

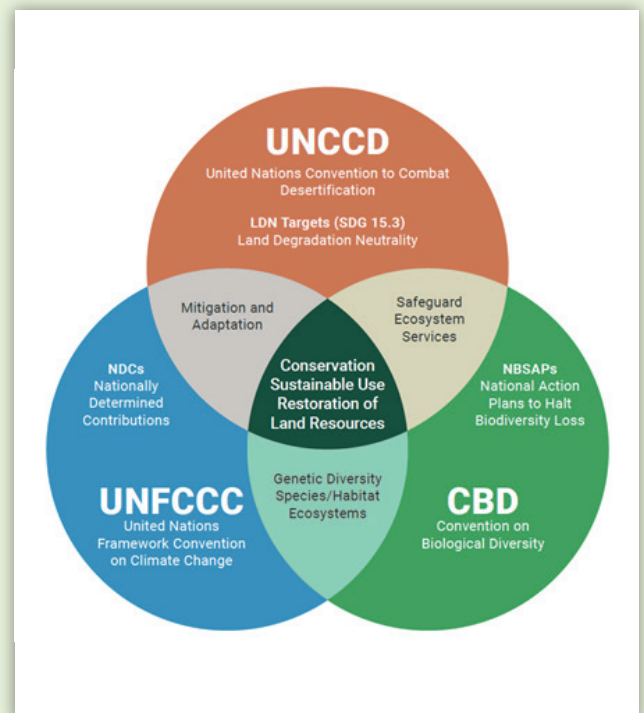
POLICY BRIEF

Economics of Harmonizing Land Restoration Activities across the Rio Conventions in Rwanda and Implications for Food Security

Revitalizing Rwanda's Landscapes: Land Restoration for Resilient Agri-Food Systems

In a world grappling with the interlinked challenges of climate change, biodiversity loss, and land degradation, the need for coordinated action has never been more apparent. Harmonizing action on land by the three Rio Conventions is not only needed because of expected efficiency and budget savings but it is also necessary because of the inherent connection between these challenges. Rwanda, a country that has witnessed significant shifts in land use and land cover over the past two decades, stands as a testament to both the potential and urgency of addressing these issues.

Rwanda aims to conserve, sustainably manage, and restore 1,069,476 hectares of land under its LDN and 805,000 ha under its NDC. Moreover, Rwanda has also made a massive commitment to restore and improve 2,000,000 hectares of land under the Bonn Challenge. Similarly, Rwanda's NBSAP has such targets as "at least 10.3% of national territory holding biodiversity and ecosystem services is protected", "at least 50% of natural ecosystems are safeguarded, their degradation reduced", and "increase of forest cover up to 30% of the country". Given the political momentum coming with the new Global Biodiversity Framework (GBF), and the need for all states to review and adapt their NBSAPs according to



“Bringing together national action plans currently siloed under the UNCCD, CBD, and UNFCCC frameworks represents an immediate opportunity to align targets and commitments to implement land restoration, realize multiple benefits, and maximize returns on investment.”

UNCCD Global Land Outlook 2022



Key Messages for Policymakers

Our findings indicate that Nationally Determined Contribution (NDC), Land Degradation Neutrality (LDN), and National Biodiversity Strategies and Action Plan (NBSAP) processes in Rwanda are overlapping and mutually complementary. Implementing them as separate processes at the national and global levels without concrete coordination mechanisms will likely result in lower effectiveness and efficiency of achieving their targets. Moreover, coordinated implementation will also help to avoid inherent tradeoffs.

Coordinated implementation of land-focused activities under the Rio Conventions can reduce transaction costs of land restoration by almost 56% in Rwanda. Specifically, coordinated implementation is estimated to save about 45.6 million US dollars per year compared to when the activities under the three Rio Conventions are carried out separately.

