

FINANCE STRATEGY FOR PRIORITY ACTIONS IN THE ALTO MAYO LANDSCAPE

A Proposal for Large-Scale Transition
Towards Sustainability



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1000 Landscapes for 1 Billion People (1000L) is a coalition of organizations united in a shared mission to advance local landscape efforts to sustain and restore ecosystems, build rural prosperity, confront climate change and contribute to the Sustainable Development Goals. Our goal is that by 2030, landscape partnerships will deliver sustainable solutions across 1000 landscapes for 1 billion people—aligning actions to meet global targets for addressing food and water insecurity, biodiversity loss, land degradation and climate change. 1000L is building the infrastructure to help landscape partnerships connect and ally with one another, strengthen their capacities and leadership, access digital data and tools for greater impact, and mobilize financing to scale landscape investment.

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Implemented by IUCN and UNEP, with funding from the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), the **Global EbA Fund** is a funding mechanism for catalytic, innovative, and inclusive projects that aim to create an enabling environment for the implementation of Ecosystem-based Adaptation (EbA) to enhance the resilience of vulnerable communities and ecosystems to the impacts of climate change. With the focus on EbA, a nature-based solution that harnesses biodiversity and ecosystem services to reduce vulnerability and build resilience of human communities to climate change, the Fund is strategically positioned to connect and contribute to the delivery of global agendas on the Climate Change – Biodiversity nexus.

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GLOSSARY

ABA	Amazon Business Alliance
AMPF	Alto Mayo Protected Forest
CAPEX	Capital Expenditures
CC	Conservation Concessions
CCRS	San Martín Climate Change Regional Strategy
DFI	Development Finance Institutions (from a single country)
EbA	Ecosystem based Adaptation
EUDR	European Union Deforestation Regulation
FFII	Forest Finance and Investment Incubator
Ha	Hectare(s)
IDB	Inter-American Development Bank
ILM	Integrated Landscape Management
LERDS	Low Emissions Rural Development Strategy (ERDRBE)
LFS	Landscape Finance Strategy
M	Million
MDBs	Multilateral Development Bank (with multiple member countries)
NGO	Non-Governmental Organization
NPV	Net Present Value
NTFPs	Non timber forest products
ODA	Official Development Assistance (from a national development authority)
OPEX	Operating Expenses
DPSPI	Directorate for the Promotion of Sustainable Private Investment (OPIPS)
PV	Present Value
REDD+	Reduced Emissions from Deforestation and Degradation +
RCCS	Regional Climate Change Strategy (ERCC)
TA	Technical Assistance
VCU	Verified Carbon Unit
WB	World Bank
ZOCRES	Areas Zoned for Conservation and Restoration

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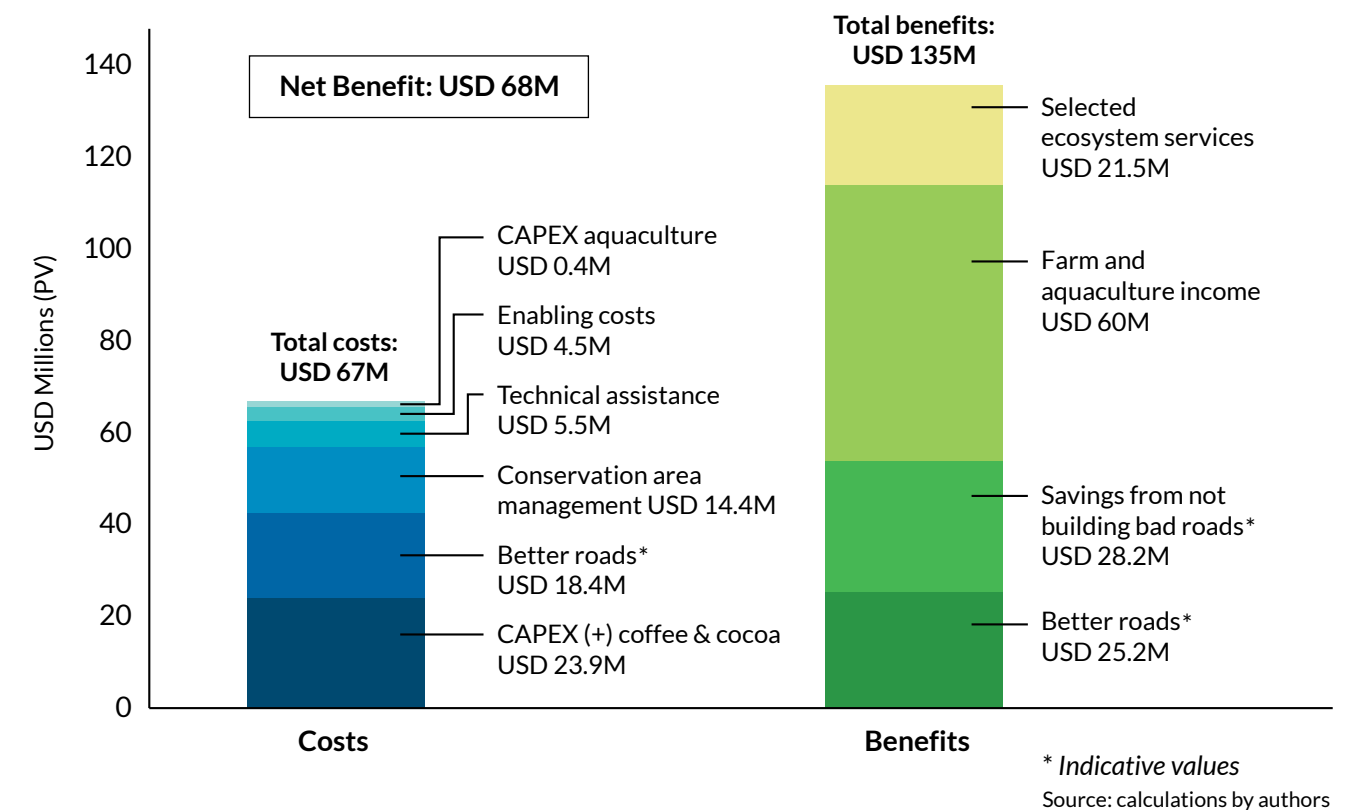
EXECUTIVE SUMMARY

The Peruvian Department of San Martín has chosen a low emissions rural development path to simultaneously promote economic wellbeing and preserve its natural resources. However, despite many successful projects in the region, economic pressures and lack of alternatives still incentivize most rural people towards clearing new land or using extractive practices to earn relatively low levels of income. As a result, despite good intentions and major efforts, land degradation is likely to continue without delivering significant livelihood improvements unless a way is found to amplify the current scope and approach to delivering transition programs and related funding.

This **Landscape Finance Strategy** aims to make a meaningful step towards addressing these challenges in the Alto Mayo landscape of San Martín. It targets several official low emissions development goals: improved agricultural production on more than 30,000 hectares, durable and effective management of 191,000 hectares of conservation area, and selectively prioritizing from among 340 km of total planned road improvements. For each priority, we assessed the costs and benefits of the planned transition to develop an integrated financial strategy. This approach seeks to build a business case for aligning diverse investments from regional and national governments, aid agencies, and other financing entities. If investments are secured, small farmers would benefit from support for transition at scale, key conservation areas would have stable finance, and roads would be improved only where there is demonstrable economic impact at the lowest levels of deforestation.

Our economic analysis projects that an investment of USD 67 million (PEN 249 million) could yield anticipated returns of USD 135 million (PEN 500 million) resulting in a net benefit of USD 68 million (PEN 251 million) in Net Present Value over 20 years at a 12% discount rate. Not considering road investments, for which our calculations are indicative rather than specific, the Internal Rate of Return of fully funding production and protection transitions is 32%.

BENEFITS AND COSTS OF LANDSCAPE TRANSITIONS (IN MILLIONS OF USD, PRESENT VALUES)



Despite these favorable potential returns, significant initial hurdles and risks must be overcome to attract capital at scale. By considering the specific transition activities and their risks during successive periods of time over 20 years, a continuum of differing capital needs becomes clearer. We use the **Capital Continuum** framework to map landscape-scale risks and prioritize mechanisms that leverage public and concessional finance to de-risk activities in early stages in order to foster economic resilience and help attract investor confidence to manage systemic risks over time.

To facilitate movement along the Capital Continuum and attract large-scale finance into an integrated set of landscape transitions over time, we adhere to the following principles:



- **Start with Existing Tools and Institutions**
Build upon and support existing processes and the current solutions and organizations already active in the landscape.
- **Evolve the Capital Stack over Time**
As risk declines and performance data accumulates, re-balance from philanthropic and public investments to private capital.
- **Match Technical and Institutional Interventions to the Right Capital and Risk Levels**
Align technical support, institution-building measures, and finance instruments to each stage of market development.
- **Outcome-Based Financial Products**
Create financial products tied to improved livelihoods for farmers, ensuring safety nets in the event of losses and more equitable sharing of risks from transition.
- **Public Sector and Philanthropy as Early Risk Taker**
Rely on development finance to provide initial risk assurance, using free or low-cost capital to transition over time to private insurance, debt and other market-based solutions.

The resulting strategy for initial capital mobilization and deployment is synthesized below. In this case we present values in real terms (i.e., not discounted) to provide clear information for investment, in which finance is raised in tranches over time rather than upfront. This approach shows costs and benefits that are significantly larger than those given in Present Values above, but the underlying numbers are the same.

Investment needs in real terms are **USD 152 million (PEN 564 million)**, starting at **USD 22 million (PEN 82 million)** for a **3-year Incubation stage**, peaking at **USD 48 million (PEN 178 million)** during Implementation, and then slowly scaling down as future initiatives and funding build off of the foundation created through this plan. The potential scope for development finance from government, philanthropy, voluntary carbon markets, official development assistance, development finance institutions, and development banks starts at 100%, and may then scale down to as little as 30% by year 16.

FINANCE REQUIREMENTS DISTRIBUTED ACROSS THE STAGES OF THE CAPITAL CONTINUUM (IN MILLIONS OF USD, REAL VALUES)

Type of Finance	Incubation (years 1 to 3)	Implementation (years 4 to 8)	Stabilization (years 9 to 15)	Maturity (years 16+)	USD (M)
Development Funding	100%	74%	42%	30%	
Government Programs	6	14	8	8	35
Philanthropy & ODA	7	4	4	3	17
Loans/Guarantees (DFI/MDB)	7	13	5	-	25
REDD+ Carbon	3	5	2	-	10
Private Capital	0%	26%	58%	70%	
Private Debt & Equity	-	13	22	19	53
Private Companies*					
Commercial Insurance	-	-	5	5	10
Public Debt & Equity	-	-	-	-	-
TOTAL	\$22	\$48	\$47	\$35	\$152

* Entities and amounts to be defined during Incubation ODA - Official Development Assistance DFI - Development Finance Institutions
MDB - Multilateral Development Bank REDD+ - Reduced Emissions from Deforestation and Degradation +

KEY STRATEGIES TO EVOLVE AND GROW THE CAPITAL STACK OVER TIME INCLUDE:

- 1. Stage appropriate finance types**, starting with grant and concessional funding and moving to private capital as projects mature and risks decrease. By strategically deploying public finance instruments and donor funds to early stage needs that reduce market friction, scalable solutions aim to attract private investors through appropriate risk adjusted returns while building ecosystem based adaptation and resilience across the landscape.
- 2. Improve technical information** to support protected area finance and road network planning, including ecosystem valuation and integrated road economic, environmental and social impact studies.

3. Scale-up and strengthen technical assistance and crop inputs, including increasing the number of technicians with concrete experience on the ground in San Martín, improving seed varieties, and where appropriate including provision of finance and value chain solutions into the role extensionists and technical support organizations play.

4. Innovative finance approaches, including insulating farmers from bearing the full risks of transitioning productive systems through risk sharing solutions, and the potential for new institutions and service providers to provide wrap-around farmer services and insurance.

Based on these assessments and ideas, this Landscape Finance Strategy presents a practical path forward to begin to mobilize sufficient and appropriate finance to address the urgent challenges of adaptation to climate change while ensuring local participation in shaping a sustainable future. Further, while every landscape is different, we hope that the approach will prove useful to other landscapes in devising finance strategies that address diverse conservation, production and connection needs for low-emission rural resilience and better outcomes for people and the planet.

This document is organized as follows: First, we present an overview of regional characteristics and the strong sustainability and participatory processes that mobilized the current detailed and spatially explicit Regional Low Emission Rural Development Strategy. We then present two key themes - the Green Halo and the Capital Continuum - that orient thinking to address systemic challenges. This is followed by an economic analysis of the costs and benefits of moving towards climate change-resilient agriculture in selected sectors, stable finance for conservation, and selective improvement of road infrastructure.

Based on these analyses, we put funding needs into the Capital Continuum and present a series of finance solutions to enable movement from initial grant dependent stages to accessing larger concessionary and commercial finance in the medium term. Finally the paper presents a 5-year strategy for initial implementation, including further analysis and development of ideas to improve the finance ecosystem, planning, partnership building, and engagement with potential funders of all types to effectively raise and deploy capital at scale across the landscape to generate equitable benefits from sustainable development.





1. JUSTIFICATION AND APPROACH

CONTEXT

San Martín is one of the most ecologically rich Departments (equivalent to a State or Province) in Peru (Larsen et al., 2024). Its ecosystems provide essential services such as water regulation, food, building materials, climate stability, erosion and flood control, and habitat for biodiversity. These are critical for human well-being locally, regionally, and globally, affecting climate and livelihoods for people in the Amazon basin and beyond. San Martín's ecosystems are also highly threatened by the expansion of road infrastructure, in-migration and land use changes from the expanding agricultural frontier for smallholder coffee and cocoa, large-scale rice and livestock production. As of 2020, the region was one of the most deforested in the Peruvian Amazon (MINAM, 2020).

The San Martín **Climate Change Regional Strategy** (CCRS), approved in 2021, identified extreme weather events, extreme temperatures, and changes in the hydrological cycle, as major social and economic threats facing the region. As a regional jurisdiction, the San Martín government has been working towards an alternative sustainable development path, with community, Non-Governmental Organizations (NGOs) and business allies. The CCRS outlines actions for **Ecosystem based Adaptation** (EbA) and mitigation, prioritizing conservation of key forest and freshwater ecosystems, and improvement of crop and livestock production, among other needs.

There are multiple convening bodies working on these issues in the Department including: various value-chain roundtables for major crops; Peru's only Directorate for the Promotion of Sustainable Private Investment (OPIPS for its acronym in Spanish); the Forest Finance and Investment Incubator (FFII) designed to generate concrete finance; and the Amazon Business Alliance (ABA), a public-private investment initiative launched in 2020 to promote environmentally sustainable business models and value chains.

In 2022, San Martín's regional Government adopted the **Low Emissions Rural Development Strategy** (LERDS) following a multi-year participatory development and planning process. The Strategy identified spatially explicit funding needs of USD 800 million over 5 years to transition the rural economy. It also included a preliminary identification of potential sources of finance, mostly government programs, development finance intermediaries (DFIs) and multilateral development banks (MDBs). The LERDS serves as a platform for actors in San Martín to coordinate their finance-generating activities. As of adoption, there was an estimated 85% gap in funding, highlighting the need for innovative funding at a large scale (GRSM, 2022b).

