance (UFF) brings together NGOs, environmental and social sector safeguarding institutes, financial sector experts and strategic advisors including Credit Suisse, European Investment Bank and Althelia Ecosphere. UFF is managed by the Global Canopy Programme, a UK nonprofit with a strong track record of implementing international projects to address tropical deforestation.

The project relied on a number of local partners: Environmental Services Development Company (CDSA) in Acre, Brazil, the Amazon Environmental Research Institute (IPAM), in Mato Grosso, Brazil, and the Centre for Development and Research in Upper Amazonia (CEDISA) in San Martin, Peru.

Other implementing partners and subcontractors are: The National Agricultural University of La Molina (UNALM) in San Martín, World Wide Fund for Nature (WWF-UK, and other WWF offices), Climate Bonds Initiative (CBI), Vivid Economics, Helmholtz Centre for Environmental Research (UFZ), the International Institute for Sustainability (IIS), the International Institute for Applied Systems Analysis (IIASA), the National Institute for Space Research – Centre for Earth Systems Science (INPE-CCST).

About CEDISA
The Centre for Development and Research in the Upper Amazon (Centro de Desarrollo e Investigación de la Selva Alta, CEDISA) was established in 1981. It works to promote sustainable development and equal rights in the Peruvian Amazon.

About The Global Canopy Programme
The Global Canopy Programme is a tropical forest think tank working to demonstrate the scientific, political and business case for safeguarding forests as natural capital that underpins water, food, energy, health and climate security for all. Our vision is a world where rainforest destruction has ended. Our mission is to accelerate the transition to a deforestation free economy. To find out more about our work visit www.globalcanopy.org

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Executive Summary

Introduction: How it works

The Unlocking Forest Finance project aimed to design and implement 'sustainable landscape initiatives' in three regions: San Martín, in Peru, and Mato Grosso and Acre, both in Brazil. The UFF project takes a 'landscape approach.' This aims to increase agricultural production while protecting forests and reducing carbon emissions. Balancing these competing demands on the landscape is complex.

Making a transition to more sustainable land use is also costly. The UFF project aims to develop a pipeline of investable projects that have the capacity to attract finance. The project has worked closely with stakeholders in the region over the last three years to design investment plans and innovative financial mechanisms.

This approach means designing a set of interventions in agricultural sectors which are important for the regional economy but generate significant pressure on forested areas (coffee, cocoa, oil palm). It also worked on supply chains/ products that are a priority for regional food security (rice, aquaculture) or part of the regional strategy to promote native products (sacha inchi, palm hearts). In parallel to the agricultural interventions, the UFF project also devised interventions to strengthen protected areas and support the livelihoods of indigenous and traditional peoples living in the region.
For farmers and investors, greater productivity means increased profits.
Moreover, if properly designed, these interventions can reduce the overall amount of land needed for agriculture, reducing pressure on the forest. Interventions in agriculture should be accompanied by environmental and social safeguards to address potential negative effects such as deforestation, pollution, land conflicts and other possible side-effects.

Context

The Amazon rainforest covers 53.9% of Peru[1], making the country the ninth largest forested landmass in the world and the second largest in South America. However, it is estimated that between 2001 and 2014 Peru lost an average of 118,000 hectares (ha) of forest each year. In 2015 alone, Peru lost 158,658 ha of forest, the highest annual rate of deforestation since 2000. If appropriate measures are not taken now, the Ministry of Environment estimates that Peru could lose a further 250,000 to 350,000 ha of forest per year up to 2030[2].

San Martin has the largest deforested area in Peru with 1,327,736 ha (18.51%) of the region already deforested. According to a study by the San Martin REDD+ Round Table, the region lost an average of 23,271 ha of forest per year between 2000 and 2010.

Peru's national government has made significant commitments to addressing deforestation, including a pledge to achieve zero net deforestation by 2020. Moreover, under the Paris climate agreement the government has committed to reducing emissions by 20% of business-as-usual projections by 2030, possibly increasing to 30%. The majority of these emissions are driven by land-use change such as deforestation. In this context, the regional government aims for San Martin to become a 'green' region, able to generate economic growth and support its population's prosperity while protecting the environment.

A significant proportion of deforestation in Peru is linked to small scale and migratory agriculture clearing relatively small areas. However, small-scale farms can play a crucial role in reducing deforestation by using sustainable agricultural methods and reforesting some areas. This will require significant financial resources to cover the upfront cost of the transition. This demands financial mechanisms which appeal to investors and producers.

[1] Ministerio del Ambiente - MINAM, 2016. Estrategia Nacional Sobre Bosques y Cambio Climático, Lima: MINAM
[2] Ibid.

Understanding financial, social and environmental benefits

The project aimed to define priority interventions to make up an investment portfolio. To this end, the project evaluated the benefits of different interventions in a sustainable ecosystem management scenario (SEM), where the interventions had been implemented. This was compared to a business-as-usual (BAU) scenario, where no interventions were implemented.

Product	Intervention	Hectares	Average Yield BAU (Kg/ha/year)	Average Yield SEM (Kg/ha/year)	Families
Cocoa	Productivity	24,730	750	2,200	7,517
	Expansion	8,059			5,133
Coffee	Productivity	6,493	840	2,240	1,283
	Renewal	9,739			1,925
Oil Palm	Productivity	14,382	13,000	22,000	1,298
Palm hearts	Productivity	709	4,200*	7,000*	121
Rice	Productivity	39,587	13,000	20,000	3,269
Sacha Inchi	Productivity	352	700	2,000	355
	Expansion	317			314
Tilapia	Productivity	153	4,500	21,850	96
		104,521			**21,311**

Table 1. Targets for the transition period (10 years) (*): stems/ha/year

To estimate the financial returns of implementing the transition to sustainable agricultural production, the project projected cash flows for each supply chain intervention. The internal rates of return (IRR) vary across supply chain interventions, from 18% for cocoa expansion to over 40% for rice, fish and palm oil[3].

[3] These internal rates of return are based on a central scenario, where prices, costs, productivity remain constant. These numbers do not include risk analysis derived from changes in prices and other variables.

Productive sector	**Expected IRR** (transition time)
Aquaculture	>40%
Cocoa	18% in new area/36% in currently farmed area
Coffee	27% in renewed area/28% in currently farmed area
Palm Hearts	29%
Palm Oil	>40%
Rice	>40%
Sacha Inchi	23%

Table 2. Expected internal rates of return for the interventions on a 30 year horizon

Potential social and environmental benefits of the transition were also estimated. For example, implementing the sustainable agriculture element of the transition has the potential to generate over 57,234 jobs, improve the technical and sustainable management capacity of 21,311 farmers and avoid emissions equivalent to 2 million tonnes of CO_2[4].

This analysis also helped to understand risks, such as the continued expansion of palm oil into forested areas or areas where farmers may be unable to use more sustainable practices. Furthermore, considering these risks highlighted potential mitigation strategies. Specific interventions representing high risks and low probability of mitigating these risks were excluded from the investment portfolio, for example interventions to expand the agricultural area of palm oil and palm hearts. However, if it was judged possible to mitigate risks, these actions have been specified in the safeguarding framework.

Finally, the project analysed the basic practical conditions for the adequate implementation of each intervention. These conditions include the presence of institutions with experience and interest in channelling financial resources, the availability of technical assistance providers to train farmers, and potential market access (local, regional or international) for the agricultural products.

Sustainable agricultural production

The proposed transition will involve 21,311 small farmers, covering a total area of 104,521 ha.

Agricultural interventions are expected to require a total of PEN 308.4 million (USD 94.2 million)[5]. This includes loans to increase productivity and the planted area[6], and also grants to fund elements of technical assistance and capacity building for farmers and their organisations.

The amount of finance required for loans is around PEN 287 million (USD 88 million), including PEN 6 million (USD1.78 million) for technical assistance. Funds for technical assistance should be reimbursable, in order to make it financially sustainable in San Martin and other areas hoping to replicate the project. However, many of these aspects are still to be defined, including the percentage of this to be channelled through loans and who will pay this cost (cooperatives, producers, government, companies).

The three interventions requiring the most resources are rice, cocoa and coffee. These are also the interventions affecting the highest number of families. Technical assistance (TA) costs vary significantly across supply chains due to the number of producers a TA provider can cover. This is influenced by the geographical dispersal of the particular supply

[4] According to our Ecosystem Service Assessment. See complete report for more information

[5] This amount estimates undiscounted requirements of resources for implementation during a 10 year period. By using a 5% discount rate, the present value of the resource requirement is PEN 251.4 million (US$ 75.4 million).

[6] According to the regional economic and ecologic zoning plans.

chain and the way it operates. For instance, for cocoa the project estimates that one TA provider can support 60 farmers, while for palm hearts a TA provider can support 100 farmers.

	Reimbursable (PEN Millions)		**Non reimbursable** (PEN Millions)	**Reimbursable** (USD Millions[8])		**Non reimburs-able** (USD Millions)
Product	Production credit	Technical assistance*	Organisational strengthening and part technical assistance	Production credit	Technical assistance*	Organisational strengthening and part technical assistance
Cocoa	59.48	3.08	10.66	18.19	0.94	3.25
Coffee	40.58	1.21	4.12	12.41	0.37	1.26
Oil Palm	14.08	0.26	1.05	4.31	0.08	0.32
Palm Hearts	1.05	0.05	0.41	0.32	0.01	0.13
Rice	147.44	0.80	3.41	45.08	0.24	1.04
Sacha Inchi	7.29	0.42	0.96	2.23	0.13	0.29
Tilapia	11.56	0.14	0.39	3.53	0.04	0.12
Total per component	**281.48**	**5.96**	**21.00**	**86.07**	**1.81**	**6.41**
Capital requirement	**287.44**		**21.00**	**87.88**		**6.41**

(*) Part of the technical assistance is expected to be reimbursed by loan repayments, while a larger part is non-reimbursable.

Table 3. Undiscounted capital requirements for Sustainable Agricultural Production

Conservation

For conservation, the priority is to strengthen natural protected areas including the Alto Mayo Protection Forest (BPAM), National Park Cordillera Azul (PNCAZ), National Park Abiseo River (PNRA) and the Regional Conservation Area of the Cordillera Escalera (ACR CE). Together they cover 1,092,306 ha of forest ecosystems.

The interventions aim to increase these areas' capacity for management, planning and control to enable them to implement adequate protection measures that ensure the continued flow of the significant ecosystem services they provide, such as water, biodiversity and climate regulation. These interventions were jointly developed with stakeholders managing protected areas in San Martin.

This is estimated to cost PEN 174 million (USD 53 million) undiscounted. As these activities do not generate revenue, these costs will need to be financed by grants or an increase in public funding beyond existing government budget commitments. These four areas currently receive a total of PEN 117.4 million (USD35.8 million) in government funds.

Sustainable livelihoods

The sustainable livelihood interventions focus on three indigenous ethnic groups in San Martin. Indigenous populations are normally rural groups with high poverty and exclusion levels, whose security and livelihoods are very dependent on the forests and the ecosystem services these provide. However, indigenous populations' forests are threatened by illegal loggers and other trespassers. To meet these challenges, the interventions aim provide financial support for designing and implementing 'sustainable livelihood development plans', land titling, and forest monitoring. For those communities with land titles, the project also includes interventions to improve food security and and organisational capacity.

In this area, the project prioritises seven interventions requiring funding, targeting communities both with and without formal land titles. These interventions require resources totalling PEN 28.90 million (USD8.8 million) undiscounted over a five-year period.

The investment required for sustainable livelihood interventions is significantly smaller than that for the agricultural interventions. However, these are non-revenue generating activities and as such would need to be funded either by government resources, grants or a combination of the two.

The cost of transition

Implementing the interventions above has significant costs.

