Incentives and financing mechanisms for improved landscape management, biodiversity conservation, nature-based solutions and livelihood development

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The present report has been prepared by CIFOR-ICRAF as part of a study for the World Bank to provide Technical Assistance in Forestry and Rural Development in Rwanda under PROGREEN (https://www.progreen.info/about_page).

The development objective of the study is to support the identification and design of incentive mechanisms and the development of technical readiness for improved landscape management, biodiversity conservation, nature-based solutions and livelihood development in the Congo-Nile Ridge (CNR) landscape in Rwanda.

The study had four tasks: Review of and recommendations for 1) tree improvement, 2) forest management planning, 3) development planning for biodiversity conservation and tourism development, and 4) developing stakeholders' incentives and appropriate financing mechanisms.

This report is on Task 4.

Cover photo: The red-tailed monkey (*Cercopithecus ascanius*), photographed in Nyungwe National Park.
Photo by Fabio Pedercini/CIFOR-ICRAF

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List of abbreviations

ARCOS	Albertine Rift Conservation Society
BIOFIN	Biodiversity Finance Initiative
BRD	Development Bank of Rwanda
CAF	Community Adaptation Fund
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CECF	Community Environmental Conservation Fund
CER	Certified emission reductions
CIFOR-ICRAF	Center for International Forestry Research - World Agroforestry
CNR	Congo-Nile Ridge
CNFS	Climate and Nature Finance Strategy
ESG	Environment, Social and Governance Framework
GEF	Global Environment Facility
GMNP	Gishwati-Mukura National Park
ICPC	Integrated Crafts Production Centre
IUCN	International Union for Conservation of Nature
KIFC	Kigali International Financial Centre
MINECOFIN	Ministry of Finance and Economic Planning
NBSAP	National Biodiversity Strategy and Action Plan
NDC	Nationally Determined Contribution
NGO	Non-governmental organization
NST	National Strategy for Transformation
OAF	One Acre Fund
ORTPN	L'Office Rwandaise de Tourisme et des Parcs Nationaux
PES	Payment for ecosystem services
PROGREEN	Global Partnership for Sustainable and Resilient Landscapes
RAB	Rwanda Agriculture and Animal Resources Development Board
RDB	Rwanda Development Board
REMA	Rwanda Environment Management Authority
RFA	Rwanda Forestry Authority

RGF	Rwanda Green Fund
RWB	Rwanda Water Resources Board
RWF	Rwandan Franc
SACCO	Saving and Credit Cooperative
TRS	Tourism revenue sharing scheme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
VCM	Voluntary carbon market
WVR	World Vision Rwanda

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Executive summary

Despite ongoing efforts, a noticeable gap persists in the availability of financial tools to expedite sustainable landscape management and biodiversity conservation in Rwanda. Rwanda grapples with challenges in climate finance, as outlined in its Third National Communication, including limited budgets for climate action implementation, and restricted private sector involvement in environmental and climate change activities.

This study employed a multifaceted approach to evaluate existing incentives and provide financing mechanism recommendations for sustainable land management and biodiversity conservation in Rwanda. The approach used included a comprehensive literature review to gain a foundational understanding of the existing landscape; the administration of semi-structured questionnaires to 22 key actors; a stakeholder consultation workshop for district forest and natural resources officers from nine Congo-Nile Ridge (CNR) landscape districts; and focus group discussions with 15 sector forest officers and 21 lead farmers.

The literature review indicated that Africa has adopted various innovative incentives and financing mechanisms for sustainable land management and biodiversity conservation. Notable is South Africa's Wildlife Conservation Bond, launched in 2022, that focuses on rhino conservation and offers principal protection with performance bonuses. Additionally, the Upper Tana-Nairobi Water Fund initiative has been financing sustainable landscape management, operating a blended finance model. Other regional efforts include Uganda's Plan Vivo Framework, the Democratic Republic of the Congo's Mampu plantation project, and Kenya's Payment for Water Ecosystem Services initiatives, all of which enhance local economies, community involvement and ecological integrity.

African examples demonstrate how combining financial empowerment with environmental stewardship can lead to enhanced ecological and social outcomes. Local communities and private actors are more likely to invest in conservation efforts and nature-based solutions when they see clear benefits and engage with trusted partners. These examples offer lessons and inspiration for crafting effective incentives and financing mechanisms tailored to Rwanda's unique context and environmental goals.

A review of Rwanda's sustainable land management and biodiversity conservation funding shows heavy reliance on external sources. This underscores the need to boost domestic funding and leverage both local and international resources, aligning with Rwanda's policies and green economy goals. Over the past decade, Rwanda has innovated in financial tools to promote sustainable landscape management and attract both domestic and international finance. Since 2012, the Rwanda Green Fund has raised USD 274 million, supporting 46 green projects. Other initiatives, such as the Community Adaptation Fund and proposed biodiversity and environment conservation funds, focus on enhancing community engagement and sustainability. Recent ventures such as Ireme Invest and the Intego facility have further stimulated investments in sectors including clean energy and public infrastructure. Additionally, Rwanda has developed mechanisms including the Sustainability-Linked Bond and National Carbon Market Framework to bolster its environmental and emission reduction goals, while public-private partnerships have improved national park management and boosted tourism revenues.

Rwanda uses a range of incentives to enhance landscape management and nature-based solutions, targeting private investors, communities and individuals. Notable initiatives include the Investment Code, which offers tax holidays for sectors such as tourism and agriculture, and the tourism revenue sharing scheme, allocating tourism revenues to community projects. Other efforts include subsidies for rainwater harvesting and planned subsidies for organic fertilizer use, alongside community incentives in agroforestry, including training to promote sustainable practices.

This study recommends various incentive mechanisms and financial instruments for supporting healthy environments and livelihoods in the CNR landscape of Rwanda. It highlights the need to reassess financial strategies within the CNR landscape to transition from short-term project financing to more sustainable, comprehensive programmes. Balancing localized needs with national policies is critical to align CNR landscape management objectives with broader frameworks. Promoting sustainability will require the introduction of long-term incentives, scaling of successful models, and effective resource leveraging.

Recommended incentives and financing mechanisms for managing protected areas are as follows:

Develop concession agreements for Lake Kivu Islands management: A proposed three-step approach includes a comprehensive biodiversity assessment, business plan formulation, and consideration for protected area designation. The Rwanda Development Board should then solicit experienced concessionaires, prioritizing urgent actions including island restoration. This approach promotes economically viable and socially responsible tourism, aiding employment and poverty reduction.

Scale the application of wildlife conservation bonds from Gishwati-Mukura and Nyungwe national parks: This could attract biodiversity finance, restore habitats, and boost conservation, enhancing tourism. Emulating successful models like the Rhino Bond in South Africa could establish a thriving conservation bond market. Learning from experiences with iconic animal species, including the eastern chimpanzee, is a promising start. Multiple conservation actors, led by the Rwanda Development Board, should be involved.

Recommended incentives and financing mechanisms for tourism development are as follows:

Enhance the effectiveness of the tourism revenue sharing scheme to optimize biodiversity outcomes: The scheme has further potential to financially support biodiversity conservation initiatives. Communities that are supported with livelihoods initiatives could sign an agreement with fund managers, clearly indicating how the communities will actively contribute to biodiversity conservation efforts. In this way, supported communities will play an active role for biodiversity outcomes. The indicators used should specifically target biodiversity conservation goals.

Develop a comprehensive business plan for tourism in Bigogwe pastureland: This would attract resources. With an emphasis on community-based culture and agritourism initiatives, Bigogwe hills offer insights into Rwandan cattle keeping traditions, cultural experiences, hiking and scenic views. Ibere rya Bigogwe Company has pioneered the attraction of tourists on a small part of the landscape. The business plan should consider the larger landscape, including activities such as hiking, biking, rock climbing and camping, with a management plan aligned with conservation targets for sustainability. This business plan could attract funds from local and international sources.

Recommended incentives and financing mechanisms for forest management are as follows:

Provide performance-based incentives for tree growth: Incentives would acknowledge the costs incurred by tree growers, emphasizing the growth of native tree species. These incentives could include agricultural equipment, livestock or community benefits, enhanced by novel incentives such as carbon credits. Incentives would also extend to extension agents and community efforts funded through forest harvesting, carbon markets and environment-related fees.

Provide blended finance options for wood value chain development: The approach combines grants, contributions and loans. To implement this blended finance approach, collaboration with commercial banks and microfinance institutions is essential. Development banks and partners could serve as the sources for loans and matching grants. Rwanda's Business Development Fund could take a leadership role in negotiating with development finance institutions and partners to derisk and encourage the engagement of commercial banks and microfinance institutions in wood value chain development.

Recommended incentives and financing mechanisms for agriculture development are as follows:

Provide blended finance options for regenerative agriculture projects: This approach would apply specifically in the production of sustainably cultivated commodities such as organic fruits, eco-friendly pesticides and crops bearing organic labels. Under this approach, farmers could contribute their funds, seek loans, and concurrently apply for matching grants. Development finance institutions and the Development Bank of Rwanda would facilitate funding, streamlining loan payments through commercial banks and microfinance institutions to finance sustainable farming projects.

Support the establishment of Rwanda's Sustainable Value Chain Fund for small-scale agricultural investments: Proposed by the 2022 Sustainable Finance Roadmap, the fund would boost the agribusiness sector, focusing on the sustainability of identified value chains of dairy, poultry, pork, aquaculture and sustainable fertilizer. It would draw international investment, with funding from development banks and partners. The Kigali International Financial Centre, in collaboration with the Ministry of Trade and Commerce, could lead fund mobilization efforts. This would require seed capital for setup.

Recommended incentives and financing mechanisms for water management are as follows:

Support a revolving fund for rainwater harvesting: Leveraging insights from the Sebeya catchment's Environment and Conservation Fund, a revolving fund for rainwater harvesting is proposed. Development partners would provide initial seed funding for three to five years. Managed by the Rwanda Water Resources Board and funded partially by water permit and use fees, homeowners could borrow at a nominal three percent interest with a two-year repayment to install affordable rainwater systems, enabling continuous fund replenishment and broader access.

Recommended mechanisms for carbon markets and payment for ecosystem services (PES) are as follows:

Operationalize the National Carbon Market Framework: Key priorities include developing a comprehensive policy, legal and implementation framework, and enhancing local capacity in market management. Technical skills development, either through special programmes or further studies, is crucial. It is vital to ensure carbon prices are fair for communities and the country, and for revenues to support nature-based solutions, biodiversity conservation and sustainable landscape management. The key agencies of the Rwanda Environment Management Authority, Rwanda Forestry Authority and Rwanda Development Board would be pivotal in setting up necessary structures, with the Rwanda Green Fund (RGF 2022) facilitating deal making to achieve carbon market goals.

Support the Community Adaptation Fund to facilitate PES schemes: The Community Adaptation Fund (CAF) was piloted in Gicumbi District and has potential to enhance the implementation of PES in the CNR landscape. This framework can allow ecosystem service buyers to fund community-led restoration activities through CAF, with regulatory support from the Rwanda Environment Management Authority and the Rwanda Green Fund. Agreements between service buyers and community sellers promote a market-based approach, enabling the government to transition to a regulatory role and reduce direct funding in the ecosystem services market.

The investment plan provided in the present report covers the initial stages of the setting up, managing and limited further testing of incentive schemes for better landscape management in Rwanda. It does not cover payments administered through the schemes or their long-term management. Through strategic implementation, however, the eventual vision is to foster in Rwanda a balanced future that benefits both the environment and the people it serves, epitomizing a commitment to sustainable development in the country.

1 Background and introduction

As outlined in its Third National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) (GoR 2018), Rwanda grapples with challenges in climate finance, including limited budgets for climate action implementation, and insufficient private sector involvement in environmental and climate change activities. This underscores the imperative to enhance the effectiveness and long-term financial sustainability of biodiversity and landscape management in the Congo-Nile Ridge (CNR) region.

According to the Country Climate and Development Report (CCDR) for Rwanda (World Bank Group 2022), implementing the Nationally Determined Contributions (NDCs) requires USD 11 billion, with USD 7 billion needing new financing – exceeding official development assistance (ODA), foreign direct investment (FDI) inflows and domestic revenues. Furthermore, the updated Green Growth and Climate Resilience Strategy (REMA 2022) needs USD 2 billion annually, but only USD 700 million comes from government budgets. Therefore, new financing mechanisms are essential for improved landscape management and nature-based solutions.

Despite ongoing efforts, a noticeable gap persists in the availability of financial tools to expedite sustainable landscape management and biodiversity conservation. The approach taken in this study to explore incentives and financing in Rwanda for these purposes tackled three main questions: (i) What can be learned from the experiences of other African countries in using incentives and financial mechanisms for landscape management and nature-based solutions?; (ii) What financing and incentive mechanisms have been developed and implemented in Rwanda itself?; and (iii) What are the viable incentives and financial instruments for accelerating improved landscape and natural resources management and adoption of nature-based solutions in the CNR landscape?

This report documents several practices from African contexts regarding incentives, financial tools and mechanisms, and it also includes a review of financial instruments and incentives implemented in Rwanda. Through consultations with stakeholders, the report identified priority interventions and crafts an initial three-year roadmap for developing effective tools. Its primary objective was to recommend impactful and feasible financial instruments and incentive mechanisms that enhance landscape management and facilitate the adoption of nature-based solutions in Rwanda. The recommendations encompass a broad spectrum of mechanisms for the management of protected areas, forest landscapes, agriculture and water resources, including tourism development and the use of innovative instruments like the carbon market and payment for ecosystem services (PES). By offering these insights, the report aims to forge a clear path for the successful integration of nature-based solutions, sustainable landscape management and biodiversity conservation in the CNR region.

2 Approach and methodology

A multifaceted approach was employed in the current study as outlined below:

I. **Literature review**: The study started with a literature review to gain insights into the current state of stakeholder engagement in incentive and financing mechanisms for nature-based solutions, biodiversity conservation and landscape management. This review provided a foundational understanding of the existing landscape.

II. **Identification of relevant stakeholders**: Following the literature review, the study identified stakeholders actively engaged in nature-based solutions, biodiversity conservation and landscape management within the Congo-Nile Ridge (CNR) region. These stakeholders include the public sector, private organizations, non-governmental organizations (NGOs) and community members.

III. **Development of interview guides**: In preparation for key informant interviews and focus group discussions, interview guides were prepared. These guides contained sets of questions designed to determine the current status of financing for biodiversity conservation, nature-based solutions and landscape management, and to pinpoint areas for potential improvement.

IV. **Key informant interviews**: Semi-structured interviews were administered to 22 key actors in biodiversity conservation, landscape management and tourism development. They included central government, local government, development partners, NGOs and private sector actors.