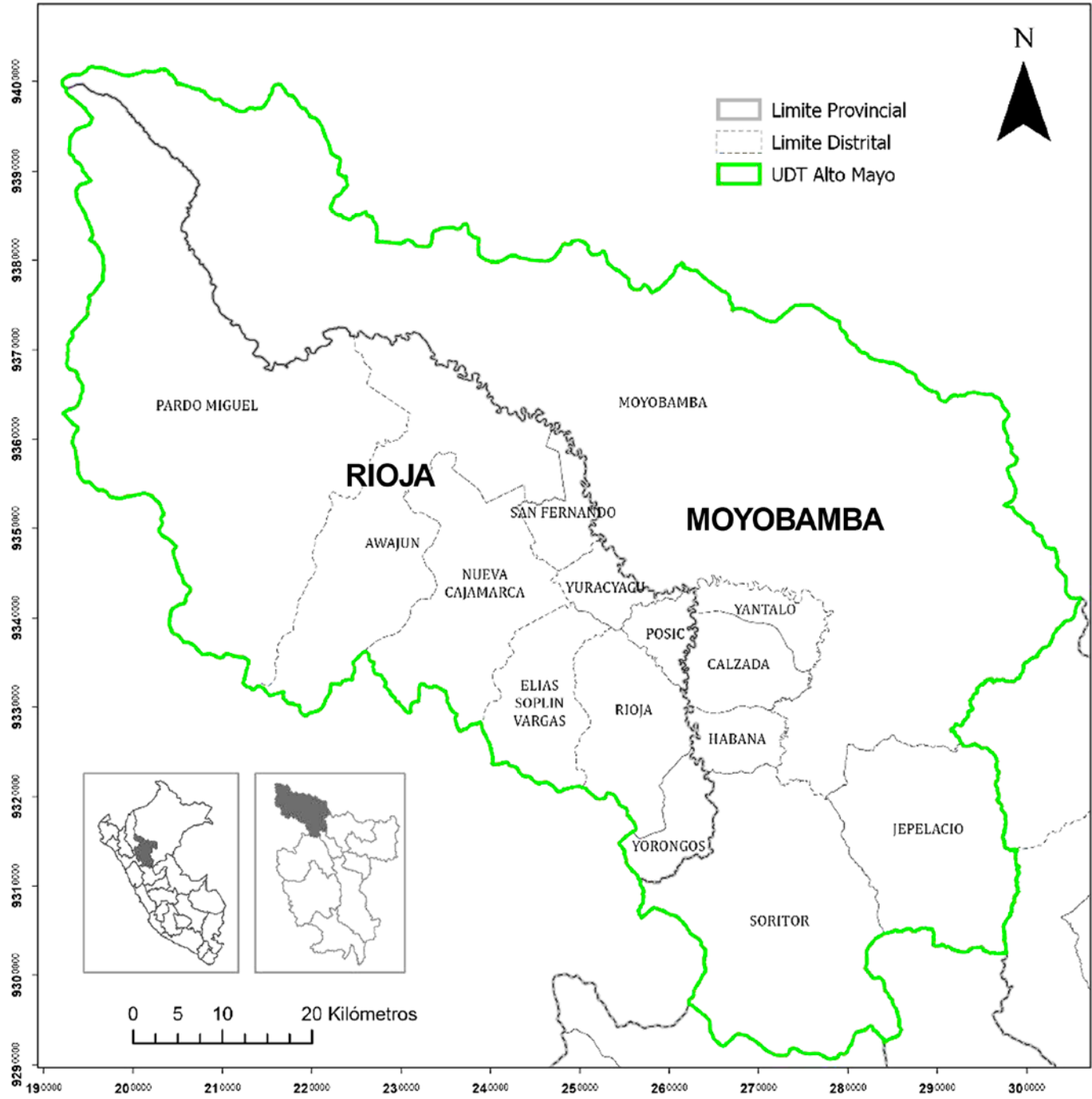
This combination of actors, initiatives and plans makes San Martín a mature context in which to develop a landscape finance strategy (LFS), based on a history of cross-sectoral coordination, action planning, restoration experience, monitoring indicators, financing information and multi-stakeholder engagement with an explicit landscape and territorial approach (GRSM, 2022a).

Within the broader San Martín LERDS, Alto Mayo is one of four territorial development units or landscapes (**Figure 1**). The landscape has nearly 300,000 people including the territory of 14 Awajún native communities. It hosts a rich diversity of flora and fauna including more than 400 bird species. The main conservation area, the Alto Mayo Protected Forest, is globally significant for its biodiversity, as well as its role in piloting carbon finance and conservation agreements to align protected area management and livelihood activities. Of the LERDS estimated funding needs for the entire Department of San Martín, approximately 20% is needed in the Alto Mayo landscape. As in the Department as a whole, financial needs in the Alto Mayo landscape are mostly unmet at the same proportion.



**THE LANDSCAPE HAS
NEARLY 300,000
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NATIVE COMMUNITIES**

FIGURE 1: BOUNDARIES OF THE ALTO MAYO LANDSCAPE



Source: San Martín Regional Government, 2022a

This LFS builds on the CCRS and the LERDS by adding analyses to design a concrete finance vision and roadmap for a priority set of transformations. We drew heavily from both documents and discussions with regional stakeholders to:

1. **Identify priority EbA actions** and analyze their economic impacts.
2. **Identify gaps and barriers** preventing the implementation and scaling of EbA actions.
3. **Design a framework for delivering landscape solutions** drawing from technical, institutional, policy, and financing needs.
4. **Build a process flow for implementation**, including completing additional needs analysis to validate assumptions and refine the work plan.



In this context, this landscape finance approach aims to add value to existing work through an economic analysis of a portfolio of EbA aligned actions integrated with risk reduction mechanisms, and by proposing and substantiating a financing approach that should increase the probability of generating the needed funding for transitions.

Given the breadth of themes to be covered in an integrated LFS, our analytical rigor varies across this scope of work. Overall, the most attention is given to productive sector solutions and compiling an integrated finance plan along the Capital Continuum.

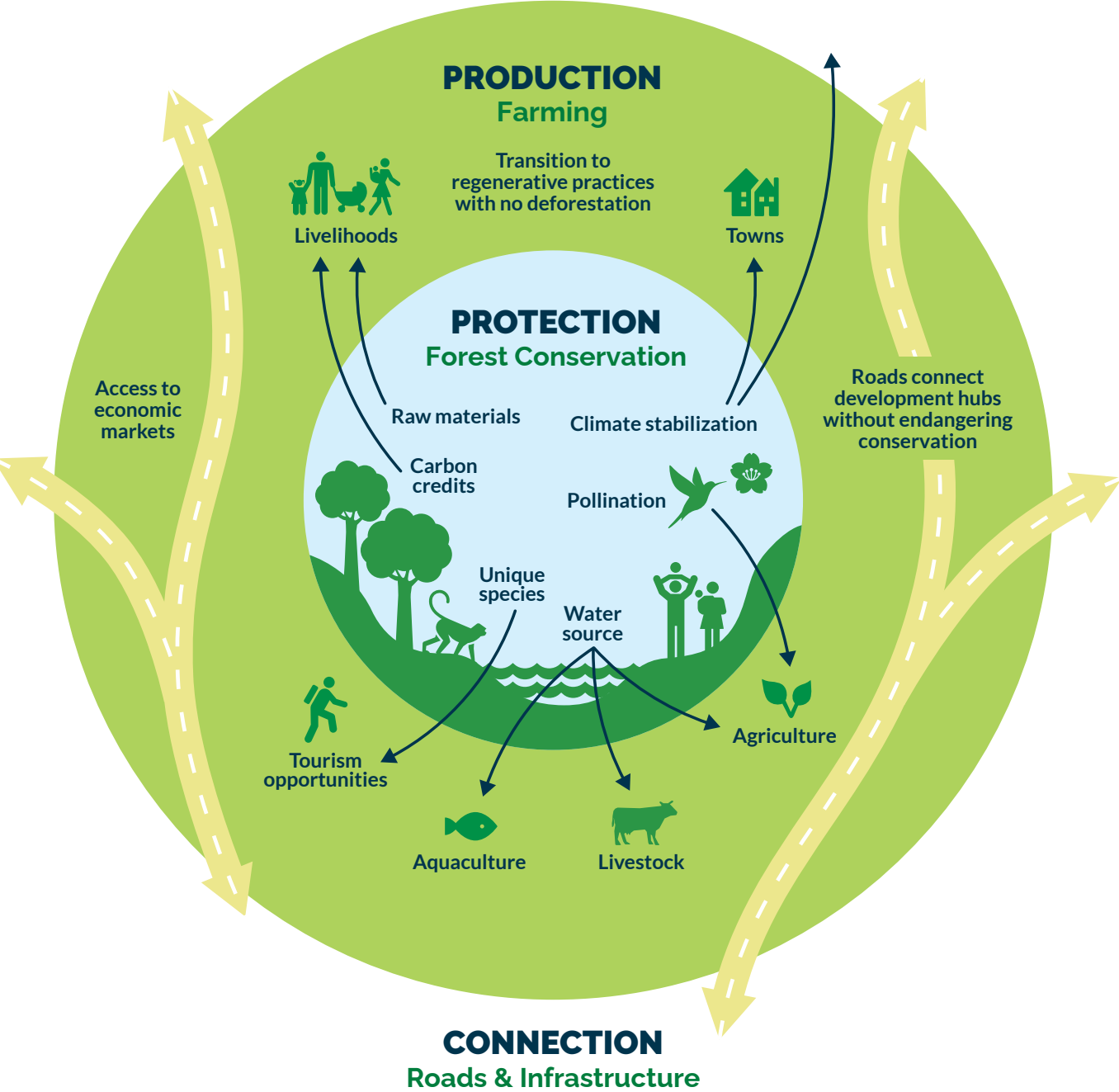
SPATIAL APPROACH: GREEN HALO

The vision and approach for the LFS presented here is anchored in two frameworks related to integrated landscape and systemic thinking.

The first is a “**Green Halo.**” Originally conceived to support management of coastal ecosystems, in the context of sustainable landscapes, the Green Halo refers to a mutually beneficial relationship between protected core areas and surrounding or interspersed crop production and urban areas. Core areas can be forests, wetlands, or habitat corridors. These core areas protect species and maintain ecosystem services that contribute to livelihoods directly and by supporting production in surrounding areas. Surrounding “halo” areas include farms, degraded lands, unprotected natural ecosystems, and towns or cities. These areas can provide ecological connectivity and function in synergy with core areas, enabling livelihood and conservation goals to advance together. Or they can threaten conservation areas and the services they provide to people. Roads play a key role in connecting places, and facilitate both beneficial and harmful flows between the parts of the halo, supporting development but also facilitating deforestation.

In the Alto Mayo landscape, the Green Halo is centered on the **Alto Mayo Protected Forest (AMPF)**. It radiates out through agricultural areas, pastures, conservation concessions, and mixed-tenure areas zoned for conservation (ZOCRES for the Spanish acronym). Interspersed in the landscape are deforested and more densely populated urban and industrial areas. Major agricultural activities include coffee, rice and cattle, with numerous other crops including cocoa and palm oil also present. An existing road through the AMPF has already facilitated significant migration and deforestation, with plans to widen and improve hundreds of kilometers of additional roads to support increased regional competitiveness and economic growth objectives.

FIGURE 2: GREEN HALO



Source: Adapted from Indonesia Blue Halo S Initiative by Konservasi Indonesia, 2024

The Green Halo concept targets approaches that benefit people and nature overall across the landscape. Rather than maximizing the benefits of one group or sector over the other, interactions between different land uses are emphasized.

In **protection areas** a narrow focus might call for strict protection and rangers keeping people out of protected areas. This approach can cause alienation, cut people off from nature, and generate long term hostility to conservation. As part of a Green Halo, core areas should instead be managed to provide multiple economic opportunities, including tourism and use of appropriate forest products inside their boundaries, pollination and cooler microclimates for nearby crops, erosion control and stabilization of water flows farther downstream, and maintenance of climate stability and unique biodiversity globally. Some of these values can generate monetary returns, including tourism and carbon payments. The majority are hard to monetize but can nonetheless be quantified and communicated to make them easier to take into account in economic decision-making.

In **production areas**, a narrow focus might call for maximizing short term profit, frequently moving to full sun production and high chemical inputs, or else a least cost approach leading to land clearing, degradation, and then abandonment. This approach can lead to an ongoing cycle of deforestation, pesticide and other toxic runoff, and conservation areas becoming increasingly isolated. As part of a Green Halo, agricultural transition towards agroforestry and diversified systems can reduce the need for deforestation and frequently enable improved farmer profits over the medium and longer. Improved access to finance as part of an integrated landscape may be used, as is proposed here, to reduce farmer risk and/or periods of reduced earning during transition.





In **connecting infrastructure**, a traditional focus might seek to maximize economic activity, or else simply respond to narrow political demands. Many roads in the Amazon are not good investments even on narrow financial grounds because they fail to generate net economic benefit after considering their cost to build and maintain, even without accounting for losses due to environmental damage.

Within a Green Halo framework, road networks can be designed to maximize economic benefit at the least environmental cost, including factoring in the physical impacts of climate change. This means prioritizing road locations that connect areas of economic activity or where access is a priority (in San Martín potentially the LERDS' development hubs) and avoiding roads near sensitive areas, as well as incorporating good social and environmental practices into design. While tradeoffs will remain, regional studies (Vilela et al., 2020) suggest that a small fraction of the proposed road improvement projects in a region can generate the majority of economic value with far less environmental cost than building everything.

In the context of the Alto Mayo landscape, we apply the Green Halo concept to group a select set of official targets from the LERDS:

1. **Protection**
2. **Production, and**
3. **Connection**

1 PROTECTION AND RESTORATION

Ensure durable conservation and restoration on 191,000 hectares, backed by reliable conservation funding, carbon credits, non-timber forest products (NTFPs), ecotourism revenues, and broader awareness of ecosystem service value. This target is a subset of the full area prioritized for improved conservation and restoration.



2 PRODUCTION

Promote sustainable practices across 33,000 hectares, impacting 18,000 farmers and several businesses with support for agroforestry, nutrient management, and productivity enhancements in coffee, cacao, and aquaculture. Again, this is a subset of total area under production in the prioritized crop.



3 CONNECTION AND ROAD INFRASTRUCTURE

Develop only a fraction of the 340 km of proposed road improvement projects, by only pursuing those that support the most regional economic activity with the least environmental degradation, and embedding ecosystem remediation. Based on regional evidence (Vilela et al., 2020), a placeholder value for the fraction of such roads is 40%, 135km.



For each of these spheres of activity, we analyzed current needs, technology, funding and institutional frameworks to deliver services and funding. We also assessed the potential financial benefits and costs of coordinated interventions in each activity. Addressing these activity spheres has the potential to create benefits for the major stakeholder groups in the LERDS, and directly relates to the concept of integrated landscape management (ILM) and finance (1000L, 2024).

The regional government would contribute to progress towards stated development goals, including increasing financial resilience for farmers, durable conservation, and strengthened EbA. Looking forward, by addressing deforestation and enhancing conservation and regenerative agriculture, San Martín would be better positioned to meet global commodity market trends, including compliance with the European Union Deforestation Regulation (EUDR). Beyond avoiding lost market access, there may be strategic opportunities to partner with global buyers who need to align with the EUDR requirements as allies in the creation of sustainable finance mechanisms. For instance, forward purchase agreements with small producers can be used as a guarantee to leverage provision of credit as a means to support further progress towards sustainable practices.

For small producers, the transition strategy shows potential for considerable income increases due to improvements in yield and price premiums associated with quality and market access. Coupled with conservation area management and a judicious road network expansion, this could help stabilize farming on currently cleared land, and help increase economic resilience for families, which in turn builds regional economic growth.

