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TECHNICAL REPORT

Financing Mechanisms for Resilient Multifunctional Landscapes

Fitsum Hagos, Avinandan Taron, Christopher Agyekumhene, and Solomie Gebrezgabher

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Authors

Fitsum Hagos, Social Science – Economist, International Water Management Institute (IWMI), Addis Ababa, Ethiopia
Avinandan Taron, Researcher – Environmental and Resource Economist, IWMI, Colombo, Sri Lanka
Christopher Agyekumhene, Researcher – Sustainable Finance, IWMI, A**ccra,** Ghana
Solomie Gebrezgabher, Senior Researcher – Economics, IWMI, Accra, Ghana

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Contents

1. Introduction

Sustainable and resilient landscapes are central to achieving global climate, biodiversity, and developmental goals. However, many landscapes across the Global South face accelerating pressures, including land degradation, deforestation, water scarcity, biodiversity loss, and climate-induced shocks, which undermine ecosystem services and local livelihoods (Ellis et al. 2013; Steffen et al. 2011). These challenges are further compounded by fragmented land-use governance, limited public budgets, insufficient private capital, and the lack of long-term financing mechanisms to support integrated landscape management (Shames and Scherr 2020).

Simultaneously, national governments and development partners increasingly recognize they must not pursue climate mitigation, climate adaptation, food security, biodiversity conservation, and livelihood improvement in isolation. Traditional sectoral approaches to agriculture, forestry, and conservation often fail to address the interconnected nature of ecosystems and human activities, leading to fragmented outcomes and inefficiencies (Scherr et al. 2013). Multifunctional landscape approaches provide a system-based framework for aligning these objectives (Lovell and Johnston 2008). However, despite the growing consensus on their importance, funding for landscape-scale interventions remains inadequate, short-term, and poorly coordinated. Unlocking investment at scale requires an understanding of financing gaps, institutional constraints, and policy and market conditions that can attract diverse forms of capital (Shames and Scherr n.d.).

Multifunctional landscapes are geographic areas where ecological, productive, and social functions are managed in an integrated manner to deliver multiple benefits. These benefits include food and fiber production, carbon sequestration, biodiversity conservation, watershed protection, climate resilience, and improved livelihood. Unlike sector-based interventions, multifunctional landscape approaches emphasize spatial integration, cross-sectoral coordination, and multi-stakeholder governance, thereby enabling more resilient and equitable resource management systems. By recognizing the interdependence of natural ecosystems, agricultural systems, and human communities, multifunctional landscapes provide a platform for designing investments that deliver co-benefits across climate, environmental, and developmental outcomes (Lovell and Johnston 2008, Mander et al. 2007, Otte et al. 2007).

Effective landscape management requires predictable, long-term financing to support activities such as restoration, climate-smart and regenerative agriculture, ecosystem conservation, sustainable forestry, water resource management, and community stewardship (Shames et al. 2014). However, financing flows for nature and landscape interventions remain insufficient, fragmented, and heavily reliant on short-term projects (Shames and Scherr n.d.). Sustainable financing mechanisms, ranging from public expenditure tools and fiscal incentives to market-based instruments, carbon markets, blended finance structures, and community-driven financing, are essential for mobilizing resources at scale. They help reduce investment risks, attract private capital, support community participation, and align national policies with global climate and biodiversity commitments. Without robust financing frameworks, the transformative potential of multifunctional landscapes cannot be realized.

This report endeavors to deliver an evaluation of sustainable financing mechanisms for multifunctional landscapes, with the objective to analyze the existing financing gaps, barriers, and challenges that constrain investment in integrated landscape management. This study offers a structured typology of sustainable financing mechanisms, encompassing public, private, donor, market-based, community-based, and risk-mitigation instruments. It aims to document global and regional case studies from Africa, Asia, and Latin America that exemplify innovative financing models and provide practical insights. Furthermore, it seeks to evaluate the enabling conditions and institutional arrangements that fortify the financial ecosystem for landscape investments. Additionally, the report identifies emerging trends and innovations that can support scalable, long-term financing pathways for nature, climate, and livelihoods.

The report is organized into five interconnected sections aimed at supporting policymakers, practitioners, and investors. The next section defines multifunctional landscapes, articulates the rationale for integrated financing, and situates landscape finance within the global climate and biodiversity agendas. This section is followed by a discussion on gaps and barriers in financing. The section explores structural constraints, including institutional fragmentation, risk perceptions, information asymmetries, and policy challenges, that impede investment. The fourth section provides a comprehensive classification of sustainable financing instruments and presents empirical examples from Africa, Asia, and Latin America. The last section deals with enabling environment and innovations. It provides a guideline towards the policy, regulatory, governance, MRV (Measurement, Reporting, and Verification), and safeguard systems necessary to facilitate large-scale finance, alongside emerging innovations.

2. Conceptual and Analytical Framework

Sustainable financing mechanisms refer to the institutional, policy, and market arrangements that mobilize, allocate, and manage financial resources to achieve long-term environmental, social, and economic goals. Sustainable financing for landscape management comprises funding flows and instruments that i) internalize externalities by compensating providers of ecosystem services; Ii) are structured to be scalable and sustainable in the long term; and iii) align incentives with desired ecological and social outcomes (Reed et al. 2022). This definition builds on payment for ecosystem services (PES) logic while encompassing diverse market, public, and blended instruments that match finance type to project conditions and objectives (Reed et al. 2022, Guo et al. 2018).

The framework for Sustainable financing for landscape management has five interconnected components (Figure 1). Sustainable financing mechanisms function as corrective instruments that make conservation and sustainable management economically rational for land managers. The theoretical foundation to the financing mechanisms includes the internalization of the externalities, lowering transaction costs and de-risking the dynamic systems. Enabling conditions for sustainable finance in landscape management include several key factors that support the mobilization and effective use of finance in landscape management that balances ecological integrity with social and economic resilience.