V. **Key informant consultation workshop**: A stakeholder consultation workshop was organized, mainly for district forest and natural resources officers, to discuss the current realities and propose incentives and financing mechanisms for nature-based solutions, particularly forestry and agroforestry. Rubavu, Rusizi, Musanze, Rutsiro, Nyamasheke, Burera, Nyabihu, Karongi and Ngororero districts were represented.

VI. **Focus group discussions**: Farming communities and public extension agents were engaged through focus group discussions to identify the main drivers of landscape management practices and functional incentive mechanisms for wide adoption of such practices, particularly agroforestry – the predominant practice in landscape management. Discussions were held with 21 lead farmers in Nyabihu, Rubavu and Ngororero districts; and with 15 forest extension officers and agronomists from Ngororero, Rutsiro and Karongi districts.

The study resulted in a series of recommendations for contextualized incentives and financing mechanisms for nature-based solutions, landscape management and biodiversity conservation.

3 Rwanda's national commitments for landscape management and nature-based solutions

Financing plays a critical role in the implementation of landscape management and nature-based solutions, and in Rwanda there is a pressing need to develop and refine incentive mechanisms that enhance landscape management. This development is essential for accelerating the fulfilment of Rwanda's ambitious commitments. Rwanda's targets, which align significantly with international obligations, require substantial financial resources and effective incentive mechanisms at the operational level. These financial instruments and incentives must be robust and functional to ensure the successful reaching of conservation and sustainability goals, facilitating progress towards ecological resilience.

A policy and institutional foundation for climate change action and biodiversity conservation exists in Rwanda, integrated into the Sustainable Development Goals and reflected intentionally in the national vision – Vision 2050 (RoR 2020) and the (new) National Strategy for Transformation (NST2) for 2024–2029. Environmental protection, enshrined in the revised national constitution of 2015 (RoR 2015), recognizes the right of citizens to reside in a clean environment, and outlines the obligations of both the people and the government to safeguard the environment.

Rwanda, having signed the Paris Agreement agreed at the UNFCCC COP21 in 2015, is therefore committed to climate action, notably the Article 5 commitment to forest conservation. The country also affirmed its commitment to biodiversity by ratifying the Convention on Biological Diversity (CBD) in 1995 and the recent Kunming-Montreal Global Biodiversity Framework in 2022. Implementation of CBD objectives is facilitated through the National Biodiversity Strategy and Action Plan (NBSAP), initially formulated in 2003 and revised in 2016 (RoR 2016) to align with the CBD Strategic Plan on Biodiversity 2011–2020.

Policies for climate action were laid out in the Green Growth and Climate Resilience Strategy of 2011, which was later revised and strengthened in 2022 (REMA 2022) in response to the escalating effects of climate change. The revised strategy aims to make Rwanda carbon neutral and reduce carbon emissions by 38 percent by 2050, as detailed in the updated Nationally Determined Contribution (NDC) report (of May 2020; GoR 2020). This confirms Rwanda's commitment to achieving a 16 percent carbon equivalent emissions reduction by 2030, regardless of international finance, with the updated NDC totalling investments of USD 11 billion by 2030. Contingent on international support, Rwanda aims to attain an additional 22 percent carbon equivalent reduction, reaching a total reduction of 38 percent against the baseline by 2030. Rwanda's commitment extends to well-developed national policies supporting forestry and agroforestry, including the National Forestry Policy (MINILAF 2018c), the Forest Sector Strategic Plan (MINILAF 2018b) and the Agroforestry Strategy and Action Plan (MINILAF 2018a). Overall, these commitments aim to contribute to Rwanda's Vision 2050, which aspires to transform the country into an upper-middle income nation by 2035 and a high-income country by 2050, with a focus on a carbon-neutral and climate-resilient economy (RoR 2020).

In addition to its climate-related commitments, Rwanda has set ambitious targets to restore degraded land under the Bonn Challenge and the African Forest Landscape initiative (AFR100; see https://afr100.org/country/rwanda). The nation has pledged to restore two million hectares of degraded land by 2050, covering 76 percent of its land mass. This significant commitment acknowledges the importance of sustainable land use, with an emphasis on managing both forests and trees outside of forested areas. The accomplishment of AFR100 commitments is expected to substantially boost carbon sequestration.

4 Overview of Rwanda's Congo-Nile Ridge region

Situated in the western highlands of Rwanda, the Congo-Nile Ridge (CNR) landscape harbours the nation's last remaining montane forests and other unique biodiversity. Despite covering just one-fifth of the country's land area, the region sustains nearly one-third of Rwanda's population, with an average population density of 736 people per km². The CNR landscape faces the highest rates of rural poverty in the country, impacting vulnerable subsistence farmers.

The significance of the CNR landscape extends beyond its demographic support, as its forests play a crucial role in moderating the local climate. This climatic influence is pivotal for Rwanda's tea production and overall agriculture. Moreover, the rain in the highlands serves as the primary water source for hydroelectricity, the main contributor to Rwanda's power supply. The CNR landscape is also a vital habitat for globally and locally threatened species, including the endangered eastern chimpanzee in Gishwati-Mukura and Nyungwe national parks.

While the CNR landscape's forests are integral to the region's climate resilience, over the years, natural forest cover has dwindled by 40 percent as a result of planned excisions and uncontrolled incursions including large-scale cattle ranching, illegal mining and conversion for crop production. Alarming is the drastic loss around the Gishwati and Mukura core forest area, witnessing nearly a 90 percent reduction since the 1980s. The recent establishment of Gishwati-Mukura National Park (GMNP) is a crucial step towards halting and partially restoring the depleted forest.

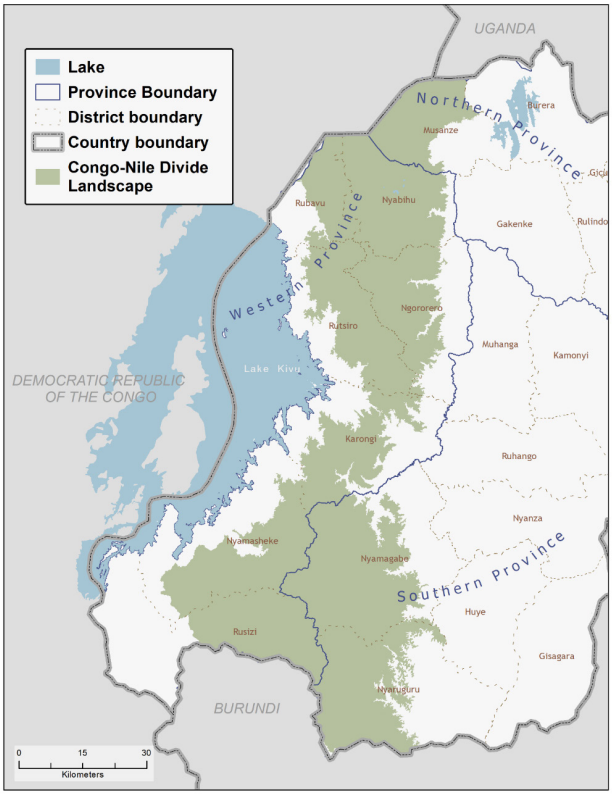

Figure 1. Map of the Congo-Nile Ridge landscape in Rwanda

The CNR landscape's wood value chain offers significant potential. The value chain benefits from growing urbanization in the region, which increases construction projects that create demand for wood products.

The CNR landscape, supporting a significant portion of Rwanda's population, grapples with challenges exacerbated by high population density and fragile soils. Poor agricultural practices contribute to rapid land degradation, causing erosion, flooding and siltation of lowland infrastructure. To counter these issues, ongoing efforts aim to promote climate-smart and resilient agricultural practices, while restoring forest cover in sensitive catchments. Intergovernmental Panel on Climate Change (IPCC) models project rising temperatures and more intense precipitation in the CNR region, posing threats to vegetation zones and traditional crop practices, and negatively affecting the production of important export crops.

To improve climate resilience in the CNR landscape, projects have been initiated in the region. Initiatives such as the Building Resilience to Climate Change and Sustainable Agriculture Value Chains in Agro-systems around Mukura Forest and Lake Kivu Catchment Landscape project (MuLaKiLa) by the Albertine Rift Conservation Society (ARCOS) envision a 30-year plan to plant native and fast-growing trees. Another Green Climate Fund (GCF) supported project in the region focuses on bolstering resilience in vulnerable communities through forest and landscape restoration. Furthermore, improved management initiatives targeting Nyungwe National Park and GMNP contribute to the sustainable development of the CNR region.

5 Review of incentives and financing mechanisms for sustainable land management and biodiversity conservation

Incentives are mechanisms designed to encourage specific behaviours by offering rewards or benefits. They align actions with public policy goals, promote efficiency, support innovation, and address market failures, making policy implementation cost-effective. Incentives attract private investment, balance costs and benefits, and ensure equitable outcomes, enhancing overall policy effectiveness.

The review of incentives and financing mechanisms for sustainable land management and biodiversity conservation in Rwanda indicates a reliance on external funding with only limited domestic resource mobilization. External dependence introduces uncertainty in securing future financing for biodiversity, emphasizing the need to increase domestic resources. To safeguard the crucial biodiversity and natural resources that underpin Rwanda's economy, it is imperative to leverage both domestic and international resources. This approach should capitalize on Rwanda's robust policies and institutions, while aligning with ongoing initiatives aimed at fostering the country's transition to a climate-resilient, green economy. Recognizing the delayed returns on investments in sustainable land management, positive incentives are required. A few have been piloted already, considering the public goods nature of the benefits associated with sustainable practices, which often extend beyond the market.

5.1 Examples of incentives and financing mechanisms for sustainable land management and biodiversity conservation in Africa

Africa has adopted various, diverse and innovative incentives and financing mechanisms for sustainable land management and biodiversity conservation. In Ghana, forest outgrowers receive incentives that integrate economic benefits with reforestation efforts. The Democratic Republic of the Congo (DRC) promotes agroforestry, incentivizing producers with training and technical assistance. The Community Environmental Conservation Fund (CECF) financed by the Danish International Development Agency (DANIDA) supports local environmental projects in Uganda and Kenya as a low-cost approach to incentivize restoration at micro-catchment and village levels to improve livelihoods. Uganda's Plan Vivo Framework (ECOTRUST 2022) focuses on generating ex ante carbon credits over 20 to 25 years for landholders. South Africa's innovative Wildlife Conservation Bond links investment returns to wildlife population successes (World Bank 2022). Kenya implements payment for water ecosystem services initiatives, funding watershed conservation to secure clean water, and promotes private sector-led ecotourism, compensating individual landowners to encourage collective action, aiming to preserve wildlife habitats and enhance tourism without jeopardizing pastoral livelihoods. (These and other schemes are discussed in more detail in Appendix 1.)

As Rwanda strives towards nature-based solutions and biodiversity conservation, these examples offer lessons and inspiration for crafting effective incentives and financing mechanisms tailored to the nation's unique context and environmental goals.

Some key lessons and possible applications from African examples are presented in Table 1.

Table 1. Summary of incentive and financing mechanism examples from Africa for sustainable land management and biodiversity conservation. Key lessons learned and possible applications for Rwanda are shown

Example	Lesson learned	Possible application for Rwanda
Plan Vivo Framework (Uganda)	Tangible incentives can encourage farmers to invest in long-term tree growth.	Context for Rwanda's National Carbon Market Framework to generate ex ante carbon credits for native trees.
Rhino Conservation Bond (South Africa)	Private support for conservation is enhanced with clear benefits and trusted partners.	Collaborate with the World Bank to further develop and scale conservation bonds.
Community Environmental Conservation Fund (Uganda and Kenya)	Organized community groups can effectively contribute to landscape restoration.	Scale up support across the CNR landscape for village savings and lending associations involved in land-use plans.
Payment for water ecosystem services (Kenya)	Effective engagement of private actors ensures ecosystem service delivery.	Develop a coordinated engagement strategy for private actors to support ecosystem services in upstream communities.
Forest outgrower incentives (Ghana)	Market guarantees and rewards can motivate landholders to manage native trees on degraded land.	Engage grouped landholders in private forest management units with market guarantees and rewards.

5.2 Existing financing instruments for landscape management and nature-based solutions in Rwanda

Rwanda employs a variety of financial mechanisms to fulfil its environmental commitments, specifically, the financial requirements outlined in its climate plan – the Nationally Determined Contributions (NDCs) – where Rwanda aims to fulfil its conditional contribution through the utilization of climate finance and international market mechanisms. This approach also includes exploring potential participation in international cooperative approaches under Article 6 of the Paris Agreement, among other approaches, for the financing of nature-based solutions.

5.2.1 Programmes providing finance

A substantial portion of Rwanda's environmental budget relies on donor-supported projects, and is not sourced from domestic sources. A 2019 BIOFIN study (REMA 2019) however highlighted several domestic mechanisms, including transfers from central and local governments to service providers for ecological activities, environmental charges (such as water user fees, forest harvest royalties, mining guarantees), fines, penalties, revenue from tourism concessions and business licenses, and park entry fees. Over the past decade, Rwanda has demonstrated innovation in crafting proactive financial tools and mechanisms to implement its commitment to sustainable landscape management and nature-based solutions. These mechanisms are designed to attract both domestic and international finance.

I. Rwanda Green Fund

Established by the Government of Rwanda in 2012, the Rwanda Green Fund (RGF) is an investment fund dedicated to environmental and climate change initiatives (RGF 2022). A decade after its creation, it has mobilized USD 274 million for 46 green projects. Funding sources include domestic fines, fees and environmental revenues, as well as external support from bilateral and multilateral partners. The fund, accessible to government entities, districts, civil society and the private sector, operates through thematic financing windows. Its financial instruments range from innovation grants and credit lines to traditional grants. Currently transitioning to a hybrid model, it aims to allocate 30 percent to innovative private sector investments and 15 percent to civil society, guided by strategic national priorities outlined in Rwanda's Green Growth and Climate Resilience Strategy. The fund prioritizes sectors such

as renewable energy, green cities, waste management and climate-smart agriculture. Over the last decade, the fund is estimated to have created 176,000 green jobs; supported 120,000 people to cope with the effects of climate change; restored 47,000 hectares of forests and agroforestry; and secured 24,000 hectares of land against soil erosion.