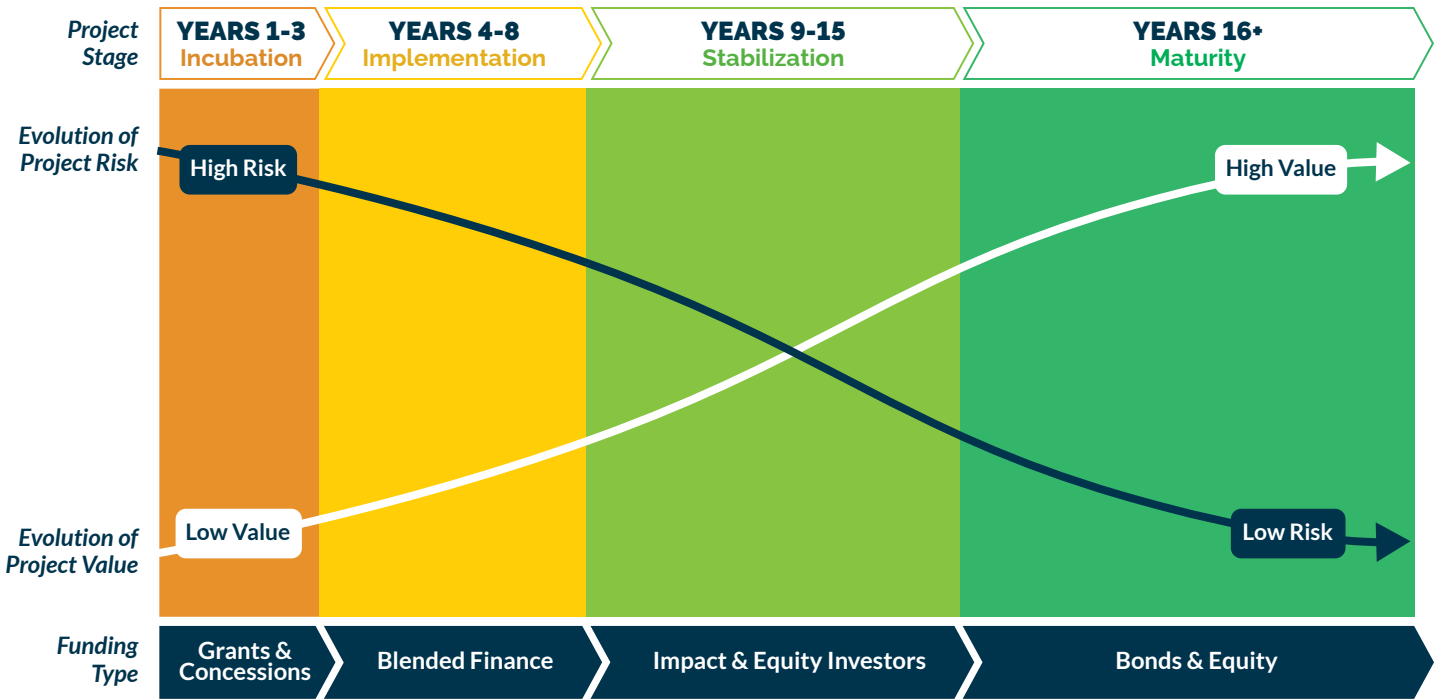
TEMPORAL APPROACH:
APPLYING THE CAPITAL CONTINUUM TO SCALE LANDSCAPE FINANCE

Addressing climate change at scale in the Alto Mayo landscape requires mobilizing significant amounts of capital to support sustainable land-use initiatives, climate-resilient agriculture, and ecosystem-based adaptation solutions. This in turn requires addressing barriers to landscape investment, including risk asymmetry, reluctance among smallholders to take loans given their risk exposure to market volatility, climate change and health, and the need for accessible technical assistance (TA). The Capital Continuum approach frames financing needs across an investment lifecycle, starting with concessional funding and moving to private capital as projects mature and risks decrease (CPIC, 2023). By strategically deploying public finance instruments and donor funds to early stage needs that reduce market friction, scalable solutions can attract private investors through appropriate risk adjusted returns while building ecosystem based adaptation and resilience across the landscape.

Understanding the Capital Continuum and Its Risk Drivers

The Capital Continuum framework helps explain how stewards of an LFS can evolve finance over time. At the outset, capital is scarce and risks are high: technical models are unproven, revenue streams uncertain, and enabling policies underdeveloped. Over time, as projects demonstrate results, build institutional capacity, and refine business models, risk diminishes and commercial value increases. This shift creates a more hospitable environment for institutional capital that prefers lower risk and more predictable returns.

FIGURE 3: STAGES OF THE CAPITAL CONTINUUM



Source: Capital Continuum

The early-stage capital gap in an agricultural landscape such as Alto Mayo is typically driven by some or all the following dynamics:

- **Fragmented Markets:** Multiple smallholders or microenterprises, each with unique needs and production cycles, create complexity and raise transaction costs.
- **Climate Uncertainty:** Volatility in weather patterns, pests, and disease introduce yield and revenue instability, putting return projections at risk.
- **Policy and Governance Instability:** Weak institutions, fluctuating regulations, overlapping mandates, perverse incentives and political turbulence deter long-term commitments.
- **Limited Track Records:** Without proven models or performance histories, investors lack confidence in new technologies, or business models.

These combined factors increase the perceived risk for investors, who are understandably reluctant to enter the market before these uncertainties are resolved. As a result, local producers and entrepreneurs—often already vulnerable to climate and market shocks—bear a disproportionate share of the risk burden for current and new economic activity.

De-Risking Through Targeted Blended Finance

To bridge this early-stage financing gap and scale up climate solutions, we need blended finance strategies. Blended finance combines public, philanthropic, and private capital in creative ways to lower risk and encourage commercial investment. By providing targeted support at the outset, these approaches help align incentives, build institutional and policy capacity, and incubate new business models.

Key strategies include:

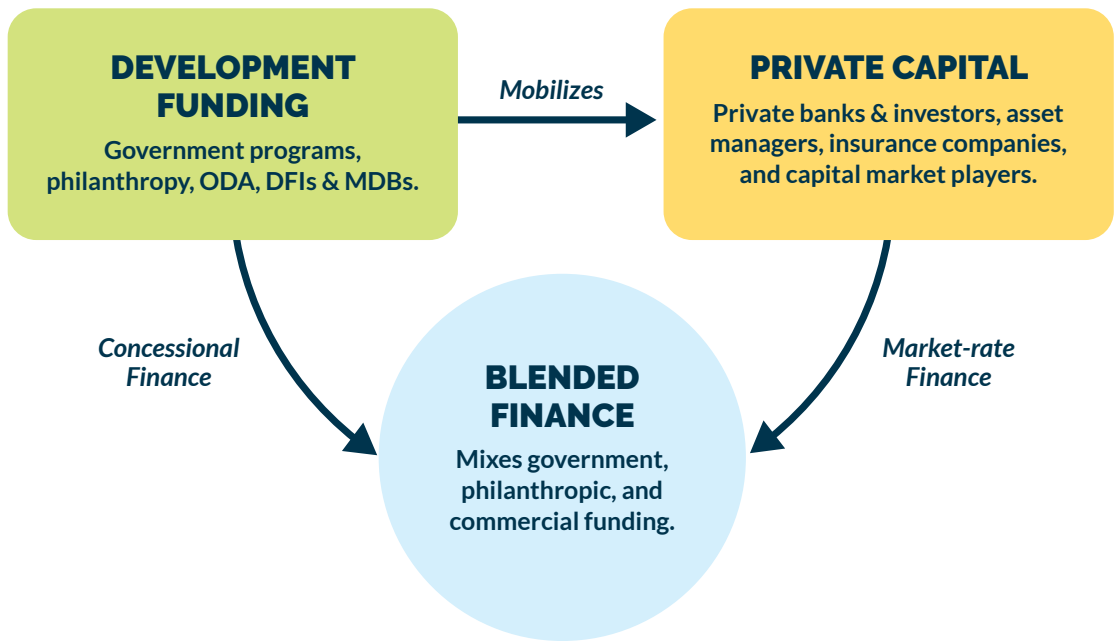


- 1. Technical Assistance and Capacity Building:**
Public and philanthropic funds can support training, knowledge and technology transfer, and data systems that help projects meet performance standards for later stage capital.
- 2. Institutional and Policy Strengthening:**
Early-stage spending on legal frameworks, enforceable land rights, and transparent permitting processes lay a stable foundation for future growth.
- 3. Risk-Mitigation Instruments:**
Instruments such as first-loss guarantees, political risk insurance, and climate insurance pools help shift or cushion the impact of volatility from farmers and small entrepreneurs onto a broader set of risk-tolerant investors.

These interventions, coordinated across a dispersed set of actors, can help make strategic use of even relatively small sums of flexible upfront capital to unlock larger pools of institutional funding over time. As risks decrease and projects demonstrate viable returns, the “capital stack”—or mix of grants, debt, equity and guarantees—can progressively shift from a reliance on concessional or public funds toward a more commercial structure.

The blended finance capital stack can be characterized by two key types of financial actors - development funding and private capital (Convergence, 2024, figure 4). **Development finance** includes public and government agencies in the region, Official Development Assistance (ODA) grants and TA, philanthropic grants, and concessionary loans and finance from Development Finance Institutions (DFIs) and Multilateral Development Banks (MDBs). **Private capital** includes private banks, asset managers, insurance companies and private company investors. Each of these types of investors are described under Participants in the Capital Stack section below.

FIGURE 4: BLENDED FINANCE SCHEMATIC



Source: Adapted from Convergence, 2024

Staging Capital Across the Continuum

The Capital Continuum framework clarifies how public and private investments interact over time to de-risk markets and scale solutions.

To effectively attract private and foreign capital into the Alto Mayo Landscape, the Government of San Martín must strategically leverage public funding to build market stability. This approach will help create the confidence needed for Development Finance and Private Capital to commit resources. The Capital Continuum provides a framework for transitioning through different stages of risk and capital involvement, gradually reducing reliance on public and philanthropic funds while scaling private investment.

STAGE 1: Incubation

The word “Incubation” here refers to the starting stage of the Capital Continuum process rather than the more common use describing the incubation of new businesses. This first stage focuses on early-stage innovation and development, primarily funded by grants and programmatic subsidies from philanthropy and government sources. At this stage, resources are used to design and incubate products or services that are not yet financially profitable and will likely require subsidies or incentives when launched or scaled. Public, philanthropic and ODA funding is critical at this stage, as private capital is unlikely to invest due to high uncertainty and unproven business models. Nonetheless, it is important to begin dialogue with businesses in relevant value chains to ensure their input, as they will play a key role in later stages.

This stage lays the groundwork for future investment by testing concepts, creating prototypes, and identifying solutions that can transition to the next stage. Without sufficient support during Incubation, promising ideas may fail before they are able to prove their value.

STAGE 2: Implementation

During the Implementation stage, products and services undergo small-scale rollout, and funding is still highly dependent on subsidies and incentives. These subsidies, provided by governments, DFIs, philanthropies, or impact funds, help reduce costs and risks for early adopters. At this stage, some private capital may begin to enter, both through the market and companies, although typically only as a minor component of the overall capital stack. Carbon sequestration transactions in the voluntary market also start as of this stage and can play a key role in generation of monetary income from conservation areas.

A key milestone in this stage is the establishment of a provable business model. Metrics for graduation from Stage 2 might include a growing base of adopters, demonstrated performance, or high confidence in projected cash flows. This stage matters because it begins to demonstrate market demand, which is essential for attracting larger-scale private investment. A common metric for readiness to move to the next stage and attract more private capital is the ability to offer returns that are at least twice the invested capital or appropriately adjusted for the associated risks.

**WITHOUT SUFFICIENT
SUPPORT DURING
INCUBATION, PROMISING
IDEAS MAY FAIL BEFORE
THEY ARE ABLE TO
PROVE THEIR VALUE**



STAGE 3: Stabilization

As the market matures, private capital begins to play a more significant role. This stage is marked by increased participation from private investors through debt, equity, or private sector credit enhancements such as insurance or guarantees. Companies also begin to contribute significant resources through direct investments and enabling mechanisms such as forward purchase agreements. Programmatic subsidies may still be necessary to make financing rates achievable for target borrowers, but their share of the capital stack begins to decline. For example, in Stage 2, public subsidies might have funded 70% of costs while private capital contributed 30%. In Stage 3, these proportions might reverse, with private capital covering 70% and public funding reduced to 30% or less.

The Stabilization stage signals growing confidence in the program's viability, demonstrating that risks are manageable and that private investment can scale with reduced reliance on public resources.

STAGE 4: Maturity

In the final stage, programs achieve mainstream acceptance, and risks are clearly understood. At this point, capital markets and commercial insurance solutions can be leveraged to access large-scale, low-cost financing through securitization, bond offerings, or public listings. Governments, banks, and financial intermediaries play a key role, using these instruments to scale up successful programs and successful products, significantly expanding their reach. While private markets can represent the majority of funding, it is expected that government programs still have a critical role to play through policy aligned funding for climate related incentives such as tax-credits, interest rate floors and sovereign guarantees that provide assurances to private capital providers.

Success at this stage depends on the program's ability to demonstrate a solid track record over at least 3-5 years, with clear data on portfolio performance, default rates, and risk metrics. This stage matters because it enables access to large pools of capital at reduced costs, contributing to the sustainability and growth of initiatives over the long term.

An aerial photograph of a vast, lush green mountain valley. A winding river flows through the center of the valley, surrounded by dense tropical forest. The mountainsides are steep and covered in thick vegetation. In the distance, more mountain ranges are visible under a clear sky.

STAGE FOUR MATTERS BECAUSE IT ENABLES ACCESS TO LARGE POOLS OF CAPITAL AT REDUCED COSTS, CONTRIBUTING TO THE SUSTAINABILITY AND GROWTH OF INITIATIVES OVER THE LONG TERM

TABLE 1: GENERIC MAPPING OF THE FINANCE TYPE TO THE STAGES OF THE CAPITAL CONTINUUM

Type of Finance	Incubation (years 1 to 3)	Implementation (years 4 to 8)	Stabilization (years 9 to 15)	Maturity (years 16+)
Development Funding	100%	70%	30%	15%
Private Capital	0%	30%	70%	85%
TOTAL	100%	100%	100%	100%

POTENTIAL PARTICIPANTS IN THE CAPITAL STACK

Below is an overview of the various funding entities and their potential roles in providing capital for landscape and conservation investments. Following Convergence (2025), These participants are broadly categorized into Development Funding (below-market terms) and Private Capital (market-rate financing terms) providers.

Development Funding

Development Funding encompasses funding that provides programmatic grants or loans and expects below-market returns because it derives value from social or environmental outcomes rather than purely financial returns. Key participants include:

Government Programs

- Utilize a broad range of instruments with significant potential for innovation, including direct grants, policy-aligned subsidies and incentives, tax credits, credit guarantees, and public-service investments (e.g., roads, utilities).
- Align investment priorities with public policy goals, leveraging budgets to drive economic growth and sustainable development.

Philanthropy

- Generally private foundations or donors offering non-repayable grants, although they may also provide recoverable grants (principal only) and forgivable loans (interest and/or principal may be waived depending on specific performance outcomes).
- Motivated by impact objectives such as environmental conservation, community development, or sustainable livelihoods.

ODA

- Provide a range of non-return seeking technical and financial support for environmental, social and economic priorities.

