

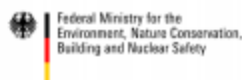


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Rwanda Biodiversity Finance Initiative

Biodiversity Finance Policy and Institutional Review

November 2017



Foreword

On behalf of the Rwanda BIOFIN team, I am pleased to present this Finance Policy and Institutional Review. The Review is meant to start a process of encouraging debate and discussion on the way forward in protecting and restoring our country's rich biodiversity heritage. The Review examines the institutional and policy context in which the financing of biodiversity and conservation takes place in Rwanda. Understanding this context is key to identifying ways that new resources or more efficient use of existing resources can be applied to protecting Rwanda's extensive and diverse natural capital.

We hope readers of this report whether in public institutions or in Rwandan society more broadly defined will find it helpful and informative.

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Director General
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Acknowledgements

This Biodiversity Finance Policy and Institutional Review is the first in a series of reports, policy briefs and other documents being prepared under the auspices of the Rwanda BIOFIN project. This report has taken shape over the last several months due to the hard work and generous support offered by many individuals both in Rwanda and from members of the global BIOFIN team.

The lead author for the report was Humphrey Kisioh whose knowledge of biodiversity and conservation issues in the Rwanda government and among NGOs proved invaluable. Sylvia Kawera, the BIOFIN project officer in REMA, played an important role in the process, including making stakeholder contacts and necessary follow-ups to ensure that representatives of key institutions were available for consultations. A word of thanks is also due to Reina Otsuka Iseda of UNDP Rwanda for her inputs and vital administrative and logistical support during the report's preparation.

Annex 2 of this report provides a full list of the individuals who were contacted as part of the background research and analysis. Their kind assistance so professionally and kindly provided is sincerely acknowledged, be it in the form of meetings, emails or follow-up phone calls. Among the individuals contacted, several played particularly important roles in shaping the direction of this report. These included Laetitia Busokoye, Eugene Mutangana, Vincent de Paul Kabaliisa, Leonard Kayonga, Charles Karangwa, Beth Kaplin, and Dorothy Uwera.

The report went through a number of drafts and revisions and greatly benefitted from the insights and suggestions of numerous individuals, including David Meyers and Jessica Alvsilver, senior technical advisors for the global BIOFIN team, as well Tom Stephens, lead BIOFIN consultant in Rwanda. The BIOFIN Technical Advisory Committee also provided valuable suggestions and comments prior to the report being distributed for review and comments by participants at the Validation Workshop held on September 20-22, 2017 in Rubavu. The members of the Technical Advisory Committee are listed in Annex 7.

It is hoped that this report helps to stimulate debate and a frank exchange of views among stakeholders in Rwanda who are interested in protecting and restoring Rwanda's vital biodiversity resources, upon which the future of our country is so heavily dependent.

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List of Acronyms

ACNR	Association pour la Conservation de la Nature au Rwanda
ARCOS	Albertine Rift Conservation Society
ARECO	Association Rwandaise des Ecologistes
BER	Biodiversity Expenditure Review
BFP	Biodiversity Finance Plan
CAVM	College of Agriculture and Veterinary Medicine
CBD	Convention on Biological Diversity
CBOs	Community Based Organizations
CEPA	Communication Education Participatory Awareness
CCST	College of Science and Technology
CoEB	Center of Excellence in Biodiversity and Natural Resource Management
DFGFI	Dian Fossey Gorilla Fund International
EDPRS	Economic Development and Poverty Reduction Strategy
EIA	Environmental impact assessment
ETOA	Environmental Threats and Opportunities Assessment
FNA	Financial Needs Assessment
FHA	Forest of Hope Association
GACP	Great Apes Conservation Program
GEF	Global Environment Facility
GGCRS	Green Growth and Climate Resilience Strategy
GNP	Gross National Product
GWNP	Gishwati-Mukura National Park
IGCP	International Gorilla Conservation Program
IUCN	International Union for the Conservation of Nature
MGVP	Mountain Gorillas Veterinary Project
MINEACOM	Ministry of Industry, Trade and East African Affairs
MINECOFIN	Ministry of Finance and Economic Planning
MINEDUC	Ministry of Education
MINIAGRI	Ministry of Agriculture and Animal Resources
MININFRA	Ministry of Infrastructure
MINIRENA	Ministry of Natural Resources
MoE	Ministry of Environment
MTEF	Medium-term expenditure framework
NBDP	National Biomass Domestic Program
NBSAP	National Biodiversity Strategy and Action Plan
NIRDA	National Industrial Research and Development Agency
NST	National Strategy for Transformation
NTAC	National Technical Advisory Committee
OECD	Organization for Economic Cooperation and Development
PA	Protected area
PIR	Policy and Institutional Review

PSF	Private Sector Federation
RAB	Rwanda Agriculture Board
RDB	Rwanda Development Board
RECOR	Rwanda Environment Conservation Organization
REDD	Reduced Emissions from Deforestation and Forest Degradation
REMA	Rwanda Environment Management Authority
RNRA	Rwanda Natural Resources Authority
RURA	Rwanda Utilities Regulatory Authority
RWF	Rwandan francs
RWFA	Rwanda Water and Forest Authority
SWAp	Sector-Wide Approach
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
US\$	United States dollars
WCS	Wildlife Conservation Society
WAVES	Wealth Accounting and the Valuation of Ecosystem Services

Executive Summary

This Biodiversity Finance Policy and Institutional Review (PIR) is the first in a series of reports and studies undertaken as part of the Biodiversity Finance Initiative (BIOFIN) being carried out in Rwanda. The PIR is a review of the challenges and opportunities surrounding the current status and potential trajectories of Rwanda’s biodiversity and ecosystem finance context. The objective of this Report is to analyse the adequacy of current policies, the existence of policy gaps, the translation of policies into practice, the role of the broader policy environment in influencing existing practices, the roles, responsibilities, and capacities of existing institutions and institutional frameworks to finance and manage biodiversity and the existing finance mechanisms, important subsidies, laws, and trends around biodiversity finance. As part of the BIOFIN process, the PIR will be followed by a Biodiversity Expenditure Review, Financial Needs Assessment, and Biodiversity Finance Plan.

The report is organized into six chapters and includes a number of technical annexes. An introductory chapter is followed by the second chapter which reviews Rwanda’s biodiversity trends, policies, strategies and related national development plans that have been developed to meet Rwanda’s biodiversity challenges. Chapter 3 provides an analysis of the roles and responsibilities of major institutions with regards to policy-making, biodiversity management and finance, as well as economic and financial expenditures and incentives for biodiversity management. Chapter 4 examines the economic drivers and sectoral linkages that have negative or positive consequences for biodiversity change including biodiversity’s impact on economic growth and GDP. Chapter 5 provides an analysis of Rwanda’s biodiversity finance “landscape” – examining government revenue-generating programs, subsidies and incentives, a rapid analysis of the current legal framework, as well as identification “entry points” that interest government and the private sector that may be used for generating increased biodiversity financing. The final chapter provides recommendations and areas for legal, policy and management attention targeting more efficient use of biodiversity financing, important existing and potential new sources of biodiversity finance.

Because of its location in the Albertine Rift ecoregion and the high productivity of its forest and wetland ecosystems, Rwanda has extremely high levels of biodiversity. However, Rwanda’s rich biodiversity and ecosystem services are subjected to the following trends¹:

- Ongoing loss of forest cover outside of protected areas;
- Pollution and depletion of rivers and lake systems;
- Spreading problems of invasive alien species;
- Loss of native plant species associated with intensive farming practices; and
- Erosion and loss in soil quality.

¹ Rwanda’s Fifth National Report to the CBD, 2014

Rwanda has formulated a number of strategies and policies that directly or indirectly address biodiversity issues. Two most direct policy statements are the National Biodiversity Policy (2011) and the National Biodiversity Strategy and Action Plan (2003 and 2016).

Many organizations and institutions in and outside the government play important roles in biodiversity management and financing in Rwanda. The Ministry of Environment (MoE), the Ministry of Land and Forestry (MINILAF), and the Rwanda Environment Management Authority (REMA) are key governmental organizations responsible for biodiversity overall policy oversight and management. In addition, other ministries and agencies also have important roles to play in biodiversity and conservation, such as Rwanda Development Board, Ministry of Agriculture, FONERWA, and other institutions. Likewise, Rwanda’s donor partners and several environmental NGOs are active in the country. These organizations are discussed in chapter 3.

Biodiversity and ecosystems constitute Rwanda’s natural capital on which the country’s economic sustainability and human welfare depend and maintaining and enhancing these natural assets is crucial. One way to assure adequate financing to maintain natural capital is to clearly articulate the links between biodiversity, ecosystem services and economic benefits to decision makers responsible for long term planning, policy development and budget allocation. For example, agriculture, forestry, and fishing – economic sectors largely biodiversity dependent – account for about 30 percent of GDP and even a greater percentage of jobs.

GDP by type of economic activity, 2012-2017
(% at current prices)

Activity description	2012	2013	2014	2015	2016	2017 Q1
Gross Domestic Product (as %)	100%	100%	100%	100%	100%	100%
Agriculture, Forestry and Fishing	28%	29%	29%	28%	29%	32%
Industry	16%	18%	17%	17%	17%	15%
All Services	48%	47%	47%	49%	47%	46%
Taxes less subsidies on products	8%	6%	7%	6%	7%	7%

Source: NISR, June 2017

Analysis done by the WAVES Rwanda project examined biodiversity’s contribution to GDP and noted that with about 80 percent of Rwanda being rural, close to 90 percent of the population depends on natural resources – land, water, minerals, ecosystems and forests – for their livelihood. According to WAVES study, their analysis showed a much lower estimate of these resources contributing to about 7 percent of GDP.

Unfortunately political pressure for rapid economic growth drives investments negatively affecting land use decisions and placing pressure on natural resources. While the Rwandan government has sought to promote sustainable economic growth, many investment decisions imply choosing among trade-offs between different land use outcomes that impact ecosystems. For example, Rwanda’s policy goal of becoming a middle-income economy is heavily dependent upon a significant structural transformation away from subsistence agriculture towards more

commodity focused production. But, the scarcity of land combined with population growth has exacerbated the environmental challenges associated with modern agriculture. Thus, the national economy and the majority of Rwandans' livelihoods are highly dependent on agriculture at the same time that many agricultural practices – both traditional and new technologies – are having detrimental impacts on biodiversity and ecosystem function.

Another threat to biodiversity is found in the energy sector where approximately 86 percent of primary energy use is from biomass in the form of wood that is used directly as fuel (57 percent) or is converted into charcoal (23 percent) and other uses (6 percent). The continued heavy dependence of the nation's energy requirements on wood and other biomass represents a major negative driver on biodiversity and ecosystem viability to the extent that forest resources for energy use are coming from unsustainable forests. In addition, the use of non-native eucalyptus and pine – often used for energy – may be sustainable, but are now understood to have negative impacts on such ecosystem components as soil and watersheds.

Rwanda is facing increasing degradation of watersheds and water bodies as a result of unsustainable land use practices driven by the demands of intensified socio-economic development and continuing population pressures. The sustainable use of water in areas such as agriculture and hydropower require more vigilant attention by policymakers in order to safeguard this indispensable resource.

Tourism is a key sector for biodiversity in that it is an important source of revenue for biodiversity (i.e. park visitation fees, tourism related taxes, etc.) and a major driver of economic development in Rwanda. Continuing support for ecotourism, especially, can benefit the economy and conservation as long as potential adverse impacts are adequately managed through capacity development, awareness raising, and maintaining high tourism ecological and social safeguards.

The mining sector is impacting biodiversity through significant land clearing, heavy use of local water resources, and historical environmental degradation. Even though most mining in the country is still small-scale and artisanal in practice, this activity can be extremely damaging and larger scale mining must be adequately managed in the future to avoid risks.

This review explores the range of existing biodiversity finance mechanisms in the country, documents associated taxes and subsidies, and reviews elements of the public sector budgeting process. For example, a range of public sector ministries and agencies including the Rwanda Development Board (RDB) and Rwanda Water and Forestry Authority generate considerable revenues from biodiversity related sources each year. In other cases, many inflows from biodiversity related revenues are not retained at source and are not directly invested back into the biodiversity sector. Of these that go to the consolidated government fund some portion of the funds may be allocated back to biodiversity and conservation during the normal budget cycle.

The tourism industry is heavily dependent on visitation to national parks and other natural areas. Tourism's total contribution to GDP is growing at an average annual rate of over 11 percent.

According to RDB estimates, income from tourism is projected to grow from US\$ 296 million in 2013 to US\$ 896 million in 2017. So in addition to the direct revenues generated by the RDB and other park management entities, the government receives substantial tax income from nature based tourism through hotels, transport, and related services industries.

As compared to the high levels of direct and indirect revenues generated from the tourism sector, the water and forestry sectors generate only small revenues streams based on licensing, penalties, and user fees.

There are numerous subsidies and other incentives that are intended to support biodiversity, green the Rwanda economy, or achieve other social goals such as food security and job creation. Some of the positive subsidies identified include those supporting renewable energy and the use of cooking gas to reduce wood and biomass consumption. Often subsidies create unplanned distortion in the economy and many result in unintentional negative impacts on biodiversity. In the agriculture sector, subsidies are provided for inorganic fertilizers, improved seeds, and irrigation equipment, with the objective of boosting productivity. However, some of these subsidies are seen to have negative impacts on biodiversity and many of agricultural subsidies are now being reviewed and revised in the face of these unintended consequences.

This review documented existing financial mechanisms supporting biodiversity in Rwanda. The country has various existing mechanisms cited above and is in the process of developing or piloting a range of innovative solutions. One such solution is the outsourcing of park management to a private management company. This reduces direct costs to the government and provides strong incentives for good management of the area. The existence of Rwanda's Environmental Fund – FONERWA – as a vehicle for direct financing of a range of climate and environmental programmes and projects creates valuable institutional capacity that could be expanded in the future. As well, environmental fiscal reforms should be implemented to harmonize and rationalize the full range of national fees, fines, and penalties.

Initial potential opportunities for finance solutions in Rwanda reviewed in this report include:

- Generating increased biodiversity revenues through tourism;
- Effectively assessing and capturing water resources values;
- Expanding FONERWA's focus towards biodiversity;
- Rationalizing and streamlining environmental fines and penalties; and
- Increased bioprospecting through the access and benefit sharing mechanism.

This PIR will contribute to the ongoing BIOFIN process that concludes with the development and implementation of a Biodiversity Finance Plan. The plan seeks to increase the level, quality and effectiveness of investments in biodiversity and ecosystem services with the goal of protecting, restoring, and sustainably managing Rwanda's rich biodiversity endowments. The plan will gain strong traction with decision-makers if it can effectively show how investments in biodiversity support key government priorities such as sustainable agriculture, forestry, and water quality.

Summary of Key Recommendations

- Rwanda now has in place most of the policies and institutions it requires for effective management of its biodiversity.
- There is a need for developing increased technical and institutional capacities and targeting financial resources to effectively manage and implement regulations.
- The Cabinet approved National Biodiversity Strategy and Action Plan 2 should be effectively integrated into the new National Strategy for Transformation.
- Environmental fiscal reforms can be a powerful instrument for biodiversity financing and can encompass full-cost pricing of natural resources, user fees, taxes and tax breaks, smart subsidies and other forms of incentives and revenue-generating measures.
- One goal of these environmental fiscal reform could be to better capture and distribute biodiversity related revenues.
- Biodiversity financing in the public sector is determined by the planning, budgeting and expenditure review cycle at both national and decentralized levels; improvement and better engagement in this process will encourage increased financing for biodiversity.
- The report further recommends establishing a national system of biodiversity indicators to measure and monitor all aspects of biodiversity. This results based system can be tied to budgeting.

1. Introduction

1.1 Background

This Biodiversity Finance Policy and Institutional Review (PIR) is the first in a series of reports and studies undertaken as part of the Biodiversity Finance Initiative that is being carried out in Rwanda. The Biodiversity Finance Initiative (commonly known as BIOFIN) is a global program that was initiated by the international community in response to the urgent global need to generate significantly more financing from all possible sources towards global and national biodiversity goals, as highlighted during the 2010 Biodiversity Convention of the Parties (COP 10) in Nagoya, Japan. Currently, the total number of countries participating in BIOFIN has risen to 31, including eight in sub-Saharan Africa (Botswana, Mozambique, Namibia, Rwanda, Uganda, Seychelles, South Africa, and Zambia).²

Toward the goal of improving financing for biodiversity and conservation, BIOFIN has developed a robust methodology enabling countries to measure their current biodiversity expenditures, assess their financial needs in the medium term, and identify the most suitable finance solutions to bridge their identified national biodiversity financing gaps. The BIOFIN methodology includes the following main steps:

1. **Biodiversity Finance Policy and Institutional Review (PIR):** Analysis of the policy and institutional architecture for biodiversity finance and existing finance solutions.
2. **Biodiversity Expenditure Review (BER):** Analysis of public and private expenditures towards sustainable biodiversity management.
3. **Financial Needs Assessment (FNA):** Estimates of the investment required to implement national biodiversity plans and achieve national biodiversity targets and results.
4. **Biodiversity Finance Plan (BFP):** Analysis of options to optimize current and expand future investments (public, private, national, international, traditional and innovative) in biodiversity management.
5. **Implementing Finance Solutions:** Support the implementation of policy recommendations emerging from BIOFIN, such as the improvement or creation of finance mechanisms and enhanced integration of biodiversity into national planning cycles.

The PIR is an important first building block in understanding the challenges and issues surrounding the current status and potential trajectories of Rwanda's biodiversity and ecosystem finance. The objective of this Report has therefore been to analyze the adequacy of current policies, the existence of policy gaps, the translation of policies into practice, the role of the broader policy environment in influencing existing practices, as well as the adequacy of existing institutions and institutional frameworks to finance and manage biodiversity. While policy and institutional analyses are common in other sectors and contexts, the complexity of the current direct and indirect drivers of biodiversity loss and the complexity of disaggregating finance flows for biodiversity present additional challenges.

² For a full description of the Biodiversity Finance Initiative, see BIOFIN's website found at www.biodiversityfinance.net

1.2 Report preparation

This PIR has been prepared under the overall guidance of REMA, as lead agency for BIOFIN Rwanda, and has involved an extensive review process by BIOFIN's National Technical Advisory Committee (NTAC) as well as senior technical advisors from the global BIOFIN team.

The process of preparing this PIR has entailed a review of existing government documents and other primary and secondary sources, as well as meetings and conversations with key stakeholders across a wide spectrum of institutions including government ministries and agencies, environmental non-governmental organizations (NGOs), and other specialists and researchers. The sources used are noted in subsequent chapters and a full list of the works and references cited is found in Annex 1. In addition, a list of the stakeholders consulted is found in Annex 2.

Preparation of the PIR also benefited from discussions that were held as part of a BIOFIN training workshop in Musanze from June 6-8, 2017, and the following BIOFIN National Inception Workshop that took place on June 9, 2017 in Kigali, and the PIR validation workshop held in Rubavu from September 20-22, 2017. These three workshops were attended by members of the NTAC and other key stakeholders who will remain involved in the BIOFIN project through December 2018.