II. Ireme Invest

With the objective of increasing the private sector's contribution to Rwanda's response to climate change, Ireme Invest has initiated its inaugural capitalization round, securing USD 104 million in 2022, mostly from bilateral and multilateral organizations. Employing a blended finance strategy, the investment facility aims to attract private investment. This approach involves a credit facility within the Development Bank of Rwanda (BRD) for credit guarantees and concessional loans, alongside the project preparation facility provided by the RGF. The latter offers grants, recoverable grants, and accelerator and incubation programmes through a preparatory facility. Its funds are from bilateral and multilateral organizations, and other environmental funds. Ireme Invest focuses on sustainable cities, smart mobility, clean energy, waste and the circular economy, and climate-smart agriculture, with limited emphasis on landscape management and nature-based solutions. It has so far run two application rounds for grants and equity, and provided credit to a few businesses. The funded businesses so far do not include enhanced landscape management. The impact has yet to be documented.

III. Intego – Rwanda's NDC Facility

Established in 2023, Intego is a novel climate-focused funding facility for the public sector, hosted by the RGF. Initiated with support from the Federal Government of Germany, it has the potential for expansion through additional fund commitments from The German Federal Ministry of Economic Cooperation and Development (BMZ) or other development partners. Intego is designed to finance the execution of public sector-led projects aligned with Rwanda's NDC climate action plan. These projects encompass biodiversity conservation, sustainable transport, integrated water resources management, climate-smart agriculture, and landscape restoration and forestry. Public institutions at both central and local levels in Rwanda can access funding for climate change adaptation and mitigation projects in various priority areas. In June 2024, the facility approved USD 32 million funding for mostly landscape management projects, including in the four CNR landscape districts of Nyaruguru, Nyamagabe, Karongi and Nyamasheke. The impact has yet to be documented.

IV. Community Adaptation Fund

The Community Adaptation Fund (CAF) was supported by the World Bank and piloted in Gicumbi District in 2023 to assist rural communities in tackling climate change impacts. It financed low-risk, community-based pilot projects that align with environmental protection, climate resilience and socioeconomic benefits. The one-year pilot included projects in beekeeping, compost production, seed multiplication, renewable energy, milk collection, tree nurseries, small livestock, and mushroom cultivation. After rigorous selection, 25 cooperatives with 2,321 members received training and financing totalling Rwandan Francs (RWF) 1,018 million (USD 780,000, where 1,305 RWF = 1 USD, July 2024 exchange rate). Indirectly benefiting around 13,789 people, CAF generated employment and supplied goods and services throughout the supply chain, showcasing a net profit in the first year of implementation and positive net present value across all project clusters.

V. Biodiversity Conservation Fund

Following Rwanda's BIOFIN Finance Plan recommendations, the creation of a Rwanda Biodiversity Conservation Fund was proposed to attract diverse funding sources, such as public, private and civil society institutions, directing dedicated funds for conservation through a designated window within the RGF. This finance mechanism intends to streamline domestic and international finance sources, reducing transaction costs and enhancing conservation benefits. A feasibility study for the fund, nearing

completion and validation, supports its establishment within the RGF. With the establishment of this fund, there is potential to link with the newly established Global Biodiversity Framework Fund to access global biodiversity finance. Thus, it is a potential opportunity to rehabilitate degraded landscapes in Rwanda.

VI. Community Environment Conservation Fund

As part of innovative finance mechanisms for landscape restoration, the International Union for Conservation of Nature (IUCN) introduced the Community Environment Conservation Fund (CECF) in the Sebeya water catchment (IUCN 2022). This initiative involved providing initial funding to establish a local credit fund utilized by communities, through established village saving and loan associations. These funds were directed towards implementing activities aligned with ecosystem restoration and management, typically guided by an environmental management plan. The CECF prioritized landscape restoration activities such as tree seedling production, agroforestry, conservation agriculture, on-farm water storage, riverbank protection, on-farm sediment traps, energy-efficient cook stove adoption, kitchen garden establishment and environmentally friendly mining methods at a local scale. By the end of the project in 2023, more than 130 village saving groups had participated in the CECF intervention, and were helped to bring farmers together and enhance their financial capacity through addressing their immediate community livelihood needs, and they were motivated to utilize and manage natural resources responsibly.

VII. Sustainability-linked bonds on the Rwanda Stock Market

In 2023, the BRD launched the first-ever sustainability-linked bond (SLB) on the Rwanda Stock Exchange, marking a milestone for national development banks globally and in East Africa. The SLB, with a first tranche maturing in seven years targeting RWF 30 billion, was oversubscribed at 110 percent; and the second tranche in 2024 was oversubscribed at 130 percent, supporting BRD's commitment to environmental, social and governance (ESG) principles. Partially credit-enhanced through a World Bank lending operation to the Government of Rwanda through the Access to Finance for Economic Recovery and Resilience Project, the bond aims to diversify funding sources, increasing women-led business loans and financing affordable housing. The credit enhancement facilitates private sector capital mobilization, positioning BRD as a regional leader in sustainable finance and contributing to Rwanda's capital market development agenda. The issuance sets the foundation for future sustainable financial endeavours by BRD. The funds raised through these bonds will be channelled towards sustainability-linked projects that align with Rwanda's Vision 2050, focusing on inclusive growth and environmental sustainability. Funds from the first tranche supported projects including two in the agriculture sector for tea and coffee export commodities. The bonds are in the first and second year of maturity, and the impact has yet to be documented.

5.2.2 Other strategic frameworks and instruments for sustainable finance for improved landscape management

I. National Carbon Market Framework

In 2023, Rwanda's cabinet approved the National Carbon Market Framework (REMA 2023), reinforcing the nation's commitment to achieving emission reduction targets outlined in its NDC climate action plan. While a voluntary carbon market was already in progress, the new framework will reinforce it and expand the compliance carbon market as well. The Rwanda Environment Management Authority (REMA) serves as the carbon market regulator, overseeing rigorous validation and certification processes for projects generating carbon credits, ensuring adherence to international standards. Operating on a cap-and-trade system, Rwanda's carbon market will enable businesses to trade carbon credits, offering economic incentives for companies to reduce their carbon footprint within this market-driven approach. Currently, a carbon registry is under development through the support of the World Bank. Meanwhile, other actors such as CO_2 Capital Projects Africa are engaging owners of private forest management units (see more about forest management units in Rwanda in parallel studies) to join the carbon market.

II. Payment for ecosystem services

In 2014, Rwanda introduced guidelines for payment for ecosystem services (PES) implementation. Various PES schemes were tried before and after the guidelines' introduction. The Government of Rwanda is now intensifying efforts in landscape restoration, exploring comprehensive PES-like strategies that require operational designs for roll out. Despite the eagerness of upstream farming communities for landscape restoration, private sector involvement in PES remains slow-paced. Challenges include establishing a buyer/seller market and a functional institutional framework, and ensuring reliable ecosystem service delivery – critical for widespread PES operationalization. To glean insights, Rwanda signed a Memorandum of Understanding with Costa Rica in 2019, focusing on innovative financial mechanisms for environmental conservation, including PES for water. Despite efforts in the piloted Upper Nyabarongo catchment, the project turned into a classic initiative with farmers establishing terraces through Rwanda Water Resources Board (RWB) support, lacking funds from downstream water users for ecosystem service payments. However, Rwanda's technical experts are still learning from Costa Rica to determine how PES models could be more effectively operationalized.

III. Rwanda Sustainable Finance Roadmap

In 2022, the Kigali International Financial Centre (KIFC) launched the Rwanda Sustainable Finance Roadmap. Rwanda aspires to become a leading pan-African hub for sustainable finance. The roadmap outlines key objectives, including developing financial instruments, cultivating human capital, and building necessary infrastructure. The implementation involves actions such as attracting sustainable venture capital; establishing a sustainable stock market; transitioning to sustainable lending; developing debt capital markets; expanding the sustainable insurance sector; enhancing ESG risk management in the financial sector; and improving corporate ESG disclosure. The roadmap also emphasizes capacity building in sustainable finance to achieve these ambitious goals. Among others, key recommended interventions include the establishment of a Sustainable Value Chain Fund to invest in small-scale agricultural initiatives aimed at integrating sustainability into key value chains.

IV. Climate and Nature Finance Strategy

The Climate and Nature Finance Strategy (CNFS) is nearing completion and aims to mobilize substantial resources to meet Rwanda's climate and nature-related goals by 2030. It integrates with existing policies, enhancing coordination among financing initiatives to support climate adaptation, mitigation and broader development objectives outlined in Rwanda's key strategies and international commitments. The CNFS identifies five strategic priorities to stimulate investment, these being capital shifts, leveraging public funds, innovative instruments, private investment incentives, and improved monitoring. A new Climate Finance and Green Growth Department within the Ministry of Finance and Economic Planning (MINECOFIN) will play a coordination role for these efforts, focusing on investment identification, prioritization and policy implementation.

V. Public-private partnerships in national park management

Outsourcing national park management to private entities has reduced direct government costs, and incentivizes effective area management. In late 2010, African Parks and the Rwanda Development Board (RDB) forged a joint management agreement, establishing Akagera Management Company Ltd. with members from both entities overseeing Akagera National Park. The park is nearing complete self-financing, with 92 percent of operating costs covered by tourism and local enterprise projects in 2022. Through effective wildlife conservation, Akagera's animal population has surged. Similarly, African Parks formalized a 20-year management agreement for Nyungwe National Park in October 2020. Meanwhile, Wilderness Safaris is actively engaged in a conservation and tourism management programme for GMNP, partnering with RDB and Forest of Hope Association (FHA) to develop an exclusive chimpanzee and primate trekking experience in Gishwati forest (see more about the development of such experiences in a parallel study). This management model has benefited local communities through job creation and infrastructure improvements including schools and clean water facilities, and has supported local economic activities including organic farming and beekeeping.

VI. Forest concessions

This represents an approach to addressing the historically suboptimal management of public planted forests (see parallel study), establishing public-private partnership agreements between district authorities or the ministry and companies for forest management units. These units encompass various forests and woodlots. In this framework, the government owns the forests while the private investors manage them. The government highlights the necessity for private investors with capacity, expertise and innovative technologies to enhance the productivity of forest resources, reducing the import bill on timber and finished wood products. Another form of public forests co-management agreement also exists between the government and private actors. Presently, 67 percent of public forests operate under concession agreements with private operators, typically lasting 40 to 49 years. The goal was to elevate this to 80 percent by June 2024, contingent upon cabinet approvals for additional forest concessions.

VII. Microfinance products for forest management

Financial products are piloted in the CNR landscape, particularly in Rutsiro District. In 2022, Inkunga Microfinance initiated two loan products backed by the Luxembourgish Microfinance NGO, Appui au Développement Autonome, targeting actors in the forest value chain. The loan products, Noza Urubaho and Kunda Igiti, catered to bulk inventory of forest products and forest management, respectively. Twenty-five clients sought loans totalling RWF 120 million. Proposals for forest harvesting exceeded those for tree planting. A lesson learned is the continued need for capacity development among microfinance officers concerning climate change and nature-based solutions, enabling them to explore local-level financial products aligned with nature-based initiatives.

The financing programmes, instruments and frameworks listed here and in the previous subsection vary in their relevance to sustainable landscape management. Some, like CAF and forest concessions, have a high impact, while others, such as Ireme Invest and sustainability-linked bonds, play a more limited role. Collectively, they underscore Rwanda's commitment to securing funding for enhanced landscape management and nature-based solutions. Building their effectiveness, however, depends on seed funding from external sources. Since most of these mechanisms, aside from the RGF and public forest concessions, have been established within the last five years, they are still in their early stages of adoption, and are learning much from implementation challenges. While community interest in participating is strong, local private sector involvement in financing remains low, and active community financial participation, such as in revolving funds, needs further encouragement. Nonetheless, the diverse range of programmes, instruments and frameworks presents a valuable opportunity to enhance engagement in sustainable financing for landscape management and nature-based solutions.

5.2.3 Tax and other incentives

Various tax and other incentives in Rwanda promote landscape management and nature-based solutions. These encompass incentives for private sector involvement, aiming to attract investors; community-level incentives for groups engaged in landscape management; and incentives for individuals championing nature-based solutions. These incentives are facilitated by the government through policies, creating a conducive environment, as well as by government partners and non-governmental organizations.

I. Incentives through the Investment Code

The Investment Code (Law No. 006/2021 of 05 February 2021 on investment promotion and facilitation) (RoR 2021) offers incentives for investors in diverse sectors including tourism, covering hotels, adventure tourism and agro-tourism, as well as large-scale agricultural operations. Incentives encompass preferential corporate income tax, a tax holiday of up to seven years, and a flat accelerated depreciation rate of fifty percent for the first year on new or used assets. Additional incentives, contingent on the investment, may be determined by ministerial order or cabinet decisions.

II. Tourism revenue sharing scheme

The tourism revenue sharing scheme serves as an incentive for communities near protected areas, acknowledging their role in conservation. Initially set at five percent of gross tourism revenues by the Tourism Board's 2005 'ORTPN' policy, the share increased to 10 percent in 2017 as tourism expanded. From RWF 42 million in 2005, the 2022–2023 allocation reached RWF 3.3 billion, benefiting sectors bordering parks. According to RDB, 35 percent of the revenues supports Volcanoes National Park communities, 25 percent supports those near Akagera National Park, and 25 percent supports those near Nyungwe National Park, while 15 percent of the revenues supports communities near GMNP. Funds address community needs, funding projects such as schools, health facilities, rainwater tanks and livestock purchases, and income-generating initiatives like beekeeping. The scheme, with over RWF 10 billion now invested, has transformed community attitudes toward biodiversity conservation through support for more than 1,000 projects.

III. Subsidy scheme for rainwater harvesting

From 2014 to 2016, the Rwanda Natural Resources Authority (now divided into three agencies) implemented a programme aimed at enhancing livelihoods and mitigating water runoff. The process involved the Authority subsidizing water tank purchases, with beneficiaries making a 10 percent down payment and committing to a 12-month payback plan. The tanks were installed by beneficiaries using local masons, verified by RNRA field technicians before subsidy approval. Upon completing payments, users gained full ownership of the tanks. In collaboration with GT Bank, saving and credit cooperatives, and tank suppliers, the scheme successfully installed 6,825 water tanks; equipped 70 public institutions with rainwater harvesting systems; established five housing group settlements with underground rainwater storage reservoirs; distributed 4,000 sets of local materials; and trained 500 technicians for small water pond construction. This initiative significantly increased the adoption of rainwater harvesting systems among households.