DFIs and MDBs

- Offer both market-rate and concessionary loans to governments and non-governmental entities, alongside sovereign and development risk insurance, guarantees, equity-like products, and some catalytic grants.
- Focus on projects that support sustainable development, poverty reduction, and environmental resilience, often working in partnership with local and international stakeholders.

Voluntary carbon markets

- Large-scale transactions are possible via sale of Verified Carbon Units (VCUs) or other means of quantifying impact. Until carbon sequestration transactions are formally integrated into financial markets, these transactions can be considered in the space of development finance.

Private Capital

Commercial capital operates at market rates, seeking risk-adjusted financial returns. Participants often blend their investments with public or philanthropic funds to distribute risk more effectively. Key participants include:





Local and Regional Banks and Investors

- Provide debt or equity financing and typically have a strong understanding of local markets and borrower risk profiles.
- May offer fewer specialized products but can amplify government subsidies or guarantees to spur greater commercial lending.

International Asset Managers and Dedicated Funds

- Invest in projects related to regenerative agriculture, nature-based solutions, and sustainable infrastructure, aiming for measurable high-integrity impact alongside financial returns.
- Look for well-structured opportunities with transparent risk profiles and robust reporting mechanisms.

Companies

- Includes businesses and intermediaries at multiple steps in relevant value chains, including purchase, processing, storage, transport and commercialization of primary products for local, regional and international markets.
- Invest in the sustainability of their supply chains, including through regenerative production approaches, support for producers' associations, and future purchase contracts. These contracts can not only strengthen relationships with producers, but also facilitate access to finance from other sources by increasing confidence and visibility into income streams.

Insurance Companies

- Collaborate with government and private stakeholders to develop climate-focused or tailored insurance products (e.g., coral reef insurance).
- Often rely on partial public or philanthropic support to build first-loss reserves, thereby making climate-resilient investments more attractive to larger pools of private capital.

Capital Markets Players

- Include investors in publicly traded instruments, such as green bonds (issued by governments or private entities) and public equities (e.g., supply-chain companies in sustainable sectors).
- Enter the market in later stages, once projects have matured, cash flows are more predictable, and investment risks are relatively well-understood.

An emerging group of capital market players are **Green Banks**, which are rapidly increasing their presence in the US and globally with support from the Green Climate Fund. Green Banks can be for-profit or not-for-profit, they can be purely commercial, or they can be entirely focused on deploying catalytic concessionary capital to support private capital. Their role is to catalyze capital into environmental or climate related projects and investments that are not currently attracting funding from private sources. Green Banks may be an important future actor in any LFS for their ability to act at the national, regional, or city scale, and their unique ability to raise both public and private sector capital to deploy into EbA and broader climate transition activities.



**DEVELOPMENT FUNDING
DERIVES VALUE FROM
SOCIAL OR ENVIRONMENTAL
OUTCOMES RATHER THAN
PURELY FINANCIAL RETURNS**



2. ECONOMIC OPPORTUNITY BY SECTOR

This section details economic analyses carried out to quantify costs and benefits of the identified set of landscape changes.

CONSERVATION AREAS

The financing needs and strategy for conservation areas within this LFS focus on maintaining and enhancing ecosystem services, protecting biodiversity, and supporting sustainable land use practices. Costs and needs are taken from the LERDS (GRSM, 2022b). We add a preliminary estimate of benefits from ecosystem services.

The three types of conservation area included are:

- **Alto Mayo Protected Forest.** This is a 182,000 ha National Protected Area that benefits from State funding, a REDD+ carbon project in operation since 2009, and civil society conservation activities. Income from REDD+ carbon will continue into the future but at reduced levels. The Alto Mayo Protection Forest needs stable and sufficient finance to continue to deliver conservation benefits. Activities to be supported include: salaries and equipment for staff involved in monitoring and community engagement, active ecosystem management, maintenance of management infrastructure, and conservation agreements.
- **Conservation Concessions.** In Peru, Conservation Concessions (CCs) are a legal mechanism through which the State grants a private or community entity the right of exclusivity to a particular area, to carry out a range of potential activities in harmony with environmental protection goals. In the Alto Mayo landscape, four CCs cover slightly over 9,000 ha. Activities include tourism and protection. All require innovative financial solutions to guarantee their sustainability.
- **Zones for ecosystem conservation and recuperation (ZOCRES).** In San Martín, this zoning refers to areas designated to develop models for restoration and sustainable management, including through assisted natural reforestation and agroforestry. ZOCRES cover a significant area of 141,000 ha. Although they are important both in terms of coverage and for political objectives, tenure and other challenges are likely to make progress towards sustainable finance difficult. We nonetheless include the cost of managing them as reported in the LERDS, as covering these costs would be a significant advance even if not a scalable solution for all ZOCRE areas nor an integrated solution for large-scale restoration.

Costs and Benefits

Long-term management costs for all three categories of conservation area requires an estimated USD 14.4 million (S/53 million) over a 20-year period (Present Value), or about USD 1.7 million (S/6.4 million) per year. The largest share of these costs (87%) is for management of the AMPF, at USD 1.5 million (S/5.6 million) per year (**Table 2**).

TABLE 2: CONSERVATION AREA COSTS

Conservation Area	Coverage (ha)	Annual Cost (USD)	Annual Cost (PEN)
Alto Mayo Protected Forest (AMPF)	182,000	1,500,000	5,600,000
Conservation Concessions (CCs)	9,086	150,000	556,000
Zones for ecosystem conservation and recuperation (ZOCRES)	140,921	70,000	258,000
TOTAL	332,007	1,720,000	6,370,000

Source: San Martín Regional Government, 2022 (for CCs and Zocres), B. Andrade pers. comm. 1/22/2025 (for AMPF)



We estimate ecosystem service values for the Alto Mayo Protected Forest only, excluding conservation concessions because we lack the necessary data on avoided deforestation (explained below), and ZOCRES because the costs included are not expected to be sufficient to deliver concrete results in terms of avoided deforestation or restoration at scale.

Ecosystem service valuation first requires a change scenario to understand how much forest would be lost without investment. For this purpose, we use calculations carried out in compliance with the Verified Carbon Standard (Verra, 2018). These calculations found that between 2008 and 2020, AMPF prevented the deforestation of 19,538 hectares (ha), equivalent to 1,628 ha per year. These hectares would have been cleared in absence of the AMPF and multiple types of work to ensure its effective management. We assume that this rate of reduced deforestation can be maintained into the future as long as financial needs for management of the AMPF are met.

To estimate the value of the multiple ecosystem services preserved by this action (specifically, avoided loss of ecosystem services), we use per hectare average values reported in Brander et al., (2024). This approach is common but leaves room for improvement - when extrapolating from other studies it is best to use value functions that account for varying conditions and increasing value with scarcity. To be conservative, we exclude values that have been monetized already (climate regulation via a REDD+ carbon agreement), which we expect are not likely to be monetized (genetic resources), or for which we expect a low loss of value to result from a relatively small reduction in forest area (existence and bequest values). These values make up more than 80% of the per hectare total, so our estimate should be seen as conservative.

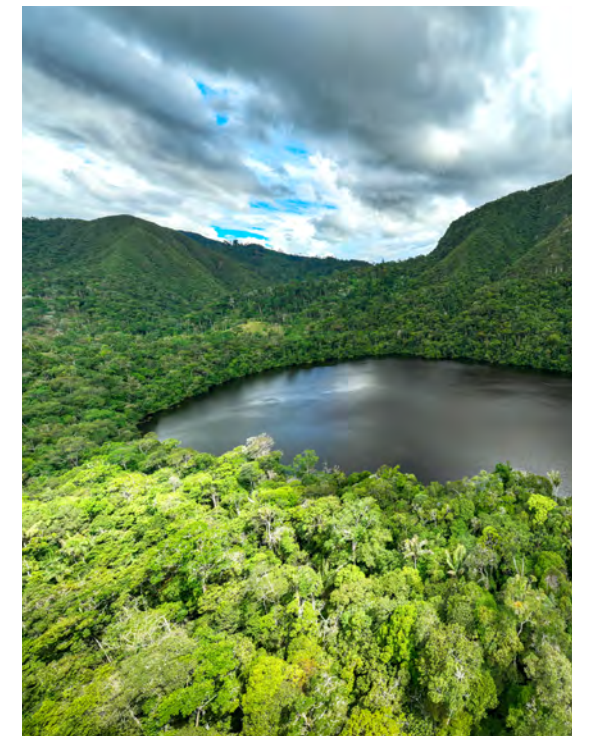
The resulting value is USD 1,115 (S/4,100) per ha per year). Multiplying, adequate investment in management of the AMPF would generate USD 1.8 million (S/6.8 million) per year. On top of this, future carbon agreements (i.e., carbon value not yet transacted) in the AMPF might generate an estimated USD 1 million (S/3.7 million) per year for at least 10 more years (B. Andrade, Pers. Comm 1/22/2025).

As a net value (ecosystem service benefits minus management costs) for the group of conservation areas as a whole, there is a net annual benefit of USD 1.1 million (S/4.1 million) until carbon payments stop. Afterwards, net benefits are USD 96,000 (S/355,000). This calculation does not include ecosystem services from CCs. Finally, we note that estimating benefits “at the margin” - i.e., estimating only the value of avoided loss as we do here is methodologically correct, many valuations instead quantify the standing “stock” of ecosystem services provided by an area, which gives much higher values. Done that way, the AMPF has a value of approximately USD 200 million (PEN 725 million) per year.

Implications for Finance

In the Alto Mayo Protected Forest, carbon credits and entrance fees can generate some revenue for protection, especially while carbon credit sales continue. However, these sources are insufficient to cover total financial needs. This is because eco-tourism infrastructure is still limited, and the existing REDD+ project has already monetized much of the carbon credit value with revenues supporting existing management programs. Recognizing the ongoing public benefits provided by conservation areas, government funding, international cooperation, and private collaboration will all have important roles in ensuring financial sustainability. In-depth assessment of the best division amongst these sources, as well as the potential for entrance or other fees is beyond the scope of this analysis.

In Conservation Concessions, very few concessionaires in San Martín have been able to fully fund the cost of effectively managing their concessions. Again, deeper analysis is beyond the scope here, but continuing to support the use of this mechanism is an important means to bring diverse funding and management effort to bear. As noted, we do not assess ZOCRE finance beyond including the initial cost to support them from the LERDS.



BETWEEN 2008 AND 2020, AMPF PREVENTED THE DEFORESTATION OF 19,538 HECTARES (HA), EQUIVALENT TO 1,628 HA PER YEAR

PRODUCTIVE SECTORS

The productive sectors in the Alto Mayo landscape encompass a range of activities, with a primary focus on staple commercial crops such as rice and coffee, livestock production in the form of cattle, and expanding to other ventures like aquaculture, cocoa, non-timber forest product (NTFP) management (e.g., vanilla and medicinal plants), and eco-tourism initiatives. These activities form the backbone of the region’s economy, supporting smallholder farmers while contributing to the broader economic health of the San Martín region.

The focus of much of the analytical effort for this report is on the productive sectors. Accordingly, this section provides more detail about challenges and needs than the previous section on conservation areas.

We focus here on coffee, cocoa and aquaculture. These were selected by assessing which sectors a) best combine significant current and future economic scope, b) offer the greatest potential for EbA, c) were prioritized by stakeholders for inclusion, and d) for which data was available.¹ This prioritization and the initial economic analysis were carried out by Deuman (2024b and 2024c).

The production model for cocoa and coffee is based on agroforestry systems that generate additional income from sale of plantain in initial years and timber at the end of the 20-year cycle. As a simplification for analytical purposes, although all productive transitions considered take place on already cleared areas, we model the production system as starting with new plantings. Technical details on the specifics of the agroforestry systems, modeling approach, and initial parameters are described in Deuman (2024c).

Results should be interpreted as broadly representative of a transition from production approaches with limited management to more resilient agroforestry systems. In practice, there are numerous agroforestry production approaches as well as physical and economic conditions that will affect costs and returns on each farm. The present analysis does not seek to address this complexity or recommend specific agroforestry systems. To enable investments over time, the LFS includes enabling investment in generating more precise data via impact evaluation implemented during the Incubation and Implementation stages. These data would permit refinement of the economic models here and development of investment strategies aligned to the variation in real observed conditions.

¹ Given that aquaculture currently occupies a comparatively small physical space, a full description of modeling is beyond the scope here, but given success of current operations in making use of multiple EbA practices in addition to business approach shifts, we include the sector in our calculations as illustrative of business models that might be supported in emerging sectors.



THE AVAILABILITY OF
HIGH QUALITY AND
CLIMATE-RESILIENT SEED
GENETICS FOR COFFEE,
CACAO, AND NATIVE
TREES IS INADEQUATE

Challenges Facing the Productive Sector

Small farmers in the Alto Mayo landscape face a series of interconnected challenges that make it less appealing and/or possible for them to transition towards regenerative and EbA practices despite potential benefits from improved productivity and income. Challenges include:

- 1. Technical and Resource Constraints**
The availability of high quality and climate-resilient seed genetics for coffee, cacao, and native trees is inadequate. Current seed varieties are mostly not optimized for the region’s changing climate, leaving farmers with a risky decision about whether to invest in them. Further, once suitable seed varieties are identified through testing, large-scale, reliable and trustworthy seedling nurseries and businesses must be developed to meet farmer demand.
- 2. Limited Access to Technical Assistance**
The region lacks a sufficient number of extension professionals with in-region, on-the-ground expertise in locally effective agroforestry and agricultural transitions. Further, current extension services beyond those offered by San Martín Regional Directorate for Agriculture are predominantly grant-funded, which limits their scalability, or funded through rural associations and cooperatives, which can limit the scope of solutions they provide.

3. Financial Barriers During Transition

Farmers face substantial financial challenges during the transition to regenerative farming, including likely temporary reductions in productivity, revenue and profitability. Without targeted financial support, few farmers can afford the upfront costs of the transition or will likely be willing to absorb the risks associated with short-term losses and increased effort for unknown outcomes. Moreover, the possibility of crop failure, weather volatility, health emergencies, or other household crises (these are “insurable risks”, suggesting a solution that we describe later on) make loans a risky option.

4. Market and Value Chain Challenges

Many small producers sell their crops at lower farm-gate commodity-level prices, often to intermediaries who visit their farms, avoiding the complexity of transporting crops to market or investing in value-addition activities, such as fermentation. This prevents them from accessing higher prices for higher quality products through cooperatives associations, or higher end-buyer relationships. This issue may become even more noteworthy as EUDR compliance requirements demanding increased traceability and sustainability come into force. Further, the lack of coordinated services and a disaggregated value chain make it difficult to fund small producers effectively and efficiently.

5. Challenges in Financing and Investment Models

Investors are hesitant to finance small producers due to the small ticket sizes of individual loans, high transaction costs, and the same insurable risks that deter farmers from seeking credit.