Firstly, good governance is vital, encompassing transparent, inclusive, and accountable institutions that can manage financial resources and coordinate among stakeholders while ensuring adherence to sustainability goals (Keesstra et al. 2024). Governance structures must foster collaboration across sectors and scales to enable landscape-level planning and decision-making that integrates environmental, social, and economic objectives (Plieninger et al. 2020). Secondly, enabling policies and regulatory frameworks are critical to provide clarity, stability, and incentives for investments targeting sustainable land use and ecosystem services. These frameworks reduce uncertainties and risks for investors, supporting long-term commitment and innovation in financing mechanisms for sustainable land management (Fu et al. 2024). Thirdly, social acceptance and stakeholder engagement are fundamental. Inclusive approaches that actively involve local communities, landowners, businesses, and civil society build trust, ensure alignment of interests, and increase the likelihood of sustainable finance adoption and landscape stewardship (Plieninger et al. 2020, Marques et al. 2016). Fourthly, viable economic conditions and financial viability play an enabling role. Sustainable financing mechanisms must demonstrate economic returns or co-benefits that appeal to investors and project developers. This often involves designing innovative financial products such as green bonds, sustainability-linked loans, or ecosystem service markets to mobilize capital efficiently (Kuteesa et al. 2024). Finally, capacity building and knowledge sharing facilitate the understanding of sustainable finance opportunities and risks, improving project preparation, evaluation, and monitoring at the landscape scale (Keesstra et al. 2024).

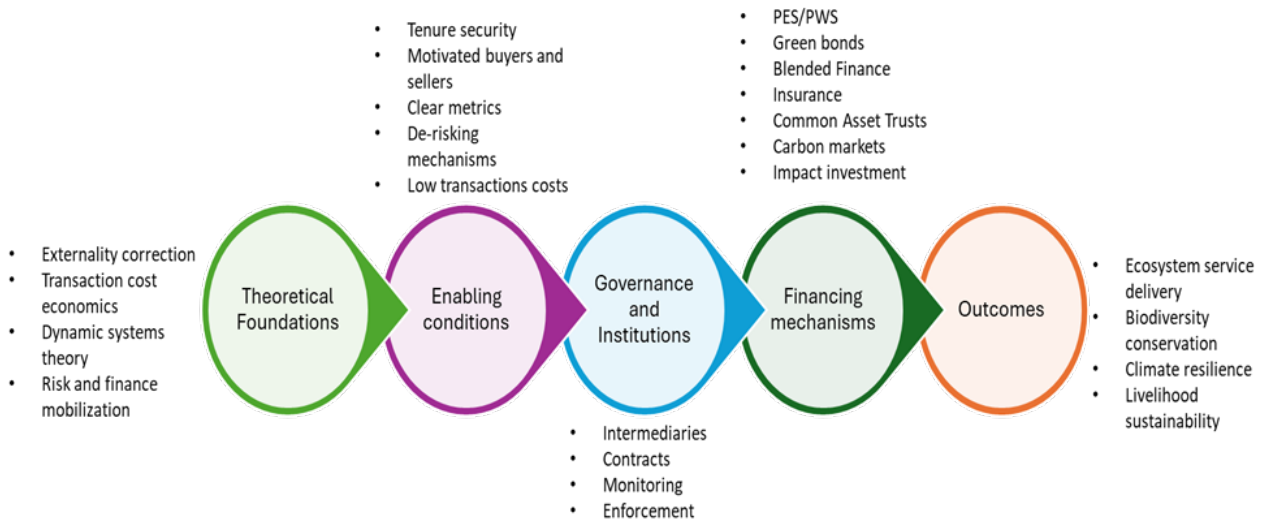

Figure 1. Conceptual framework to understand and implement sustainable finance for landscape management.

Governance structures influence stakeholder collaboration in sustainable financing for landscape management by creating inclusive, participatory frameworks that engage diverse actors such as public institutions, investors, and communities. These structures foster multi-sector partnerships, align interests, and manage power dynamics and conflicts, enabling equitable and innovative financing solutions. Polycentric governance allows flexible, context-specific approaches tailored to local needs, enhancing effectiveness and local autonomy. Good governance also ensures transparency and accountability, building investor confidence and supporting coherent financial and regulatory mechanisms. Overall, governance facilitates coordinated, trusted collaboration essential for mobilizing and managing sustainable finance in landscape management (Macdonald et al. 2017, Hedden-Dunkhorst and Schmitt 2020, Nonet et al. 2022, Hovardas 2021, Conrad et al. 2018).

Financing mechanisms for sustainable landscape management encompass a range of public, private, blended, and risk-covering approaches to mobilize and allocate capital effectively (Louman et al. 2020). Public financing typically includes government budgets, grants, subsidies, and development aid aimed at supporting environmental and social outcomes. Private financing involves investments from commercial banks, impact investors, green bonds, and corporate social responsibility funds seeking financial returns alongside sustainability benefits. Blended finance combines public and private capital, leveraging public funds to reduce risks and attract larger private investments, thus enhancing scale and impact. Risk-covering mechanisms, such as insurance products, guarantees, and credit enhancements, address financial uncertainties and mitigate investment risks, making sustainable landscape projects more bankable and appealing to investors. Together, these mechanisms provide a diversified toolkit to finance complex, multi-stakeholder landscape initiatives that balance ecological, social, and economic objectives (Reed et al. 2022).

However, the last component related to measuring outcomes related to financing landscapes emphasize the use of comprehensive, data-driven approaches that integrate environmental, social, and financial metrics to evaluate sustainability impacts and financial performance effectively. A fundamental practice involves collecting robust quantitative and qualitative data from diverse sources, including environmental monitoring, economic indicators, and stakeholder feedback, to capture the multifaceted effects of financed projects (Bentley and Halim 2024). Employing advanced analytics such as machine learning and predictive modeling enhances risk assessment and investment optimization, allowing stakeholders to understand long-term viability and potential impacts more accurately (Adeoye et al. 2024). Additionally, impact measurement tools track key sustainability indicators, such as carbon emission reductions, energy efficiency improvements, and social benefits like job creation, thus aligning financial objectives with environmental and social goals (Adeoye et al. 2024). Multi-dimensional frameworks that include financial returns, ecological preservation, and community well-being are critical to comprehensively assess outcomes. Transparency, ongoing monitoring, and adaptive management are also best practices, enabling dynamic responses to emerging challenges and promoting accountability among stakeholders (Sreenu 2024). Collectively, these practices support data-driven decision-making that enhances the effectiveness, scalability, and sustainability of financing in landscape management.