1.3 Organization of the report

The Report is organized into six chapters, as well as a number of technical annexes that constitute an integral part of this Report. The next chapter reviews Rwanda's biodiversity trends, and the policies and strategies and related national development plans that have been adopted to meet Rwanda's biodiversity challenges.

Chapter 3 offers an analysis of the major institutions and their roles and responsibilities in policy-making and implementation, as well as their role in promoting or affecting economic and financial spending and incentives for biodiversity and conservation.

The fourth chapter examines more specifically the economic drivers and sectoral linkages that have either negative or positive consequences for biodiversity change. Chapter 5 then turns to an analysis of Rwanda's biodiversity "landscape" – examining biodiversity's impact on economic growth and GDP, the country's budgeting processes, as well as the role of subsidies affecting biodiversity.

The final chapter provides a summary of key recommendations in such areas as policy and legal context, changes in sectoral practices to reduce biodiversity loss, and institutional and organizational changes to promote biodiversity protection and conservation, to include capacity development.

The technical annexes should be considered an integral part of this report, which include a summary table of government roles and responsibilities, a full list of national policies and strategies affecting biodiversity, and other background information.

2. Biodiversity Trends, Vision, and Strategies

2.1 Overview of Rwanda's biodiversity

Because of its bio-geographical location in the Congo–Nile Divide and the high productivity of its forest and wetland ecosystems, Rwanda has extremely high levels of biodiversity. Rwanda's biodiversity also benefits from its rich mix of species from the Guineo-Congolian forests in the west in the Congo Basin and Sudanian savanna species found in other parts of the country. Below is an overview from the 2016 National Biodiversity Strategy and Action Plan (NBSAP).

Plant species

Rwanda has 2,280 species of higher plants. About 280 species of flowering plants from Rwanda are considered to be endemic to the Albertine Rift. Of these endemic species, about 20 are restricted to Rwanda, 50 species confined to Rwanda and Eastern Congo, and 20 species found only in Rwanda and Burundi. 21 species are found additionally in the forests of western Uganda, eastern Congo, Rwanda and Burundi. The biodiversity in the lowlands of the eastern part of Rwanda comprises mainly savannah with grasses, bushes and trees, mountain rainforests in the Akagera National Park, and gallery forests in the eastern part of Rwanda. Gallery forest around lakes and other water bodies are mainly found in the Akagera National Park. The flora of these forests comprise 66 tree and shrub species, some of them threatened.

Fauna species

Rwanda's fauna includes 151 mammal species, 11 of which are currently threatened some of which are endemic. Among them are primates (14 to 16), with half of the remaining world population of mountain gorillas (*Gorilla gorilla berengei*) in Volcanoes National Park. Other primates include the owl-faced monkey (*Cercopithecus hamlyni*), the mountain monkey (*Cercopithecus hoesti*) in Nyungwe, the chimpanzee (*Pan troglodytes schweinfurthii*) in Nyungwe and Gishwati, and the golden monkey (*Cercopithecus mitis kandti*) also found in Volcanoes National Park and Gishwati-Mukura National Park (GWNP). Rwanda also has 97 species of reptiles, 25 species of amphibians and 19 fish species.

Rwanda has over 700 species of birds and supports the second highest number of Albertine Rift endemics than any other country. Rwanda has seven Important bird areas including three of the four national parks—Volcanoes, Akagera and Nyungwe -- as well as the protected areas and forest reserves of Rugezi Swamp, Akanyaru, and Nyabarongo. On its own, Nyungwe National Park is home to more than 300 species of birds, 27 of which are regional endemics.

Biodiversity trends and impacts

As highlighted in the 2016 National Biodiversity Strategy and Action Plan (NBSAP), the table below summarizes some of the major causes of biodiversity loss in Rwanda.

Table 2.1. Underlying pressures and drivers affecting biodiversity loss in Rwanda

Cause	Characteristics
Population pressure	Rwanda's population density in 2012 was estimated at 415 inhabitants per square kilometer. Compared to neighboring countries: Burundi (333), Uganda (173) or Kenya (73), Rwanda is the highest densely populated county in the region. The majority of Rwandans depend on natural resources and agriculture, thus putting enormous pressure on natural resources and existing protected areas.
Habitat loss	Encroachment for human settlements and associated agricultural pursuits and forested landscapes fragmented by development and other competing land uses.
Invasive and exotic species	Example includes the water hyacinth, <i>Eichhornea crassipes</i> , which was introduced as an ornamental plant. It has since has invaded lakes in Rwanda from Muhazi to Rweru from the River Nyabarongo and other water systems, and endangering the biodiversity in the inland water ecosystems of the Lake Victoria Basin.
Water and soil pollution	Contamination of water and soil weakens or eliminates many useful species, alters the flow of energy, and disrupts the chemical and physical constitution of the environment.
Poaching and illegal wildlife trade	In the last 15 years, extirpation of elephants in Nyungwe National Park, lions in Akagera National Park; other species are regularly threatened with poaching inside and outside parks
Civil conflict	Some of the major losses of protected area land and forest resources occurred in the early nineties, during the conflict and post-conflict resettlements.
Climate change	A potential threat of unknown magnitude, which may accentuate other direct threats, especially habitat loss, degradation and fragmentation, and the threat from invasive species.

Source: NBSAP, 2016

As noted in Rwanda's Fifth National Report (2014) submitted to the CBD on its implementation of the NBSAP, the following specific changes to Rwanda's overall biodiversity were noted:

Negative changes:

- Continued conversion of Karama savannah natural forest into farming, grazing lands and other economic activities;
- Mukura forest reserve degradation due to mining exploitation;
- Water hyacinth invading lakes including lakes of Bugesera, Gisaka, Nasho and other water bodies, especially in Nyabarongo-Akagera rivers system and Akagera wetland complex;

- Decreasing or extirpation of native fish species in lakes of Nyabarongo-Akagera river system due to the invasion and increase of predator species;
- Drying of water bodies (small lakes) in the summit of volcanic mountains of the Volcanoes National Park and altitudinal upward migration of species distribution due to climate change effects; and
- Underutilization and disappearance of landraces and local breeds due to crop intensification policy that favors high yields varieties.

Positive changes:

- Increase in the area under protection with the creation of the new Gishwati Mukura National Park in 2015, adding a total of 342,746 ha. to Rwanda's PA network;
- Increase in primate and ungulate populations in Akagera National Park since 1998 ; reintroduction of lion and rhino to Akagera;
- Increase in Mountain Gorilla population in Virunga Mountains from 1971 to date;
- High participation and involvement of local communities around Akagera National Park in restoring Akagera lakes;
- Reduction in human-wildlife conflict around Akagera National Park due to the erection of an electrical fence completed in the south-western part of the park;
- Improvement of environmental education and awareness;
- Boreholes, solar surface water pumps and small dams provided for communities outside Akagera National Park;
- Revenue sharing program for funding socioeconomic activities that benefit the local communities living around national parks; and
- Initiation of the Special Guarantee Fund to deal with compensation of damages caused by wild animals.

2.2 Vision and policy statements

Over the years, Rwanda has formulated a number of strategies and policies that encompass biodiversity, either directly or indirectly. At the highest level, Rwanda has adopted a long-term vision statement and medium-term development plans. With respect to biodiversity, the two most direct policy statements are the National Biodiversity Policy (2011) and the National Biodiversity Strategy and Action Plan (2003 and 2016). In addition, there are other relevant policy statements that are highlighted below.

National Vision Statements

Rwanda's first national vision statement – *Rwanda Vision 2020* – was adopted in 1999 with the goal of laying out the country's overarching policy framework and long-term aspirations. The protection and management of the environment is one of the pillars of Vision 2020 and calls for, among other things:

- Reduced pressure on natural resources, particularly on land, water, biomass and biodiversity, and the process of environmental pollution and degradation reversed;
- The management and protection of these resources and environment are more rational and well regulated in order to preserve and bequeath to future generations the basic wealth necessary for sustainable development;

- Effective and updated regulations established which are adapted to the protection of environment and sustainable management of natural resources.

Currently, a new vision statement – *Rwanda Vision 2050* -- is being drafted that builds on the success and lessons learned from *Vision 2020*. Although still in its formative stage, *Vision 2050* is expected to call for a low-carbon, climate-resilient economy that achieves:

- Economic growth and poverty eradication;
- Good regional and global citizenship;
- Sustainability of the environment and natural resources;
- Gender equality and equity; and
- Welfare and wellness of all citizens in a growing population.

As part of the ongoing discussion, one of its strategic objectives that has been discussed is the development and preservation of biodiversity and ecosystem services (Gatete, 2016).

Economic Development and Poverty Reduction Strategy/National Strategy for Transformation

As the means for implementing the current Vision 2020 and future Vision 2050, the Government of Rwanda employs medium-term, five-year development plans -- the Economic Development and Poverty Reduction Strategies (EDPRS). The intent of the EDPRS has been to systematically integrate all sectors so that they can deliver on their respective mandates and contribute to common goals and objectives. The Government requires all sectors to be organized into Sector Working Groups and to deliver on their respective mandates jointly through Sector Wide Approach (SWAp) documents. Through the SWAp process, Sector Strategic Plans are jointly developed and progress jointly reviewed and monitored. All Sector Strategic Plans are required to demonstrate how cross-cutting issues are integrated into their plans, after which time operational budgets are disbursed.

As the current EDPRS 2 is coming to an end in 2018, the Government is preparing a new six-year strategy, the National Strategy for Transformation (NST) 2018-2024, as a successor to EDPRS 2. As of October 2017, the NST is still in its draft stage and is being developed using both a bottom-up and top-down approach engaging all sectors and sub sectors. The NST framework thus represents an important vehicle by which greater attention to biodiversity and environmental issues could potentially be more fully integrated into government programs and budgets.

National Biodiversity Policy

Rwanda's Biodiversity Policy, enacted in 2011, was meant to be a key pillar in a broader framework for addressing sustainable development. The stated goal of the Policy is:

“To conserve Rwanda’s biological diversity, to sustain the integrity, health and productivity of its ecosystems and ecological processes, whilst providing lasting development benefits to the nation through the ecologically sustainable, socially equitable, and economically efficient use of biological resources.”

The Policy includes 11 specific objectives, which include the following of particular interest in the BIOFIN context:

- 1) Conserve the diversity of landscapes, ecosystems, habitats, communities, populations, species, and genes in Rwanda;
- 2) Establish a comprehensive strategy for land-use planning that integrates and connects biodiversity conservation to serve diverse production and conservation goals;
- 3) Maintain and strengthen existing arrangements to conserve Rwanda's biodiversity, both inside and outside of protected areas;
- 4) Ensure in situ conservation of Rwanda's species diversity and enhance the maintenance and recovery of viable populations of species;
- 5) Promote environmentally sound and sustainable development in areas adjacent to or within protected areas, with a view to furthering protection of these areas; and
- 6) Integrate the conservation and sustainable use of biological diversity into all sectoral and cross-sectoral plans, programs and policies at all levels of government.

National Biodiversity Strategy and Action Plan

The recently revised and updated 2016 NBSAP³ is a key document and summary of Rwanda's national biodiversity vision and strategies. The first NBSAP was prepared in 2003 and reviewed the then existing threats to biodiversity and developed an action plan.

The updated NBSAP has a long-term vision, which is in line with the Convention on Biological Diversity Strategic Plan to 2020 and states that:

"By 2040, national biodiversity will be restored and conserved, contributing to economic prosperity and human well-being through delivering benefits essential for Rwandan society in general."

As the 2016 NBSAP points out, significant progress was achieved since the 2003 NBSAP; however, remaining implementation gaps were identified (NBSAP, 2016):

- Inefficiency in coordination of the NBSAP implementation activities;
- Lack of frequent monitoring and assessment for efficiency;
- Insufficient technical capacity in biodiversity related fields including development of projects;
- Insufficient financial resources to implement NBSAP activities;
- Lack of links with other international instruments for complementarities, though some regulatory systems have been initiated;
- Conflicting priorities depending on institutional mandates;
- Sector-driven donor & technical support;
- Disconnection between legalities and realities;
- Different visions, entry points, modus operandi by different players, despite having the same objectives;

³ The most recent NBSAP was completed in December 2016 and approved by Cabinet in February 2017.

- Lack of integration of biodiversity considerations into land-use planning procedures and environmental assessments; and
- Lack of benefits sharing policy in agro-ecosystems.

The major objectives of the 2016 NBSAP are to:

- 1) Improve environmental stability for natural ecosystems and their biodiversity;
- 2) Restore degraded ecosystems and maintain equilibrium among biological communities;
- 3) Establish an appropriate framework for access to genetic resources and equitable sharing of benefits arising from biodiversity use and ecosystems services; and
- 4) Improve policy, legal and institutional framework for a better management and conservation of national biodiversity

A stated objective of the 2016 NBSAP is to ensure that biodiversity is integrated in a cross-sectoral manner and incorporated into other strategies and plans including the Green Growth and Climate Resilience Strategy (see below), agriculture, energy, mining, industry and infrastructure development.

Green Growth and Climate Resilience Strategy

In 2011, the Government of Rwanda also adopted the Green Growth and Climate Resilience Strategy (GGCRS), which aims to guide the process of mainstreaming climate resilience and low carbon development into key sectors of the economy. The Strategy was built upon work that was already being done in Rwanda on climate change, focusing the various projects and policies into a holistic national document that encompasses the long-term direction as well as short-term priority actions (National Strategy for Climate Change and Low Carbon Development, 2011).

The focus of the Strategy is on climate resilience and low carbon development, addressing both adaptation and mitigation, while linking efforts to economic growth and poverty reduction. In the Strategy, Rwanda acknowledges that the country has the opportunity to leapfrog old technologies and avoid destructive development pathways that are harmful to biodiversity and build a green economy that is resilient to shocks such as oil spikes and a changing climate.

The recently concluded Green Investment Baseline Study 2017, conducted by the former MINIRENA, revealed that, through GGCRS, Rwanda's public sector has contributed considerably to the green economy. For instance, between 2012 and 2016, green investment through the public sector constituted over 37 percent of the gross expenditure in all socio-economic development sectors. By 2030, green growth is estimated at 20.9 percent according to the same Baseline Study. Much of this investment is channeled towards energy, transport, agriculture, and forest plantations (Ibid., 2011).

Other Relevant Policies

Apart from the key policy documents and strategies highlighted above, there are several other policies of relevance to biodiversity and conservation that are listed in Annex 3.

3. Institutional Analysis

As the review in the previous chapter of national policies and strategies would suggest, there are multiple ministries and organizations in Rwanda that have both a direct and indirect bearing on biodiversity and conservation. This chapter focuses on the key institutions that establish the policy and economic framework in which funding for biodiversity is allocated and implemented OR that are responsible for the policy decisions, laws and regulations that generate positive or negative incentives or drivers for biodiversity change. The next two chapters then look more specifically at what those economic drivers and incentives are. This chapter focuses more narrowly on identifying the institutional roles and responsibilities that generate such incentives and are responsible for the funding and investment decisions impacting biodiversity.

3.1 Key ministries and institutions

Over the past few years, Rwanda has embarked on considerable institutional transformations in the environment sector. A number of institutions have been created or restructured to address different environmental needs and priorities.

As explored in the previous chapter, public sector institutional mandates and arrangements are defined by national policies and legislation. At the highest level, the Cabinet is responsible for overall government decisions and coordination. All policy and legislative proposals have to be scrutinized and approved by Cabinet before being forwarded to Parliament for debate and approval. Cabinet approval is also required for establishing new institutions, restructuring existing ones (e.g. the recent restructuring of RNRA and MINIRENA) and the appointment of Chief Officers. In this regard, any new funding proposals for biodiversity or creation of new financial instruments for funding biodiversity would have to be presented, justified and approved at this level.

With respect to biodiversity, two ministries and one affiliated institution have crucial roles – the Ministry of Environment (MoE), the Ministry of Land and Forestry and REMA, which is an autonomous institution affiliated with MoE. Currently, the responsibility for implementing biodiversity policy is placed on REMA, acting as the regulatory authority for the environment and focal point and reporting responsibilities for CBD and the Nagoya Protocol.

The Ministry of Environment and the Ministry of Land and Forestry (both formerly within MINIRENA but separated in 2017) are the ministries directly responsible for the management of the environment and natural resources, including lands, water, forests and mining in Rwanda. The two ministries and their affiliated agencies are responsible for coordinating sector players such as multilateral and bilateral organizations and environmental NGOs in order to ensure harmony, coherence and alignment of their policies and practices with national conservation and development goals. As noted above, the coordination of the new ministries will continue to be done through the SWAp process, which brings together stakeholders from other government agencies, private sector and NGOs for joint policy review, planning and monitoring of ongoing programs. This is an important platform for mainstreaming biodiversity into sectoral policies and plans. It is expected that each new ministry will establish a SWAp Coordination Unit that is responsible for convening meetings, review of sub-sector policies and strategies, reporting and follow-up on implementation of agreed actions.

At the same time, in Rwanda, as in most countries, there is not always a clear institutional boundary between those organizations that impact biodiversity and those that do not. To some extent, nearly all government ministries have some bearing on biodiversity. For purposes of this BIOFIN analysis, two sets or groupings of institutional actors can be identified:

1. Those institutions with specific mandates to manage components of biodiversity. These include: i) environment; ii) forestry; iii) water; iv) agriculture; and v) wildlife.
2. Those institutions, while not directly involved in managing biodiversity, have activities with major impacts on biodiversity. These include: i) lands; ii) tourism; iii) Infrastructure; iv) energy; v) mining and iv) science and technology

Table 3.1 lists the primary government organizations that are the focus of this review and, in turn, for the BIOFIN Biodiversity Expenditure Review (BER). In addition, there are other government institutions and several environmental NGOs that implement numerous projects and programs funded by government, donors or from private sourcing, such as major foundations or individuals⁴. These are mentioned below:

Table 3.1 Major government organizations directly Impacting biodiversity

Ministry or Agency	Role and/or Function
Ministry of Finance and Economic Planning (MINECOFIN)	Allocates funding to various sectors through sectoral strategic plans and budgets proposals submitted by line ministries
Ministry of Natural Resources (MINIRENA) (Now split into the Ministry of Environment and the Ministry of Land and Forestry)	Overall responsibility for environment and natural resources management (including biodiversity) and its subsidiary bodies
Rwanda Environment Management Authority (REMA)	Regulatory authority for national environmental protection, conservation, promotion and overall management, including advising the government on all matters pertinent to the environment and climate change
Rwanda Natural Resources Authority (RNRA)	Dissolved in early 2017 and split into 3 autonomous agencies: (i) Mines, Petroleum and Gas Board, (ii) Land Management and Use Authority, and (iii) Water and Forestry Authority [SEE BELOW]
Fund for the Environment in Rwanda (FONERWA)	Cross-sectoral financing mechanism to support the achievement of environmentally sustainable, climate resilient and green economic growth as articulated in the Green Growth and Climate Resilience Strategy
Rwanda Development Board (RDB)	Cabinet level institution that is responsible for the establishment and management of national parks and

⁴ While not specifically listed in table 3.1, there are other institutions of note. For example, the Prime Minister’s Office is responsible for the lead coordination and oversight role as well as its role as a clearinghouse for all government policies and legislative proposals submitted to the Cabinet and then to Parliament.

	for the development of tourism within and outside protected areas
Ministry of Agriculture and Livestock Development (MINIAGRI)	Overall responsibility to coordinate the planning and implementation of all projects and programmes in the agricultural sector. The key strategic thrusts of agricultural development include: (i) diversification and intensification of plant, animal and fish production and (ii) sustainable management of natural resources, particularly soil and water and conservation of agro-biodiversity.
Rwanda Agriculture Board (RAB)	Responsible for coordination of agricultural research and promotion of science-based technology for sustainable agriculture development, including forestry, agro-forestry, post-harvest management, land conservation and water management
National Industrial Research and Development Agency (NIRDA)	NIRDA currently has a Cleaner Energy and Environmental Management Division that is responsible for conducting applied research on clean energy, waste management, eco-tourism, ecology and biodiversity. However, NIRDA is currently undergoing an organizational restructuring. As a consequence, the Cleaner Energy and Environmental Management Research Division will be phased into a division of Business Technical Support Services, responsible for promoting resource efficiency and cleaner production standards across all industries.
University of Rwanda	Has two colleges that directly deal with biodiversity and agro-biodiversity: College of Agriculture, Animal Sciences and Veterinary Medicine and the College of Science and Technology. Offers programs and degrees in conservation science and management .
Center of Excellence in Biodiversity and Natural Resource Management	Hosted at the University of Rwanda, mandated to undertake research and knowledge management by NBSAP 2016, but lacks adequate funding.

