# REPUBLIC OF RWANDA

# REVISED AND UPDATED NBSAP

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## ABBREVIATIONS & ACRONYMS

| | | |
|---|---|---|
| ABAKIR | : | Autorité du Bassin du Lac Kivu et de la Rivière Rusizi |
| ABS | : | Access and Benefits Sharing |
| ACNR | : | Association pour la Conservation de la Nature au Rwanda |
| ADB | : | African Development Bank |
| ADN | : | Deoxyribonucleic Acid |
| AK-47 | : | Avtomat Kalashnikova |
| AMC | : | Akagera Management Company |
| ANP | : | Akagera National Park |
| ARCOS | : | Albertine Rift Conservation Society |
| ARECO | : | Association Rwandaise des Ecologistes |
| AZE | : | Alliance for Zero Extinction |
| AWC | : | Akagera Wetland Complex |
| BZ | : | Buffer Zone |
| CAVM | : | College of Agriculture and Veterinary Medicine |
| CBD | : | Convention on Biological Diversity |
| CBNRM | : | Community-Based Natural Resources Management |
| CBOs | : | Community Based Organizations |
| CEPA | : | Communication ï Education- Participatory ï Awareness |
| CITES | : | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| CHM | : | Clearing House Mechanism |
| CoE | : | Centre of Excellence on Biodiversity |
| COP | : | Conference of Parties |
| CST | : | College of Science and Technology |
| DDP | : | District Development Plan |
| DFGFI | : | Dian Fossey Gorilla Fund International |
| DRC | : | Democratic Republic of Congo |
| EDPRS | : | Economic Development and Poverty Reduction Strategy |

| | | |
|---|---|---|
| EESD | : | Environment Education for Sustainable Development |
| EIA | : | Environmental Impact Assessment |
| EICV | : | Enquête Intégrale des Conditions de Vie |
| EMP | : | Environment Management Plan |
| EWSA | : | Energy Water and Sanitation Authority |
| FAO | : | Food and Agriculture Organization of the United Nations |
| FONERWA | : | Rwanda National Environment and Climate Change Fund |
| GDP | : | Gross Domestic Product |
| GEF | : | Global Environment Facility |
| GEF ï SGP | : | Global Environment Facility ï Small Grants Program |
| GHU | : | Germplasm Health Unit |
| GIS | : | Geographical Information System |
| GMOs | : | Genetically Modified Organisms |
| GO | : | Gorillas Organization |
| GR | : | Genetic Resources |
| GVTC | : | Greater Virunga Transboundary Collaboration |
| ICRAF | : | International Center of Research in Agro-Forestry |
| IGCP | : | International Gorilla Conservation Program |
| INES | : | Institut National dôEnseignement Supérieur |
| INATEK | : | Institute of Agriculture, Technology and Education of Kibungo |
| IRST | : | Institut de Recherche Scientifique et Technologique |
| ICCN | : | Institut Congolais pour la Conservation de la Nature |
| IPR | : | Intellectual Property Rights |
| ITPGRF | : | International Treaty on Plant Genetic Resources for Food and Agriculture |
| IUCN | : | International Union for Conservation of Nature |
| IWMS | : | Integrated Watershed Management System |
| IWRM | : | Integrated Water Resources Management |
| KCCEM | : | Kitabi College for Conservation and Environmental Management |
| KRC | : | Karisoke Research Center |
| MGVP | : | Mountain Gorillas Veterinary Program |
| MIDIMAR | : | Ministry of Disasters and Repatriation |
| MINAFET | : | Ministère des Affaires Etrangères |

| | | |
|---|---|---|
| MINAGRI | : | Ministry of Agriculture and Animal Resources |
| MINALOC | : | Ministry of Local Administration |
| MINECOFIN | : | Ministry of Finance and Economic Planning |
| MINEDUC | : | Ministry of Education |
| MINICOM | : | Ministry of Trade and Industry |
| MINIJUST | : | Ministry of Justice |
| MININFOR | : | Ministry of Information |
| MININFRA | : | Ministry of Infrastructures |
| MINIRENA | : | Natural Resources Ministry |
| MINISANTE | : | Ministère de la Sante |
| MINISPOC | : | Ministry of Sports and Culture |
| MINITERE | : | Ministère des Terres et Ressources Environnementales |
| MTN | : | Multinational Telecommunications Group |
| NAEB | : | National Agriculture Export board |
| NAFA | : | National Forestry Authority |
| NBF | : | National Biosafety framework |
| NBSAP | : | National Biodiversity Strategy and Action Plan |
| NGOs | : | Non Government Organizations |
| NCA | : | National Competent Authority |
| NIRDA | : | National Industrial Research and Development Agency |
| NISR | : | National Institute of Statistics of Rwanda |
| NNP | : | Nyungwe National Park |
| PAs | : | Protected Areas |
| PCFN | : | Projet pour la Conservation de la Forêt de Nyungwe |
| PCR | : | Polymerase Chain Reaction |
| PES | : | Payment of Ecosystem Services |
| PRA | : | Participatory Rapid Appraisal |
| PRS | : | Poverty Reduction Strategy |
| PSTA | : | Strategic Plan for the Transformation of Agriculture in Rwanda |
| RAB | : | Rwanda Agriculture Board |
| RBC | : | Rwanda Biomedical Center |
| RBM | : | Ranger Based Monitoring |

| | | |
|---|---|---|
| RBS | : | Rwanda Bureau of Standards |
| RDB | : | Rwanda Development Board |
| RECOR | : | Rwanda Environment Conservation Organization |
| RECO | : | RECO Rwanda Nziza |
| REMA | : | Rwanda Environment Management Authority |
| RNRA | : | Rwanda Natural Resources Authority |
| RPSF | : | Rwanda Private Sector Federation |
| RRA | : | Rwanda Revenue Authority |
| RRECPC | : | Rwanda Resource Efficient and Cleaner Production Centre |
| RS | : | Revenue Sharing |
| RTDA | : | Rwanda Transport Development Agency |
| SAP | : | Strategy and Action Plan |
| SCBD | : | Secretariat of the Convention on Biological Diversity |
| SMTA | : | Standard Material Transfer Agreement |
| STAR | : | System for Transparent allocation |
| TIGO | : | Transportable Integrated Geodetic Observatory |
| UN | : | United Nations |
| UNDP | : | United Nations Development Program |
| UNEP | : | United Nations Environment Program |
| UNFCCC | : | United Nations Framework Convention on Climate Change |
| UR | : | University of Rwanda |
| UWA | : | Uganda Wildlife Authority |
| VNP | : | Volcanoes National Park |
| WCS | : | Wildlife Conservation Society |
| WHO | : | World Health Organization |

# ACKNOWLEDGEMENTS

The revised and updated National Biodiversity Strategy and Action Plan (NBSAP) is the output of the valuable contributions from key actors directly or indirectly involved in biodiversity management and conservation activities. These included individuals and representatives from relevant sector ministerial departments, public institutions, private sector, national and international organizations and NGOs as well as the community based organizations.

The revision process was carried out by Rwanda Environment Management Authority (REMA) on behalf of Government of Rwanda. Financial support for this activity was from the Global Environment Facility (GEF) through United Nations Environment Program (UNEP). REMA, on behalf of Government of Rwanda, is grateful to GEF and UNEP for the financial support.

In order to guarantee the technical orientation required in the revision process and safeguard the cross-sectoral character of biodiversity issues, a technical working group was set up with representatives from Government ministries, departments and agencies as well as private sector and NGOs involved in biodiversity management and conservation. The group worked tirelessly while carrying out the stock taking and assessment for the review and update of the NBSAP for Rwanda. REMA highly acknowledges the overall technical guidance provided by members of NBSAP Steering Committee during the preparation and revision of the NBSAP. Their inputs were critical and helped the technical working group and the consultant to address gaps. REMA commends members of the Committee for their support and dedication.

REMA extends appreciation to authorities at both central and decentralized levels for their collaboration and useful information provided during consultations.

The revision of NBSAP required effective coordination and guidance on the CoP decisions and this task was ably carried out by the National CBD Focal Point.

# EXECUTIVE SUMMARY

Biodiversity constitutes a key to human survival and livelihood, especially in developing countries such as Rwanda, where a large proportion of the population depend on natural resources for their livelihood.

The present National Biodiversity Strategy and Action Plan (NBSAP) as elaborated reflect a framework for conservation, sustainable use and equitable sharing of benefits from biodiversity use and ecosystems services of the country. It also provides a framework for maintaining the necessary environmental conditions to reduce poverty, ensure sustainable development and food security in the country.

In Rwanda, root causes of biodiversity loss range from natural processes to anthropogenic actions. Results from recent research have shown that threats to biodiversity arise from loss of habitat due to encroachment for gaining agriculture lands, over-harvesting of resources through poaching and deforestation, as well as increasing socio-economic activities such as mining, urban development etc.

Underlying causes are predominantly related to issues of land tenure and poor management of natural resources. In addition, a long-standing focus on increasing production at the expense of natural resources conservation constitutes also a key factor leading to intensive biodiversity loss.

Nowadays, partnership between different stakeholders including government institutions, development partners, private sector, civil society (NGOs) and local communitiesô organizations is playing vital role in sustainable use and conservation of biodiversity.

The NBSAP preparatory process was highly participatory, involving broad stakeholdersô consultations. Three national workshops have been organized which have provided the basis for the national priorities for conservation, targets and strategic actions that collectively constitute the NBSAP substance.

More emphasis has been oriented towards awareness building among stakeholders, in order to ensure that ownership of the NBSAP is widespread among them, and that responsibility for its implementation is widely shared. Furthermore, modalities for improving biodiversity policy and

legal framework have been emphasized as well as capacity building for a better natural resources management.

The overall objective of the NBSAP development has been worked out as to preserve the national biodiversity in order to ensure that its various components are utilized in a sustainable manner for attending socio-economic development of the nation and ensuring better livelihood of Rwandans.

The major objectives of the NBSAP are to:

- to improve environmental stability for natural ecosystems and their biodiversity;
- to restore degraded ecosystems and maintain equilibrium among biological communities;
- to establish an appropriate framework for access to genetic resources and equitable sharing of benefits arising from biodiversity use and ecosystems services;
- to improve policy, legal and institutional framework for a better management and conservation of national biodiversity.

Nineteen national targets have been developed to shape and direct the strategic actions towards achieving the five objectives of the NBSAP implementation and they are as follows:

**Target 1:** By 2020, at the latest, Rwandan people are aware of the values of biodiversity and ecosystem services as well as apprehend the steps for use and conserve them sustainably.

**Target 2:** By 2020, the values of biodiversity and ecosystem services have been integrated into planning processes, poverty reduction strategy and into national economy.

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

**Target 4:** By 2020, public and private sectors and civil society have promoted and implemented plans that consider ecosystem carrying capacity.

**Target 5:** By 2020, natural ecosystems, especially identified ñAlliance for Zero Extinction (AZE)ò sites are safeguarded, their degradation and fragmentation reduced.

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

**Target 7:** By 2020, environmental 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, spatial distribution are identified. Harmful species are controlled or eradicated, and related mitigation measures are put in place.

**Target 9:** By 2020, at least 10.3 per cent of land area is protected to maintain biological diversity.

**Target 10:** By 2020, the extinction of threatened species is prevented and their conservation status improved, particularly for those that are most endangered of extinction.

**Target 11:** By 2020, the genetic diversity of local animal breeds and landraces as well as their wild relatives are conserved, thus in order to minimize genetic erosion.

**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 local communities especially the vulnerable groups.

**Target 14:** By 2020, 30% of the country is covered by forests hence increasing carbon stocks and contributing to climate change mitigation and adaptation.

**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, cultural heritage and practices of local communities relevant for sustainable use and conservation of biodiversity are enhanced, fully integrated into national policy and legal framework and reflected in the implementation of the NBSAP.

**Target 18:** By 2020, knowledge in biodiversity status, values, causes and consequences of biodiversity loss, is enhanced, shared across the country 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 reach an appreciable level.

The Ministry of Natural Resources Management through Rwanda Environment Management Authority (REMA) will participate to the implementation of the NBSAP, with other government agencies, academic institutions, non-governmental organizations and communities based organizations taking responsibilities for activities that fall within their mandate. These institutions will incorporate the proposed relevant activities into their work programs.

It has been proposed that a national Institution such as the Centre of Excellence for Biodiversity Conservation (CoE) will be strengthened to coordinate the implementation program of the NBSAP.

To achieve the assigned objectives of the NBSAP, and ensure that our nation will fulfil its biodiversity conservation commitments will mostly depend on the availability and efficient use of financial resources. So, a financing strategy has also been proposed for the sustainable and successful implementation of the NBSAP. This focused on initiating innovative financial mechanisms in order to increase public and private budget contributions as well as development partnersô support.

A communication and outreach strategy has also been proposed which suggests development of a stronger and more effective clearing house mechanism using as many channels of communication as possible. To reach more audiences, support development of media plus folk theatre has been suggested as well as establishing links to the ongoing activities on awareness raising and information dissemination.

The proposed NBSAP constitutes a ôliving documentô in the sense that it shall be responsive, flexible and practical. Its implementation and monitoring will run simultaneously with provisions for periodical reporting and reviews.

# I. INTRODUCTION

Rwanda ratified the Convention on Biological Diversity (CBD) on 18th March 1995. Reference to Article 6 of the Convention which states that each Contracting Party should develop national strategies, plans or programs for the management, conservation and sustainable use of biodiversity, Rwanda has developed its first NBSAP in 2003 and four National Reports, the last one being submitted in 2008. These acts set out Rwandaôs formal framework for the implementation of the provisions of the Convention especially its three objectives.

Although an appreciable step towards the accomplishment of five major outcomes targeted in first NBSAP, a lot of programmed actions have not been achieved on a sufficient scale to address the pressures on national biodiversity. Moreover, there has been insufficient integration of biodiversity conservation issues into broader policies, strategies, development programs and actions and therefore, the underlying drivers of biodiversity loss have not been sufficiently reduced.

The current revised and updated NBSAP, as key tool for the implementation of the CBD objectives and its Aichi Targets, has been developed based on national needs and priorities for biodiversity conservation, in response to threats that are facing biological resources at country level as it has been highlighted during the stocktaking exercise. This framework document should address challenges and fill gaps encountered in the implementation of the first NBSAP. It will create more coherence in understanding biodiversity conservation and serve as a reference for the development and updating of biodiversity strategies and actions implemented in other development sectors.

The revised and updated strategy spells out a range of 5 objectives and 19 national targets that aim to halt biodiversity loss and increase the economic benefits associated with the biological resources utilization and ecosystems services.

Finally, the revised NBSAP reflects the countryôs vision for biodiversity and the broad strategic mechanisms that Rwanda will take to fulfil the objectives of the Convention, while the action plan comprises the concrete actions to be taken to achieve the strategy.

# II. VALUES OF BIODIVERSITY AND ECOSYSTEM SERVICES IN THE COUNTRY AND THEIR CONTRIBUTION TO HUMAN WELL-BEING

## 2.1. VALUES OF BIODIVERSITY AND ECOSYSTEM SERVICES IN THE COUNTRY AND THE REGION

Natural ecosystems and their biodiversity constitute our Godôs provided natural capital. Thus, Rwandan economic prosperity will depend on how we maintain and enhance our assets, including natural capital. In underdevelopment country, for which more than half of the annual governmental budget is gained from foreign supports, the need to put forward the clear link between biodiversity use, ecosystem services and economic benefit is of great importance to boost the national economy.

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.

The country is endowed with favourable and less variable climatic conditions and our natural ecosystems might provide important goods and services enough to support the national economy and improve populationsô livelihood. Rwanda has key assets such as protected areas as national parks and reserves, sites of scenic and scientific importance which can be utilized to further support tourism efforts. Time has come that environmental issue such as biodiversity conservation strengthens other important economic sectors, supporting employment and local communitiesô welfare.

National protected areas (parks and reserves) provide a lot of goods and services contributing to the growth of national economy and population welfare. Tourism development has often been concentrated in and around protected areas. Many governments looked to tourism as a source of development, poverty alleviation and employment. Rwanda is one of the countries whose tourism activities are concentrated in protected areas, particularly National Parks. Tourism is one

of the fastest growing sectors in Rwanda and has shown significant potential for future growth. Tourism receipts reached US$ 282 million in 2012 (MINICOM, 2013) and is estimated to have generated 293.6 Million USD in 2013 which corresponds to an increase of 4% (RDB, 2014).

Furthermore, the national household survey conducted in 2010/11 (NISR, 2012) estimated the number of employees in the tourism sector at 23,000 people, with many more sectors indirectly benefiting from tourism, for example restaurants, transportation services and retail trade.

Because of the above aforementioned benefits, the Government of Rwanda through its Ministry of Commerce and Industry has developed in 2013, the ñRwanda Protected Areas Concessions Management Policyò in order to attract private sector to invest in protected areas-based tourism. It is expected that the private sector itself will identify new facilities and services to be developed under concession agreements, bringing an entrepreneurial input to investment in protected areas.

Introducing the private sector can bring much needed finance, expertise and innovation to the tourism sector, since Rwanda has currently positioned itself as a high-end tourist destination, especially for visits to Mountain Gorilla form Volcanoes National Park (VNP). In 2012 the VNP has attracted 23,800 visitors and generated a substantial financial means which contributed to the country development. The park also offers several forest products to local people including bee-keeping.

In addition, the whole complex of Volcanoes National Park (VNP) and Rugezi wetland play an important hydrological role for the Akagera/Nile system and constitute water catchment zone for the region.

A part from the VNP, the country has many other potential and growing protected areas which are generating economic and financial benefits in addition to ecological ones. These are the following:

- The Akagera National park (ANP) and its prolonged wetlands play an important hydrological role (fresh water, fresh air, climate mitigation) of the Akagera/Nile system and contribute to water cycle and the reduction of water loss by evaporation.

  Socio-economically, for the only ANP, tourism industry has generated up to US$ 400,000 in 2011 from more than 15,000 visitors per annum (AP/RDB, 2011). The whole

complex constitutes an important fishing area, with high catch yield, in lakes Ihema, Rwanyakizinga, Mihindi, Nasho, Cyambwe and Rwampanga, plus other marshland products.

Nyungwe Natinal Park (NNP) provides vital watershed protection for Rwanda and important hydrological network for the Akagera/Nile system. It includes an important wetland, Kamiranzovu, which contributes to high biodiversity maintenance, water cycle and the reduction of water loss by evaporation.

Socio-economically, for the only NNP, tourism industry is attracting almost 8,000 visitors per annum. NNP offered opportunity for income-generating activities, i.e. beekeeping cooperatives generated 18,000,000 Rwf in 2012.

Furthermore, with the Rwandan Concession Policy, local communities are best placed o develop facilities and services under a concession, where their land, local knowledge and/or products give them a competitive advantage over others. In this case, local communities shall be supported to develop proposals for concessions.

Besides biodiversity in protected areas, agro-biodiversity contributes also to boost national economy. According to the United Nations Food and Agriculture Organization (FAO), 40% of the worldôs economy is based directly or indirectly on the use of biological resources. In Rwanda, the agriculture sector, through the utilization of agro-biodiversity contributed 32.7% of GDP and 28% of total growth (MINECOFIN, 2013). Table 1 illustrates some elements of Agriculture sector which contributed significantly to the growth of national economy.

**Table 1: Contribution (in billion Rwf) of Agriculture sector to national GDP**

| **Sector** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** |
|---|---|---|---|---|---|---|---|---|
| Gross Domestic Product | 2,649 | 2,851 | 3,170 | 3,368 | 3,579 | 3,846 | 4,127 | 4,316 |
| Agriculture | 965 | 990 | 1,053 | 1,135 | 1,193 | 1,244 | 1,278 | 1,317 |
| Foods crops | 634 | 660 | 701 | 767 | 805 | 845 | 872 | 899 |
| Export crops | 86 | 61 | 79 | 67 | 76 | 79 | 71 | 76 |
| Livestock | 104 | 107 | 109 | 113 | 118 | 122 | 128 | 129 |
| Forestry | 159 | 165 | 171 | 175 | 180 | 185 | 192 | 197 |
| Fisheries | 12 | 12 | 13 | 13 | 14 | 14 | 14 | 15 |

***Source: NISR, 2014***

It is a fact, national biodiversity and ecosystem services have a clear link to supporting our agricultural sector (e.g. water for irrigation, clean water for consummation, soil and pollination services, etc.).

In order to generate information and recommendations which are consistent with the biodiversity values and ecosystem services in the country and their contribution to human well-being, the following principal actions have to be planned and executed:

- Assess the value of national ecosystem services: their productive output and human utility;
- Valuation of ecosystem services from forestry development;
- Valuation of the ecosystem services provided by biodiversity to freshwater resources;
- Assess the value of soil biota for nutrient assimilation and recycling in Agriculture;
- Evaluate appropriate pest control and savings on pesticides;
- Assessment of benefits from sustainable farming;
- Valuation of medicinal plants use in medical and pharmacological discoveries.

Then, the total economic value of national biodiversity will include:

- Direct use values: the direct use values from goods such as fish, timber, wild meat, fiber, sand which are consumed in their original state or used as raw materials for other production processes such as animal feeds etc. These direct uses have an economic value which is to some extent revealed through market expenditures and sales;
- Ecological services: include watershed catchment protection, climate change mitigation, and soil erosion control. Etc. Although these services have no market price, their economic benefits can be quantified by looking at the costs of replacing them with other alternatives, which represents the expenditure saved by their existence and can be used as a partial proxy of their economic value.

### 2.2. CONTRIBUTION OF BIODIVERSITY TO HUMAN WELLBEING

The World Health Organization (WHO) emphasizes that good human health and productive livelihoods depend upon ecosystem products and services, such as availability of fresh water, fresh air, food, fuel sources etc.

Ecosystem goods and services affect positively human health promotion, diseases prevention and cost of public health management. In contrary, biodiversity loss and ecosystem change may limit discovery of potential treatments for many diseases and put at risk community health development.

Thus, biodiversity loss can have significant direct impact on human health if ecosystem services are no longer adequate to meet social needs.

# III. ANALYSIS OF THE CAUSES AND CONSEQUENCES OF BIODIVERSITY LOSS

From literature review and field visits, identification and analysis of the direct and indirect causes of biodiversity loss have been conducted for each ecosystem. Yet, a ray of potential threats such as natural habitats degradation, climate change, pollution, encroachment for agriculture development, mining, poaching, fire outbreak and invasive species have been categorized as direct drivers of biodiversity loss.

During consultations and interviews with key stakeholders, an additional information has been gathered in order to provide a better understanding of origin and causes of threats, how and why people have been dealing with these biological resources.

A narrative description of the impacts of declining biodiversity and ecosystemsô services on human well-being and poverty reduction has been done. Furthermore, an emphasis has been considered to know, what kinds of new initiatives and incentives mechanisms have been put in

place by the Government and partners to motivate local communities for effectively participate in biodiversity conservation.

The Consultant has proposed the best strategies related on how to change behaviour and practices of people and institutions in regard to effective biodiversity management and conservation.

### 3.1. MAIN THREATS TO BIODIVERSITY AND THEIR UNDERLYING CAUSES

#### 3.1.1. Poaching

The bush meat trade is a huge concern for the protected areas, since most of them are on international boundaries and poachers are coming from Tanzania, Burundi, Democratic Republic of Congo, and Uganda as well as within the country. They are using snares, hunting with traditional weapons like spears and bow and arrows, dogs or guns such as high powered rifles, shotguns or assault rifles such as the AK-47.

In Akagera National Park (ANP), around six elephants and many other animals have been reported killed in the park within a period of less than a year for ivories and meat.

In this park as well as in other protected areas, several animals such as *Trageraphus spekei* (Sitatunga), *Cyncerus caffer* (Buffalo), Hippopotamus amphibious, wild pig, Shoe-bill etcé are regularly hunted for meat, ivory, skin and other sub-products. In Nyungwe National Park, search of bush meat resulting by killing mammals species. Moreover, large ungulates (Elephant and Buffalo) have been exterminated from this ecosystem.

ARCOS (2012) reported that in Mukura, the number of mammalô species was tremendously reduced from 14 to 4 species due to forest encroachment and hunting. While in Volcanoes National Park (VNP), poaching has been classified as ñHighò threat, to Hagenia woodland and mountain Gorilla as well as for other targeted animal species such as antelopes, and wild pigs, mostly using snares (Photo 1).