- Total capital requirement for the proposed transition in San Martin is PEN 599.3 million undiscounted (US USD183 million).
- Of this total, PEN 287.4 million (USD87.8 million) investment is needed in revenue-generating interventions in sustainable agriculture. These funds are reimbursable, in that they are expected to be repaid.
- In addition, PEN 311.9 million (USD 95.2 million) is required for interventions supporting conservation and sustainable livelihoods, as well as well as some parts of the transition to sustainable agriculture, such as elements of technical assistance and capacity building. These funds are non-reimbursable, i.e. they are not expected to be repaid.

Financing the transition in San Martin

One of the benefits of the landscape approach is that it considers different demands on the landscape together, for example conservation and different types of farming, However, funding may be another matter as different elements will need different types of funding.

A financial mechanism has been developed to finance the transition in San Martin. This was a result of engaging different international and multilateral financial institutions, and tailored to the particular context in Peru and San Martin (see Figure 1).

The proposed model combines finance from multilateral organisations, climate funds and donor governments to provide concessional credits, credit guarantees and weather insurance. These elements can reduce the risk for investors and, at the same time, reduce the interest rate offered to farmers. These institutional support mechanisms can also come in the form of result-based payments, which would be directly related to the impact of implementation on the ground.

The credit element of the framework will be tested through a pilot financed by Peruvian state bank Agrobanco. The bank will disburse credit directly to selected producers. The specific terms of the credit product are still being defined.

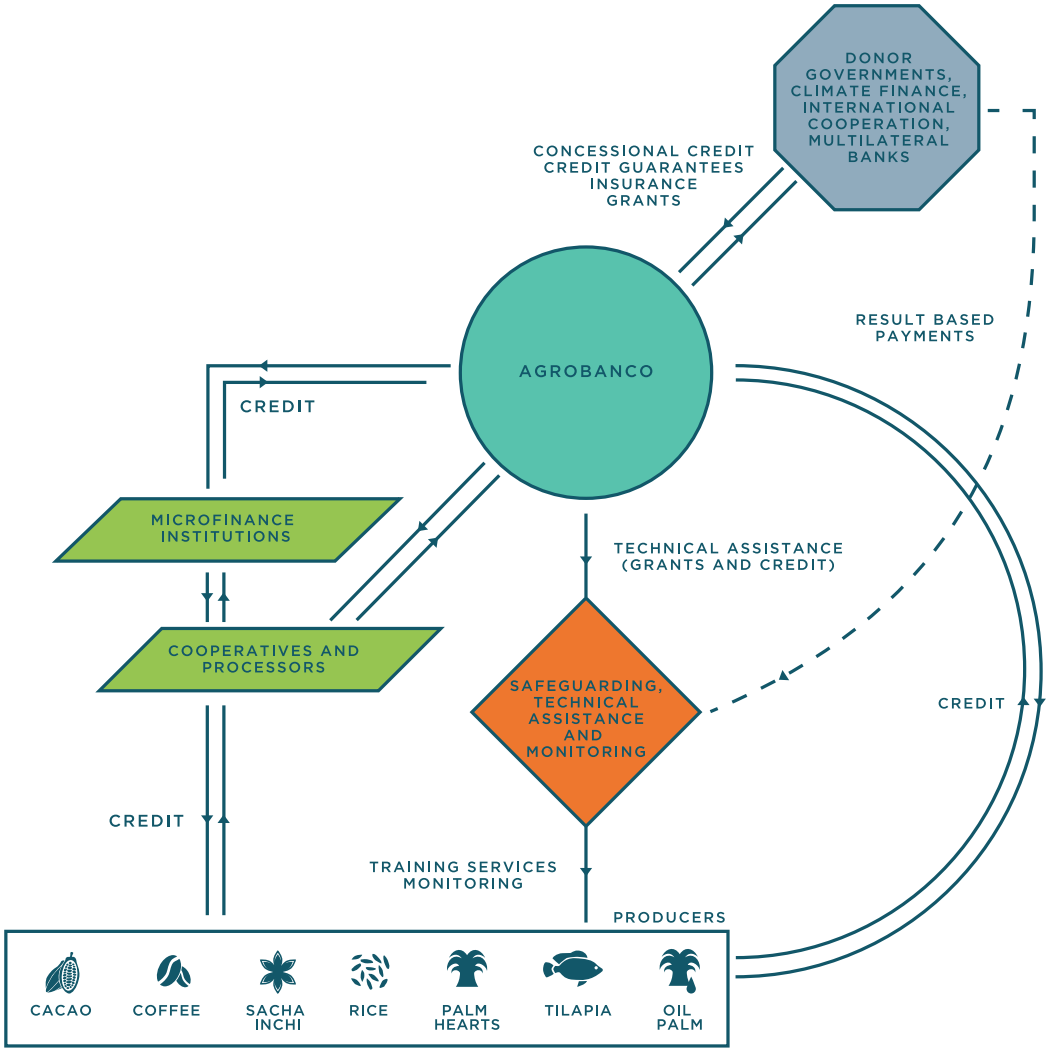

Figure 1. Financial mechanism proposed for San Martin

Safeguards, technical assistance and monitoring

The proposed technical assistance model aims to help farmers meet the Codes of Conduct. These are based on several factors:

- Specific interventions to increase productivity.
- Mitigation of environmental and social risks posed by interventions if not implemented correctly.
- Existing sustainable certification schemes already used in the area.

The project has designed a detailed safeguarding system including the steps to ensure implementation of sustainable practices on the ground and the link between this implementation and the disbursement of credit and ongoing access to the program.

The project is currently defining the criteria to select the producers that will engage in the programme. Other areas of ongoing work include finalising the Codes of Conduct for producers and corresponding indicators of social and environmental performance. Work is also continuing to design the specific monitoring strategy to be applied to the pilot scheme.

[7] The Codes of Conduct are based on existing certification schemes that are currently being used in Peru and consultations with key local stakeholders in the region.

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For more information on the Unlocking Forest Finance methodology, see financingsustainablelandscapes.org

2. The Context in Peru and San Martín

Forests in Peru

Peru has the ninth largest forested area in the world and after Brazil the second largest in South America. The natural forests of Peru cover 78.8 million ha, including 74.2 ha million in the jungle, 3.6 million ha on the coast, and 1 million ha in the mountains. The Amazon jungle covers 53.9% of the total area of the country (Ministry of Environment, 2015).

However, this forest area is gradually decreasing. The Ministry of the Environment (MINAM) and the National Programme for Forest Conservation (PNCB) estimate that Peru lost an average of 118,000 hectares (ha) of forest each year between 2001 and 2014. In 2015 alone, Peru lost 158,658 ha of forest, the highest annual rate of deforestation since 2000. If appropriate measures are not taken immediately, deforestation could increase in the near future, reaching 250,000 ha per year in 2030 in a conservative scenario and 350,000 ha per year in a more pessimistic one (MINAM, PNCB, 2016).

Logging and forest burning for agriculture is considered the main direct cause of deforestation. Most land use change for agriculture (at least 80%) happens in lands mostly suitable for forestry, or in protected areas (MINAM, PNCB, 2016). In addition, 74% of deforestation in indigenous lands is concentrated in five regions: San Martín and Loreto (the regions that show the highest annual loss of forests, each with 22% of the national total) followed by Ucayali (16%), Amazonas (8%), and Madre de Dios (6%) (MINAM, PNCB, GIZ, 2014).

The PNCB proposes a reduction of greenhouse gas emissions of at least 20% by 2030 and to avoid the deforestation of 54 million hectares of primary forests by 2021 as a contribution to the mitigation of climate change. These targets are part of commitments made by the Peruvian Government under the United Nations Framework Convention on Climate Change (UNFCCC), and through its Intended Nationally Determined Contributions (INDCs).

The San Martín Regional Government (GORESAM) has committed to conserve 2,525,735 ha of forests as part of San Martín's contribution to the national PNCB goal. This area makes up 49% of regional land and includes Protected Areas (PAs), indigenous communities, areas of regional conservation (ARCs), conservation concessions, and Areas of Conservation and Recovery of Ecosystems (ZOCRES).

The National Strategy for Forests and Climate Change (ENBC) has established three levels of action in the fight against deforestation:

- Generation of and compensation for ecosystem services (REDD+[8] mechanisms and payments for ecosystem services);
- Improving the productivity of agriculture and forestry (sustainable agriculture, reduction in carbon emissions, agroforestry systems, sustainable forest management, community forest management, forest plantations and recovery of degraded lands);
- Generation of enabling conditions (including but not limited to forest management, land use according to the suitability of the soil, proper forest and agricultural rights, titling of Indigenous Communities and effective forest monitoring).

[8] REDD+ refers to reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks.

Current funding for forests and climate change

The main sources of financing for forests and climate change in Peru come from national budgetary programmes and international funding. Budgetary programmes have increased in the 2012-2015 period, from USD40 million to USD143 million. Direct and indirect international financing for forests and climate change amounts to USD613 million, with 72% of this financing coming from donations. Most notable are funds from the Norwegian government, which amount to USD300 million.

The main institutions managing international financing are the Peruvian Ministry of Economy and Finance (MEF), the United States Agency for International Development (USAID) and the Inter-American Development Bank (IDB). These receive financing from governments, climate funds, or financial institutions, and generally redistribute them to institutions that manage and execute the funds. The main implementing institutions are the Ministry of Agriculture (MINAGRI), CHEMONICS INTERNACIONAL, the German Society for International Cooperation (GIZ), the National Forest and Wildlife Service (SERFOR) and PNCB. Of all the implementing institutions, PNCB manages the most resources (DAR, 2014).

Forests in San Martín

The region of San Martín has the highest level of deforestation, with 1,327,736 ha (18.51%), followed by Amazonas with 1,001,540 (13.96%), and Loreto with 945,642 ha (13.18%). According to a study carried out by the REDD+ Roundtable in San Martín[9], the region has lost an average of 23,271 ha of forest per year between 2000 and 2010. Table 7 shows different estimates of the loss of forests in San Martín.

Land use change for small and large-scale agriculture is considered the main cause of deforestation in San Martín. Land use change occurs on land that is suitable for agricultural production as well as within protected areas, forests on the land of titled and untitled indigenous communities, protected forests, timber forest concessions, and unassigned permanent production forests. Family producers are a key agent in the expansion of the agricultural frontier into forest areas, but they are also essential for conservation through sustainable management and reforestation activities in deforested lands.

The Regional Office for the Development of Indigenous Communities of San Martin (ORDEPISAM) lists 194 indigenous communities living in San Martín, including 32 peasant communities. Only 29 communities have been recognised and titled, and 50 are currently in process of being recognised, demarcated, and titled by the Regional Directorate of Agriculture of San Martín (DRASAM). Land and forest titling is the main demand of indigenous communities to help them counteract ongoing land invasions and logging. If the degradation

Different estimates	Area of forest 2000	Area without forest 2000	Loss of forest 2000-2005	Loss of forest 2005-2010	Loss of forest 2000-2010
REDD+ Roundtable at San Martín	3,728,382	1,049,056	114,991	117,727	232,718
MINAM-UMD	3,782,441	1,031,383	112,058	141,122	253,180
MINAM-CLASlite	3,191,128	789,097	46,547	149,769	196,317

Table 4. Different estimates of deforestation in San Martín 2000 - 2010 Source: REDD+ Roundtable

[9] The REDD+ Desk is a coordination space between the regional government and the civil society for learning and for the participative construction of a frame-work for the implementation of REDD+.

of forests in indigenous land continues, these communities will be deprived of their sources of food and income as well as the areas where they have lived and maintained their traditions for centuries.