Another important institutional role is played by the Ministry of Local Government, which is responsible for the decentralized structures such as district administrations and lower level structures (sectors, cells), through which conservation and development activities are actually implemented in the field. Through the government’s Decentralization Policy, districts have been entrusted with new responsibilities in environmental management. The new organizational framework for the districts provides staffing positions in environment, natural resources, water, agriculture and lands. These staff are responsible for all aspects of planning and implementation of programs in their areas of competence, although their level of training and available resources may not always be sufficient for their responsibilities.

District administrations supervise several technical and administrative activities which include: (i) mobilizing community members to participate in project activities, (ii) participating in the consultations leading to the formulation of protected area management plans, and (iii) planning for and integrating conservation activities in the District Development Plans (National Decentralization Policy, 2012).

FONERWA has been playing an increasingly important role as an institutional actor supporting climate and biodiversity issues. The Fund finances projects that cover a wide range of development areas, including projects at the district level. According to recent FONERWA data, 20 projects have already been approved for funding and are at various stages of implementation. Projects can be funded under four thematic financing windows, or government priority investment areas affecting the environment and climate issues. At least 20 percent and 10 percent of FONERWA resources are earmarked, respectively, for the private sector and districts (FONERWA website, www.forewa.org).

There are currently five district-based projects approved by the fund and three of these have started implementation, the other two still at the post approval stage. In cash terms, projects being implemented by district-level organizations account for 39 percent (RWF 7.52 billion) of the total portfolio of RWF 19.38 billion, so in that respect district organizations have been very successful in accessing the fund.

For the private sector, FONERWA targets private investments to respond to green economic opportunities through innovation grants and line of credit mechanisms. The line of credit facility is implemented in partnership with the Rwanda Development Bank to leverage resources at a reduced interest rate of 11.45 percent, which is considerably below the market rate.

One of the newest organizations with direct responsibility for biodiversity-related activities is the Rwanda Water and Forestry Authority (RWFA), one of the three agencies created upon the dissolution of the Rwanda Natural Resources Authority in early 2017. The RWFA is mandated to conserve and manage water and forest resources, including the protection of watersheds and development of agroforestry in the country. The law establishing RWFA is number 06/2017 dated 3 February 2017 which articulates its mission, organization and functions.

Annex 4 provides an overview of key institutional roles and responsibilities within government.

Biodiversity mainstreaming

Apart from the ministries and agencies involved in biodiversity is the fundamental question of *if and how* biodiversity should be mainstreamed across multiple sectors of the Rwanda government and economy. Despite the SWAp process, ministries and agencies that may have important but nonetheless indirect impacts on biodiversity may not necessarily include biodiversity in their plans and budgets. Doing so would potentially increase the resources available for investment in biodiversity and improve resource allocation efficiencies.

NBSAP 2 gives high priority to the mainstreaming of biodiversity, calling for the incorporation of biodiversity considerations into the plans, programs and budgets of key line ministries and agencies. However, to be able to do such mainstreaming, these other institutions would need to have biodiversity expertise, either in-house or from another institution with the relevant expertise. At the same time, it should be recognized that there are other mainstreaming efforts under way in such areas as environment, natural resource management and climate change.

Section 6.4 below discusses the question of biodiversity mainstreaming and recommends a holistic approach to mainstreaming biodiversity as part of a more integrated approach to environmental issues, broadly defined.

Multilateral and bilateral agencies

The Government of Rwanda receives substantial funding from multilateral and bilateral development partners for biodiversity related activities. A brief summary of some of the major donors is given below.

- World Bank: The World Bank has been a major development partner for Rwanda, although direct support to biodiversity is not assigned. However, under the Strategic Plan for the Transformation of Agriculture, heavily supported by the World Bank, some 20 percent of the Plan's budget is allocated for *Sustainable Management of Natural Resources and Water and Soil Preservation*. The objectives of this sub-program are to: a) decrease sharply the rate of soil erosion, b) provide irrigation to hillside farmers, and c) increase the water retention capacity of watersheds.
- Global Environment Facility (GEF): As of 2017, forty-one projects have been financed through the GEF in Rwanda, totalling US\$ 153 million. These projects cover areas such as biodiversity, land degradation, climate change, and persistent organic pollutants. This GEF financing has leveraged an additional US\$ 750 million in co-financing.
- UNDP: UNDP has been a major supporter of biodiversity and the environment, both in co-financing GEF projects and in stand-alone projects entailing capacity support to different agencies and ministries, such as the Poverty and Environment Initiative and preparation of the latest NBSAP.
- United States: The U.S. Government has funded a few projects directly related to biodiversity in Rwanda. Two projects funded by the U.S. Agency for International Development (USAID) have supported biodiversity conservation and sustainable ecotourism in and around Nyungwe National Park. In addition, the U.S. Department of Interior funded, through the U.S. Fish and Wildlife Service, a number of great ape and avian conservation activities through conservation NGOs.
- United Kingdom (DFID): The United Kingdom, through its Department for International Development (DFID) has primarily supported the natural resource and agriculture in Rwanda through two funding mechanisms. Since 2011/12, the UK has provided over US\$ 36 million in sector budget support to agriculture. In addition, DFID has provided, through its International Climate Fund, over US\$ 22 million in capitalization funds
- Sweden (SIDA): Sweden's support to biodiversity conservation in Rwanda is reflected in the SIDA-supported Natural Resources and Environment Programme (NREP). The objectives of this project were twofold: 1) land reform and land tenure regularization, and 2) environment and climate change.

- Belgium: Belgium has historically been an important donor to Rwanda. Areas of focus have included renewable energy, hydropower, reforestation (energy), seed production, access to drinking water, and health sector support.
- Netherlands: Since 2008, the Netherlands (along with Belgium) have supported reforestation efforts under RNRA's PAREF project, implemented in two phases from 2008 through 2016. The primary objective of this project is to increase forest surface cover and biomass energy productivity, and to test participatory management schemes in pilot areas.
- Germany: Through the Federal Ministry for Environment, Nature Conservation and Nuclear Safety's (BMUB) International Climate Initiative (IKI), Germany supported the creation of an agroforestry transition zone around Nyungwe National Park, implemented through the University of Koblenz-Landau.

Environmental NGOs

Turning to environmental NGOs there are several international and national NGOs that are active in Rwanda, some of which have regional mandates. These include:

- International Gorillas Conservation Program (IGCP): The mission of IGCP is to ensure the conservation of mountain gorillas and their regional afro-montane forest habitats in Rwanda, Uganda and the Democratic Republic of Congo (DRC). IGCP operates in the Virunga massif in partnership with the respective protected area authorities and local communities in the three countries.
- Dian Fossey Gorilla Fund International (DFGFI): DFGFI is dedicated to the conservation and protection of gorillas and their habitats in Africa. In Rwanda, DFGFI operates the Karisoke Research Center, the world's centerpiece for the study and protection of the critically endangered mountain gorillas.
- Wildlife Conservation Society (WCS): WCS is an international conservation NGO, which has had a long presence and collaboration with Rwanda going back over 50 years, especially in the management of Nyungwe National Park.
- International Union for Conservation of Nature (IUCN): IUCN recently established a regional country office in Rwanda to support the Forest Landscape Restoration Program for Eastern and Southern Africa. In Rwanda, the project will rehabilitate 18,000 hectares of degraded forest areas in Gichumbi and Gatsibo over the next three years.
- Mountain Gorillas Veterinary Project (MGVP): This NGO is involved in surveillance of wildlife health, especially mountain gorillas, livestock, monitoring of human/wildlife disease transmission, and capacity building of protected areas staff.
- Albertine Rift Conservation Society (ARCOS): The Albertine Rift Conservation Society was founded in 1995 as the only regional conservation organization with the sole focus on the biodiversity conservation Albertine Rift. Since its creation, ARCOS Network has

grown and increased its geographic coverage to include the Africa Great Lakes Region and the Africa Mountain Ecosystems. In 2012 ARCOS received a MacArthur Award for Creative and Effective Institutions.

- Association pour la Conservation de la Nature au Rwanda (ACNR): ACNR is a Rwanda NGO with the mission to conserve and promote biodiversity in Rwanda, with a focus on endangered ecosystems in the country, such as wetlands or forest regions. It is a partner of Birdlife International for the conservation of Rwanda birds.
- Association Rwandaise des Ecologistes (ARECO): ARECO is mainly involved in environmental education and awareness raising, community conservation of natural resources and community tourism development.
- Rwanda Environmental Conservation Organization (RECOR): RECOR interventions focus on environmental education, promotion of the utilization of renewable energy, soil conservation, reforestation and agro-forestry, water management, wildlife conservation and sustainable tourism. It works with local community in developing suitable and sustainable solutions to local environmental challenges in all activities undertaken.
- Forest of Hope Association (FHA): This national NGO focuses on the conservation of the Gishwati Forest Reserve in Western Rwanda. Established in January 2012, FHA emerged from – and builds on -- the Great Apes Conservation Program, an International NGO that worked on conservation of the Gishwati Forest Reserve from 2008 through 2011.

Business sector

Apart from the tourism sector, there is very limited data on the role played by the Rwandan private sector in affecting biodiversity and conservation. Based on information from the Private Sector Federation (www.psf.org.rw), there are ongoing investments in forest and agrobiodiversity that include production of beans, barley, maize, wheat and rice, tea, coffee and sugar cane plantations, including out-grower schemes, although the impacts of these investments on biodiversity are not clear. Some companies also support community activities such as tree planting, soil and water conservation, and some income generating activities. Notwithstanding guidelines, it is unclear what kinds of activities are supported by mining companies' activities aimed at reducing the negative impacts of their mining operations or through their corporate social responsibility programs for local communities. But is it likely that reputable large mining companies, in keeping with accepted industry practices, have environmental mitigation strategies within their environmental impact management plans. This is in contrast to artisanal mining practices, which are much more difficult to regulate.⁵

As part of the BER research, a short survey was conducted through the PSF in order to determine the kinds of activities and levels of support to biodiversity that are being undertaken by PSF member companies.

⁵ In the regard, see the new 2017 draft Mining Policy.

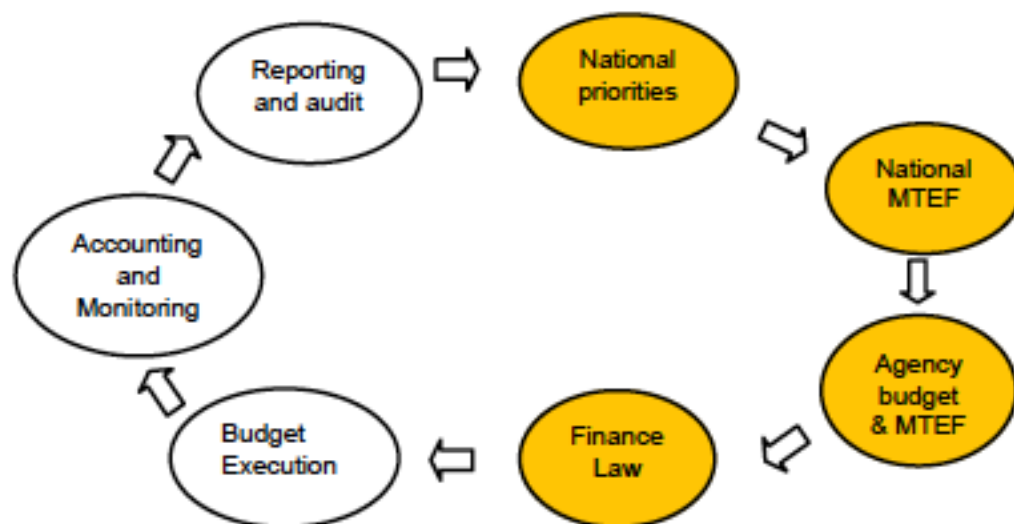
3.2 Budget and resource allocation process

The Government of Rwanda follows a formal budget process that was introduced some 10 years ago. The Organic Budget Law, which was adopted by Parliament in 2006, and the Financial Regulations, which were adopted by Cabinet in 2007, lay down in detail the procedures for the control and use of public funds. Strategic planning, budgeting and the Medium–Term Expenditure Framework (MTEF) form an integral part of the public financial management cycle. This cycle identifies the process through which public resources are allocated, disbursed, and accounted for, in order to meet national objective as shown in the figure 3.1 below.

The overall annual planning and budget cycle can roughly be divided into three consecutive phases: national priority setting (month 1-4), strategic planning (MTEF, month 4-8), and development of the National Finance Law (month 9-12).

At the same time, Rwanda’s budget cycle generally covers a three-year period. Thus, at any one point in time, three annual budgets are at different points in the cycle. For example, in October of any year, the budget of the previous year is being audited, the budget of the current year is being executed, and next year’s budget is under preparation.

Figure 3.1 Government of Rwanda budget cycle



Source: MINICOFIN, 2011

While the budget cycle described above is standard across all government ministries and agencies, it is important to understand how the government has created a system for benchmarking performance and agreeing on national priorities, based on past performance and newly identified needs.

At the national level, the first step in budget planning and preparation is the forecasting of government revenues and expenditures in the country’s macroeconomic framework, together with the determination of the national priorities of government as expressed in its Economic Development and Poverty Reduction Strategy (soon to be the National Strategy for

Transformation) and as approved by the Cabinet. This phase constitutes the review period where the previous year’s performance is assessed and national priorities are set for the coming year. It also includes joint sector and budget support reviews with external financing partners. The activities involved are shown in table 3.2.

Table 3.2 Budget review and prioritization process

Level	Activity
National (MINECOFIN)	<ul style="list-style-type: none"> • Macroeconomic review and medium-term projections • EDPRS Annual Progress Report
Sectors	<ul style="list-style-type: none"> • Joint Sector Reviews • Report on Annual Action Plan and Budget Execution
Districts	<ul style="list-style-type: none"> • Report on <i>Imihigo</i> • Joint District Reviews
Development partners	<ul style="list-style-type: none"> • Joint Budget Support and Public Financial Management Review
Cabinet/Parliament	<ul style="list-style-type: none"> • Government retreat where national priorities are decided for the coming year.

Source: MINICOFIN, 2011

From the standpoint of specific biodiversity related proposals and recommendations, understanding the linkage between Rwanda’s budget allocation and priority-setting process is important in terms of how best to formulate any recommendations aimed at increasing or re-allocating funding for biodiversity and conservation. In short, recommendations on biodiversity finance must understand where are the entry points and means by which changes in policies and incentives to promote biodiversity can “percolate to the top” and be given priority attention.

3.3 Biodiversity finance-related capacity needs and challenges

One of the common statements made by staff of government and non-governmental institutions interviewed for this report relates to the lack or serious shortage of staff with the requisite skills and knowledge as well as technical and financial resources that are vital for effective operations and organizational performance.

Another critical capacity challenge mentioned was the overlap of institutions and staff with so many and varying responsibilities without corresponding resources. Instances of overlapping mandates between institutions may also affect institutional and individual performance.

Project funding continues to play a crucial role in financing biodiversity programs. Concerted efforts are required from both the Government and donors to develop the skills necessary for effective project development, monitoring and financial reporting.

Table 3.3 below provides a summary of some of the key challenges and needs facing different sectors and subsectors as highlighted during the interviews for this analysis.

Table 3.3. Capacity challenges in the biodiversity sector influencing institutional performance and financial cost-effectiveness

Sector / Subsector	Skills and Expertise	Finances	Institutional and Technical Capacity	Policies and Legislation
Biodiversity	Dispersed across multiple institutions	Budgetary allocations are irregular and vary from year to year	No institution dedicated to biodiversity, apart from CoEB	Adequate policy and law, but not being fully implemented
Environmental Protection	Limited human capacity (training and numbers)	Inadequate finances; no retention of generated funds like other departments	Insufficient remote and on-site environmental monitoring; too many responsibilities without matching resources	Overlaps between regulatory and implementation functions
Wildlife	Inadequate staff and expertise at HQ level	Shortfall in finances for three NPs; ANP under PPP with 60% self-funding	Institutional placement not appropriate	Wildlife legislation not being fully implemented
Agriculture	Low human resource capacity (training and numbers) to promote conservation farming	Inadequate financial resources	Lack of equipment	New policy just now being implemented
Forestry	Lean structure, lack of forest guards to patrol forest reserves	Inadequate finances and budgetary allocations	Frequent institutional turn-over affects operations	Lack of collaboration resulting in conflicts
Water	Inadequate staff with required skills	Funding to water sector is untimely, erratic and inadequate to meet required obligations	Frequent institutional turn-over affects operations; no capacity to develop new finance mechanisms	Non-implementation of the decentralization policy

Source: Interviews for this report

Finally, it is important to recognize the role that government and institutions play in serving as both an unintended threat to biodiversity or as a potential guardian and protector of biodiversity and ecosystems. In general, if a country is faced with under capacity for enforcement of policies and laws, the country may be more prone to different kinds of biodiversity loss, such as illegal logging and unsustainable forest management. Similarly, the management and protection of parks and forest reserves may not always be sufficient due to a lack of trained technical and administrative staff and other resources. In addition, the protected area authorities may have neither the mandate nor adequate capacity to sustainably manage biodiversity outside protected areas, with the result that the protected areas themselves run the risk of remaining highly vulnerable from outside intrusions.