3. Financing Challenges for Integrated Landscape Management

3.1 Financing Gaps for Integrated Landscape Management

The Landscape Finance Lab (2025) estimates that USD 200 billion is needed annually by 2030 to meet biodiversity restoration targets under Kunming-Montreal Global Bioversity Framework. This gap underscores a major underinvestment in the natural capital that underpins food security, climate resilience, and sustainable livelihoods. While private investment into nature is growing, it is largely an untapped opportunity to scale nature-based solutions, as traditional public and philanthropic funding routes remain insufficient. Integrated landscape management requires substantial, sustained investment across multiple intervention types. These include on-the-ground restoration and agricultural improvements, as well as enabling activities such as planning, capacity building, and development of monitoring systems (Thaxton et al. 2017). The financing needs span several categories:

- **On-the-ground interventions:** this includes forest restoration, sustainable agricultural practices, water management infrastructure, biodiversity conservation activities.

- **Enabling public goods:** landscape planning processes, stakeholder coordination platforms, monitoring and evaluation systems and capacity building.
- **Long-term stewardship:** ongoing management, maintenance, and adaptive governance of landscape resources.

In developing economies, the challenge is particularly acute. Landscape investments often compete with short-term priorities like infrastructure or agricultural subsidies, while financial institutions lack pipelines of bankable landscape projects. Public expenditures tend to be project-specific, donor-dependent, and time-bound, without clear mechanisms for reinvestment or scaling (Shames et al. 2014). Three categories of interventions consistently face the most severe financing gaps – (i) smallholder finance and livelihoods, (ii) forest landscape restoration, and (iii) enabling public goods. Small-scale producers managing agricultural and forest landscapes in developing countries face acute financing constraints. Commercial lenders often perceive the businesses of smallholders as too risky, which creates a persistent gap for inclusive credit and working capital (Walker et al.). 2016, Louman et al. 2022). Traditional financial institutions struggle to serve these clients due to high transaction costs, lack of collateral, and limited credit histories. Moreover, enabling activities like landscape planning, monitoring system, and capacity building receive insufficient attention from private investors who typically seek direct financial return (Zanzanaini et al. 2017). Restoration efforts require patient investment to cover costs related to planting, ongoing maintenance, and securing long-term land tenure. Funding for restoration is insufficient compared to the actual needs across various ecosystems (Rode et al. 2019, Shames and Scherr, 2020). The long timeframes before financial returns are realized, combined with unstable land tenure and policy environments, create significant challenges for financing restoration through traditional mechanisms. The barriers to accessing finance are describe in Figure 2.

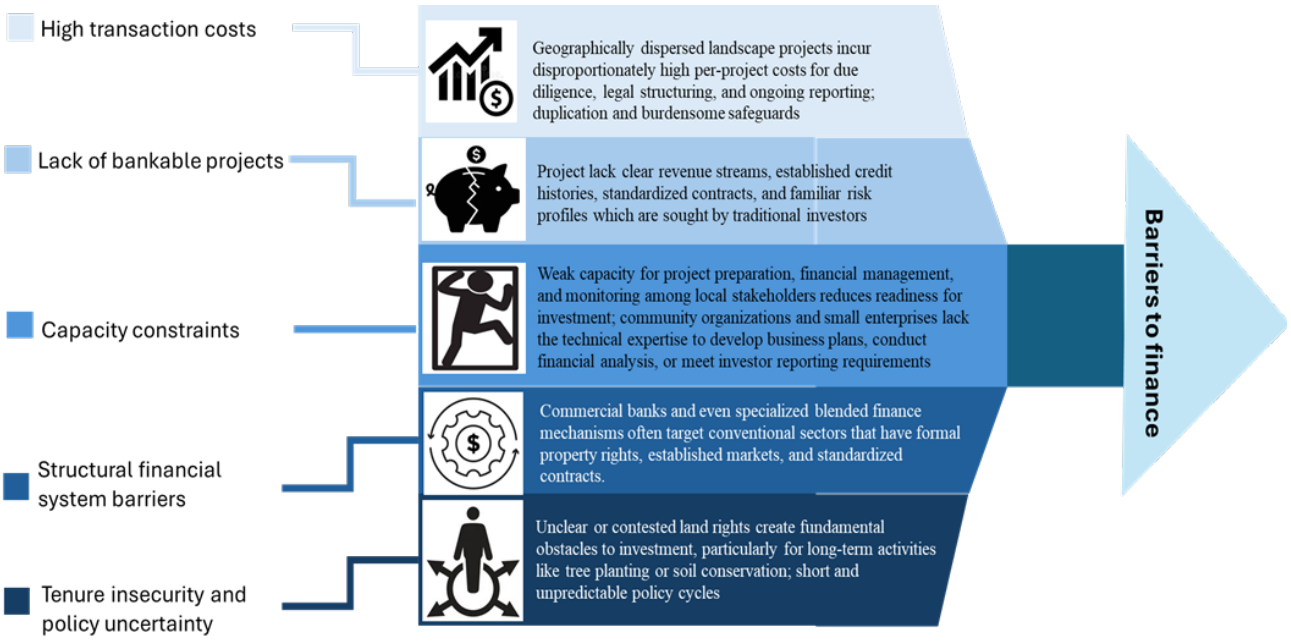

Figure 2. Barriers to accessing sustainable finance in developing economies.