There are five specific mechanisms for synergies:

1. A joint inter-agency working group can help ensure efficient resource usage,
2. An information exchange platform can facilitate improved communication and data accessibility,
3. A joint monitoring and evaluation system offers timely information sharing and recognizes contributions,
4. Joint planning and fund mobilization could streamline land restoration efforts, and
5. Joint research helps promote skill and data sharing and efficient resource usage. Through these mechanisms, well-coordinated and harmonized implementation can provide with significant efficiency gains for land restoration activities. More efficient implementation implies higher returns from land restoration, thus making it more attractive for various cooperation partners and investors to fund the activities contributing to LDN, NBSAP, and NDC processes in Rwanda.

the new framework, there is a window of opportunity to conduct this NBSAP revision in Rwanda in an integrated manner, while leveraging on other related agendas and targets through taking a significant step towards coherence, synergies, and efficiency.

Land-focused activities by NDC, NBSAP, and LDN processes in Rwanda can be categorised into conservation, sustainable management, and restoration categories, corresponding to the LDN hierarchy of avoiding, reducing, and reversing land degradation. Our findings show that the targets for land conservation are mostly synergistic, contributing to each other. However, tradeoff may occur if activities focused on maintaining forest cover are carried out through planting mono-species forests. For sustainable management of land resources, all objectives are synergistic and mutually supportive, with the only tradeoff potentially arising from the compliance with the National Land Use Master Plan 2050 due to inconsistencies because some of these NDC, LDN, and NBSAP commitments were made before the adoption of the National Land Use Master Plan 2050, so this means that these commitments may be revised in future to bring them in compliance with the evolved national legal frameworks. Land restoration objectives primarily exhibit synergies, although a tradeoff may occur if land restoration practices involve the use of alien species or mono-species forest plantations.

Costs and Benefits of Land Restoration in Rwanda

The findings show that the costs of land degradation through land use change and through soil erosion in Rwanda reach an equivalent of about 2.2 billion US dollars per year. Investments of about 1.4 billion US dollars are needed to address ecosystem degradation and cropland soil erosion in the country. This also means that each dollar invested into land restoration and addressing soil erosion in Rwanda returns a total of about 1.53 US dollars. It is crucial to note that a major share of these investments, namely 810 million US dollars, are needed to be made into agroforestry systems on agricultural lands. In fact, expansion of agroforestry also serves as one of the key measures for combating soil erosion. Restoring forests and wetlands, expanding agroforestry systems to treeless croplands and grasslands were also found to be highly profitable. However, restoring shrublands, woody savannas and savannas which became croplands is not economically viable. Restoring