4. Economic Drivers and Sectoral Linkages

4.1 Introduction

There is widespread recognition of the inter-dependencies between biodiversity and human welfare. The internationally recognized Sustainable Development Goals (SDGs), to which Rwanda is a signatory party, make several references to biodiversity and conservation. Goal 15 – Life on Land – calls for the international community to “sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.” Goal 13 – Climate Action – calls for nations to “take urgent action to combat climate change and its impacts.” Virtually all of Rwanda’s recent policy statements make mention of the SDGs and refer to the links between protecting and restoring biodiversity and human development.

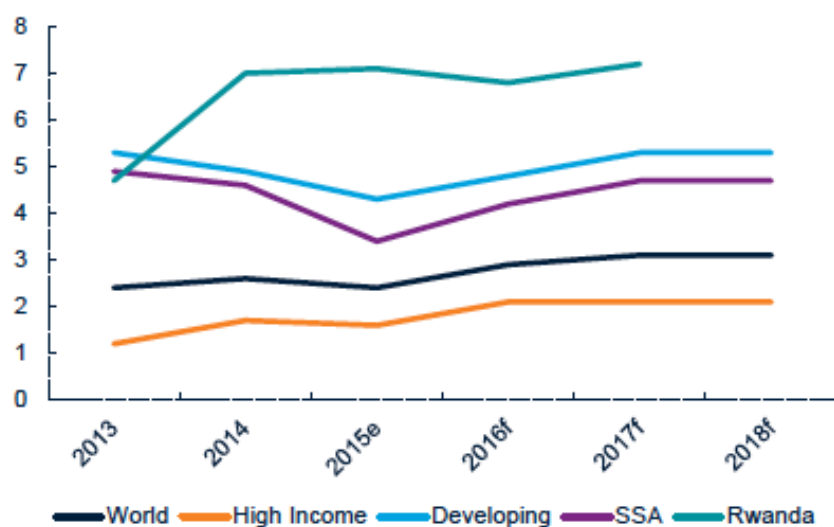
Similarly, the World Health Organization, among other organizations, has drawn direct links between good human health and productive livelihoods and ecosystem products and services, such as availability of fresh water, fresh air, food, fuel sources, etc. In addition, biodiversity loss and ecosystem change result in the loss of traditional medicine, and may also limit the discovery of new medicines (USAID, 2014).

Thus, biodiversity and ecosystems constitute Rwanda’s natural capital on which the country’s economic sustainability and human welfare depend. Maintaining and enhancing the country’s natural assets is therefore crucial to the country’s future. The need to clearly articulate the links between biodiversity, ecosystem services and economic benefits is thus of great importance for long term planning and policy development as well as budget allocation decisions. However, as discussed below, the economic link between biodiversity and Rwanda’s goals of economic growth, poverty reduction, and employment creation are not fully valued.

4.2 Sectorial dependencies, risks and Impacts

Macroeconomic overview

At the macroeconomic level, Rwanda’s economic growth has been impressive for a low-income country, reflecting the Government’s strong commitment to sound economic management and fiscal responsibility. Figure 4.1 shows Rwanda’s growth rates and projections in percentage terms compared with other income groups and for all developing countries and Sub-Saharan Africa as a whole. According to World Bank estimates, Rwanda’s economy grew at 7.1 percent in 2015, 6.8 percent in 2016 and an estimated 7.2 percent in 2017.

Figure 4.1 Rwanda's economic growth rates and projections

Source: World Bank, Global Economic Prospects, 2016

With respect to size, as opposed to growth rate, Rwanda's GDP in current prices was US\$ 8.3 billion in 2016 and is estimated to reach US\$ 8.6 billion in 2017 (IMF, 2016). The following table summarizes key macroeconomic figures based on the most recent IMF Article IV Consultation.

Table 4.1 Rwanda key macroeconomic indicators and projections

	2015	2016	2017	2018	2019
GDP (current prices RWF billion)	5,956	6,618	7,548	8,505	9,544
In US \$ (billion)	8.3	8.4	--	--	--
GDP per capita (US\$)	732	729	--	--	--
Population (millions)	11.3	11.5	11.8	12.1	12.8

Source: IMF, 2017

Assessing biodiversity's economic contribution

In Rwanda, as in other countries, determining the contribution of biodiversity to Rwanda's economy is difficult to assess, even though one can assume that its contribution is significant. At the same time, different kinds of economic activity can have negative effects on biodiversity. There is growing recognition that although sound biodiversity management is not the only contributor to some productive sectors, it supports economic and ecological resilience, water availability, soil quality, etc. and as such is vital to economic activities (NBSAP, 2016).

Table 4.2 shows the percentage of GDP by type of economic activity, as tracked by the National Institute of Statistics of Rwanda (NISR). Based on these data, it is difficult to attribute biodiversity's contributions by type of activities or the negative impacts of economic activity on biodiversity. Only in the case of agriculture, forestry, and fishing (32 percent of GDP in 2017), can we say that this sector is largely biodiversity dependent. In many instances, there are clearly overlapping benefits from biodiversity -- and potentially negative impacts. Such sectors with overlapping dependencies would include mining, construction, beverages, water and waste management, and electricity, among others. Notably, the mining sector only accounts for 2 percent of GDP but is generally considered to have high negative impacts on biodiversity. By

the same token, nearly all sectors listed could be a net benefactor from biodiversity, by way of currently uncounted externalities.

Table 4.2 GDP by type of economic activity, 2012-2017
(% at current prices)

Activity description	2012	2013	2014	2015	2016	2017 Q1
Gross Domestic Product (as %)	100%	100%	100%	100%	100%	100%
Agriculture, Forestry and Fishing	28%	29%	29%	28%	29%	32%
Food crops	16%	18%	18%	17%	18%	22%
Export crops	1%	1%	1%	1%	2%	2%
Livestock and livestock products	3%	3%	3%	3%	3%	3%
Forestry	7%	7%	6%	6%	6%	5%
Fishing	0%	0%	0%	0%	0%	0%
Industry	16%	18%	17%	17%	17%	15%
Mining and quarrying	2%	2%	3%	2%	2%	2%
Total Manufacturing	6%	6%	6%	6%	6%	6%
<i>Of which: Food</i>	<i>2%</i>	<i>2%</i>	<i>2%</i>	<i>2%</i>	<i>2%</i>	<i>2%</i>
<i>Beverages and tobacco</i>	<i>2%</i>	<i>2%</i>	<i>2%</i>	<i>2%</i>	<i>2%</i>	<i>2%</i>
<i>Textiles, clothing and leather goods</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>
<i>Wood and paper; printing</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>
<i>Chemicals, rubber and plastic products</i>	<i>1%</i>	<i>1%</i>	<i>1%</i>	<i>1%</i>	<i>1%</i>	<i>1%</i>
<i>Non-metallic mineral products</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>
<i>Metal products, machinery and equipment</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>
<i>Furniture and other manufacturing</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>
Electricity	1%	1%	1%	1%	1%	1%
Water and waste management	1%	1%	1%	1%	1%	1%
Construction	7%	8%	7%	7%	7%	6%
All Services	48%	47%	47%	49%	47%	46%
Trade and Transport	12%	11%	12%	12%	12%	10%
Maintenance and repair of motor vehicles	0%	0%	0%	0%	0%	0%
Wholesale and retail trade	8%	7%	7%	8%	8%	6%
Transport	4%	4%	4%	4%	4%	4%
Other Services	36%	36%	35%	37%	36%	36%
Hotels and restaurants	2%	2%	2%	2%	2%	2%
Information and communication	2%	1%	1%	2%	1%	1%
Financial services	3%	3%	3%	3%	3%	3%
Real estate activities	11%	9%	9%	8%	8%	8%
Professional, scientific and technical activities	3%	3%	3%	3%	3%	3%
Administrative / support service activities	4%	4%	4%	4%	4%	5%
Public administration, defense, social security	5%	5%	5%	5%	5%	5%
Education	2%	3%	3%	3%	3%	2%
Human health and social work activities	2%	2%	2%	2%	2%	2%
Cultural, domestic and other services	4%	4%	4%	5%	5%	5%
Taxes less subsidies on products	8%	6%	7%	6%	7%	7%

Source: NISR, June 2017

While specific disaggregation of biodiversity impacts on GDP by sector and subsector is difficult to determine, some preliminary analysis has been done by the WAVES Rwanda project of biodiversity's contribution to GDP. Their analysis noted that with about 80 percent of Rwanda being rural, close to 90 percent of the population depends on natural resources for their livelihood, including land, water, minerals, ecosystems and forests. According to the WAVES estimate, these resources contribute about 7 percent of gross domestic product (WAVES, 2017).

Sectorial impacts and economic drivers

As noted in chapter 2, some of the major biodiversity trends that have been occurring in Rwanda over the last several years reflect these sectorial practices and economic drivers. These include:

- Ongoing loss of forest cover outside of protected areas;
- Depletion of rivers and lake systems;
- Poaching and illegal wildlife trade;
- Water pollution and spreading problems of invasive species;
- Loss of native plant species associated with intensive farming practices; and
- Erosion and loss in soil quality.

More specifically, the following sectorial impacts and economic drivers of biodiversity change are highlighted.

Macroeconomic growth pressures

At the most general level, pressures for rapid economic growth drives investments affecting land use decisions and pressures on natural resources. While the Rwandan government has sought to promote sustainable economic growth, investment decisions invariably imply choosing trade-offs between different land use outcomes that increase or relieve pressure on ecosystems. From time to time, key infrastructure projects can be initiated without adequate assessment of potential adverse environmental impacts. Weak environmental impact assessments lead to sub-optimal biodiversity management efforts. In order to have positive impacts, mitigation against adverse impacts should be done before project implementation can be allowed. It would appear that major highways, such as the one through Nyungwe National Park, have been constructed without due regard to their ecological impacts, e.g., pollution, disruption of wildlife movement, etc. (REMA, 2007).

Similarly, expansion through urbanization and industrialization can exert pressure on peri-urban forests, wetlands and water bodies. Whereas Rwanda's urbanization is still low -- estimated at 30 percent of the population in 2013, the rate of urbanization is increasing fast (NISR, 2013). Increased urbanization need not be bad for biodiversity, but attention to urban biodiversity challenges needs to be integrated into overall biodiversity management planning. This concern is being addressed in the draft revisions to the Forest Policy.

Agriculture

The agricultural sector remains the economic backbone of the country. The sector employs about 87 percent of the working population, produces around 32 percent of GDP and generates about 80 percent of total export revenues.

Given the importance of agriculture in the national economy and its importance for food and nutrition security, the Government has started to reformulate policy and strategies in order to achieve food security and boost the national economy. The government's new agriculture policy continues the efforts of transitioning farming from subsistence-based to a market-based focus (MINIAGRI, 2017). The main elements of the strategy that are related to biodiversity include:

- *Diversification and regional specialization:* Crops will be developed in favorable agro-ecological zones. Some crops are indeed more adapted than others according agricultural regions. Producers should diversify their crops, develop particular specialization in which they can make more money and benefit from comparative advantages to maximize income.
- *Genetic improvement:* A programme of genetic improvement is necessary given the limited potentials of local breeds. Measures to this end include importation of improved breeds and use of biotechnology in animal reproduction (artificial insemination, embryo transfer).
- *Water conservation and soil fertility management:* Water is a key factor in agriculture. When adequate supplies are not available, productivity is likely to fall. Water and soil conservation measures such as terracing, mulching, crop rotation use of agroforestry species will be applied.

From a broader perspective, Rwanda's policy goal of becoming a middle-income economy is heavily dependent upon a significant structural transformation away from subsistence agriculture. At the same time, the scarcity of land and population growth have exacerbated the biodiversity challenge associated with modern agriculture. According to data from the 2013 Integrated Household Living Conditions Survey conducted by NISR, over 50 percent of households own less than 0.5 ha. of land (NISR, 2013). In addition, the land tenure and inheritance system further causes diminution of farm size. Also, the inadequacy of sustainable livelihood options further exacerbates encroachments on the ecosystem through agriculture as a major source of food and income. While fertilizer subsidies are causing short-term increases in people's disposal income, these subsidies have been estimated to contribute only 4 percent of the average 8.5 percent agricultural growth rate of the last few years, without accounting for the negative impacts caused by subsidies (Mugabo, 2013).

In short, given the importance of agriculture to the economy, Rwanda's agricultural strategy had focused on intensification driven by use of inorganic fertilizers and other inputs. While this may have led to short term increases in productivity, this has been at an ecological price. Intensification has sometimes led to loss of natural ecosystems; monocropping risk loss of native crop varieties that are better adapted to local environments; inorganic fertilizers have contributed to water and soil pollution; and heavy metals in water resulting from fertilizers have

been associated with health hazards. The new agricultural policy is addressing these negative consequences.

Energy

Rwanda's energy sector policy and strategy were prepared in 2009 and revised in 2015. The Energy Policy articulates the main mandate of the energy sector to be an effective contributor to the growth of the national economy, thereby improving the standard of living for the entire nation in a sustainable and environmentally sound manner. The energy sector policy is meant to achieve three specific goals:

- Ensuring the availability of reliable and affordable energy supplies for all Rwandans;
- Encouraging the rational and efficient use of energy;
- Establishing environmentally sound and sustainable systems of energy production, procurement, transportation, distribution and end-use.

Currently, Rwanda's energy needs are met from several sources of varying importance. Approximately 86 percent of primary energy use is from biomass, in the form of wood that is used directly as a fuel (57 percent) or is converted into charcoal (23 percent), together with smaller amounts of crop residues and peat (6 percent). Only 14 percent of energy is non-biomass; petroleum products account for 11 percent used mainly in the transport sector and three percent for electricity (Landi, 2013).

Presently, biomass energy is dominant for cooking and other household uses; and, in this regard, it is imperative that forests and woodlots be more productively managed and charcoal more efficiently produced. Failure in this realm could result in further deforestation. It is against this background that the Government, together with Netherlands Development Organisation (SNV), initiated a National Biomass Domestic Program (NBDP). Like in other Sub-Saharan African countries, such efforts are designed to achieve both short-term and long-term benefits. The program's short-term objectives include a reduction in firewood collection time and reduction in the use of firewood, whereas, enhancement of agricultural production by use of fertilizers and health benefits (improved air quality) are some of the long-term benefits. With such multiple expectations, sound evidence about the actual outcomes of NBDP is still limited despite the government's subsidy of RWF 300,000 on digester installations. (Landi, 2013).

In addition, Rwanda's "Electricity Development Strategy 2011-2017" targets the production of 333 MW of electricity from hydro-generation, out of a total 1000 MW generation. The location of hydro-power facilities (existing and future) in and near critical ecosystems means that hydropower development can have long-term benefit to biodiversity by reducing pressures on biomass for energy sourcing (National Energy Policy and National Energy Strategy, 2015).

Water

The water sector in Rwanda faces growing challenges arising from multiple pressures that impact biodiversity and ecosystems, such as pressures of rapidly changing demographic patterns, the demands of intensified socio-economic development, and degradation of watersheds and water bodies as a result of unsustainable land use practices. Likewise, water quality is being affected by extreme climatic events such as widespread drought and flooding, leading to destabilization of ecosystems, and impacts on human livelihoods and supporting infrastructure. Such impacts also magnify the risk of contamination of both surface and ground water.

Similarly, water pollution is a growing problem in Rwanda. In some parts of the country, rivers and lakes have become so polluted that ecosystems and the health of plants, animals, and humans are heavily threatened. Recycling domestic, agriculture and industrial wastewater together with efficient wastewater management could help reduce water pollution. Besides wastewater, there are various other factors which cause water pollution such as waste dumping, inorganic fertilizers, and oil pollution (Rahman, 2014).

Forest sector

Nearly two thirds of Rwanda's forests have been lost since independence, and currently the country has about 28.3 percent of forest cover (World Bank, 2014b). A GIS inventory completed by using 2012 aerial photos revealed that forests (natural montane forests, savannah forests, and tree plantations) cover about 673,636 ha. This is comprised of 125,889 ha. of natural forests and 547,747 ha. of forest plantations -- 60 percent of which are smallholder woodlots, 12 percent are district forests, and 28 percent are state forest.

A second analysis by FAO estimates forest area at only 19.5 percent where forest cover is defined as 'land under natural or planted stands of trees of at least 5 meters in situ, whether productive or not, and excludes tree stands in agricultural production systems (for example, in fruit plantations and agroforestry systems) and trees in urban parks and gardens.'⁶

Forest ecosystems in Rwanda are primarily contained within the protected transboundary areas of Akagera National Park, Nyungwe National Park, and Volcanoes National Park, and within Gishwati Forest Reserve, Iwawa Island Forest Reserve and Mukura Forest Reserve. There have been problems associated with protected areas being encroached and reduced in size through successive re-gazetting. In addition to these protected forest areas, Rwanda also has remnant terrestrial ecosystems that have resulted from the fragmentation of former larger ecosystems. World Bank, 2014b

The Government has committed itself in the 2016 NBSAP (Target 14) to a major afforestation program, with the aim of achieving 30 percent forest cover by 2020, although there are concerns about the use of fast-growing, non-native species to achieve such a target.

⁶ See <http://www.indexmundi.com/facts/rwanda/indicator/AG.LND.FRST.ZS> which also provides links for country comparisons of forest cover using FAO and World Bank data.

Tourism

While tourism is a major driver of economic development in Rwanda, it can also have adverse impacts on biodiversity, through ecosystem degradation caused by poorly controlled tourism, pollution, and accumulation of solid waste. The allocation of land for tourism development needs to be carefully coordinated and inappropriate activities that damage ecosystems be strictly regulated. This may be done only by strengthening and developing integrated policies and management that cover all socio-economic activities in the different ecosystems, including terrestrial and aquatic zones. In high tourism areas, management solutions are also needed for simple, but persistent, problems such as litter and waste disposal (Rwanda Protected Areas Concessions Management Policy, 2012).

The importance of tourism for biodiversity is discussed in more detail in the next chapters.

Mining

The Rwandan mining sector makes a significant contribution to the country's economy, accounting for approximately 1.2 percent of national GDP, 38 percent of export revenue and employs over 35,000 people (World Bank, 2014). The sector is dominated by artisanal and small-scale mining businesses and provides important employment and income distribution in local rural economies. Since 2007 the Rwandan mining sector has been transitioning from a publicly-run sector into a private industry and the Rwandan government has steadily increased the number of mining and quarry licenses. There are currently approximately 213 registered mining entities and 725 mining permits. The vast majority of mining licenses are held by small and artisanal miners (MINIRENA, 2017b).

The Government categorizes mining operations into three groups – artisanal, small-scale and large-scale. The large majority of mining licenses are held by small and artisanal miners. Of the 213 registered mining companies in 2013, 208 were small domestic companies or cooperatives and five (5) foreign operated companies. The Government is actively promoting the development of larger operations. Between 2011 and 2013 the Rwanda Development Board (RDB) signed 22 new projects, mainly in exploration, for a total of USD110.5 million in investment commitments (World Bank 2014).