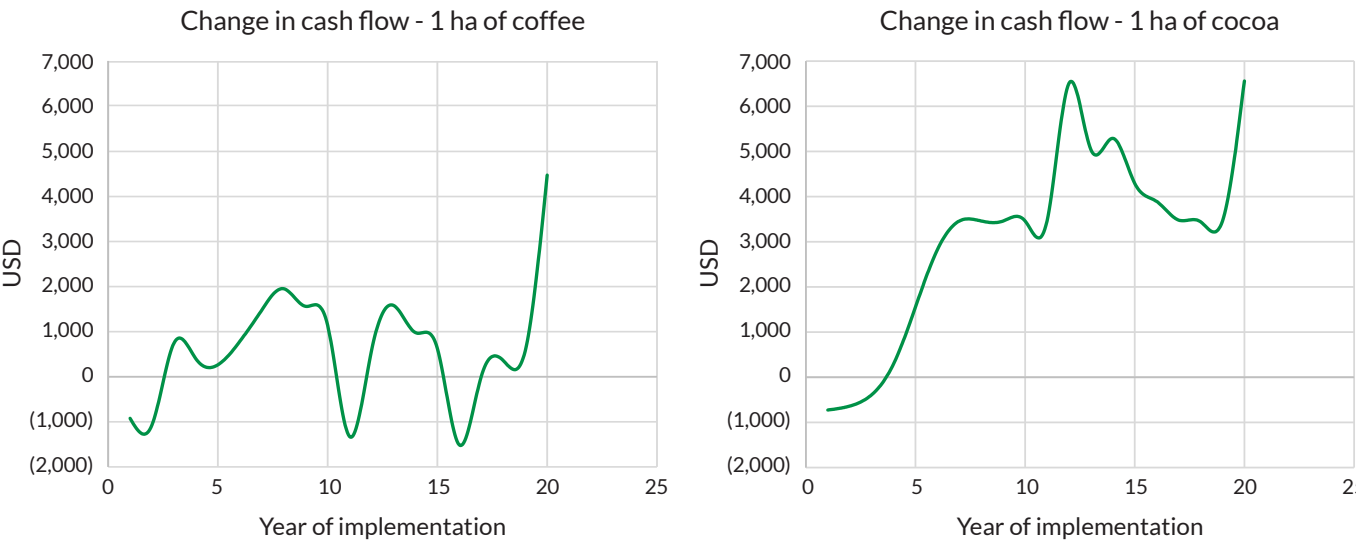


FARMERS FACE SUBSTANTIAL FINANCIAL CHALLENGES DURING THE TRANSITION TO REGENERATIVE FARMING, INCLUDING LIKELY TEMPORARY REDUCTIONS IN PRODUCTIVITY, REVENUE AND PROFITABILITY

Costs and Benefits

A major part of addressing the above challenges involves targeted investments in technical assistance and capital expenditures. In coffee and cacao, these investments focus on activities such as canopy and soil management, pruning, nutrient application, and pest and disease control. Farmers also face the prospect of reduced earnings as compared to current systems in the short term (2 years for coffee, 3 for cacao). After this initial period, regenerative production is more profitable and stable over time as a result of improved diversification and management, which improve soil quality and optimize shade (Figure 5). Given levels of wealth and vulnerability in Alto Mayo, external investment is likely required to cover all or part of these costs as well (Deuman, 2024c), especially at the start of the Capital Continuum process.

FIGURE 5: CHANGE IN CASH FLOWS IN COFFEE AND COCOA AGROFORESTRY SYSTEMS



Note: Values shown are the difference in farmer costs or profits in each year resulting from the transition to agroforestry.

We estimate the cost of technical assistance at approximately USD 500 (\$/1,800) per hectare (total, divided over three years) to cover training hours and in-field support for farmers, based on ProAsocio’s proposed “Service Center” model (O.L. Guanilo and J. Heredia, PC). We assume costs must be covered by external finance during years 1-3, after which they can be understood to be covered by farmers themselves based on increased earnings and demonstrated value, again following ProAsocio’s proposed approach to scaling TA.

We estimate capital expenditures (CAPEX) as the sum of reduced farmer earnings until the profitability of the new regenerative system exceeds the current system. This definition is slightly different from a standard CAPEX, but is useful here as a means to capture the sum of the upfront costs farmers would face (including the typical equipment and time, but also the opportunity cost of temporarily reduced earning) if they decide to shift systems. We model these costs as needing



to be fully covered by external development sources of finance at least during initial stage of Implementation. The implication is that adopting farmers would be cash neutral or positive throughout adoption, removing one but not all of the risks that farmers must assess. If impact can be demonstrated, the need for purely external development finance might shift over time. CAPEX is estimated at approximately USD 2,000 (S/7,000) per hectare (slightly higher for coffee, slightly lower for cacao) based on internal modeling done for this project (Deuman, 2024) and includes time and materials including on soil preparation, seedlings, organic fertilizer systems, agroforestry crops, disease management, pruning, equipment and harvest.

The expected income gains from improved management are substantial, primarily driven by higher yields and improved crop quality that can attract premium prices if marketed and sold effectively. In coffee, net earnings (NPV over 20 years) from an average hectare are estimated to increase from USD 650 (S/2,400) per hectare under relatively low input management to USD 3,800 (S/14,000) in a well-managed system, representing an sixfold increase.

In cacao, net earnings from an average hectare are estimated to increase from USD 3,900 (S/14,000) per hectare to USD 20,000 (S/75,000), a fivefold improvement. It should be noted that current cocoa prices are high in comparison to historical levels. Rerunning our calculations with more conservative price levels observed in the recent past (USD 2/ kg, S/7-8/kg), predicted change in profits from transition to a well managed system reduce to approximately USD 6,500 (S/24,000) NPV. As future price fluctuations are unknown, further calculations here use current prices. Interpretations should be made with due caution.

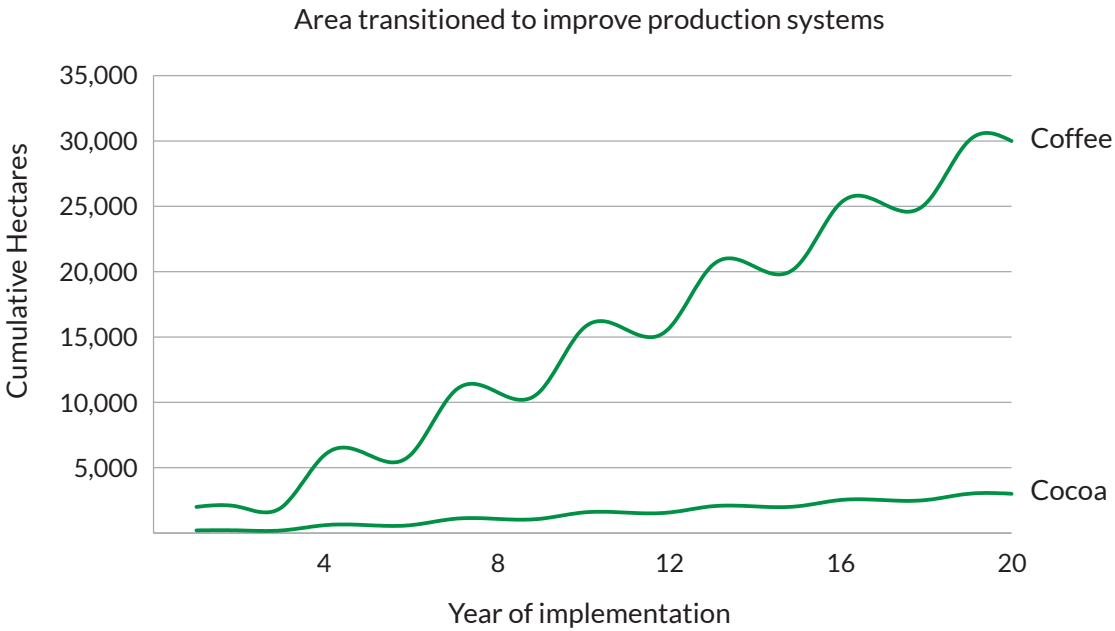
If an external actor covers CAPEX as defined here, the positive effect on farmers’ earnings would be considerable. For coffee, earnings per hectare would see a net increase of USD 5,000 (S/18,600) in NPV, equivalent to USD 600 (S/2,200) annually on average without including income from timber sales at the end of the 20 years in the agroforestry system modeled. In the case of cocoa, the change in earnings per hectare is USD 18,000 (S/67,000) NPV, or USD 3,600 (S/13,200) per year on average, again without considering additional income from timber sales at the end of the 20 year period (Table 3).

TABLE 3: COSTS AND BENEFITS OF TRANSITION OF 1 HECTARE TO AGROFORESTRY SYSTEMS (USD, NPV OVER 20 YEARS)

Costs and Benefits	Coffee (USD)	Cocoa (USD)
External cost in initial stages: Technical Assistance in initial years of transition	500	500
External cost in initial stages: CAPEX(+) until earnings exceed those of prior system	2,000	1,800
Benefit to farmer: Increased net earnings if CAPEX is covered externally	5,000	At current prices: 18,100 At historical prices: 8,300

Considering challenges to expansion identified here and in consultation with sector experts, we model a rate of adoption in periods of three years. The model starts with 2,000 ha in coffee and 200 ha in cocoa during the first period, adds 4,000 ha in coffee and 400ha in cocoa during the second period, then reaches its maximum of adding 4,800 ha of coffee and 480 ha of cocoa in each following three year period as of year 7 (Figure 6).

FIGURE 6: PREDICTED GROWTH IN AREA (HA) ADOPTING AGROFORESTRY SYSTEMS



SOME ROADS GENERATE LIMITED ECONOMIC BENEFIT AT HIGH ENVIRONMENTAL COST, WHILE OTHERS CAN GENERATE MAJOR ECONOMIC BENEFIT AT COMPARATIVELY LOWER DAMAGE



Implications for Finance

We propose that transition costs for early cohorts of farmers be funded by development finance from either public or concessional funding, potentially under grants, highly concessional or forgivable loans, with minimal out-of-pocket expense for farmers. Potential loan structures might allow farmers to contribute in-kind or access concessional financing for capital investments. Once the initial cohorts have demonstrated the model's viability, the transition of the productive sector could be expected to become at least somewhat self-sustaining, where more private capital can effectively scale existing models or fund new commercial instruments. Stable income levels would allow farmers to repay loans and reinvest in their operations, while regenerative practices would reduce the risk of yield and price volatility caused by environmental and market factors.

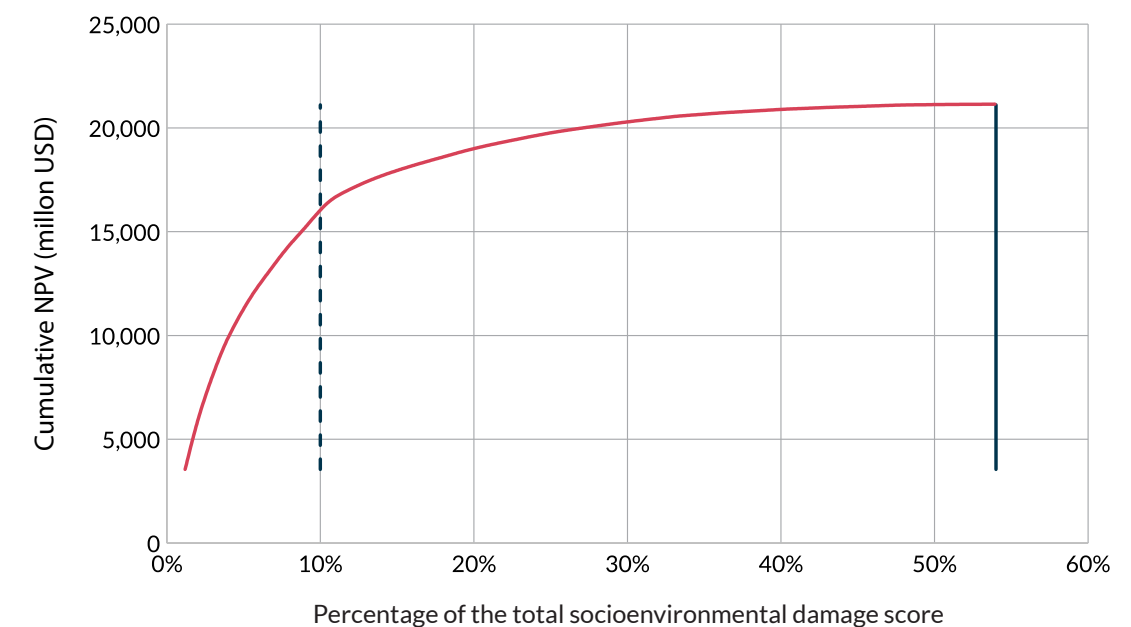
ROAD INFRASTRUCTURE

The San Martín development strategy includes road improvement projects to drive economic development by improving market access, enabling residents to more easily move around for work and to access social services, and reducing transport costs. These in turn should make investment more feasible and increase competitiveness.

However, road construction and improvement is also the main driver of land clearing and degradation (Engert et al., 2024). Road-driven clearing is in turn associated with loss of biodiversity, increased carbon emissions, and displacement of traditional activities and Indigenous communities. Furthermore, despite being broadly seen as key to development, a surprising number of road projects are bad investments even on narrow economic grounds, costing more to build and maintain than they generate in economic benefit. A recent study suggests this fraction will be high in the Amazon, with approximately 50% of all major priority road projects among Amazon countries found to have negative economic returns (Vilela et al., 2020).

In addition, among roads that would generate positive economic returns, the relationship between economic benefit and negative environmental and social impacts varies and is not uniform among roads. Some roads generate limited economic benefit at high environmental cost, while others can generate major economic benefit at comparatively lower damage. The Amazon road study referenced above found that only building those roads that best balance this tradeoff would enable 77% of economic value to be achieved at only 10% of environmental damage (**Figure 7**). Related studies have shown similar results elsewhere (Damania et al., 2017, Dasgupta and Wheeler, 2019).

FIGURE 7: CUMULATIVE ECONOMIC RETURN COMPARED TO NEGATIVE SOCIO-ENVIRONMENTAL IMPACT FROM A BROAD STUDY OF AMAZON ROADS



Source: Vilela et al., 2020

In alignment with the vision for development presented in the LERDS (and basic fiscal efficiency), this LFS recommends an economic and environmental analysis along the lines of work carried out by Vilela et al. (2020) to provide high quality data for decision making about road improvement projects.

This would generate multiple benefits. First, it would ensure that no road is built that would be a simple financial loss. Second, by prioritizing and improving only those roads that generate the most economic activity at the least cost, it would directly align with the LERDS’ intention to promote sustainable development, rather than maximizing short-term economic activity at any cost. Further, conservation of sensitive areas in the landscape can be supported by road network planning that takes into account the strategic location of Development Hubs as focal areas for economic activity.

Costs and Benefits

It was not possible to carry out the recommended analysis within the limits of this project. However, to suggest the scope of possible results, we use information from the Amazon wide road study described above. We consider only the benefits of avoiding the improvement of roads that would not generate benefits in excess of their costs. We do not include the potential to optimize amongst economically beneficial roads such that it is probable that additional benefit exist, but are not included in this analysis. Regarding costs, we do not consider costs associated with good environmental and social practices, including related to technology and engineering, prior informed consent, remediation, and protection of sensitive areas. We also do not include an economic valuation of associated environmental damage.



Of the Peruvian roads analyzed in that study, only 39% of planned road length would have benefits greater than costs, again not accounting for environmental damage (own calculations from Vilela et al., 2020 data). If this fraction is similar to the proposed roads in Alto Mayo, of the 341 km planned, only 135 km would likely generate positive economic results in classic terms. At per km costs reported in the LERDS, construction costs for 135 km would be USD 18.4 million (S/68 million) NPV, if building were spread out over the proposed 10 years.