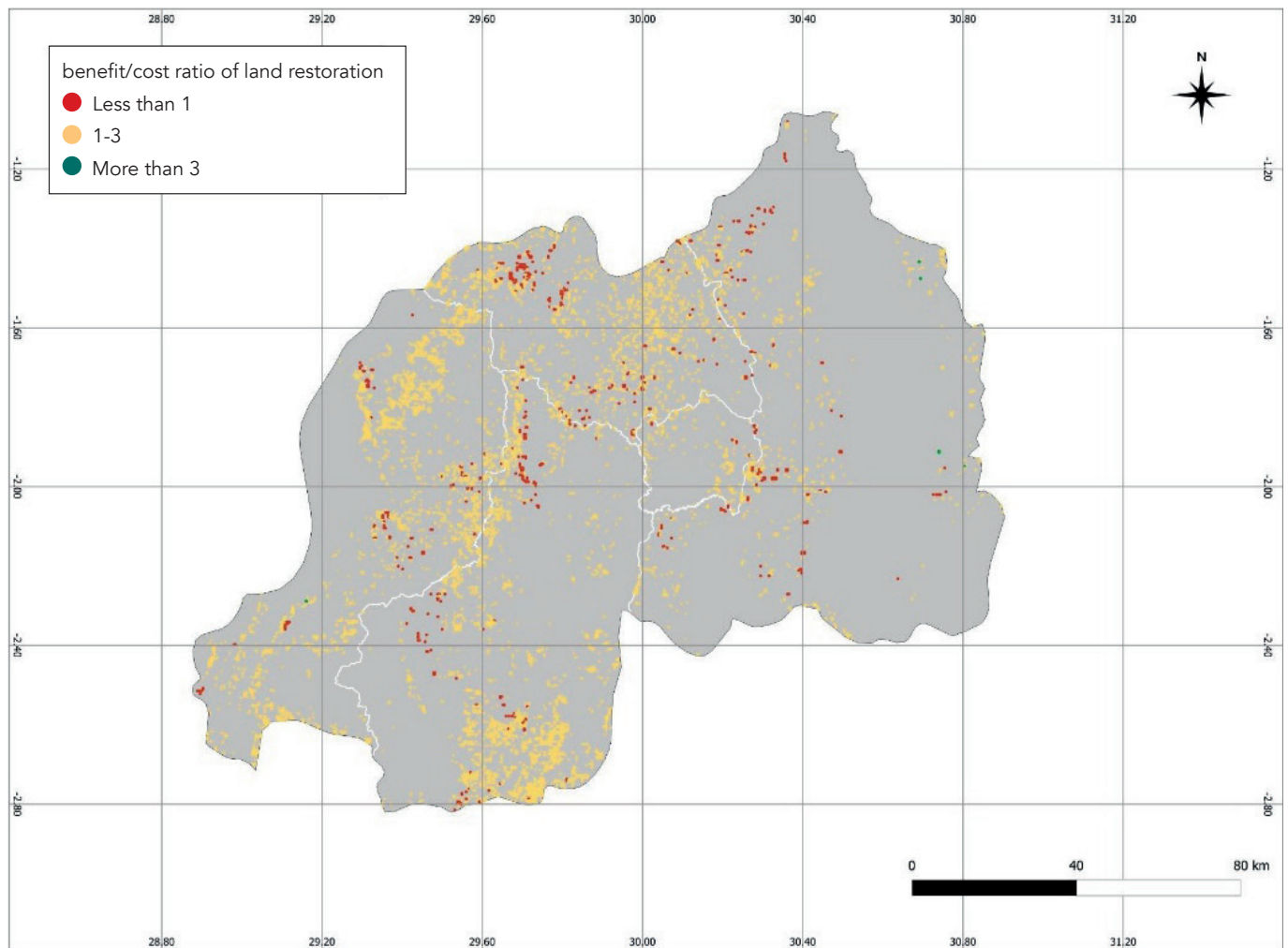
cropland without agroforestry from grassland is also not profitable but becomes profitable when converted to cropland with agroforestry.

Cost benefit analysis of land restoration revealed the spatial distribution of areas with different economic returns from investments in land restoration. Some high return areas are observed along the shore of lake Kivu

(the northern part of Nyamasheke District, southwest of Rubavu District and northwest of Rutsiro District), border of the Western and Southern Provinces (around the west of Muhanga) and southern part of Gisagara and Nyaruguru Districts near the border to Burundi. Analysis of such detailed spatially explicit representation of land restoration costs and benefits will help target most appropriate and economically efficient land restoration activities.

FIGURE 1

Benefit/cost ratio of land restoration



Furthermore, maintaining all croplands in Rwanda in good fertile condition would require recurring annual investments of 91 million US dollars. Expanding agroforestry systems to all croplands would imply an annualized cost of 123 million US dollars. However, these investments

are worthwhile because gross benefit from them reach 168 million US dollars per year, and net benefits equal about 45 million US dollars per year. Of these net benefits, about 27 million US dollars per year occur in the form of additional food and agricultural commodities' production.