IV. Policy intervention to subsidize organic fertilizer

Rwanda's National Circular Economy Action Plan and Roadmap (MoE 2022) aims to subsidize premium commercial organic fertilizers and locally manufactured biological farm inputs. The policy involves targeted promotion of organic fertilizers to farmers, encouraging businesses to explore this promising theme. The intervention anticipates a comprehensive review of the existing fertilizer policy and the development of a new one specifically addressing organic fertilizers. This new policy will seek to standardize and regulate organic fertilizer production. In order to achieve price competitiveness, the roadmap indicates that the financial support for the proposed subsidy will be derived from the same funding source as the subsidy for chemical fertilizers – the 'Smart Nkunganire System'. This proposed initiative aligns with Rwanda's commitment to advancing sustainable and environmentally-friendly agricultural practices.

5.2.4 Community incentives in landscape management

To keep all key actors motivated and drive the desired change in improved landscape management, incentive mechanisms should be an integral part of the extension system, and devised at three different levels targeting different actors: farmers and private forest owners; farmer promotors; and public extension agents at cell and sector levels. However, despite numerous programmes, such incentive mechanisms do not yet exist.

Sustainable landscape management practices are primarily disseminated through three main extension channels. First, NGOs play a key role, using project-based information systems where dedicated staff provide training and monitor the implementation of practices among project beneficiaries. Second, the public extension system involves project-supported staff and a limited number of public agents who share knowledge with farmers and landowners, especially during times like tree planting seasons. Third, private agents contribute by sharing information through both formal and informal channels, such as seed and seedling supply networks.

No formal extension system for landscape management exists, and the Rwanda Forestry Authority (RFA) has no unit dedicated to the extension of forestry and agroforestry. The only staff in charge of extension report to the Non-Timber Forest Products Unit under the Forestry Management Division of RFA. Landscape management extension messages are channelled through district forest and natural resources officers, sector agronomists and sector forest officers. Sector forest officers should drive change, but they are few and not well motivated. Currently, there are fewer than 215 sector forest officers in 416 sectors across the country, who are not in the government formal structure, and are paid less than RWF 70,000 per month (see also parallel study).

Presently, there are limited dedicated funds for the extension system for sustainable landscape management. Additionally, the few existing extension professionals often lack a solid foundation in sustainable landscape management, hindering their ability to support frontline agents and farmers.

Incentives should also be channelled through farmer promotors who promote improved landscape management on a day-to-day basis. However, the current situation is that farmer promotors often have inadequate knowledge and skills, and need capacity building to drive change. Their role generally focuses on the use of farm inorganic inputs and good agricultural practices to increase crop yield. Their training lacks an integrated landscape perspective that incorporates trees in agricultural landscapes. Their limited understanding impacts negatively on how they advise farmers.

The predominant landscape management practice across Rwanda is agroforestry, and its adoption is accelerated through devised incentive schemes by public, private and non-governmental organizations. A scan through existing agroforestry-related incentive mechanisms published by CIFOR-ICRAF in 2024 indicated the following approaches for agroforestry interventions:

I. **Capacity building and farmer training**: Farmers are provided with formal or informal training on agroforestry, which motivates them to plant and maintain trees on their farms.
II. **Non-financial rewards for best performers**: Useful materials, such as agricultural equipment or livestock, are provided to farmers in recognition of their efforts to grow agroforestry trees.
III. **Free tree planting materials**: Providing tree seedlings at no cost may motivate farmers to adopt agroforestry trees because they could not easily access agroforestry tree planting materials otherwise. However, while considered an incentive for tree planting, it may effectively be a disincentive for quality seedling production, not only as a business, but also for purposeful selection of planting material (see also parallel study).
IV. **Job opportunities in seedling production:** Nursery operations offer an opportunity to mobilize farmers for agroforestry. This is particularly for youth and women employed in nursery activities, who are motivated to grow the trees they produce.
V. **Tree survival-based recognition**: Organizations reward farmers who keep trees on their farms until they are properly established, standing at least one or two rainy and dry seasons.
VI. **Outreach facilitation materials**: Useful materials such as gum boots, bicycles, umbrellas and raincoats are provided to farmers who lead the movement of agroforestry adoption in their neighbourhoods. This motivates farmers to accelerate agroforestry adoption.
VII. **Seed fund for farmers' revolving fund**: Agroforestry project beneficiaries are grouped into saving and lending groups, and are supported with initial capital or supplementary capital to keep the revolving fund moving.
VIII. **Public recognition of tree adopters**: When farmers are visited by authorities in recognition of their efforts to plant more trees on their farms, and when they are recognized in public for their agroforestry adoption efforts, they are motivated to do more.
IX. **Solving a local community challenge**: Agroforestry-based projects identify a need in a beneficiary community, and address it to recognize the farming community's adoption efforts. This could be a community water tank, a fruit selling point, etc.
X. **Strengthening cooperative leadership**: Some cooperatives that are active in agroforestry still have governance issues. Agroforestry project teams decide to build the capacity of their governing teams.
XI. **Carbon credit for sustained trees**: An incentive is to sell carbon credits for the carbon sequestered by agroforestry trees.

Table 2. Incentive types for agroforestry interventions identified by key actors

Incentive type	RFA	RAB	ARCOS	ENABEL	IUCN	ICRAF	OAF	WVR	REMA
Capacity building and farmer training	√	√	√	√	√	√	√	√	√
Non-financial rewards for best performers			√	√	√	√	√	√	
Free tree planting materials	√	√	√	√	√	√	√	√	√
Job opportunities in seedling production		√	√	√	√	√	√	√	√
Tree-survival based recognition			√			√			
Outreach facilitation materials		√					√	√	
Seed fund for farmers' revolving fund			√		√			√	
Public recognition of tree adopters			√			√		√	
Solving a local community challenge			√						
Strengthening cooperative leadership			√			√		√	
Carbon credits for sustained trees			√						

Notes: ARCOS = Albertine Rift Conservation Society; ENABEL = Belgium Development Agency; ICRAF = World Agroforestry; IUCN = International Union for Conservation of Nature; OAF = One Acre Fund; RAB = Rwanda Agriculture and Animal Resources Development Board; REMA = Rwanda Environment Management Authority; RFA = Rwanda Forestry Authority; WVR = World Vision Rwanda. Source: CIFOR-ICRAF 2024

The most prevalent incentives for agroforestry projects as identified by key actors (Table 2) are capacity building and farmer training, along with the provision of free tree planting materials, mostly by NGOs and public agencies through donor-supported projects. The nature of offered training varies from one organization to another, as do the types of seedlings provided. For instance, One Acre Fund (OAF), an active NGO in Rwanda's agriculture and environment sector, organizes campaigns for comprehensive information on tree planting and management during tree planting seasons. Upfront information is given to communities during tree seedling distribution, although there has been only limited follow-up on the planted trees, which has negatively impacted survival rates. Presently, the organization is implementing new measures to enhance survival rates. Practical sessions in agroforestry training are often constrained. Organizations like World Vision Rwanda (WVR) and ICRAF focus their training on lead farmers, hoping these individuals will transfer their acquired skills to the farmers they support. However, this is not always the case.

One challenge in the distribution of tree seedlings is that they are often not produced in close proximity to farmers, necessitating them to be transferred over some distance. The lack of standard quality control measures for transporting seedlings, on top of the lack of quality control in seedling production itself, as well as the limited knowledge of receivers regarding tree management, lowers seedling survival rates. Another challenge is that the free distribution of seedlings discourages farmer groups from venturing into seedling production as a business. Seedling production businesses then only thrive when the buyers are not farmers, but rather NGOs or public projects (who then often provide seedlings for free to growers), which is not a sustainable situation. Additionally, during current seedling production, farmers and private landowners are often not consulted regarding important factors such as their desired tree species to match their preferences and the needs of their landscapes (see parallel study).

As indicated in Table 2, many actors also offer non-financial incentives for farmers who have planted and managed their trees according to agreed standards. These incentives include small livestock, agricultural equipment, and more. The distribution of these rewards is often performance-based. OAF, WVR and RAB provide tools to facilitate key lead farmers in reaching out to fellow farmers, such as gum boots, raincoats and bicycles.

Three organizations (ARCOS, IUCN and WVR) provide seed funds for revolving funds managed by farmers who have adopted agroforestry. For example, IUCN has initiated a community environment and conservation revolving fund accessible to adopters of restoration activities in the Sebeya catchment. The funds are used by communities through established village saving and loan associations. The funds are directed towards implementing agreed-upon activities, including agroforestry. WVR provides seed funds for village saving and lending associations whose members are actively involved in agroforestry. In its target communities, ARCOS has initiated the Umusave fund, a nature-based community fund managed at the local saving and credit cooperative (SACCO) level. This fund begins with savings, and ARCOS injects funds later for loan access by communities presenting nature-based solutions.

At the community level, ARCOS introduces a distinctive incentive for agroforestry adopters. Communities identify pressing needs, and ARCOS addresses them. For example, ARCOS have constructed water tanks for communities facing water challenges. Strengthening cooperative leadership is another community-level incentive, where organizations such as ARCOS and WVR enhance the institutional strength of organized groups involved in agroforestry. ARCOS ensures that nature-based community enterprises possess strong leadership, an accountability system, ethical practices and planning capacity. WVR empowers community groups and cooperatives, providing support to those not yet registered to prepare them for cooperative registration.

A novel incentive for agroforestry adopters is carbon credits. ARCOS is currently pioneering landscape restoration projects with carbon market components in Rulindo, Rutsiro and Bugesera districts; namely, they promote sustainable land management in the Mukura Forest and Lake Kivu Catchment Landscape (MuLaKiLa) and Agroforestry for Livelihoods projects. These projects focus on tree growing initiatives, with near-future plans to involve farmers in carbon credit agreements.

Further engagements with farming communities and extension agents added farmer exchange visits as an incentive to early adopters, which facilitates farmer-to-farmer learning. When farmers visit an already practicing farmer, they are inspired to go back and apply lessons. When they see tangible benefits of improved landscape management, they develop a further understanding of the importance and value of the promoted practices.

5.2.5 Some counterproductive incentives

Subsidies for chemical fertilizers and pesticides often promote unsustainable farming practices. These subsidies encourage farmers to overuse such inputs, resulting in soil degradation, water pollution and harm to beneficial insects, including pollinators. While the aim is to boost agricultural production, the overuse of these chemicals can ultimately reduce the long-term productivity of soils, and damage surrounding ecosystems.

A study by the Institute of Research and Dialogue for Peace (IRDP) on the determinants of fertilizer use in Rwanda found that subsidies had made inorganic fertilizers more affordable for farmers, leading to increased use (IRDP 2020), with the goal to raise fertilizer application rates to 75 kg per hectare by 2024.

However, the distribution of inorganic fertilizers does not consider the specific needs of local crops and soils. Soil nutrient deficiencies are not established before fertilizers are applied. Addressing this challenge was a primary objective of the Rwanda Soil Information System project, but its impact has yet to be fully realized.

Another study assessing the impact of agricultural subsidies and incentives on Rwanda's ecosystems (REMA 2019) identified various negative effects where pesticides and inorganic fertilizers are used, including soil degradation, water pollution, disturbance of the water table, loss of soil microorganisms, an increase in invasive species, and reduced quality of agricultural products. For example, the study reported elevated levels of nitrogen, phosphorus and potassium that sometimes exceeded the surface water standards for Rwanda. This is likely due to fertilizers leaching or percolating through the soil.

Transitioning to subsidies for organic fertilizers would enhance soil health management across landscapes. Integrating subsidies for organic fertilizers into the national subsidy programme would encourage practices that maintain long-term soil fertility, reduce chemical runoff into water bodies, and support sustainable yields, addressing both soil degradation and water pollution. This approach promotes the use of high-quality compost and biofertilizers, which help build soil organic matter, improve water retention, and support beneficial microorganisms. Such an approach is in alignment with the priorities outlined in the National Circular Economy Action Plan and Roadmap (MoE 2022).

The free distribution of tree species' seeds and seedlings can act as a disincentive to the development of seed and seedling supply systems and limit tree diversity in landscapes. While offering tree seedlings at no cost may encourage farmers to adopt landscape management practices by supporting access to tree planting materials they might otherwise lack, it can also discourage the purposeful selection of planting material. Many of the freely distributed seedlings are of only a few exotic tree species, which while having useful productive functions may reduce resilience and have negative or less beneficial (than native tree species) environmental impacts (see parallel study).

Additionally, the free distribution of tree seeds and seedlings discourages farmer groups from entering the seedling production business, thereby limiting the growth of seed and seedling supply systems. Even though the quality of freely distributed seedlings is often low, farmers and landowners have limited alternatives for tree seedling sourcing, as only a few individuals and cooperatives are involved in the production and sale of high-quality tree seedlings.

5.3 Main challenges and the need for incentives

The lack of incentives undermines long-term impact in sustainable landscape management. Current funding is mostly project based, leading to short-term effects without sustaining change. For instance, traveling through the CNR region, abandoned tree nurseries are found where activities ended with project completion. Without targeted incentives, there is limited encouragement for ongoing engagement in nature-based solutions and conservation activities, resulting in temporary improvements that fade after projects end. Financial mechanisms often focus on immediate goals, neglecting the need for incentives that support continuous involvement in environmental stewardship. Addressing this gap is essential to shift from temporary impacts to enduring, community-driven efforts that ensure long-term sustainability and resilience in landscape management.

Incentives are required for strengthening the grassroots networks that are crucial for sustainable landscape management. While community interest in improved landscape management is high, financial barriers limit participation. Incentives tailored to local needs can enable investment through revolving funds or microfinance schemes, supporting farmer groups and cooperatives that spread information and organize collective action. Additionally, shifting behaviours among farmers and landowners is essential, and targeted incentives can reward those adopting biodiversity-friendly and landscape management practices. To date, many mechanisms depend on external seed funding, and community-level incentives can leverage this seed funding to build a more sustainable approach that lives beyond project duration.

Enhancing ecosystem service value is crucial, but the necessary incentives are missing. Many services in the CNR region, such as water purification, soil erosion control and soil stabilization, benefit communities yet lack direct market value. Without incentives, locals receive limited or no compensation for maintaining these services, missing opportunities to foster shared responsibility. PES could promote sustainable livelihoods while protecting habitats, but such mechanisms are underdeveloped. Similarly, incentives that build social capital, strengthen trust and enhance community-driven monitoring are not in place, limiting the potential for effective, culturally attuned and long-term sustainable landscape management.

The significant financing gaps stress the importance of effective community-level incentives. For instance, with a USD 7 billion shortfall for NDC implementation, traditional funding sources such as ODA and FDI have proven insufficient. Once community-level incentives become functional, they could ensure that mobilized funds are used efficiently. By empowering communities to take part in sustainable practices, these incentives would not only boost local engagement, but also maximize the impact of available resources.

6 Conclusions

Financing is vital for Rwanda's implementation of landscape management and nature-based solutions. Although the country is refining incentive mechanisms and has made progress in sustainably financing biodiversity conservation and management, significant challenges persist.