3.2 Risk-return Perceptions and Information Asymmetry

A fundamental challenge is the mismatch between how investors perceive risks and returns in landscape investments versus the actual risk-return profiles of these projects. This gap is exacerbated by information asymmetry: project developers often lack the standardized data and transparent reporting that investors need to accurately assess risks (Rode et al. 2019). Private and impact investors consistently report that many landscape projects
do not meet their risk-return expectations and the factors contributing to these perceptions are:

- **Unfamiliarity:** Landscape management represents a relatively new investment category for many investors, who have limited experience and benchmarks for assessing performance.
- **Perceived complexity:** The multi-stakeholder, multi-objective nature of landscape approaches creates perceived governance and coordination risks.
- **Tenure concerns:** Unclear or contested land rights are viewed as fundamental risks that can undermine entire projects.
- **Market uncertainties:** Limited or emerging markets for ecosystem services and sustainably produced commodities create revenue uncertainties.
- **Long time horizons:** Many landscape interventions, particularly restoration activities, require patient capital with extended periods before returns materialize.

These perceptions raise the cost of capital and constrain investment flows and there exists information asymmetry between investors and project developers which result in a vicious cycle - insufficient investment leads to limited track records, which perpetuates information gaps, which in turn constrains future investment (Louman et al. 2021, Cervigni and Morris, 2016).

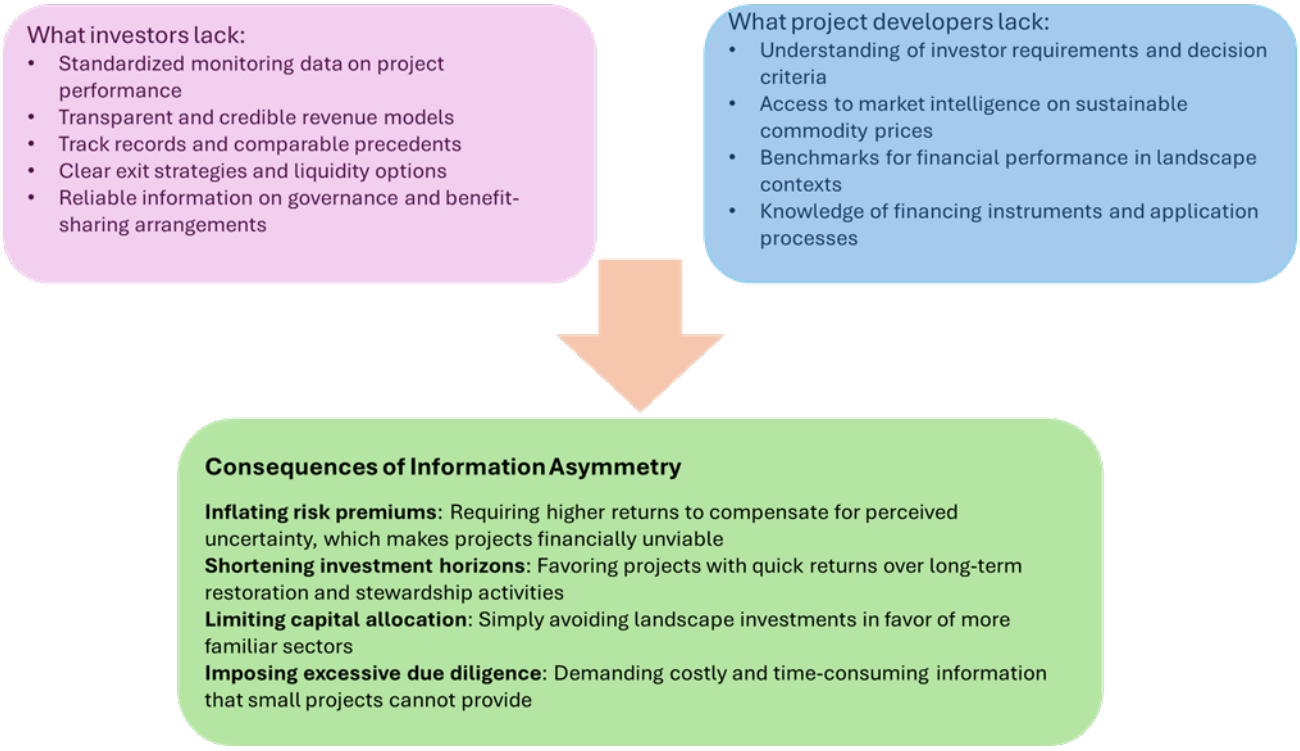

Figure 3. Factors and consequences of asymmetric information.

4. Typologies of Financing Mechanisms

Sustainable landscape financing draws from a diverse spectrum of financial resources, delivery modalities and functional objectives. No single instrument can meet the complex financing needs of multifunctional landscapes that must address mitigation, adaptation, biodiversity, resilience, and livelihoods simultaneously. Instead, landscape finance requires a portfolio approach combining public budgets, private capital, donor support, market revenues and community-driven mechanisms into a coherent, long-term financing architecture (Havemann et al. 2020).

4.1 Typologies Based on the Source of Funding

Based on sources of funds, finance may originate from public sector budgets, national trust funds, state-owned banks or fiscal transfers (Thiele and Gerber 2017, Sergi et al. 2019). This forms a major contributor to the financing mechanisms. The other sources of funds include private sector entities and international development partners. Private entities investing in agribusiness, or in the value-chain, agricultural impact investors and venture capitalists, mobilize capital and innovation to modernize agribusiness value chains, promote inclusive growth, improve productivity and supply chain quality, and address sustainability challenges (Tan 2022, Sergi et al. 2019). International development partners like bilateral agencies, multilateral development banks, climate funds, and philanthropic foundations play a significant role in the context of developing and emerging economies. Each of the above source carries different incentives, risk appetites, fiduciary standards, and time horizons, shaping the type and scale of investment it can support (Khatri-Chhetri et al. 2021).

Donor funds mainly come from international aid, multilateral institutions, philanthropic organizations, and climate finance mechanisms. These may take the form of grants, concessional loans, or performance-based instruments like Environmental Impact Bonds (EIBs). Donor financing often targets capacity building, pilot projects, and bridging funding gaps in developing regions. While donor funding is crucial, dependence on it may hamper long-term sustainability; hence, innovative approaches like blended finance are promoted to combine limited donor funds with larger private investments for landscape management (Havemann et al., 2020; Brand et al. 2021, Baker et al. 2025).