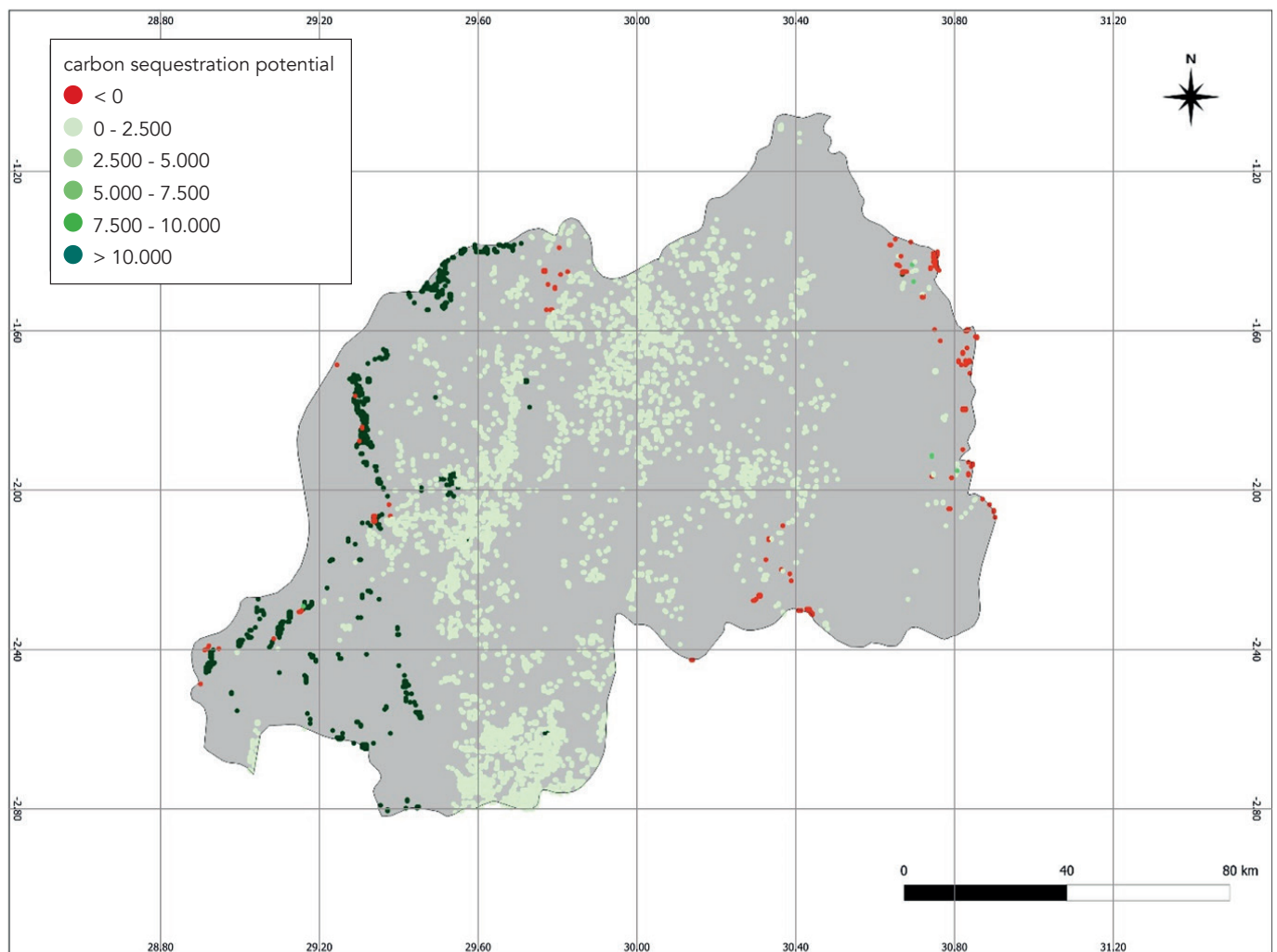
Carbon sequestration through land restoration in Rwanda