In this context, from 2005 GORESAM has been working towards sustainable development, with the goal of being a region with low-carbon economy and a leader in the conservation of natural capital and forests' ecosystem services. They have developed a range of instruments:

- Macro-level Ecological and Economic Zoning (ZEE) of the region, and Meso-level ZEE in some provinces of the region;
- Coordinated development plans at the sub-national, provincial, and district levels;
- Sectoral development plans (agriculture, livestock breeding, tourism, forestry);
- A REDD+ regional strategy, and the establishment of socio-environmental safeguards;
- A Regional System of Conservation (SRC), including a range of different conservation strategies in an area that is close to 60% of the whole region;
- REDD+ and PA projects, and concessions for conservation;
- Payment mechanisms for environmental water services[10];
- A regional policy of sustainable investment;
- A vision of 'production-conservation' development, and the creation of the San Martín regional brand.

[10] The REDD+ projects and the payment for environmental services are being implemented in San Martin as a financing strategy for the conservation of natural forests. The REDD+ projects have been developed for two National Protected Areas at the national level, the Alto Mayo Protected Forest (BPAM) managed by Conservation International (CI), the Cordillera Escalera National Park (PNCAZ), managed by the NGO Centre for Research, Conservation and Management of Natural (CIMA); in the Conservation Concession Alto Huallabamba (CCAH) managed by the NGO Amazonians for Amazonia (AMPA); and the Martin Sagrado Biocorredor managed by the NGO Amazonia Alive (AV). All these initiatives are certified by the Verified Carbon Standard (VCS) and the Climate Standard, from the Biodiversity Community (CCB).

3. Methodology for selecting interventions

The transition to a low-carbon economy, which ensures the adequate protection of forests and the livelihoods of vulnerable populations, has a significant upfront cost. A range of stakeholders will need access to appropriate resources to facilitate this transition. The Unlocking Forest project seeks to support this transition in San Martín by designing an investment portfolio channelling and disbursing large-scale investments.

To this end, Unlocking Forest Finance has been developing a business proposal, making up an investment portfolio divided into three main parts:

- **Sustainable agricultural production**
- **Conservation**
- **Sustainable livelihoods for indigenous peoples**

For **sustainable agricultural production**, the Project has developed an investment portfolio to transition to sustainable agricultural production in coffee, cocoa, oil palm, palm hearts, rice and sacha inchi and tilapia. These sectors were prioritised by GORESAM, in alignment with plans and policies for economic and agricultural development[11]. To build this portfolio, analysts considered the economic, financial, social, and environmental viability of each intervention, as well as the 'additionality' that the transition will generate (the additional benefits of the intervention, compared to what would have happened without it). The investment plan considers key activities required to catalyse the transition to sustainable production such as target population, implementation schedule, expected benefits and productivity.

For many of the supply chains, more sustainable land management requires new technological inputs and improved agricultural practices. This will allow for an increase in productivity and a reduction in negative environmental impacts on the landscape. It will also increase the resilience of agriculture and aquaculture systems.

To make this happen, the UFF project has designed a financial mechanism aiming to provide producers with a comprehensive credit product suited to their needs, and an "integrated package" of non-financial services. This package will include technical assistance in the field, organisational capacity building, education, a sound safeguarding framework and financial coordination.

The main goals for transition were drafted through a process that included an analysis of requirements to implement the plan, costs and benefits of installation and production. It compared these to current management systems. At the same time, to better understand the producer profile, researchers interviewed a sample of 659 producers. Results of this survey helped set the transition goals in terms of the area to be included and the number of producers to be involved.

In **conservation**, the project prioritises four Natural Protected Areas representing 43% of the total legally protected area and 21% of the area of San Martín. Specifically, these are the Alto Mayo Protection Forest (BPAM), Cordillera Azul National Park (PNCAZ), Rio Abiseo National Park (PNRA), and Cordillera Escalera Convervation Area (ACR CE).These protected areas are subject to significant anthropogenic pressure. While they have management plans, they still suffer from serious gaps in financing.

The sustainable livelihoods element focuses on indigenous communities living in San Martín's rural areas. They have some of the highest levels of poverty and exclusion in the region. Their subsistence and security depend, to a major extent, on the forest and the ecosystem services that it provides. Their forests face increasing threats such as illegal loggers and other trespassers. It is therefore important to deliver legal security and land tenure to these communities, thereby enhancing their technical and organisational capacities so that they can fully benefit from their forest resources in a sustainable way. The indigenous populations considered in the project are the three existing ethnic groups in San Martín: Kechwas, Awajun, and Shawis.

For all interventions, two different scenarios were constructed with a 30-year time horizon. The were business as usual (BAU), without the interventions, and sustainable ecosystem management (SEM), where interventions are expected to take place.

[11] At the beginning of the project (2013) these supply chains were already included in the agricultural development policies prioritized by GORESAM. The main policy documents consulted were the Regional Development Plan 2008-2015; Aquaculture Diagnosis of San Martin (2011), the Regional Agrarian Sectorial Strategic Plan 2009-2015; and the Regional Development Plan of San Martin until 2021. Throughout the planning process this prioritisation was continually validated through meetings with the GRDE, DRASAM, producer associations and cooperatives.

4. Methodology for social and environmental safeguarding

Environmental and social improvements are the core mission of the 'green' financing approach of the Unlocking Forest Finance project, and often a requirement when it comes to funders and investors. The project includes a series of environmental and social safeguards to ensure that these improvements take place. This section outlines how guidance has been given in order to mitigate risks from the very start of the project and throughout its entire duration.

Understanding risks and concerns

At the outset, the project identified three broad areas of concern:

- Issues of human rights and environmental justice. In the past, economic development projects and conservation initiatives have violated the rights of indigenous communities or other land user groups, rendering their general legitimacy questionable and potentially leading to violent conflict.
- Environmental effectiveness: Intensifying agricultural production in an ecologically sound way is a challenge, since intensification is usually accompanied by negative environmental effects. Moreover, if farming activities become more profitable through intensification, there is a risk that these activities become more attractive and that farms will expand onto more land.
- Commodification of nature: This criticism includes moral arguments about selling natural resources. Many critics also believe that there is a risk that privatisation of common goods such as the environment leads to their capture by private interests and increases social inequality.

These three areas present major challenges for a project such as this. In order to find well-designed interventions for mitigating these areas, the project reviewed several codes of conduct, ranging from global political agreements to standards or codes of conduct for projects addressing production on the ground.

Designing safeguards

Efforts to design and operationalise safeguards can be split into three main parts:

Stakeholder involvement

From the outset, the project consulted representatives of the regional government of San Martín, various agencies, producer associations, farmer cooperatives, non-governmental organisations and others.

Involving stakeholders from the outset increases the legitimacy of the process and it is an ethical and legal obligation in virtually all safeguarding procedures. Moreover, stakeholder integration is instrumental for the successful implementation of a sustainability transition

Social and environmental impact analyses

The project estimated the expected social and environmental impacts for each of the proposed interventions. The results were used alongside financial analyses to select the final investment portfolio.

To assess the social impacts of investment, the project developed a guidance framework with a list of categories for social criteria (including health, education, land rights, income and cultural heritage) and suggestions for specific indicators and assessment methods. CEDISA selected a subset of social criteria linked to local priorities, for which data was available. These were: increase in income, increase in employment, improved technical capacity, increase in producer association, female empowerment, no violations of indigenous rights and rights to land, access to water, traditional knowledge, and health-related water and air quality. Data on these criteria were gathered by consulting regional databases and stakeholders, then evaluated.

To estimate environmental impacts, consultants assessed the effects of proposed interventions by carrying out questionnaire surveys and interviews with local partners. This allowed in-depth analysis of the impacts against a set of 10 criteria. The main results raised particular concerns about supporting the expansion of cocoa, palm hearts and palm oil.

The results of the social and environmental impact analysis were used in two ways. First, a series of “no-go” criteria were defined, which would lead to the elimination of the activity from the portfolio. These “no-gos” not only included social and environmental criteria, but also insufficient financial return on investment, lack of institutional frameworks or logistical barriers for implementation. Regarding social impacts, all interventions were evaluated for whether they would risk violating indigenous rights, destroy traditional lifestyles or reduce access to natural resources for other stakeholders. In addition, supply chains would also be discarded if they were mostly located in disputed lands or if it would be impossible to implement social safeguards.

For the social ‘no-go’ criteria, none of the interventions were rated as critical. However, the environmental impact assessment indicated that the project could not support expansion of rice and palm oil onto new areas, mainly due to their environmental effects on hydrology and biodiversity. Existing areas of rice and palm oil production should only be supported with strong standards which ensure a positive environmental impact.

The second use of the socio-economic and environmental assessment results was the creation of an overview table to compare the interventions in terms of their expected financial, environmental and social impact.

For social criteria, three main indicators emerged: the number of families that would be positively affected (in terms of additional income and capacity building), the average amount of income increase per family, and the expected increase in employment. Increase in employment and income were calculated using the cash flow models built for each intervention and improvement in technical capacity was obtained from a survey with producers to assess their eligibility and interest in taking part in the transition. Results show the expected net positive impact of the transition for the next 30 years (i.e. the expected difference between SEM and BAU scenarios).

Another three indicators are presented here from the environmental impact assessment (selected from the initial 10 indicators). The environmental impact assessment evaluated the different environmental aspects of transition proposals to produce suggestions for either elimination or mitigation.

Table 5 shows that from a financial perspective, the implementation of proposed activities makes sense. There is great potential for returns for farmers as a result of more sustainable practices. These results justify the case for private investment in the transition to a sustainable landscape in San Martín.

From the perspective of social impacts, investment in aquaculture and rice can be expected to increase family income the most. However, aquaculture would benefit relatively few families. Cocoa, coffee, and smallholder palm oil investments are expected to benefit a large

	Financial indicator	Social indicators			Environmental indicators					
					Carbon balance		Biodiversity		Hydrological effects (water quality and quantity)	
Sector	Financial return on investment	Number of positively affected families (by increased income and improved technical capacity)	Income increase per family (PEN), average over 10 years	Increase in employment (total for 10 years)	Initial proposal	With safeguards	Initial proposal	With safeguards	Initial proposal	With safeguards
Aquaculture	>40%	96	37,851	602						
Cocoa	18% area / 36% yield	12,650	2,763	24,214						
Coffee	27% renewal / 28% yield	3,208	2,487	18,553						
Palm Hearts	29%	121	1,069	401						
Palm Oil	>40%	1,298	1,201	2,124						
Rice	>40%	3,269	2,890	10,886						
Sacha Inchi	23%	669	3,259	454						

Positive impact compared to today's situation

No significant impact (neutral)

Positive and negative impacts broadly balance each other out

Negative impact compared to today's situation

Very negative impact compared to today's situation

Table 5. Multi-criteria overview of the expected financial, social, and environmental benefits of the agricultural interventions

number of families, with modest increases in per-family income and improved technical capacity. The highest amount of new employment would be generated in cocoa, coffee, and rice.

If safeguards are implemented in a way that addresses environmental risks, the interventions should be largely beneficial, particularly in the case of more sustainable agroforestry systems. These interventions will lead to better soil quality, water management, reduced pollution and increased carbon sequestration. This should be coupled with increased productivity.

For farmers, safeguards take the form of codes of conduct which must be followed. These were based on existing certification schemes (Table 6, below).

Coffee	Cocoa	Palm oil	Aquaculture	Sacha Inchi	Palm hearts	Rice
C4	C4	RSPO	ASC Tilapia	USDA Organic	USDA Organic	Sustainable Rice Platform
SAN	SAN	SAN	Global GAP	Manual de Produccion de Sacha Inchi para el biocomercio	SAN	SAN

Table 6: Benchmark standards used for defining sector-specific Codes of Conduct

The intervention in coffee should lead to a significant impact on carbon savings and avoided deforestation because farmers are encouraged to recover plantations affected by rust that otherwise could be abandoned, with production potentially moving into the forests.