Blended finance mechanisms leverage and combine public, private, and donor funding to address the sizable financial requirements and risks associated with landscape management. This approach uses limited concessionary or catalytic public and donor funds to mobilize larger-scale private capital, aligning incentives and spreading risks to increase investment in sustainable land use and conservation efforts (Havemann et al. 2020).

4.2 Typologies based on Functionality

Sustainable landscape financing can be categorized from functionality perspective, and there are multiple objectives which are targeted. For example, climate mitigation (e.g., carbon pricing, REDD+), climate adaptation and resilience (e.g., adaptation funds, insurance products), biodiversity protection (e.g., offsets, eco-certifications), and socio-economic development (e.g., livelihood diversification, value-chain upgrading, inclusive business models) (Digitemie and Ekemezie, 2024). Aligning the functional purpose of finance with specific landscape outcomes is essential for designing coherent investment strategies.

4.3 Typologies Based on the Financing Instruments

There exists a wide range of financial instruments and mechanisms that are being designed to mobilize public and private capital. These include public expenditure tools and fiscal incentives (subsidies, taxes), debt and equity instruments, green and sustainability-linked loans, carbon pricing instruments, Payments for Ecosystem Services (PES), biodiversity offsets, eco-certifications, green bonds, REDD+ arrangements, mitigation and adaptation funds, blended finance structures, ESG-linked lending, community trust funds, insurance solutions, and sovereign risk instruments such as debt-for-nature swaps (DfNSs). Each instrument (Table 1) differs in maturity, risk-transfer mechanisms, market orientation, and suitability for specific ecosystem and socio-economic contexts.

Table 1. Types of different financing instruments

Classification	Subcategory	Definition
Equity Instruments	Common Stock	Represents ownership in a sustainable enterprise based on profits generated from sustainable operations or positive environmental and social outcomes leading to long-term value creation.
	Preferred Stock	This financial instrument grants ownership with predetermined dividend payouts, giving investors precedence over common shareholders in asset allocation during liquidation and is especially appealing to those looking for consistent returns while investing in sustainable landscape initiatives.
Debt Instruments	Bonds (particularly green bonds/ sustainability bonds)	Long-term debt securities where the issuer raise capital specifically for projects benefiting environment (reforestation, watershed management, and sustainable agriculture) and pays interest to the holder.
	Loans	Loans, similarly, can be structured with sustainability criteria—such as concessional loans or blended finance—to support long-term, large-scale landscape projects that may not otherwise attract traditional financing due to their complexity or longer payback periods.
Market-Based Mechanisms	Carbon Pricing	A market-based approach involving fees or trading of carbon emissions to incentivize reductions and support ecosystem services.
Fiscal Incentives	Subsidies & Taxes for Private Green Investments	Government financial incentives or disincentives to promote private sector investments in sustainable land management and conservation.
Public Finance	Public Green Investment	Direct government funding for projects promoting ecosystem restoration, sustainable land use, and multifunctionality.
Fiscal Policy Reform	Green/Environmental Fiscal Reform	Reforms in fiscal policies aimed at internalizing environmental costs to support landscape multifunctionality and sustainability.
Payments for Ecosystem Services (PES)	Payments for Ecosystem Services	Financial rewards given to land managers who maintain or enhance ecosystem services beneficial for multifunctional landscapes.
Mitigation Instruments	Biodiversity Offsets	Compensatory conservation efforts to offset biodiversity loss due to development or land-use change.
Certification Schemes	Eco-Certifications	Voluntary certifications ensuring that products or services support sustainable landscapes and ecosystem services.
Green Bonds and Finance	Green Bonds	Debt instruments raising capital for projects with environmental benefits and multifunctional outcomes.
Climate Finance	REDD+ (Reducing Emissions from Deforestation and Degradation)	Programs that provide financial incentives to reduce deforestation and enhance carbon stocks in multifunctional forest landscapes.
Blended Finance	Adaptation/Mitigation Funds	Dedicated funds for supporting climate adaptation and mitigation strategies in multifunctional landscapes.
	Blended Finance	Combining public/private funds and concessional finance to leverage investment in sustainable landscape projects.

Classification	Subcategory	Definition
Sustainable Lending	Environmental, Social and Governance (ESG)-Linked Lending	Loans with terms linked to the borrower's performance on ESG criteria, encouraging sustainable landscape management.
Community Finance	Community Trust Fund	Financial mechanisms where community members pool resources to support local sustainable land and resource management.
Debt Instruments	Debt-for-Nature Swaps (DfNSs)	Agreements where debt is forgiven in exchange for commitments to conservation or sustainable land management.
Risk Management	Insurance	Financial products that protect against environmental risks, supporting resilience of multifunctional landscapes.

Source: Eyo-Udo et al. 2024; Simpa et al. 2024; Dafermos and Nikolaidi 2019; Taneja et al. 2022; Digitemie and Ekemezie 2024; Kilgore et al. 2017; Ding et al. 2021; Zamora-Cristales et al. 2022; Ranjan 2024; Wallbott et al. 2019; Reed et al. 2020; Xie et al. 2021; Bell et al. 2018; Buschke et al. 2017; zu Ermgassen et al. 2019; McFarland 2018; Maltais and Nykvist 2020; Tolliver et al. 2020; Angelsen et al. 2018; Schalatek et al. 2020; Rode et al. 2019; Bui et al. 2021; Canning et al. 2021.

Financing instruments used in Asia, Africa, and Latin America for landscape management and sustainable development differ significantly due to variations in financial market maturity, regulatory environments, institutional capacities, and socio-economic contexts.

In Asia, particularly in emerging economies, financial instruments for sustainable development prominently include innovative instruments such as green bonds, green lending, and blended finance that combine public and private funds.
Asian countries emphasize developing green financial governance frameworks and market innovations to attract private sector investments towards sustainable projects. However, regulatory obstacles and information asymmetry still hinder full market development. The focus is on mobilizing private capital through sustainable finance markets combined with public incentives and policies to support sustainable infrastructure and renewable energy (Prakash and Sethi 2021, Volz 2018).