Environmentally sustainable and economically profitable ecosystem restoration opportunities can help sequester about 13.5 million tons of carbon in Rwanda over a period of 30 years. This is about 2.5 times more than Rwanda's current annual greenhouse gas (GHG) emissions. The estimation shows that even considering that the value of land restoration investments is focused only on carbon sequestration, the cost of each ton of carbon sequestered in evergreen broadleaf forests in Rwanda is 7.74 US dollars, for wetlands 5,300 US dollars, and for agroforestry systems 137 US dollars. For comparison, each ton of carbon is currently (August 2023) trading at about 100 US dollars per

ton under the European Union's Emissions Trading System (ETS). Restoring natural forests in Rwanda represent one of the most cost-effective carbon sequestration opportunities. Although the cost of each ton of sequestered carbon is higher in agroforestry systems, due to their extensive area coverage, agroforestry systems can provide nearly half of the additional carbon sequestration potential through land restoration in Rwanda. Restoring lost wetlands makes a broader economic sense, particularly from the perspective of biodiversity conservation. It appears, however, that from the carbon sequestration perspective in above and below ground biomass wetlands restoration will have rather modest effects in Rwanda. This point highlights that prioritization of areas to restore may result in diverging targeting options depending on each Convention action agendas.

FIGURE 2

Carbon sequestration potential from land restoration in Rwanda, in tons per pixel



Aligning Actions, Amplifying Impact: Synergies from Coordinated Land Restoration

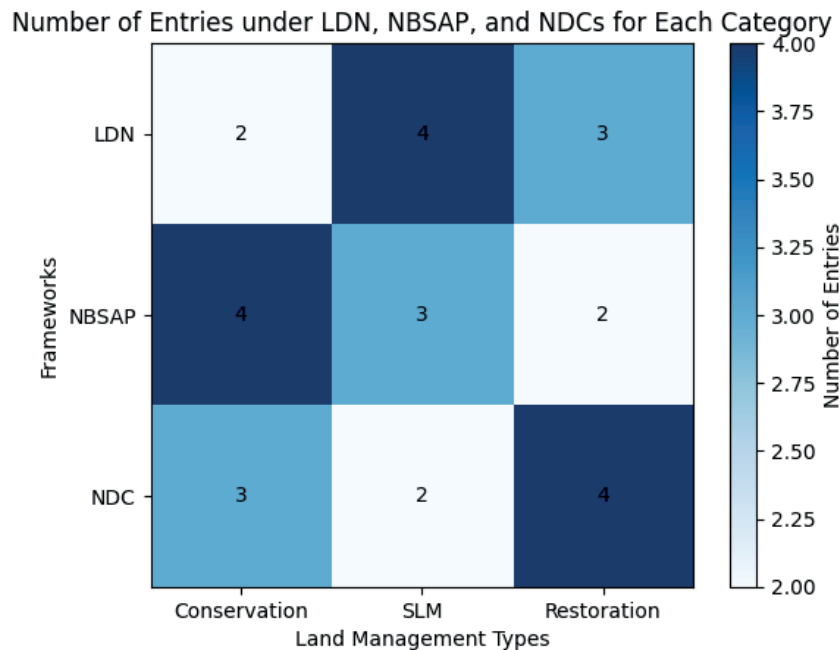
Land degradation is a pressing global environmental issue, posing threats to food security, ecological stability, and sustainable development. The three Rio Conventions — the United Nations Convention to Combat Desertification (UNCCD), the Convention on Biological Diversity (CBD), and the United Nations Framework Convention on Climate Change (UNFCCC) — aim to address these challenges through land and ecosystem restoration. This

study in Rwanda evaluates the potential for synergies from joint programming and implementation of land restoration activities under the Rio Conventions. It uses the Total Economic Value (TEV) framework approach for the valuation of ecosystem services and applies simulation modelling of transaction costs to identify synergies across land restoration activities. The policy brief, thus, aims to provide policy-relevant evidence on opportunities for maximizing effectiveness, efficiency, and socio-economic impact from land restoration in Rwanda, with a particular emphasis on food security.