**Photo 1: Bones of killed wild animals in ANP**

Moreover, RDB monitoring statistics indicate that rate of poaching and other illegal activities increased from 2003 to 2013, as it appears in the figure below.

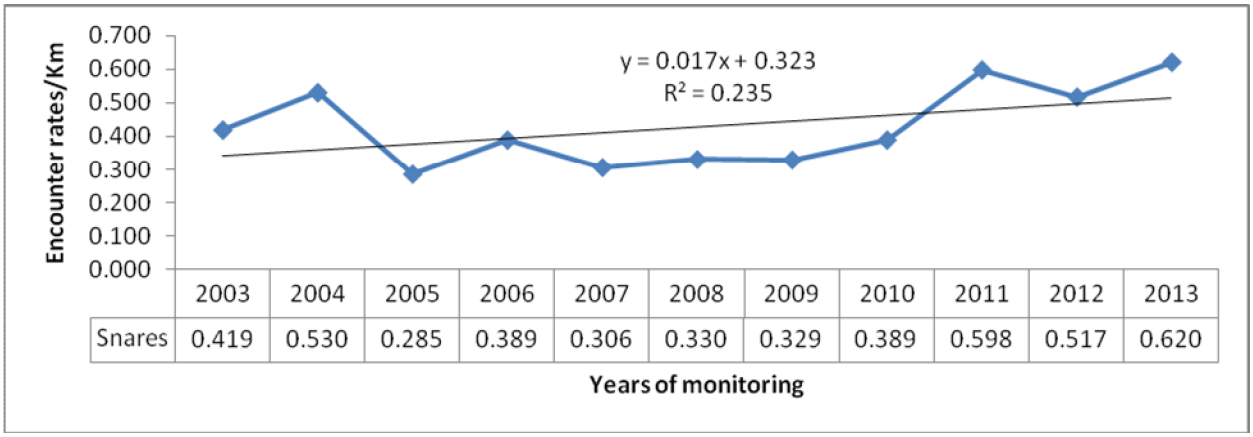


**Figure 1: Trends of poaching in NNP over 11 years**

This situation received some explanations from respondents interviewed that: patrol coverage within NNP has been expanded to many others and new areas of the forest so that they were able to discover many other hidden and previously uncontrolled illegal activities. In addition, poachers form Burundi used to cross the border from Kibira National Park and encroach on the southern side of Nyungwe National Park.

### 3.1.2. Boundary encroachment

In most of protected areas, the area surrounding a park has been divided into an ecological buffer zone closer the core area with a further economic zone beyond that. In most of the cases, the

ecological buffer zone is not respected and many landowners use this land for agriculture, often encroaching within the park boundaries. For example, in ANP, the ecological buffer zone has been irreversibly compromised in many instances. Recently, there is a hope that the proposed electrical fence will prevent people to invade inside the park in a near future.

The Ibanda-Makera forest has been under high human pressure and consequently degraded with large areas of bush, thicket and woodland. Only a small remnant mature forest patch still exists.

In Nyungwe national park, encroachment has resulted in loss of hundreds of forest hectares (annual average decrease of 750 ha (1%) between 1958 and 1972). Even worse is the illegal and prohibited cultivation of Marijuana within the core-inner part of the park.

Gishwati forest reserve has been deforested over a period of decade for over crop farming exploitation, cattle ranching development, plantations of non-native trees species, followed by resettlement of refugees after the 1994 genocide from when land has been degraded due to free-grazing of livestock.

The original physionomy of Mukura natural forest reserve has been degraded and only some patches remain, due to encroachment for agriculture development, refugeesô resettlement search of livestock pastures.

Very high population density around Volcanoes National Park has been directly and indirectly threatening the park through agriculture farming on fertile volcanic soils situated in its immediate vicinity. Use of pesticides in crop production has been declared to negatively impact on bee-keeping around the park by reducing bee populations as key pollinators.

Rugezi wetland has been invaded and seriously degraded by human activities including agriculture development in the vicinity of the wetland, diverting and using water from swamp for crop irrigation, livestock free grazing within the wetland, bricks making etc.

Rweru-Mugesera wetlands complex harbours a rich biodiversity; however, the wetland is most threatened mainly by human activities, especially for agriculture reclamation, settlement, improper land use practices that result in siltation.

### 3.1.3. Alien invasive species in aquatic and land ecosystems

Water hyacinth, Eichornia crassipes also represents a serious problem, as an exotic and invading species which is in competition with local plant species, but also by worsening the overall water evaporation of the aquatic ecosystems. Lakes and rivers in hydrological system have been invaded by water hyacinth due to unwanted introduction.

The Protopterus aethiopicus, fish species introduced in Lake Muhazi in 1989 for controlling increasing gastropodsô biomass, as well as Clarias gariepinus, both big predators, have invaded lakes and rivers systems from Lake Muhazi to water bodies in Akagera basin, including most of wetlands.

Among invasive plant species, Lantana camara is the main prolific plant especially along roads and around human habitations where it is planted as an ornamental plant. It has become a weed in some croplands. Jointed cacti of the Opuntia family are used as hedges by cattle farmers adjoin the park and these have also spread to many areas within the parks. Sisal plants Agave sisalana are also found as well as stands of Blue Gum Eucalyptus spp. and some Jacaranda trees. The indigenous Sickle Bush Dichrostachys cinerea has also encroached in grassland areas because of over grazing by cattle in the past and no fire management policy.

Uncontrolled introduction of plant species has also been propagated without enough studies on their ecology. These are the case of Macadamia, Neem, Mulberry-tree, and recently Jatropha (for biodiesel production), etc. In Volcanoes national park, invasive species include Solanum aculeastrum, Papaya cundinamarcensis etcé should be controlled and/or completely removed.

Within the Lake Kivu Islands, invasive species are considered to be the main threat to species although climate change is predicted to be a major threat to islands in the future. The most invasive species recorded on Kivu islands are Lantana camara and Caesalpinia decapetala.

### 3.1.4. Uncontrolled fires

Uncontrolled fires continue to pose a threat during the dry season usually started by poachers or as a result of fire crossing from the neighbouring countries, for example in Tanzania side where the papyrus is being purposely burnt.

Firewood is still used extensively for cooking and heat and this is collected in the park or trees cut down, especially close to villages. Charcoal is often made with wood from the park and sold commercially.

In NNP, fire out break remains one of the greatest threats to the conservation of parkôs habitats though significant progress have been made to prevent it through community awareness raising and controlling them once they occur.

### 3.1.5. Tree cutting and vegetation clearing

Some tree species with high value exist in small patches and in danger of extinction due to their intensive exploitation for multiple uses. Osyris lanceolata with Pterygota mildbraedii are two species massively and illegally exploited in the Eastern Province despite the fact that they are endemic in the province. In the ANP there is an increasing infringement of Osyris lanceolata for illegal exportation. Osyris lanceolata (locally known as Kabaruka) is used for food, medicine, timber, essential oils, tannin, basketry and source of firewood.

Wetlands play an important environmental function, such as storing and releasing water and buffering the impacts of floods. In most of cases, wetlands have been threatened by human activities including vegetation clearing for agriculture activities, human settlement and industrial uses, as well as livestock activities and sand quarries (REMA, 2006).

### 3.1.6. Mining

Mining development within Nyungwe national park, Mukura natural forest reserve and cement materials exploited in Mashyuza site are currently considered by local stakeholders as very serious and permanent threats to the survival of biodiversity in these ecosystems. Furthermore, mining activities contribute to the disruption of hydrological cycle and perturbation of water quality in streams of the region.

### 3.1.7. Human-wildlife conflict

Because of the human pressure on the boundaries and the relatively new downsizing of some protected areas, many animals such as elephant, buffalo, hippo, monkeys and wild pigs tend to move outside the parks, posing a threat to human lives and their crops. Human-wildlife conflicts

are inevitably worsening the relationships between the park and the local communities and inevitably lead to biodiversity loss.

### 3.1.8. Poisoning

Poison has also been used very effectively in some protected areas. The majority of lions were killed in this manner where cattle carcasses were laced with poison such as Temic (case in ANP). Poachers have also used poison to kill animals and in some rivers, poisonous plants have been used as fishing method. Disappearance of large predators created disequilibrium between prey and predator and tend to make herbivorous more abundant in some parks, especially in ANP.

### 3.1.9. Commercial Fishing

A lot of prohibited fishing methods have been utilized in national water bodies, such as small mesh size, use of beach seine, mosquito nets utilization,é impacting on fisheries resources. Some commercial fishing operations within lakes of Akagera basin constitute an important threat to biodiversity.

### 3.1.10. Agriculture intensification

Agriculture and livestock intensification are major mechanisms to ensure food security and enhance livelihood in developing countries. In this context, farmers are encouraged to use improved varieties, with emphasis on few key crops, and improved animal races instead of landraces and local animal races in order to fulfil food security requirements.

The replacement of local varieties by improved or exotic varieties and species is the main cause of genetic erosion in agro-biodiversity. Genes and gene complexes, found in many farmersô varieties, are not contained in modern agriculture.

In addition, through agriculture intensification, there is the use of more fertilizers and pesticides as well as the expansion of crop land. All of these contribute negatively to the biodiversity degradation.

### 3.1.11. Climate change

Climate change causes also threat both natural and agro-biodiversity, as many plants, animals and microorganisms are unable to adapt to changing temperatures and moistures gradients caused by global warming or cooling.

### 3.1.12. Increasing or dropping water levels

In the Northern part of the country, Ruhondo lake which is part of RAMSAR site complex composed of Rugezi-Bulera-Ruhondo, use to over flooding and cover bordering areas over far and beyond the protected space of 50 meters from the shore, thus, surrounding houses and crop lands are inundated. On the other hand, wetlands and water bodies (small lakes) are drying at the summit volcanoes mountains causing loss of biodiversity species due to possibly climate change effects. Also, some species changed their original habitats, migrating upward altitudinal in search of suitable climate conditions. Over the past couple of years water levels of the aquatic systems have significantly dropped in Eastern lakes, a trend that is observed throughout the great lakes and eastern African countries.

### 3.1.13. Illegal grazing

Cattle herds are continually being observed on or near the boundaries of protected areas. Besides the consequences on the integrity of the park, there are also serious implications in terms of potential disease transmission between wildlife and livestock. Furthermore, erosion caused by over grazing by cattle has caused extensive topsoil loss.

### 3.1.14. A combination of illegal activities

High human presence inside the Ibanda-Makera and other remnants forests has resulted in increasing of illegal activities such as poaching, grazing, medicinal plant collection and wood cutting for different uses especially for firewood and cultivation, which constituted the major threats to those species whose the number is gradually declining. In addition, the fact that remnant forests are surrounded by agricultural lands has led to many types of encroachments being made inside the forest.

In Nyungwe National Park (NNP), other threats impacting on biodiversity loss include infrastructures development (roads, paths and camps), water extraction, climate change etc...

Volcanoes National Park has known nearly the same threats, tourism use and infrastructure development have been considered as ñHighò threats to Afro-Alpine habitats and Mountain Gorilla; while disease transmission, lack of sufficient suitable habitat and legal/illegal water collection have been categorized as ñHighò threats to Mountain Gorilla. Lack of regeneration mechanism is a ñHighò treat to Bamboos forest.

Furthermore, in VNP, low bamboos regeneration and progressively biomass decreasing has been attributed to overgrazing or dynamic changing. Furthermore, wetlands and water bodies are drying due to anthropogenic activities and climate change.

The Lake Kivu islands biodiversity has suffered from a high degree of extinction in the past and many threatened species are island endemics, principally climate change, natural and environmental disasters, land degradation and pollution

### 3.2. CONSEQUENCES OF BIODIVERSITY LOSS

The loss of a part of NNP had as consequence a severe decreasing of biological resources and isolation of a group of Chimpanzee (Pan Troglodytes) inhabiting Cyamudongo natural reserve. The lack of connectivity between different populations of Chimpanzee inhabiting respectively the main Nyungwe national park and Cyamudongo forest reserve will have as consequence inbreeding phenomenon causing genetic erosion and leading to extinction of isolated chimpanzee group.

The same problem occurred in Gishwati natural reserve, where the remaining patches of forest host a number of plants and animal species among which are chimpanzee sub-species (Pan troglodytes schweinfurthii). This sub-species of Chimpanzee account a much reduced population counting some tens of individuals, isolated and at risk of inbreeding due to lack of connectivity with other populations. It has been classified as endangered under IUCN criteria since it belongs to Pan troglodytesô species.

Gishwati forest reserve has been deforested over a period of decade, and consequently, the area was plagued with flooding, landslides, erosion, decreased soil fertility, decreased water quality, and heavy river siltation, all of which aggravating poverty within local population.

In Mukura natural reserve, mining activities have various and cumulative negative effects on the biodiversity, water system of the ecosystem landscape and on local community well-being. In fact, streams and rivers are situated in upstream and diverted for mining activities, whilst downstream water users for crop production and domestic needs suffer either from water shortage or water quality, because of heavily cumulated soil sediments upstream mining sites and uncontrolled soil erosion. Furthermore downstream wetlands and streams are drying, since the forest that used to serve as natural sponge feeding downstream water system is being disrupted. There is also potential health risk to local communities due to possible water sources contamination by waterborne pathogens.

In Volcanoes national park, climate change effects and anthropogenic activities have caused loss of biodiversity species or migration upward altitudinal.

The drainage of Rugezi wetland for hydropower production had as consequence, drying of marshland areas with accompanied loss of important biodiversity, as well as drastically river decreasing. Current management initiatives aim to restore hydrological and ecological functions of the Rugezi wetland.

The over flooding of Ruhondo lake created conflicting situation between local communities and local administration responsible for law enforcement related to aquatic areas, since the previous protected area forming the bank has shifted toward the land.

Due to water hyacinth introduction, some water bodies such as Mihindi are under serious threats, while Kishanju has been completely disappeared. This has as consequence: loss of all biodiversity and serious decreasing of fishery production.

The introduced fish predators constitute a big threat to other indigenous fish species such as Tilapiines, Haplochromines and small native fish species, which are decreasing drastically.

The most serious consequence of invasive plant species is the colonization of fertile and productive lands, contributing to decrease of soil fertility and agriculture products.

The most common challenge in modern agriculture system is that attention and efforts are concentrated on a small range of varieties while others are underutilized and neglected, especially indigenous vegetables and landraces in general. Once local varieties are underutilized and many of them not used in genetic improvement, they are at risk of disappearing with their genetic value that will not be got back, or not found in any other genetic material in concerned areas and even in the World.

Furthermore, Most of these modern varieties and races have low genetic variability and are susceptible to biotic and abiotic stresses. The consequence of climate change to agro-biodiversity loss is that interaction and processes in agro-ecosystem are disturbed and ecological equilibrium affected. Climate change may be the cause of other constraining factors to agro-biodiversity such as pathogens, drought, floods, and erosion, among others.

# IV. NATIONAL POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

The review of relevant policies, regulations and institutional framework has been carried out in order to find out how regulatory instruments and institutional frameworks have been more or less effective and inclusive in the biodiversity conservation process. In this regard, the analysis took into consideration the following aspects: (i) the institutions mandates, focusing on complementarities, duplication, overlapping or conflicting mandates (ii) the rationales and objectives of the policies; (iii) at what extent the policy statements contribute to biodiversity conservation; (iv) the considered policy does conflicts with the Biodiversity and at what extent and what are the motivation behind; (v) specific provisions of sectoral laws relevant or irrelevant for biodiversity conservation; and (vi) analysis of institutional roles and responsibilities in regards to sustainable management of the biodiversity.

## 4.1. INSTITUTIONAL FRAMEWORK

Institutions involved in biodiversity management in Rwanda are divided into six main categories which are: Government institutions, High learning institutions, Non-government organizations (NGOs), Community Based Organizations (CBOs), Local Communities, Private Sector.

### 4.1.1. Government institutions

The Ministry of Natural Resources (MINIRENA), Rwanda Environment Management Authority (REMA), Rwanda Natural Resources Authority (RNRA) and Rwanda Development Board (RDB) through its Tourism and Conservation department, are the leading institutions with legal mandate of protecting the overall environment and the biodiversity in Rwanda. Others are those involved in biodiversity use.

**The Ministry of Natural Resources (MINIRENA)** has the mandate of ensuring the protection and conservation of the environment and promoting optimal and rational utilization of natural resources for sustainable development. Among its assignments include the formulation of relevant policy and law regulating the protection of the Environment.

**Rwanda Environment Management Authority (REMA)** is a regulatory authority for environment and Biodiversity. The institution is legally mandated with environmental

enforcement and compliance, including Environmental Impact Assessment studies and is responsible for resources mobilization for biodiversity conservation program. REMA is the focal institution for the Convention on Biological Diversity and other international environmental related instruments including Climate Change Convention. It has decentralized environmental activities up to district levels which can help in implementing biodiversity related activities. REMA oversees NBSAP project implementation and provides liaison between biodiversity dealers at national level with other national, regional and international environmental related instruments (Conventions, Treaties).

**Rwanda Natural Resources Authority (RNRA)** is a national institution mandated to lead the management and promotion of natural resources. The institution has merged old separate agencies that were dealing with either land, water, forests, mines and geology. RNRA is responsible for implementing national policies, laws, strategies, regulations, government resolutions and international conventions on matters relating to the promotion and protection of natural resources. RNRA can provide information related to forests, plantation management and land use, appropriate mechanisms for investment opportunities in natural resources, conservation and proper management of resources, and valuation of natural resources or their rehabilitation.

**Rwanda Development Board (RDB)** mandate is to conserve the rich biodiversity of the Protected Areas and to develop a sustainable tourism in collaboration with stakeholders for the benefit of all the Rwandan community. RDB promotes Rwanda as a high quality tourism destination, to serve as a regional hub, and to enhance Rwanda's diverse and unique tourism as well as generate revenues that contribute to the country's overall socio-economic development. In terms of biodiversity conservation, RDB maintains research and innovations, enhances and sustains the ecological integrity, health and productivity of national ecosystems as pillars of environmental stewardship and sustainable development. RDB prepared new Wildlife Policy providing the opportunities for the establishment of additional national parks as well as other categories of Protected Areas.

**The Ministry of Agriculture and Animal Resources (MINAGRI):** The mission of the MINAGRI is to initiate, develop and manage suitable programs of transformation and modernization of agriculture and livestock to ensure food security and to contribute to the national economy. One of its key vision pillars is the transformation of agriculture from

subsistence to a productive high value; market oriented farming that is environmentally friendly and has an impact on other sectors of the economy. Among the ten strategic thrusts which have been identified for the transformation and modernization of agriculture and livestock, include: (i) diversification and intensification of plant, animal and fish production and (ii) sustainable management of natural resources, particularly soil and water. In some areas, the MINAGRIôs activities lead to conflict interest with MINIRENA in regard to biodiversity conservation, specifically in wetlands zones.

**Rwanda Agriculture Board (RAB):** RABôs mandate is the overall coordination of countrywide agricultural research activities and driving science based technology generation for sustainable agriculture development. It has carried out research and promoted technologies in crop production, livestock, forestry, agro-forestry, post-harvest management, land conservation and water management. Among other activities, biotechnology aims to respond to the considerable demand in the country for quality planting material through mass propagation of disease free high yielding planting material using tissue culture technology.

**Local administration:** Concerning biodiversity conservation, local Government supervises several technical and administrative activities which include: (i) mobilize community members to participate in project activities, (ii) participate in the consultations leading to the formulation of the Management plans, (iii) plan for and integrated conservation activities in the District Development Plans (DDPs) & ñImihigoò, (iv) receive support for DDP elaboration, (v) support to community development activities in their districts, etc.

### 4.1.2. High learning and research institutions

**University of Rwanda (UR):** Two colleges of the University of Rwanda are directly dealing with biodiversity and agro-biodiversity: College of Agriculture and Veterinary Medicine (CAVM) and College of Science and Technology (CST). The university provides professional skills to suit the National, Regional and Global context encompassing biodiversity management programs. CAVM offers an undergraduate program in Soil Science and Environmental Management with commonalities in soil fertility and watershed management. CST provides a Masterôs degree in Biodiversity Conservation.

**Institute of Research in Science and Technology (IRST):** It is the leading institution of the knowledge-based and technology-led economy of Rwanda. Its innovative technologies help Rwandan population to solve their socio-economic problems. Among areas of research, IRST has Phytomedecine and Life Sciences Research Program. Within this research program, the most interesting research topics in relation with biodiversity conservation include: animal breeding for toxic and pharmacological tests; phyto-geography distribution and ecology of rare species /or threatened to disappearance; database of Rwanda flora; and In vitro plants multiplication techniques. Currently IRST is undergoing the process to be reformed to become the National Industrial Research and Development Agency (NIRDA) in order to support industrial growth.

### 4.1.3. Non-Government Organizations (NGOs)

Several Non-governmental organizations are involved in different programs/projects in relation with the biodiversity management and conservation. Among others activities, they provide support in co-funding for environmental initiatives; transfer skills to local organized groups and the PAs; and mobilization and engagement of other stakeholders.

International Gorillas Conservation Program (IGCP): the objective of the International Gorilla Conservation Program (IGCP) is to ensure the conservation of mountain gorillas and their regional afro-mountain forest habitat in Rwanda, Uganda and the Democratic Republic of Congo (DRC). IGCP operates in Virunga massif in partnership with the respective protected area authorities of the three countries, which are: the Rwanda Development Board (RDB), the Uganda Wildlife Authority (UWA) and the Congolese Institute for Nature Conservation (ICCN).

IGCP conducted several interventions in conservation areas, among others include:

- Conservation of Mountain;
- Gorillas and their habitats trans-boundary coordination;
- Support to VNP management Capacity building at national and park levels;
- Community outreach activities.

Project Co-funding although its work is limited to the region around VNP (IGCP has made substantial contributions though co-funding and the development of management plans, monitoring systems and capacity for park management).

**Dian Fossey Gorilla Fund International (DFGFI):** the Dian Fossey Gorilla Fund International (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. The activities of the Karisoke Research Center are research, protection and monitoring of the gorillas, Biodiversity and socioeconomic research, conservation education (primary and secondary school located near the Volcanoes National Park), capacity building (staff training, conservation field courses for undergraduate students) support to local communities (rehabilitation of school, clinics, provision of clean water, treatment of intestinal parasites).

**Wildlife Conservation Society (WCS):** the work of WCS in Rwanda has been focused on Nyungwe National Park, and sufficient in-depth knowledge and experience were gained in the area through the ñProjet pour la Conservation de la Forêt de Nyungwe (PCFN)ò. This international society conducted several interventions in conservation areas, among others include:

Species conservation, wildlife and protected areas,

Generation of conservation knowledge,

Biodiversity assessments,

Rehabilitation of degraded areas,

Park monitoring,

Payment of ecosystem services,

Nyungwe National Park management.

WCS participated in co-funding projects, support biodiversity monitoring; threat analysis, conservation advocacy, capacity building at central and field levels, community outreach and support.

**Mountain Gorillas Veterinary Program (MGVP):** this NGO is involved in surveillance of wildlife health, especially mountain gorillaôs livestock, monitoring of human/wildlife disease transmission, capacity building of protected areas staff.

**Greater Virunga Transboundary Collaboration (GVTC):** the GVTC brings together Rwanda, Uganda, and the Congo DR for the purpose of conservation and management of the mountain gorilla populations and their habitat. GVTC is a strategic management system for the Greater Virunga landscape, through transboundary and collaborative mechanisms, which help to address both conservation and socioeconomic and political issues, in a landscape defined by ecosystems rather than administrative boundaries. This is in accordance with the Convention on Biological Diversity that advocate for the use of landscape and ecosystem approaches for managing biodiversity in the region, in recognition of the need for increased regional cooperation.

**Albertine Rift Conservation Society (ARCOS):** this is a regional conservation organization with the mission to enhance biodiversity conservation and sustainable management of natural resources in the Albertine Rift region through the promotion of collaborative conservation action for nature and people. ARCOSô programs in Rwanda focus on the environmental conservation, promoting sustainable benefits from ecosystem services, economic development and improving community livelihoods. ARCOS assesses the relation between ecosystems and human health, evaluating health impacts on communities from changes in ecosystems, climate change and invasive species in the regions around Volcanoes, Nyungwe-Kibira National Parks and Mukura Forest.