The mining sector has been consistently identified as a serious threat to biodiversity due to the significant land clearance, use of local water resources, and decades-long environmental degradation. Mining activities can impact natural drainage systems, pollute adjoining lands and waterways, and disrupt local communities by threatening food supply. Environmental problems identified in the sector include: (i) obsolete technology and processes; (ii) inadequate assessment and management of environmental impacts; (iii) occupational health and safety risks; as well as (iv) limited social impact management and community development (MINIRENA, 2017b)

These problems were recognized in the draft of the new mining and mineral policy prepared earlier this year (MINIRENA, 2017). The new policy statement is meant to improve the governance of the sector and its environmental sustainability. Unless the proposed new

policies, legislation, and institutions take effect, the threat to biodiversity is likely to grow in the face of potentially new mining projects in biodiversity rich areas. Local and poor populations, who often inhabit these remote, biodiversity rich areas and rely on them to survive, are especially threatened by any loss of biodiversity.

Climate change

Finally, it is useful to mention climate change as a potential threat of increasing concern, which may accentuate other threats, especially habitat loss, degradation, and the threat from invasive species. In some ways, climate change falls into a grey area between cause and threat, in the sense of being a cause of some of the other direct biophysical threats to ecosystems and species. Climate change and weather variability -- especially in fragile ecosystems such as wetlands and steep slopes -- result in ecological degradation and natural disasters. The low resilience to climate change and other forms of slow onset disaster means that innovative and traditional means of production are lost and unsustainable harvest of natural resources is the fastest recourse.⁷

The 2016 NBSAP listed the following specific potential impacts of climate change on biodiversity:

- Climate change will have differential effects on species. Some species will migrate through fragmented landscapes whilst others may not be able to do so.
- Many species that are already vulnerable are likely to become extinct.
- Changes in the frequency, intensity, extent, and locations of climatically and non-climatically induced disturbances will affect how and at what rate the existing ecosystems will be replaced by new plant and animal assemblages.
- Loss or fragmentation of forest habitat due to climate change is a major threat to biodiversity.
- Climate change negatively affects crop production and cause vulnerable people to depend mostly on ecosystem services.
- Climate change negatively impacts water bodies by increasing or dropping water levels.

Trade and manufacturing

Finally, it is important to briefly mention the domestic trade and manufacturing sectors that interact with multiple ecosystems through the use of raw materials from agriculture, forest products and minerals which are processed into traded products. Industries also utilize large quantities energy and water that are generated by natural ecosystems such as watersheds. In their production processes, there is considerable risk that industries can produce wastewater and solid waste management problems. Poor management of waste leads to pollution of surface water systems and wetlands. Due to time limitations, in-depth analysis of trade and manufacturing could not be carried out as part of this study..

⁷ See, for example, Olivia Serdeczny, et.al. *Climate change impacts in Sub-Saharan Africa: from physical changes to their social repercussions* .Regional Environmental Change. Berlin. December 2015

Economic valuation studies

Discerning information about biodiversity's contribution to the Rwandan economy is difficult. As a microcosm of the difficulty of assigning an economic value to biodiversity, a simple example is demonstrated by the Rugezi Wetlands. These wetlands cover an area of 6,735 ha (listed as a RAMSAR site in 2009), and the area plays both ecological and economic roles at the national and regional level. Rugezi is important as a water reservoir for the surrounding communities and for hydro-electric power generation. The wetland supplies water to two of Rwanda's main hydro-electric power plants, namely, Ntaruka and Mukungwa Power Plants, generating some 30 percent of the 78.73 MW of hydro-electric power produced in Rwanda. Despite its importance, until 2017 there had never been an economic valuation of the wetlands' impact on other economic activities, or in terms of estimating its contribution to GDP or using other economic indicators. [See below.]

Rwanda's 2014 report to the CBD on its NBSAP implementation included a discussion of "Values of Biodiversity and Ecosystem Services in the Country and Their Contribution to Human Well-Being. The section concludes:

Actually, in our country, while there is now a good understanding of the linkages between biodiversity, ecosystem services and human well-being, the value of biodiversity is still not reflected in broader policies and incentive structures. In fact, little is still known about the economic cost of biodiversity loss as well as the benefits associated with its utilization and ecosystem services. Until now, many of the benefits associated with biodiversity use have no price, or are undervalued in the market. Thus, without accurate baseline data, it is actually very difficult to conduct an environmental economic analysis.

In fact, a total of only four economic valuation studies have been done in recent years. A fifth study is currently being undertaken by the University of Rwanda.

2010 Study of hydrological services benefits from forest ecosystems

A study was conducted of the economic valuation of the eco-hydrological services from forested watersheds in Nyungwe National Park (Masozera, 2010). The study explored the possibilities of linking the growing interest in payments for ecosystem services (PES) mechanisms with alleviating poverty of smallholder farmers. Specifically, it analyzed the potential of PES programs for carbon offsets, water quality enhancement, and biodiversity, and identified key challenges and opportunities for successful implementation. As the study explained, local farmers critically depend upon local ecosystems for survival and are directly affected by changes in availability of ecosystem goods and services, such water, medicinal plants, firewood, and raw materials for building. Thus, the loss of ecosystem services would be devastating for local families. The author estimated that the value of forest ecosystem services in the park for "watershed protection" was US\$ 118 million per year, or about US\$ 1,100 per hectare for the 97,000-hectare park.

2014 ARCOS Mukura Forest Total Economic Value (TEV) Study

Mukura Forest is a highland forest located in the west of Rwanda covering 1,798 hectares. The forest is located in a densely populated landscape (668 inhabitants per km²) with more than 85 percent of the population living below the international poverty line. Results from the study (ARCOS, 2014) indicated that the Mukura Forest contributes significantly to the livelihoods of the local communities in form of ecosystem services that benefit other people even beyond the landscape such as water catchment protection and carbon storage and sequestration.

The TEV of Mukura Forest was estimated at a total of RWF 1.151 billion per year, equivalent to US\$ 1.7 million. The monetary benefits from Mukura translate into a value of US\$ 817 per hectare per year, a value comparable to most productive forest landscapes. Notable among the key benefits valued from Mukura Forest was water, which is used for domestic purposes and for livestock watering and contributes annually a total of up to RWF 477,469,000 (US\$ 702,160). The table below shows the range of economic benefits from the forest.

Table 4.3: Ecosystem Benefits Valuation for Mukura Forest Reserve

Ecosystem Products	Value (US\$ equivalent)
Firewood	103,500
Timber	25,700
Poles for fencing	16,700
Bean stakes	12,600
Bushmeat	9,300
Honey	9,000
Wild fruits	8,400
Medicinal plants	7,600
Ropes and fibers	4,400
Mushrooms	3,300
Ecosystem Services	
Water for domestic uses	576,800
Water for livestock	125,400
Carbon sequestration	39,600
Nonmaterial Benefits	
Aesthetic value/tourism	(\$647,300)

Source: ARCOS, 2014

2016 NBSAP analysis of the forest sector

The 2016 NBSAP estimated the economic value of the forest sector. According to this analysis, the forest sector contributed an estimated RWF 197 billion to the national economy in 2013. The sector helped to create 21,494 jobs through investments in forestry activities. The analysis further estimated that the total economic value of goods and services derived from forestry activities contributed about 3.4 percent to Rwanda's GNP.

2017 WCS study: Economic values of Nyungwe National Park and Rugezi Wetlands

This WCS study found that the monetary value of benefits from Nyungwe National Park was US\$ 4.80 billion (2014 prices). And the total monetary value of Rugezi wetlands was US\$ 374.32 million (2014 prices). The study further found that the annual monetary value of flow benefits from Nyungwe National Park was US\$ 139.3 million. The report also recommended that in

order to optimize the management of Nyungwe National Park, the Government of Rwanda should implement a business plan prepared in 2015 by Conservation Capital that called for an investment of US\$ 15 million over the next ten years -- or US\$ 1.5 million a year (WCS, 2017).

* * * * *

In summary, some of the key messages from this chapter are:

- The national economy and the majority of Rwandans' livelihoods are highly dependent on agriculture at the same time that many agricultural practices – both traditional and new technologies -- have had detrimental impacts on biodiversity and local ecosystems.
- The continued heavy dependence of the nation's energy requirements on wood and other biomass represent a major negative driver on biodiversity and ecosystem viability.
- In order to obtain more sustainable use of water as it affects water quality and hydropower requires more vigilant attention by policymakers so as to safeguard this indispensable resource.
- Tourism is increasingly being recognized for its importance both as a source of revenue for biodiversity and as a sector that requires additional support in terms of financing and institutional capacity.
- The economic value of Rwanda's has not been sufficiently quantified and integrated into policy implementation, although its importance to the economy and human well-being is well understood.

5. Biodiversity Finance Landscape

Chapter 3 described some of the key institutions and policies that have a direct impact on biodiversity and conservation, including the formulation of policies and the budget process for implementing national priorities. The previous chapter focused on sectorial dependencies and risks and impacts on biodiversity as well as some of the economic and financial drivers affecting biodiversity. This chapter explores the biodiversity finance “landscape” by reviewing the role of financial mechanisms impacting biodiversity and other economic and financial means by which biodiversity is helped or harmed. In addition, this chapter identifies “entry points” through which modifications and/or development of new laws, policies, regulations, and incentives could support greater biodiversity protection and mitigation. These, in turn, form the basis of potential biodiversity-enhancing “finance solutions” that represent opportunities to increase financial resources for biodiversity in Rwanda.

5.1 Government revenue-generating programs

Public sector ministries and agencies generate considerable revenues from biodiversity related sources each year, such as RDB and the Rwanda Water and Forestry Authority (RWFA). At the same time, there are numerous subsidies and incentives that are intended to support biodiversity and the greening of the Rwanda economy, or – conversely – have negative impacts.

With respect to inflows from domestically generated revenues, these are not always retained at source, meaning they may not be directly invested back into biodiversity-related programs and activities. Most revenues coming from government agencies go to the consolidated government fund, even though some portion of the funds may be allocated to biodiversity conservation during the budget cycle. Exceptions to this budgeting approach include RBA and FONERWA. Traditional financing for biodiversity conservation originates from the national budgetary allocations and off-budget investments, notably donor-supported projects and funding.

Tables 5.1 below summarizes the main conduits and mechanisms for biodiversity financing followed by a brief overview of key sectors.

Table 5.1 Summary of current biodiversity finance mechanisms

Mechanism Name	Specific Description	Mechanism Type	BIOFIN Category Description	Implementing Entities	Primary Financing Source	Financing Category	Other Financing Sources	Legislative Framework	Opportunity for Expansion / Improvement
Central government transfers	Main government funding mechanism for biodiversity	Ecological targeted fiscal transfers	Biodiversity and Development Planning; Access and Benefits Sharing	MINICOFIN and line ministries	National taxes and revenues	Public national	ODA	Annual Finance Bill	Improve government budget process to better target biodiversity
Local government transfers	On-site mgt. of biodiversity and watersheds by districts	District government transfers	Biodiversity and Development Planning; Access and Benefits Sharing	MINALOC, District and Sector Administrations	Central government and local taxes	Public national	ODA	Annual Finance Bill; Decentralization Policy	Increase allocations to districts; enhance revenue collection
Environment enforcement fees and charges	Revenues collected to protect and remediate environment	Penalties and fees to limit biodiversity damage	Restoration; Pollution Management; Sustainable Use	REMA, RDB, Rwanda Petroleum and Mines Board	Users and polluters	Public national	N/A	Environment Organic Law, Mining Law	Penalties should be high enough to serve as deterrent
FONERWA	Environment / biodiversity conservation through national, district and private sector projects	Trust fund	Green Economy, Access and Benefits Sharing	FONERWA and REMA	National government	Public national and int'l	ODA	FONERWA Law	More focus on biodiversity and ecosystem window
Water use permits	Revenues from license fees for water use	Taxes on renewable natural resource; Water markets	Sustainable Use	RWFA	N/A	Private national	N/A	Forest Law	Higher fees and royalties to increase revenues

Mechanism Name	Specific Description	Mechanism Type	BIOFIN Category Description	Implementing Entities	Primary Financing Source	Financing Category	Other Financing Sources	Legislative Framework	Opportunity for Expansion / Improvement
Water harvesting fees	Revenues raised from abstraction of water by large consumers based on volume	Taxes on renewable natural resource	Sustainable Use	RWFA	Consumers	Private national	N/A	Water Policy and Law	Fees based on volumes extracted; install gauging stations
Forest concession fees	Revenues from forest concessions to private companies	Taxes, fees and royalties in forest sector	Sustainable Use	Catchment Committees	Consumers	Private national	N/A	Water Policy and Law; Decentralization Policy	Expand management to all catchments in the country
Stumpage fees and royalties	Forest revenues based on sale of standing timber harvested	Taxes, fees and royalties in forest sector	Sustainable Use	RWFA	Consumers	Private national	Timber sales in District Forests	Forest Law, Decentralization Policy	Increase capacity for management of district forests
Forest license fees	Fees levied on forest/wood processing business	Taxes, fees and royalties in forest sector	Sustainable Use	RWFA	Consumers	Private national	N/A	Forest Law, Decentralization Policy	Ensure all businesses are licensed
Tourism concessions	Revenues from leasing and establishment of tourism business (e.g. lodges in PAs)	Taxes and fees in tourism sector	Protected Areas and Other Conservation Measures	RDB	Businesses	Private national and int'l	N/A	Wildlife and Park Concession Policies	Expand concessions to other PAs
Tourism business licenses	Fees levied for conducting tourism business in or outside PAs	Sustainable tourism and Park management	Protected Areas and other Conservation Measures	RDB / AMC	Businesses		N/A	Wildlife and Park Concession Policies	Ensure all companies are licensed and fees paid

Mechanism Name	Specific Description	Mechanism Type	BIOFIN Category Description	Implementing Entities	Primary Financing Source	Financing Category	Other Financing Sources	Legislative Framework	Opportunity for Expansion / Improvement
Park entry fees	Daily park entry fees charged on local and foreign tourists	Sustainable tourism and Park management	Protected Areas and other Conservation Measures	RDB	Consumers	Private national and int'l	N/A	Wildlife and Park Concession Policies	Develop more specialized fees such as filming
Revenue sharing with communities neighboring PAs	Finance instrument used by GOR to mitigate human wildlife conflict		Biodiversity Awareness and Knowledge	RDB	Park entry fees, NGO-supported Projects	Public and private national	Park entry fees, NGO-supported Projects	RDB Revenue Sharing Programme	Shared benefits should be directly linked to contributions to conservation
Bioprospecting	Systematic search for biochemical and genetic information in nature in order to develop commercially valuable products	Sustainable use of genetic components of biodiversity	Access and Benefit Sharing	NIRDA	Investors	Private national and Int'l		Biodiversity Policy, NIRDA Law	Develop a regulatory framework and incentive plan to attract bioprospecting

Tourism

Rwanda's national parks, wildlife and other natural areas are a growing and major attraction for tourism. The Rwanda Development Board (RDB) is the agency mandated to manage national parks, set the levels of various park-related fees, and is responsible for reviewing the fee structure from time to time. The tourism industry is heavily dependent on visitation to national parks and other natural areas. Tourism's total contribution to GDP is growing at an average annual rate of over 11 percent. According to RDB estimates, income from tourism is projected to grow from US\$ 296 million in 2013 to US\$ 896 million in 2017. The industry also creates employment, directly or indirectly, for approximately 23,000 people (NBSAP, 2016).

Park related revenues are derived from:

- *Park Entry Fees:* Park entry fees are statutory and form part of the revenue for the wildlife sector and vary from one park to another, and sometimes also by season. Higher entry fees are charged during the high tourism seasons.
- *Tourism Concessions - Fixed Lease Fees and Variable Fees:* RDB enters into Concession Agreements with investors to establish a camp or a lodge within a national park. Concessions are leases for space within protected areas for private sector investment, e.g. construction of lodges. The concessionaire pays fixed lease fees as well as bed night levy.
- *Tourism Enterprise License Fees:* These are license fees charged on tourist enterprises conducting business within national parks. These fees are also collected by RDB. They differ from concession fees because they are collected on an ongoing basis, so long as the enterprise operates in the park.
- *Penalties and Court Fines:* Fines paid by individuals as prescribed by courts of law when such an individual has carried out illegal activities or failed to follow regulations. These include poaching, illegal fishing, indiscriminate cutting of trees, causing wildfires and other offences.

Table 5.2 shows the aggregate fees generated by Rwanda's national parks in 2015 and 2016, although a breakdown by the different kinds of parks fees is not available.

Table 5.2: Revenues generated by three main national parks, 2015 and 2016 (US\$ millions)

Park	Revenues		Percent change
	2015	2016	
Akagera National Park	1,160	1.356	15%
Nyungwe National Park	0.318	0.549	73%
Volcanoes National Park	14.256	16.394	15%
Total	15.734	18.309	26%

Source: Derived from RDB Tourism and Conservation Department data

Using the fees generated, the RDB has created a revenue sharing program aimed at distributing funds to communities neighbouring the national parks. The revenue share was previously set at five percent of gross park entry fees but has been recently increased to 10 percent. This transfer

can have positive impacts on biodiversity by increasing community awareness and therefore support for conservation – thus lowering the costs of park management.⁸

Another new program is RDB's public-private partnership with Africa Parks Foundation that turns over direct management responsibility of Akagera National Park, making it possible to mobilize additional resources for park maintenance and biodiversity protection (Akagera Management Company, 2015).

Water sector

Water related revenues are determined by the Water Policy (2011), Water Resources Management Masterplan (2015), Water Law (2008) and the Ministerial Orders 2013.

There are several categories of water related revenues:

1. Application Fees - RWF 35,000 per year
2. Water permits, for which there are 3 categories:
 - Water concessions for uses such as fisheries, apiculture, recreation
 - Costs for large-scale users such as industries and irrigation, from ground water, springs and rivers. Charges for per unit are RWF 30/m³ for agriculture and RWF 40/m³ for industries. These charges have not yet been effected due to lack of accurate measurement for water extracted. Large water users will therefore be required to install gauging stations for measuring the volume of water they use.
 - Declaration Permits for carrying out water research or exploration; these permits are free of charge

According to information obtained during an interview with and RWFA staff, currently, all large-scale water users are consuming water at almost no cost. The revenue earned for water from these permits is meagre, each costing RWF 35,000, regardless of user. In the fiscal year 2016/17 only 19 permits were issued, fetching a total of only RWF 665,000. Currently, the Water Policy, Law and Water Masterplan are in the process of revision. Hopefully, the revised Water Policy and Masterplan will introduce appropriate financial instruments and charges / fees for various water uses. There is obviously an opportunity to increase revenues and provide incentives to reduce consumption by fully implementing a scale of different water tariffs.

Forestry

Forestry sector revenues are derived from timber licenses, fees and levies as well as concessions for forest plantations. The main concessions are the Nyungwe Forest Buffer Zones leased to New Forest Company for a period of 20 years and renewable on mutual agreement. There are also other types of fees that are commonly associated with "stumpage fees" that fall into one of four categories:

- 1) Sale of standing trees in forest plantations – auctioned by standing volume
- 2) Forest residue sale by auction (For regeneration) -- sale of small dimension wood such as branches for firewood

⁸ For more information on the revenue-sharing program, see <http://www.rdb.rw/home/newsdetails/article/increase-of-gorilla-permit-tariffs.html>,

- 3) Roadside trees sales by auction (for road construction activities, dangerous trees, residues) -- sale of individual trees along streets and highways
- 4) Forest product sales (e.g. originally obtained illegally) – sale of confiscated wood products

Table 5.3 shows the total forest revenues collected between 2014/15 and 2016/17, reaching over RWF 1 billion in this time period.