Even though there are emerging domestic sources of funds such as revenues from tourism, a substantial portion of Rwanda's environmental budget relies on donor-supported projects rather than the national budget. This dependency creates uncertainty in future financing for biodiversity, highlighting the necessity to bolster domestic funding sources. To protect its vital biodiversity and natural resources – which are crucial for the economy – Rwanda must utilize both domestic and international resources effectively. This strategy should leverage the country's strong policies and institutional frameworks (see Appendix 2), aligning with efforts to transition to a climate-resilient, green economy. Given the slow returns from sustainable land management investments, there is a need for positive incentives, some of which have been successfully piloted, acknowledging the public goods nature of sustainable practices that yield benefits beyond immediate market returns.

Incentives aimed at individual operators, such as farming communities, often lack coordination and are typically piloted sporadically by NGOs without integration into broader, long-term programmes. One of the longest and most consistent incentive mechanisms to date is the tourism revenue sharing scheme, which has significantly improved the livelihoods and behaviours of communities near national parks. To enhance landscape management, there is a crucial need to develop a comprehensive incentive programme that motivates behavioural change across all levels – farmers, private forest owners, farmer promotors, and public extension agents at the cell and sector levels – ensuring that incentive mechanisms are central to the extension system and drive the desired change on the ground.

Addressing the multifaceted challenges of landscape management and biodiversity conservation in the Congo-Nile Ridge (CNR) landscape requires a comprehensive approach, utilizing both innovative and established financial instruments and incentives. There is a critical need to establish sustainable funding models that not only align conservation efforts with economic benefits, but also maximize biodiversity outcomes and attract investments. Initiatives such as financing sustainable tree growth and developing the wood value chain are essential. Despite agriculture occupying a large portion of the landscape, sustainable practices such as regenerative agriculture often receive minimal funding. Additionally, innovative financial mechanisms such as carbon markets and PES schemes are being introduced to monetize ecosystem services, thereby generating new revenue streams that support both environmental conservation and community livelihoods. These strategic measures are pivotal in tackling the urgent requirements for sustainable landscape management and biodiversity conservation in Rwanda, promoting nature-based solutions that ensure long-term ecological health and community welfare.

7 Recommended incentives and financial instruments for landscape management and nature-based solutions

The below recommended key interventions for improved landscape management and nature-based solutions in the Congo-Nile Ridge (CNR) region aim to address major challenges such as limited access to quality tree planting materials; limited knowledge and skills in the tree seed and seedling supply system; lack of, and inadequate implementation of, forest management plans; limited diversity of planted tree species; presence of exotic tree species in protected areas; unsustainable agricultural practices; lack of biodiversity assessment and monitoring plans; limited wood value chain development; uncoordinated management of Lake Kivu Islands; insufficiently explored tourism products; and more. Recommendations encompass the establishment of pilot nurseries, revision of forest management plans and fostering community-based tourism, as well as developing wood value chains, promoting rainwater harvesting and mitigating flood risks.

With the aim of bolstering ecological resilience, enhancing livelihoods and mitigating environmental degradation in the CNR region, the proposed recommendations necessitate long-term (beyond a typical project cycle) and specific financial instruments and incentive mechanisms, in addition to technical advice. The financial tools should be implemented by various stakeholders, and are specifically tailored for protected area management, tourism development, forest and landscape management, sustainable agriculture, water management, payment for ecosystem services, and carbon market initiatives.

It is crucial to reconsider prevailing financial instruments and incentives. The predominant trend has been short-term project financing, resulting in transient impacts only. Recognizing the necessity for enduring solutions, a shift from projects to comprehensive programmes is imperative. However, a notable challenge arises as certain recommended incentives and financial mechanisms operate at the national level, whereas the current study is specifically concerned with the CNR region. A balancing is therefore needed to align regional targets with national-level mechanisms. To truly promote sustainability, it is essential to introduce incentives and financial instruments that extend beyond immediate project durations, scale successfully piloted mechanisms and leverage domestic and international resources, while fostering lasting positive effects on the landscape and encouraging the widespread adoption of nature-based solutions. In addition, within the CNR landscape as a whole, incentives should be spatially targeted to locations where nature-based interventions are likely to be most useful for supporting regional landscape connectivity among existing natural forest blocks and other key conservation areas, so to enhance conservation efforts.

7.1 Incentives and financial instruments for protected area management

Establish concession agreements for Lake Kivu Islands management: Rwanda's strategic policy direction offers a distinct opportunity for collaboration between the public and private sectors in the management of its protected areas. Even though Lake Kivu's islands are not yet a protected area, a study by The Rwanda Environment Management Authority (REMA) in 2014 developed a conservation plan for them in support of their inclusion into the protected areas network. Currently, the National Land-Use and Development Masterplan 2020–2050 (RoR 2022) indicates that islands not among the five designated for residential activities will be registered in the public domain to conserve biodiversity. As provided for in Rwanda's protected areas concessions management policy of 2013, a clear framework guides private sector engagement and public-private partnerships for the effective management of

these crucial spaces. To facilitate the forging of concession agreements, a three-step approach is recommended: (i) a comprehensive biodiversity assessment for Lake Kivu Islands is essential (see also parallel study). This will provide crucial data for financial planning and determine the potential value of the islands; (ii) the formulation of a business and management plan is imperative. This plan should outline a profitable framework for conserving Lake Kivu Islands. It should aim to align with long-term conservation targets, determining the islands' contributions to economic sectors and community livelihoods. The plan should also assess the feasibility of concession fees, balancing potential revenues against restoration costs; and (iii) the designation of Lake Kivu Islands, or a portion thereof, as a protected area should be considered. The plan could designate zones of the islands as protected areas, and others as economically viable tourism destinations. Following completion of the Lake Kivu Islands Business and Management Plan, the Rwanda Development Board (RDB) should initiate the solicitation of qualified and experienced concessionaires. The feasibility of concession fees should be explored based on the business plan's profitability projections versus restoration costs.

The challenge in this agreement is the high level of degradation of Lake Kivu Islands through illegal farming, grazing and extraction of firewood and medicinal plants. However, previous assessments have indicated that they are not beyond repair. The National Land Authority is registering these islands for future regulation. The new Lake Kivu Monitoring Division at REMA offers a chance for cooperation. Sustainable management requires collaboration between REMA, RDB and the Ministry of Environment (MoE).

A concession agreement, typically spanning 5–20 years, should prioritize urgent actions, with island restoration taking precedence. Under a public-private partnership, the Government of Rwanda would retain a regulatory role, ensuring effective monitoring mechanisms. Such a concession agreement would hold the promise of expanding the economic base for local communities. The government would stand to benefit from concession fees and taxes levied on concessionaires, while the transfer of operational costs to private sector operators or public-private partnerships would enhance sustainability. This approach would foster tourism that is both economically viable and socially responsible, generating employment and reducing poverty in island communities. To ensure community engagement and prevent social exclusion, territorial conflicts and compromised livelihoods, community capacity building, job creation, revenue sharing, and local value chain development, should be integral components of this comprehensive strategy.

Scale the application of wildlife conservation bonds from Gishwati-Mukura and Nyungwe national parks: The concept of conservation bonds emerges as an innovative financial instrument with potential for fostering biodiversity preservation. Representing a sustainable approach to channelling private funds into conservation efforts, it operates on a pay-for-success model within a defined timeframe. The payment is made by multilateral organizations. The success payment, contingent upon the growth rate of species populations throughout the bond's tenure, mitigates risks by capitalizing on the robust credit ratings of multilateral development banks. Investors, assured of principal redemption irrespective of conservation outcomes, find alignment with sustainability goals.

Plans are already being developed to apply conservation bonds in Rwanda in the form of the Rwanda Wildlife Conservation Bond, which will fund conservation efforts to support flagship animal species, initially targeting Gishwati-Mukura and Nyungwe national parks. To further explore the viability of conservation bonds, a comprehensive feasibility study is imperative. This should indicate the country's preparedness, and identify collaboration opportunities with multilateral development banks and organizations such as IBRD and the Global Environment Facility (GEF). Leveraging the previously launched sustainability-linked bonds at Rwanda's stock exchange, the Development Bank of Rwanda (BRD) could borrow wildlife-targeted funds under those bonds, or pursue specific wildlife bonds. Known impediments lie in the absence of legal, institutional and implementation frameworks, coupled with limited in-country capacity. Business case development, verification mechanisms, and a transparent fund mobilization and management system, are all essential aspects of implementation.

Collaborative efforts involving the World Bank as a trustee, reputable organizations such as the Wildlife Conservation Society as verifiers and certifiers, and guidance from the Ministry of Finance and Economic Planning, are integral to navigating the legal and implementation landscapes. Spearheading negotiations, RDB should play a pivotal role in the implementation and marketing of conservation bonds.

7.2 Incentives and financial instruments for tourism development

Enhance the effectiveness of the tourism revenue sharing scheme to optimize biodiversity outcomes: The tourism revenue sharing scheme has the potential to support biodiversity conservation initiatives financially as it incentivizes the communities residing near conservation areas to enhance their conservation efforts. Initially set at five percent of gross tourism revenues, this share was augmented to 10 percent in 2017 to align with the expanding tourism sector. The generated funds are earmarked for community-centric projects, addressing identified needs and fostering community well-being.

However, the current scheme does not necessarily prioritize projects directly linked to biodiversity outcomes, and to address this the programme could evolve to better address community needs such as water and fuelwood, alleviating pressures on conservation areas' (national park) resources and reducing human-wildlife conflict. Drawing on the insights of the 2019 biodiversity finance plan (REMA 2019), involving communities in the selection of tourism revenue sharing scheme-funded projects could ensure that funds are directed where they are most needed for promoting biodiversity outcomes. This could be formalized through a performance contract, outlining expectations for supported communities in terms of their contributions to biodiversity conservation. For instance, community groups could actively engage in restoring degraded sections of national parks through a well-regulated framework, going beyond reporting park invasions and abstaining from illegal activities.

To further enhance the scheme, RDB needs to revisit its structure. Currently, payments are paid ex post at a fixed percentage with little community involvement. In future, communities that are supported with livelihood initiatives could sign a clear agreement with the park management, clearly indicating how they will actively contribute to biodiversity conservation efforts. In this way, supported communities will not play a passive role for biodiversity outcomes. Indicators should be established, specifically targeting biodiversity restoration goals. Through these strategic revisions, the scheme could not only meet, but exceed, biodiversity conservation objectives.

Develop a business plan for tourism in Bigogwe pastureland and leverage it to attract resources: Situated in the northern part of the CNR region, Bigogwe boasts picturesque green hills and expansive pasturelands within the Kivu Belt Destination Management Area. Positioned for community-based cultural and agricultural tourism, it offers a unique insight into traditional Rwandan life centred around cattle keeping, providing visitors with a comprehensive cultural experience, hiking opportunities and breathtaking views. Despite its tourism potential, challenges that include inadequate infrastructure and poor road conditions, coupled with limited access to piped water, hinder its development. Nevertheless, an existing initiative, the "Ibere rya Bigogwe Company," has successfully attracted both local and international tourists, showcasing the cultural richness of cattle keeping in Bigogwe hills.

To capitalize on Bigogwe and its surrounding attractive landscapes, a comprehensive tourism business plan needs development, encompassing activities such as experiencing the local cattle keeping culture, hiking, biking, rock climbing and camping. Furthermore, the business plan can extend to include the extensive 15,547-hectare Gishwati pastures, amplifying sustainable tourism opportunities beyond Bigogwe's borders. As the tourism and conservation potential of these areas is high, the proposed activities would create and increase demand, thus allowing surrounding communities to secure direct benefits from tourism. Additionally, an accompanying management plan aligned with long-term conservation targets for the landscape is essential for the sustainable integration of tourism into the area.

RDB could spearhead the creation of a business plan for Bigogwe, drawing inspiration from successful pioneers such as the Ibere rya Bigogwe Company. Once formulated, this business plan could serve as a tool to attract funds from local and international funders.

7.3 Incentives and financial instruments for forest and landscape management

Provide performance-based incentives for tree growth: Performance-based incentives for tree growth recognize the opportunity costs, labour and input expenses borne by individual or group tree growers, but also the externalities and public goods generated to justify the incentives. While direct returns from tree products benefit planters, especially smallholder farmers, their investment ultimately contributes to the public good. This contribution comes in the form of carbon sequestration, soil erosion control, regulation of hydrology cycles, the provision of habitat to other flora and fauna, and other communal benefits. Ensuring the growth of tree species with high biodiversity value requires special attention, involving extra investments that lead to unique ecosystem services (see also parallel studies).

Effective incentives respond to the needs of farmers, de-risk investments, enhance productivity and recognize that needs and imperatives vary across landscapes. Before tree planting, clear and tree-specific incentive mechanisms should be communicated, with transparent assessment and rewarding criteria made known to growers, giving particular attention to native tree species (for which the incentive structure may need to be different than for exotic trees). Incentives can range from providing agricultural equipment to livestock, and contributions that support higher tree survival rates, especially during the initial rainy and dry seasons, are important. A novel incentive for tree growth involves carbon credits. Farmers engaged in tree management that enhances carbon sequestration then receive cash incentives through the carbon market, based on the number of well-managed trees. This is applicable both for trees in agricultural landscapes and production forests such as private forest management units. Performance-based incentives should extend beyond farmers to include extension agents actively ensuring proper tree growth and providing technical advice. For outstanding communities that grow more trees, a community incentive could be provided. For instance, a community-level challenge could be identified and resolved using incentive funds.

Despite attempts by various public- and NGO-led projects to implement performance-based incentives at the farmer and community levels, challenges persist due to weak coordination of the existing agricultural extension system, and an under-resourced tree-based extension system. Leveraging the established crop-based extension system could contribute to the solution, as the system has consistently improved agricultural productivity across the country, particularly through the crop intensification programme.

Regular and adequate resourcing is essential for the sustainability of performance-based incentives, and funding sources could include district-earmarked funds for forestry and agroforestry, forest-harvesting fees, proceeds from the carbon market, and environment-related fees and fines at the Rwanda Green Fund (RGF). Collaborative efforts between the RGF, Rwanda Forestry Authority (RFA) and Rwanda Agriculture and Animal Resources Development Board are vital for operationalizing and optimizing this incentive scheme. This approach would ensure the alignment of incentives with sustainable tree growth and environmental conservation efforts in Rwanda.