**Association pour la Conservation de la Nature au Rwanda (ACNR):** it is a Rwandan non-profit NGO that aims to conserve and promote biodiversity in Rwanda, with a focus on endangered ecosystems in the country, such as wetlands or forest regions. The association intends to reach the whole Rwandan society through creation of Nature Clubs for the youth in primary, secondary and higher education institutions and sites, and support groups for the population around protected areas. The objectives of ACNR are: To create public awareness on the importance of biodiversity and its conservation; to participate in the promotion of knowledge about fauna, flora and the functions of natural ecosystems; and to suggest ways and means for sustainable management of natural heritage in Rwanda.

**Association Rwandaise des Ecologistes (ARECO):** ARECO is mainly involved in environmental education and awareness raising, community conservation of natural resources and community tourism development. Its main activities are: Community mobilization and capacity building; tree nurseries for household and community forestry development; development of horticulture crops; beekeeping development for the conservation of Mukura forest reserve; bamboo promotion for the conservation of the Volcanoes National Park and the Rugezi wetland in Northern Province of Rwanda.

**Rwanda Environmental Conservation Organization (RECOR):** RECOR interventions focus on environmental education, promotion of the utilization of renewable energy, soil conservation, reforestation and agro-forestry promotion and execution, water management, wildlife conservation and tourism promotion. It involves community in looking for suitable and sustainable solutions to local environmental challenges in all activities undertaken.

### 4.1.4. Community Based Organizations (CBOs)

Local community based organizations are effectively involved in biodiversity conservation programs and undertake several activities such as: (i) field implementation of project activities as sub-contractors to the implementing partners, (ii) capacity building for community members and built their own capacity. CBOs are participating only where the implementing NGO has engaged them. In most areas, the NGOs have directly implemented the projects in communities or engaged short-term external contractors.

### 4.1.5. Local Communities

In the same line as their CBOs, local communities are effectively involved in biodiversity conservation programs and they are recognized as active partners in biodiversity conservation Local communities undertake several activities such as:

- Participate actively in identifying their own priorities;

- Support park management through joint patrols and provision of information;

- Contribute to the formulation of management plans;

- Building of capacity and confidence.

### 4.1.6. Private Sector

**The Rwanda Private Sector Federation (RPSF)** is a professional organization, dedicated to promote and represent the interests of the Rwandan business community, while at the same time providing timely and relevant business development services that lead to sustainable private sector led economic growth and development. In fact, wise use of biodiversity and natural resources is key element for sustainable development. Therefore, private sector has critical role to play in biodiversity conservation.

## 4.2. POLICY ANALYSIS

Conflicting status between the biodiversity policy and some of the sectoral policies are evident, whilst others are quite good aligned and advocate for biodiversity conservation and its sustainable utilization. Thus, there is a need of reviewing and updating such policies conflicting with biodiversity conservation so that they include best ways for sustainable management of biodiversity, taking into account the protection of critical ecosystems and endangered species as well as and land rare and local breeds.

### 4.2.1. The Rwanda Vision 2020

The Vision 2020 document presents a framework and key priorities for Rwandaôs development and a guiding tool for the future of the country. It states that ñRwanda wants to build a diversified, integrated, competitive and dynamic economy, which could raise the country to the level of medium income countries (MINECOFIN, 2000). The protection and management of the environment is among the pillars of Vision 2020. The objective of the Government is that by 2020, it will have built a nation in which pressure on natural resources, particularly on land, water, biomass and biodiversity, has significantly been reduced and the process of environmental pollution and In regard to degradation has been reversed (REMA, 2013).

### 4.2.2. The EDPRS 2 (2013-2018)

*The Economic Development and Poverty Reduction Strategy* (EDPRS) is an *implementation strategy for Vision 2020 and incorporates the Millennium Development Goals*. It specifies the priorities to be achieved during a five-year period. At the end of EDPRS 1 which covered the period 2006 - 2012, the area of land protected to maintain biological diversity (%) indicator has reached 10.1% from a baseline of 8% in 2006, the target set for 2012 having been 9.6%. Some relevant paragraphs of ñEDPRS 2 (2013 - 2018) are quoted as follows:

- ✓ ***"Rwanda's economy is heavily dependent on its environment and natural resources*** *and the livelihoods of rural (and increasingly urban) communities depend on access, use and management of such resources. Without sound environmental management, development activities in key sectors such as agriculture, industry, infrastructure, commerce, and energy can lead to significant environmental degradation that can undermine economic growth."*
- ✓ ***"Achieving sustainable economic growth in Rwanda will require the prudent use of natural resources and ensuring that climate resilience is built into economic planning***. *Mainstreaming environmental sustainability provides an opportunity for improved and sustained livelihoods of present and future generations of Rwandans".*

### 4.2.3. Rwanda Biodiversity Policy (2011)

The goal of this 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* (REMA, 2013).

The objectives of the biodiversity policy are to:

- Provide a comprehensive and cohesive policy framework that will strengthen the Governmentôs ability to conserve and protect Rwandaôs natural and cultural resources;
- Provide a legal and institutional framework for biodiversity conservation and management throughout the country;

- Promote partnerships, incentives and benefit sharing to enhance biodiversity conservation and management;
- Promote generation, management of conservation knowledge, including traditional knowledge, and its application in the conservation of biodiversity;
- Provide a framework for access to genetic resources and the sharing of benefits derived from those resources;
- Promote positive attitudes towards biodiversity conservation and management

In more details the Rwanda biodiversity policy:

- Comprises part of the broader context of strengthening the management of the environment as one of the key pillars of sustainable development;

- Provides the framework for developing strategies, plans and programmes for implementing the environmental targets set out in Rwandaôs Vision 2020 and the economic development and poverty reduction strategy ï EDPRS;

- Provides the framework for effective strategies for action to save biodiversity and promote sustainable use;

- Provides for comprehensive conservation planning through the formulation of a national conservation plan;

- Provides for the expansion of the pa network through the establishment and gazetting of new national parks and other categories of protected areas;

- Provides for the creation of a governance system that integrates various stakeholders and clearly defines their responsibilities in the conservation and management of biodiversity;

- Aims to provide for the development of a whole range of scientific, technical and managerial skills necessary for planning and management of biodiversity, as well as multi-stakeholder participatory processes and skills for joint planning and community participation;

- Supports the intensification of biological and other research, the dissemination and deployment of the findings and the establishment of a regional centre of excellence in biodiversity in Rwanda;

- Calls for the development of tools for monitoring and reporting on trends in biodiversity conservation and sustainable use;

- Establishes a framework for cross-sectoral coordination and for the development of a variety of strategies that are compatible with conservation;

- Institutionalizes the requirement for incorporation of biodiversity considerations in land-use planning and environmental assessment procedures; and

- Establishes a coherent and systematic framework for long-term decisions which will be supported by appropriate legislation, which were previously lacking.

Therefore, through the biodiversity policy, the Government of Rwanda:

- Asserts its sovereignty, authority and the rights to regulate the conservation, access and use of Rwandaôs Biodiversity;

- Shall adopt a more holistic and coordinated approach towards the conservation of biodiversity.

- Establishes a legal framework for controlling and regulating the introduction and spread of such organisms in Rwanda;

- Requires the establishment of a framework for regulating the transfer, handling, use and release of genetically modified organisms (GMOs) in order to minimize the potential risks to biodiversity and human health.

The following sector policies will be analyzed and find out if they are conflicting or not with the Biodiversity Policy.

### 4.2.4. Environment Policy (2003)

The overall objective of the Environment Policy is the improvement of manôs well-being, the judicious utilisation of natural resources and the protection and rational management of ecosystems for sustainable and fair development. More specifically this policy aims at, among other things, to conserve, preserve and restore ecosystems and maintain ecological and systems functioning, which are life supports, particularly the conservation of national biological diversity (MINITERE, 2003). It contains a policy statement on biodiversity which seeks ñto ensure the conservation and sustainable utilization of biodiversity of natural ecosystems and agro-ecosystems in compliance with the equitable share of benefits derived from biological resources.ò Strategic options to achieve this are, (i) to make an inventory of endemic native and/or less known species of economic importance; (ii) to conserve In Situ and Ex Situ the native genetic heritage; (iii) to ensure the development of alternatives for the exploitation of biodiversity; (iv) to conserve the genetic diversity of native plant and animal species; (v) to develop mechanisms for the control of imports and the dissemination of genetic materials; (vi) to implement identified action plans for the conservation of biodiversity in the National Strategic Plan on Biodiversity; (vii) to ensure the rehabilitation of sites after mining and quarrying activities (MINITERE, 2003). Thus, the Environment Policy does not conflict any more with the Biodiversity Policy which is part and complete its provisions by providing more emphasizes and details on biodiversity conservation.

### 4.2.5. National Land Policy (2004)

One of the main obstacles that hinder the efficient management of land in Rwanda and necessitated the establishment of a national land policy for guiding the essential land reforms is that the biotic environment and biodiversity which should be protected at all costs (MINITERE, 2004). In fact, due to its scarcity in Rwanda, land as a natural resource does not offer many alternatives in terms of increased arable land. The total Agricultural land is estimated at around 1,589,000 ha, or 60% of the national territory. Marshland area is estimated at around 165.000 ha only half of which is suitable for crops, while the other half needs to be protected in order to regulate the water cycle, the eco-climatic balance, and for the conservation of biodiversity (MINITERE, 2004).

The main objective of establishing protected areas in Rwanda (Volcano National Park, the Nyungwe forest, the Akagera National Park and Game Reserve) was the conservation of different species and different habitats of biodiversity for educational, touristic and research purposes. These areas have been affected by various changes, two thirds of the park and the entire Game Reserve having being given away to the population and almost 100% of the Gishwati forest has been destroyed by agricultural and pastoral activities. The Nyungwe forest has often been the scene of illegal activities such as the disorderly tree cutting for timber and charcoal, mining and drug cultivation. It is in this regard that three policy statements were made concerning the use and management of land in protected areas as follows (MINITERE, 2004):

- Improved protection and management of protected areas is the responsibility of all Rwandans;

- A special law should govern the management of protected areas;

- The involvement of neighbouring communities in the conservation of protected areas should be encouraged.

To fulfil the above mentioned recommendations the following strategic options were formulated (MINITERE, 2004):

- Inventory and demarcation of protected areas;

- Formulation and implementation of development and management plans for each protected area;

- Development of ecotourism-oriented infrastructure;

- Identification and promotion of appropriate technologies for the rational use of biological resources;

- Development of an integrated policy and legal framework for conservation and sustainable use of resources in protected areas;

- Creation and strengthening of structures for community management of protected areas.

The land policy, as it is stated is in the alignment of the biodiversity policy. It is has been developed in 2003 and most of the formulated recommendations are being currently implemented and contribute to the biodiversity conservation. However, the land use policy itself is not fully followed in practice, especially when it is about the implementation of some sectoral programs of land use.

### 4.2.6. Rwanda Wildlife Policy (2013)

The Rwanda Wildlife Policy has been developed to ensure the sustainability and protection of Rwandan wildlife and address related issues, since this policy addresses Rwandaôs need for long-term management of wildlife, inside and outside protected areas, as well as provide for the establishment and management of National Parks and other protected areas.

The wildlife policy underlines the fact that one of the major threats facing the country is the loss of biological diversity due to land use changes favouring agriculture and rural and urban development and led to the reduction and modification of natural areas, resulting in the extinction of, or threat of extinction to wildlife species and natural areas which serve as their habitats. Remaining wildlife populations are increasingly under threat and consequently opportunities for positive contribution to economic growth, wealth creation and increased employment, are being lost. In addition, rapid change of tenure and land use in areas neighbouring National Parks, associated land subdivision, fencing and conversion for other uses particularly agriculture, infrastructure and urban development have exerted enough pressures on the parks, limiting wildlife movement and creating serious human-wildlife conflicts.

These are few statements indicating how the Wilde life Policy comply and complete each other with the Biodiversity Policy.

### 4.2.7. Rwanda Protected Areas Concessions Management Policy (2013)

This policy has been developed in the framework of Public-Private Partnership strategy in order to maximize potential revenue and income generated through tourism sector development. The Government is aware that tourism as a key contributor to economic growth and development, and mechanisms for ensuring effective management of protected areas should be established. The sustainable utilisation of these protected areas can contribute to reduced poverty, community

development and conservation of these ecological areas to meet the needs of future generations. However, as stated by this policy, tourism development in fragile environments like protected areas (National Parks and other protected areas) is more destructive if there are no control measures put in place; it can cause severe adverse environmental, financial and socio-cultural impacts. That why responsibilities shall be shared between Rwanda Development Board (RDB) and concessionaires (private operators), so that RDB through its conservation department will be responsible for conservation and protection of protected areas resources, while the concessionaires will be developing tourism-based revenue generating activities. The policy is new and its effective implementation shall be ensured through permanent collaboration and consultation between public and private institutions.

### 4.2.8. National Forestry Policy (2010)

The overall goal of the Forest Policy is to make the forestry sector one of the bedrocks of economy and national ecological balance for sustainable benefits to all segments of the society.

Among preferred options of the Forestry Policy are those contributing to biodiversity conservation such as the establishment, rehabilitation and conservation of watershed protection forests, conservation and wisely use of forest biodiversity and Farm forestry enhancement. But, other options like Promotion of profitable and productive forest plantation business, and Forest-based industries promotion, may unfavourably conflict with biodiversity conservation interests, especially, when priority is given to maximize income to be generated through forest resources exploitation, without taking into consideration biodiversity issues. Wise use of forest resources and close collaboration with partnersô institutions responsible for environment protection will ensure sustainable utilization of forest resources for the present and future generations.

### 4.2.9. National Policy for Water Resources Management (2011)

The National Policy for Water Resources Management needs to take into account international best practices in water resources management and contribute efficiently to the achievement of the overarching national policy objectives as stipulated in Vision 2020, the EDPRS and other similar high level national policies, and breaks them down into concrete principles, objectives and statements.

Water is a finite resource, which is essential for sustaining life on earth and is indispensable to human survival and to the ecological functions of plants and animals. Water is also necessary for human and socio-economic development as an input in industrial processing, energy generation, transport, agriculture and tourism, among other commercial activities. However, water can also cause harm to humans, plants and animals as well as to social and economic activities as a result of disasters arising from floods, drought and water borne diseases.

Accordingly, planning and decision making processes regarding water resources must take account of, and give effect to, the implications for all sectors, including the economy, the ecology, and socio-cultural values. This calls for an integrated approach to water resources management, a principle to which this policy will aspire to give effect. Therefore, the objectives of this Policy are to**:**

- Provide a comprehensive and suitable policy framework that will strengthen the Governmentôs ability to conserve and protect Rwandaôs water resources;

- Provide a legal and institutional framework for water resources conservation and management throughout the country and at trans-boundary level;

- Promote partnerships, incentives and benefit sharing to enhance water resources conservation and management;

- Provide a framework for equitable allocation of water resources and the sharing of benefits derived from that resource;

- Promote positive attitudes towards water resources conservation and management.

Based on the above assumptions and considerations, the National Policy for Water Resources Management is designed in a way to better and efficiently manage multi-sector interests and uses of water resources and reconcile both environmental and biodiversity with socio-economic benefits. This is achievable through an integrative approach known as Integrated Water Resources Management (IWRM) approach. It is also acceptable in the framework of biodiversity conservation, since conservationists and biodiversity managers are integral parts of the management system of the resource and participate in decision making with other stakeholders.

### 4.2.10. National Agriculture Policy (PSTA III, 2013)

The overall objective of the National Agricultural Policy is to ensure unstained economic growth; and contribute to the reduction of poverty in rural areas and increases in incomes of producers. The following aspects are priorities of this policy:

- Poverty reduction and economic growth in relation to the PRS;

- Modernization of agriculture in a context of sustainable development;

- Food security.

The main strategy for agriculture sector is crop intensification aiming at the increase of productivity of land and labour devoted to crop production through increased use of inputs (seeds selected, organic and chemical fertilizers, concentrates, pesticides, etc.), land use consolidation, marshlands reclamation (irrigation schemes/projects), agro-forestry, improved livestock, etc.

The use of chemical fertilizers and pesticides as well as large scale irrigation schemes did not favouring the conservation of biodiversity, especially when utilized quantities of chemical fertilizers and pesticides are above tolerable and required threshold. Irrigation also many of time encroaches on fragile and critical ecosystem like wetlands adding to the fact that diverting or pumping water from lakes or rivers often contribute to decrease of their water level resulting in loss or degradation of aquatic biodiversity as well as hydrological and ecological process and functions. However, most of irrigation large schemes studies are conducted along with the environment impact assessment (EIA) aiming to minimize/mitigate related negative impacts to the biodiversity and others environmental and socio-economic aspects. Furthermore, the National Agricultural Policy includes a sub-sector of water and soil conservation management whose specific objectives aim at maximizing agricultural production in marchlands and waterlogged areas but also underlines the importance of protection and conservation of soils at watersheds/hill shades level, using adequate and integrated erosion control techniques.

### 4.2.11. National Energy Policy and National Energy Strategy 2008 - 2012

One of the rationale of this policy is that the use of biomass energy has potentially serious environmental implications and will not be sustainable unless managed properly. In addition, biomass energy will remain 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. More efficient production and use of biomass energy by households needs to be complemented by promoting other sources of energy, including biogas, peat, LPG, kerosene and of course electricity.

The objectives of Energy Policy are to support national development through:

- 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.

However, construction and maintenance of hydropower plants and associated dams are subject to rise issues of environment including the biodiversity as well as socio-economic issues, on which negative impacts are potentially expected. Nevertheless, for such kind of projects the conduct of EIA is a must to mitigate related adverse effects. Moreover, the policy underlies the importance of cross-cutting issues among which is the environmental sustainability to be taken into consideration when it is about energy development.

### 4.2.12. Mining Policy (2010)

Mining Policy set out five pillars considered as outcomes and eight objectives as impacts. Pillars as the following:

- Strengthen the enabling legal, regulatory and institutional environment;

- Develop targeted investment, fiscal and macro-economic policies;

- Improve mining sector knowledge, skills and use of best practices;

- Raise productivity and establish new mines;

- Diversify into new products and increase value addition.

The eight objectives are:

- Higher productivity (3 industrial mines by 2020);

- Increased investment ($500 million by 2020);

- More employment & higher paying jobs (50,000 employees by 2015);

- Increased exports ($240million per year by 2020);

- Reduced imports ($10million per year fall in construction material imports);

- Increased tax revenue ($30million per year by 2020);

- Reduced environmental impact (no artisanal treatment in rivers);

- Greater macro-economic stability.

When you look through either pillars or objectives no one of them raises issues of biodiversity or environment in general as an important aspect to be considered in mining development. All of them are about to increase productivity and income generated by mining sector. However, mining concessioners are asked to provide an EIA as a requirement for receiving authorization for exploitation and through this EIA they commit to take care of biological resources as well as other environmental aspects and agree to rehabilitate degraded sites when exploitation is completed. But, the reality on the ground is different and degraded areas are not rehabilitated and still posing serious threat to physical environment and the biodiversity.

Moreover, the mining privatization policy is also focusing on the increase of productivity of this sector. Therefore, there is need of close collaboration between RNRA in charge of mining sector

management and REMA and RDB for the establishment of an effective environmental monitoring program for the enforcement of related law and regulations.

### 4.2.13. National Industrial Policy (2011)

The broad goals of the Rwandan Industrial Policy are about promoting the growth of the economy with the target of becoming a middle-income country by 2020 - requiring GDP growth of at least 8 per cent on average per annum. These objectives include also the structural transformation, with industry accounting for 26% of GDP by 2020; the national investment rate reaching 30 per cent of GDP; and non-farm employment reaching 1.4 million.

Regarding environmental issues and biodiversity, the policy talk about ñenvironmental sustainabilityò as the statement is well developed through the below paragraphs, that:

Economic activities are intrinsically linked with the physical environment. Externalities, unaccounted side effects to economic activity, are a fundamental part of all production. These externalities can be positive, for example when a beekeeping business helps a horticultural producer due to the pollinating behaviour of its bees; but externalities can also be negative, where the waste produced by industrial processes is harmful to the environment and to the businesses and people who rely on it. It is therefore paramount that mitigating measures are taken so that growth can take place in a sustainable long-term manner.

It is estimated that close to 70 per cent of industry in Rwanda is located in Kigali, which implies concentration of pollution in the capital. While most industrial firms have traditionally been separated from dwelling houses, they have often been placed in the valleys or marshes bordered by heavily populated areas. In Kigali, industry is principally localised in the industrial park of Gikondo, in the zone of Kicukiro, as well as in periphery of the hill of Nyarugenge. Where toxic materials are produced as waste products there has therefore been a danger of contamination of local water supplies among other risks.

The majority of industrial firms are not endowed with equipment for treatment of their industrial waste in the natural environment. Effluents are poured mainly in waters such as the river Nyabugogo. As the table shows, this includes disposals of biodegradable organic products, oils, and heavy metals such as the chrome, lead, zinc and copper among others. The recent Kigali

Master Plan of Waste Water Management (2008) states that the best outcome is to systematically treat pollutants at the source of industry. This is recommended due to technical reasons, in which firms may be more specialised to deal with the varieties of effluent to treat, as well as to institutional problems, such as the difficulty for different private partners to share the use of an installation.

The Rwanda Cleaner Production Centre was established to promote an integrated strategy applied to the whole of the production cycle to improve environmental performance of industrial firms in Rwanda. The Centre promotes more efficient use of raw materials, energy and water and aims to ensure a life cycle production approach ensuring environmental sustainability. A number of firms have now been supported by the Centre, which is funded by UNIDO. The Centre is the key base for promoting the environmental sustainability in industry.

The Rwanda Environmental Policy highlights the effects of trade and tourism on the environment. Under the new Rwanda Tourism Policy, destinations will be encouraged to develop guidelines and tools for the development of responsible tourism, including codes for tourists and operators on sustainability issues, including waste disposal, energy use, local economic impact and cultural sensitivity. The Policy highlights the need for a suitable waste management policy. As it currently stands, hotels have to install a waste management system that can be very costly. Waste management services are part of the key infrastructure required and should be provided for by Government.

Furthermore, the Rwanda Industrial Policy will enforce the implementation of Rwandaós environmental laws and policies, such as the requirement for industry relocation from marshland areas.

This is quite encouraging since the Industry sector policy is aware of its critical impact on natural environment when the industry development is not wisely and properly managed. Thus, as recommended for mining and other sectors that are due to pollute or degrade the biodiversity as well the overall natural and social environment, environmental monitoring mechanisms are needed to ensure environmental friendly industry development.

### 4.2.14. National Policy & Strategy For Water Supply and Sanitation Services (2010)

The global objective for the Water Supply and Sanitation Sector is to: Ensure sustainable and affordable access to safe water supply, sanitation and waste management services for all Rwandans, as a contribution to poverty reduction, public health, economic development and environmental protection. It has nine specific objectives linked with water use sub-sectors (Water Supply, Sanitation and Institutional Sector Framework) most of them aiming to ensure proper and effective related services supply.

But, the most interesting in the framework of biodiversity concerns are five of them contributing directly or indirectly to conservation protection and the safeguard of broader environment through:

- Raising household sanitation coverage to 65% by 2012 and 100% by 2020, and promote hygiene behaviour change;

- Implementing improved sanitation for schools, health facilities and other public institutions and locations;

- Development of safe, well-regulated and affordable off-site sanitation services (sewerage and sludge collection, treatment and reuse/disposal) for densely populated areas;

- Enhancing storm water management to mitigate impacts on properties, infrastructure, human health and the environment;

- Implementing of integrated solid waste management in ways that are protective to human health and the environment.

### 4.2.15. Health Sector Policy, 2005

The goal of this policy is to contribute to the well-being of the population by providing quality health services that were acceptable and accessible to the majority of people and provided with their participation.

### 4.2.16. National Bio-safety Policy

The National Bio-safety Policy has been developed based on experiences and lessons learned on similar development done in the sub-region countries, and the various policies, strategies and initiatives existing in Rwanda. The objectives of the policy are to:

- Build and **strengthen national capacity** in biotechnology and bio-safety through research and development such that in future Rwanda could be self-reliant;

- Put in place **a regulatory and institutional framework** for biotechnology development and its safe application;

- Ensure public and environmental safety and ethics in biotechnological research, development and its application;

- Determine **measures for risk assessment and management** for all biotechnological applications;

- Develop **mechanisms for public awareness, education and participation** in the decision making processes in relation to the modern biotechnology practices in the country.