Table 5.3 Forest revenues, 2014/15 – 2016/17
(in RWF millions)

Type of Revenue	2014/15	2015/16	2016/17	Total
Concession Fees	-	467.08	45.79	512.87
Sale of Forest Plantations	115.78	136.39	-	252.17
Sale of old trees in Degraded Forests	-		21.59	21.59
Sale of forest residues	216.56	17.27	-	233.82
Sale of confiscated wood	-	-	-	-
Fines	-	1.07	1.00	2.07
Total	332.34	621.81	68.38	1,021,52

Source: Compiled from 2014-2017 data files provided by Forest Licensing Office

Utilities

Utilities are overseen by the Rwanda Utilities Regulatory Authority (RURA), originally created in 2001, and now operating according to Law N° 09/2013 passed in March 2013. The Law guides RURA, defines its mission and determines its powers, organization and functions. According to the Law, RURA has the mandate to regulate:

- Postal services;
- Renewable and non-renewable energy, industrial gases, pipelines and storage facilities;
- Water and sanitation;
- Transport of persons and goods; and
- Other public utilities, as deemed necessary.

The Authority plays a pivotal role by linking policy, licensed service providers and consumers in coordination with line ministries responsible for each of the regulated services. In performing its regulatory functions, the Authority has the responsibility to ensure fair competition, promoting and protecting consumers' interests and rights in regulated services.

With respect to biodiversity-related matters, RURA has the potential to play a much greater role in valuing the true costs of many natural capital resources in such areas as water usage, pollution abatement, and renewable and non-renewable energy utilization.

FONERWA

The establishment of the Fund for the Environment in Rwanda (FONERWA) has created distinct financing opportunities for environmental protection, including biodiversity and protected area management. Parks and protected areas, districts, and the private sector can seek funds

through FONERWA for developing innovative solutions, including business solutions for managing natural resources. FONERWA began operations in 2012, with seed funding of GBP 22.5 million (US\$ 34 million) provided by the UK International Climate Fund. Domestic counterpart funding was critical to securing this bilateral support; and, to date, the Government has contributed US\$ 3.7 million. A further € 6.7 million was provided by the German Development Bank to support adaptation projects at the district level over five years. This endowment makes FONERWA the largest demand-based climate fund in Africa (CDKN, 2015).

In addition to the DFID and KFW funds, UNDP has provided US\$ 5 million over 5 years to strengthen the capacity of the Government to manage FONERWA, as well as funding received from fees and penalties highlighted below. FONERWA is currently entering a resource mobilization phase as about 90 percent of the seed funding from DFID has now been committed to projects. The British International Climate Fund is considering recapitalizing the Fund based on a project evaluation that was conducted in 2015 (www.fonerwa.org).

Mining and Environment Guarantee Funds

A holder of a mineral license is expected to comply with environmental laws and regulations. They are also required to rehabilitate areas that have been damaged through or by their mining operations. Historically, the Criminal Law (Penal Code) set the fines for environmental damage by mining operations at between RWF 300,000 to RWF 1 million, depending on the level of damage. The Guarantee paid depended on type of mine, the size of the mining area, and the size of investment.

The fines were imposed by the mining agency, and debited to the Guarantee account. The fines imposed were paid either to the Rwanda Revenue Authority or FONERWA accounts and not directly to the agency responsible for mines. This system was stopped in 2015, when GOR decided that fines should only be imposed through a court process. This process has not yet been put in place. According to an oral interview by the author with Mines and Petroleum Board staff, no funds have been collected from this source since 2015.

Table 5.4 Summary of biodiversity-dependent revenues in public sector

Sector	Type of Income	Total annual income	Contribution to GDP
Agriculture	All	RWF 4.316 billion (2013)	32%
Forest Sector	Forest Licenses	RWF 197 billion (2013)	5 %
	Forest Concessions		
	Royalties		
	Penalties		
	Others		
Tourism	Park entry fees	\$ 18.31 million (2016)	
	Concession fees		
	Penalties		
	Total Industry	US\$ 896 million (2017 projected)	11.2%

Water sector	Water Fees	RWF 665,000	
	Water fees (private companies)		
	Penalties		
	Other		
Mining	Penalties	Not available	
Infrastructure		Not available	

Source: author’s calculation from various government data sources

5.2 Government subsidies and incentives

Subsidies and incentive are commonly used by governments to encourage or promote specific kinds of economic, social or environmental outcomes or behavior. More specifically, a subsidy is generally a sum of money (or equivalent) granted by the government or a public body to assist an industry, business or individual so that the price of a commodity or service can remain low or competitive. Virtually all governments use subsidies and incentives in one way or another, although in many cases they end up having more political than economic benefits.

With respect to overall corporate incentives, box 5.1 below summarizes current government subsidies and incentives available to international investors and entrepreneurs. At noted, there are no specific biodiversity-specific incentives presently offered by the Government, although such incentives could be made available with an order from the Minister of Finance.

The next sections then examine specific incentives found in various sectors and sub-sectors.

Box 5.1 Summary of corporate incentives offered by the Government of Rwanda

- A seven-year tax holiday for investments in the following specific sectors: manufacturing, tourism, health, exports, energy projects producing at least 25 MW (excluding investors having an engineering procurement contract executed on behalf of the government of Rwanda, and information and communications technology with an investment involving manufacturing, assembly, and service. The investment should be of at least US\$ 50 million and the investor should contribute at least 30% of this investment in the form of equity in these sectors.
- A preferential Corporate Income Tax (CIT) rate of 0% for international companies with their regional offices in Rwanda and that fulfil certain requirements.
- A preferential CIT rate of 15% for registered investors undertaking; (i) exportation (ii) energy generation, transmission, and distribution, (iii) transport of goods and related activities, (iv) mass transportation of passengers and goods, (v) ICT, (vi) financial services, including global business activities, private equity funds, fund management, wealth management, mutual funds, collective investment schemes, captive insurance schemes, venture capital, and asset backed securities, (vii) building of low-cost housing, and (viii) any another priority economic sector as may be determined by an Order of the Minister of Finance.
- Exemption from capital gains tax.
- Five-year tax holiday for micro-finance institutions.
- Customs exemption on products used in Export Processing Zones.
- Prompt settlement of VAT refunds.

Source: Pwc Report, 2017

Agriculture

As part of the Agricultural Intensification Program, the Rwandan government has provided financial subsidies on inorganic fertilizers, improved seeds, and irrigation equipment, as a means of assisting agricultural producers (MINIAGRI, 2009). At the same time, many of these subsidies are seen as largely having negative impacts on biodiversity. As noted in a study by REMA (REMA ,2014), some of the negative impacts of this program include:

- Direct soil and water pollution which has adverse impacts on plant, animal and human health;
- Long-term loss in soil fertility and reduced crop levels, leading to new land clearing for crop cultivation;
- Purchase of inappropriate irrigation technologies resulting in overdrawing of water and draining of wetlands;
- Promotion of improved seeds for some crops leading to mono-cultures and loss of native agro-biodiversity.

With respect to fertilizer use, a recent study prepared for REMA (UNDP-UNEP PEI, 2017) found that the net soil nutrient depletion from fertilizer user was valued US\$ 1.3 million/year and the nutrient loss in value to surface water systems was estimated to be RWF 779 million a year. The study concluded that the

“effectiveness and efficiency of the fertilizer use is quite low in Rwanda . . . despite the large amount of subsidy provided....This may mean a shift [is required] in investments from costly and seemingly inefficient fertilizer subsidies, to improving market conditions, research and enhancing farmers’ knowledge of effective fertilizer use, to achieve increased and more sustainable smallholder crop production.”

Table 5.4 below summarizes the total agricultural subsidies paid and projected by the Government in the three fiscal years, 2015/16 to 2017/18

Table 5.5 Agricultural subsidies 2015/16 to 2017/18
(US\$, estimates and projections)

Subsidy	2015/16	2016/17	2017/18
Irrigation and water	61,630	62,707	63,904
Farm Inputs (fertilizers)	16,103	8,423	1,367
Seed Development	7,336	4,347	1,549
Total	85,069	75,477	66,620

Source: Institute of Policy Analysis and Research. *Annual Analysis of Rwanda’s Agriculture Budget Expenditure 2015-2016*

There are private companies in Rwanda that have invested extensively in forestry and agriculture that include production of beans, barley, maize, wheat and rice, tea, coffee and sugar cane. The companies also support community activities such as tree planting, soil and water conservation, and some income generating activities, typically as part of their corporate social responsibility programs (www.psf.org.rw). However, many of these private sector investments focus on monocultures, while the agro-landscape could provide opportunities for investment in a wider range of species in terms of livestock (cattle, sheep, goats, pigs, chicken) and plants (to include coffee, tea, wheat, sugar cane, and other food crops)

Renewable Energy

Rwanda's investment code provides the following incentives to an investor in renewable energy:

- A variety of non-fiscal and fiscal incentives (tax exemption including VAT on importation of equipment, investment allowance up to 50 percent, free repatriation of profits, 100 percent written-off development and research costs, preferential corporate income tax of 15 percent)
- A seven-year tax holiday for investments in energy projects producing at least 25 MW (excluding investors having an engineering procurement contract [EPC] executed on behalf of the government of Rwanda,
- A preferential Corporate Income Tax rate of 15 percent for registered investors undertaking energy generation, transmission, and distribution (Pwc, 2017).

With the assistance of the World Bank, Rwanda has set up a Renewable Energy Fund with an IDA credit of US\$ 27.5 million. This project will help to increase electricity access in Rwanda through off-grid technologies and facilitate private-sector participation in renewable off-grid electrification.

Cooking Gas Subsidy

The Ministry of Infrastructure has introduced a subsidy for cooking gas as a way of discouraging use of firewood and charcoal. There is a parallel measure of restricting the transport of charcoal. The intended impact is to reduce deforestation and biodiversity loss. By scrapping import duties and using a subsidy on cooking gas, retail prices per kilogram have dropped by 67 percent over the past seven years. These changes have brought down the cost of a 12 kg. cylinder from RWF 23,000 – 26,000 in 2012 to RWF 12,000 currently. By comparison, according to the Energy Development Corporation, a sack of charcoal costs between RWF 8,000 and RWF 12,000 on the market. One 12 kg. gas cylinder can cook meals that would otherwise take three sacks of charcoal (worth at least RWF 24,000). In addition to cost saving, gas cooks twice as fast as charcoal and ensures improved hygiene and cleanliness compared to charcoal (*Rwanda New Times*, January 11, 2017, quoting the Energy Development Corporation).

However, a 12 kg. cylinder filled with gas, gas stove and other accessories cost between RWF 90,000 and RWF 100,000, making the total cost of the technology not affordable for the majority of Rwandans. It therefore remains unlikely that there will be a significant reduction in the use of charcoal and firewood as the main source of Rwanda's domestic energy needs as a result of this subsidy alone (Ibid.).

5.3 Gap analysis of legal framework of biodiversity finance

The different environmental and biodiversity policies and laws provide a strong foundation for biodiversity conservation, but need to be fully implemented and adequately resourced. At the most general level and as mentioned in Chapter 3, some institutional arrangements and diffusion of mandates across different institutions reduce the effectiveness of organizations, such as the mandate given for EIAs to RDB rather than to REMA. Likewise, as noted earlier,

clear distinction needs to be made between regulatory and resource management functions. In some cases, major biodiversity concerns are simply not addressed, including sufficient attention to ecosystem services and urban biodiversity, or climate change as part of biodiversity.

Given below are some specific gaps in the overall policy framework and various sectors.

Biodiversity policy and legislation

The Rwandan Constitution, Vision 2020 and the EDPRS all give high priority to environmental conservation and sustainable natural resource management. And as noted earlier, the sectoral regulatory frameworks (policies and laws) which give effect to these commitments include:

- Environment Policy and accompanying Law,
- Biodiversity Policy and accompanying Law,
- Agricultural Policy and Strategy,
- Wildlife Policy
- Forest Policy and accompanying Law,
- Water Policy and accompanying Law.

The Biodiversity Policy 2011 and Biodiversity Law 2013 are the only ‘stand-alone’ instruments for the conservation of biodiversity in Rwanda. But neither the Biodiversity Policy nor Law has been fully implemented. And those activities whose implementation would enhance biodiversity conservation and those through which additional resources for biodiversity conservation could be raised (e.g. bio-prospecting) have not been adequately funded.

The policy development process in Rwanda requires that each new policy is accompanied by an implementation plan and a budget. While the law provides overall guidance, this suggests a mismatch between the policy requirement for a budget and the actual allocation of resources. This mismatch forms a key factor in the potential underlying basis for the financial gap in addressing biodiversity priorities.

Stated another way, the Biodiversity Policy articulates conservation goals as a key pillar of national development, but there is a lack of empirical evidence that the Policy’s implementation is effectively reversing threats to biodiversity. In this regard, there is a need for a comprehensive national level biodiversity conservation-planning framework or a National Conservation Plan.

Water resource laws and policies

In terms of gaps and legislation affecting biodiversity financing, water sector programs do not specifically include a biodiversity mandate, thus impairing the sector from participating in biodiversity-oriented initiatives or receiving targeted financial support for potential activities. As such, developing a broader legal definition of water-related activities and financing to include disaster and biodiversity management would be advantageous. Water and freshwater ecosystems fall within different jurisdictions – national, community, district, transboundary and regional. As such, no single entity has a monopoly in the management of water resources. Responsibility must be shared between diverse stakeholders through consultations and

collaboration. Inputs from all stakeholders - whether they are actual users, potential users, neighbours or occasional visitors - will need to be sought.

A water conservation technology policy is also needed to provide guidance for the development and application of technologies that support watershed management and promote the more efficient utilization of water resources. Appropriate technology is particularly required for data collection and analysis in order to understand the water balance, current and future abstraction, long-range climate observation, and research to support water resources related planning and development. According to an interview with the author, RWFA is currently in the process of constructing gauging stations in major sources in order to be able to determine levels of water abstraction and to levy charges based on volumes used.

Parks and wildlife management

Rwanda has developed a comprehensive Wildlife Policy as well as Park Concession Policies that are meant to guide the management of parks and tourism development in and round the parks. Nevertheless, the legislation to affect the implementation of the policies has not been enacted. Some of the buffer zones around the national parks – such as the Nyungwe National Park Buffer Zone -- are managed by RWFA, rather than the park itself. These sorts of management overlaps have both efficiency and cost implications. A comprehensive wildlife management strategy, including nearby protected areas and buffer zones, needs to be implemented in order to enable wildlife management activities to be carried out in a systematic, predictable and cost-effective manner. Such a comprehensive strategy must likewise be accompanied by enforceable regulations and enforcement mechanisms.

In addition, the Wildlife Policy requires that a regulatory framework be set up for the management of wildlife and their habitats outside protected areas. The first step in this process would be to undertake quantitative and qualitative assessments of wildlife, biodiversity and their habitats outside protected areas as part of the national baseline assessment. This information would be vital for making decisions on the management and protection of these resources.

Furthermore, changes in incentives may be required for landowners and farmers operating on privately owned or leased land to adopt wildlife management principles, to include wildlife farming and the establishment of community and private wildlife conservancies. Such an approach would strengthen the ecological integrity and functioning of protected areas through the designation and establishment of buffer zones, migratory corridors and wildlife dispersal areas. It would also generate new revenue streams for both communities and private land owners.

Agriculture

In addition to the new Agricultural Policy, there is growing attention to reducing the harmful impacts of agrochemicals, fertilizers and the cultivation on riverbanks, lakeshores and on steep slopes. However, the widespread acceptance and mechanisms for application of these legal instruments and enforcement mechanisms are not clear.

Law N° 30/2012 of 01/08/23012 on Governing Agrochemicals oversees the manufacturing, importing, distribution, use, storage, sale and disposal and burial of agrochemicals for the protection of human and animal health and the environment, so as to avoid injury and contamination which may result from their use. The Law further provides for:

- The creation of an Advisory Council that establishes guidelines and instructions for the use of agrochemicals, advises the registration of approved agrochemicals and defines agricultural best practices;;
- Specific guidelines on environmental sustainability and climate change, such as
 - Periodic nationwide soil sampling and analyses to update the soil nutrient requirements for the various regions in the country;
 - Research and development of fertilizer formulations/blends and fertilizer recommendations through RAB and its research affiliates, the private sector, and universities;
 - Publication of soil nutrient maps as well as fertilizer application recommendations for specific crops based on different geographic regions;
 - Soil maps shall be updated periodically to ensure changes in soil nutrient deficiencies and requirements for different crops and agro ecological zones are identified to facilitate updating of fertilizer recommendations;
- Prohibitions on cultivation along riverbanks, lake shores and steep slopes in order to reduce soil erosion and siltation of water bodies. No cultivation is allowed 50 meters on either side of river banks and 100 meters on lake shores.

Agro-forestry, as a sub-sector of agriculture, is an area that merits much closer policy and legal review. For example, although forest plantations are perceived as an alternative to reduce carbon emissions and address environmental degradation, there is a growing concern in Rwanda about their environmental and ecological challenges. In many cases, fast-growing Eucalyptus is used, but its planting entails high nutrient/water uptake, discourages wildlife diversity, and increases soil acidification. The use of forest plantations was originally introduced as a tentative remedy to soil erosion and landslides as well as to combat increased demand for firewood and building materials (Nsabimana et al, 2008).

More recently, the Government has supported the growing of exotic species - *Eucalyptus*, *Grevillea*, *Cedrella*, *Pinus*, *Cupressus* and *Callitris*. Unlike the other species, the silvicultural growth of eucalyptus has caused soil chemical changes. A study (Nsabimana et. al., 2008) shows that eucalyptus species are too acidic with a pH between 4.0 – 4.5 compared to other species having a pH range of 4.9 – 6.0. As a consequence of low pH, eucalyptus species have caused increased soil acidity and nutrient depletion, hence, a need to favor less-acidifying, native species.

5.4 Key national entry points for expanded biodiversity financing

To increase the level, quality and effectiveness of investments in biodiversity, special attention will be required to explore new ways of fully meeting the financing needs for protecting and restoring Rwanda's rich biodiversity endowments. In some cases, these new methods may have already been found effective in other countries. In other instances, excellent options exist for improving or scaling up existing procedures or practices. Whatever the case, the momentum for making any changes requires demonstrating that such changes can be linked to what might

be called “higher order” national priorities including sustainable development goals, and that the proposed changes enhance the likelihood of achieving these national priorities.

Given below are four examples of commonly agreed sustainable development challenges that represent entry points for enhancing biodiversity finance and management.

Sustainable agriculture

Rwanda is still a predominately resource-based economy and primarily a rural population. As such, agriculture is the overwhelming basis for most Rwandans’ livelihoods. With ongoing population pressure and overexploitation of existing farmlands going back decades, there is increasing pressure both at the individual smallholder farmer level and at the national policy level to promote and implement sustainable agriculture practices that both increase productivity and safeguard the resource base upon which agriculture is dependent.