In the future, investors could prioritise and select interventions according to their own priorities. However, Agrobanco has agreed to invest in the entire portfolio, so no further prioritisation is required at this stage.

5. The transition in sustainable agricultural production

The seven agricultural sectors prioritised by UFF currently cover a total area of 245,374 ha and currently involve 78,246 families of small and medium producers (Table 8).

Source: REDD+ Roundtable

Product	Area in Production (Ha)	Average regional yield (kg/ha)	Families of producers involved	Association membership (%)	Families associated
Cocoa	56,351	750	22,000	45	9,900
Coffee	106,315	840	36,000	26	9,252
Oil Palm	32,257	13,000	3,428	57	1,415
Palm Hearts	1,371	4,200*	374	76	707
Rice	48,130	6,500	14,413	46	6,688
Sacha inchi	672	700	1,422	56	795
Aquaculture (tilapia)	278	4,500	609	36	219
Total	**245,374**		**78,246**		**28,976**

Table 7. Current Situation of Agricultural Production (*) For palm hearts, yield is measured in stems/ha.

These crops continue to expand over a greater area and drive deforestation to varying extents. This is due to several factors including market conditions (increasing demand and prices), availability of land, the support of GORESAM, international cooperation and the improvement of the road and communications network.

Without effective interventions to change this pattern, the agricultural sector will most probably grow through an increasing prevalence of migratory agriculture practices and unsustainable patterns of natural resource management. Cocoa, coffee[12] and oil palm sectors have grown rapidly in the last ten years, a trend which is expected to continue under business as usual (BAU) conditions.

The proposed transition involves 21,311 small producers over an area of 104,521 ha. The capital requirement for the transition is estimated at PEN308.4 million (USD94.2 million). As stated above, this sum will be mostly covered by reimbursable investments. These investments will be disbursed in the form of loans to help farmers increase productivity and expand new plantations, in accordance with regional zoning. Reimbursable investments will also cover part of the technical assistance costs. However, interventions in productive supply chains will also need some non-reimbursable resources in the form of grants to cover capacity building and the remainder of the technical assistance, as can be seen in Tables 8 and 9.

[12] In 2012, yellow rust affected severely coffee plantations in the region, damaging over 60% of coffee production areas in San Martin. Production has been recovering since 2013, although some farmers who have traditionally cultivated coffee are switching to cocoa or oil palm production, while another group of producers are either recovering their plantations or clearing new areas to establish new plantations

Product	Intervention	Hectares	Average Yield BAU (Kg/ha/ year)	Average Yield SEM (Kg/ha/ year)	Families
Cocoa	Productivity	24,730	750	2,200	7,517
	Expansion	8,059			5,133
Coffee	Productivity	6,493	840	2,240	1,283
	Renewal	9,739			1,925
Oil Palm	Productivity	14,382	13,000	22,000	1,298
Palm hearts	Productivity	709	4,200*	7,000*	121
Rice	Productivity	39,587	13,000	20,000	3,269
Sacha Inchi	Productivity	352	700	2,000	355
	Expansion	317			314
Tilapia	Productivity	153	4,500	21,850	96
		104,521			**21,311**

Table 8. Physical Goals for the Transition Period (10 Years)

	Reimbursable (PEN millions)		Non reimbursable (PEN millions)	Reimbursable (USD millions)[16]		Non reimbursable (USD millions)
Product	**Production credit**	**Technical assistance**	**Organisational strengthening and part technical assistance**	**Production credit**	**Technical assistance**	**Organisational strengthening and part technical assistance**
Cocoa	59.48	3.08	10.66	18.19	0.94	3.25
Coffee	40.58	1.21	4.12	12.41	0.37	1.26
Oil Palm	14.08	0.26	1.05	4.31	0.08	0.32
Palm Hearts	1.05	0.05	0.41	0.32	0.01	0.13
Rice	147.44	0.80	3.41	45.08	0.24	1.04
Sacha Inchi	7.29	0.42	0.96	2.23	0.13	0.29
Tilapia	11.56	0.14	0.39	3.53	0.04	0.12
Total per component	**281.48**	**5.96**	**21.00**	**86.07**	**1.81**	**6.41**
Capital requirement	**287.43**		**21.00**	**87.76**		**6.41**

Table 9. Capital Requirements for the Project

Additional benefits

Comparing BAU and SEM scenarios highlights several socio-economic benefits over the initial 10-year period, as shown in Table 11.

Crops	Additional production (kilos)	Value of production (millions)		Additional income per hectare/year (average)		Additional new jobs
		PEN	USD**	PEN	USD**	
Cocoa	107,961,737	658	201	2,763	844	24,214
Coffee	61,384,529	378	115	2,487	759	18,553
Rice	1,007,481,924	977	298	2,890	882	10,886
Oil palm	442,954,046	169	51	1,201	367	2,124
Palm heart	8,831,104	17	5	1,069	327	401
Sacha Inchi	2,471,024	14	4	3,259	995	454
Tilapia	17,929,858	143	43	37,851	11,558	602
Total		**2,356**	**717**			**57,234**

Table 10. Additionality generated during the intervention (10 years)

*Palm heart production in thousands of stems
**Exchange rate 3.275PEN/USD

The transition in cocoa

The main goal of the intervention is to increase cocoa producers' revenue through sustainable increases in productivity and implementing more sustainable systems in new areas, in accordance with regional economic and ecological zoning. This will lead to greater stability for the farmer and will prevent expansion into forested areas or areas suitable for reforestation.

The intervention is based on the idea that smallholders adapt to agroforestry systems, where crops are grown shaded by trees. This is expected to have several benefits: increasing sequestration of atmospheric carbon dioxide (CO_2), conserving biodiversity and protecting soils.

BAU Scenario	BAU Risk	Proposal for SEM Transition
• Poorly implemented practices of proper management of the soil fertility, pruning management, weed control, and the rational use of pesticides. • Improper management of waste water. • Low level of organisation and business management • Limited access to financial services, business development, training, and technical assistance. • Informality in land ownership. • Advanced age of plantations, which causes problems of low yields. • Low levels of productivity, profitability, and competitiveness in the activity.	• Disorderly expansion of new areas through deforestation or crop substitution coupled with habitat alteration, and a greater fragmentation in the landscape. • Soil degradation and greater decreases in productivity due to the exhaustion of soil fertility. • Increase in water pollution due to poor management of waste water.	• Expansion of new production zones in areas already deforested, according to ZEE. • Soil analysis for the efficient and rational use of pesticides, synthetic and organic fertilisers. • Comprehensive management of pests. • Sowing of rapid-growth native forest species on the edge of the cocoa farm. • The use of composting and the addition of organic residues over the plantation area, in order to protect the soil from erosion and improve water infiltration. • To stabilise the producer in his or her current productive unit, which will prevent his displacement to new forested areas or areas with agricultural suitability. • Producers with greater socio-organisational and business skills. • Renewal of old cocoa farms through the use of rejuvenation pruning, grafting, or the sowing of new plants.

Table 11. BAU and SEM Scenarios in the cocoa production

Transition goals:

- To increase productivity in 24,730 ha of existing plantations, going from 750 kg/ha to 2,200 kg/ha through the implementation of agroforestry systems;
- To install 8,059 ha of new plantations using agroforestry systems;
- To support 12,650 families of small producers, of which 7,517 families will be supported in helping them increase productivity in existing plantations, and 5,133 families will be supported to install new plantations

Transition benefits:

Expected socio-economic impact in 10 years:

- 24,214 additional jobs created;
- Additional production value of PEN 658 million ($201 million);
- Net revenue per hectare doubled in six years, compared with the BAU scenario, both due to improvements in existing plantations and new plantations in suitable areas;
- 12,650 producer families with improved technical capabilities and better management skills. These skills will be important in the move towards sustainable systems of production.

Expected environmental impact:

- Reduced deforestation due to increase in per-hectare efficiency;
- Improvements in soil health;
- Reduced pollution of water and soils;
- Carbon sequestration, contributing to climate change mitigation;
- Increased biodiversity.

Required funding:

The transition for cocoa is estimated to require a total of PEN 73.2 million (USD 22.3 million) undiscounted.[13]

Financial performance in 30 years:

Increase in productivity;

- Internal Rate of Return (IRR) 36.3%;
- Net Present Value (NPV): PEN507 million.

Expansion in new areas;

- Internal Rate of Return (IRR) 17.7%;
- Net Present Value (NPV): PEN95.6 million.

[13] Applying a 5% discount rate, this is PEN59.9 million (USD18.3 million).

The transition in coffee

The intervention is designed to reduce the pressure on forests through increasing yields, both in plantations affected by the rust fungus and in currently-productive plantations. This intervention will contribute to soil conservation and the recovery of degraded soils. For crops affected by rust, this is expected to reduce the likelihood of farmers moving plantations into the forest. Furthermore, improving productivity in other areas should also prevent the displacement of farmers to new, currently forested areas.

As with cocoa, the intervention in coffee will help small coffee producers to adopt agroforestry systems.

BAU Scenario	BAU Risk	Proposal for SEM Transition
• Plantations are located in the buffering area, and inside the NPA, permanent production forests, protection forests, and CCNN. • Poorly implemented fertilising practices, pruning and post harvesting management. • Deficiencies in the management of waste water. • Prevalence of older, low-yield plantations. • Low level of productivity, profitability, and competitiveness in the activity. • Low level of organisation and business management. • Limited access to financial services, business development, training, and technical assistance. • Informality in land ownership.	• Soil degradation. • Expansion into new areas through deforestation in basin headwaters, or crop substitution that alters habitats, and brings about a greater landscape fragmentation. • Increase in GHGs. • Increase in soil degradation and water pollution. • Increased incidence of pests and disease in poorly managed or old coffee farms. • Increase in soil erosion. • Decrease in hydrological services, both in quantity and quality.	• Decrease of pressure on forests due to not having expanded into new areas with the coffee crop. • Manure / Fertilizer: The number of fertilizers that are harmful to the soil will be reduced. Amounts will be used in accordance with the study of the soil and the nutritional requirements of the plant during the productive cycle. The use of organic manure will be increased (island guano, compost.) • Pesticides: Limited use. The use of pesticides which affect soil fertility will be reduced. Use will be restricted to those pesticides authorized by the National Service of Agricultural Health (SENASA). • Suitable density of coffee trees and of woody forest species. • Crop residues and pulped coffee will be used to produce compost for use as fertiliser in farms. • Implementation of fermenter boxes for the treatment of waste water. • Increase in yield in renewed plantations and in production. • Introduction of soil and water conservation. • Producers remaining in their current productive units, which will prevent displacement to forested areas or areas with further agricultural suitability.

Table 12. BAU and SEM Scenarios in the coffee production

Transition goals:

- To increase productivity in 6,493 ha of existing coffee farms, moving from 840 kg/ha to 2,240 kg/ha through the implementing agroforestry systems;
- To renew 9,739 ha of coffee farms affected by rust, by implementing agroforestry systems;
- To support 3,208 families of small producers: 1,283 families in increasing productivity by adapting their current systems of production to agroforestry systems and 1,925 families through installing agroforestry systems to renew rust-affected coffee farms.

Transition benefits:

Expected socio-economic impact in 10 years:

- 18,553 additional new jobs created;
- Additional value of production of PEN378 million (USD114 million);
- Net revenue per hectare will double in three years, compared with the BAU scenario, both because of improvements in productivity of existing crops and through the renewal of coffee farms affected by rust;
- 3,208 families of producers with better technical capabilities and better management skills, which will help progress towards sustainable systems of production.

Expected environmental impact:

- Improved soil fertility with the use of organic fertilisers and the reduction of harmful chemicals;
- Reduction in water pollution through the management of waste water;
- Reduction in soil erosion due to more extensive forest cover.