Provide blended finance of matching grant + own contribution + loan for wood value chain: Several factors make the wood value chain particularly promising within the CNR landscape, and there is an opportunity to develop the chain through blended finance. This model combines a matching grant with individual contributions and loans specifically tailored for the wood value chain, addressing a critical need for capital in the sector. The forest resources and the local training institutions (the Integrated Polytechnic Regional Centre specializing in training woodworkers, and the Integrated Craft Production Centre with a specific focus on wood products) create a conducive environment for skills development and product innovation. Furthermore, given urbanization trends and the increasing number of construction projects, the growing demand for wood products adds to the sector's viability.

However, capital is still needed to secure quality timber and improve forest productivity for the market. This could be through an outgrower scheme that subsidizes quality tree planting-material delivery and enhances extension support for timber producers.

A step further in the wood value chain addresses the primary challenge faced by woodworkers: access to capital. This hinders their ability to procure the necessary equipment for woodworking. Such challenges extend to the lack of funds to access efficient equipment for tree logging and wood processing, such as timber dryers for quality wood products. Timber drying is arguably the biggest constraint faced today by the timber sector in Rwanda, including in the CNR region. Traditional drying methods still dominate due to the lack of sufficient capital. Producers and traders/retailers use both formal and informal means to finance their businesses with a preference for informal mechanisms due to the difficulties faced in accessing formal credit. Blended finance emerges as a strategic solution, aligning with the enthusiasm of wood value chain actors who can contribute their own funds, seek loans and simultaneously apply for matching grants.

To implement a blended finance approach, collaboration with financial institutions such as commercial and development banks, and microfinance institutions, is essential. Development banks and partners can serve as the sources for loans and matching grants. Rwanda's Business Development Fund could take a leadership role in negotiating with development finance institutions and partners, to derisk and encourage the engagement of commercial banks and microfinance institutions in the wood value chain's development. By unlocking blended finance for the wood value chain, the solution not only addresses the capital challenge, but becomes a catalyst for employment opportunities. The wood industry, with its substantial workforce involved in production, processing and marketing of timber-derived products, could significantly contribute to economic growth and sustainability within the CNR region.

7.4 Incentives and financial instruments for agricultural development

Provide blended finance of matching grant + own contribution + loan for regenerative agriculture projects: Blended finance holds the potential for advancing regenerative agriculture, specifically in the production of sustainably cultivated commodities such as organic fruits, eco-friendly pesticides, and crops bearing organic labels. The opportune conditions, including favourable rainfall patterns and a burgeoning market for sustainably grown food, coupled with an increasing acceptance of regenerative agriculture principles, create a conducive environment for growth.

However, a noteworthy challenge persists in the form of insufficient investment capital, exacerbated by heavily degraded land requiring patient capital for soil restoration in the CNR region. For instance, regenerating such degraded soils requires more organic fertilizer, which does not appear on the list of fertilizers subsidized by the government. A patient investment is therefore needed to reverse the degradation trends. To address this, a strategic blended finance mechanism would help, aligning with the willingness of farming communities to invest. Under this approach, farmers would contribute their funds, seek loans, and concurrently apply for matching grants.

Development finance institutions and development banks stand as key players in this financial ecosystem that could facilitate direct payments to commercial banks and microfinance institutions for the provision of loans. The BRD could take a leading role in resource mobilization, directing payments to commercial banks, thereby accelerating the adoption of regenerative agriculture.

Support the establishment of a Rwanda Sustainable Value Chain Fund for small-scale agricultural investments: The proposed Rwanda Sustainable Value Chain Fund is envisioned to channel investments towards small-scale initiatives aimed at integrating sustainability into key value chains. The endorsement of the Fund aligns with the recommendations outlined in Rwanda's Sustainable Finance Roadmap (2022). The primary objective is to enhance the productivity and competitiveness of local value chains, with special emphasis on sustainability within the agribusiness sector. By enhancing

productivity and competitiveness, the fund aims to diminish import reliance and potentially bolster hard currency reserves through increased exports. Rwanda seeks to distinguish its products by incorporating sustainability branding.

Identified priority value chains linked to the Nationally Determined Contribution (NDC) project list encompass investments in dairy livestock productivity; poultry, pork and aquaculture value chains; and sustainable fertilizer production; as well as energy-efficient post-harvest and cold chain logistics. The fund would be positioned as an innovative financial instrument designed to attract international investor interest, with potential sources of funding from development partners and development banks. The responsibility of mobilizing these resources would lie with the Kigali International Financial Centre (KIFC), working collaboratively with the Ministry of Trade and Commerce.

Establishing the fund necessitates the creation of institutional structures and the formulation of an operational roadmap. Seed capital could be provided to build functional structures. This initiative aims to forge market linkages, particularly for small-scale investments in the agricultural sector, contributing to the overall sustainability and resilience of Rwanda's economic landscape.

7.5 Incentives and financial instruments for water management

Support a revolving fund for rainwater harvesting: The CNR region faces dual water-related challenges: the first involves water runoffs causing soil erosion, landslides and flooding, while the second relates to a scarcity of water for household use due to the geographical alignment of houses on hilltops and water points downstream. In addition to landscape restoration with trees, a potential remedy lies in rainwater harvesting, meeting household needs and mitigating the adverse effects of water runoff. The 2017 Rainwater Harvesting Strategy aimed to equip households with rainwater harvesting facilities, but there is still very low adoption of these facilities among households across the country, and particularly in the poverty-stricken CNR region. Providing rainwater harvesting systems to communities involved in sustainable landscape management projects can incentivize participation, while also meeting water supply requirements. To ensure sustainability, grassroots-level initiatives for rainwater harvesting are essential to support low-cost rainwater harvesting facilities.

Establishing a revolving fund could catalyse and support such grassroots initiatives, drawing on lessons learned from the Environment and Conservation Fund in the Sebeya catchment that runs through four districts of Western Province: Ngororero, Nyabihu, Rutsiro and Rubavu. Initially, development partners could inject seed money into the revolving fund for three to five years. Subsequently, the Rwanda Water Resources Board (RWB), partially funded through collected water permit and use fees, could sustain and scale the fund's impact. Homeowners could borrow from this fund at a nominal interest rate of three percent, with a two-year repayment window, utilizing the loan to acquire or build low-cost rainwater harvesting facilities. As repayments are made, more households would gain access to funds, promoting widespread adoption.

A well-structured management framework for the revolving fund would be crucial, involving the RWB, saving and credit cooperatives for fund channelling, and local governments for sensitization and monitoring. The initial seed money, when strategically managed, would have the potential to yield a multiplied impact over time, emphasizing sustainable use and fund replenishment. This initiative, marked by increased rainwater harvesting system adoption among households, holds promise for addressing both water runoff challenges and household water scarcity in the CNR landscape, fostering resilience and sustainable water management. To enhance community awareness, the RWB could collaborate with water catchment management committees, organizing events to educate communities about rainwater harvesting. However, the existing challenge is the non-functional status of water committees at the village level, despite their incorporation in the water catchment management structure.

7.6 Carbon market and payment for ecosystem services as novel instruments

Operationalize the National Carbon Market Framework: Rwanda is steadfast in its ambition to evolve into a developed, carbon-neutral and climate-resilient economy by 2050. At present, the Clean Development Mechanism (CDM) and Voluntary Carbon Market (VCM) serve as key players in Rwanda's sustainability endeavours. The majority of Rwanda's carbon credits, approximately 87 percent, stem from improved cookstove projects, with lighting and solar initiatives contributing 9 percent and 4 percent, respectively. These endeavours have cumulatively garnered over 2,250,000 carbon credits, comprising 724,320 Certified Emission Reductions (CERs) from CDM and 1,525,680 Voluntary Emission Reductions (VERs) from VCM activities, significantly aiding in the mitigation of greenhouse gas emissions and in sustainable development.

However, the agriculture, forestry and land use sectors have yet to fully tap into the carbon market potential. Pioneering landscape restoration projects by ARCOS in Rulindo, Rutsiro and Bugesera districts are underway, focusing on tree planting initiatives with near future plans to engage farmers in carbon credit agreements. Additionally, CO2 Capital Projects Africa has entered Rwanda's carbon space. It is in its initial phase of mobilizing private forest owners through organized cooperatives and groups of farmers that manage private forest management units in Gakenke, Rulindo, Gicumbi and Rwamagana districts.

Opportunities for carbon credit generation include enhancing silvicultural practices in private forests to optimize biomass increments (see parallel study), thereby increasing carbon credits. Another avenue involves planting mixed native and exotic tree species on all public land, such as riparian zones, roadsides, and the buffer zones of wetlands and water bodies. However, effectively managing these publicly planted trees for optimal growth presents a challenge. Additionally, agroforestry systems hold substantial potential to sequester carbon on croplands while providing direct benefits to farming households. However, comprehensive guidelines are necessary to ensure farmers can apply the required tree management practices in ways that meet both their livelihood needs and carbon market requirements.

While negotiations regarding compliance carbon trading with bilateral and multilateral partners were ongoing, Rwanda's cabinet approved its National Carbon Market Framework in 2023, which was subsequently launched at COP28. The Ministry of Environment (MoE), supported by the World Bank, is finalizing the carbon registry, aligned with the Standardized Crediting Framework, offering the country greater control over carbon trading.

Once established, mechanisms for quantifying carbon stocks and operationalizing monitoring and verification systems will be implemented, overseen by REMA. The RGF will facilitate deals in the compliance carbon market, while policy instruments such as the sustainable finance roadmap aim to issue voluntary carbon credit offsets to finance forestry projects.

The carbon market scheme could be piloted in the CNR region, leveraging ongoing projects in landscape management, nature-based solutions and biodiversity conservation. Implementing the scheme in this region would not only contribute to emissions reductions, but also serve as a model for integrating carbon market strategies into landscape management, fostering nature-based solutions and promoting biodiversity conservation on a broader scale.

The private sector can invest in carbon offset projects, develop green technologies, engage in public-private partnerships, offer expertise in carbon quantification, and participate in financing mechanisms such as green bonds, thereby supporting Rwanda's carbon market and sustainability goals.

A key priority for the operationalization of the carbon market is a functional policy, legal and implementation framework, and building capacity for framework implementation. A clear mechanism is imperative to ensure

that funds from carbon credits are directed toward nature-based solutions, biodiversity conservation and sustainable landscape management. Community engagement and capacity building of technical experts regarding carbon trading are crucial initial steps, supported by a robust legal framework to ensure fair pricing for carbon sellers. REMA, with RFA and RDB, would spearhead the establishment of necessary arrangements, while RGF could facilitate deal-making, collectively steering Rwanda towards its carbon market objectives. Throughout this process, the implementation must align with the World Bank's ongoing collaborations with Rwanda on the carbon market.

Essential public and private officers need training on emerging financial instruments like green bonds, wildlife conservation bonds, and carbon trading. There is a critical need for skills in technically quantifying carbon sequestration and managing carbon markets to minimize reliance on foreign expertise. To address this, special programmes and further studies should be supported. RDB, through its Skills Development Department, could facilitate this by sourcing experts and linking Rwandan professionals with qualified trainers and educational programmes. This training could include a variety of formats, such as short residential or online courses, specialized programmes, and advanced degrees.

Support the Community Adaptation Fund to facilitate a payment for ecosystem services scheme: Rwanda witnessed a growing interest in the implementation of PES when it took an important step in 2014 by introducing guidelines for the execution of PES initiatives. Both governmental and non-governmental organizations experimented with various PES schemes before and after the guidelines were developed. In 2019, Rwanda signed a Memorandum of Understanding with Costa Rica, focusing on leveraging their exemplary financial mechanisms for environmental conservation, particularly PES for water.

To accelerate Rwanda's commitment to environmental sustainability and climate change policies, a roadmap and an action plan for PES were developed in 2019 under the MoE. Drawing inspiration from the Costa Rican model, a team of Rwandan experts embarked on a knowledge-sharing mission, engaging in insightful sessions to understand the intricacies of Costa Rica's successful PES endeavours.

However, challenges persist in establishing a functional PES market and institutional framework in Rwanda, and in ensuring the reliable delivery of ecosystem services that is a critical factor for the widespread operationalization of PES initiatives. In addition, the private sector has not been actively engaged. Despite the enthusiasm of upstream farming communities for landscape restoration, private sector involvement in PES remains slow paced. The lack of a clear institutional framework and a well-defined market system, specifying criteria for buyers and sellers of ecosystem services, further impedes PES progress. Ecosystem services users, including public utilities and private industries with a vested interest in quality water, present potential avenues for collaboration. Regarded as Rwanda's water tower, the CNR landscape is a potential area for PES.

The favourable climatic conditions in the CNR region support numerous economic activities, such as nearly ten tea factories operating around Nyungwe and Gishwati-Mukura national parks. These entities benefit from clean water sources, which reduce the production costs associated with water treatment.

In seizing the opportunity presented by the CNR landscape, companies operating in the region, including mining companies, tea companies and coffee washing stations, could commit to supporting upstream conservation activities and landscape restoration. However, past PES schemes faced hurdles due to the absence of clear mechanisms. Leveraging the Community Adaptation Fund (CAF) managed by the RGF presents a viable alternative due to its community-centric focus and emphasis on financing nature-based solutions. Piloted successfully in Gicumbi District, the CAF model could now be interconnected with PES.

In this recommended framework, buyers of ecosystem services could channel funds through the CAF, while communities organize themselves to apply for funding for upstream landscape restoration activities. Regulatory roles could be played by REMA and the RGF. Agreements between buyers (private companies and public utilities) and sellers (organized farming communities) on specific services could

be facilitated by CAF, with organized upstream communities submitting proposals for landscape restoration and nature-based solutions. With this market-based scheme, the government could gradually withdraw from direct funding, assuming a regulatory role in the increasingly self-sustaining ecosystem of PES.

Additionally, this PES framework could serve as a critical mechanism to sustain large-scale restoration initiatives once their initial project funding and timelines have ended. Although many projects successfully initiate forest and buffer zone restoration, establish terraces and initiate agroforestry systems, they frequently lack a strategy to cover ongoing maintenance costs to preserve gains. The proposed PES framework could be leveraged to continue to fund sustainable landscape management activities post-project. Local beneficiary communities could be organized into groups dedicated to safeguarding the restored landscapes. At the same time, downstream beneficiaries such as hydropower plants would be identified to compensate these communities for the ecosystem services they continue to provide (e.g., water regulation, soil stabilization). Under this model, CAF could facilitate and coordinate the flow of payments, while REMA and RGF would ensure proper oversight and regulation. This approach would foster a self-sustaining cycle of stewardship and resource protection, strengthening project ownership and securing long-term ecological benefits.