The new Agriculture Policy reflects these concerns. Agriculture practices that deplete the resource base over time cannot, by definition, be considered sustainable agriculture. Thus, there is an ongoing tension between the use of some modern technologies that can result in higher crop yields in the short to medium term, but have harmful consequence for local ecosystems over the long term. Finding the right balance for adopting agricultural technologies and practices that increase crop yields and protecting local ecosystems will be a major challenge and opportunity for Rwanda. This represents a critical entry point for linking biodiversity to a top national priority as part of any poverty reduction strategy focusing on the rural poor. Options include development of climate smart agriculture, payment for ecosystem services in agro-ecological landscapes and multi-cropping production systems to meet both production and ecological objectives.

Deforestation

In many ways, deforestation mirrors the problems associated with harmful agriculture practices and the relentless pressures on communities to find energy sources and building materials. As noted earlier in this report, Rwanda has already lost most of its natural forest cover. The only remaining forests of any size are found in protect areas, and they are under threat from illegal logging. There is considerable scientific evidence that forest cover represents the foundation on which many ecosystems are dependent, whether in terms of flora, fauna, water quality, carbon sequestration, preventing soil erosion, and even micro-climate effects. (See, for example, Agar, 2017). As forest cover is depleted, then these other elements of the ecosystem will be impacted negatively. Rwanda’s forest problem is compounded by a policy that has favored Eucalyptus, pine and other fast growing but low value species. Government policy-makers have begun to explore ways to incentivize farmers to start planting native species, to plant along streams and rivers, and to limit charcoal and fuel wood harvesting to fast-growth / invasive species.

Thus, how Rwanda is able to address the deforestation challenge must be considered another top national priority, with impacts on the pace of economic development and poverty reduction, in addition to the residual impact on ecosystem performance and long-term viability that also affects economic growth and poverty reduction.

Water quality

Rwanda has an immense hydrological system, but that system is under threat from population pressures, harmful agricultural practices, deforestation, water siltation, invasive plants, as well as industrial uses of water, including mining. As mentioned earlier in this report, water as a commodity is generally either under-priced or is treated as a free good. While water is understood to be an important component for sustainable development and individual health and well-being, it is not given high national priority precisely because its economic value is not effectively factored into policy, finance, and decision making. At the same time, the strong link between water quality and biodiversity has also been well researched in the scientific community. (See, for example, Rodis, 2011.) Well functioning and sustainable ecosystems are the basis for water quality and its regeneration. In this regard, articulating the importance of water quality and its effective stewardship to national development and poverty reduction represents another entry point that promotes the wider role played by biodiversity protection and mitigation.

Tourism

As discussed above, the Government has put in place a wide range of policies that promote tourism while seeking to protect national parks and protected areas. As such, the tourism industry is one of the fastest growing sectors in Rwanda and one of the economy's major sources of foreign exchange earnings. The sector is also a major source of jobs and employment. Policy makers well understand that it is Rwanda's rich biodiversity and natural beauty which draws an increasing number of tourists to the country.

To the extent that Rwanda's biodiversity's is threatened by over exploitation and is poorly managed, tourism may contribute to these threats. On the other hand, if the tourism sector is sustainably managed, it can contribute to conserving biodiversity and ecosystems on which it depends. It will also enhance Rwanda's reputation as a tourist attraction and the sector's importance as an economic driver will continue to grow. As this report noted, the Government has put in place fairly robust policies and laws concerning wildlife conservation, national parks and protected areas, but, as noted earlier, the sector is still under funded and faces serious capacity constraints. Consequently, the tourism sector and its critical dependence of biodiversity and conservation represent an important entry point for further debate and discussion.

5.5 Developing effective finance solutions for biodiversity

As explained in the first chapter, one of the key objectives of the BIOFIN project is to identify and begin to implement a number of biodiversity-enhancing finance solutions or mechanisms that represent a combination of new or modified laws, policies, programs, regulations, fees, incentives and subsidies. These solutions are aimed at expanding the resource envelope for biodiversity and using existing resources more cost effectively, so that they can be made available for use by government, NGOs, local communities, and the private sector. It should be stressed that the rationale behind developing finance solutions is not simply to seek additional monies, but to use existing resources in ways that better leverage their opportunity costs.

Each finance solution that is eventually adopted through the BIOFIN process should be able to clearly answer six fundamental questions:

1. What are the desired economic or finance results or outcomes that the solution is intended to achieve?
2. Which is/are the lead or intermediate agency(ies) responsible for operationalizing the solution?
3. Does the finance solution build upon existing programs or initiatives, or is it a completely new activity?
4. How will the finance solution be funded?
5. At what pace can the finance solution be implemented?
6. What are the instruments or mechanisms used to mobilize, collect, manage and disburse the funds?

The analysis and consultations held during the preparation of this report have brought to light a wide number of potential financial solutions. With this report's focus on the financial policy and institutional context for biodiversity, many of the initial round of potential finance solutions identified ways to address policy and institutional inefficiencies and overlaps that have implications for biodiversity finance and the use of available resources. Other proposed solutions included new instruments that have been used successfully in other countries but not yet applied in Rwanda. And still others relate to potential changes in programming by specific Rwandan institutions that could result in new revenues for biodiversity.

The discussion of finance solutions will be an ongoing process in the coming months based on feedback and consultations with interested stakeholders. At this juncture, it is nonetheless useful to suggest just a few finance solutions that relate to the entry points highlighted immediately above and other discussion areas reviewed in the report. Five are briefly outlined below. No doubt many more will be discussed in the coming months.

Generating increased biodiversity revenues through tourism

If much of the reason for tourists visiting Rwanda is to enjoy the country's rich biodiversity heritage, then there are numerous opportunities to increase biodiversity spending through tourist taxes ranging from marginal increases in hotel room taxes, to airport fees, and airline tickets. Assuming the projected growth in the numbers of tourists visiting the country comes to fruition in the coming years, there is tremendous potential to increase revenues for biodiversity, provided the funds generated are specifically earmarked for biodiversity and conservation, and not simply placed in the general government coffers. It is also likely that international tourists would not be dis-incentivized by additional taxes that are earmarked specifically for biodiversity and conservation. It will be essential to show the tourists and tour operators that the additional money received is going directly to conservation and sustainable use. Also, better earmarking of existing revenues from tourism at national parks, etc. to be used for conservation would be beneficial.

Effectively assessing and capturing water resource values

Policy makers and water managers in Rwanda could explore opportunities for incentive-based instruments to reduce pressure on water resources and improve freshwater management for

all users. RWFA could more urgently work with water stakeholders to assess and develop suitable instruments that are equitable and cost-effective to administer. One potential instrument includes a rationalized fee structure and eventually water quality trading for controlling / reducing water pollution. Another instrument entails more widespread use of payment for ecosystem services or watershed services. This could include water farming where some sites such as hills or forested landscape are managed mainly for generating, conserving and assuring a continuous supply of water. The water so generated can be sold to the water utility or communities at an agreed prices. For Rwanda, the land of a “thousand hills,” this concept could be easily applicable by setting aside some of the particularly steep hills for water farming.

Expanding FONERWA’s focus on biodiversity

During the BIOFIN training workshop that was held in June 2017, there was a lively debate and general consensus on a more active role that FONERWA could play in supporting biodiversity and its linkages to climate change. FONERWA is uniquely placed as an innovative “financing laboratory” and its ability to solicit funding proposals from government agencies, NGOs, local communities and private companies. In this capacity, FONERWA could support projects that can demonstrate cost-effectiveness and economic and social sustainability, particularly for on-the-ground initiatives that support biodiversity and local communities. FONERWA could also explore, subject to the approval of its Board, the creation of new financing windows, such as a biodiversity enterprise fund that provides funding for biodiversity focused business or social enterprises. FONERWA might also explore developing a window specifically targeted at other development or commercial banks or impact investors who seek investments that generate economic, social and environmental returns while providing protections for the investment and some return as well as repatriation of capital.

Rationalizing and streamlining environmental fines and penalties

There is ample room to explore a more holistic approach to the environmental fines and penalties imposed by the Government. This is part of the “environmental fiscal reform” discussed in the next chapter. The current patchwork of fines and penalties has evolved incrementally, can send mixed market signals, and often overlaps jurisdictional boundaries. The most fundamental question to be answered is whether or not the specific fine is an actual deterrent to repeating the offence, or is the fine simply viewed as an inconvenient cost of doing business, not a deterrent to repeated environmentally-damaging behaviour. The potential financial benefit from rationalizing fines and penalties could be significant, depending upon the extent to which reforms are carried out.

Bioprospecting

Bioprospecting is an area with potentially great impact on both preserving biodiversity and effectively using biodiversity in a sustainable manner. Bioprospecting is defined as the systematic search for biochemical and genetic information in nature in order to develop commercially-valuable products for pharmaceutical, agricultural, cosmetic and other

applications. Bioprospecting activities must comply with the definition of the utilization of genetic resources found in the Nagoya Protocol⁹ or as stated in national law or policy. Bioprospecting, when properly regulated, generates revenues that can be directly linked to the conservation of biodiversity and to the benefit of local communities. Given Rwanda's rich biodiversity, there is great potential to use bioprospecting to generate revenues for biodiversity through fees, royalties or equity stakes in private investments while also supporting local communities. More analysis and policy work is required to better exploit this potentially significant finance solution.

⁹ The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity is an international agreement which aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way. See. <https://www.cbd.int/abs/>

6. Conclusions and Key Recommendations

6.1 Macro and sectoral perspective

Over the past twenty years, Rwanda has laid firm policy and legal foundations for effective management of its environment. During that period, a range of policies and laws to enforce them have been enacted including the Environment Policy and Law, Biodiversity Policy and Law, Forest Policy and Law, Wildlife Policy, Water Policy and Law, Park Concession Policy. Multiple institutions have been created and/or re-organized to implement these policies, including RDB which has assumed responsibility for parks and tourism. Rwanda now has in place most of the policies and institutions it requires for effective management of its biodiversity. However, at the broadest level, there are technical and institutional capacity development needs that should be addressed to better manage and implement defined mandates. Likewise, there is a need for concerted efforts to strengthen coordination between agencies charged with managing and financing biodiversity, especially in light of the recent re-organization of many environmentally focused ministries and agencies .

At the sectoral level, five key sectors were selected for analysis based on their having priority attention in the 2016 NBSAP and their key roles in managing biodiversity and therefore in biodiversity financing. The sectors are: environment protection, protected areas and wildlife, water resources, forestry, and agriculture. A second tier of sectors does not have direct roles in managing and financing biodiversity; however, their activities have major impacts on biodiversity, and they should be given priority in efforts toward biodiversity mainstreaming. These sectors are: tourism, trade and Industry, infrastructure, and mining. Mention is also made of MINICOFIN, which is responsible for budget planning and ultimately decides on how much of public finance is allocated to biodiversity.

6.2 Recommendations from the policy review

While the environment, biodiversity and wildlife policies and laws provide a strong foundation for biodiversity conservation, there is still room for improvement in several areas. To enhance the role of policy in biodiversity conservation and to ensure that policies are adequately resourced, implemented, and monitored, the following recommendations are made.

- The analysis conducted as part of this PIR suggests that many of the existing environmental fines and penalties are not being adequately collected nor the laws and regulations upon which they are based being adequately enforced. This is leading to a loss in revenues for the Government as well as continued loss or degradation to the natural capital that is meant to be protected.
- With the new agriculture policy, priority attention must continue toward more sustainable, eco-friendly agriculture that safeguards the long-term interests of smallholder farmers through protection of local ecosystems.
- There is a growing need to ensure that current efforts to refine Rwanda's water policies are fully articulated and implemented , so as to safeguard this vital resource through effective water pricing policies and restoration of catchment areas.

- With respect to major infrastructure and capital projects, there is a pressing need to strengthen biodiversity considerations in environmental compliance and regulations and to ensure that environmental impact assessments are effectively utilized in the “design and build” stages of such projects.
- Integration of biodiversity into sustainable land use planning is crucial to the success of ecosystem diversity. Currently not all samples of Rwanda’s ecosystems are represented in its network of protected areas. There are a number of large wetlands sites (Rugezi, Akanyaru) that could be gazetted as national parks.
- Increased support for education and research is needed so that there is sufficiently trained manpower to monitor, study, evaluate and assess policies and activities relevant to biodiversity and conservation – with the goal of ensuring research-driven decision making. Public awareness and education campaigns should be an integral part of this effort.

6.3 Biodiversity budgeting and environmental fiscal reform

Biodiversity financing in the public sector is defined largely by the planning, budgeting and expenditure review cycle at both national and decentralized levels. When the budget allocations have been approved, the budget centers are authorized to incur expenditure according to their action plans. At the same time, the approval by Cabinet of NBSAP 2 as the strategic plan for biodiversity management should now be solidly integrated into the NST now under preparation. In the very short term, this is the entry point where biodiversity can be more closely aligned with the Sectoral Strategic Plans and their budgets as part of the government-wide planning and budgeting cycle. In the coming months, a key objective of the BIOFIN project is to help Government to cost NBSAP 2 so that its goals can be prioritized in the context of the Government’s overriding commitment to sustainable growth and poverty reduction. This will be done as part of BIOFIN’s Financial Needs Assessment.

Over the longer term, environmental fiscal reforms can be a powerful instrument for biodiversity financing. Such reforms encompass full (or at least fuller) cost pricing of natural resources, involving user fees, taxes, tax rebates, exemptions, smart subsidies and other forms of incentives and disincentives. Several of these instruments were discussed in previous chapters. Rwanda has been providing some of these incentives through the Investment Code and other laws for customs, VAT, income and consumption. These incentives have much greater potential to offer multiple benefits including: (i) addressing environmental issues, (ii) reducing poverty and, (iii) raising revenue. Presently, there is no central and coordinated approach to fully measure the magnitude and impacts of these instruments, nor to explore new or modified alternatives. The Government is in the process of studying them further with a view toward greater harmonization and effectiveness. This review process merits very high priority. Equally important would be a thorough review of the range of subsidies that the Government uses with the objective of rationalizing their use in order to meet multiple development objectives that protect biodiversity while still meeting the priority for sustainable growth and poverty reduction.

6.4 Biodiversity mainstreaming

As noted in Section 3.1 above, biodiversity mainstreaming had been discussed in earlier policy documents such as EDPRS 2 and NBSAP2, both of which noted that the importance of biodiversity requires a more multi-sectoral perspective to planning and budgeting. The overall objective was to ensure that overall budget decisions support the achievement of national biodiversity targets and avoid any negative impacts on biodiversity.

Since these policy documents were formulated, there have been parallel mainstreaming efforts to address other cross-sectoral issues, such as climate change and environment and natural resource management. This has been a primary focus of the Government's support under the UNDP-UNEP Poverty and Environment Initiative (PEI). Thus, if the primary goal of mainstreaming is to take a more holistic approach to policy development, programing and budgeting, then separate, parallel tracks for biodiversity, climate change, and environment and natural resources would be counterproductive and inefficient, to say the least.

In this regard, a more holistic approach to environmental mainstreaming, of which biodiversity is one component, is recommended. Under this approach, environmental mainstreaming is, by definition, broader than simply the mandate and activities undertaken by the new Ministry of Environment, and would continue to involve multiple ministries and other institutions.¹⁰ Any broader effort at mainstreaming should nonetheless be sure to reflect the Government's commitment to the Aichi Targets on biodiversity.

It is not the role of this report to articulate the full content of a broad environment mainstreaming policy, but it is hoped that a full debate around environmental mainstreaming can occur during deliberations for the new National Strategy for Transformation.

Development of a national system of biodiversity Indicators

It is impossible to measure and monitor all aspects of biodiversity without a system of biodiversity indicators. A "score card" of indicators is vital for establishing a solid biodiversity baseline as a reference point for measuring future changes in biodiversity, as a result of implementation of conservation policies and activities or other policies and programs that have unintended consequences.

Like economic and social indicators biodiversity indicators are required as an important tool for highlighting key messages and presenting general trends on the state of biodiversity in the country. They are also a fundamental part of policy-making as they provide an all-important feedback mechanism for determining whether conservation policies and actions are having the desired effect. Urgent attention needs to be taken to develop a national system of biodiversity Indicators.

CoEB would seem to be well placed to spearhead the development of these indicators.

¹⁰ For an overview of ENR mainstreaming, see *ENR Sector Strategic Plan (SSP) 2018-2024*. Unpublished PowerPoint presentation dated August 28, 2017.

Connecting science to policy formulation

Science and technology can contribute to address and tackle multifaceted problems such as environmental sustainability, biodiversity loss, water and food security among others. Due to the widespread and long-term impacts of policies addressing these problems, it is increasingly valuable for policymakers to have access to the best available scientific and technical information as a critical input in order to establish priorities, make decisions, and develop and measure the effects of various policies and practices. The Government is the most important stakeholder for the successful engagement of scientists with policy. Government agencies, ministries, and legislative bodies need to be more actively engaged with science and scientific bodies in order to ensure that policies are premised on the best available scientific evidence.

Toward this end, it would be highly beneficial to conduct a review and analysis of what kinds and within which institutions is biodiversity research currently being conducted so as to identify gaps and ensure the most efficient use of available resources. Again, CoEB is well placed to coordinate this effort.

6.5 Summary observations

In all of the conversations and meetings held as a part of this report's preparation, there was not one single person who did not think biodiversity was important for Rwanda's long-term sustainability and citizens' well-being. At the same time, however, because biodiversity as a concept encompasses all of "nature," it has a "messaging" problem. From a planning and budgeting process, how is something as all-encompassing as biodiversity to be analysed and prioritized against other competing and equally important national priorities?

The argument posited by BIOFIN is that biodiversity – while itself comprised of multiple sub-components – is integrally linked to the twin national goals of long-term sustainable economic growth and poverty reduction. Over the course of the BIOFIN project, considerable attention will be given to the "business case" for the recommendations put forward to generate increased resources for biodiversity protection and conservation that fully support the country's twin goals of sustainable growth and poverty reduction.

Currently, there is no shortage of policy advice and reports written by government agencies, donor agencies, NGOs, think tanks, and advocacy groups that lay out a whole range of options for prioritizing biodiversity. These different policy and program prescriptions certainly warrant careful consideration, yet ultimately, the Rwandan government will invariably need to identify and then implement a strategic set of policy and program choices that are deemed priorities in the national context, that have the highest likelihood of making important changes, that can work synergistically, and that have the best chance of being successfully implemented. BIOFIN's objective is to support a process of prioritization for protecting biodiversity, given the tremendous needs and resource constraints facing Rwanda. To be successful, the prioritization process must have the full backing of society, based on consultation and consensus. Whatever the policies and programs chosen, there will be a need for more robust data collection and analysis in order to monitor implementation and assess biodiversity benefits.

In short, the task does not necessarily entail selecting and implementing a wide range of policy options, but rather, following an orderly and transparent process of prioritizing among multiple

(and often contending) policy options – all of which place competing demands on scarce public resources.