FIGURE 3

Focus of the three Rio Conventions on different aspects of land management

Note: figures represent the number of adopted targets under each category



Collaboration between the Rio Conventions on land restoration is essential to achieve the goals of land degradation neutrality, biodiversity conservation, mitigating and adapting to climate change, and more broadly, achieving the Sustainable Development Goals (SDGs). There is an ample legal basis mandating harmonized and well-coordinated implementation of the three Rio Conventions. Land restoration is, arguably, the single most important activity where this coordination for boosting synergies and avoiding tradeoffs is essential. Synergies arise when actions to meet one Convention's objectives support those

of another. Conversely, tradeoffs occur when actions towards one goal inadvertently harm another. In the context of land restoration, the promotion of synergies across the Rio Conventions implies that improved coordination helps increase the effectiveness and efficiency of land restoration activities, with direct implications on mobilizing much needed funding for land restoration. This is because more effective and efficient planning, implementation, and monitoring of land restoration will make land restoration more attractive for public, multi-lateral, and private sector investments.

TABLE 1

Coordinated vs. separate implementation of land targets under the three Rio Conventions (in millions of US dollars) until 2030.

| Scenarios for synergy collaboration | Annual transaction costs when Rio Conventions' land restoration activities implemented in coordination | Annual transaction costs when Rio Conventions' land restoration activities implemented separately | Total annual gains from collaboration in Rwanda |
|--|--|---|---|
| Scenario 1. A joint inter-agency working group for land restoration, including the process for joint designing of land restoration (CA) | 4.77 | 8.46 | 3.69 |
| Scenario 2. An information exchange platform and website for land restoration, awareness raising and advocacy activities (AR) | 7.19 | 12.69 | 5.5 |
| Scenario 3. A joint monitoring and evaluation system for land restoration (ME) | 33.82 | 59.20 | 25.38 |
| Scenario 4. Joint funding mobilization for land restoration (FM) | 2.41 | 4.23 | 1.82 |
| Scenario 5. Joint research and capacity building for land restoration (RCB) | 11.94 | 21.14 | 9.2 |
| Total of all scenarios | 60.13 | 105.72 | 45.59 |

Recommendations

The following suggested recommendations for collaborative synergies are based on the findings of this study for the consideration by concerned Ministries and other organization in Rwanda engaged in land restoration and at the international level by the Secretariats of the three Rio Conventions.

Synergy mechanism:

1. A joint inter-agency working group for land.

Strengthening inter-Ministerial coordination on land conservation, sustainable land management (SLM), and land restoration in Rwanda. National dialogues and coordination mechanisms are essential for implementing international conventions and agreements effectively. Establishing such mechanisms can help streamline communication and cooperation among different stakeholders, including government ministries, agencies, sub-national

administrations, private sector, civil society organizations, and local communities.

Establishing a national focal point for coordinating land-based activities (including the entire spectrum from conservation, SLM, to restoration) within the government, such as dedicated inter-ministerial committee headed by a high-level official, can help coordinate actions among different ministries and stakeholders engaged in land management from diverse angles. The focal point could also bring together currently existing land management-focused working groups which are operating in parallel, despite being usually composed of the same organizations and individuals.

Enhancing the mandate of the Joint Liaison Group among the Rio Conventions. At the Rio Conventions' level, the Joint Liaison Group was established to enhance coordination and cooperation among the Rio Conventions. Strengthening the Joint Liaison Group's capacity and pro-

viding it with a more explicit mandate to facilitate collaboration on land restoration could help enhance synergies among the Rio Conventions.