The strategic focus of the national biotechnology-bio-safety policy for Rwanda embraces: human resource capacity, institutional arrangements, legal and regulatory regimes, infrastructure, research and development, funding mechanisms, ethical issues, public awareness, education and participation, linkages and partnerships, biodiversity conservation and utilization, biosafety risk assessment and management, standards, monitoring and evaluation, emergency responses, Intellectual Property Rights (IPR), labelling and traceability, technology transfer, and access to information.

Given that more than 90% of Rwandans depend on the agriculture for their livelihoods, and considering the complex problems of low agricultural productivity, shortage of land and severe environmental degradation, there is consensus even at the highest level of Government that modern biotechnology has a strong potential to play a crucial role. However, care should be

taken for preventing risks associated with biotechnology development on biodiversity resources and environment as well as on human being safe.

### 4.3. LEGAL FRAMEWORK

The legal framework with content of environment and biodiversity conservation starts by the constitution of the Republic of Rwanda. Further provisions have been provided through the Organic law determining modalities of protection, conservation and promotion of environment in Rwanda of April 2005, the law determining the mission, organization and functioning of Rwanda Environment Management Authority (REMA) of August 2013 and the Law governing biodiversity in Rwanda of September 2013. All of them underline obligations of the state and individual citizen to protect the environment. In addition, the mentioned laws and organic laws have preventive and punitive provisions for those who harm or destroy the environment in general and biodiversity in particular. However, the most determinant are: the Law governing biodiversity in Rwanda and the Organic law determining modalities of protection, conservation and promotion of environment, in addition to International conventions and protocols related to biodiversity conservation.

#### 4.3.1. The Constitution of the Republic of Rwanda

The new Constitution of the Republic of Rwanda that was adopted by Rwandan Citizens in the Referendum of 26 May 2003 (Republic of Rwanda, 2003) states:

- **Article 30:** Private ownership of land and other rights related to land are granted by the State. The law specifies the modalities of acquisition, transfer and use of land.

- **Article 31**: The state property consists of the public sector and the private sector of the government together with the public sector and private sector of decentralized public communities. The properties of the public sector are inalienable except in case of their previous disuse in favour of the private concession of the government;

- **Article 49**: Each citizen has the right to healthy and satisfying environment. Each person has the right to protect to conserve and promote the environment. The government will take care of

the environment protection. An Act defines the procedures of protecting, conserving and promoting environment.

### 4.3.2. Law N° 70/2013 of 02/09/2013 governing biodiversity in Rwanda

This Law contains provisions on:

- Biodiversity planning and monitoring;

- Threatened ecosystems and endangered and invasive species;

- Bio-prospecting, access and benefit sharing;

- Permits to undertake activities in terms of bio-prospecting in and export of indigenous biological resources and

- Administrative sanctions.

**Article 4** states that the national biodiversity strategies must especially:

- Provide for all possible actions to put in place an integrated, coordinated and uniform approach to biodiversity management by organs of state, national and international non-governmental organizations, the private sector and local communities;

- Identify priority areas for conservation actions and the establishment of protected areas;

- Reflect regional co-operation on issues concerning biodiversity management;

- Identify national biodiversity strategies which determine norms and standards for biodiversity conservation plans at local level.

### 4.3.3. The Environment organic Law N° 04/2005 of 08/04/2005 determining modalities of protection, conservation and promotion of environment in Rwanda

The law sets out the general legal framework for environment protection and management in Rwanda with relevant articles for biodiversity protection such as:

**Article 19:** Swamps with permanent water shall be given special protection. Such protection shall consider their role and importance in the preservation of the biodiversity;

**Article 21:** With exception of provisions of laws that govern National Parks in regard to self-defence or in case of necessity, any poaching shall be carried out by an authorized individual;

**Article 24 :** Importation, exportation of wild animals or products of wild animals and wild plants are governed by permission issued by competent authorities in accordance with the provisions of the Convention on International Trade in endangered species of wild fauna and flora;

**Article 52:** the State shall identify reserved areas for protection, conservation or rehabilitation of:

- Ecosystems;

- Forests, woodlands, species of biodiversity and protected zones;

- Monuments, historical sites and landscapes;

- Water systems and its quality;

- Banks and shores, rivers, streams, lakes, plains, valleys and swamps.

**Article 82:** It is prohibited to dump any substances, in any place, which may kill and destroy flora and fauna; endanger the health of biodiversity;

**Article 89:** In accordance with regulations provided for by International Conventions signed and ratified by Rwanda, it is prohibited to dump, eliminate, and immerse any chemical substance in water and in any other place where it may:

- Threaten general public health and biological resources;

- Harm navigation, fishing and others;

- Deteriorate the beauty of a place which is potential for its aquatic tourist interest;

A**rticle 96**: Anyone who, in a manner that is not provided for by the law that governs it, burns, cuts trees or who causes others to do so or kills animals in protected forests and other protected areas and in national parks, is punished by an imprisonment of two (2) months to two (2) years and a fine ranging from three hundred thousand (300,000) to two million (2,000,000) Rwandan francs or one of the two penalties. Accomplices are also liable for the same penalties; etc.

# V. LESSONS LEARNED FROM THE EARLIER NBSAP AND THE REVISION AND UPDATING PROCESS

Rwanda has developed its first National Biodiversity Strategy and Action Plan (NBSAP) in 2003 after identification of major threats to biodiversity conservation in Rwanda and targeted the following four major outcomes:

- Improved conservation of protected areas and wetlands, sustainable use of the biodiversity of natural ecosystems and agro-ecosystems;

- Rational use of biotechnology;

- Development and strengthening of policy, legal, institutional and human resource frameworks;

- Equitable sharing of benefits derived from the use of biological resources.

## 5.1. EVALUATION OF THE EFFECTIVENESS OF EARLIER NBSAP

### 5.1.1. Improved conservation of protected areas and wetlands

The management of Virunga NP and Nyungwe NP have been improved through:

- Rehabilitation or development of management plans;

- Monitoring of threats and implementation of preventive measures;

- Improving scientific knowledge on biodiversity in those parks, awareness raising of communities surrounding the parks on biodiversity conservation and support alternative livelihoods to avoid encroachment; and

- Rehabilitation of critical ecosystems.

Four wetland complexes, lakeshores and riverbanks and related watersheds, rehabilitation of natural forests (Mukura & Gishwati) have been considered and inventory and development of related legislations for better conservation and sustainable use of wetlands. Biodiversity in those complexes has been inventoried to inform decision makers on policy actions for conservation. Other biodiversity inventories have been undertaken (Kivu islands, Remnant forests). In addition, inventory and mapping of threatened remnants natural forests has been conducted, and their biodiversity catalogue developed.

### 5.1.2. Rational use of biotechnology

National Bio-safety Framework (NBF) has been developed comprising (1) National biotechnology and bio-safety policy, (2) National bio-safety bill and (3) Institutional framework. Adoption of those instruments has taken long before reaching a consensus.

### 5.1.3. Policy, legal, institutional and human resources strengthening

Key policies have been approved including the environment policy, Biodiversity policy, forestry policy, wildlife policy and law. Furthermore key legislations adopted to support biodiversity conservation include Environment organic law, biodiversity law, a set of decrees for protection of biodiversity, FONERWA law, PES regulatory framework preparation, Institutional frameworks like Centre of Excellence on Biodiversity, CBD steering committee, Department of Forestry and Terrestrial ecosystems under RNRA, RDB/Tourism and conservationé have been put in place.

### 5.1.4. Equitable sharing of benefits derived from the use of biological resources

The Nagoya Protocol for access to genetic resources and equitable sharing of benefits derived from the use of biological resources has been ratified. Domesticating steps via development of enabling regulatory Framework, Communication-Education and Public Awareness, capacity building, establishment of Clearing House mechanism and GR of valuation will follow.

### 5.1.5. NBSAP Successes stories

- Unification of biodiversity stakeholdersô community through NBSA development and implementation;

- Identification of key national priorities for action including among others rehabilitation of degraded ecosystems, control of alien species (see policy areas) etc...;

- Creation of awareness on biodiversity issues in different institutions;

- Rising of new conservation NGOs and;

- Leverage of new and additional funds for the conservation and sustainable use of biodiversity (GEF projects, FONERWA, etc.).

### 5.1.6. Challenges and gaps to be addressed

Although many successes have been reached, some gaps were encountered, inter alia:

- 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 of financial means to implement NBSAP activities;
- Lack of link 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, despite having the same objectives;
- Decentralized collection holders;

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

## 5.2. NBSAP UPDATING PROCESS AND PRODUCTION OF THE 5TH NATIONAL REPORT TO THE CBD

The revision and updating of NBSAP and preparation of the 5th national report to the CBD has been - undertaken through the following three phases:

- Stocktaking assessment and targets setting,

- Development of the strategy, its action and implementation plans,

- Production of the 5th national report.

The first phase was dedicated to stocktaking exercise during which broader consultations have been organized across the country, through interviews in convened meetings, focus group discussion and exchange of views with different stakeholders from public sector, private sector, civil society and local communities both at central and decentralized levels.

Meanwhile, a large number of documentations were collected and reviewed. This provided detailed information on the current status of biodiversity in natural ecosystems and agro-ecosystems, threats/causes and consequences of biodiversity loss, institutional, policy and regulations framework, etc. The biotechnology and biosafety status has also been assessed during this exercise. Based on the stocktaking results, national priorities, targets and strategic actions for biodiversity conservation in Rwanda have been set, in accordance with the CBD objectives and its Aichi Targets.

A two daysô workshop was organized for the validation of stocktaking results by participants from various institutions, including NBSAP Steering Committee members. Comments, remarks and recommendations have been provided by participants to the Consultant and were incorporated in the final version of the stocktaking report.

The second phase concerned the development of Strategy and Action Plan (SAP), along with its implementation plans which include the capacity building plan, communication and outreach strategy, financial resources mobilization strategy as well as institutional, monitoring and reporting issues.

The third phase was dedicated to the elaboration of the fifth national report following the guidelines given by the COP and the SCBD. The development of the report has used the data already gathered during consultations for the NBSAP process and other data collected by various experts. This means that the revision and updating of the NBSAP and the development of the 5th National Report to CBD has been one process but with two different products.

A final two daysô workshop was also organized for the examination of all draft reports, both for the strategy and fifth report. Participants formulated remarks and comments to be incorporated in the final reports and proceeded to their validation.

# VI. NATIONAL BIODIVERSITY PRINCIPLES, PRIORITIES, TARGETS

## 6.1. LONG-TERM VISION

The revised and updated Strategy has a long-term vision which is in line with the CBD Strategic Plan to 2020 and states that: *"By 2040, national biodiversity be restored and conserved, contributing to economic prosperity and human well-being through delivering benefits essential for Rwandan society in general.*ò

## 6.2. PRINCIPLES GOVERNING THE STRATEGY

- The National Biodiversity Strategy and Action Plan as a ôliving documentô, responsive, flexible and practical.

- Including biodiversity conservation in economic decisions and turn it into a driver for national development.

- Relevant economic development sectors such as agriculture and animal resources, fisheries, forestry, mining and infrastructures will incorporate biodiversity conservation activities into their planning systems as well as in the annual budgets of upcoming years.

## 6.3. GOALS AND STRATEGIES

The National Biodiversity Strategy is built on five (5) goals with nineteen (19) targets that have been defined in line to CBD objectives and its Aichi Targets. In the context of Rwanda, the following Targets have been set and are almost in line with the CBD goals:

- To address the main causes of national biodiversity loss by mainstreaming biodiversity conservation in the decision making process across all governmental, private and civil societyôs development programs.
- To reduce anthropogenic pressures on biodiversity resources and promote their sustainable use.

- To improve the status of national biodiversity by expanding and safeguarding priority protected ecosystems and maintaining biological communities in equilibrium state.
- To ensure equitable sharing of benefits arising from the use of biodiversity and ecosystem services.
- To enhance NBSAP implementation through biodiversity knowledge management, participatory planning and capacity building.

*The following strategies have been aligned to achieve the above aforementioned goals:*

*- Partnership development, stakeholders' involvement and set up transboundary management mechanisms of the biodiversity;*

*- Promotion of conservation incentives and alternatives sources of livelihoods;*

*- Establishment of corridors and connectivity between patched habitats and extension of protected areas superficies where possible;*

*- Promotion of Community-Based Natural Resources Management around natural ecosystems;*

*- Community awareness raising and capacity building in biodiversity conservation and sustainable use.*

### 6.4. NATIONAL TARGETS

Nineteen biodiversity national targets were set in line with the Aichi Biodiversity Targets and based on needs and priorities highlighted during consultations with stakeholders. These are presented through the below tables along with related strategic actions and indicators.

The targets in this revised and updated strategy bring accountability and demonstrate that the Rwandan Government is making a long-term commitment to biodiversity conservation, and that it recognizes to be pivotal to the national economy development and welfare of population.

**Table 2: CBD Strategic Goals and Aichi Targets & National Goals and Targets**

| CBD Strategic goals and its Aichi Targets | National Goals and Targets |
|---|---|
| ***Strategic Goal N°1:*** ***Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society*** | ***Goal N° 1:To address the main causes of national biodiversity loss by mainstreaming biodiversity conservation in the decision making process across all governmental, private and civil society's development programs.*** |
| ***Target 1:*** By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably. | ***Target 1:*** By 2020, at the latest, Rwandan people are aware of the values of biodiversity and ecosystems services as well as apprehend the steps for use and conserve them sustainably |
| ***Target 2:*** By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems. | ***Target 2:*** By 2020, the values of biodiversity and ecosystem services have been integrated into planning processes, poverty reduction strategy and into national economy. |
| ***Target 3:*** By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions. | ***Target 3:*** By 2020, at the latest, positive incentives for biodiversity conservation and sustainability towards local communitiesô development are boosted and applied. Harmful incentives are eliminated. |
| ***Target 4:*** By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for | ***Target 4:*** By 2020, public and private sectors and civil society have promoted and implemented plans that consider ecosystem carrying |

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| sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits. | capacity. |
| ***Strategic Goal Nº 2:Reduce the direct pressures on biodiversity and promote sustainable use*** | ***Goal Nº 2:To reduce anthropogenic pressures on biodiversity resources and promote their sustainable use*** |
| ***Target 5:*** By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced. | ***Target 5*****:** By 2020, natural ecosystems, especially identified ñAlliance for Zero Extinction (AZE)ò sites are safeguarded, their degradation and fragmentation reduced. |
| ***Target 6:*** By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits. | ***Target 6:*** By 2020, fishing and aquaculture, agriculture and forestry are managed sustainably, legally and taking into consideration ecosystem specificities to ensure biodiversity conservation. |
| ***Target 7:*** By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity. | |
| ***Target 8:*** By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity. | ***Target 7*****:** By 2020, environmental 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 9:*** By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and | ***Target 8*****:** By 2020, invasive alien species, their pathways, spatial distribution are identified. Harmful species are controlled or |

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| measures are in place to manage pathways to prevent their introduction and establishment. | eradicated, and related mitigation measures are put in place. |
| ***Target 10:*** By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning. | |
| ***Strategic Goal N° 3: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.*** | ***Goal N° 3: To improve the status of national biodiversity by expanding and safeguarding priority protected ecosystems and maintaining biological communities in equilibrium state.*** |
| ***Target 11:*** By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes. | ***Target 9:*** By 2020, at least 10.3 per cent of land area is protected to maintain biological diversity. |
| ***Target 12:*** By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained. | ***Target 10*****:** By 2020, the extinction of threatened species are prevented and their conservation status improved, particularly for those that are most endangered of extinction. |
| ***Target 13:*** By 2020, the genetic diversity of 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 11*****:** By 2020, the genetic diversity of local animal breeds and landraces as well as their wild relatives are conserved, thus in order to minimize genetic erosion. |

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| é é é é é é é é é é é é é é é .. | ***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. |
| ***Strategic Goal N$^{o}$ 4: Enhance the benefits to all from biodiversity and ecosystem services*** | ***Goal N$^{o}$ 4: Ensure equitable sharing of benefits arising from the use of biodiversity and ecosystem services*** |
| ***Target 14:*** By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable. | ***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 local communities especially the vulnerable groups. |
| ***Target 15:*** By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification. | ***Target 14*****:** By 2020, 30% of the country is covered by forests hence increasing carbon stocks and contributing to climate change mitigation and adaptation. |
| ***Target 16:*** By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation. | ***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. |
| ***Strategic Goal N$^{o}$ 5:Enhance implementation through participatory planning, knowledge management and capacity building*** | ***Goal N$^{o}$ 5: To enhance NBSAP implementation through biodiversity knowledge management, participatory planning and capacity building*** |

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| ***Target 17:*** By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan. | ***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 18:*** By 2020, the traditional knowledge, innovations and practices of indigenous and 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 relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels. | ***Target 17:*** By 2020, values of traditional knowledge, cultural heritage and practices of local communities relevant for sustainable use and conservation of biodiversity are enhanced, fully integrated into national policy and legal framework and reflected in the implementation of the NBSAP. |
| ***Target 19:***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, and applied. | ***Target 18*****:** By 2020, knowledge in biodiversity status, values, causes and consequences of biodiversity loss, is enhanced, shared across the country and reflected in the implementation of the NBSAP. |
| ***Target 20:*** By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011- 2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties. | ***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 reach an appreciable level. |

# VII. ACTION PLAN FOR BIODIVERSITY CONSERVATION

A well elaborated strategy by itself is of little use unless it is put into actions. As mentioned above, the conceived Strategy in whole reflects the countryôs vision for biodiversity and the broad strategic mechanisms that Rwanda will take to fulfil the objectives of the Convention.

While, the following elaborated Action Plan defines the specific actions to be carried out over a certain period of time, that will result in enhanced biodiversity conservation, more sustainable use of national biological resources, more equitable sharing of benefits from its use and better conservation of agro-biodiversity in a bio-safety compromise.

The prepared action plan includes the following elements:

1) A set of activities, each of them clearly linked to the objective and the national targets aligned to achieve the objective;
2) An appropriated responsible institution to implement the strategic actions;
3) A calendar for the implementation of the proposed action;
4) A ray of indicators for monitoring and periodically evaluating its implementation.

### 7.1. NATIONAL ACTIONS TO ACHIEVE THE STRATEGY

Actions that are planned to achieve the strategy are presented in the log frame table below:

**Table 3: Actions to achieve the strategy**

| Targets | Actions | Responsible | Time (up to 2020) | Indicators | Sources/Means of Verification |
|---|---|---|---|---|---|
| ***Goal 1:* To address the main causes of national biodiversity loss by mainstreaming biodiversity conservation in the decision making process across all governmental, private and civil society's development programs** | | | | | |
| ***Target 1:*** By 2020, at the latest, Rwandan people are aware of the values of biodiversity and ecosystems services as well as apprehend the steps for use and conserve them sustainably | Strengthening communication and outreach tools | REMA, CoE of Biodiversity, RDB/Tourism and Conservation Department | Year 1 | Number of communication tools and channels developed and in use | - Communication tools documents<br>- Annual and period reports |
| | Raising awareness among stakeholders on the value of biodiversity and ecosystem services | REMA, CoE of Biodiversity, RDB/Tourism and Conservation Department, MINEDUC, MINALOC, Media | Years 2 -3 | Number of people sensitized, trained and engaged in sustainable use of biodiversity resources<br><br>Number of newsletters, Radio and TV programs, é produced | - Sensitization and training reports<br>- Annual and period reports<br><br>TV show, CDs, Radio spots produced |
| ***Target 2:*** By 2020, the values of biodiversity and ecosystemsô services have been integrated into planning processes, poverty reduction strategy and into national economy. | -Increasing knowledge on methods of biodiversity and ecosystems services valuation. | REMA, RDB, MINEDUC, CoE on Biodiversity, RNRA and economic planers | Years 1, 2, 3, 4, 5, 6 | - Number of people trained in biodiversity and ecosystem services valuation methods | - Training reports<br>- Annual and period reports |
| | Integrate biodiversity and ecosystem services valuation and their account in economic planning at national and decentralized levels | MINECOFIN MINICOM MINAGRI MINIRENA, RDB & other develop. Sectors | Years 1,2, 3, | - Number of sectoral strategic and action plans integrating accounting of biodiversity and ecosystem services values | - Content of Strategic and actions plans documents<br>- Content of DDPs |

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| ***Target 3:*** By 2020, at the latest, positive incentives for biodiversity conservation and sustainability towards local communitiesô development are boosted and applied. Harmful incentives are eliminated. | - Promote positive incentives for conservation and sustainable use of biodiversity<br>- Sustainable investment to address poverty among communities living around PAs | Central Government, Local Government, Private sector and Civil Society | Years 1, 2, 3, 4,5, 6 | Number of income-generating projects initiated around protected areas, enhancing their protection and contributing to local communitiesô livelihoods | - Annual and period activity reports from local administration<br>- Park warden (RDB) Reports |
| ***Target 4:***By 2020, public and private sectors and civil society have promoted and implemented plans that consider ecosystem carrying capacity | - Public, private and civil society development plans safeguarded by EIA and environmentally monitored<br><br>- Biological resources thresholdsô utilization respected | Central Government, Districts, Private sector and Civil Society | Years 1, 2<br><br>Years 3, 4, 5, 6 | - Percentage of development plans that encompass EIA<br>- Number of ecosystems whose resources thresholds exploitation is known.<br><br>- % of development plans implementing properly EMP | - EIA/SES reports<br>- Environmental Monitoring reports |
| ***<u>Goal 2:</u>To reduce multiple anthropogenic pressures on biodiversity and promote sustainable use of all renewable natural resources*** | | | | | |
| ***Target 5*****:** By 2020, natural ecosystems, especially identified ñAlliance for Zero Extinction (AZE)ò sites are safeguarded, their degradation and fragmentation reduced | - Identify ñAlliance for Zero Extinction (AZE)ò sites and evaluate their degradation status,<br><br>- Elaboration and implementation of rehabilitation plans for degraded areas | REMA, CoE, RNRA, RDB, Conservation NGOôs | Years 1, 2,<br><br>Years 3, 4, 5, 6 | - AZE sites identified and protected;<br><br>- Number of rehabilitation plans elaborated and implemented | - Study reports on identified AZE sites<br>- Rehabilitation plans documents<br>- Rehabilitation reports |

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| ***Target 6:*** By 2020, fishing and aquaculture, agriculture and forestry are managed sustainably, legally and taking into consideration ecosystem specificities to ensure biodiversity conservation. | - Evaluation of fish stock for each lake and estimate its thresholds fishing yield<br>- Restoration/ re-introduction of native fish populations and selective fishing targeting invasive species<br>- Promotion of integrated management of watersheds resources around water bodies<br>- Implementation of District land use master plans for sustainable agriculture and forestry | MINIRENA, MINAGRI REMA, RNRA RAB, CoE | Years 1, 2,<br>Years 3, 4, 3<br>Years 1, 2, 3, 4, 5, 6<br>Years 1, 2, 3, 4, 5, 6 | - Thresholds fishing yield for each lake is defined<br>- Number of lakes whose native fish populations restored and predators/ invasive speciesô populations reduced<br>- Water quality improved in lakes and swamps<br>- District Land use master plans implemented sustainably and forest management plans elaborated and implemented | - Evaluation reports on fish stock<br>- Lakes management reports<br>-Evaluation reports |
| ***Target 7*****:** By 2020, environmental 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 | - Sensitization of industrial and agriculture developers for improving management of wastes and pollutants<br>- Regular monitoring of water quality in sources, small streams, rivers lakes and swamp | UR, REMA, RBS, NIRDA, RNRA, RRECPC | Years 1, 2<br>Years 3, 4,5,6 | -Number of awareness campaigns organized<br>- Sanitation status and water quality improved | - Campaigns reports<br>- Annual and periodic monitoring reports on sanitation status and water quality assessment |