In Africa, financing instruments are often constrained by limited financial infrastructure and capacity, leading to greater reliance on concessional loans, grants from donors, international funds, and public-private partnerships to finance renewable energy and sustainable projects. Green bonds are emerging as critical tools but are less developed compared to Asia. African initiatives often emphasize capacity building, regulatory reforms, and international collaborations to stimulate climate finance. The financial instruments are designed to accommodate higher risks and to leverage international support aimed at climate resilience and sustainable development (Adisa et al. 2024, Ayorinde et al. 2024, Versal and Sholoiko 2022).

In Latin America, financing mechanisms similarly include green bonds, but the region faces distinct challenges linked to socio-political contexts, land tenure issues, and market fragmentation. Urban development financing reflects patterns of exclusion and inequality, influencing how investments are made. There is growing use of international capital mobilization for renewable energy and green economy projects. Latin America benefits from active participation of supranational institutions and increasingly from sustainable finance instruments addressing environmental and social projects, though with institutional and governance challenges (Kusters et al. 2006 Klaufus et al. 2017).

Overall, while all three regions employ green bonds, public-private partnerships, concessional loans, and international grants, Asia's emphasis on developing green financial markets contrasts with Africa's reliance on donor funds and capacity building, and Latin America's challenges with socio-political contexts and structural inequalities influence the effectiveness and choice of financing instruments. These regional variations underscore the need for context-specific policies and innovative blended finance solutions to mobilize sufficient capital for sustainable landscape management and development (Table 2).

Table 2. Comparison of different financing instruments used across in region of Global South.

Dimension	Asia	Africa	Latin America
Dominant Financing Mechanisms	Public **Payment for Ecosystem Services (PES)** programs, **national environmental funds**, and **blended finance** for agriculture and forestry (e.g., China's Grain for Green, Vietnam's VNFF, Indonesia's TLFF)	**Blended finance** for restoration and value chains, **national green/climate funds**, and **results-based payments** (e.g., Rwanda's FONERWA, Ghana Cocoa-REDD+)	**Environmental and biodiversity funds**, **PES**, green and **blue bonds**, and **market-based carbon/credit systems** (e.g., Brazil's Amazon Fund, Costa Rica's FONAFIFO, Colombia's biodiversity bond)
Institutional and Policy Maturity	High policy integration and fiscal embedding of PES within national budgets; strong central coordination and decentralization to provinces	Emerging but improving integration of climate, land, and finance institutions; strong regional initiatives (AFR100, Great Green Wall)	Mature institutional frameworks linking national funds and market instruments; advanced monitoring and verification capacities (Brazil, Mexico, Costa Rica)
Private Sector Engagement	Expanding role through **corporate value chains** and sustainability-linked finance (e.g., agroforestry, renewable energy)	Increasing engagement through **PPP and value-chain finance**; early-stage green bond markets	Deepening involvement through **impact funds, green/biodiversity bonds, and sustainable commodity certification**
Community and Cooperative Role	Strong presence in **community forestry and agroforestry cooperatives** (e.g., Nepal, India)	Community participation integrated via p**ublic employment and watershed programs** (e.g., Ethiopia SLMP, Kenya Water Fund)	Longstanding community and indigenous stewardship models; PES and ecotourism revenues reinvested locally (e.g., Peru, Costa Rica, Mexico)
Scale and Investment Flows	Large-scale programs (hundreds of thousands to millions of ha) financed primarily by national public budgets and development loans	Moderate-scale programs leveraging international donor and climate finance with co-benefits for livelihoods	Increasing private capital flows—**USD 17 billion annually in Brazil** alone for land use; strong linkage between climate finance and biodiversity targets
Monitoring and Verification (MRV) Systems	Satellite-based MRV for forest cover and water services institutionalized (China, Vietnam)	Growing digital MRV integration through donor support (e.g., SERVIR-Africa, LEAF Coalition)	Advanced MRV and carbon accounting systems; global models for REDD+, PES, and biodiversity credits (Brazil, Costa Rica)
Scalability and Replication Potential	High—due to government ownership, clear policy frameworks, and fiscal incentives	High—driven by regional restoration commitments and emerging blended-finance pipelines	High—mature regulatory systems and strong investor confidence in green financial products
Main Donor Entry Points	Technical assistance for PES scaling, green taxonomy development, and risk-sharing facilities	Capitalization of climate/ environmental funds, guarantee facilities, and smallholder value-chain finance	Catalyzing biodiversity finance, private investment blending, and replication of fund models (Amazon Fund, FONAFIFO)

4.4 Typology Based on Thematic Clusters

Sustainable landscape finance operates across distinct but interconnected thematic domains, each requiring tailored financial instruments and business models. These domains represent functional entry points for mobilizing investment, ranging from ecosystem restoration to climate-smart agriculture, resource recovery, and emerging digital markets. Within each theme, financial mechanisms determine how capital flows while business models define how returns are generated and sustained.

1. **Restoration and Conservation Landscapes** focus on regenerating forests, watersheds, and degraded lands through results-based and performance-linked financing.
2. **Climate-Smart and Resilient Production Systems** integrate sustainable agriculture, forestry, and fisheries with value-chain financing and insurance to manage risks and enhance productivity.
3. **Circular Bioeconomy and Resource Recovery Systems** transform organic waste into energy and bio-products, leveraging blended finance and public–private partnerships.
4. **Community and Cooperative Finance Models** strengthen inclusivity and ownership by channeling microfinance, revolving funds, and social enterprises into landscape management.
5. **Green and Blue Market Mechanisms**—including PES, bonds, and credit markets—monetize ecosystem services, carbon sequestration, and biodiversity values.
6. **Innovative and Digital Finance Mechanisms** use fintech, tokenization, and blended structures to expand transparency and attract private investment at scale.

photo: Freepik

Table 3. Thematic clusters of financing mechanisms and business models.