Required funding

The transition for coffee is estimated to require a total of PEN 45.9 million ($14 million) undiscounted.[14]

Financial performance in 30 years:

Increase in productivity;

- Internal Rate of Return (IRR) 28.1%;
- Net Present Value (NPV): PEN52 million ($16 million).

Renewal of plantations using agroforestry systems;

- Internal Rate of Return (IRR) 27.4%;
- Net Present Value (NPV): PEN99.2 million ($30.3 million).

[14] Applying a 5% discount rate, this is 36.7 discounted million (USD11 million).

The transition in oil palm

For oil palm, interventions are designed to modify the current production system. This means incorporating sound agricultural practices in existing productive areas, aiming to guarantee intensification without expansion. This will generate higher revenue and allow farmers to continue to farm the same land without resorting to further deforestation.

BAU Scenario	BAU Risk	Proposal for SEM Transition
• Enlarge the plantations and eliminate primary or secondary forests; • Lack of soil studies to manage soil fertility; • Sub-optimal agricultural practices: preparing the soil by destroying the forest, indiscriminate use of agrochemicals (fertilisation, weed control and burning of organic residue); • Use of chemicals (pyrethroids) to control fall armyworm (Spodoptera).	• Decrease in soil productivity; • Increase in plantations through forest removal; • Increasing habitat alteration and landscape fragmentation; • Increase in GHG emissions; • Greater pollution of soil and water; • Loss of ecosystem services (SE).	• Small farmers stabilised in their cultivation areas; • Selection of the crops to sow; • Use of cover crops to control soil erosion and the loss of nutrients through leaching; • Improve the nutritional level of the soil and control weeds; • Incorporation of organic residues on the surface of the plantation to protect the soil and improve the infiltration of water into the soil; • Use compost during maintenance to control the growth of weeds and improve soil conditions to benefit the target plant; • Phytosanitary monitoring: using a farm census system, we try to detect the initial hints of the presence of pests and diseases that may affect the crop; • Control of fall armyworms (Spodoptera) by manually collecting the larvae; • Integrated pest management (MIP); • Manual control of weeds; • Sanitary monitoring.

Table 13. BAU and SEM scenarios for oil palm production

Transition goals:

- Increase productivity in 14,382 hectares of existing plantations, from 13,000 kg/ha to 22,000 kg/ha;
- Support 1,298 families of small oil palm farmers during the transition to more sustainable production systems.

Transition benefits:

Expected socio-economic impact in 10 years:

- 2,124 new jobs;
- Additional value of the production of PEN169 million ($52 million);
- 80% increase in the net income per hectare in the second year of improved productivity compared to the BAU scenario;
- 1,298 producers with improved technical and management skills.

Expected environmental impacts:

- Reduced deforestation and loss of biodiversity;
- Reduced greenhouse gases;
- Soil conservation;
- Reduced soil and water pollution.

Required financing:

We estimate that the transition for oil palm will require a total amount of PEN15.3 million ($4.3 million) undiscounted.[15]

Financial return in 30 years:

- Internal Return Rate: 40.3%;
- Current net value: PEN42.8 million ($13.1 million).

[15] By applying a discount rate of 5%, this is PEN12.4 million ($3.8 million) discounted.

The transition in palm hearts

For palm hearts, the intervention aims to adapt the current production system to sustainably intensify production , providing higher incomes and encouraging farmers to stay in the same areas. Specifically, sustainable management of palm heart production includes soil analysis and monitoring, adequate use of fertilisers, proper weed management, pest control (especially regarding diseases and insect infestations), harvesting techniques and transportation of the product.

BAU Scenario	BAU Risk	Proposal for SEM Transition
• Deforestation of areas for crops by burning forests; • Mechanised clearing of forests; • Most farmers do not fertilise their soils and neither do they carry out soil studies to determine what the nutrients required by the plantation are; • Burning of crop and weeding residues; • Use of herbicides to control weeds; • Use of chemicals (pyrethroids) to control fall armyworm (Spodoptera sp.); • Use of chemical fertilisers.	• Enlargement of new areas through deforestation or crop substitution, altering habitats and causing a greater fragmentation of the landscape; • Degradation of soils and decreases in productivity; • Greater GHG emissions due to burning for clearance and excessive use of mineral fertilisers; • Producers obliged to switch to other crops, such as oil palm or cocoa.	• Less deforestation, and conservation of ecosystem services important for agricultural production; • During the preparation of the soil, no burnings will take place after soil smoothing; no herbicides will be applied. Weed control will be manual; • The use of fertilisers that damage the soil will be reduced. Only the quantities indicated by the study of nutritional soils for the plant during the productive cycle will be used; • The use of pesticides will be limited to those authorised by the National Service of Agricultural Health (SENASA); • Workers will be less exposed to pesticides; • The use of organic fertilisers will increase; • Use a proper combination of organic and synthetic fertilisers to fertilise the soil, to reduce the impact of environmental pollution; • Incentivised conservation of plot buffer areas; • Minimal extraction of biomass from the plot, leaving the stems and leaves cut during the harvest as a cover to prevent the erosion of the soil and to recycle nutrients; • Distribute organic matter in the production area between palm trees rows to incorporate organic matter to the soil and prepare compost that the farmer can use in the same farm.

Table 14. BAU and SEM scenarios for the production of palm hearts.

Transition goals:

- Increase productivity in 709 hectares of existing plantations from 4,200 stems/ha to 7,000 stems/ha by installing stakes, introduce related crops and controlling pests and nutrients;
- Provide training and technical assistance to 121 farmers involved in the project.

Transition benefits:

Expected socio-economic impact in 10 years:

- 401 new jobs;
- An increase in the value of production by PEN17 million (USD5 million);
- Net income per hectare 23 times higher than in the BAU scenario in the two years following productivity improvements;
- All producers to have improved technical and management skills for the sustainable management of production systems.

Expected environmental impacts:

- Reduced deforestation;
- Conservation of ecosystem services important for agricultural production, namely water supply, pollination and soil conservation;
- Reduced pollution from chemical pesticides;
- Soil rehabilitation.

Required financing:

The transition for palm hearts is estimated to require a total amount of PEN1.5 million[16] (USD 0.43 million) discounted.

Financial return in 30 years:

- Internal Return Rate: 29%;
- Current net value: PEN5 million ($1.5 million).

[16] By applying a discount rate of 5% to the non-discounted cash flow, this is PEN 1.2 million (USD 0.38 million) discounted.

The transition in rice

For this crop, the intervention is based on Integrated Crop Management. This is a set of management practices endorsed by the National Institute of Agricultural Innovation (INIA) to increase production in a smaller area through the efficient use of water, integrated pest management, and no burning of straw during the preparation of the soil. Farmers should only chemical products endorsed by SENASA, and only in quantities deemed necessary by soil analysis.

BAU Scenario	BAU Risk	Proposal for SEM Transition
• Inefficient use of water and soil fertility; • Limited or excessive use of fertilisers without a proper soil analysis and of pesticides; • Inconsistent use of improved seeds; • Preparation and cleaning of the plot through burning the stubble of the harvest; • Burning rice husks in the open air; • Health problems related to the use of pesticides by the workers who fumigate, and to the consumer as well; • Pay a rate for the use of water that is independent from the quantity used in production; • Limited access to technical assistance and funding.	• Enlargement of new areas through deforestation or crop substitution that alters habitats and causes a greater fragmentation of the landscape; • More water requirements in a context of water stress; • Conflicts with other uses of water due to a decrease in the quantity and quality of the resource; • Larger pollution of soil, water and air; • More pest attacks and diseases; • Increase in production costs; • Degradation of soils and decreases in productivity; • Increased exposure to toxic substances from the use of agrochemicals; • Greater greenhouse gas emissions due to the burning of straw and the sub-optimal use of mineral fertilisers.	• Soil analysis; • Efficient and rational use of mineral and synthetic fertilisers as well as of pesticides, using the correct dose and applying them in the recommended way and season; • Efficient use of water and proper drainage management; • Use of seeds improved with high production potential varieties which are pest and disease resistant; • Integrated pest management (IPM); • No straw burning after the harvest; • Crop rotation to break the life cycles of pests and diseases; • Conservation of the forests thanks to the involvement of the producers in payment or compensation schemes for environmental hydrological services. These would be paid to the owners of the land in higher parts of the drainage basins.

Table 15. BAU and SEM scenarios for rice production

Transition goals:

- Increase productivity in 39,587 ha of rice plantations, from 13,000 kg/ha/year to 20,000 kg/ha/year;
- Provide training and technical assistance to 3,269 producers taking part in the project.

Transition benefits:

Expected socio-economic impact in 10 years:

- 10,886 new jobs;
- Increased value of the production of PEN977 million (USD298 million);
- 60% increase in the net income per hectare, from three years after interventions to improve productivity;
- 3,269 families of farmers with better technical and management skills for the sustainable production of the crop and a greater participation in the production process;
- Reducedof health problems related to the use offrom pesticides, for both workers and consumers for the workers who fumigate, and for the consumer as well.

Expected environmental impacts:

- Better soil and water quality;
- Reduced greenhouse gas emissions;
- Reduced fragmentation of the landscape;
- Conservation of forests in the higher areas of the basins.

Required financing:

We estimate that the transition for rice will require a total amount of 151 million (USD 46.3 million)[17] undiscounted.

Financial return in 30 years:

- Internal Return Rate: 196%;
- Current net value: PEN1.1 billion ($336.4 million).

[17] By applying a discount rate of 5% to the non-discounted cash flow, this becomes PEN 123 million ($37.5 million) discounted.

The transition in sacha inchi

The intervention to make sacha inchi production more sustainable requires the adoption of sound agricultural practices included in the Peruvian Technical Standards (NTP) 151.402:2012 SACHA INCHI, both for currently-farmed areas and for new plantations. To this end, traditional management must transition towards high-technology management, based on the use of artificial stakes with trellises and other practices which can sustainably intensify the crop. This intervention is based on practices which have a strong track record in other areas.

BAU Scenario	BAU Risk	Proposal for SEM Transition
• Inefficient use of seeds; • Management of densities below the recommendations for a good production; • Predominance of live stakes without trellises; • Inconsistent practices regarding pruning management, fertilisation and weed control; • Weak phytosanitary controls; • Inefficient practices in the post-harvest management.	• Soil exhaustion; • Greater incidence of pests and diseases; • Pressure on the surrounding forests to sow other crops; • Soil erosion.	• Management plots correspond to areas in production, and new plantations will be sowed in soils already under cultivation or in open degraded areas; • Soil studies will be conducted and a fertilisation plan produced, based mainly on organic fertilisers and improved seeds; • Incorporation of commercial and native forest trees in the boundaries and in the areas where sacha inchi is not present to counteract high slopes and poor soils; • Integrated pest management • Proper management of pruning (transformation and production); • All the producers implement stakes with trellises; • Biological control of pests and diseases; • Limited use of pesticides approved for organic agriculture plus foliar fertiliser; • Sacha inchi plant stress is avoided; • The cut vegetable matter will be laid on the paths of the crop to produce shadow and decrease the proliferation of weeds, improve the retention of humidity and reduce erosion; • Crops, pruning and weed control residues will be used to produce compost; • Sacha inchi fruit skins and other organic matter produced will be laid on the floor to allow decomposition and at the same time to cover the soil and prevent the growth of weeds.

Table 16. BAU and SEM scenarios for sacha inchi production

Transition goals:

- Increase productivity in 352 hectares of existing plantations from 700 kg/ha to 2,000 kg/ha by building stakes, introducing related crops and controlling pests and nutrients;
- Enlarge 317 hectares of plantation in degraded areas using the same system as in production areas;
- Provide training and technical assistance to 669 farmers involved in the project.