To achieve the kind of transformation needed to address biodiversity, Rwanda will need to practise the discipline of linking short-term priorities to its long-term vision for 2050. This translates into the ability to visualize different kinds of futures than the current trajectories that continue to diminish the country natural resource base, while still addressing challenges and issues in the medium term, most notably in terms of sustainable economic growth and poverty reduction.

The importance of linking short- and long-term prioritization cannot be overstated. Yet how is the process of prioritization among multiple demands manifested in government decision-making? While the priorities selected are ultimately decisions taken by the Government, some analytical guidelines are offered to inform the policy and implementation debate that is required. Three guidelines are suggested, as follows:

- What policies and programs have the highest likelihood of improving Rwanda’s biodiversity and ecosystems? Are there opportunities to exploit multiplier effects where one intervention can lead to achieving multiple objectives for maintaining Rwanda’s natural capital?
- In what ways are the views and concerns of stakeholders, particularly the rural poor, being factored into the decision-making process in order to safeguard and promote their livelihoods?
- In situations when resources are shifted from one program or initiative to another, can the shift be justified in terms of improved economic and social outcomes as well as environmental benefits?

This Finance Policy and Institutional Review is one in a series of BIOFIN reports and consultations meant to help facilitate such a process of prioritization that meets Rwanda’s long-term development objectives while sustaining and protecting the country’s rich biodiversity heritage.

Annexes

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Annex 2. List of stakeholders consulted

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MINIRENA (interviews conducted prior to reorganization)	UWIZEYE, Emmanuel BANAMWANA, Marshall KAYIRANGA, Damascene KATANISA, Peter BUTERA, Joseph	Dir. Land Environ. Water and Forestry Unit Environment Protection Officer Water Resources Specialist SWAP Secretariat Mining and Petroleum Economist
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WCS	MASOZERA, Michel	Director, Country Programme
ACNR	NSENGIMANA, Serge	Executive Director
GVTC	RUZIGANDEKWE, Fidele	Deputy Executive Secretary
Lafrec Project	NSABIMANA, Patrick	Project Coordinator

Annex 3. Summary of policies and strategies affecting biodiversity

(adapted from NBSAP 2016, Table 4)

Policy	Key Provisions in Relation to Biodiversity Policy	Comments / Observations
Vision 2020	Implementation of adequate land and water management techniques coupled with sound biodiversity policy and practice in order to ensure sustainable development	Vision 2050 being developed
EDPRS 2	Achieving sustainable growth in Rwanda requires the prudent use of natural resources and ensuring climate resilience is built into economic planning	Being replaced by the National Strategy for Transformation currently being developed
Biodiversity Policy 2011 and Biodiversity Law 2013	Conserve Rwanda's biodiversity, sustain the integrity, health and productivity of its ecosystems and ecological processes, whilst providing lasting development benefits to the nation through ecologically sustainable, socially equitable and efficient use of biological resources	Resources (financial, technical, human) needed to be provided for the implementation of this policy
Environmental Policy 2004	Ensure the protection of the environment and conservation and sustainable use of biodiversity, natural and agro-ecosystems in compliance with equitable sharing of benefits derived from biological resources	
National Land Policy 2004	Promote land use practices that are favorable to environmental protection; promote the conservation and sustainable use of wetlands; set aside lands for national parks and other natural reserves for conservation of biodiversity.	
Wildlife Policy 2013	Ensure that wildlife inside and outside PAs are managed within a comprehensive national conservation plan. Promote stakeholders participation in the management of wildlife and equitable distribution of benefits Build the human and institutional capacity for the management of wildlife at all levels in government, local communities and private sector	The Wildlife Law needs to be enacted urgently to give effect to the policy
Protected Areas Concession Policy 2013	Manage PAs in accordance with the fundamental purpose of conserving wildlife, scenic values and heritage, Streamline proper management of tourism and conservation of biodiversity through concessions Generate revenues to the government that can be channeled into the conservation and management of PAs	Strong guidelines and enforcement measures should be put in place to minimize potential risks to wildlife and biodiversity

<p>National Forest Policy 2010</p>	<p>Conservation and wise use of forest biodiversity Rehabilitation and conservation of watersheds and catchment areas Supply of improved high quality tree seeds and germplasm Promotion of agroforestry in the agricultural and livestock production systems</p>	<p>Policy and Law being revised to address emerging issues (Climate change, urban biodiversity)</p>
<p>National Policy on Water Resources Management, 2011</p>	<p>Mainstreaming protection of the environment and climate change into the programmes of the water resources sector Integrated management of water resources Regional collaboration in the management of shared water resources</p>	
<p>National Energy Policy and Strategy 2012</p>	<p>Sound and sustainable systems of energy distribution and use Progressive reduction in the use of biomass energy Promotion of alternative sources of energy and clean technologies</p>	
<p>Mining Policy 2017 (draft)</p>	<p>Increasing productivity of mines while protecting environment and biodiversity Development of best practices and appropriate technologies for the mining sector</p>	
<p>National Industrial Policy, 2011</p>	<p>To ensure environmental sustainability:</p> <ul style="list-style-type: none"> • Establish industry-specific waste management systems • Enforcement of clean production systems in all industrial sectors 	<p>Strong enforcement and monitoring systems required to ensure compliance with environmental standards</p>
<p>Tourism Policy 2009</p>	<p>Sustainable tourism is planned and developed to generate both socio-economic and ecological benefits</p>	<p>Greater emphasis should be given to low-impact nature based tourism Tourism industry is dependent on nature and should contribute more to conservation</p>
<p>Agricultural Policy 2017</p>	<p>Four key strategic pillars:</p> <ol style="list-style-type: none"> 1. Productivity and commercialization for food security, nutrition, and incomes 2. Resilience and sustainable intensification 3. Inclusive employment and improved agrofood systems' skills and knowledge 4. An effective enabling environment and responsive institutions 	
<p>Green Growth and Resilience - National Strategy on Climate Resilience and Law Carbon Development 2011</p>	<p>Conservation of biodiversity and ecosystem services, eco-tourism and payment for ecosystem services Sustainable forestry and agroforestry</p>	

Annex 4. Overview of government roles and responsibilities

Institution	Sector	Key Roles	Supporting Legislation
MINERENA (Now split into the Ministry of Environment and the Ministry of Land and Forestry)	Environment, biodiversity, water and forest resource management	Formulate and supervise implementation of policies and programmes for environmental protection, biodiversity, water resource management and sustainable management and use of forest resources and biodiversity. Promote multi-stakeholder participation, including Private Sector, NGOS and Local communities in sustainable forest management; coordination of all environment players through the SWAP	Constitution, EDPRS, Vision 2020, Biodiversity Policy 2011, Biodiversity Law 2013
REMA	Environmental protection	To provide regulatory, advisory, monitoring and coordinating functions for all environmental and biodiversity issues; Focal point for UNFCCC and CBD; Green Growth and Climate Resilience strategy	Organic Environmental Law, 2005, Environment Policy 2003, Law No. 165/2006 of April 3, 2006 and Law n°63/2013 of 27/08/2013. Green Growth and Climate Resilience Strategy 2011
RWFA	Water and forest resources	Sustainable forest management, agroforestry, forest biodiversity; IWRM, Watershed conservation	Forest Policy 2010, National Policy for Water Resources 2011, Forest Law No. 37 of September 2013 Water Law No. 62, of Sept. 2008
RDB	Protected areas and wildlife Tourism development in protected areas	Establishment and management of national parks, establishing tourism concessions in NPs, setting park entrance fees, permits and licenses, Adopting strategies for ensuring sustainability, conservation of ecosystems and biodiversity; ensure proper balance between sustainable use of wildlife & management of ecosystems, protection of threatened app.	Wildlife Policy 2013, Concession Policy 2013, Tourism Law of May 2014,

		Such as mountain gorillas; PPPs with private sector, EIAs	
MINAGRI	Agriculture	Initiating agricultural policies; creating an enabling environment for increased private sector participation in the agricultural sector;	Draft Agricultural Policy 2004, Strategic Plan for the Transformation of Agriculture in Rwanda, 2014
RAB	Agriculture	Developing new agricultural technologies, conserving agrobiodiversity	
NIRDA	Industrial research	Development of biofuels Bioprospecting	Law No. 30 of July 2013 Reorganization pending
FONERWA	Environment and climate change	Financing environment and green growth financing mechanisms	Law No. 26 of June 25, 2012
Rwanda Land Management and Use Agency	Land-use planning	Setting aside land for conservation	Land Policy and Law; Land Use Masterplan, 2010
Decentralized Structures	Rural governance and development		Decentralization Policy 2001 (revised 2013), Decentralization Implementation Plan, 2011

Annex 5. Positive and negative impacts of sectoral policies and practices

Sector	Positive Practice	Negative Practice
Water Sector	Catchment based management is being introduced as part of IWRM; Nine major catchments identified	Catchment committees are not yet fully functional
		Water resource-based PES not developed to facilitate more sustainable management of water resources
	Water resources contributing to generation of hydropower, industrial supplies and urban supply and sanitation	Hydropower generators, water utilities and industrial consumers do not directly contribute to the conservation of watersheds
		No effective system in place for testing levels and effects heavy metals in the aquatic systems
		The fees paid as water resource permit fees are too low and do not contribute to full cost recovery
ENR Sector	Specific regulations for EIA and audit for all developments that impact biodiversity are in place	Legal authority and actual implementation of EIA situated in different institution
	Policy guidelines on bioprospecting and equitable benefit sharing in place.	Not being implemented for lack of institutional capacity and resources
	Importance of wetlands recognized and some protection measures on-going	Wetlands still threatened by pollution and conversion
	Importance of urban biodiversity recognized	Guidelines for urban forestry and agro-ecosystem still under development
	Devolution of management of some categories of forest reserves	Districts lack the capacity and resources for effective management
	Reliance on biomass energy still high, leading to continued deforestation	
Agricultural Sector	Subsistence farming is based on mixed native livestock and crops which promotes sustainability	Unsustainable farming practices on in steep landscapes cause degradation, loss of biodiversity and natural disasters
	Establishment of gene banks is promoting the conservation of native agro-biodiversity	Increasing commercialization and intensification based on monocultures reduces diversity of the agro-systems
		Subsidies on fertilizers leads to soil and water pollution and lower productivity in the long-run
	Growing focus of climate smart agriculture may boost climate change mitigation and adaptation.	
	Multi-cropping based on agroforestry boosts production, water and soil conservation, diversifies livelihood options and revenue streams	Inadequate uptake due to low extension and promotion of new technologies

Wildlife and Tourism	Wildlife and Tourism policies seek to promote both sustainable tourism and conservation of biodiversity	Mass tourism and development of infrastructure within PAs can have adverse impacts on biodiversity
	Revenue sharing between RDB and communities neighbouring reduces HWC and pressure on PAs	Some HWC (crop raiding, etc.) continues in certain areas without timely compensation
		Tourism industry does not contribute enough to biodiversity conservation
Energy Sector	GOR providing fiscal and policy incentives for development and use of alternative sources of energy	Biomass is the single largest source of household energy leading to deforestation, land degradation and loss of biodiversity
	Hydropower generation providing increasing amount of clean energy	Hydro-projects do not have provisions for biodiversity offsets to cover address adverse impacts not covered by EIAs
	Rwanda is implementing new biomass energy strategy aimed at promoting more efficient technologies for energy conversion and use	The increasing urban demand for charcoal and slow up-take of efficient technologies may still lead to deforestation
Mining Policy	Cash environmental guarantee provides for the rehabilitation of areas degraded by the miners	Higher penalties and fines required to deter and control illegal mining
		Ambiguous policy guidance on large-scale exploration and prospecting in PAs
	EIA is a statutory requirement for all major projects	Encroachment on wetlands and forest reserves by major infrastructure projects

Annex 6. Targets for Rwanda's National Biodiversity Strategy and Action Plan

Target 1: By 2020, at the latest, Rwandan people in at least Districts that are adjacent to protected areas are aware of the values of biodiversity and ecosystem services and understand the steps for its sustainable use and conservation.

Target 2: By 2020, the values of biodiversity and ecosystem services in the key natural ecosystems for at least two selected protected areas have been determined and integrated into planning processes, i.e. poverty reduction strategies and into national economy.

Target 3: By 2020, at the latest, positive incentives for biodiversity conservation and sustainability towards local communities' development are boosted and applied and harmful incentives are eliminated.

Target 4: By 2020, public and private sectors and civil society organizations have promoted and implemented plans that consider ecological limits.

Target 5: By 2020, at least 50 percent of natural ecosystems are safeguarded, their degradation and fragmentation significantly reduced.

Target 6: By 2020, fishing and aquaculture, agriculture and forestry are managed sustainably taking into consideration ecosystem specificities to ensure biodiversity conservation.

Target 7: By 2020, pollutants including those from excess nutrients are controlled and their harm has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Target 8: By 2020, invasive alien species, their pathways, are identified and prioritized invasive alien species controlled or eradicated, and related mitigation measures are put in place.

Target 9: By 2020, at least 10.3 percent of national territory holding particular biodiversity and ecosystem services is protected taking into account the landscape approach in order to maintain biological diversity.

Target 10: By 2020, the extinction of threatened species is prevented and their conservation status improved, particularly for those identified as "Alliance for Zero Extinction (AZE)".

Target 11: By 2020, the genetic diversity of priority cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Target 12: By 2020, the potential risks resulting from biotechnology use and placement on the market of its products have been minimized and/or eliminated.

Target 13: By 2020, all ecosystems that provide essential services to human well-being and contribute to health as well as livelihoods are restored and safeguarded, taking into account the needs of women, local communities especially the vulnerable groups.

Target 14: By 2020, the ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced through increase of forest cover up to 30 percent of the country and restoration of other ecosystems thereby contributing to Climate Change adaptation and mitigation.

Target 15: By 2017, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is integrated into national legislation and administrative practices and enforced.

Target 16: By 2016, Rwanda has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated National Biodiversity Strategy and Action Plan (NBSAP).

Target 17: By 2020, values of traditional knowledge, innovations and practices of local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of local communities, at all relevant levels.

Target 18: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, applied and reflected in the implementation of the NBSAP.

Target 19: By 2020, at the latest, the mobilization of financial resources for an effective implementation of NBSAP from all potential sources, and in accordance with agreed process in the strategy for resource mobilization, is reinforced and increased substantially from the current levels.

Annex 7. Members of BIOFIN Project National Technical Advisory Committee

Institution	Focal Person
MINIRENA	Mr. Marshall BANAMWANA Environment Protection Specialist
MININFRA	Ms. Mireille UWERA Environment Specialist
MINEACOM	Mr. Christian TWAHIRA M&E and Project Design Officer
MINECOFIN	Mr. Frank RUTEHENDA Sector Officer
MINAGRI	Mr. Innocent BISANGWA Environment Specialist
RDB	Mr. Telesphore NGOGA Community and Tourism Development Analyst
PSF	Ms. Dorothy UWERA Head Environment & Investment
WCS	Ms. Madeleine NYIRATUZA Manager, Vital Signs Project
ARCOS	Mr. Sam KANYAMIBWA Executive Secretary
DFIGF/KRC	Mr. Felix NDAGIJIMANA Director
KCCEM	Mr. Richard NASASIRA Principal
ACNR	Mr. Serve NSENGIMANA National Coordinator
UNDP	Ms. Sun CHO Climate Change Specialist
REMA	Mr. Djuma NSANZIMANA Environmental Education Officer Ms. Sylvia R. KAWERA BIOFIN Project Officer
FONERWA	Mr. Florian MUGABO M&E Specialist
Natural Capital Accounting	Mr. Swaib MUNYAWER Data Analyst
RECOR	Mr. Jean Chrysostome SEHENE Executive Secretary
CoEB	Prof. Beth KAPLIN Acting Director

Annex 8. Glossary of terms

Adaptation: Activity intended to reduce vulnerability of humans or natural systems to actual or expected climate change impacts by maintaining or increasing resilience including possibility to exploit opportunities. Adaptation can be anticipatory or reactionary.

Biodiversity: Defined by the UN Convention on Biological Diversity (CBD) as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”

Biodiversity finance: Biodiversity finance is the practice of raising and managing capital and using financial incentives to support sustainable biodiversity management. It includes private and public financial resources used to conserve biodiversity, investments in commercial activities that produce positive biodiversity outcomes and the value of the transactions in biodiversity-related markets such as habitat banking.

Biological resources: Include genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.

Biotechnology: Any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

Climate change: A change in the state of the climate that can be identified by (e.g using statistical tests) change in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer.

Climate finance: Generally defined as finance flowing from developed to developing countries, including support for mitigation, adaptation, policy and capacity building. Mitigation projects include renewable energy projects, energy efficiency and fuel switch, forestry and land use, sustainable urban transportation and sequestration projects. Adaptation projects imply that part of the project is dedicated to a specific adaptation purpose such as water, agriculture, infrastructure, or capacity building or direct budget support for climate policy

Climate proofing: A shorthand term for identifying risks to a development project, or any other specified natural or human asset as a consequence of climate variability and change, and ensuring that these risks are reduced to acceptable levels through long-lasting and environmentally sound, economically viable, and socially acceptable changes implemented at one or more of the following stages in the project cycle: planning, design, construction, operation and decommissioning.

Ecosystem: A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Ecosystem services: are the direct and indirect contributions of ecosystems to human well-being. They support directly or indirectly our survival and quality of life. Ecosystem services can be classified into four main categories: **Provisioning services** are the products obtained from ecosystems such as food and medicines; **Regulating services** for ecosystem processes such as

climate regulation, natural hazard regulation, water purification; **Habitat services** highlight the importance of ecosystems to provide habitat for migratory species and to maintain the viability of gene-pools; and **Cultural services which are** non-material benefits such as spiritual enrichment, intellectual development, recreation and aesthetic values.

Ex-situ conservation: means the conservation of components of biological diversity outside their natural habitats.

Genetic material: means any material of plant, animal, microbial or other origin containing functional units of heredity.

Green economy: an economy that results in improved human well-being and social equity, while significantly reducing environmental risks and scarcities and has in-built mechanisms of reducing emissions of greenhouse gases (GHG)

In-situ conservation: means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

Payment for ecosystem services (PES): a voluntary transaction for a well-defined ecological service, with at least one buyer, at least one provider, and based on the condition that the buyer(s) only pay if the provider(s) continue to deliver the defined ecosystem service over time. The concept of PES has garnered substantial international interest as a cost-effective means to improve environmental management and improve livelihoods by rewarding people for their efforts in providing ecosystem services, such as watershed protection, soil stabilization etc.

Protected area: means a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives.

Public environment expenditure review: This is expenditure by public institutions for purposeful activities aimed at the prevention, reduction and elimination of pollution or any other degradation of the environment resulting from human activity, as well as natural resource management activities not aimed at resource exploitation or production.

Resilience: The ability of a system to withstand negative impacts [from climate change] without losing its basic functions.

Sustainable use: The use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

Vulnerability: The degree to which a system is susceptible to, or unable to cope with adverse effects of climate change, including climate variability and extremes like floods, drought, epidemics.