One source of benefit from this investment is the classic value of roads. The roads analyzed by Vilela et al. were large scale projects with an average cost of USD 1.3 million per km to build among those with NPV>0. The proposed roads in Alto Mayo are smaller with an estimated cost of USD 216,000 per km. If the ratio of costs (Alto Mayo’s roads cost 16% of the large regional ones per km) is similar to the ratio of benefits, building this set of roads might generate in

the range of USD 25 million (S/94 million) in gross benefit. Additionally, Peru would avoid wasting scarce fiscal resources to build money-losing roads. If 61% of roads are an economically bad choice, savings would be in the range of an additional USD 28 million (S/105 million).

Again, these results should be interpreted only as broadly indicative. Detailed road planning is required to make the particular decisions necessary. Beyond what is considered here, additional benefits would likely come from careful tradeoff decisions amongst the economically valuable roads, and additional costs would be required to ensure best practices are implemented, including likely spending on conservation, reforestation and environmental remediation to address direct ecological degradation.

Implications for Finance

There are two broad financial implications from the proposed approach. First, the Government of Peru stands to avoid significant waste of fiscal resources and a reduction in the costs and risks that would emerge from uneconomic roads. In whole or in part, these could be reallocated to productive uses related to roads that are built (these uses are not costed here) or other needs (including those in this LFS). Second, a government commitment to selectively improve roads (and critically, not build or improve others) in a manner aligned to high-integrity environmental management, should increase eligibility and attractiveness for advantaged financing terms, due to perceived reduced environmental and social risks, from MDBs such as the World Bank and InterAmerican Development Bank. Finding means to attract such finance would help move towards a future transport network in Alto Mayo that includes fewer improved roads, in better locations, and following better practices.



LANDSCAPE-WIDE, MULTISECTOR INVESTMENT AND RETURN OPPORTUNITY

Table 4 summarizes the initial projected costs and benefits described above in the three primary themes, discounted over 20 years. Because much of the benefit occurs in the latter part of the 20 year period, these net benefits may appear moderate in today’s terms compared to undiscounted amounts. In real terms (i.e., undiscounted), projected costs are USD 148 million (S/554 million), generating USD 382 million (S/1.4 billion) in benefits. The net undiscounted benefit is USD 233 million (S/873 million). These issues of how costs and benefits accrue over time are addressed further in Section 5 below.

TABLE 4: NET PRESENT VALUE OF LANDSCAPE TRANSITION ACTIVITIES OVER 20 YEARS

Landscape Transition Activities	PV*
Enabling	(5)
Protection	
Operating Expense (OPEX)	(14)
Benefits	21
Net Benefit (Cost)	7
Productive Sector	
Capital Expense (CAPEX) and TA	(30)
Marginal Earnings	60
Net Benefit (Cost)	30
Roads	
CAPEX	(18)
Benefits	53
Net Benefit (Cost)	35
All Costs	(67)
All Benefits	135
Net Benefit	68

* Net Present Value US Dollars (millions)

Scope for Including Additional Themes in the LFS in the Future

The costs and benefits described above cover an initial and limited set of activities. After initial activities are incubated, there are significant opportunities to design enhanced projects and funding opportunities to further strengthen landscape resilience. Analysis of these is beyond our scope, but we mention them to inform a next stage of financial planning. Many of these are already in the LERDS and other documents that establish policy priorities:

- **Protection:** Include a finance opportunity assessment for the 140,000 ha of ZOORES in the landscape. As areas that are already substantially deforested, these areas could offer significant opportunities for carbon income through assisted natural regeneration and agroforestry, as well as carefully managed production activities. In addition, work with Awajún communities to strengthen their conservation and development initiatives. There is significant potential for carbon sequestration and forest product related income here as well.
- **Production:** Extend analysis of current crops to include investment opportunities in supply-chain enhancement and food processing, which could lead to greater performance projections and investment opportunities. Add assessment of additional revenue potential through soil or agroforestry carbon sequestration. Add consideration of additional crops, ecotourism, and NTFPs like vanilla, medicinal plants, resins, and handicrafts.
- **Infrastructure:** Include additional priorities under the Climate Change Regional Strategies such as distributed renewable energy and water access. There are well-defined models to efficiently deliver these services using private and public funding.

Implications for Finance

Work on these themes could harness carbon credits, ecotourism, and NTFPs as new and increased self-sustaining income streams. It could also accelerate revenue generation through agroforestry on fragile lands, stabilization of untenured areas, and exploration of renewable energy and water management infrastructure that could access the increasing pools of climate finance that are emerging.

By aggregating carbon sequestration potential, promoting sustainable tourism, and commercializing resources like medicinal plants and resins, the LFS could attract private capital once initial risks have been mitigated. Beginning to address these issues once a first round of issues are incubated and underway would allow a smooth progression towards broader impact and increased flow of concessional and then non-grant finance.



3. FUNDING STRATEGY

To enable progressively more funding to be raised and channeled effectively into the landscape, initial work should focus on strengthening existing initiatives and demonstrating impact, business case, and value added. Focus themes include scaling regenerative practices for farmers with secure land tenure, using public funding to generate conservation-related public goods, and guiding road improvement projects based on economic-environmental analyses.

Early actions emphasize planning and incubation: stakeholder workshops to identify gaps and set governance structures, designing a robust monitoring and reporting system, and developing targeted financial mechanisms. Programs like the Biocreditos from municipal cajas, Agrobanco loans, and some non-reimbursable public funds illustrate potential solutions for bridging the transition finance gap. However, further engagement is needed to understand and resolve capacity constraints (e.g., loan sizes, subsidy limitations), and to strengthen technical and financial capacity to better support smallholder adoption of climate-resilient practices.

IMPORTANT EARLY ACTIVITIES INCLUDE

Incubation Planning Workshops

Initial incubation workshops should bring together key stakeholders—farmers, local organizations, financiers, and government agencies. These workshops can identify gaps in existing mechanisms and collectively prioritize the enabling conditions required for successful incubation. Participants can also design a cohesive governance structure, develop standardized metrics for progress monitoring, and establish a robust reporting system. Ensuring the right financial management expertise is available at this stage is critical, as it will guide partners in designing suitable financing mechanisms and developing a detailed scope, budget, and fundraising strategy for the broader program.

Some business models may already be ready for incubation without the need for further planning. Raising early finance for these and demonstrating their impact is also an upfront priority. Conversely, some models may require individualized focused efforts to design.

Incubation of New Businesses

Once the foundational planning is in place, the focus shifts to incubating (in the more traditional sense referring to companies) new business models that address specific gaps in the landscape finance ecosystem. One approach would be to use early funds to issue calls for proposals that encourage solutions to key gaps in the innovation and entrepreneurship ecosystem. These could include producing climate change-resilient seedstock, expanding nursery operations, delivering integrated TA alongside targeted finance products and risk-mitigation insurance.



Piloting Projects in the Productive Sector

Concurrent with incubation activities, pilot projects should be launched to test and refine approaches to regenerative agriculture and land-use practices. For example, the Biocreditos program offers financing conditional on adoption of good agricultural practices that contribute to forest conservation. However, it is necessary to explore means to reduce interest rates and incorporate more specific social standards. During these pilot phases, concessional funding from governmental sources and ODA will likely be pivotal to covering high-priority costs that private finance typically cannot shoulder at this early stage.

Preparing to Add More Themes

Work on the broader set of themes, starting with further analysis, can begin around year four, once initial priorities shift from the Incubation to Implementation stage. The approach to these issues would roughly replicate that to the initial priority set, with added challenges related to some complicated problems, but also some added momentum from initial success with incubation and piloting, as well as functioning institutional arrangements to drive the LFS forward.

CAPITAL NEEDS AND TIMING

Table 3 presents the aggregated cost and benefit forecast for the initial round of prioritized themes. In this section, we present costs and benefits as the sum of real values (i.e., undiscounted) for clarity about net impacts and magnitude at each stage of the Capital Continuum and because finance is most likely to be raised sequentially over time such that the real values represent the likely actual amounts needed at that moment. This is a different approach to discounting used in the earlier cost benefit analysis such that the numbers are different. They capture the same underlying values, just presented in another form.

The aim is to secure the entire capital requirement for each stage—Incubation or Implementation—up front, using a blended finance approach that mixes government, philanthropic, and commercial funding as appropriate to the stage. Each type of funder covers different segments of the overall risk, permitting an efficient distribution of sources of capital.

Across all stages, total benefits exceed total costs (Table 5), starting at a ratio of 1.6:1 during the Incubation stage and growing over time to 3.8:1 at Maturity. This highlights the benefits that the Alto Mayo landscape would receive from investment in the full set of changes. On the other hand, in the early Incubation and Implementation stages, financial returns (that is, those that are not public goods that are more difficult to finance with private capital) are less than costs. During Incubation, the benefit cost ratio for transitioning to agroforestry systems is 0.3:1, increasing to 0.8:1 during the Implementation stage. These ratios underscore the need for concessional capital and public/

philanthropic finance in the initial stages to overcome the probable gap in private finance. Over time, private benefits increase relative to costs, reaching a ratio of 4.1:1 for agroforestry transitions during Stabilization. This growth makes conditions more appealing to commercial investors as of the Stabilization stage, as perceived risks decrease and business models are consolidated.

Total investment needs in real terms are USD 152 million (PEN 564 million), starting at USD 22 million (PEN 82 million) for the Incubation stage, peaking at USD 48 million (PEN 178 million) during Implementation, and then slowly scaling down. Benefits start at USD 35 million (PEN 131 million) and then grow continuously to USD 143 million (PEN 530 million) during Stabilization.

TABLE 5: PROJECTED COSTS AND BENEFITS OF PRIORITY ACTIVITIES AT EACH STAGE OF THE CAPITAL CONTINUUM (IN MILLIONS OF USD)

Stage Duration	Incubation Years 1 to 3	Implementation Years 4 to 8	Stabilization Years 9 to 15	Maturity Years 16+	20-year TOTAL	NPV
Enabling*						
Cost	(3)	(2)	(2)	(1)	(8)	(5)
Protection						
OPEX	(5)	(9)	(12)	(9)	(34)	(14)
Benefits	8	14	15	9	46	21
Net Benefit (Cost)	3	5	3	0	12	7
Multiple on Cost	1.6	1.6	1.2	1.1	1.3	1.5
Productive Sector						
CAPEX and TA	(6)	(23)	(27)	(25)	(81)	(30)
Marginal Earnings	1	19	111	122	253	60
Net Benefit (Cost)	(4)	(4)	84	97	173	30
Multiple on Cost	0.3	0.8	4.1	4.9	3.1	2.0
Roads						
CAPEX	(9)	(14)	(6)	-	(29)	(18)
Benefits	25	42	17	-	84	53
Net Benefit (Cost)	17	28	11	-	55	35
Multiple on Cost	2.9	2.9	2.9		2.9	2.9

All Costs	(22)	(48)	(47)	(35)	(152)	(67)
All Benefits	35	75	142	131	383	135
Net Benefit	13	27	95	96	232	68
Multiple on Cost	1.6	1.6	3.0	3.8	2.5	2.0

* **Enabling activities include:** landscape scale monitoring through Landscale, road planning studies, seed business incubation, finance for a base 2-person team to lead the initiative, initial incubation workshops, precise impact evaluation of investment in coffee transformation, and strengthening of systems for technical assistance.

CAPITAL DEPLOYMENT MODEL

San Martín has a finance ecosystem with a variety of existing services, both public and private, that could be adapted to serve the goals of this LFS. These include public and public-private funding solutions, as well as private commercial and impact financing mechanisms. This LFS suggests building from and with these existing service providers to help direct their funding to the priority activities identified in the strategy, and to break down barriers that might limit their applicability.

Based on the break-down of costs and benefits by category in each stage, and given the reduction in risks in later stages, **Table 6** illustrates a potential funding strategy by stage and capital type. More comprehensive discussions are required to refine the actual interventions and funding activities sought in each stage, along with more detailed discussions with current and prospective capital partners. The ultimate allocation of capital by source and stage will differ from the estimate presented below, but the conceptual allocation and consideration of different investor needs and opportunities is a useful guide for planning and discussion.

TABLE 6: FINANCE REQUIREMENTS DISTRIBUTED ACROSS THE STAGES OF THE CAPITAL CONTINUUM (IN MILLIONS OF USD, REAL VALUES)

Type of Finance	Incubation (years 1 to 3)	Implementation (years 4 to 8)	Stabilization (years 9 to 15)	Maturity (years 16+)	USD (M)
Development Funding	100%	74%	42%	30%	
Government Programs	6	14	8	8	35
Philanthropy & ODA	7	4	4	3	17
Loans/Guarantees (DFI/MDB)	7	13	5	-	25
REDD+ Carbon	3	5	2	-	10
Private Capital	0%	26%	58%	70%	
Private Debt & Equity	-	13	22	19	53
Private Companies*					
Commercial Insurance	-	-	5	5	10
Public Debt & Equity	-	-	-	-	-
TOTAL	\$22	\$48	\$47	\$35	\$152

* Entities and amounts to be defined during Incubation

ODA - Official Development Assistance
MDB - Multilateral Development Bank

DFI - Development Finance Institutions
REDD+ - Reduced Emissions from Deforestation and Degradation +



THE AIM IS TO SECURE THE ENTIRE CAPITAL REQUIREMENT FOR EACH STAGE UP FRONT, USING A BLENDED FINANCE APPROACH THAT MIXES GOVERNMENT, PHILANTHROPIC, AND COMMERCIAL FUNDING AS APPROPRIATE TO THE STAGE

Criteria for Capital Allocation

In a staged landscape finance approach, investments are funded according to the ratio between their costs and anticipated returns, as well as the type of return expected. When net economic value of an investment is negative—or close to a breakeven multiple of 1x (i.e., costs equal to benefits) — philanthropic grants and government financing typically provide the initial capital. These sources absorb early risks and fund foundational activities that yield significant public or environmental benefits, but in early stages don’t yet generate sufficient financial returns to attract private investment.

For transitions that generate benefits that are highly dispersed, difficult to quantify, or are typically not transacted in markets (as is the case for many ecosystem services and improvement of particular roads), development finance will continue to be the main source of capital. On the other hand, for projects with private returns in productive sectors, participation of private investors can be expected to increase as projects consistently demonstrate a higher return threshold—generally at or above a 2x multiple—private investors become more interested and begin to integrate into the capital stack. This transition reflects the improved risk–reward profile of later-stage initiatives, where commercial capital can confidently co-invest alongside, or in place of, concessionary funding.

Based on these criteria, we propose that 100% of funding be sought from various development funding sources during the Incubation stage, largely through grants, and that following the approaches detailed above will allow gradually more private capital to participate, potentially reaching 70% of the capital stack by the Maturity stage.

Additional criteria that were used in designing this target capital allocation framework are highlighted below:

Government Programs include a broad set of funding mechanisms including grants, budgets for business incubation, interest rate subsidies for rural producers and tax credits for project finance. While we did not specifically define which of these programs could fund which activities in the capital stack – an exercise to be developed in collaboration with various government partners – we estimate the following types of allocations as indicative:

- **Protection Activities:** We propose that government finance cover the gap in costs to manage the AMPF after accounting for what is covered by REDD+ carbon payments. This gap is approximately 35% in the Incubation and Implementation stages. If new finance mechanisms can be developed based on carbon or other means to generate returns, part of these costs could also be covered by private payments, debt or commercial capital. In the absence of these, the fraction of costs that must be covered will increase as current carbon finance runs out early in the Stabilization stage.
- **Roads:** 20% of cost during the initial planning and road design stage, assuming that the balance of costs will be paid through a project finance loan to the government by a DFI or MDB.
- **Productive Sector:** Government funding is proposed to support up to 50% of productive sector costs during the Incubation stage, largely through incubation funding, non-reimbursable public funds, and program development grants to demonstrate a financeable model for agroforestry transitions. During Implementation, government funding declines to 45%, mostly through farmer incentive programs, non-reimbursable public funds and credit enhancement such as interest support and loan loss reserves to lenders such as Agrobanco, local cajas, and possibly banks. Additionally, it would be valuable to develop a pilot agricultural insurance program or climate loss pool. During the Stabilization and Maturity stage, government funding is estimated at only 5%, largely envisioned through credit support and public sector insurance.