8 Roadmap for recommended incentives and financial instruments

As discussed above, Rwanda has various policies and localized initiatives to improve the incentive framework for landscape and natural resource management, but the overall system remains fragmented and needs consolidation through a systematic process. Developing and scaling up the right incentives takes time. The roadmap presented below outlines a three-year plan for implementing novel finance instruments and business plans, aimed at enhancing landscape management and nature-based solutions in Rwanda.

Year 1: Evaluate and plan

The first year is dedicated to evaluating and planning novel financial instruments that could support landscape management and nature-based solutions. This is for financial instruments including wildlife conservation bonds, blended finance for regenerative agriculture and the wood value chain, and performance-based instruments for tree growth. Activities include:

- **Feasibility studies**: Conducting studies to assess the viability of various financial instruments;
- **Legislative review**: Reviewing existing laws to ensure compatibility with new financial instruments;
- **Support from legislative and implementation partners**: Engaging with legislative bodies and potential implementation partners to garner support;
- **Negotiation of agreements**: Beginning negotiations with relevant stakeholders to finalize the details of the financial instruments.

Year 2: Adapt and begin pilot application

The second year focuses on adapting existing schemes to local requirements and beginning pilot application of the planned financial instruments. Activities include:

- **Adaptation of existing schemes**: Modifying existing financial and conservation schemes to better fit local needs and maximize their impact. This includes adapting the tourism revenue sharing scheme; adapting PES schemes to the Community Adaptation Fund (CAF) model; drawing up an operationalization plan for a Rwanda Sustainable Value Chain Fund; developing rainwater harvesting subsidies; designing a support system for the implementation of regenerative agriculture; and operationalization of the National Carbon Market Framework;
- **Design of concession agreements**: Designing tailored concession agreements for Lake Kivu Islands conservation that align with Rwanda's conservation and economic goals.

Year 3: Prepare and raise finance

The third year focuses on finalizing preparations and securing the necessary funding to ensure the sustainability and effectiveness of implemented plans. Activities include:

- **Preparation of finance budgets**: Developing detailed financial plans that include capital allocations for the upcoming years;
- **Community involvement and funding**: Focusing on securing funding through various sources, including CAF, the Rwanda Sustainable Value Chain Fund and others;
- **Continued engagement and capacity building**: Maintaining active engagement with all stakeholders and continuing to build the capacity of selected stakeholders in utilizing the financial instruments.

Throughout the three years, there will be a concerted effort to integrate these activities into the various ongoing landscape programmes in the the Congo-Nile Ridge (CNR) region, ensuring that these local efforts align with global environmental and sustainability goals. This structured approach aims to systematically address the financing and management challenges in landscape and biodiversity conservation, while fostering sustainable economic growth through nature-based solutions and community engagement.

During the three years, a monitoring and evaluation framework will be employed to track progress and ensure alignment of the financial instruments and incentives with Rwanda's financing systems, as well as its landscape management and nature-based solutions goals. This will ensure that strategic objectives are met on time. Proposed key performance indicators (KPIs) in the first year include the number of feasibility studies completed for new financial instruments and the progress of the legislative review measured by the number of relevant laws and regulations reviewed. In the second year, KPIs will include the number of adaptation plans developed for existing financial instruments and the number of completed operationalization plans. KPIs for the third year will include the number of detailed financial plans and budgets prepared; and the number of stakeholders trained and engaged in preparation for wide implementation.

9 Budget estimation for recommended incentives and financial instruments

The development of recommended incentives and financial instruments is spread over a three-year period and involves budgets for the three programme elements listed in Table 3. It is important to note that the investment plan shown only covers the initial stages of the setting up, managing and limited further testing of incentive schemes for better landscape management. It does not cover payments administered though the schemes or their long-term management.

Implementation of the recommended three-year workplan would be financed by a dedicated grant, specifically allocated to support the various activities outlined in this roadmap. This grant would fund all necessary actions, ensuring successful and timely execution throughout the period. Alternatively, given the constrained funds available to implement the nature of activities in this roadmap, a strategic way to secure financing is by embedding the recommended actions within both existing and upcoming project proposals. Each responsible institution should integrate the roadmap's recommendations into their current and planned initiatives, whenever feasible. The planned monitoring mechanism will track which roadmap activities receive funding and which do not. This will help identify gaps and expedite implementation efforts where additional resources are needed.

Table 3. Indicative roadmap for the initial design of stronger incentives for better landscape management

Programme elements (budgets by year in USD)		Year 1	Year 2	Year 3	Budget total	Responsible party
1. Implementing existing national frameworks and funds						
1.1	Implement the National Carbon Market Framework.	130,500	87,000	0	217,500	REMA, RDB, RFA
1.2	Plan to implement the Community Adaptation Fund.	38,250	25,500	0	63,750	REMA
1.3	Develop a platform to integrate incentives for long-term, coordinated programmes of intervention.	51,000	35,700	15,300	102,000	REMA
2. Establishing new funds						
2.1	Design a functional structure for implementing the Sustainable Value Chain Fund.	15,600	10,400	0	26,000	KIFC, RAB
3. Adjusting and testing proven community-based approaches						
3.1	Design improvements to the tourism revenue sharing scheme.	22,200	14,800	0	37,000	RDB
3.2	Make plans to implement blended finance options in support of wood value chain development and regenerative agriculture.	125,250	72,325	11,175	159,250	BDF, BRD
3.3	Preparations to further test wildlife conservation bonds in the CNR landscape.	69,000	34,500	11,500	115,000	RDB, BRD
Totals		**451,800**	**280,225**	**37,975**	**770,000**	

Note: The investment plan shown only covers the initial stages of the setting up, managing and limited further testing of incentive schemes for better landscape management. It does not cover payments administered though the schemes or their long-term management. This explains the short timescale of the current investments. Responsibilities for implementation of activities are shown. BDF = Business Development Fund; BRD = Development Bank of Rwanda; KIFC = Kigali International Financial Centre; RAB = Rwanda Agriculture and Animal Resources Development Board; RDB = Rwanda Development Board; REMA = Rwanda Environment Management Authority; RFA = Rwanda Forestry Authority.

References

Allen KE and Colson G. 2019. Understanding PES from the ground up: A combined choice experiment and interview approach to understanding PES in Costa Rica. *Sustainability Science* 14: 391–404. https://doi.org/10.1007/s11625-018-00653-w

Andrew G and Masozera M. 2010. Payment for ecosystem services and poverty reduction in Rwanda. *Journal of Sustainable Development in Africa* 12: 122-139.

BRD (Development Bank of Rwanda). 2022. Ireme Invest. https://iremeinvest.rw/

CIFOR-ICRAF. 2024. Analysis of existing agroforestry extension systems and identification of opportunities for improvement. Bogor, Indonesia: CIFOR and Nairobi, Kenya: ICRAF.

Cross-sectoral Taskforce Meeting on Forest Landscape Restoration and Sustainable Agriculture. https://www.iucn.org/story/202308/rwandas-ministry-environment-and-iucn-convened-16th-cross-sectoral-taskforce-meeting

ECOTRUST. 2022. Plan Vivo Project Design Document. Trees for Global Benefits in Uganda. https://www.planvivo.org/trees-for-global-benefits

GoR. 2018. Third National Communication: Report to the United Nations Framework Convention on Climate Change. Kigali, Rwanda: Government of Rwanda. http://climateportal.rema.gov.rw/node/136

GoR. 2020. Updated Nationally Determined Contribution. https://unfccc.int/sites/default/files/NDC/2022-06/Rwanda_Updated_NDC_May_2020.pdf.

IRDP (Institute of Research and Dialogue for Peace). 2020. Determinants of inorganic fertilizers and improved seeds usage along extension services support for agricultural productivity in Rwanda. Kigali, Rwanda: IRDP.

IUCN (International Union for Conservation of Nature). 2022. Community Environment Conservation Fund. List of knowledge products produced under EWMR project. https://www.iucn.org/blog/202301/list-knowledge-products-produced-under-ewmr-project.

KIFC (Kigali International Financial Centre). 2022. Rwanda Sustainable Finance Roadmap. https://kifc.rw/wp-content/uploads/2023/01/KIFCSustainableFinanceRoadmap.pdf

MINICOM (Ministry of Trade and Commerce). 2013. Protected Areas Concession Management Policy.

MINILAF (Ministry of Lands and Forestry). 2017. Forestry Investment Plan. https://www.environment.gov.rw/index.php?eID=dumpFile&t=f&f=19731&token=156bce526b18fbfbaf4f6dcff67773c190fb2c7a

MINILAF. 2018a. Agroforestry Strategy and Action Plan 2018–2027.

MINILAF. 2018b. Forest Sector Strategic Plan 2018–2024. https://environment.prod.risa.rw/fileadmin/user_upload/Moe/Publications/Laws/Forest_Sector_strategy_2018-2014__4_.pdf

MINILAF. 2018c. Rwanda National Forestry Policy. https://www.environment.gov.rw/fileadmin/user_upload/Moe/Publications/Policies/Rwanda_National_Forestry_Policy_2018__1_.pdf

MoE (Ministry of Environment). 2019. National Environment and Climate Policy.

MoE. 2022. National Circular Economy Action Plan and Roadmap. https://www.environment.gov.rw/index.php?eID=dumpFile&t=f&f=58556&token=1efafef04395aa568ceac5346426c5d29864bced

REMA (Rwanda Environment Management Authority). 2019. Biodiversity Finance Plan. Rwanda Biodiversity Finance Initiative (BIOFIN).

REMA. 2022. Revised Green Growth and Resilience Strategy: National Strategy for Climate Change and Low Carbon Development. https://www.rema.gov.rw/fileadmin/user_upload/Rwanda_Green_Growth___Climate_Resilience_Strategy_06102022.pdf.

REMA. 2023. National Carbon Market Framework. https://www.rema.gov.rw/fileadmin/user_upload/Rwanda_National_Carbon_Market_Framework_updated_1_.pdf

RoR (Republic of Rwanda). 2015. The Constitution of the Government of Rwanda of 2003 revised in 2015. Official Gazette No. Special of 24/12/2015, Article 22.

RoR. 2016. National Biodiversity Strategy and Action Plan (NBSAP).

RoR. 2017. Seven-Year Government Programme: National Strategy for Transformation (NST1) - 2012-2024. Kigali: Republic of Rwanda. https://www.minaloc.gov.rw/fileadmin/user_upload/Minaloc/Publications/Useful_Documents/National_Strategy_For_Transformation_-NST1.pdf

RoR. 2020. Vision 2050. Kigali: Republic of Rwanda. https://www.minecofin.gov.rw/fileadmin/user_upload/Minecofin/Publications/REPORTS/National_Development_Planning_and_Re search/Vision_2050/English-Vision_2050_Abridged_ version_WEB_Final.pdf

RoR. 2021. Law No. 006/2021 OF 05/02/2021 on investment promotion and facilitation. https://rdb.rw/wp-content/uploads/2022/02/Investment-code-2021.pdf

RoR. 2022. National Land Use Development Master Plan. https://www.environment.gov.rw/index.php?eID=dumpFile&t=f&f=10551&token=ef94f9c2e05dfb6b5e43acfdaaefa0dfe0071380

RoR. 2023. Rwanda's Green Taxonomy. White paper. https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=86157&token=d71147b50abd9777735ff3debaf7a2caf98e717e

RGF (Rwanda Green Fund). 2022. Intego – Rwanda's NDC Facility. https://greenfund.rw/intego

UNDP (United Nations Development Programme). 2016. Local action for the global goals: Promoting innovative conservation and development solutions. New York, USA: UNDP.

World Bank. 2022. Wildlife Conservation Bond Boosts South Africa's Efforts to Protect Black Rhinos and Support Local Communities. https://www.worldbank.org/en/news/press-release/2022/03/23/wildlife-conservation-bond-boosts-south-africa-s-efforts-to-protect-black-rhinos-and-support-local-communities.

Appendices

Appendix 1. Examples of incentives and financing mechanisms for sustainable land management and biodiversity conservation in Africa

In the pursuit of sustainable land management and biodiversity conservation in Africa, various incentives and financing mechanisms have emerged to address environmental challenges and promote long-term ecological integrity. These strategies align with the broader goal of balancing environmental preservation with economic development and community welfare. From innovative financing models to collaborative conservation efforts and private sector-led initiatives, these approaches indicate possible incentives and financing mechanisms from which Rwanda can learn.

Community Environmental Conservation Fund in Uganda and Kenya

The Community Environmental Conservation Fund (CECF) is used by IUCN in Uganda and Kenya as an approach to catalyse restoration and improve livelihoods. The CECF is a low-cost approach to incentivize restoration at micro-catchment and village levels as part of livelihood improvement. The CECF involves providing financial grants to villages for farmers, based on criteria for each action type that need to be identified and agreed to. Based on village performance contracts through selected service providers, farmers and villages can access grants to meet individual needs and aspirations. The CECF is linked to implementation of actions within village and micro-catchment land-use plans. Villages and micro-catchments that plan to implement and achieve their restoration targets qualify to access the CECF. Such targets could include soil conservation terracing (and associated grass strips, check dams); climate smart agriculture (agroforestry, use of compost and legumes for soil fertility); and forest landscape restoration. In Rwanda, the implementation of this fund was piloted with success in the Embedding Integrated Water Resource Management in Rwanda project, and can be scaled out in the the Congo-Nile Ridge (CNR) region.

Plan Vivo Framework Uganda

Implemented by the Environmental Conservation Trust of Uganda, Plan Vivo Framework Uganda is a collaborative effort with financial backing from the Foreign, Commonwealth and Development Office (FCDO, UK) and USAID aimed at long-term carbon sequestration and climate change mitigation. Now in its sixth year, the project focuses on generating ex ante carbon credits over 20 to 25 years, depending on woodlot type (*Maesopsis emnii* woodlots and mixed native woodlots). The initiative aims to establish 5,000 hectares within the first decade. The recruitment of 30 to 50 farmers annually, each with 1 to 5 hectares of land, contributes to the project's success. This initiative anticipates an average net accumulated carbon uptake of 226 tons of CO_2 per hectare by year 25. Lessons could support the operationalization of Rwanda's new National Carbon Market Framework. The framework should be contextualized to smallholders as very few own more than one hectare of land. Land consolidation for smallholders could be one of the options. Alternatively, medium and large landowners could benefit from the framework. Due to the limited planted tree diversity in the CNR region, this long-term approach could be applied to the growth of native tree species. Species selection should consider multipurpose trees with high carbon sequestration potential.