Transition benefits:

Expected socio-economic impact in 10 years:

- 454 new jobs;
- Additional value of the production of PEN14 million (USD4.0 million);
- In the third year after the intervention, the net income per hectare will be three times higher than in the BAU scenario. This is due to improvements in productivity and new plantations in degraded areas;
- 669 producers with management and technical skills;
- Better food security for families involved in the project.

Expected environmental impacts:

- Recovery of degraded soils;
- Reduction of extractive activities that affect fauna and flora, including logging and indiscriminate hunting.

Required financing:

We estimate that the transition for sacha inchi will require a total amount of PEN 8.6 million (USD2.6 million) undiscounted[18].

Financial return in 30 years:

Increased productivity in existing plantations;

- Internal Return Rate: 17.8%;
- Current net value: PEN3.7 million ($1.1 million).

Enlargement of new areas;

- Internal Return Rate: 22, 8%;
- Current net value: PEN3.69 million ($1.1 million).

[18] By applying a discount rate of 5% to the non-discounted cash flow, this becomes PEN 7.2 million (USD 2.2 million) discounted.

The transition in tilapia fish

For tilapia fish farming, the intervention will move production from a low-technology subsistence level expected under a BAU scenario to a semi-intensive technology system.

This is expected to increase the efficiency of production processes, improve the quality of the product, in both taste and nutrition, and create less pollution. The fish will be fed using pelleted or extruded feed which complies with strict specifications for protein and energy content, according to the stage of growth and the species. The daily feed rate and time of feeding will be in accordance with the biomass of the fish cultivated.

In addition, fish farmers will contribute to the conservation of the forests in the higher areas of the basins through payments or compensations to the owners of land and forests. This is expected to increase income for small farmers and reduce deforestation incentives.

BAU Scenario	BAU Risk	Proposal for SEM Transition
• Low technology levels and small-scale production; • Inefficient management of fry density, nutritional aspects and disease control; • Lack of soil management and water pollution with organic and inorganic waste; • Inefficient management of organic nutrition; • Low quality of fish meat due to the feed used during production.	• Enlargement of new areas by deforestation or crop substitution altering habitats and causing a greater landscape fragmentation; • More water requirements in a context of water stress; • Conflicts with other uses of water due to the lower quality and quantity of the resource; • Increased pollution of soil and water.	• No required expansion of ponds, due to the increase in productivity caused by the adoption of semi-intensive technology; • Increased production derived from the efficient and rational use of water and soil; • Increases in fish density • Balanced feed used according to the nutritional needs of the fish; • Proper use of organic and inorganic fertilisers; • Participation of the producer in the payment for ecosystem services (PES) mechanism.

Table 17. BAU and SEM scenarios in tilapia production

Transition goals:

- Increase productivity in the existing 153 hectares, from 4,500 kg/ha to 21,850 kg/ha through the implementation;
- Provide training and technical assistance to 96 producers.

Transition benefits:

Expected socio-economic impact in 10 years:

- 602 new jobs;
- Additional value of the production of PEN143 million (USD43 million);
- Net income per hectare 6 times higher than in the BAU scenario within two years;
- 96 families of farmers with better technical and management skills for the sustainable production of the crop and greater participation in the production process.

Expected environmental impacts:

- Reduced level of soil and water pollution;
- Reduced fishing pressure on wild fish in the the rivers in the region;
- Reduced alteration of the landscape.

Required financing:

The transition for tilapia is estimated to require a total amount of PEN 12 million (USD 3.5 million) undiscounted.[19]

Financial return in 30 years:

- Internal Return Rate: 107%;
- Current net value: PEN59.6 million ($18.2 million).

[19] By applying a discount rate of 5% to the non-discounted cash flowthis becomes PEN 10.7 million (USD3.2 million) dis counted. .

6. The transition in protected areas

A landscape level intervention must consider all key elements of that landscape. Conservation areas are critical components of the landscape in San Martín, so efforts to increase agricultural productivity must go hand in hand with conservation efforts.

Many protected areas currently have a basic level of management. Interventions aim to upgrade this, moving from an ability to mitigate basic, low-level threats (BAU scenario) to an ability to protect against all threats in the SEM scenario. In the SEM scenario, management strengthened so they can protect against all threats. This requires greater availability and diversity of financial resources, increased management skills, better planning and more effective enforcement. Together, these could lead to a total mitigation of the main anthropogenic issues threatening the integrity of protected areas.

By preserving the ecological functions of these areas, it is possible to ensure the continued supply of ecosystem services which will benefit economic activities and the welfare of the surrounding rural and urban populations, including the indigenous communities. It is estimated that the enhancement of four natural protected areas will require PEN174 million (USD53 million) undiscounted. This intervention will improve the management of 1,092,306 hectares of forest ecosystems in San Martín (Table 19). The project team is still working to define a mechanism to sustainably finance the conservation component of the transition.

Despite the importance of protected areas, current analyses carried out under the UFF project do not consider conservation as an activity generating a significant revenue flow. This intervention would therefore need finance from national and regional budgets, donor governments or a combination of both.

There is also potential to implement a scheme of payments for ecosystem services as part of the financial mechanism employed in the scheme. Such a model is in the design stages in San Martín. One idea is that urban and agricultural water users could help pay to preserve river basins which provide clean water.

Source: GORESAM

ANP	Level	Surface (ha)	Deforested area	% of loss
Alto Mayo Conservation Forest (BPAM=	National	177,749.84	5,059.53	2.85
Cordillera Azul National Park(PNCAZ) *	National	494,724.71	1,361.61	0.27
Río Abiseo National Park (PNRA)	National	272,002.29	1,548.09	0.57
Cordillera Escalera, Regional Conservation Area (ACR, CE)	Regional	147,829.79	1,971.09	1.33
Total		**1,092,306.63**	**9,940.32**	**0.91**

Table 18. Deforestation in protected areas in San Martín, 2001-2011

(*) PNCAZ comprises four Amazon departments of Peru that cover a surface of 1,353,190.85 hectares, out of which 494,724.71 hectares are located in the department of San Martín.

Natural protected areas	Existing government resources (PEN million)	Required operational costs (PEN million)	Financial gap (PEN million)	Existing government resources (USD millions)	Required operational costs (USD million)	Financial gap (USD million)
National Park Rio Abiseo	12.2	38.5	26.3	3.7	11.7	8.0
National Park Cordillera Azul	43.0	122.2	79.2	13.1	37.3	24.2
Regional Conservation Area Cordillera Escalera	14.2	44.2	30.0	4.3	13.5	9.2
Alto Mayo Protection Forest	48.0	86.8	38.8	14.7	26.5	11.8
Total	**117.4**	**291.7**	**174.3**	**35.8**	**89.0**	**53.2**

Table 19. Undiscounted capital requirements

7. The transition in sustainable livelihoods

Alongside work in productive supply chains and conservation, the transition to a sustainable landscape in San Martín is designed to safeguard indigenous peoples' livelihoods and basic conditions for development. This includes legal security for their forests and ancestral domains, food and nutrition security, the legal rights and land tenure to sustainably control and manage their resources, and the protection of the knowledge and traditions.

The plan aims to support 79 titled and untitled indigenous communities of the Kechwa, Awajun and Shawi ethnic groups to work towards a future in which their natural capital produces a greater income flow as well as profits and jobs without affecting that natural capital. Seven activities require financing (see Tables 21 and 22). The total capital required for these interventions, plus operational costs for the implementation over a five-year period, amounts to PEN 28.9 million (USD8.8 million).

These interventions will be facilitated by the eight indigenous organisations of the Regional Coordination Agency for the Indigenous Peoples of San Martín (CODEPISAM), whose main role will be to liaise with the authorities at different levels of GORESAM to ensure implementation. In addition, there will be support for land titling processes and the implementation of livelihood plans in the communities associated with CODEPISAM.

As in the case of conservation, this is a key intervention when we consider an investment plan at the landscape level. However, this is currently considered to be an intervention that does not generate a defined flow of income. This intervention would therefore need funding from government budgets or donor governments, or a mix of both.

Activity	Total cost PEN	Total cost USD
1. Design of community livelihood development plans	420,000	128,244
2. Food security module	1,425,640	435,310
3. Improved cooking facilities	425,718	129,990
4. Organisational capacity building and management of natural resources	3,321,000	1,014,046
5. Equipment, tools, materials and training in community forest surveillance.	1,113,600	340,031
6. Operational costs (communities with and without land title)	3,634,940	1,109,905
Total	10,340,898	3,157,526

Table 20. Investments for the sustainability of livelihoods of communities with land titles.

Activity	Total cost PEN	Total cost USD
Titling of new communities	640,000	195,420
Equipment, furniture and office material for land titling	382,000	116,641
Land registry into public registry office	5,501,000	1,679,695
Design of livelihood development plans	1,500,000	458,015
Implementation of livelihood development plans	8,641,250	2,638,550
Equipment for community forest surveillance	1,920,000	586,260
Total	18,584,250	5,674,580

Table 21. Investments for the sustainability of livelihoods of untitled communities.

8. The environmental impact of the transition

The aim of Ecosystem Service Assessment is to to estimate the potential value of the ecosystem services generated by implementing the transition (in terms of carbon sequestration, for example). These are designed to reduce the degradation of ecosystems, thus conserving the many services they provide. In San Martín, the transition plan devised by the project includes interventions to help farmers reduce the environmental impact of production processes. This section focuses on three supply chains with the greatest presence in the landscape, and therefore the greatest environmental impact: cocoa, coffee, and rice.

If the past deforestation rate is extrapolated into the future this gives the business-as-usual (BAU) scenario. It is then necessary to estimate how deforestation could be reduced with targeted interventions. The estimated result of these interventions is the sustainable ecological management (SEM) scenario.

The improvements in the transition plan are expected to have a direct positive impact on the environment, through avoided deforestation, that is, forest area in the initial land-use map which is converted in the BAU scenario and not converted in the SEM scenario. There are also indirect environmental impacts, through land-sparing, which is an overall reduction in the demand for land in the SEM scenario as compared to the BAU one, leading to reduced competition for the land-use. The maps below show the results of the landscape modelling.

The difference between land spared and avoided deforestation can be explained by landscape dynamics. Although the overall area of land needed for production may decrease, in some cases it will still be more advantageous for farmers to move into pristine forest areas. For this reason, estimating the real effect on deforestation is only possible by properly accounting for these dynamic changes in the landscape.

In order to describe these landscape dynamics, the model looks at the three aforementioned supply chains alongside several other large production activities affecting the landscape, such as palm, maize, beef, and diverse subsistence agriculture. Projections for these seven sectors in the year 2030 were carried out, for both a baseline scenario (BAU) and one in which the UFF transition plan is successfully implemented (SEM). Projections were based on a land-use map for 2012.