Philanthropy and ODA is assumed to provide the primary funding for *enabling* activities and a portion of the *protection* activities. Specifically, *enabling* costs include the Incubation planning workshops, road planning study, training costs, and landscape level measurement and validation reporting using Landscale or a comparable platform. For *protection* costs, we propose that philanthropic grants will fund about 20% of costs, based on the calculation that Conservation Concessions represent approximately 20% of the total conservation area budget considered here for the Alto Mayo Landscape. Finally, up to 50% of productive sector funding during the Incubation stage would likely come from ODA.

Loans & Guarantees (DFI / MDB) are projected to fund the majority of the road infrastructure, estimated at 80-90% of the infrastructure costs, largely through loans to the government. In addition, they are added as 5% of the cost in the Maturity stage envisioned as a credit enhancement for the productive sector. This is envisioned to follow the model of IDB and DFC as insurers or guarantors to climate related green and blue bonds in recent years, which can unlock funding from private and public investors for landscape finance. An example of this is the Nature Conservancy’s work in sovereign blue bonds and green bonds in Belize, Barbados, Ecuador and Gabon for recent examples. These models could be reasonably adjusted to private sector issuers and borrowers in addition to sovereigns.

Voluntary Carbon Markets are projected to continue transacting the unsold credits from the AMPF during the next 10 years, contributing 50% of the total cost of managing the AMPF during the 20-year period of this analysis, and 44% of the total conservation area cost. There is likely additional potential to generate income from carbon sales in conservation concessions and ZOCRES, as well as in agroforestry systems.



Private Debt & Equity includes a range of participants, some already active in the region, ranging from local and regional players to international investors. They might be brought in to participate through the following:

- Support existing participants to expand and enhance their services, such as the *Cajas* in providing funding through biocredits, through Agrobanco in bundling and delivering low-cost loans that are subsidized by the government, through the Amazon Business Alliance in providing incubation funding and low-cost loans funded in part by philanthropy, and even by private investors and companies who are leveraging the government's tax-credit program for public works finance (*obras por impuestos*). By the Implementation stage, we assume that these existing sources are expanded, with new participants helping to provide scale, to provide approximately 55% of the productive sector costs during the Implementation stage, and stepping up to 75% during the Stabilization and Maturity stages.
- Private Debt & Equity is also indicated as a funding source for *protection* activities in the latter stages, conservatively providing about 20% of the funding for these activities, assuming that effective carbon markets and other revenue generating activities can be put in place at scale.

Private Companies: we do not project a percentage of costs financed by companies, but they can play a key role in the coffee and cocoa sectors considered here in alignment with their own business interests. Among possible contributions are investment in sustainable supply chains, support for formation and strengthening of producer associations, and future purchase commitments with producers that in turn facilitate access to finance from other sources. This LFS suggests that these possibilities among others be explored during the Incubation stage, to be launched during Implementation.

Commercial Insurance providers may be able to provide solutions to rural producers, through collateralized loan pools or forms of parametric insurance to provide limited protection in the event of acute weather or climate events. In some cases in India, Colombia and East Africa, for instance, commercial health insurance supports small producers who have taken micro-loans. While the government can provide lender guarantees and/or insurance over an initial period, supporting the development of a private sector insurance solution could catalyze private finance across small-scale borrowers exposed to climate and related risks. Moreover, a growing number of development and climate insurance programs are emerging to provide green guarantees to support private investment and publicly listed green bonds and performance-based bonds, such as the Green Guaranty Company and the EU Green Coupon Facilities, which could be applied to or inspire strategies in the region. The illustrative model assumes that commercial insurance might account for up to 20% of the capital stack. This is not a cash investment, but rather credit enhancement that could lower the cost of capital provided by private and public debt and equity markets.

Public Debt & Equity is potentially a long-term viable option for the capital continuum in Alto Mayo. At this time we are not modeling any issuances of public debt through green bonds, or other instruments, nor the public listing of equity instruments related to the LFS. Nonetheless, these are mechanisms that can provide useful exit strategies to private lenders and investors, including options to refinance as finance programs mature over time. Evaluating the viability of these instruments in later stages could permit access to scalable finance at lower costs, and as such help to consolidate financial sustainability in the landscape.





4. CHALLENGES AND PROPOSED SOLUTIONS

Planning for financial needs over time using the principles above will build off of existing actors and initiatives to help move towards sufficient finance for an ambitious set of changes. However, it is also necessary to look directly at the systemic barriers that prevent capital from flowing. We propose specific solutions in response to these barriers to improve the finance ecosystem. We cannot be certain how much these solutions will accelerate the efficient development of landscape finance. However, it is clear that being mindful of how to address systemic challenges, including constantly answering the question of why theoretically appealing changes are not yet happening, is central to making progress.

CHALLENGES

Barriers include but go beyond those for the productive sectors described earlier. Addressing these challenges holistically is necessary for moving multiple pieces of landscape transition forward together. We highlight:

- Underfunded public goods:** Investments in conservation and ecosystem management provide multiple benefits. However, on public lands where benefits are spread across the landscape, beneficiaries are largely unlikely to pay for most of the shared ecosystem services they receive, leaving a gap between what makes sense for society and what is financed through market mechanisms. This is the case for most of the ecosystem service flows from the AMPF.
- Insufficient technical assistance and productive technology:** The technical and physical inputs needed to move farm production towards EbA and regenerative systems is limited or inconsistent across the landscape. This includes the number of extension professionals with in-region, on-the-ground expertise in locally effective agroforestry and agricultural transitions, and availability of seeds and genetic stock that is appropriate and adapted for shifting climate needs.
- Market and value-chain challenges:** Many small producers sell their crops at lower farm-gate prices to intermediaries who visit their farms, or otherwise tend to access commodity market prices. This prevents them from accessing higher prices for higher quality products through cooperatives associations, or higher end-buyer relationships. This issue may become even more noteworthy as EUDR requirements come into force and products that cannot demonstrate compliance lose access to higher end European markets.
- Unmitigated farmer risk:** Farmers face significant risks such as crop failure due to flooding, pests, and price volatility, as well as health emergencies or other household crises or uncertainties. Additional risks may be posed by the transition to regenerative farming, including uncertainty about new systems, the need to put in additional labor time, and expected temporary reductions in productivity and profitability. Even when potential income gains are substantial, these make a risky proposal for farmers, especially when adding loan finance liabilities.
- Limited capital deployment:** Local public and private institutions already present an array of financing solutions, but their reach needs to be amplified and broadened. One significant challenge is high transaction costs for financing on-farm transitions, especially for numerous small-scale farmers scattered across large areas. At the same time, intermediary organizations largely do not currently engage in bundling financing with technical solutions.
- Road decision making:** Road improvement decisions are frequently not made based on sound economic data, despite the fact that they require use of scarce public funding that should seek the greatest public goods for its use.
- Institutions and policies:** Funding is required to finance ongoing landscape stakeholder coordination and further technical study to achieve LERDS objectives, including related to broader consideration of tradeoffs and synergies around roads, regenerative agriculture, and economic benefits from stable finance of conservation areas.



Solutions to some of these issues are already underway. We describe some new ideas, with greater details provided in the Annex. We aim to highlight at least one approach to addressing each barrier (**Figure 8**).

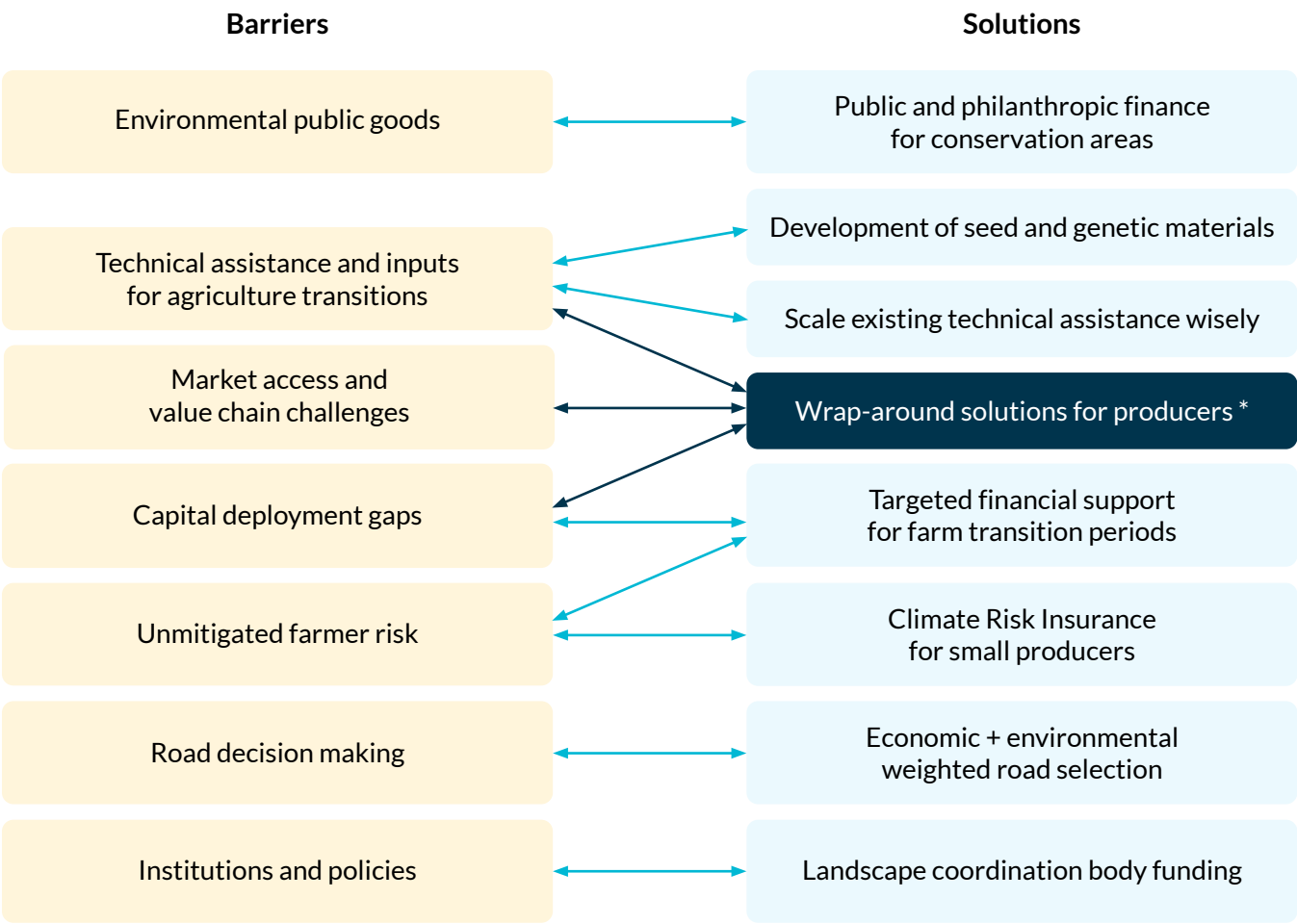
IMPORTANT SOLUTIONS INCLUDE:

- Public and philanthropic finance is applied to conservation areas:** Public finance is a standard solution to the market failure that public conservation areas seek to address. Such finance might be facilitated by high quality valuation of ecosystem services, carried out as a means to make a clear case to the public and the Ministry of Finance that financing of conservation areas as a good use of scarce state funds. Peru is already a global leader on acting on this kind of information, significantly increasing its national budget for protected areas in response to a major study of the contribution to the national economy made by the National System of Protected areas (Leon, 2007). Peru has also already participated in innovative financial mechanisms to assure finance for its protected areas, including debt for nature swaps that commit state budget to conservation, and Project Finance for Permanence arrangements that leverage outside commitments to complement state budgets.
- Development of seed and genetic materials:** Investment into seed variants that are adapted to San Martín's climate, climate change and high quality production is proposed as an enabling investment, i.e., one that does not seek financial return. This solution is highlighted in the LERDS. In addition, once suitable seed varieties are identified through testing, large-scale, reliable and trustworthy seedling nurseries and businesses must be developed to meet farmer demand. These businesses could eventually function on a for-profit basis, enabling new sources of finance.
- Scale the reach of technical assistance:** A comprehensive scaling plan is needed to efficiently roll out extension services across the landscape. This plan should focus on economies of scale and integrate legacy farmers as in-field mentors and next-generation technical assistance providers (J Heredia and O.L Guanilo, PC). Legacy farmers can play a pivotal role in fostering trust and disseminating knowledge among their peers, bridging the gap left by limited professional capacity. In addition, there is a need to develop spatially strategic transition models for farmers that account for risks and logistical constraints. Transitioning an entire farm at once may be unappealing for many farmers due to financial and operational risks. Instead, staged or partial-farm approaches tailored to individual properties should be explored during the TA extension phase to reduce risk while maintaining productivity. These models must provide clear guidance on how farmers can implement sustainable practices incrementally while managing associated uncertainties.
- Broader role for extension services organizations:** Beyond their traditional roles, extension organizations could provide additional services, such as supporting farmers in navigating loan financing or streamlining the delivery of commodities to off-takers at competitive prices. Equipping extension organizations with these skills and relationships would enhance their effectiveness and add value to the services they provide. In addition, bundling subsidized or government-backed agricultural loans with technical assistance is an important potential strategy to drive farmer participation. Such financing mechanisms would stimulate demand for transition services, ensuring that farmers have access to the resources they need to adopt sustainable practices. By creating sufficient demand, these loans would also incentivize supply-side responses, encouraging investment in necessary infrastructure and support systems across the landscape. A comprehensive version of these ideas, *wrap-around producer solutions*, can integrate technical assistance, financing and coordination with commodity buyers seeking verified deforestation-free products has promise to meet multiple elements of the challenge to farmer transition and to financing technical assistance at scale. This idea is further elaborated in the Annex.
- Targeted financial support for farm transition periods:** Without targeted financial support, few farmers can afford or will reasonably commit the upfront costs of the transition or absorb the risks associated with short-term losses. Mechanisms should be developed specifically to cover all or part of short-term loss in earnings. The correct amounts and time periods should be developed and trialed during the Incubation stage, such that impact would be measured and the approach modified for the Implementation stage when less concessionary sources of capital are sought. An example of a similar approach - including development of a clear understanding of transition barriers and then testing the result of addressing them - comes from the Silvopastoral project, which supported the transition to silvopastoral systems in Colombia and Nicaragua (Pagiola et al., 2017).
- Climate risk insurance for small producers:** Introduction of insurance products could mitigate risk to lenders and borrowers under force majeure events such as extreme climate events that can be protected through parametric coverage, and potentially provide recovery finance for rural families and communities.