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| ***Target 8*:**By 2020, invasive alien species, their pathways, spatial distribution are identified. Harmful species are controlled or eradicated, and related mitigation measures are put in place. | - Conducting research on alien invasive species and develop related control action plans<br>- Law enforcement in control of the introduction of exotic species<br>- Promotion of the use of native species (landraces/breed races) | REMA, CoE, RNRA, RAB, MINAGRI, MINIRENA, RDB | Years 1, 2<br>Years 2,, 6 3, 4, 5<br>Years 2,, 6 3, 4, 5 | - Number of invasive species identified and controlled<br>- Legal, scientific/ecological based management of exotic species established<br>-Number of native and neglected species promoted | - Annual and period reports on invasive species control<br>- Annual and period activity reports |
| ***<u>Goal 3</u>: To improve the status of national biodiversity by expanding and safeguarding priority protected ecosystems and maintaining biological communities in equilibrium state*** | | | | | |
| ***Target 9:*** By 2020, at least 10,3 per cent of land area is protected to maintain biological diversity | - Legal designation and establishing new protected areas : (i) *Complex Akagera NP-Akagera Wetland-Ibanda-Makera Forest; (ii) Ecological corridor between main Nyungwe and Cyamudongo); (iii) Ecological corridor between Mukura and Gishwati; (iv) associating the wetland complex Rugezi-lakes Burera-Ruhondo to* | REMA, CoE, RNRA, RDB, RAB | Years 1, 2, 3, 4, 5, 6 | - Number of new protected areas designated<br>- % of protected areas increased<br>- New law, decrees and ministerial orders enacted related to new protected areas | - Law, decrees and ministerial orders documents<br>- RDB, RNRA, REMA report<br>- National Reports to the CBD |

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| | *Volcanoes-Buhanga National Park; (v) Rweru-Mugesera wetland Complex; (vi) lake Kivu islands; (vii) all remnants forests inventoried* (*see Annex 1 for details* )<br><br>- Development, updating and implementation of integrated conservation plans for critical (terrestrial and aquatic) ecosystems<br><br>- Finalizing and enforcement wildlife Law and updating sectoral ones | | | - Number of critical ecosystems for which management plans have been developed and implemented<br><br>- Wildlife law finalized and number of other sectoral laws revised and enforced | - Management plans documents<br><br>- Law documents |
| ***Target 10*****:** By 2020, the extinction of threatened species is prevented and their conservation status improved, particularly of those most in very endanger of extinction. | - Conducting inventory of threatened species, especially those in danger of extinction and propose specific measures for their conservation<br><br>- Re-introducing some lost species for re-establishing ecological equilibrium | RDB, REMA, CoE, RNRA, RAB | Years 1, 2<br><br>Years 1, 2 | - List of threatened species in natural and agro ecosystems, and their respective status established<br><br>- Number and types of lost species re-introduced | - Inventory report<br><br>-Annual reports |

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| ***Target 11*:** By 2020, the genetic diversity of local animal breeds and landraces as well as their wild relatives are conserved, thus in order minimizing genetic erosion. | - Identification of landraces and local breeds that are neglected and under extinction<br><br>- Development and implementation of plans aimed at conservation of neglected and underutilized landraces and local breeds | RAB, MINAGRI, CoE, RNRA | Years 1<br><br>Years 2, 3, 4, 5, 6 | - Number of neglected landraces and local breeds that are disappearing<br><br>- Related conservation plans elaborated and implemented | - Assessment report on landraces and local breeds<br><br>- Plans documents<br>- Annual and period activity reports |
| ***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. | - Technical capacity development in biotechnology risk assessment including GMOs risks<br><br>- Monitoring and Evaluation of GMOs impacts on human health, biodiversity and local economy<br><br>- Elaboration of policy and regulations required in Bio-safety and particularly in GMOs | RBS, RAB, RDB, MINAGRI, MINICOM | Years 1, 2<br><br>Years 2, 3, 4, 5, 6<br><br>Years 1, 2 | - Number of trained people in biotechnology risks assessment<br><br>- Modern and accurate lab. equipment for GMOs and overall biotechnology control<br><br>- Number of policies and regulations elaborated and enforced in Bio-safety area | - Training reports<br><br>- List of available lab equipment<br><br>- Policy and regulations documents |

| ***Goal 4*: *Ensure equitable sharing of benefits arising from the use of biodiversity and ecosystem services*** | | | | | |
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| ***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 local communities especially the vulnerable groups. | - Evaluation of restoration needs for particular ecosystems, development and implementation of related rehabilitation plans | REMA, RNRA, NAEB, CBOs | Years 1, 2, 3, 4, 5, 6 | - Well established status of ecosystems that contribute both to biodiversity conservation and local livelihoods and related rehabilitation plans developed | - Study/evaluation reports<br>- Rehabilitation plans<br>- Annual and period implementation reports |
| | - Promotion of socio-economic activities, i.e. tea plantation in some areas, with more involvement of local vulnerable groups, mostly dependant to ecosystemsô goods | REMA, RNRA, NAEB, CBOs | Years 2, 3, 4, 5, 6 | - Number of socio-economic activities involving poor and vulnerable groups | - Annual and periodic activity reports |
| | -Construction of needed socio-infrastructures to improve welfare of population using revenue sharing funds. | RDB, Districts Private sector International NGOs | Years 2,3,4,5,6 | -Number of socio-infrastructures constructed<br>-Volume of budget utilized | - Visits to constructed infrastructures<br>- Budget/financial statements<br>- Annual and periodic activity reports |
| | -Government participates to financing local socio-economic initiatives generating incomes to alleviate poverty among less endowed families. | Government (Districts, Partners donors) Bilateral cooperation | Years 2,3,4 5 and 6 | -Number of initiatives supported by the Government;<br>-Number of families for which poverty has been alleviated | - Annual and periodic activity reports<br>- Local administration reports |

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| ***Target 14*:** By 2020, 30% of the country is covered by forests hence increasing carbon stocks and contributing to climate change mitigation and adaptation. | -Promotion of afforestation and reforestation programs<br><br>-Policy and law enforcement in forestry and promotion of forest sustainable management programs<br><br>-Strengthening institutional capacity for technology transfer in forestry development | RNRA, RAB, REMA | Years 1, 2, 3, 4, 5, 6<br><br>Idem<br><br>Idem | -Superficies of afforestated areas increased<br><br>- Appropriate forest management system in use<br><br>-Number of laboratories equipped, seed banks and/or tree nurseries developed by communities | - Forest management reports<br><br>- Annual and periodic activity reports |
| ***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. | -Establishing a National implementation plan for Nagoya protocol<br>- Access to natural resources that can be sustainably harvested by neighboring communities (i.e. medicine plants)<br><br>- Enhance share of National Parksô financial revenue earned through tourism or other activities with local communities | Central Government and Local administration, RDB, RNRA, RAB | Years 1, 2, 3, 4, 5, 6<br><br>Years 1, 2, 3, 4, 5, 6<br><br>Years 1, 2, 3, 4, 5, 6 | Implementation report<br><br>-Number and types of natural resources that benefit to local communities<br><br>- Number of socio-infrastructures and income-generating projects initiated through Revenue Sharing (RS) around PAs<br><br>- Local communities are tolerant vis-à-vis wildlife | - Implementation plan for Nagoya Protocol document available<br>-Annual and periodic activity reports<br><br>- Local administration reports<br>- RDB and partners reports |

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| | - Compensate local communities for to crop raiding and animalsô attacks | | Years 1, 2, 3, 4, 5, 6 | caused damages | |
| | - Construction of needed socio-infrastructures to improve welfare of population using revenue sharing funds. | RDB, Districts, Sectors and Private Sector | Years 1,2,3,4,5,6 | -Number of socio-infrastructures constructed<br>-Volume of revenue shared per protected area | - Visits to constructed infrastructures<br>- Local administration reports<br>- RDB and partners reports |
| ***Goal 5:*** ***To enhance NBSAP implementation through biodiversity knowledge management, participatory planning and capacity building*** | | | | | |
| ***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). | - Development of revised and updated NBSAP through participatory approach<br><br>- Monitoring and evaluation of NBSAP implementation status | REMA, CoE and stakeholders | Year 1<br><br>Year 2, 3, 4, 5, 6 | - NBSAP and implementation plans developed and validated by March 2014<br><br>- Monitoring and evaluation reports highlighting the implementation status of the NBSAP | - NBSAP revised report<br>-Fifth National Report to the CBD document available<br><br>- NBSAP implementation monitoring reports |
| ***Target 17:*** By 2020, values of traditional knowledge, cultural heritage and practices of local communities relevant for sustainable use and conservation of biodiversity are enhanced, fully | - Conduct research and valuation of traditional knowledge and practices related biodiversity management<br><br>- Transfer traditional knowledge within | Ministry of Sport and Culture (MINISPOC), Institute of National Museums, CoE, MINICOM, RDB, research Institutions | Years 1, 2, 3<br><br>Years 2, 3, 4, 5, 6 | - Number of published papers on traditional knowledge and practices relative to biodiversity conservation;<br><br>- Teaching programs that include traditional knowledge | - Published papers documents<br><br>- Training modules content |

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| integrated into national policy and legal framework and reflected in the implementation of the NBSAP. | training and research institutions and their utilization in teaching programs and joint research projects<br>-Review of national policies and legislations and include respect and use of traditional knowledge cultural heritage in biodiversity management and conservation | | Years 2, 3 | related to biodiversity conservation<br><br>- Number of national policies and legislations revised accordingly | -Revised policies and laws documents |
| ***Target 18*:** By 2020, knowledge in biodiversity status, values, causes and consequences of biodiversity loss, is enhanced, shared across the country and reflected in the implementation of the NBSAP. | - Assessment of the biodiversity status, trends, causes and consequences of biodiversity loss, and values, during the stocktaking phase of the NBSAP development | REMA, CoE, MINIRENA, RNRA, RDB and stakeholders | Years 1, 3, 6 | - Stocktaking report encompassing all these information | - Stocktaking reports |
| | - Continue fundamental research projects in order to increase knowledge on ecosystems and their biodiversity. | CoE, Research and Training institutes, REMA, RDB | Years 1,2,3,4,5,6 | -Published documents on status of biodiversity<br>-Number of research projects elaborated and executed | - Research papers documents<br>- Research projects documents |
| | - Strengthen and enhance the capacity on national Centre for Excellence in Biodiversity | MINEDUC & Partners, UNEP/GEF | Years 2,3,4 | -Number of research programs managed<br>-Volume of scientific production accumulated | - Research programs documents<br>- Annual and periodic reports |

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| | Conservation. | | | | |
| | - Conduct research on genetic resources important for national agriculture especially those whose survival is threatened; | RAB, Regional ,International agriculture research institutes | Years 2,3,4 | -Number of published papers on important genetic resources<br>-Number of trials conducted | - Published papers documents<br>- Trials development reports |
| | - Enhance the capacity of human resources in biodiversity management and conservation through short, medium and long term training. | High training institutions International educational institutions | Years 2,3,4, 5,and 6 | -Number of human resources trained with low, medium and high degrees | - Training modules<br>- Training reports |
| | - NBSAP content mainstreamed and information transferred across the country | All stakeholders involved in Biodiversity conservation | Years 1, 2, 3, 4, 5, 6 | -NBSAP mainstreamed and adopted by central and decentralized entities and all stakeholders | - Biodiversity mainstreaming report<br>- Stakeholders reports |
| ***Target N° 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 reach an appreciable level. | - Strengthening capacity of NBSAP staff in ñresource mobilization " strategy to facilitate effective implementation of the strategy | REMA, CoE, RDB, | Years 1, 2 | - NBSAP staff trained and skilled in Resource mobilization | - Training module<br>- Training reports |
| | - Inventory of all potential sources of fund internally and externally for NBSAP implementation and establish resources mobilization strategic mechanisms | REMA, RDB CoE, MINECOFIN | Year 1, 2 | - List of potential source of fund and resources mobilization strategy established through NBSAP implementation plan | List of donors |

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| | - Assessment of the current resources available and their distribution across sectoral planned budgets | REMA, CoE MINECOFIN | Year 1, | - Total budget allocated to biodiversity conservation, disaggregated by sector | - Budget document and reports |
| | - Assess the state of ecosystems and economic value of their services | REMA, CoE, RDB & Partners | Years 1,2,3,4,5,6 | -Reports on status of ecosystems and their values | - Assessment report<br>- Economic valuation reports of ecosystems services |
| | - Development of emerging markets for biodiversity and other ecosystem services | MINICOM, RDB | Years 2,3,4 5,6 | -Number of emerging markets acquired | - Annual and periodic reports |
| | - Development and use of innovative financing mechanisms, including market-based tool. | REMA, RDB MINECOFIN | Years 1,2,3 and 4 | -types of innovative financing mechanisms proposed, accepted and utilized | - List of operating innovative financing mechanisms |
| | - Setting out financial needs for biodiversity conservation and matching it with financial flows | REMA, RDB, CoE and MINECOFIN | Years 1,2,3,4,5,6 | -Financial needs and flows status | Annual and periodic reports on financial needs |

## 7.2. MAINSTREAMING BIODIVERSITY INTO SECTORS, POVERTY REDUCTION AND CLIMATE CHANGE

Communication tools will be utilized during biodiversity conservation mainstreaming phase across development sectors, ministries, and between levels of government and different entities. An effort to enlarge and enhance partnership for biodiversity conservation will continue by engaging with a range of potential new partners, including those from areas outside the environmental sector such as private business and industry.

During NBSAP implementation phase, the integration of biodiversity across all sectors, through participatory approaches will be considered.

### 7.2.1 Mainstreaming Biodiversity into other Economic Development Sectors

The promotion of natural resources sustainable exploitation constitutes a crucial asset for endogenous economic development in many countries. Nowadays, companies developing and marketing biodiversity products are emerging in several African countries and the protection and promotion of ecological assets constitutes a growth factor for eco-tourism development.

Therefore, time has come to integrate the economic value of biodiversity and ecosystems into national accounts, local development strategies and planning processes.

Mainstreaming biodiversity and ecosystem service values into other development sectors will be facilitated by cross-sectoral approach, meaning that specific NBSAP activities will be incorporated into other strategies and plans as follows:

- Some biodiversity issues should be included in the national Climate Change Policy, specifically those with regards to territorial planning for mitigation and adaptation to climate change, taking into account the integrated management of watersheds, the environmental management of productive land with bio-cultural and biological corridors;

- The Agricultural Policy should include the strengthening of socio-environmental management and the wise use of natural resources and goods, especially land, water and forests, according to the principles of bioethics;
- The National Strategy for Environment Conservation should integrate management and conservation of selected remnants forests with important biodiversity to supplement the national Protected Areas (PA). Furthermore, the need to take into account the role of traditional knowledge and cultural heritage in biodiversity conservation should be emphasized;
- Some environmental issues such as: preservation and restoration of environmental conditions while maintaining the productive capacity of natural ecosystems should be included in the national Strategy for Food Security
- In a sense of integrating environmental and economic accounting in national economy reporting eight sectoral accounts should be developed for forests, water resources, fisheries and aquaculture resources, energy and emissions, waste, land and ecosystems services as well as subsoil resources.

### 7.2.2. Mainstreaming biodiversity in Education Sector

Though environment, management and conservation of biodiversity are keys to peopleôs livelihood, these vital concepts have not yet found their place in the formal education system, which should start basically at the primary level, secondary schools and universities.

REMAôs mandate related to Environmental Education and Mainstreaming Framework indicates that the Authority will ensure between 2007 and 2011 among others (REMA, 2010):

- Integration of environmental concerns into national and sectoral policies and legislation, plans, programs and projects including education;
- Improved documentation and dissemination of environmental information;
- Increased awareness and public participation in environmental conservation and management.

The functions and roles of the Environmental Education and Mainstreaming unit of REMA are as follows:

- Integrate environmental issues into primary and higher institutions of learning (school curricula);
- Collect, document and disseminate environmental information to different users;
- Supervise the dissemination of environmental information to national and international agencies;
- Facilitate outreach activities for environmental awareness raising and networking;
- Facilitate preparation and implementation of environmental training programs and awareness raising materials for different stakeholders/CBOs and public at large;
- Coordinate the production of REMA newsletter and other technical materials;
- Integrate environmental concerns in the policy and law making process at all levels.

What is most needed at the moment is expressed in the following strategies for integrating Environmental Education for Sustainable Development (EESD) in school programs:

- Advocacy for the infusion of EESD in the curriculum of Primary, Secondary schools and teacher training colleges and University. Advocacy materials such as posters, brochure and shirts will be developed including website for information sharing etc;

- EESD awareness raising seminars in all the provinces will be held and exhibitions used to share best practices and experiences. Furthermore the EESD activities will be exhibited through the media (newsletters, electronic press);

- Strengthen the capacity of schools to enable them to effectively integrate EESD in the Education system in collaboration with NCDC. This includes further/in-service training in integration/mainstreaming sustainability issues in various curricula disciplines, practical project management, strategic planning action learning, development of learning resources and networking;

- Promote EESD schools through sensitization and establishment of EESD demonstration Centres on how school and communities in cooperation can target poverty alleviation on a local scale;

- Establishment of income generating micro-projects based on local needs in all schools to promote localizing curriculum, action learning, research and innovation and problem solving as well as enhance better performance. Development themes will be established in collaboration with schools to address local issues such as water, energy, health, agriculture, waste, and biodiversity;

- Develop simplified EESD learning and teaching supplementary materials (handbook, starter pack, theme parks and teachersô guides). Electronic curriculum support materials (video tapes and radio program scripts) will be developed;

- Establish networks and cooperate with relevant government, private sector and civil society organizations to implement EESD.

### 7.2.3. Role of development partners in mainstreaming biodiversity

Many international agencies and development partners (donors) are supporting biodiversity and natural resource management projects in the country, especially for sustainable socio development, poverty reduction and livelihood security.

In implementing the NBSAP, there are opportunities for donors to contribute in many action areas, such as, Capacity Building, Co-management of Protected Areas, Communication and Awareness Rising, Knowledge development on biodiversity, Biodiversity Management Partnership with NGOs and CBOs, in securing population livelihood through integrating biodiversity in other development sectors.

For illustrative purpose, to achieve the development goals for poverty alleviation within the country, the donors as development partners should think of:

- Integrating elements of the NBSAP into their strategic and annual plans;

- Supporting means for NBSAP sustainable implementation;

- And suggesting ways of inter-sectoral cooperation through coordinated action programs.

### 7.2.4. Including Biodiversity conservation in Economic Decisions

In many countries, business and economic activities play a major role in biodiversity conservation or destruction, either by the impacts (negative or sometimes positive) of their activities on species and natural ecosystems, or through the benefits which they derive from the goods and services delivered by biodiversity. These costs and benefits are rarely addressed in economic decision-making.

It is necessary to integrate biodiversity more fully into the economic sphere in order to reconcile public and private interests, ensure mainstreaming in the long term, raise awareness among businesses of their dependence on biodiversity and encourage economic stakeholders to invest in ecological capital and thus to play a role in developing this common asset.

In order to successfully integrate biodiversity into the economic sphere, it is necessary:

To reduce then withdraw incentives which harm biodiversity;

To reform the tax system;

To develop new positive incentives especially around protected areas;

To extend the ñpolluter paysò principle and enforce it more rigorously and;

In particular, public subsidies must be redirected in several areas to avoid contributing to the loss of biodiversity and must be subject to bio-conditionality measures.

# VIII. IMPLEMENTATION PLANS

## 8.1. CAPACITY BUILDING PLAN

### 8.1.1. Introduction

#### 8.1.1.1. Rationale

During the stocktaking phase key training needs have been identified for which capacity ought to be strengthened for the effective implementation of the NBSAP. These include institutional arrangements and human resources development for sustainable management of the biodiversity both in natural and agro ecosystems, but also the need for safe and standardized use of biotechnology in medicine and food industries, especially the use of GMOs.

#### 8.1.1.2. Objective of the capacity building plan

This plan intends to propose a framework for:

Institutional capacity strengthening in biodiversity management. This entails institutional arrangements, partnership and collaborative mechanisms for effective management of the biodiversity

Human resources capacity building for entities involved in the biodiversity, agro-biodiversity and biotechnology management. This entails awareness creation, basic and advanced techniques and methods for taxonomic and ecological studies and related socioeconomic studies to the biodiversity conservation, agro-biodiversity, biotechnology and Bio-safety

Building capacity in supportive areas such as resources mobilization, communication and outreach strategy and gender mainstreaming in biodiversity management

Define types of indicators for proper monitoring of the capacity building plan

### 8.1.2. Capacity Building Needs Areas

#### 8.1.2.1. Institutional arrangements

A. National Centre of Excellence in Biodiversity Conservation strengthening

The Centre of Excellence (CoE) is a knowledge-based institution whose responsibility is to address challenge of biodiversity and natural resources management. The central hub of the CoE is hosted by the UR and linked to nodes representing specific functional networks. Nodes are others institutions such as of high learning and research and development, NGOs private sector and others. Each of the nodes have specific roles they play to ensure the Centre achieves its mission. The hub is the coordinating organ and provides administrative, financial and managerial services to the CoE. It will function as a corporate centre, providing potential sources for ensuring all research and information management and the sharing of skills and expertise, through proper landscape level planning and management for sustainable development. It shall be a source of information (databases of biodiversity, economy, social issues, and data base of experts, publications and access to existing literature, and play advisory roles for decision making.

The National Centre of Excellence for Biodiversity conservation should be in front line, coordinate, oversees and monitor the cross sectoral implementation of the NBSAP, through collaborative and partnership mechanisms. Its capacity should be strengthened technically and legally mandated for this purpose.

The Centre of Excellence shall be having a website with a catalogue for biodiversity where related data and information will be uploaded and updated for the benefit of different types of users. A link shall be established between the website of the Centre and other websites such as REMA website, Clearing House Mechanism (CHM) as well as with other most popular social media such as Google, Twitter, Face-Book, etc, in order to communicate updated information on biodiversity and facilitate easy access to all users.

B. Partnership development among keys institutions involved in biodiversity management

Number of institutions and organization are directly or indirectly engaged in biodiversity conservation or use based on their respective legal mandates and responsibilities. A sound broad-based approach that allows the involvement of all stakeholders is cost-efficiency strategy for the NBSAP implementation. In addition, the principle of shared responsibility should be operational in biodiversity conservation strategy, thus each stakeholder agrees upon reducing its harmful impacts on the biodiversity. This is particularly important for sectors such as agriculture, mining, industry, settlement, transport, and others whose development plans should include biodiversity conservation and provide awareness to their personnel. In Rwanda, leading institutions in biodiversity conservation are: the Ministry of Natural Resources (MINIRENA), Rwanda Environment Management Authority (REMA) and Rwanda Development Board (RDB) through its department of Tourism and Conservation. It is soundly that Rwanda Natural Resources Authority (RNRA) should be among the above leading institutions in biodiversity conservation, but, it is compromised by its mining department which is among the main causes of ecosystems degradation and biodiversity loss.

Other ministries and agencies with responsibility of contributing to sustainably manage the biodiversity, since they are the main users, are as follows:

Ministry of Agriculture and Animal Resources (MINAGRI);
Ministry of Infrastructures (MININFRA);
Ministry of Trade and Industry (MINICOM);
Ministry of Finance and Economic Planning (MINECOFIN);
Ministry of Local Administration (MINALOC);
Ministry of Disasters and Repatriation (MIDIMAR);
Ministry of Education (MINEDUC);
Ministry of Foreign Affairs (MINAFET);
Ministry of Health (MINISANTE);
Ministry of Gender and Family Planning;
Rwanda Agriculture Board (RAB);
Rwanda Export Board (REB);
Rwanda Natural Resources Authority (RNRA);

Energy Water and Sanitation Authority (EWSA);
Rwanda Transport Development Authority (RTDA);
Rwanda Biomedical Center (RBC);
Gender Monitoring;
Parliament and Senate; and
Judiciary.

Institutions like REMA can effectively advocate for NBSAP implementation and overall biodiversity conservation to the Government, private sector and civil society. The operational of the Centre of Excellence on Biodiversity will also support such an initiative.

Other organizations such as Wildlife Conservation Society (WCS), International Gorilla Conservation Program (IGCP), DFGF-I, MGVP, ACNR, ARCOS, Gorilla Organization (GO), RECO Rwanda Nziza, CBOs, Environment Clubs, also advocate for biodiversity conservation in addition to their direct technical and financial support to biodiversity initiatives.