Wildlife Conservation Bond in South Africa

The 5-year Wildlife Conservation Bond in South Africa, a USD-denominated principal-protected World Bank Sustainable Development Bond initiated in 2022, concludes in 2027. It channels funds to rhino conservation at Addo Elephant National Park and Great Fish River Nature Reserve. Investors may receive a success payment at maturity tied to black rhino population growth. Financed by the Global Environment Facility (GEF), this payment is World Bank-facilitated, and verified independently by Conservation Alpha and the Zoological Society of London. Developed with Credit Suisse, the AAA-rated financial structure assures principal return at maturity, offering a secure investment with potential additional returns. This innovative financing mechanism encourages increased private sector participation in conservation initiatives. Rwanda can leverage this experience by collaborating with the World Bank to develop conservation bonds. Initial testing of the approach in Rwanda is already under development.

Incentive to facilitate access to microfinance in Senegal

In Senegal, the Fédération Locale des GIE de Niodior (FELOGIE-Niodior) focused on rehabilitating mangrove ecosystems and advancing natural resource management within the Saloum Delta Biosphere Reserve in 2016. The federation created a participatory code of conduct for responsible marine resource harvesting, invested in monitoring equipment for reserve access, and established a central fund. This fund, totalling USD 55,500, operated as a rotating communal fund benefiting over 7,000 individuals. Through this initiative, previously marginalized women could gain access to microcredit loans ranging from CFA 50,000 to 300,000, breaking barriers to formal credit and savings systems. Empowered by these small loans, women found pathways out of poverty through contributing to nature-based solutions. Since there is growing financial literacy among Rwandan communities in the CNR region, such a communal fund could support workers in landscape management. This could build on already existing saving and loan initiatives, particularly focusing on their governance.

Payment for water ecosystem services in Kenya

Kenya Environment Volunteers, supported by the Critical Ecosystem Partnership Fund, introduced a payment for water ecosystem services initiative in Kenya's Kikuyu Escarpment Forest, spanning 37,000 hectares. Community institutions such as community forest associations and water resource user associations facing resource constraints had struggled to protect the forests and rivers. This initiative ensured communities engaged in watershed management receive payment from downstream beneficiaries such as water utilities, farms and industries. Businesses committed to safeguarding 3,000 hectares annually, fostering increased private sector financing through partnerships with community forest associations for water ecosystem service restoration. A similar initiative has been tried in Rwanda but was not successful due in part to limited commitment from businesses. A coordinated and contextualized engagement of private actors is necessary for success.

Water fund in Kenya

The Nature Conservancy partnered with Pegasys to launch the Upper Tana-Nairobi Water Fund (UTNWF) in Kenya, enhancing water quality and supply for Nairobi by investing in upstream watershed conservation. Collaborating with local farmers on sustainable practices including agroforestry and terracing, it secures water for nine million people and supports Tana River-based economic activities. Its blended finance model leverages public and private contributions, including from Coca-Cola, East African Breweries PLC, and utilities and government agencies, for watershed management. By 2021, the UTNWF had planted three million trees, promoting carbon sequestration and biodiversity while boosting the Masinga hydropower system, which provides 40% of Kenya's electricity. By September 2021, it had improved management of 73,000 hectares of land, including 36,000 hectares of public forests, and facilitated Rainforest Alliance certification of 8,500 coffee farms. Rehabilitated communal

water pans holding 43.5 million litres benefit 4,200 households. These achievements underscore the possibility of blended finance to sustainably support landscape restoration, offering lessons for Rwanda.

Incentives for forest outgrowers in Ghana

The Swiss Lumber Company outgrower scheme in Ghana has been providing guarantees to farmers for investment in forest and landscape restoration since 1991. The company lacked access to forests for wood supply, and the plantations on its own land were insufficient to meet the capacity of its sawmill. Incentive strategies have been developed to attract outgrowers to grow native trees on land that was degraded or producing only marginal agricultural yields. The company provides cash and in-kind rewards to landholders and farmers to develop plantations. Farmers and landholders are allocated land and other resources to support the production and management of trees to supply the sawmill, and the company provides a guaranteed market for the wood produced. Should there be an interested forestry investor in Rwanda, this approach could be explored by engaging grouped landholders in private forest management units.

Incentives for agroforestry in the Democratic Republic of the Congo

The Mampu plantation spans 8,000 hectares, strategically combating deforestation linked to charcoal use while enhancing soil fertility. Supported by the Hanns Seidel Foundation, it involves over 300 farming families, practicing agroforestry by integrating crops like cassava and maize with acacia in a 12-year cycle. Burning mature acacias produces charcoal, enriching soil for crops and supplying Kinshasa with sustainable charcoal, mitigating deforestation in peri-urban areas. Producers benefit from charcoal sales and increased crop yields due to acacia-fixed nitrogen, preventing the destruction of 500 hectares of bushlands annually. The Mampu project generates around USD 9,000 yearly for farmers on 1.5-hectare plots. Success hinges on providing producers with training and technical assistance to address agroforestry complexities and ensure sustainable acacia regeneration intervals. Training and technical assistance stand as major incentives in agroforestry adoption in Rwanda. This approach could be used, with emphasis on the quality of training to ensure maximization of agroforestry benefits to farming communities.

Private sector-led ecotourism in Kenya

The Olare Orok Conservancy (OOC) in Kenya stands as a safeguard against land degradation and overgrazing, while fostering tourism by leasing community land. This private sector-led initiative directly compensates individual landowners to encourage collective action, aiming to preserve wildlife habitats and enhance tourism without jeopardizing pastoral livelihoods. Since 2006, Maasai landowners receive USD 41 per hectare annually from a consortium of five tourism operators. In exchange for this compensation, landowners voluntarily relocate settlements outside the conservancy and prohibit livestock grazing within the OOC. This public-private partnership ensures the exclusive dedication of the conservancy to wildlife tourism. By carefully studying and implementing this approach, socioeconomic benefits through increased tourism can be maximized in Rwanda.

In conclusion, the evolving landscape of sustainable land management and biodiversity conservation in Africa reveals a diverse array of incentives and financing mechanisms that support the tackling of environmental challenges, while promoting long-term ecological integrity. The presence of innovative financing models, collaborative conservation efforts, and private sector-led initiatives within this context provides valuable insights and potential pathways for learning. As Rwanda strives towards nature-based solutions and biodiversity conservation, these examples offer inspiration for crafting effective incentives and financing mechanisms tailored to the nation’s unique context and environmental goals.

Appendix 2. Policy and institutional framework for the financing of improved landscape management and adoption of nature-based solutions in Rwanda

Rwanda's ambitious Vision 2050 (RoR 2020) sets the trajectory for its transformation into an upper-middle income nation by 2035 and a high-income country by 2050, emphasizing a carbon-neutral and climate-resilient economy. This transformational journey is underpinned by a robust policy and institutional framework, reflecting a commitment to sustainable land management and biodiversity conservation. The National Environment and Climate Policy (MoE 2019) forms the bedrock of Rwanda's environmental aspirations, seeking a clean and resilient environment that enhances societal well-being in the face of climate change. Complementing this, the Rwanda Green Growth and Climate Resilience Strategy has undergone revisions (REMA 2022) to align with Vision 2050, charting a course for climate-resilient development. The strategy requires an annual investment of USD 2 billion, with leadership from the Ministry of Finance and Economic Planning and the RGF. Another major guiding policy instrument is Rwanda's commitment to global climate goals demonstrated through its NDC to the Paris Agreement, targeting a 38 percent emission reduction from the baseline business-as-usual scenario by 2030, with an investment cost of USD 11 billion.

The National Land Use Development Master Plan (RoR 2022), a prioritized plan stemming from Vision 2050, serves as a national spatial guide for sustainable development. This is supported by the Protected Areas Concession Management Policy (MINICOM 2013), aimed at: increasing investments; ensuring well-managed protected areas; and fostering visitor facilities to boost both visitation and employment. The Forestry Investment Plan (MINILAF 2017), part of the USD 95 million Forest Investment Program, also aligns by focusing on sustainable agriculture, forest management and enhancing the wood supply chain. All these contributed to the National Strategy for Transformation spanning from 2017 to 2024, whereby sustainable natural resource management was embedded in Priority 7, contributing to the transition towards a green economy (RoR 2017).

Other key policy instruments were recently developed in the framework of sustainable finance for nature-based solutions, landscape management and biodiversity conservation. Introducing innovative financial mechanisms, the Green Taxonomy (RoR 2023) is being developed, setting sustainability criteria to establish a direct link between the economy and the financial market, preventing greenwashing and attracting green investments. In addition, the Rwanda Sustainable Finance Roadmap (KIFC 2022), developed by the KIFC, strives to raise awareness about climate-related risks and make sustainable finance accessible to all. Prior to this, the Payment for Ecosystem Services Roadmap and Action Plan had been developed to improve Rwanda's climate resilience through soil conservation and landscape restoration. Recently, in a bold move towards carbon neutrality, Rwanda launched its National Carbon Market Framework, underlining its commitment to be a climate-resilient and carbon-neutral nation by 2050. Collectively, these policy instruments demonstrate Rwanda's dedication to fostering sustainability, economic growth and climate resilience through innovative financing for nature-based solutions.

Active NGOs in biodiversity conservation and nature-based solutions include the International Gorilla Conservation Programme (IGCP), Dian Fossey Gorilla Fund International (DFGFI), the Wildlife Conservation Society (WCS), IUCN, ARCOS, Association Rwandaise des Ecologistes (ARECO), Rwanda Environmental Conservation Organization (RECOR) and Forest of Hope Association (FHA).

The Government of Rwanda is a recipient of substantial funding for landscape management and biodiversity-related activities from various multilateral and bilateral development partners. The World Bank, a key partner, supports the Strategic Plan for the Transformation of Agriculture, allocating resources to sustainable management of natural resources, focusing on soil erosion reduction, irrigation for hillside farmers, and increasing watershed water retention. GEF has financed multiple projects covering biodiversity, land degradation and climate change. The United Nations Development Programme plays a crucial role, co-financing GEF projects and independently supporting biodiversity and natural resources sector projects through initiatives like the Poverty and Environment Initiative.

Institutions and their key roles in landscape management, nature-based solutions and biodiversity conservation in Rwanda

Institution	Key role
Ministry of Finance and Economic Planning	Allocates funds to the environment and natural resources sector based on sectoral strategic plans and budget proposals submitted by the Ministry of Environment – a line ministry.
Ministry of Environment	Formulates and supervises the implementation of policies and programmes related to environmental protection, biodiversity, water resource management and sustainable forest resource utilization. Promotes multistakeholder participation, including the private sector, NGOs and local communities in sustainable forest management.
Rwanda Green Fund	Mandated to invest in public and private projects with the potential to create transformational change; build an ecosystem to incubate, accelerate and provide growth capital to high-impact green ventures; and play a catalytic role to attract climate finance and green investment.
Rwanda Development Board	A cabinet-level institution responsible for establishing and managing national parks, developing tourism within and outside protected areas. It manages tourism concessions, park entrance fees, permits and licenses. It engages in public-private partnerships.
Rwanda Environment Management Authority	Provides regulatory, advisory, monitoring and coordinating functions for all environmental and biodiversity issues, including multilateral agreements. It acts as the regulatory authority for national environmental protection, conservation, promotion and overall management, including advising the government on matters related to the environment and climate change.
Rwanda Forestry Authority	Mandated to conserve and manage forest resources, including the protection of watersheds and development of agroforestry in the country.
Rwanda Water Resources Board	Mandated to ensure the availability of enough, and well managed, water resources for sustainable development, and to reduce soil erosion and the impact caused by flooding and landslide risks.
Rwanda Land Authority	Mandated to manage and administer land in Rwanda, including implementing land policy, land-use planning, land registration, land consolidation and management of land conflicts.
Ministry of Local Government	Coordinates the implementation of district development strategies, ensuring alignment between these, districts' 'imihigo', and their contribution to National Strategy for Transformation targets, including nature-based solutions targets.
Ministry of Agriculture and Animal Resources	Initiates agricultural policies and creates an enabling environment for increased private sector participation in the agricultural sector. It holds overall responsibility for coordinating the planning and implementation of all projects and programmes in the agricultural sector. It focuses on agricultural diversification and intensification, and sustainable management of natural resources.

The United States, through USAID, funds projects for biodiversity conservation and sustainable ecotourism in Nyungwe National Park. The United Kingdom, Sweden, Belgium, the Netherlands and Germany contribute to Rwanda's natural resource and agriculture sectors, with a focus on areas such as land reform, environment, climate change, renewable energy and health. Notably, Belgium supports various sectors, including energy, reforestation and water access. The Netherlands, in collaboration with Belgium, aids reforestation efforts to increase forest cover and biomass energy productivity.

The GCF is a noteworthy partner in financing landscape management and nature-based solutions. Over the last decade, utilizing diverse financial instruments such as grants, equity guarantees and loans, and in conjunction with co-financing from the Government of Rwanda, the MoE has administered GCF in support of 13 projects in the country, amounting to USD 219.8 million. Notable initiatives implemented only in Rwanda encompass the Rwanda Green Investment Facility; climate resilience building in the CNR landscape; transforming Eastern Province through adaptation; and the reinforcement of climate

resilience in Northern Rwanda. GCF additionally supported projects for multiple countries including Rwanda as one nation among others. These projects include the Global Subnational Climate Fund; the Energy Access Relief Facility; the KawiSafi project to drive off-grid solar power in East Africa; the Catalytic Capital for First Private Investment Fund for Adaptation Technologies in Developing Countries (CRAFT); the Green Guarantee Company; the Infrastructure Climate Resilient Fund; and the Africa Rural Climate Adaptation Finance Mechanism. Projects in the pipeline include mainstreaming climate change in Rwanda's agricultural sector. Rwanda has also requested the GCF to fund other projects in renewable cooking energy and forest tree planting.

Opportunely, the Team Europe Initiative, the Sustainable Finance Advisory Hub (SFAH) – a multi-donor EU Action implemented by a consortium of European and international partners – is planning to build a conducive environment for sustainable finance, and promote the uptake of sustainability-related instruments with a view to contribute to mobilizing financing for the priorities of Global Gateway, in support of the Sustainable Development Goals. The SFAH will be a demand-based technical assistance facility that offers support to: credible sustainable finance frameworks; green bond issuances; and other sustainability-related financial products.

Institutional arrangements, spearheaded by sector working groups and cross-sectoral task forces comprising government entities, NGOs, donors and the private sector, ensure coordinated efforts. Forest land restoration is overseen by the National Cross-sectoral Task Force, and agroforestry is managed by the National Agroforestry Task Force. These efforts add to the sector working groups for environment and natural resources and for agriculture. These institutional arrangements foster a holistic understanding of the value and importance of trees in the landscape, showcasing Rwanda's advanced understanding of the interconnected efforts needed to enhance forests and plantations and increase tree coverage in agricultural landscapes.

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