Thematic Cluster	Financing Mechanism	Definition / Key Features	Linked Business Models
1. Restoration and Conservation Landscapes	**Payment for Ecosystem Services (PES)**	Direct payments for maintaining or restoring ecosystem services such as carbon sequestration, water regulation, and biodiversity protection.	Landscape stewardship cooperatives; forest user associations; watershed management groups
	Results-Based and Impact Financing	Financing disbursed upon achievement of verifiable environmental or social outcomes; aligns public and private incentives.	REDD+ programs; restoration enterprises; impact-oriented investment funds
	Landscape Trusts and Endowment Funds	Long-term investment vehicles generating returns for conservation, restoration, and community livelihood initiatives.	Protected area funds; multi-stakeholder landscape platforms; conservation endowments
2. Climate-Smart and Resilient Production Systems	**Sustainable Value Chain and Agribusiness Finance**	Credit and investment tools embedding sustainability criteria into commodity production and trade finance.	Certified producer groups; cooperative agribusinesses; regenerative agriculture SMEs
	Fiscal Incentives and Subsidy Reforms	Policy tools redirecting public subsidies and tax benefits toward sustainable farming and low-emission practices.	Eco-restoration enterprises; climate-smart cooperatives; green input suppliers
	Green, Blue, and Landscape Bonds	Debt instruments financing sustainable production and infrastructure within defined environmental objectives.	Agricultural sustainability funds; landscape consortia; resilient infrastructure operators
3. Circular Bioeconomy and Resource Recovery Systems	Blended Finance and Risk-Sharing Structures	Combine concessional and commercial capital to de-risk investment in circular bioeconomy ventures.	Waste-to-energy PPPs; biofertilizer SMEs; biomass-based mini-grids
	Public–Private–Community Partnerships (PPCPs)	Joint investment arrangements integrating public oversight, private capital, and community implementation for sustainable resource use.	Green industrial parks; local energy cooperatives; municipal composting ventures

Thematic Cluster	Financing Mechanism	Definition / Key Features	Linked Business Models
4. Community and Cooperative Financing	**Cooperative and Community-Based Finance Models**	Revolving and microfinance systems governed by communities for local investment in land restoration and livelihoods.	Village savings and loan groups; forest user cooperatives; women-led enterprise clusters
	National Environmental and Landscape Funds	Centralized mechanisms pooling government, donor, and private finance to support local landscape initiatives.	Community grant schemes; local climate adaptation funds; PES intermediaries
5. Green and Blue Market Mechanisms	**Carbon, Biodiversity, and Water Credit Markets**	Market-based mechanisms monetizing verified ecosystem outcomes through voluntary or compliance trading.	Carbon farming enterprises; biodiversity offset providers; water stewardship networks
	PES-linked Environmental Markets	Advanced PES models integrating tradable credits and digital MRV systems for transparency and scalability.	Hybrid PES–credit operators; digital environmental brokers
6. Innovative and Digital Finance	**Digital and Tokenized Ecosystem Assets**	Use of blockchain, fintech, and digital registries to tokenize and trade verified ecosystem services.	Green fintech start-ups; tokenized carbon/ biodiversity exchanges; community MRV service providers
	Blended and Impact Investment Facilities	Pooled funds deploying multiple financial instruments (loans, equity, guarantees) to scale investment in sustainable landscapes.	Restoration funds; climate venture accelerators; nature-positive impact portfolios

5. Innovations and Emerging Trends in Governance and Institutional Systems for Landscape Finance

There are different enablers required to create sustainable financing mechanisms for landscape management (Figure 4). Effective governance underpins all sustainable landscape financing efforts. Financing mechanisms cannot function without institutions capable of coordinating across sectors, enforcing rules, allocating budgets, and monitoring outcomes. Because multifunctional landscapes span agriculture, forestry, water, climate mitigation, and rural development, they often suffer from fragmented mandates and uncoordinated public spending (Digitemie and Ekemezie 2024; Faijue et al. 2024, Yunus and Nanda, 2024, Lakasse et al., 2024).). Strong governance frameworks reduce investment risks, support tenure security, and generate the transparency that donors and private financiers require (Chu et al. 2019, Edunjobi 2024).

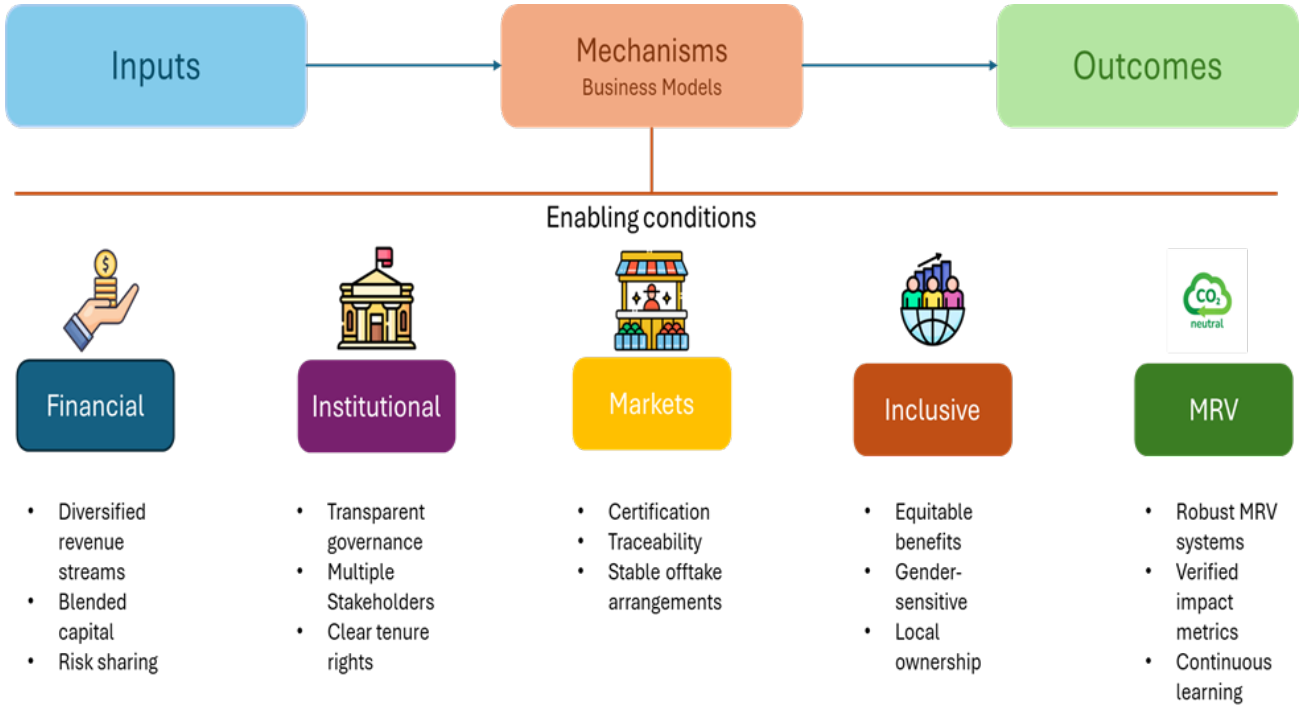

Figure 4. Enablers to create sustainable finance for landscape management.