At international level the main partners and donors that support to national related initiatives, are CBD Secretariat, UNEP and GEF.

C. Development and Enhancement of transboundary collaborative management mechanisms

Enhancing transboundary mechanisms in biodiversity management is very important for Rwanda, since its biodiversity hotspots are almost located at the boarders with neighbour countries. This is the case for Volcanoes National Park transbordering and connected with Virunga National Park in Democratic of Congo (DRC) and Mugahinga National Park in Uganda, Nyungwe National Park border and connected to Kibira National Park form Burundi; Akagera National Park on the border with Tanzania; Rweru-Mugesera complex wetland bordering with Burundi and Akagera complex wetland bordering with Tanzania. Therefore, effective management of these ecosystems is ultimately depending on the collaborative and enhancement of transboundary management mechanisms in order to control poaching and other types of encroachment from neighbouring countries.

Great Virunga Transboundary Collaboration (GVTC) already operates though not yet fully endorsed by all riparian countries, the Democratic Republic of Congo (DRC), Rwanda and Uganda. It has been established for transboundary management of Mountain Gorilla population hosted by the three national parks (Volcanoes National Park in Rwanda,Virunga National Park in DRC and Mugahinga National Park in Uganda) of Virunga Massif. Such Transboundary collaborative mechanisms should be strengthened between Rwanda and Burundi for effective management of two connected and transboundary National Parks which are Nyungwe National Park in Rwanda and Kibira National Park in Burundi. And also between Rwanda and Tanzania for Akagera National Park management in Rwanda and the hunting reserve situated in the other side of Kagera River in Tanzania.

#### 8.1.2.2. Policy strengthening and law enforcement

Biodiversity considerations shall be integrated into new and revised sectoral policies and laws, including those for agriculture, mining, forestry, fishery, industry, water supply and sanitation, transport, energy, rural and urban settlement, and other type of land use in order to promote and support biodiversity and environment sustainable development.

Permits for land use or natural resources exploitation should be given under strict agreement between concessionaires and the Authority upon set mechanism that guaranty the conservation of the biodiversity including protection of critical ecosystems as well as the restoration of degraded ones after completion of exploitation. Mining sector is one of the most concerned sector, since mining activities have particularly intensified in Western Province of Rwanda where natural forest reserve such as Mukura are seriously threatened by mining exploitation. Mining legislation should be revised and gives more considerations to biodiversity and environment conservation.

Traditional knowledge that ensure sustainable use of natural resources land use management shall be identified and promoted along with the fair and equitable sharing of benefits arising from the utilization of biodiversity resources as required by Nagoya Protocol.

### 8.1.2.3. Institutional Human resources capacity building

Human resources capacity shall be strengthened though the development and implementation **Short courses, Medium** and **Long term** training programs benefiting to early and mid-career as well as the upgrading of the experienced staff from various institutions involved in biodiversity, agro-biodiversity and biotechnology management in Rwanda.

Medium term training is dedicated to biodiversity conservation practitioners for getting professional Diploma certificate. Whilst long term training are for those staff intending to perform MSc and PhD programs, short courses are just for the upgrading of everyone who needs to be so.

***a. Training areas/topics***

Proposed training areas and topics are the following:

- Methods for the conduct of taxonomic studies for all plants groups, animals classes and microorganisms;

- The conduct of ecological studies;

- Wildlife species behaviour (eco-ethology);

- Biodiversity valuation (i.e. the value of Ruhande arboretum, Nyungwe forest);

- Ecosystems services valuation methodology;

- GIS applied to conservation;

- R statistic and others statistics software (i.e. Diversity index) for analysis and interpretation of biological and ecological data;

- Traditional knowledge (in biodiversity conservation) documentation and valuation;

- Biodiversity modelling;

- The conduct of evaluation studies, especially the effectiveness of implemented incentives programs;

- Buffer zone management system around protected areas, taking into account its double functions of park protection and socio-economic development;

- Land use management;

- Conduct a broader research on landraces and livestock breeds, considering vulnerability and risk of extinction, values (ecological, economic, nutritional, scientific, cultural), and conservation strategies;

- Environmental impact/security assessment (EIA/ESA);

- Apiculture, sericulture and horticulture related value chains development;

- Climate change impact on biodiversity dynamics;

- Urban agro-forestry systems;

- Watersheds management;

- Biotechnology management and bio-safety/ genomics and GMOs analysis;

- Food technology, quality control for food and medicine products; Bioinformatics, etc.

Other most supportive training areas for which capacity should be strengthened are: Financial resources mobilization strategy, the development of an effective biodiversity communication and outreach program, Gender mainstreaming into biodiversity planning, Community-Based Natural Resources Management (CBNRM). Details related to each of these training areas are as follows:

**- Financial resources mobilization strategy.** The capacity building plan as well as the overall NBSAP activities need sufficient fund for their effective implementation. Therefore, NBSAP implementers need to be trained on how to mobilize resources through strategic mechanisms including the development of project proposals that are meeting donorsô requirements and

eligibility criteria. They also need to be timely informed of potential sources of fund internally and externally. This shall be a cross sectoral training topic benefiting to biodiversity conservation practitioners and agro-biodiversity managers.

**- Development of an effective biodiversity communication and outreach program:** aiming at mainstreaming biodiversity considerations into policies, programs and plans. This is important for gaining stakeholders support and involvement in the NBSAP implementation and the ownership of its priority actions. People from RDB, REMA, RNRA, MINIRENA and NGOs involved in biodiversity and nature conservation, are the most indicated for such short courses, since they need to communicate and collaborate with other stakeholders, convince and engage them in biodiversity conservation and sustainable use.

**- Gender mainstreaming into biodiversity planning**: In rural area, mostly in developing countries like Rwanda, women and young are the most in contact with the natural resources for multiple uses including firewood collection, grass cut, cultivation, grazing, etc. Thus, they should be considered and involved in biodiversity conservation process.

**- Community-Based Natural Resources Management (CBNRM)**: is a participatory conservation approach that allows local communities and other stakeholders living in the vicinity of protected areas or other natural and agro ecosystems with which they interact either positively or negatively. The current community conservation system established around National Park in Rwanda is related to CBNRM with aim of making local communities participating in conservation of PAs. The CBNRM approach should be promoted and applied through the NBSAP implementation process.

***b. Available training institutions***

The country is endowed with number institutions offering the opportunity to train people in biodiversity, agro-biodiversity, biotechnology and related fields. These range from public and private high learning institutions to non-government organizations.

The University of Rwanda (UR) which is currently a huge and multidisciplinary academic institution provides a complex set of teaching and research programs including those related to

the aforementioned fields. It runs among other programs: Biology Conservation, Biotechnology, Crop Production, Animal Production, Soil and Environment, Chemistry, Environmental Management, Water Resources Management, etc. It has also three MSc programs related to biodiversity conservation and natural resources management. Its GIS Center and the Center for Environment, Entrepreneurship and Sustainable Development have many achievements in biodiversity conservation and natural resources management (Twarabamenye et al., 2011). In addition, the University of Rwanda is well equipped with modern research and teaching infrastructures such as laboratories, equipment and other related facilities that enable the university to effectively run Bachelor, Master and PhD programs. The University has also developed a strong and wide international partnership with universities and research institutions around the world.

There are other public research institutions, private higher learning institutions, government agencies and international NGOs that are also involved in delivering various training, teaching and research programs including those related to biodiversity and environmental conservation. The list of some of these institutions is presented in the below table.

**Table 4: List of the main training and research institutions operating at country level**

| Institutions | Teaching & Research areas | Degree/Certificate delivered |
|---|---|---|
| **Universities and High Learning Institutions** | | |
| University of Rwanda (UR) | • Biology Conservation<br>• Environmental Chemistry<br>• Natural Resources Management<br>• Crop production and Animal Husbandry<br>• GIS and Remote Sensing<br>• Environmental Management and Sustainable<br>• Rural Development<br>• Biotechnology<br>• Urban Planning<br>• Water resource management<br>• Life Sciences, Humanities<br>• Applied Microbiology<br>• Applied Biology<br>• Education<br>• Environmental Science<br>• Environmental Health<br>• Agriculture<br>• Veterinary Science, etc. | Bachelor, Diploma, Masters and PhD |
| Institut National dôEnseignement Supérieur de Ruhengeri (INES) | ÅTraining and research<br>ÅLand survey<br>ÅBiotechnology<br>ÅSocial sciences | Bachelor degree |
| Institute of Agriculture, Technology and Education of Kibungo (INATEK) | ÅEducation<br>ÅRural development<br>ÅAgriculture<br>ÅTechnology | Bachelor degree |
| Kitabi College for Conservation and Environmental Management (KCCEM) | Å Training in Conservation and Environmental Management Education | Diploma and Certificates |
| **Research Institutions** | | |
| National Industrial Research and Development Agency (NIRDA, ex-IRST) | ÅTraining and research<br>ÅPhytomedecine<br>ÅEnergy<br>ÅForestry<br>ÅSocial sciences | |

| | | |
|---|---|---|
| Rwanda Agriculture Board (RAB) | ÅCrop variety<br>ÅLivestock improvement<br>ÅForestry and Agroforestry<br>ÅBiotechnology<br>Åsoil science<br>ÅVeterinary<br>ÅMicrobiology<br>Germoplasm Conservation for adding value research to crop, livestock, forestry and agroforestry products<br><br>It also delivers a package of technology targeting farmers aiming at the increase of production, adapt to climate extremes, etc. | |
| **Government Agencies** | | |
| Rwanda Environment Management Authority (REMA) | • Mainstreaming environmental issues into schools curricula.<br>• Mainstreaming environment into informal education<br>• Conducting research to facilitate integration of environmental considerations into development policies, plans, programs and projects<br>• Facilitating research to address environmental degradation ( air, water, land, é .) for the purpose of rehabilitation<br>• Undertaking and coordinating environmental research and cooperating with national and international organizations involved in research | |
| **International NGOs** | | |
| International Gorilla Conservation Program (IGCP) | • Building capacity for staff involved in the Volcanoes National Parks;<br>• Support of environmental education<br>• Ecological and surveillance using GIS and Remote Sensing technologies;<br>•Gorilla monitoring/Ranger-Based Monitoring (RBM)<br>• Tourism development;<br>• Community initiatives and management planning;<br>• Socio-economic monitoring | Certificates |
| Dian Fossey Gorilla Fund International (DFGF-I)/Karisoke Research Center (KRC) | ÅGorilla Protection<br>ÅResearch on Gorilla : behavior, monitoring<br>ÅPlants and animal inventory<br>ÅImprovement of population living conditions | |
| Wildlife Conservation Society (WCS) | • Inventory of mammals, amphibians, birds and plants<br>• Forest regeneration and tree phenology | |

| | | |
|---|---|---|
| | Å Environmental Education | |
| Mountain Gorillas Veterinary Program (MGVP) | ÅTissues fixing for feature histopathology examination in California, US<br>• Mountain Gorillas health care Monitoring<br>• ñBiobankò samples preparation and sent to scientists worldwide<br>• Health care provision to gorilla in the Volcanoes<br>• Assessment of the health of other species | |

***Reference: Twarabamenye et al. (2011)***

At Regional and International level there are also other training and research institutions that can be useful in delivering types of training for which there is no or sufficient competencies. Many of them established yet collaboration and partnership with the University of Rwanda and other institutions and organizations aforementioned in the above Table[4].

**Table 5: Human resources capacity building framework**

| Training areas/topics | Training timeframe (Short, Medium and Long Terms ) | | | Targets people/ Institutions/ Departments | Indicators | | Training Institution | Indicative Budget (in Rwf ) |
|---|---|---|---|---|---|---|---|---|
| | *S* | *M* | *L* | | **Outputs** | **Outcomes/Impacts** | | |
| **Biodiversity conservation in natural ecosystems** | | | | | | | | |
| Methods/techniques for taxonomic studies | **x** | | | RDB, REMA, RNRA, Local NGOs involved in conservation | - Training module developed<br>- Number of people trained<br>- Training reports | - Species composition known<br>- Rare species known<br>- Sustainable management of natural ecosystems | - UR<br>- Biodiversity Centre of Excellence<br>- KCCEM,<br>- DFGF-I, | **30,000,000** |
| Ecological studies | | | **x** | RDB, REMA, RNRA, Local NGOs involved in conservation | Idem | - Study reports, research papers<br>- Ecological processes and dynamics known<br>- Balanced and sustainable management of ecosystems | UR, DFGF-I other research and high learning institutions | **100,000,000** |
| Animal species behavior (eco-ethology) | | **x** | **x** | RDB, Local NGOs involved in conservation | Idem | Research papers<br>- Species behavior known<br>- Proper management system of animal species established<br>- Species safety | UR, DFGF-I other research and high learning institutions | **100,000,000** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Environment economics | **x** | **x** | **x** | MINIRENA, MINICOM, MINECOFFIN, NISR, RDB, REMA, RNRA, Local NGOs involved in conservation, and local administration technicians | Idem | - Ecosystem services valuation reports<br>- Biodiversity and ecosystem values integrated into national accounting system<br>- Biodiversity-based decision making | - WCS<br>-UR<br>- Other research and high learning institutions | **120,000,000** |
| Bioinformatics | **x** | **x** | **x** | RDB, REMA, RNRA, MINIRENA, Local NGOs involved in conservation, and local administration technicians | Idem | - Biological data are statistically analyzed<br>- Conservation scenarios are developed | - UR<br>- Other research and high learning institutions | **100,000,000** |
| Biodiversity modeling | | **x** | **x** | RDB, REMA, RNRA, MINIRENA, Local NGOs involved in conservation, and local administration technicians | - Training module developed<br>- Number of people trained<br>- Training reports | - Biodiversity trends are well demonstrated<br>- Decision making in biodiversity management are scientifically guided<br>- Proper measures are taken and biodiversity loss is prevented<br>- Biodiversity models are developed | Idem | **70,000,000** |
| GIS and RS applied to conservation | **x** | **x** | **x** | Idem | Idem | - All critical ecosystems mapped and characterized<br>- Efficient ecosystem management and monitoring system | - UR/Centre for GIS<br>Other research and high learning institutions | **60,000,000** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | developed<br>- Sustainable management of critical ecosystems | | |
| Traditional knowledge documentation and valorization | **x** | | | RDB, REMA, RNRA, CBOs, Local NGOs involved in conservation | Idem | - Traditional knowledge documented<br>- Use of traditional knowledge in biodiversity conservation<br>- Local communities involvement in biodiversity conservation | -NIRDA (IRST)<br>- MINISANTE<br>- MINISPOC | **20,000,000** |
| Biodiversity assessment | **x** | **x** | | RDB, REMA, RNRA, MINIRENA, Local NGOs, and local administrationô technicians | - Training module developed<br>- Number of people trained<br>- Training reports | - Evaluation reports produced<br>- Conservation plans revised and adjusted<br>- Sustainable management of Biodiversity | - UR,<br>- Private companies | **35,000,000** |
| Adaptive management of Natural Resources | **x** | | | RDB, RNRA, Local NGOs, CBOs and Local administrationô technicians | Idem | - Integrated/inclusive buffer zone management plans developed<br>-Effective and sustainable community based biodiversity conservation<br>- CBNRM plans developed<br>- Biodiversity conservation and community livelihoods ensured<br>- Sustainable biodiversity conservation. | WCS, IGCP, UR (MSc biodiversity Conservation Program) | **35,000,000** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Climate change impact on the biodiversity | | **x** | **x** | RDB, RNRA, REMA, Local NGOs | - Training module developed<br>- Number of people trained<br>- Training reports | - Mitigation and adaptation measures developed<br>- Ecosystems resistance and resilience capacity improved | UR, WCS, UNEP, CBD Secretariat, UNFCCC Secretariat | **100,000,000** |
| Regeneration and propagation of indigenous plant species | **x** | **x** | | RNRA, RDB, REMA, local NGOs, local communities | Idem | - Indigenous plant species conserved<br>- Natural habitat restored<br>- Biodiversity conserved | UR, WCS, RNRA | **100,000,000** |
| **Sub-total 1** | | | | | | | | **87,000,000** |
| **Agro-biodiversity** | | | | | | | | |
| Land use management | **x** | | | REMA, RDB, Local NGOs, CBOs, Local administration, RAB,RNRA, MINAGRI | - Training module developed<br>- Number of people trained<br>- Training reports | - Sustainable land use management plans developed<br>-Biodiversity sustainably managed | - UR<br>- Other research and high learning institutions | **35,000,000** |
| Apiculture, | **x** | **x** | | Local NGOs, CBOs, Local administration technicians | Idem | - Beekeeping value chains developed<br>- Apiculture products(such as honey) meeting international standards<br>- Local communities (honey producers) livelihoods improved<br>- Encroachment on PAs resources reduced and sustainable biodiversity conservation. | UR, WCS, NAEB, | **35,000,000** |
| Urban agro-forestry systems | **x** | **x** | | Local NGOs, CBOs, Cities | - Training module | - Urban agro-forestry plans developed | RAB, RNRA, ICRAF, | **35,000,000** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | administration technicians | developed<br>- Number of people trained<br>- Training reports | - Soil fertility restored<br>- Urban agriculture production increased<br>- Encroachment on urban natural resources (i.e. wetlands) reduced and sustainable biodiversity conservation | | |
| **Sub-total 2** | | | | | | | | **105,000,000** |
| **Biotechnology management and Bio-safety** | | | | | | | | |
| Agro-processed foodô quality control | **x** | **x** | | - Private food processing companies<br>- Cooperatives<br>- CBOs | - Training module developed<br>- Number of people trained<br>- Training reports | - Modern and safe equipment in use<br>- Quality control protocol developed<br>- Safe processed food produced<br>- Consumers safety ensured<br>- Population health protected | RBS<br>other institutions | **35,000,000** |
| Traditional Medicine quality control | **x** | **x** | | -Traditional healers | Idem | - Modern equipment and material use<br>- Medical control protocol developed<br>- Quality and approved drugs, medicine in use<br>- Environment pollution prevented<br>- Population health protected | NIRDA, UR,RBC, RBS | **35,000,000** |
| Genomics and GMOs detection/analysis | **x** | **x** | | - RBS<br>-RAB | Idem | - Quality control protocol developed<br>- Risk assessment and control improved<br>- Population health protected | UR<br>Other institutions | **35,000,000** |
| **Sub-total 3** | | | | | | | | **105,000,000** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Crosscutting and supportive skills** | | | | | | | | |
| Financial resources mobilization strategy | **x** | | | RDB, RNRA, REMA, RAB, Local NGOs, CBOs and Local administrationô technicians | - Training module developed<br>- Number of people trained<br>- Training reports | Resources mobilization plans developed<br>- Sufficient resources for cross-sectoral biodiversity management<br>- Sustainable Biodiversity management | MINECOFIN external finance unit, FONERWA, WB, UR | **35,000,000** |
| Biodiversity Communication and outreach techniques | **x** | | | RDB, RNRA, REMA, RAB, Media groups Local NGOs, CBOs and Local administrationô technicians | Idem | - Communication tools developed<br>- Stakeholders awareness raised<br>- stakeholders engagement improved<br>- Biodiversity managed sustainably | UR, WCS, IGCP, RBA | **20,000,000** |
| Gender mainstream into biodiversity planning | **x** | | | RDB, RNRA, REMA, RAB, Local NGOs, CBOs and Local administrationô technicians | Idem | - Gender issues considered into conservation planning<br>- Equitable sharing of biodiversity resources<br>- Sustainable management of biodiversity | - Gender Monitoring Office<br>- Ministry of Gender and Family Planning | **20,000,000** |
| **Sub-total 4** | | | | | | | | **75,000,000** |
| **TOTAL GENERAL** | | | | | | | | **1,155,000,000** |

## 8.2. COMMUNICATION AND OUTREACH STRATEGY

### 8.2.1. Importance of NBSAP Communication Strategy

It is a fact that no one will be able to manage and conserve something he doesnôt know or care about. Thus, communication strategy will be a key for gaining accurate knowledge and a support for implementing activities towards the conservation and sustainable use of biodiversity.

In substance, communication strategy shall be part of overall strategy for implementing biodiversity policy and achieving long-term objectives dedicated to conservation and sustainable use of biodiversity.

In this line, the national communication strategy with regard to biodiversity management and conservation should focus on short, medium and long-term efforts.

The strategy should include ways of using the communication channels like:

- Newspapers,

- Radio and television,

- Internet and website,

- Folk theatre,

- School curricula.

Well prepared and solid communication strategy shall be of great importance in informing and getting all stakeholders, including indigenous and local communities, to collaborate and support NBSAPôactivities.

### 8.2.2. Objectives

To improve the knowledge and information sources for Rwandan communities on the role and relevance of biodiversity conservation in their livelihoods;

To strengthen national communication tools and promote new innovative in order to provide users an enhanced communication hub necessary for the implementation of NBSAPôs activities;

Developing methods of responding to local population needs using the communication strategy efficiently;

To flow significant information necessary for national capacity-strengthening in the development and use of biodiversity and ecosystem services, smooth execution of Nagoya Protocol, as issues which constitute part of NBSAP updating and implementation.

### 8.2.3. NBSAP Implementation partners and target audiences

The priority issues outlined in national biodiversity strategy will be widely communicated to decision-makers, managers, potential donors, civil society and the general public (Table 6).

**Table 6: NBSAP implementation process**

| Stakeholders | Appropriate Action | Process Framework | Ways of engagement | Timing | Target Audiences |
|---|---|---|---|---|---|
| **NBSAP Steering Committee** | Channel Steering Committee decisions and guidance into<br>NBSAP implementation works | Meetingsô agenda, minutes, reports | Email, telephone, website, newsletters | Before and after Steering Committee meetings | NBSAP project managers;<br>Consultants;<br>Biodiversity users |
| **Potential Donors** | Mainstream NBSAP activities to potential donors | NBSAP Reports<br>Newsletters | Email, telephone, teleconference, website<br>NBSAP national meetings | Once opportunity arise | UN Agencies<br>Bilateral partners<br>National private sector |
| **National Agencies** | Mainstream NBSAP activities at national level<br>Communicate countryôs engagement in bio-diversity conservation | Workshops reports<br>Consultanciesô publications<br>Regional and Districtsô Facilitators | Email, telephone, Skype, teleconference, National website<br>NBSAP regional and national workshops<br>Newsletters | 3 times a year as reference to Capacity Buil-ding Strategy | Public and private Agencies involved in biodiversity Conservation |
| **CBD Secretariat** | Develop closer working relationship between the NBSAP Project and CBD Secretariat | National NBSAP and Reports sent to CBD<br>Newsletters | Email, teleconference, website<br>CBD, NBSAP Forum and/or meetings | More communication before CBD meetings | é é é é .. |
| **UN agencies and other Inter-national Govern. Organizations** | Mainstreaming NBSAP activities and its implementation | NBSAP outputs included in major international reports | UN Environment Agencies ôreports<br>Periodic national reports | Once opportunity arise | UN Agencies in the Country<br>International NGOs |
| **Civil Society** | Mainstreaming NBSAP activities and its | | Dissemination program<br>Participation in inter- | Every time NBSAP outputs | General public including small scale |

| | | | | | |
|---|---|---|---|---|---|
| **(NGOs and CBOs)** | implementation | | national events | are launched | organizations |
| **Sectoral Ministries** | Partnership with new sectors in biodiversity conservation | Cross-sectoral opportunities of NBSAP mainstreaming | Sectoral environmental issues channeled on website and Newsletters | Once resources opportunity arise | Private sector (business men, industries, ministerial departments) |
| **Other NBSAP Partners** | Support and maintain NBSAP activities implementation<br>Keep good communication flow | Website functioning<br>Newsletters | Email, telephone, website,<br>Technical Partnership Meetings, | Regularly, at least four times a year | Different partners officers |
| **Public and private media** | Mainstreaming NBSAP activities and its implementation | Scientific messages,<br>Biodiversity interesting studies | Press releases | Any appointed occasions | General public including scientists |

***Reference:*** *CBD-UNEP (2007) & Cambridge -UK (2012)*

### 8.2.4. Strategic Communication approach

Strengthening partnership between all stakeholders directly or indirectly involved in biodiversity management and conservation as well as enhancing communication mechanisms dedicated to share all available information will constitute the key directional approach to sustain the present NBSAP communication and outreach strategy.