- **Selection of roads for improvement:** The road improvement projects considered in the LERDS should be evaluated using an approach that integrates economic and environmental criteria to support well-informed decisions. This approach means considering only those roads that are economically viable, and among that subgroup, selecting only projects that offer the highest economic opportunity at least environmental cost. Potentially the majority of road improvement projects would be rejected under this approach due to insufficient economic and environmental justification. Finally, all projects undertaken must follow best environmental and social practices.
- **Landscape and multi-sectoral coordination body:** Building on existing efforts around the LERDS, enabling investment is needed to facilitate ongoing stakeholder participation and public-private collaboration. Among the functions of the necessary coordinating body are support for evolution of the business and entrepreneurship ecosystem from demonstration projects to integrated management. This includes prioritizing a strategic list of businesses, cooperatives and associations, articulation of funds from multiple sectors and business development services, and channeling funds towards key gaps. Building on the LERDS investment plan, maintaining an updated centralized data repository would also add value, including through transparent monitoring of environmental, social, and economic outcomes, in turn aiding government bodies, investors, and supply chain actors in assessing impact and making informed decisions. An initial assessment of these issues using the Landscape framework was completed in 2024, with discussions underway to move future management to the OPIPS government office. The budget to run future Landscape updates every 5 years is included here as part of the enabling investment.

FIGURE 8:
SOLUTIONS SUGGESTED TO ADDRESS EACH OF THE HIGHLIGHTED BARRIERS TO SCALING CHANGE



** Links to wrap-around solutions for producers are shown in a darker color to highlight their potential to address multiple issues.*



5. CONCLUSION

The Alto Mayo landscape is well positioned to chart a globally significant path towards low emissions sustainable development. However, a combination of economic pressures, technical gaps, and institutional barriers continues to drive land-use and development practices that degrade ecosystems and undermine long-term prosperity.

This Alto Mayo Landscape Finance Strategy demonstrates the economic viability of taking a major step towards a low-emissions, climate-resilient future. It also proposes a set of finance solutions to fund transitions at the necessary scale and provides an initial four-year work plan for progress towards finance goals. Development of a detailed implementation plan was beyond the scope of this study, but will be an important next step.

By addressing these challenges through a phased approach—first stabilizing and de-risking the landscape and then scaling revenue-generating opportunities—the Alto Mayo region can unlock substantial economic, social, and environmental benefits. Realizing this vision will require continued collaboration among government agencies, financial institutions, philanthropy, NGOs, and local communities. It is an ambitious undertaking, but one with the potential to position Alto Mayo as a global model for climate-resilient, inclusive, and ecologically sound development.



ANNEX: LANDSCAPE CHANGE AND FINANCE ECOSYSTEM SOLUTIONS

This annex details the solutions proposed to enable increased funding over time by addressing major barriers.

1. WRAP-AROUND TECHNICAL, MARKET AND FINANCING SERVICES SOLUTION TO FARMERS

Establishing enhanced farmer solutions to deliver wrap-around services to small farmers offers an integrated approach to overcoming the challenges of adopting regenerative farming practices. This model could be delivered through a single solutions provider or a coordinated network of transparent partnerships. It aims to address technical, financial, and logistical barriers by means of simultaneously securing benefits for farmers, financiers, and commodity buyers. Variations on this concept are possible. Below we present the approach broadly:

Comprehensive Services for Small Farmers

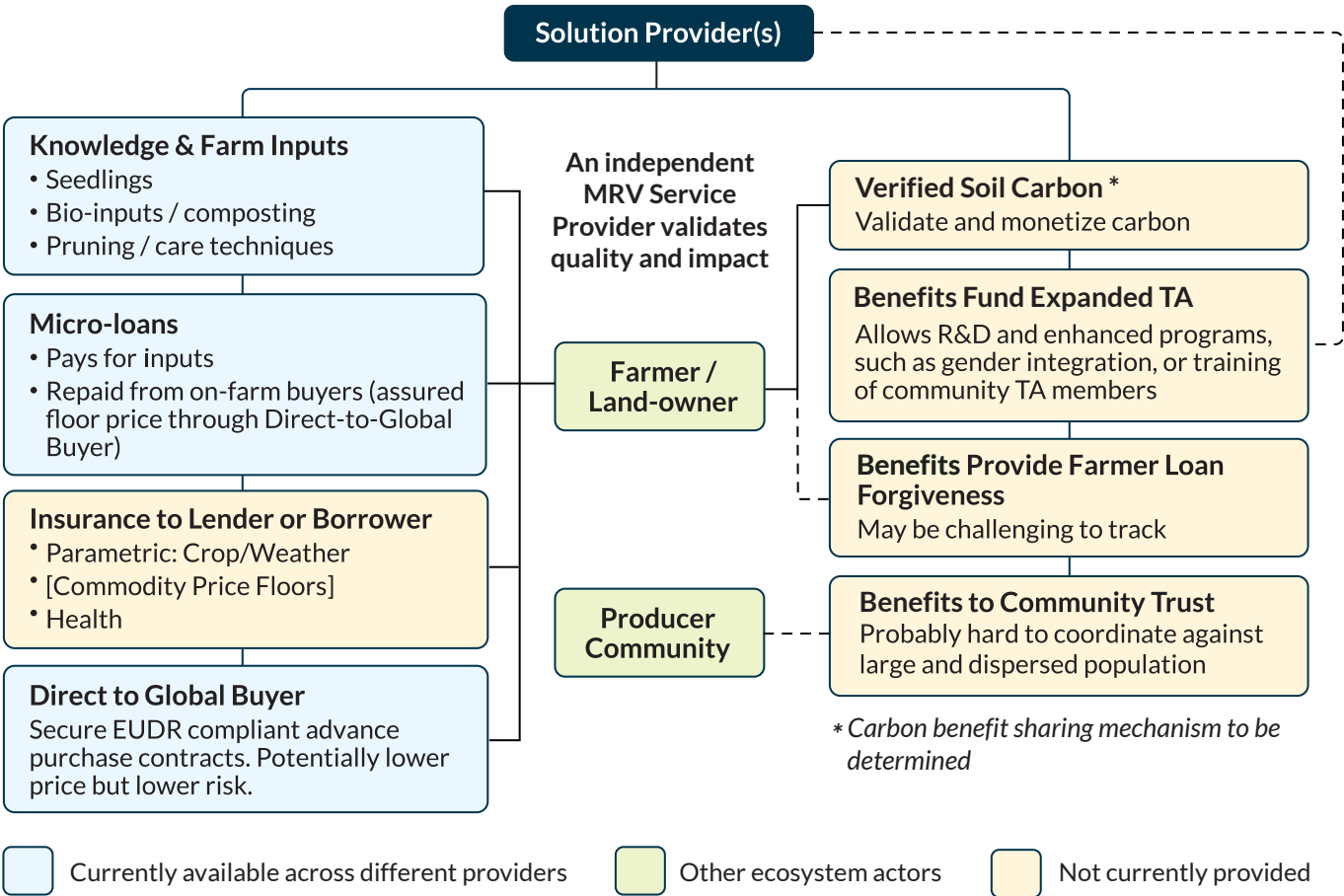
The solution provider or coordinated providers would embed a full process flow designed to meet small farmers' needs across multiple dimensions:

- **Technical Assistance (TA):** Localized clusters of TA providers can empower farmers by offering practical support in plant pruning, input optimization, and productivity enhancement. Some farmers could also be trained and positioned as future TA providers to ensure long-term sustainability.
- **Biological Inputs:** Farmers would gain access to resources, including high-quality seedlings and on-farm support for composting and bio-input production. These resources would enable the transition to regenerative practices while improving soil health and crop quality.
- **Finance Products:** Through partnerships with lenders and financial services institutions, the solution providers would deliver tailored loans or financing solutions to farmers. These would cover transition costs, including TA fees and opportunity costs.
- **Finance Product Viability:** Loans or other non-grant capital would be repaid through the success of the practices supported by the provided - likely in farm output increases and better prices. Revenues could be secured by insurance and forward offtake contracts.

- **Validation:** The providers could deliver third-party validation for compliance with standards like the EU Deforestation Regulation (EUDR), carbon offsets, and ESG benchmarks. This validation would enhance the marketability of farmers' products, elevating farm-gate prices and ensuring alignment with global commodity buyer standards.
- **Risk Management:** By offering parametric insurance for weather and crop risks, the solution providers would reduce risk for farmers, lenders, and buyers alike. These risk management tools ensure greater financial stability and resilience for all stakeholders.
- **Outputs and Offtake:** By engaging with commodity buyers, the providers would secure revenues for farmers through forward contracts with global commodity buyers, reducing repayment risks and ensuring stable income. Technical assistance would also facilitate crop collection and ensure fair farm-gate pricing, avoiding opportunistic buyers.



FIGURE 9: SCHEMATIC OF ROLES PLAYED AND INTERACTION BETWEEN WRAP AROUND SERVICE PROVIDERS, FARMERS, AND OTHER ACTORS



VALUE PROPOSITIONS FOR STAKEHOLDERS

The integrated solution providers idea creates distinct advantages for each stakeholder group involved in the productive sector:

For Farmers:

- **Increased resilience to climate change** through improved farming methods and enhanced productivity per hectare.
- **Elevated income** through better crop quality, higher yields, and compliance with market standards like EUDR and ESG.
- **Financial security** through parametric insurance and a health insurance safety net, ensuring family stability and long-term well-being.

For Financiers:

- **Diversification of risk** enabled by access to an aggregated pool of small producers managed through TA distribution networks.
- **Enhanced risk protection** through insurance products, forward purchase contracts, and rigorous governance controls, including Monitoring, Reporting, and Verification (MRV).
- **A scalable financing model** with predictable repayment flows tied to validated outputs.

For Commodity Buyers:

- **Access to bulk products** from small producers that meet ESG and carbon validation standards, assured by TA and third-party MRV.
- **Reduced procurement risk** through secure supply chains supported by forward contracts and transparent quality assurance processes.

For TA Providers:

- **Remuneration aligned with results:** Opportunity to be paid from financing as services are delivered and align incentives with farmer success.

By centralizing and coordinating these services, a single network of solution providers could ensure that small farmers can transition to regenerative practices effectively while benefiting from improved income, financial security, and market access. At the same time, the network creates a sustainable ecosystem where financiers and commodity buyers can engage confidently, knowing that risks are mitigated and value is maximized throughout the supply chain.



FINANCIAL STRUCTURING AND LOAN PRODUCTS

Proposed loans for farmers are structured with repayment terms that align with improved productivity. Loans are repaid through a portion of sales, with interest rates linked to production improvements.

Tiered Interest Rates

Interest rates based on productivity gains, using the following *for illustration only* with further analysis required to ensure that the terms are not regressive:

- **0% interest** if production equals prior output (principal repayment only).
- **5% interest** if output increases by up to 50% above prior levels.
- **7.5% interest** for over 50% production increase, with an additional “climate contribution” to personal savings or insurance fund, or to a Regional Adaptation Fund for production above 100% increase.

Loan Forgiveness

Under force majeure events like extreme weather events or significant price volatility, partial or full loan forgiveness options are available to mitigate financial risk for farmers. This would initially be funded by government and donor sources, and eventually through a private market credit enhancement solution as described below.

Near-Term Action

As part of the grant and publicly funded incubation planning workshops process, align on priority

themes and design, with potential service providers, the Incubation priorities, raise grant and subsidized loan finance (e.g., from Agrobanco at 3%), go through a troubleshooting exercise to streamline deployment with designs as amended through the Workshops. An early area of action might be with the Biocreditos program to bridge their funding into the earlier transition phase through Agrobanco’s funding.

2. FARMER CREDIT ENHANCEMENT FINANCING SOLUTION

Risk mitigation solutions play a crucial role in securing investor confidence and ensuring smallholder engagement. These are critical to cover force majeure events that are outside of the control of borrowers or lenders. Key mechanisms for assessment which could be valuable if made available include:

Climate Insurance

Insurance products, such as parametric insurance, can help cover costs associated with natural disasters that might impact conservation areas. This strategy reduces financial risks related to extreme weather events.

Crop Insurance

Market price fluctuation insurance may be a useful tool for commodity prices to stabilize income despite market fluctuations. This risk could also be mitigated through forward contracts from bulk buyers.

Bundled Insurance

Development of a regional insurance pool to manage climate and production risks, be an emergency fund to help farmers and conservation area managers to fund rebuilding after catastrophic climate events, or to provide ongoing funding for conservation management and transition. This Climate Resilience Fund would need to initially be funded through grants or government sources. Over time, this fund could incorporate private capital as revenue streams stabilize and risks are better understood. Examples of these funds are seen around the world through taxes against high emissions parties, or loss and damage funds.

Near-Term Action

Related to wrap-around services workshops above, conduct a risk assessment workshop, including public sector, lenders and producers, to define the scope of financial exposure for farmers and lenders from climate, health events, or other sources, and map out the minimum requirements to mitigate climate transition and force majeure risks.



3. PRIORITIZING LOW ENVIRONMENTAL IMPACT INFRASTRUCTURE WITH EMBEDDED MITIGATION

The road infrastructure strategy proposed here within the Alto Mayo LFS is designed to maximize economic benefits while minimizing environmental costs. The following approaches are integral to achieving this balance:

Conduct Economic-Environmental Cost-Benefit Analysis

- **All potential roads analyzed together** to permit good decision making the entire network of potential roads in the LERDS should be considered as a group.
- **Impact assessment:** Each proposed road segment should undergo a comprehensive impact assessment to evaluate economic benefits against environmental costs. Standard approaches to evaluating road economic impacts (e.g., Roads Economic Decision - RED, or Highway Development and Management Model - HDM-4) can be used, alongside deforestation modeling and national and regional data on other environmental and social attributes that need to be accounted for.
- **Prioritization:** No road segment projected to be an economically bad investment (i.e., costs greater than benefits) should be built. Amongst road segments projected to generate positive returns, only those with high economic value and low environmental impact should be prioritized for construction. The tradeoff decision in this second category of prioritization can be informed by impact assessment data as well, considering how much environmental damage is acceptable in the name of development, or conversely how much development justifies a given level of environmental damage.

Selectively Develop Only High-priority Roads with Full Costing

- **Selective development:** Instead of broadly expanding road infrastructure, build only strategically valuable roads that support regional economic goals without causing extensive ecological harm. Roads that align with low-emission, climate-resilient objectives are prioritized to balance development needs with sustainability goals. This will likely include location of environmental priority areas, as well as development hubs as economic priority areas.
- **Incorporate good design:** Road designs should incorporate climate risks and resilience measures to withstand extreme weather events, which are increasingly common due to climate change. Design should also be appropriately sensitive to environmental and social issues. These measures can help ensure that roads deliver stable societal benefits. Practically they also help roads last, minimizing long-term maintenance costs and ensuring continuity in regional connectivity.

- **Integrate and fund externalities:** All anticipated environmental damage should be quantified and appropriate mitigation mechanisms funded in the development and construction budget.

For this prioritization approach to work, a strong regional coordination body is needed to ensure that social and environmental concerns are adequately represented, as well as stewarding broader considerations for water and forest ecosystem protection.

Near-Term Action

During the Incubation planning period, hold a workshop to engage key stakeholders in the regional government, Ministry of Transport and Communications, and civil society, as well as define the process and timing.

4. LANDSCAPE COORDINATION ENTITY

Building on collaborations around the LERDS, identify means to support a dedicated landscape coordination entity to ensure long-term success across the landscape. This body should include equitable participation, facilitate public-private collaboration. A centralized data repository could also be created to provide transparent monitoring of environmental, social, and economic outcomes, aiding government bodies, investors, and supply chain actors in assessing impact and making informed decisions:

Near-Term Action

Hold a break-out workshop during the early Incubation planning period to define the scope of responsibilities, membership and governance structure, and process to set and manage landscape performance metrics, which can build on the existing LandScale process.





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