5.1 Institutional Roles and Coordination Mechanisms

Landscape financing requires a clear division of responsibilities across ministries, subnational authorities, communities, and the private sector. National inter-ministerial councils are a common coordination mechanism, ensuring alignment between climate commitments, NDC targets, land-use policies, and public financing streams. Landscape or watershed authorities serve as mid-level governance hubs responsible for planning, ecosystem restoration, and integrating donor-supported investments (Röser et al. 2020).

Multi-stakeholder platforms (MSPs) are essential for collective action in complex land-use mosaics. Evidence shows that MSPs improve legitimacy, reduce conflict, and enable co-designed investment priorities (Sarmiento Barletti and Larson 2020). The private sector plays a growing role through value-chain finance, carbon market participation, and blended finance partnerships—but requires predictable policies and reliable institutional counterparts (World Bank 2020).
Development partners and climate funds act as catalytic financiers, technical supporters, and fiduciary overseers of landscape-scale investments (Thiele and Gerber 2017).

5.2 Policy and Regulatory Frameworks

Clear and coherent policy frameworks are essential for facilitating sustainable investment in landscape management. Secure land and resource tenure is consistently recognized as a significant predictor of successful Payments for Ecosystem Services (PES), Reducing Emissions from Deforestation and Forest Degradation (REDD+), and restoration financing. Ambiguous tenure arrangements increase transaction costs and deter private investors. Environmental and climate policies—such as climate acts, forest codes, biodiversity strategies, and carbon market regulations—serve to align national development goals with landscape finance opportunities. Fiscal policies also influence investment incentives; for instance, subsidy reforms, environmental taxes,
and green levies have been demonstrated to unlock domestic revenue and redirect financial flows toward restoration. Emerging carbon market and environmental service regulations are becoming increasingly important. Robust monitoring, reporting, and verification (MRV) requirements, transparent registries, and standardized methodologies are critical for ensuring market integrity and investor confidence. Inadequate regulatory clarity remains one of the most persistent barriers to scaling landscape finance.

Landscape finance depends fundamentally on the strength and coherence of regulatory frameworks governing land, water, forests, climate, and carbon assets. Key domains include:

1. **Land and Resource Tenure Policies -** Secure tenure is a prerequisite for PES, REDD+, and restoration markets. Clear rules on tree ownership, carbon rights, communal lands, and benefit-sharing reduce transaction costs and attract private finance (Bakunova 2022).
2. **Environmental and Climate Regulations** - Climate acts, forest codes, biodiversity strategies, and national carbon market frameworks ensure alignment of investment with national goals (Roy and Bhan 2024).
3. **Fiscal and Incentive Instruments -** Governments shape financial flows through various means, including green subsidies and incentive programs, environmental taxes and levies, and the reform of harmful subsidies such as those for fuel, fertilizer, and land conversion incentives. Evidence indicates that these reforms enhance domestic resource mobilization and influence behavior change.

Carbon Market Regulations - With the increasing prominence of voluntary and compliance carbon markets, it is essential for governments to establish clear regulations regarding Carbon ownership and transferability. MRV and registration processes. Integrity standards that align with global best practices (McFarland 2018).

5.3 Multilevel Governance for Landscape Finance

Landscape finance necessitates coordination across national, provincial, and local governmental levels. National institutions are responsible for establishing policies, standards, and climate finance priorities. In contrast, provinces and districts oversee land-use planning, natural resource governance, and adaptation implementation. Local authorities and communities are directly involved in managing land, forests, rangelands, and water systems.

Robust multilevel governance has been demonstrated to enhance outcomes in watershed management, REDD+ implementation, and ecosystem restoration. Mechanisms such as joint planning committees, co-management agreements, and ecological fiscal transfers bolster vertical alignment and provide subnational authorities with the incentives and resources required to invest in natural capital.

Community and Indigenous institutions play a pivotal role in effective landscape governance. Research indicates that landscapes governed by Indigenous peoples often exhibit lower deforestation rates, higher biodiversity outcomes, and more effective restoration. Their stewardship systems, when recognized and empowered, offer a foundation for equitable finance distribution and conflict resolution.

5.4 Capacity and Data Systems for Financial Accountability

Ensuring financial accountability is crucial for maintaining donor confidence and attracting both private and blended financial resources. Institutions must establish robust systems for budgeting, procurement, auditing, and anti-corruption that comply with the fiduciary standards mandated by climate funds and multilateral banks. High-integrity monitoring, reporting, and verification (MRV) are fundamental to landscape finance. The efficacy of carbon markets, biodiversity credits, payment for ecosystem services (PES) schemes, and resilience finance is contingent upon verifiable ecological and socio-economic data. Recent advancements in remote sensing, digital MRV, and spatial data systems provide cost-effective tools for impact tracking. However, capacity gaps, particularly within subnational governments and local organizations, continue to pose significant challenges. Research indicates that without investment in institutional capacity, even substantial financial resources fail to yield sustainable landscape outcomes. Enhancing local technical expertise, project development skills, and financial literacy is essential for improving the pipeline of viable landscape projects.

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Contact
Avinandan Taron, Researcher Envronmental and Resource Economist, IWMI, Colombo, Sri Lanka (a.taron@cgiar.org)

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