The elaborated communication strategy will be a principal vehicle for coordinating the development of all NBSAP actions and the primary mechanism for monitoring progress towards achieving the National Targets for biodiversity management and conservation.

The basic approach of the strategy will consist of facilitating communication activities of partners, seeking to minimize competition for attention of the same audiences, making the flow of information necessary for national capacity-strengthening in the development and use of biodiversity and ecosystem services.

The strategic approach of the communication and outreach steps shall permit the expansion of partnership sphere of influence by engaging with development sectors previously not involved in biodiversity conservation (i.e. private business, industries emerging). The communication strategy will include specific tailored activities for this purpose.

### 8.2.5. Proposed activities

#### 8.2.5.1. Print media

The print media should play an important role in conveying the message dealing with biodiversity management and conservation in Rwanda. But, newspapers provide very few relevant information and articles on biodiversity conservation.

#### 8.2.5.2. Website use

It will be of great importance to improve REMA website which is an essential communication tool. The better development of this website will allow: (i) easy access to available biodiversity

information on national and regional initiatives, (ii) dissemination of key initiatives and NBSAP activities at the national, regional and international levels, (iii) creation of a more user friendly access to publications and documents, and (iv) possibility to attend a wide range of audiences from decision-makers to the general public.

It will be of great importance to link national biodiversity website to CBD website in order to enhance the user experience and strengthen partnership.

#### 8.2.5.3. Social media

Nowadays, social media (e.g. Face book, Twitter) has been experienced as a key communication tool for REMAôs activities. This channel has been used mainly to mainstream, some projectsô core works as well as particular events and campaigns related to environment protection in Rwanda.

This communication tool has offered great potential to reach large audiences, fast and less expensive.

Currently, in order to achieve a significant impact, information needs to be constantly posted and updated, which requires significant time resources. Moreover, besides coverage of international meetings, given the type and frequency of the information to be produced, and taking into account the time consumption, social media would not be considered the most effective channel to mainstream the NBSAP implementation activities.

#### 8.2.5.4. Newsletter

During the implementation phase of NBSAP, the operational monthly newsletter will circulate biodiversity information among all partners and governance bodiesô members. The newsletter will be used to inform about on-going activities, upcoming meetings, publications and general outcomes from miscellaneous research works.

Thematic storylines shall be developed, aiming to highlight partnership with other development sectors and understanding of different sectoral issues affecting biodiversity conservation and

ecosystem services. These thematic storylines will be featured on the proposed monthly newsletter and circulated through internet way tool.

#### 8.2.5.5. Radio and Television

In Rwanda, the role of radio in communicating information is by far the most effective means of information sharing within the country. With majority of the rural population having no other accessible means of communication, the radio happens to be the key media for communicating messages on biodiversity conservation. Both more diverse and frequent Media tours life is needed to increase the coverage on on-going environment activities in general and biodiversity conservation in particular.

Rwanda is developing its state infrastructure as regards the electronic media such as, the use of television, so that there has been a significant impact of the medium in urban, semi-urban areas and large villages, especially via state-owned television channel.

The emphasis and focus on environment and biodiversity conservation, however, shall know more improvement in near future.

#### 8.2.5.6. Scientific information sharing through internet

Recently, the use of the latest tools of information and communication technology is growing faster within the country. The use of the internet as a communication tool has been on the increase, though it has reached a limited part of the rural zones.

It was understood that scientific knowledge and technological know-how would be crucial in the implementation of the NBSAPs. So, admitting the fact that expertise in managing information and technology varies enormously from country to country, the Convention has established a **"Clearing House Mechanism (CHM)"** to ensure that all governments have access to the information and technologies they need for their work on biodiversity.

The national Clearing House Mechanism will facilitate sharing scientific information, through website link, on biodiversity conservation including bio-safety. A clear coordination mechanism

of information gathered by Rwandaôs CHM and the Centre of Excellence in Biodiversity Conservation should be established.

#### 8.2.5.7. School curricula

Although environmental issues, including biodiversity management and conservation are keys to peopleôs livelihood, these vital concepts are not yet well understood and found a place in the education system, which should start basically at the primary level, in the secondary schools and universities.

What is most needed at the moment is a government backed strong initiative to introduce biodiversity management and conservation as a regular subject, in the teaching curricula at the primary, secondary and tertiary levels of education, as appropriate.

Furthermore, many of the development projects that are currently under implementation in the country do not have focus on communicating messages and information on environmental issues.

#### 8.2.5.8. Folk theatre

Some specific short comedies dedicated to publicity or illustration of traditional knowledge in biodiversity conservation should be envisaged as well as theatre scenes played by students at school.

#### 8.2.5.9. Promotional materials

A number of promotional materials will be developed and disseminated during national, regional and international meetings and events as well as through the partnersô activities. These promotional materials will be produced especially during celebrations of various days associate with biodiversity conservation (e.g. World Environment Day, Gorilla babies naming ceremony, Tree planting day, etc.). The materials will include: leaflets, postcards, posters, banners, brochures, etc.

Their content and frequency will be determined in accordance with the schedule of relevant meetings and may vary across topics and time. REMAôs Communication and Public Relations Officer will keep an updated list of experts in the various topics to facilitate access by the media to the sources of information.

### 8.2.5.10. Reports and Publications

The activities of NBSAP will be mainstreamed through a series of publications and reports, including publications or reports from partners, CBD outputs and other international information flow. The REMAôs Communication and Public Relations Officer will liaise with the relevant production teams to explore and / or be ensured that biodiversity conservation issues are inclusive. All selected reports and publications will be included in the relevant publication website section, and News section.

### 8.2.5.11. National agencies

In the context of NBSAP implementation, national agencies are key actors for the development and use of biodiversity conservation indicators at the national level. Thus, it will be important to engage more closely partnership with national indicator developers through capacity building activities.

A communication plan will be developed and implemented to support and strengthen the capacity building activities mentioned in NBSAP document.

### 8.2.5.12 Fulltime resource persons

Three fulltime resource persons are needed to smoothly implement the communication and outreach strategy:

A fulltime communications expert dedicated to coordinating all the various communication, education and public awareness tasks;

A website development expert with experience and expertise in educational programs;

A focal point for implementation of communication, education and public awareness activities at national level. Ideally, this person should be trained in public relations and media, and be knowledgeable about biodiversity issues.

### 8.2.6. Available Resources

Government subsidy has been declared enough to cover all planned activities including publicity and awareness rising. Some specific activities have been sponsored by UNEP/Poverty Environment Initiative Project.

With increasing communication activities, new financial mechanisms will be explored, for example searching donors among partners such as World Bank, TIGO, MTN, AIRTEL or selling awareness tools ( calendar, T-shirts, Agenda, Ball pen etc..).

It is recommended for NBSAP coordinator to sell the idea of investing in CEPA in order to have an adequate budget allocation. This can be achieved both by demonstrating new ways of working by using CEPA to implement a NBSAP, and communicating the results of this work.

### 8.2.7. Communication Strategy Action Plan

The communication strategy action plan (Table 7) constitutes a concrete set of strategic and feasible actions necessary to gather and diffuse appropriate information at different levels in order to facilitate the smooth implementation of updated NBSAP and therefore to achieve the proposed National Targets.

**Table 7: Communication Strategy Action Plan**

| Strategic action | Responsible for implementing Action | Estimated budget (in Rwf) | Timeframe | Monitoring Indicators |
|---|---|---|---|---|
| - Strengthen National Biodiversity database and make it accessible to all interested people (users) | Database portfolio (Management) institution, Training, Research and other Stakeholders | 1,00,000,000 | Medium term (5-7 years) | - Volume of biodiversity information gathered<br>-Number of subscribers to database |
| - Strengthen effective Clearing House Mechanism, using different communication channels | CBD, REMA, UR and link to other biodiversity related conventions (CITES, CMS, ITPGRF, RAMSAR, WHC), other key international instruments and Partners donors | 50,000,000 | Short term 2 years | -Number of links established<br>-Number of subscribers |
| - Formulate key communication guidelines relevant to all people | REMA and UR, (UNEP/GEF and All stakeholders) | 30,000,000 | Medium term 2 years | -Document of communication guidelines<br>-Monitoring and evaluation reports |
| -Develop specific curricula on biodiversity conservation (Ecosystem services) for school and university students | Training institutions, High learning institutions, REB, & RDB, REMA | 50,000,0000 | Short term 2 years | - Number of curricula developed<br>-Number of schools adopting curricula |
| -Prepare a short, easy-to-read version of the NBSAP in the 3 official languages to communicate a broader range of stakeholders. | REMA, UNEP/GEF | 300,000,000 | Short term 1 year | -Number of documents prepared in 3 national languages<br>- Number of users |
| -Support development of raising awareness materials in Kinyarwanda | REMA, UNEP/GEF Training institutions | 50,000,000 | Short term (2 years) | -Number of materials produced |

| | | | | |
|---|---|---|---|---|
| | &NGOs | | | -Number of people received materials translated in Kinyarwanda |
| - Develop television emissions and other public media (Radio, Socio-media, Newspapers, etc.) to communicate biodiversity conservation messages | REMA, RBA, Private Sector, National Media Council, | 350,000,000 | Medium term 7 years | - Number of TV emissions broadcasted<br>-Number of channels broadcasting biodiversity conservation emission<br>- Copies of distributed newspapers |
| -Promote Environmental Education activities in schools to reach more people with biodiversity conservation messages | REMA, Schools Directorates, Civil society organizations | 60,000,000 | Short term (1 to 2 years) | - Number of biodiversity related events<br>- Number of people attending the events<br>-Number of participating schools |
| Organize training sessions on communication techniques for different stakeholders including communication personnel | REMA, UNEP/GEF Training Institutions | 30,000,000 | Short term (2 years) | -Number of sessions prepared and organized<br>-Number of participants trained |
| - Assess impacts of the communication strategy on conservation. | REMA, UNEP/GEF Research institutions or Consultants firms | 30,000,000 | Medium term (7 years) | -Monitoring Reports |
| - Empower the communication network on the ongoing biodiversity conservation activities and information exchange. | REMA, RDB, Centre of Excellence in biodiversity conservation | 30,000,000 | Short term (2 to 3 years) | -Number of network members<br>- Number of topics discussed |
| **TOTAL** | | **1,430,000,000** | | |

### 8.2.8. Monitoring System of the communication

It will be important to initiate a monitoring system in the initial stages of communication strategy implementation that feeds back to the REMA communication office in order to assess the effectiveness of communication activities and modify course accordingly.

REMAôs communication office will regularly monitor both the internal and external flow of information delivered. First of all, the office has to be ensured that partners in biodiversity management and conservation are well informed, engaged and able to perform the communication activities agreed upon. Second, the office has to be ensured that information delivered has been well received by the different range of audiences (i.e. users, new sectors, etc).

Below is an example of a tool to assess progress towards achieving communication objectives and results during an external communication monitoring phase. Proposed indicators and means of verification for monitoring are presented and clustered by area or action (Table 8).

**Table 8: Tools to monitor and evaluation the communication strategy**

| Area of action | Indicators | Means of verification |
|---|---|---|
| Effectiveness of websites establishment | -Number of search/consultations from website<br>-Newsletters subscribers | -Consultations and number of subscribers records |
| Biodiversity mainstreaming effectiveness and impact of NBSAP activities | -Part of biodiversity writing in reports<br>-Media passed | -Reports clippings on biodiversity<br>-Press clippings |
| Engagement of new partners to finance biodiversity conservation | -Number of new partners engaged in financing | -Letters accepting biodiversity financing |
| Integration of NBSAP activities within CBD processes | -Number of information documents shared or submitted to CBD | -Information documents shared |
| Engagement with new development sectors in biodiversity conservation | -Number of request for joint projects<br>-Number of collaborative meetings held within representatives of different sectors. | -Official information on requests<br>-Meetingsô agenda and reports |

## 8.3. RESOURCE MOBILIZATION PLAN

### 8.3.1. Introduction

#### 8.3.1.1. Setting Context

To achieve the assigned objectives of NBSAP and ensure that our nation will fulfil its biodiversity conservation commitments will mostly depend on the availability and efficient use of financial resources.

The present resource mobilization strategy constitutes a tool, an insight way dedicated to increase substantially financial resources from all potential sources for an effective implementation of the NBSAP.

It will not only indicates ways of raising funding, but also deals with the implementation responsibilities of different sectors involved in biodiversity conservation, so that our country becomes self-reliant on raising resources needed for the purpose. The strategy will also provide a framework for highlighting donors on priorities to support biodiversity conservation.

Thus, appropriate financial mechanisms as well as consolidated sources of funds shall be considered first. Besides financial resources from cooperation, it shall be necessary to raise national financial means through public, private as well as civil society partnership in biodiversity financing and actions implementation.

Among others, at countrywide level, it shall be necessary to map and assess the state of ecosystems, the economic value of their services and promote the integration of these values into national accounting and reporting systems.

Furthermore, Payment for Ecosystem Services (PES) schemes should reward public and private goods from agriculture, forest and water bodiesô ecosystems. Incentives shall be provided to attract private sector investment in green infrastructures.

Finally, it will be necessary to identify the full cost of implementing each of the NBSAP strategic actions and elaborate a detailed resource mobilization plan that identifies a wide range of finance actors, mechanisms and opportunities for mobilizing biodiversity resources.

#### 8.3.1.2. Definitions of key concepts

**Resource mobilization strategy in Biodiversity Conservation:** Resource mobilization strategy in biodiversity conservation comprises the mix of mechanisms the government will employs in order to directly finance all programs of NBSAP implementation in a manner that is efficient, equitable, sustainable, transparent and improves biodiversity conservation at country level.

**Financial actors:** A financial actor, agent, investor or institution is any individual, group or entity that could potentially provide funding for biodiversity objectives through a financial mechanism.

**Biodiversity finance mechanism:** A biodiversity finance mechanism is any instrument or tool that enables potential revenue to be captured (i.e. fees, taxes, incentives and payments etc.).

**Total amount of potential revenue:** The amount of potential revenue of a finance mechanism is a factor of the general amount the mechanism can generate per unit, and the total units likely to occur within a given year (i.e. value of land acquisition on a per hectare basis x number of hectares included in biodiversity offsets each year).

**Feasibility of the finance mechanism:** Feasibility of the finance mechanism is defined by numerous factors, including how easy it will be to establish, implement and maintain the mechanism, the extent of changes required, the alignment with other related policies, and the fit with the overall policy environment, among other factors.

### 8.3.2. Objectives

#### 8.3.2.1. Global objective

Design a national specific resource mobilization strategy in the framework of updating and implementing NBSAP.

#### 8.3.2.2. Specific objectives

Gather information base on biodiversity conservation funding needs, setting financial priorities and propose appropriate mechanisms for national and international resources mobilization;

Identify potential sources of funding and elaborate resource mobilization plan.

### 8.3.3. Resource needs for NBSAP implementation

One of the critical elements in formulating a resource mobilization strategy is estimating the resource needs for biodiversity conservation. The present document constitutes a resource mobilization strategy, so that only aligned activities to implement NBSAP and source of finding will be presented.

#### 8.3.3.1. Actions for NBSAP implementation and sources of funding

A seven-year program of actions will be developed, involving **8** focal areas and **64** prioritized activities (Table 9).

**Table 9: Activities and source of funding**

| Planned Actions | Source of funding |
|---|---|
| Focal area 1: Mainstreaming biodiversity conservation into development sectors | |
| Develop appropriate and efficient communication and outreach tools (website, newspapersé ) | Government funds (REMA) Private sector, NGOs |
| Raising awareness among stakeholders on the value of biodiversity and ecosystem services | Government funds (REMA, MINIRENA, RDB) and NGOs funds |
| Increase knowledge in biodiversity and ecosystem services valuation and their account in economic planning at national and decentralized levels | Government and Partners (UNEP/GEF), Bilateral donors |
| Environment Safeguards for public, private and civil society development plans through Strategic Environmental Studies (SES) and environmentally monitored | Government funds (REMA, RDB, RNRA) |

| | |
|---|---|
| Promote positive incentives for conservation and sustainable use of biodiversity | Government & Bilateral donors (Projects) |
| To develop sustainable investment to address poverty among communities living around Pas | ñ |
| Focal area 2: Biodiversity conservation and its sustainable utilization | |
| Development, updating and implementation of integrated conservation plans for critical (terrestrial and aquatic) ecosystems | Government and Partners (UNEP/GEF), Bilateral donors |
| Conduct survey to identify ñAlliance for Zero Extinction (AZE)ò sites and evaluate their degradation status | ñ |
| Elaboration of rehabilitation plans for degraded ecosystems areas | ñ |
| Conduct research on alien invasive species and develop related control action plans | ñ |
| Law enforcement in control of the introduction of exotic species | ñ |
| Promotion of integrated watersheds management plans around water bodies with biodiversity components | ñ |
| Support domestic energy alternatives to mitigate increased bio-energy use on biodiversity | Government (MININFRA) Private sector, NGOs |
| Improve management of wastes and pollutants and sensitization of polluters(industrial and agriculture developers) | Government (EWSA) |
| Regular monitoring of water quality in sources, small streams, rivers lakes and swamp | Government & Bilateral donors (Projects) |
| Conduct surveys to determine distribution patterns of harmful invasive species and evaluate their impact on biodiversity. | Government and Partners (UNEP/GEF), Bilateral donors (projects) |
| Restoration of fish stocks and intense selective fishing targeting harmful invasive species to establish a balanced predator/prey relationship | ñ |
| Evaluation of fish stock for each lake and estimate its thresholds fishing yield | ñ |
| Localization, collection and promotion of the use of underutilized native species (landraces/breeds races) | ñ |
| Development and implementation of plans aimed at conservation of neglected and underutilized landraces and local breeds | ñ |
| Evaluation of restoration needs for particular ecosystems, development and implementation of related rehabilitation plans | ñ |
| Establish appropriate and durable buffer zones around protected areas | ñ |

| | |
|---|---|
| Finalizing and enforcement of national protected areas Law and updating existing sectoral ones | ñ |
| Update an inventory of biodiversity hotspots and threatened species, especially those in danger of extinction and propose specific measures for their conservation | ñ |
| Reintroduce some eliminated species in protected areas to reestablish biological communities equilibrium | ñ |
| Focal area 3: Agricultural biodiversity and Biotechnology | |
| Development of plans for conservation of unique genetic resources whose survival is being threatened or endangered. | Government (MINAGRI /RAB, Partners and Bilateral projects |
| Promotion of socioeconomic activities, i.e. tea plantation in some areas, with more involvement of local vulnerable groups. | ñ |
| Project for conservation of selected genetic diversity of crop varieties, livestock breeds and races. | ñ |
| Project to evaluate effective use of GMOs and their impact on human health and environment in general. | ñ |
| Technical capacity development in biotechnology risk assessment including GMOs risks | ñ |
| Elaboration of biosafety policy and legal framework, particularly in relation with GMOs | ñ |
| Construction of indoor experiments to monitor GMOs restricted application. | ñ |
| Elaborate incentive policy to encourage reuse of agronomic resources and development of an alternative technology. | ñ |
| Focal area 4: Biodiversity use and ecosystems services delivery into national economic system | |
| Developing methods of cost estimate of biodiversity use and ecosystems services delivery. | Government and Partners (UNEP/GEF), Bilateral donors and NGOs |
| Assess the state of ecosystems and economic value of their services | ñ |
| Development of emerging markets for biodiversity and other | ñ |

| | |
|---|---|
| ecosystem services | |
| Development and use of innovative financing mechanisms, including market based tool. | ñ |
| Project to improve knowledge of ecosystems and their services by assessing their state, value of services and their integration into national accounting | ñ |
| Setting out financial needs for biodiversity conservation and matching it with financial flows | ñ |
| Develop a strategic framework to set priorities for all ecosystems restoration that provide essential services to human wellbeing and health. | ñ |
| Promotion of afforestation and reforestation programs to increase forest areas up to 3,000 hectares for carbon stock production and mitigating climate change | Government (MINIRENA /RNRA), Partners (ICRAF) & Bilateral projects |
| Strengthening institutional capacity for forest technology transfer and enforcement of forest policy and law. | ñ |
| Installation of 30 tree nurseries in all Districts. | ñ |
| Development of guidelines for access and benefit sharing of forest genetic resources | ñ |
| ***Focal area 5: Improving population welfare through Fair and Equitable Sharing of Benefits*** | |
| Construction of needed socio infrastructures to improve welfare of population using revenue sharing funds. | Government (RDB, Districts & Sectors), Private sector and NGOs |
| Government participates to financing local socioeconomic initiatives generating incomes to alleviate poverty among less endowed families. | ñ |
| Access to natural resources that can be sustainably harvested by neighboring communities (i.e. medicine plants) | ñ |
| Enhance share of National Parksô financial revenue earned through tourism or other activities with local communities | ñ |
| Compensate local communities for to crop raiding and animalsô attacks | ñ |
| Focal area 6: Traditional knowledge and cultural heritage preservation | |

| | |
|---|---|
| Conduct research and valuation of traditional knowledge, cultural heritage of biodiversity conservation | Government, Training and Research institutions) |
| Transfer of indigenous traditional knowledge on biodiversity into curricula development and cultural values transfer programs | ñ |
| Review of national policy and legal framework to include respect and use of traditional knowledge in biodiversity management and conservation. | ñ |
| Focal area 7: Scientific knowledge management and capacity building | |
| Promote fundamental research projects in order to increase knowledge on ecosystems and their biodiversity. | Government (MINIRENA, MINEDUC, Research institutes), NGOs |
| Strengthen and enhance the capacity on national Centre for Excellence in Biodiversity Conservation. | ñ |
| Conduct research on genetic resources important for national agriculture especially those whose survival is threatened; | ñ |
| Enhance the capacity of human resources in biodiversity management and conservation through short, medium and long term training. | ñ |
| Focal area 8: Resource mobilization for NBSAP implementation | |
| Appoint a "resource mobilization focal point" to facilitate its strategy implementation. | Government (MINECOFIN, MINICOM REMA, RDB) Partners donors |
| Strengthening capacity of NBSAP staff in ñresource mobilization " strategy to facilitate effective implementation of the strategy | ñ |
| Inventory of all potential sources of fund internally and externally for NBSAP implementation and establish resources mobilization strategic mechanisms | ñ |
| Assessment of the current resources available and their distribution across sectoral planned budgets | ñ |
| Assessment of resource requirements based on actual needs and action plan for NBSAP implementation. | ñ |

| | |
|---|---|
| Development of emerging markets for biodiversity and other ecosystem services | ñ |
| Development and use of innovative financing mechanisms, including market based tool. | ñ |
| Setting out financial needs for biodiversity conservation and matching it with financial flows | ñ |

***Reference: Suisse Confederation/UNDP. The Biodiversity Finance (BIOFIN)***

### 8.3.4. Biodiversity Finance: current Situation, Sources, Actors and Mechanisms

#### 8.3.4.1. Current situation in biodiversity financing and constraints encountered

The biodiversity financing in Rwanda is mainly provided by the government institutions, especially through the Ministry of Natural Resources Management, government agencies such as REMA, RNRA and NAFA, through donors funding as well as international NGOs support.

At present, it seems not easy to evaluate the Government contributions to biodiversity conservation because, in budget allocations to different national institutions/departments to support their activities, biodiversity conservation benefits are not always clearly indicated.

For example, there is a budget allocated to watersheds conservation activities in the Ministry of Agriculture and livestock, though not explicitly ear-marked for biodiversity conservation.

Donorsô financial support constitutes the most component of funding for biodiversity conservation in our country, it is offered through UN agencies such as UNEP/GEF, conservation projects in different ministries, International organizations directly involved in biodiversity conservation such as WCS, IGCP, and NGO etc.

Through community work (umuganda) local population contributes significant amounts of time and material resources for conservation, which have never been quantified.

Despite financial support available from government sources and international agencies, there exist several constraints such as:

The amount of budgets allocated to environment conservation are too small to address all of the programmed actions;

Lack of long-term commitments in investment of biodiversity conservation;

Very few considerations on the services biodiversity can provide in relation to poverty reduction, education, health, sanitation infrastructural development, disaster management etc.;

Lack of a broader biodiversity conservation approach which limits funding to projects level;

In most of cases, funds are allocated in relation to either a disaster or a commitment to an international obligation. Thus, the category and amount of support seem to be inadequate.