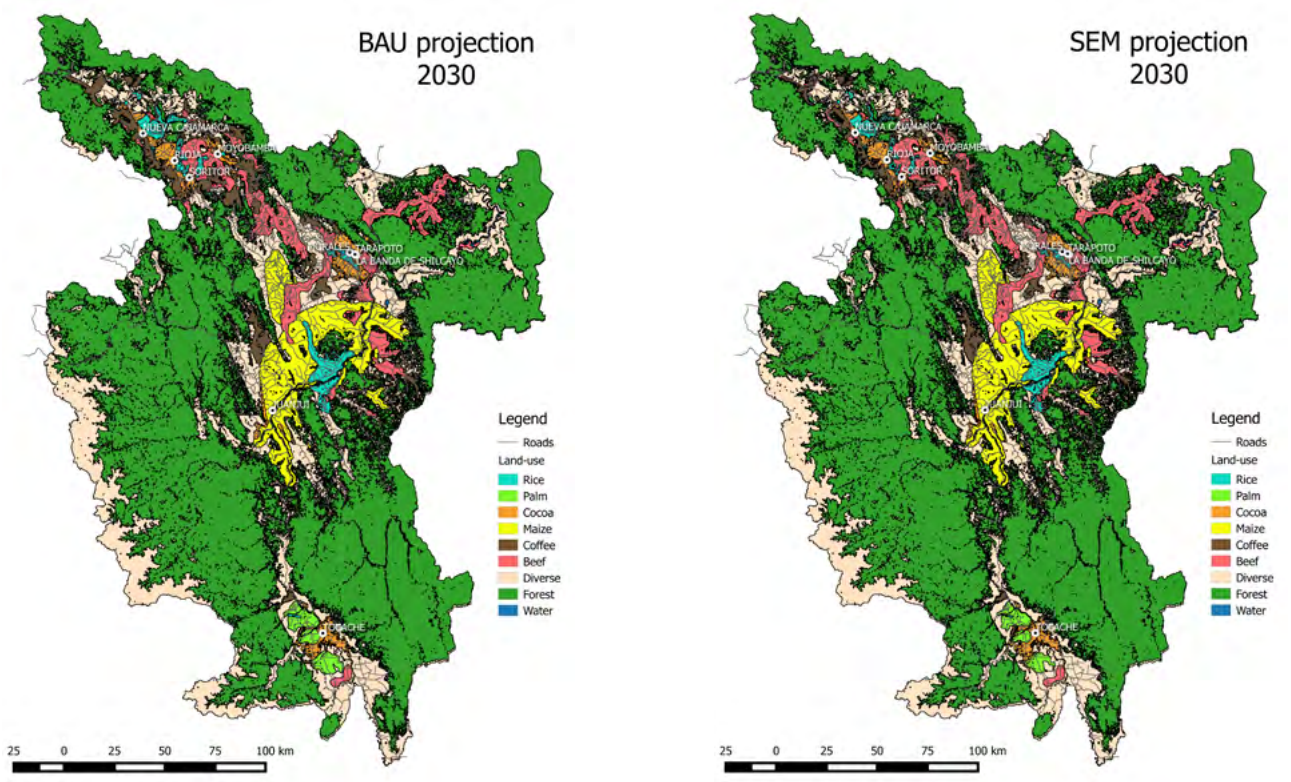

Figure 2: Land use projections without and with transition in San Martín

The maps above are results of the modelling of the landscape dynamics of the region, projected for the year 2030. Both "land-sparing" and "avoided deforestation" impacts are assessed by comparing these maps. Table 23 summarises the results for the three products included in the models.

It should be noted that is not possible to estimate the effect of single interventions in isolation. Because of the spatial dynamics of the competition for land-use, production areas can move in the landscape, causing, for example, indirect deforestation by displacing less competitive supply chains. These "landscape effects" can also cause a reduction in the direct avoided deforestation area, as compared to the land spared by a given product. This is because even if the specific sector frees up space by land-sparing, it can still have part of its production area displaced by a more competitive product and end up converting primary forest, reducing the overall area of avoided deforestation. For this reason, it is important to include all the productive activities of the region in a comprehensive analysis of the landscape. The environmental benefits of the project can only be properly reported as a whole, and only when connected to other landscape dynamics.

This explains an apparent disparity: the total production area in SEM is projected to be 18,965 ha smaller than in BAU, but the project is expected reduce deforestation by 15,500 ha, due to the aforementioned landscape dynamics. The figure below shows the modelled estimates of the most likely places where deforestation will occur from the baseline data through to 2030. Even though spared land contributes to diminishing the pressure for forest conversion, it doesn't necessarily correlate perfectly with actual avoided deforestation: only part of the area spared by one intervention is occupied by some other product, as producers may still prefer to expand into the forest instead of the area spared, leaving behind idle areas. This is confirmed by the model, which estimates the area of "other" land-uses would increase by 3,465 ha in the SEM scenario as

Product	Land spared	Avoided deforestation
Coffee	0 ha	4,300 ha
Rice	11,221 ha	3,040 ha
Cocoa	0 ha	600 ha
Overall production area (calculated for the above products and palm oil, beef, maize and subsistence agriculture).	18,965 ha	15,500 ha

Table 22. Spared land and avoided deforestation

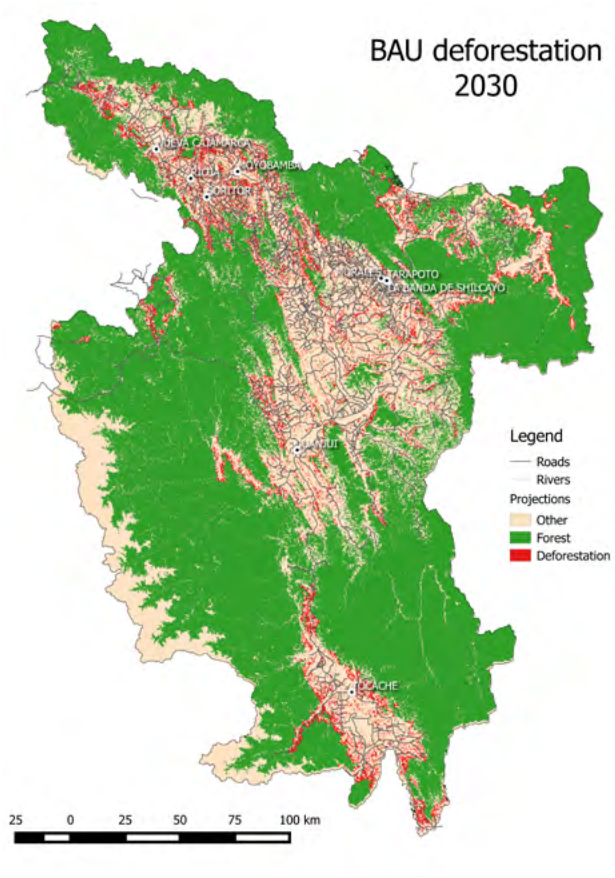

Figure 3. BAU deforestation in San Martín

compared to the BAU. This represents the land left behind by expanding sectors.

The total deforestation avoided in the SEM scenario represents an emissions saving of 1.3 million tonnes of CO2 equivalent (Mt CO2 eq.). In addition, successfully converting over 8,000 ha of current coffee plantations to an agroforestry production system will have sequestered an additional 0.7 Mt CO2 eq. by the year 2030.

The Land use, land use change and forestry (LULUCF) sector is the main source of emissions in Peru. The Unlocking Forest Finance portfolio of investments will therefore also contribute to the commitments made by the government of Peru in the intended Nationally Determined Contributions (iNDC) presented in Paris in 2015. The expected carbon savings of the UFF project alone make up 4% of the proposed national emission cuts of 47.7 Mt CO2 eq. in the LULUCF sector. Furthermore, transformational change of the agriculture and forestry sectors will contribute to the adaptation measures presented for San Martín as highlighted in the iNDC. The long-term sustainability of agricultural production in these sectors will help protect these sectors, their contributions to the economy and the most vulnerable groups in society.

To increase the positive impact of the transition plan devised by Unlocking Forest Finance, extra economic incentives, such as subsidies and tax credits, if available, should be linked to the same safeguards devised for the project. For maximum environmental impact, these should first target coffee and rice.

9. The financial mechanism for transition

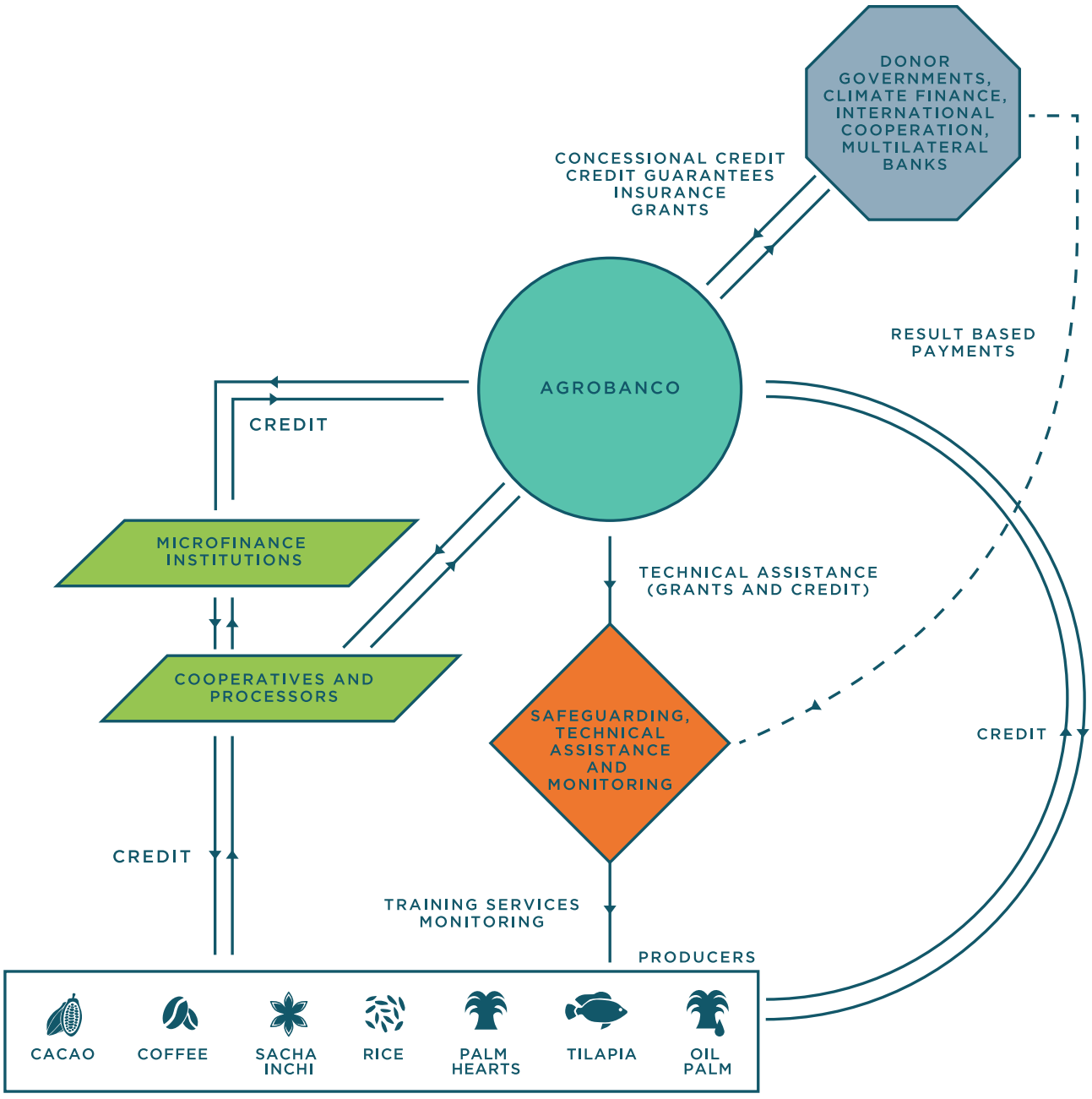

Figure 4. Structure of the proposed financial mechanism for San Martín.

The transition proposed by the project includes a combination of revenue generating and non-revenue generating activities. This combination has implications in terms of the blend of resources needed to fund these different interventions on the ground: some of them (i.e. sustainable agricultural interventions) can be largely funded through loans disbursed to farmers while some others (i.e. conservation and sustainable livelihoods) need grants or government resources.

The project created a proposed design for a financial mechanism to fund the transition to sustainable agricultural production. This was based on research on national, international, public and private financing sources for sustainable agriculture in Peru, as well as talks with stakeholders, consultations with international investors and assessment of the investment portfolio.

The financial mechanism seeks to combine public and/or private, national and international resources. It aims to channel investments to the portfolio and ultimately to the producers. It aims to bring together financing sources, financial intermediaries, non-financial intermediaries such as technical assistance suppliers, cooperatives and processing companies to direct the technical assistance and credits to the producers.