**Synergy mechanism 2:
Joint research and planning of land target implementation.**

Joint spatial mapping of lands for conservation, SLM, and restoration across the Rio Conventions. Full harmonization of Conventions' specific indicators on land can be a highly costly and lengthy process without clear and certain benefits and may not be feasible for some indicators. It may be a more optimal approach to accept these individual targets and differences as such and bring them together in one map, capturing the national commitments of land conservation, SLM, and land restoration under the three Rio Conventions in a spatially explicit manner. It is clear from this study's findings that predominant share of land conservation, SLM, and land restoration activities in Rwanda will occur on agricultural lands. Therefore, a coherent and salient integration of food security and (agro)-biodiversity implications is necessary.

Harmonizing national action plans for land conservation, SLM, and land restoration with the joint support of the three Rio Conventions can help outline Rwanda's land-related commitments, targets, and strategies for implementing, while serving as a joint roadmap for all stakeholders. Rwanda has a very rich basis to initiate such process, for example, restoration opportunity assessment methodology (ROAM) could provide the starting elements for this national coordination.

**Synergy mechanism 3:
Joint funding mobilization**

Mobilizing resources for joint work on land conservation, SLM, and land restoration: Rwandan national organizations and the three Rio Conventions can work together to secure financial resources to support collaborative efforts on land, including from the Global Environment Facility (GEF), the Green Climate Fund (GCF), and other funding sources. An urgently needed and very specific topic for such finding could be joint spatially explicit mapping of NBSAP, NDC, and LDN commitments and the joint monitoring and evaluation of their implementation status.



Elaborating joint work programs and projects. At both the national level and at the Rio Conventions' level, the development of joint work programs and projects could be considered. In Rwanda this could be part of the National Plan for land conservation, SLM, and land restoration, and for the Rio Conventions, this could be part of the enhanced mandate of the Joint Liaison Group (JLG). This collaborative programming approach can help streamline efforts and help mobilize resources to expand implementation activities in a harmonized way.

**Synergy mechanism 4:
An information exchange platform and joint research**

Facilitating knowledge and information generation and sharing: Creating a platform for the exchange of knowledge, information, and best practices related to land conservation, SLM, and land restoration between the national organizations in Rwanda can help bring land related information together in one place and provide open access to it. Such a publicly available source of rich information on all aspects of land conservation, SLM, and land restoration will help unleash various research activities that support evidence-based design of land management policies, but also help attract more investments by reducing

information uncertainties and risks faced by both private and public investors. Maintaining and updating this platform could be part of the functions of the national land focal point in Rwanda.

Fostering capacity-building efforts. The secretariats of the Rio Conventions can collaborate on providing support for capacity building and strengthening on integrated approaches that address land objectives across the Conventions. This could include training, technical assistance, and the development of tools and guidelines for application of best practices of land conservation, SLM, and land restoration.

Increasing awareness and political will. Raising awareness of the benefits of collaboration and synergies among the conventions at the political level, including through high-level dialogues and meetings, to generate the necessary political will to support collaboration.

Synergy mechanism 5: A joint monitoring and evaluation (M&E) system

Monitoring of progress of land conservation, SLM, and land restoration and evaluating its outcomes. Establishing a joint mechanism for monitoring progress and evaluating the effectiveness of collaborative efforts in land conservation, SLM, and land restoration is the highest payoff synergy area for collaboration. The Framework for Ecosystem Restoration Monitoring (FERM) under the UN Decade on Ecosystem restoration is currently intending to provide an overarching mechanism for monitoring of broader impacts of land restoration on all dimensions of sustainable development. In addition, however, there is a need for a more targeted monitoring framework, tailored to the Rio Conventions, that is also well applicable in different country settings, with a clear focus on monitoring and measuring progress in the implementation of the targets under the LDN, NBSAP, and NDC processes, both at the national and international levels. A periodic publication on the state of land restoration in the world that documents the outcomes of such monitoring could be considered.



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The Economics of Land Degradation (ELD) Initiative is a global initiative at the interface of science, policy, and practice that works to make the values of land count to inform, promote, and scale land solutions for transformative change.



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