The structure of the mechanism, to be used in agricultural interventions, is shown in Figure 4.

The proposed model also includes finance from multilateral organisations, climate funds and donor governments. They can provide concessional credits, credit guarantees and weather insurance. These elements can reduce the risk for investors and, at the same time, reduce the interest rate offered to farmers. These institutional support mechanisms can also come in the form of results-based payments, which would be directly related to the impact of implementation on the ground.

The credit element of the framework will be tested through a pilot financed by Agrobanco. The bank will disburse credits directly to producers selected in collaboration with the project and who are interested in being part of the programme. The specific terms of the credit are still being defined.

10. Conclusions

Feasibility of the transition

- According to the feasibility analysis for the seven prioritised agricultural interventions, the transition period should be at least 5 years to achieve sustainable ecosystem management.
- According to the financial institutions consulted, the productive sectors with a high level of trade coordination and partnership represent a lower risk investment.
- Ideally, technical assistance should be reimbursable to be financially sustainable. However, at the start of any programme like this, farmers will need subsidies to start the process. For this reason, the technical assistance should be partially subsidised. Producers should pay for a smaller part, paying instalments. These should be covered by the additional income obtained as result of increased productivity.
- Farmers should be able to start paying for technical assistance from the third or fourth year of the transition, as productivity increases.
- The financial mechanism requires a coordinator. This should be an organisation able to coordinate the necessary infrastructure and the agricultural assistance and, at the same time, supply information and ongoing support to all the actors that take part.

Meeting regional production goals

- If fully financed, the Unlocking Forest Finance project would contribute to reaching regional goals to increase gross value of the production in seven agricultural supply chains, reduce deforestation, sequester carbon and create jobs.
- The value of agricultural production is estimated to increase by PEN 20.018 billion (USD 6.112 billion) over 30 years of the implementation of the UFF project, due to the increase in productivity and production volume in the seven agricultural products.

Mitigation and adaptation to climate change

- Overall, the project is expected to contribute to the sequestration of 2 million tonnes of CO_2 for the 2012-2030 period, helping Peru meet its climate change commitments.

Reducing deforestation

- The project aims to implement zero deforestation practices among producers signing up to the scheme. This element is incorporated in the safeguarding framework.
- The project will contribute to regional goals to reduce deforestation. Overall, the transition is expected to reduce deforestation by 15,500 ha.

Bibliography

Environmental Law and Natural Resources - DAR, 2016. A Forest of Money? Funding for Forests and Climate Change, Lima: DAR.

DEVIDA, 2013. An Alternative, Integral and Sustainable Development Programme. “PIRDAIS” 2012-2016, Lima: s.n.

Regional Government of San Martín -GORESAM, 2007. Concerted Plan for the Development of Departments 2008-2015, Moyobamba: GORESAM

Regional Government of San Martín -GORESAM, 2008. Strategic Sectoral Regional Agricultural Plan, Moyobamba: GORESAM

Regional Government of San Martín -GORESAM, 2011. Regional Agenda for Economic Development 2012-2014, Moyobamba: GORESAM

Regional Government of San Martín -GORESAM, 2012. Strategic Framework for the Development of Aquaculture in San Martín 2013, Moyobamba: GORESAM

Regional Government of San Martín -GORESAM, 2013. Diagnosis of Aquaculture in San Martín, Moyobamba:

GORESAM

Regional Government of San Martín -GORESAM, 2015. Concerted Development Plan as to 2021, Moyobamba:

GORESAM

National Institute of Statistics and Information Technology - INEI, 2016. Publications [On line] Available at: https://www.inei.gob.pe

[Latest access: 3 10 2016].

Peruvian Institute of Economy - IPE, 2016. Publications [On line] Available at: http://www.ipe.org.pe/ [Latest access: 15 09 2016].

Ministry for the Environment - MINAM, 2010. Second National Communication of Peru to the UN Framework Convention on Climate Change, Lima: MINAM.

Ministry of Environment - MINAM, 2014. Financial Instruments for the Preservation of the Forests in the Regional Amazon Governments, Lima: MINAM.

Ministry of Environment - MINAM, 2016. National Strategy for Forests and Climate Change, Lima: MINAM.

UN Office on Drugs and Crime – UNODC. The Alternative Development Model in the Region of San Martín, Lima: UNODC.

Appendix A: Acronyms

ACR: Área de Conservación Regional (Regional Conservation Area)

ACR CE: Áreas de Conservación Regional Cordillera Escalera (Cordillera Escalera Regional Conservation Areas)

ARA: Autoridad Regional Ambiental del GORESAM (Regional Environmental Authority of GORESAM)

ASC: Consejo de Administración de Acuicultura (Aquaculture Administration Council)

BAU: Business as usual

BID : IDB Banco Interamericano de Desarrollo (Inter-American Development Bank)

BMUD: Bundesministeriums für Umwelt, Naturschutz, Bau und Reaktorsicherheit (Ministry of Environment, Nature Protection and Nuclear Security of Germany)

BPAM: Bosque de Protección Alto Mayo (Alto Mayo Protected Forest)

CEDISA: Centro de Desarrollo e Investigación de la Selva Alta (Centre for Development and Research in the Upper Amazon)

CENAGRO: Censo Nacional Agropecuario. (National Agricultural Census)

CI: Conservation International

CIMA: Centro de Conservación, Investigación y Manejo de Áreas Naturales (Centre for the Preservation, Research and Management of Natural Areas)

CoC: Codes of Conduct

CODEPISAM: Coordinadora Regional de Pueblos Indígenas de San Martín (Regional Coordination Agency for the Indigenous Peoples of San Martín)
COFIDE: Corporación Financiera de Desarrollo (Financial Corporation for Development)

DEVIDA: Comisión Nacional para el Desarrollo y Vida sin drogas (National Commission for Development and a Life Free of Drugs)

DGEVPN: Dirección General de Evaluación, Valoración y Financiamiento del Patrimonio Natural. (National Directorate for the Assessment, Valuation and Funding of Natural Heritage)

DIREPRO: Dirección Regional de la Producción (Regional Directorate for Production)

DRASAM: Dirección Regional de Agricultura de San Martín (Regional Directorate of Agriculture of San Martín)

ENBCC: Estrategia Nacional de Bosques y Cambio Climático. (National Strategy for Forests and Climate Change)

ENCC: Estrategia Nacional de Cambio Climático. (National Strategy for Climate Change)

FEPIKRESAM: Federación Pueblos Indígenas Kechwa Región San Martín (Federation of Kechwa Indigenous Peoples of the San Martín Region)

FERIAM: Federación Regional Indígena Awajun del Alto Mayo (Regional Awajun Indigenous Federation of Alto Mayo)

FERISAM: Federación Regional Indígena Shawi San Martín (Regional Shawi Indigenous Federation of San Martín)

FONAM: Fondo Nacional del Ambiente (National Fund for the Environment)

FONDAM: Fondo de las Américas (Fund for the Americas)

FONDEPES: Fondo Nacional de Desarrollo Pesquero (National Fund for the Development of Fisheries)

GCP: Global Canopy Programme

GIZ: German Cooperation for Development

GRDE: Gerencia Regional de Desarrollo Económico del GORESAM (Regional Managing Organisation for the Economic Development of GORESAM)

GRDS: Gerencia Regional de Desarrollo Social del GORESAM (Regional Managing Organisation for the Social Development of GORESAM)

GORESAM: Gobierno Regional de San Martín (Regional Government of San Martín)

IIS: Instituto Internacional para la Sostenibilidad (International Institute for Sustainability)

IFM: Innovative Financial Mechanisms

IMF: instituciones de microfinanciamiento (Micro-financing Insitutions)

INEI: Instituto Nacional de Estadística e Informática (National Institute of Statistics and Information Technology)

INDC: Aporte a las contribuciones nacionales (Provisions to National Contributions)

INIA: Instituto Nacional de Innovación Agraria (National Institute for Agricultural Innovation)

MEF: Ministerio de Economía y Finanzas (Ministry of Economy and Finance)

MINAGRI: Ministerio de Agricultura (Ministry of Agriculture)

MINAM: Ministerio del Ambiente (Ministry of Environment)

ORDEPISAM: Oficina Regional de Desarrollo de Pueblos Indígenas de San Martín (Regional Office for the Development of the Indigenous Peoples of San Martín)

PNCAZ: Parque Nacional Cordillera Azul (Cordillera Azul National Park)

PNCB: Programa Nacional de Conservación de Bosques (National Programme for the Conservation of Forests)

PNRA: Parque Nacional Río Abiseo (Río Abiseo National Park)

PROFONANPE: Fondo de Promoción de las Áreas Naturales Protegidas del Peru (Peruvian Fund for the Promotion of Protected National Areas)

REDD+: Reducción de Emisiones de la Deforestación y de la Degradación de Bosque (Reduction of Emissions from Deforestation and Degradation of Forests)

SEM: Sustainable Ecosystem Managment

SENASA: Servicio Nacional de Sanidad Agraria (National Institute for Agricultural Health)

SERFOR: Servicio Nacional Forestal y de Fauna Silvestre (National Service for Forests and Wild Fauna)

SERNANP: Servicio Nacional de Áreas Naturales Protegidas (National Service for Protected Natural Areas)

SRC: Sistema Regional de Conservación (Regional Conservation System)

UFF: Unlocking Forest Finance

UNALM: Universidad Nacional Agraria La Molina (La Molina, National Agricultural University)

UNFCCC: UN Framework Convention on Climate Change

USAID: United States Agency for International Development

LULUCF: Land use, land use change and forestry

ZEE: Zonificación ecológica y económica (Economic and Ecologic Zonning)

ZOCRES: Zonas de Conservación y Recuperación de Ecosistemas (Zones for the Conservation and Recovery of ecosystems)

Appendix B: Glossary

Agroforestry Systems: This is a sustainable system to manage land that increases yield by combining the production of crops and forest plants and/or animals, simultaneously or consecutively, in the same plot of land. It also applies management practices which are compatible with the cultural practices of the local population.

Business as Usual (BAU): future scenario which looks at what would happen without proposed interventions. In many cases, business as usual practices degrade ecosystems and associated services because they profits in the short term without considering ecosystems or the externalised costs.

Code of conduct (CoC): a set of rules that govern corporate and business practices according to acceptable standards.

Ecosystem services: Like human-made capital - such as a power station that provides electricity, or a water treatment facility that improves water quality - natural capital provides a vital flow of ecosystem goods and services. Ecosystem goods and services are functions of an ecosystem that directly or indirectly benefit human wellbeing and play a vital role in livelihoods and economies from local to global scales. Examples of these services include water filtration, carbon sequestration and decomposition of waste. These services should be considered when valuing ecosystems.

Integrated pest management (IPM): In agriculture, integrated pest management or pest control translates into a strategy that employs a wide variety of supplementary methods: physical, mechanical, chemical, biological, genetic, legal and cultural to control pests.

Payment for Environmental Services (PES): This is a tool to make landowners or other users of the resources manage their land in a certain way, compatible with the environment. PES often aims to maintain or enhance forest cover, preserve soil and water, reduce greenhouse gas emissions, improve the elimination of waste or similar.

Resilience: According to FAO, resilience can be described as the "the ability to prevent disasters and crises as well as to anticipate, absorb, accommodate or recover from them in a timely, efficient and sustainable manner". A system is resilient when it becomes less vulnerable to the effects with the passing of time and is able to recover from them. To be resilient, systems should be able to adapt.

Sustainable Ecosystem Management (SEM): A concept used to refer to the management practices that preserve the ecosystems and associated services. This approach focuses on the long-term benefits and internalises the costs of environmental impacts. In this report, it is often used to describe a future scenario where proposed interventions are implemented.

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