**8.3.4.2. Sources of funding**

Currently, the target is to identify, diversify and scale up various sources of funding. It shall be important to broaden the channels of inputs, increase national and local funding, and guide private, credit, and international capital to participate in the protection of biodiversity, and foster a diversified investment mechanism.

Further, it shall be necessary to rationalize available resource funds, integrate existing dispersed funds in biodiversity conservation to improve the use efficiency and maximize co-benefits of various funding sources.

- Public funds

The origin of public funds is diverse: Government allocation funds, special public revenue-raising effort, public sector user fees, foreign assistance etc... In line with the 2020 Strategy and the global CBD target, the reform of harmful subsidies should also benefit biodiversity management and conservation.

- International funds

In Rwanda, one of the most important resources to support biodiversity management and conservation is international cooperation. In this sense, the UN agencies such as UNEP/GEF, United States (through NGOs), European Union (through NGOs), the Germany aid etc.., appear as the country's most important partners in this area.

It is time to urge the ministries, governmental and nongovernmental institutions to consider in their budgets, for financing, the activities mentioned in the NBSAP Action Plan.

- Biodiversity users

To meet the financial needs for NBSAP implementation, ensuring synergies with other relevant innovative funding sources such as: user charge in public facilities, purchase of ecosystem goods, climate change finance, funds generated by the Nagoya Protocol on ABS, .., should be considered.

### 8.3.4.3. Principal actors and their involvement

The principal actors mentioned are individuals, group or entity that could potentially provide funding for biodiversity objectives through a financial mechanism (Table 10). As REMA is receiving technical support and assistance from multilateral and bilateral partners, particularly from UN agencies, it will be important to reinforce the cooperation and search new potential donors for biodiversity management and conservation.

REMA shall continue to forge partnership with UN agencies and bilateral partners, both at the national and regional levels, in order to participate in various regional projects.

MINIRENA and REMA shall also capitalize on their existing involvement and partnership with various regional programs through enhancing partnerships and linkages with regional organizations such as East African Conservation Society etc...

**Table 10: Involvement of different potential actors**

| ***Potential Finance Actors*** | ***Involvement*** |
|---|---|
| UNDP, UNEP, FAO, MINAGRI, etc.é | Develop joint programs with relevant sectors for funding |

| | |
|---|---|
| Multilateral organizations/agencies (GEF, UN Agencies) , FONERWA and other Funding Donors | Develop specific project proposals for the priority strategic areas and joint programs for various donors and partners |
| GEF and UN Agencies | Optimize funding allocation from the Global Environment Facility (GEF) under the System for Transparent Allocation of Resources (STAR, GEF) |
| FONERWA, GEF and UN Agencies, MINAGRI | Undertake joint and synergistic programs across biodiversity and climate change as well as between biodiversity and land degradation. |
| GEF-SGP; Bilateral Partners such as é é | -Develop community based biodiversity and livelihood projects and purchase small -scale funding windows (i.e. GEF/SGP Small Grants Program). |
| MINECOFIN, MININFRA, ABAKIR | Review existing scope of the Lake Kivu Methane Gas exploitation and Akagera Business Project to consider biodiversity in its priority support areas |
| MINECOFIN, UNDP etc | Establishment of an inter-ministerial committee to develop sustainable financing mechanism to generate revenues for biodiversity programs |
| RDB, MINICOM, Private Sector and Individuals | Ecotourism gate revenue |
| PES (EWSA, RTDA, MINAGRI, Private sector) | Ecological Services beneficiaries |
| MINECOFIN, RNRA, Bilateral Partners | Identify and estimate the benefit to major sectors provided by products and services derived from biodiversity. |
| RNRA, REMA, MINECOFIN and UNEP/GEF | Conduct economic assessment of the consequences of the loss of biodiversity. |
| CEPA, National Media Council, bilateral partners | Developing strategies and tools for communicating national biodiversity issues |

#### 8.3.4.4. Financial mechanisms

The analysis of existing mechanisms and proposal of innovative ones constitute instruments or tools for the generation and delivery of potential funds at the national level. Thus, it will be necessary to promote the development and use of innovative financing mechanisms, including market-based instruments. The following are the financial mechanisms proposed:

- Official Development Assistance to Rwanda;

- Public Sector user Funds;

- Payment for Ecosystem Services;

- Carbon credit payment;

- Biodiversity utilization payment;

- Fines and levies;

- Fundraising through public revenue-raising effort;

- Voluntary (i.e. hotel fees) and mandatory (i.e. aeroport departure fees);

- Biodiversity offsets;

- Environmental economic accounts;

- Reduction of subsidies;

- Set limits on trade of natural resources;

- Legal mechanism for economic incentives to sustain use of biodiversity.

**8.3.4.5. Analysis on feasibility of proposed financial mechanisms**

From an analysis on feasibility of proposed financial mechanisms, the following considerations have been pointed out:

- Although the proposed new mechanisms are not conflicting with the national financial policies and laws, most of them will require the establishment of legal and regulatory framework accordingly. Nevertheless, they present affordable feasibility and are politically acceptable and reflect legally correct ways of raising resources;

- Awareness rising to finance biodiversity conservation, transparent accountability for mobilized resources as well as securing sufficient resources in the long-term will constitute principal prerequisites for the smooth administration of proposed financing mechanisms;

- Spreading responsibilities among different sectors will improve cost-effectiveness and facilitate identification of diverse sources of funding;

- Improving access to genetic resources and equitable sharing of boons from biodiversity use as well as ecosystem servicesô benefits will raise a better perception, ownership and legitimacy in natural resources utilization and preservation by different users and beneficiaries;

Based on truthful scientific information, generated through research projects, a balance between increased revenues from biodiversity use/services and sustainable conservation should be established so that the implementation of new financing mechanisms will not compromise the objectives of natural resources conservation.

### 8.3.5. Develop partnership strategy

In order to increase effective engagement in biodiversity conservation, Rwanda Government needs to partner with private sector, especially the primary industries sector and attract more private expenditure on biodiversity conservation trough effective partnership.

Such a partnership to be successful, the following strategies shall be put in place:

- To ensure that there are financial incentives for actions that protect or enhance biodiversity conservation;

- The cost of damage to biodiversity is accounted for in economic planning;

- The benefits from biodiversity use and ecosystems services are fully reflected in national economic system;

- Develop and align emerging markets for biodiversity and other ecosystem services.

Well-designed markets for biodiversity use and ecosystem services will provide a way to value biodiversity, so that it can be considered alongside economic and social factors, and can be very effective in encouraging investment in biodiversity conservation.

### 8.3.6. Resource mobilization plan

The resource mobilization plan is a concrete set of strategic actions to mobilize the financial resources required to implement the full NBSAP and therefore to achieve the proposed National Targets (Table 11).

**Table 11: Resource mobilization plan**

| *Financial mechanism* | *Strategic action to implement mechanism* | *Responsible for implementing Action* | *Estimated budget to implement action* | *Timeframe* | *Monitoring Indicators* |
|---|---|---|---|---|---|
| (Official Development Assistance to Rwanda)<br><br>External financing mechanism | Coordinate with development partners, the United Nations and regional organizations and explore ways to substantially increase levels of funding and develop joint programs | MINICOFIN<br>MINIRENA | 1,000,000,000 | Once per year during 7 years program | - Number of agreement signed<br><br>- Amount of fund mobilized |
| Public Sector user Funds | Development and submission of well elaborated specific project proposals for the priority strategic areas | MINECOFIN (FONERWA), REMA, RDB, RNRA & Concerned Sectors, | 1,500,000,000 | Each year during 7 years | Number of elaborated specific project proposals submitted and funded |
| Payment for Ecosystem services | Development of schemes that allow users to pay for the costs of maintaining ecosystem services (i.e. water , electricity, road services ) | RNRA, REMA<br>RDB | 100,000,000 | First year<br>2014 | - The value of payment to ecosystem services<br>Number of beneficiaries of paid ecosystem services<br>- Financial reports of total amount of paid services |
| | Identify and estimate the benefit for major sectors generated by products and services derived from biodiversity (environment) | RNRA, REMA<br>RDB & Service users | 100,000,000 | Once each year | Benefit derived from biodiversity conservation calculated |
| | Evaluation of forested areas and development of tax credits and tax deductions for behaviors. | MINECOFIN,<br>MINAFET, RRA | 2,000,000,000 | Short term (2 years) | -Financial reports on carbon credit paid<br>-Superficies of planted |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | forest areas |
| Biodiversity utilization payment (Bio-prospective) | Increasing percentage of revenue from biodiversity use for financing local development initiatives | RNRA, RDB MINECOFIN, NIRDA | 700,000,000 | Each year during 7 years | - Amount of revenue from biodiversity use<br>- Number of certificates/permits delivered for biodiversity use |
| Fines and levies | Comply with existing punitive fees and fines to discourage environmentally harmful behaviors. | REMA, RDB MINIJUST, Rwanda National Police, Local Authorities | 50,000,000 | Short term 2 years | Number of punitive cases and collected amount/fees |
| Fundraising through public revenue-raising effort | Raising funds for biodiversity conservation during: national tree day, world environment day, KWITA IZINA (babies Gorilla naming ceremony) | MINIRENA, RDB MINECOFIN, MINALOC, RNP | 700,000,000 | Each year during ceremonies | - Amount of funds gathered<br>-Number of fundraising events organized |
| Voluntary (i.e. hotel fees) and mandatory (airport departure fees) | Directing towards biodiversity management voluntary fees (i.e. hotel fees) and mandatory fees (airport departure fees) | MINECOFIN DISTRICTS RRA | 50,000,000 | Each year | - Amount of funds gathered<br>-List of contributors recorded |
| Biodiversity offsets | Promotion of a framework for reducing biodiversity loss by allowing companies (i.e. mining) to protect equivalent areas of land and biodiversity using agreed upon standards. | DISTRICTS & MINIRENA | 500,000,000 | Once opportunity arise | Number of biodiversity offsets recorded |
| Reduction of subsidies | Reduction of subsidies on harmful pesticides (i.e. fertilizers) and increasing those having beneficial impacts on ecosystems. | RBS, MINAGRI | 500,000,000 | Each year during 7 years | -Volume of harmful pesticides reduced<br>-Volume of good fertilizers utilized |

| | | | | | |
|---|---|---|---|---|---|
| Set limits on trade of natural resources | Setting limits on amount of ecosystemôs goods to be exploited and commercialized. | MINIRENA, RNRA, RDB, MINICOM, RNP | 700,000,000 | Each year of 7 years | Amount of annual maximal capacity of ecosystem to be exploited |
| Legal mechanism for economic incentives to sustain use of biodiversity | Develop normative act of the National Biodiversity Fund (NBF) | REMA, RDB MINIJUST | 10,000,000 | Short term 1 year | Document of proposed Act and published in official gazette |
| **TOTAL** | | | **7,910,000,000** | | |

The NBSAP managers and planners will review the present resource mobilization plan, give priorities to different finance mechanisms and actors as well as create a realistic, practical strategy for implementing it.

**Recommendations**

- The Government of Rwanda need to consider how to develop new and innovative financing mechanisms and facilitate voluntary schemes dedicated to harness their potential for protecting and enhancing ecosystemôs services and contribute to pilots actions for biodiversity conservation;

- Considering Rwandaôs good climate and rich biodiversity opportunities, our country should set up a business-led Ecosystem Markets, based on expanding green goods, services and various products;

- Establish a strong partnership with all stakeholders in order to help the biodiversity sector make the most of existing sources of funding, which will continue to be highly important to support the NBSAPôs priorities.

### 8.4. TECHNOLOGY NEEDS ASSESSMENT

Biodiversity management and conservation constitutes a cross-cutting issue in different development sectors. Thus, the technology needs assessment has been conducted to identify environmentally sound technologies developed in different sectors that will positively or negatively contribute to the reduction of biodiversity loss and contribute to the national biodiversity management and conservation.

#### 8.4.1. Identification of sectoral technology needs

##### 8.4.1.1. Technology needs in Agriculture Sector

a) GMOs detection in food or feeds

The detection of genetically modified organisms in food or feed is possible by biochemical means. It can either be qualitative, showing which genetically modified organism (GMO) is present, or quantitative, measuring in which amount a certain GMO is present.

The common method used is called Polymerase Chain Reaction (PCR). The polymerase chain reaction is a biochemistry and molecular biology technique for isolating and exponentially amplifying a fragment of DNA, via enzymatic replication, without using a living organism. It enables the detection of specific strands of DNA by making millions of copies of a target genetic sequence.

The quantitative PCR is used to measure the quantity of a PCR product. It is the method of choice to quantitatively measure amounts of transgenic DNA in a food or feed sample. Quantitative method is commonly used to determine whether a DNA sequence is present in a sample and the number of its copies in the sample.

The qualitative PCR shows whether or not a GMO present in a sample can be tested by Q-PCR, but also by multiplex PCR. Multiplex PCR uses multiple, unique primer sets within a single PCR reaction to produce amplicons of varying sizes specific to different DNA sequences, i.e. different transgenes. By targeting multiple genes at once, additional information may be gained from a single test run that otherwise would require several times the reagents and more time to perform.

b) In vitro Gene bank

The standard operation procedures in vitro gene bank conditions where germplasm is maintained into in vitro slow growth conditions (medium-term storage). Referred to Badara G. et al. *(*2012) the procedures include:

- Plant tissue culture and in vitro conservation working in a sterile environment (under the sterile laminar flow);

- Media preparation for in vitro plant tissue culture. In vitro culture implies maintaining plant tissues in artificial conditions for conservation or multiplication purposes;

- The establishment of the plant material in the in vitro culture system which is called in vitro culture;

- Germplasm in vitro conservation (medium-term storage);

- In vitro gene bank inventory system. Any operation applied to the germplasm (acquisition, subculture, elimination, distribution, acclimatization, indexing, duplication) creates new information/data;

- In vitro sample preparation for indexing. Indexing involves collecting leaf samples from the in vitro seedling at an adequate time for further analysis by the Germplasm Health Unit (GHU);

- Storage of biological materials at ultra-low temperatures (generally in liquid nitrogen at ï 196 ºC) is the third option for the ex situ conservation of clonally propagated crops;

- In vitro germplasm distribution/reception. In vitro collections of the clonally propagated crops conserved should normally be distributed worldwide under the Standard Material Transfer Agreement (SMTA) for food and agriculture.

c) Micro-irrigation efficiency

Developing micro-irrigation efficiency would be instrumental in addressing water scarcity, raising crop production and food security, and by the way increasing agro-biodiversity within a larger area irrigated with the same volume of water. In terms of environmental sustainability, improved micro-irrigation efficiency may release more water for the environmental flow, thus alleviating constraints leading to biodiversity loss. Micro-irrigation application can result in higher yields and generally offers higher water use efficiency than for instant surface irrigation.

***d) Crop rotation***

Crop rotation leads to a better control over weeds, pests and insects and the soil extracts or regains more nutrients, especially when legumes are included in the rotation cycle. Crop rotation also means constant vegetative soil cover, either with live crops or dead plant residues and has to be combined with minimal tilling in order to produce the biggest benefits.

***e) Composting and raising nutrient management***

An adequate management of nutrients plays an important role in soil fertility and increasing crop production. Furthermore, integrated nutrient management aims at ensuring soil health, enhances biological processes in soil as well as biomass production and biological nitrogen fixation.

### 8.4.1.2. Technology needs in Water Sector

**a) Water reservoirs and/or large dams**

The agriculture sector, especially in eastern part of the country, is subjected to high fluctuations in rainfalls or river runoffs, and it is expected that climate change will likely bring some higher annual variability in rain water. Faced with this issue, the national authorities will propose the development of water reservoirs or large dams in the region. Water reservoirs/or dams allow for storing of large volumes of water, which can be used for multiple purposes. Several large dams were built in Nyagatare District to support agricultural expansion and maintain water supply stability for livestock development.

**b) Modernization of hydrological and hydro-meteorological stations**

Climate fluctuations conditions usually increase annual variability in rainfalls. Therefore, more robust forecasting is needed to raise preparation of agriculture production facing possible damage through droughts and floods, affecting crops and destroy biodiversity in lowlands. Relevant measures to propose will include technological modernization of hydrological and hydro-meteorological stations and foresee improvements in weather and climate forecast models.

In general, the reasons behind deterioration of hydrological monitoring as well as for meteorological observations are:
- Lack of state sufficient funding;
- Lack of national capacity of the hydrological and hydro-meteorological services;
- Lack of regional cooperation in information exchange and harmonization of measurement methods.

### 8.4.1.3.Technologies needs in Forestry Sector

**Forestation and preservation of existing forests**

Deforestation is one of the most critical environmental problems facing developing countries today in terms of its long-term catastrophic impact on biodiversity, economic opportunities, social problems created and contribution to global climate change.

Three broad categories of forest related interventions in order to conserve biodiversity can be considered:

- Better management of existing forests through extending harvesting age, reducing or avoiding deforestation and forest preservation,

- Forest cover expansion through afforestation on previous cropland or pasture and reforestation by establishing forest on clear felled areas,

- Biomass increasing through planting short rotation woody crops.

### 8.4.1.4.Technology needs in Bio-ecology Sector

The following are some needs in bio-ecology sector:

- Attaching tags on birds for tracing their migratory routes and location of their breeding sites;

- Pose of electronic devices on wild animals for tracing their distribution patterns within a protected area or fishesô migration in water bodies;

- Taxonomy equipment (both for plant and animal species);

- DNA species identification techniques and equipment;

- Specimen conservation techniques, equipment and infrastructures, etc.

**Table 12: Technologies developed in different sectors impacting on biodiversity conservation**

| *Key Sectors* | *Technologies* | *Elements impacting on biodiversity conservation* | *Needed infrastructures, equipment /or materials* | *Major barriers for their adoption* |
|---|---|---|---|---|
| | | *Agriculture* | | |
| | Micro-irrigation efficiency | Raising crop production | Line drippers, sprayers and sprinklers.<br>Valves, pumps and tubes | -Lack of an incentive system to push farmers to adopt these technologies.<br>-Application geographical limited<br>-Lack of local market for the technology |
| | | Maintain soil moisture ad its fauna | -Piezometer | Request high technical skills |
| | -Gene bank to keep genetic materials<br>-In situ or Ex-situ conservation techniques | Intense production of crop varieties and/or local landraces resistant to drought, pests and pathogens | -Autoclave,<br>-pH-meter calibrator,<br>-Precision balance,<br>-Water distiller /deionizer,<br>-Refrigerator,<br>- Laminar flow Cabinet,<br>-Label printer,<br>-Hand scanner,<br>- Erlenmeyer Flask,<br>-Chemicals etcé | Request high skills development and experience; |
| | Genetically Modified Organisms (GMOs) detection | Negative impact on human health and other biodiversity elements in general | -PCR Automated workstation<br>- Real time PCR systems have the capability for gene expression analysis | -Request special skills and experience<br>-Request high financial investments;<br>-Request institutional/policy |

| | | | | |
|---|---|---|---|---|
| | | | | efficiency |
| | Crop rotation | -Control over weeds, pests and insects<br>- Constant vegetative soil cover;<br>-Soil regains more nutrients | -Rotto tiller,<br>- Spading fork or shovel | -Government enforce cultivation of extensive specific crops be it for the reasons of economy or food security<br>-Request more skills and experience<br>-Institutional/policy deficiency; |
| | Crop diversification | -Increase crop varieties and production<br>-Inhibit local landraces development and conservation | -Crawler tractor,<br>-Harvester,<br>-Farm trailer,<br>-Grain thrower,<br>-Meadow aerator,<br>-Combine seed drill etcé | -Request skills and experience;<br>-Technology application is limited in country |
| | Composting for green manure and raising nutrient management | -Increase soil fauna;<br>-Increase vegetation biomass production | -Straddle turner,<br>-Screeners,<br>-Grinding buckets | -Request special skills and experience<br>-Request moderate financial investment |
| ***Water*** | | | | |
| | Water reservoirs or large dams | -Increasing aquatic biodiversity;<br>-Limiting drought and increasing bio-cover with associated fauna | Pumps, Dam outlets<br>Off-take towers | -Insufficient coordination between stakeholders and beneficiaries<br>-Request high financial investment<br>-Limited geographical application in the country |
| | Modernization of hydrological and hydro-meteorological stations | Development of early warning systems to avoid biodiversity loss through | Set up modern hydrological and hydro-meteorological stations; | -Request high capital costs<br>-Demand special skills and |

| | | | | |
|---|---|---|---|---|
| | | droughts and floods | - Use automated hydrological and hydro-meteorological equipment;<br>- Utilize GIS and remote sensing (RS) tools | experience |
| ***Forestry*** | | | | |
| | Forestation (afforestation & reforestation)<br>Trees nurseries development | Increasing forest biodiversity ,<br>maintain microclimate cool, slow decomposition and release of $CO_2$ | - Kilns, tumblers, separators, dewingers, etc.<br>Scalpers, grinders.<br>-Seedbeds are prepared with plows, harrows, rock rakes, packers, bed formers, and levelers;<br>-Seed is then sown with drills or broadcast seeders | -Enhancement of coordination between technicians and local communities (farmers, forest technicians);<br>-Request moderate technical skills in forestry and agro-forestry |
| | Forest biomass preservation | -Storage carbon in plants and soil;<br>-Slowing of decomposition and release of carbon to the air | Just conservation measures, no equipment needed | ñ |
| | -Rotation of high woody crops | -Maintenance of forest biomass and climate change mitigation | -Refer to equipment for tree nursery development | -Request moderate technical skills in forestry |
| ***Bio-ecology*** | | | | |
| | -Electronic devices (tags) for assessing wildlife fauna and tracing their distribution patterns<br>- Taxonomy equipment (both for plant and animal species) | -Biological resources conservation and management monitoring<br>- Biodiversity census<br>- Specimen sample conservation | -Electronic tags<br>- Systematic inventory<br>- Conservation materials and infrastructures | -Request special skills and experience;<br>-High capital costs<br>- Fund availability<br>- Required expertise, especially for DNA use in species identification |

| | | | | |
|---|---|---|---|---|
| | - DNA species identification techniques and equipment<br>- Specimens conservation techniques, equipment and infrastructures, | | | |

***References: Essegbey G.O. et al. (2012); CAREC ( 2012) & Ethiopia Ministry of IWR (2007)***

**Recommendations**

- Set up key hydrological and meteorological stations responsible for providing the end-users with climate observation data and water flow forecasts;

- Provide automated hydrological, hydro-meteorological and communication equipment;

- Promotion of water reservoirs or large dams in order to support agricultural expansion and maintain water supply for livestock development in the Eastern region of the country;

- Increasing water use efficiency through better water management at national and sub-regional levels;

- Testing specific drought, pest and pathogens resistant varieties, suitable for the Eastern Province and transfer gained success to farmers on a smaller or larger scale;

- There is a need to conciliate crop intensification and diversification program with crop rotation at country level for a better development of agriculture sector.

# XIX. INSTITUTIONAL, MONITORING AND REPORTING

## 9.1. NATIONAL COORDINATION STRUCTURES

A key to the achievement of NBSAP objectives and its effective implementation is the establishment and continuation of a coordination structure that will ensure its implementation and subsequent monitoring and reviewing.

The Ministry of Natural Resources through the Rwanda Environment Management Authority and the focal point of the CBD are responsible for the conservation and management of biodiversity in the country. At sectoral level, the responsibility of conserving and managing the nationôs natural resources is shared between a number of different government bodies, including the Ministries of Agriculture and livestock, of Natural Resources management, of Infrastructures etc.

The Rwanda Development Board (RDB) is a specialized body dealing with the management of natural reserves, wildlife and protected areas in general. Within the Rwanda Natural Resources Authority (RNRA), the Department of Forestry is another specialized body dealing primarily with planted forests.

Research institutions like Research Institute in Science and Technology (RIST), Rwanda Agriculture Board (RAB) with its forestry department and many University departments are conducting research and action programs on biodiversity documentation and management. Some international, regional and national NGOs are also involved in carrying out action programs related to biodiversity conservation and policy issues.

Unfortunately, responsibilities, coordination mechanisms and communication channels among these many different ministries, government and private agencies, training and research departments remain poorly defined and unclear.

Hence, there is need for effective coordination of various biodiversity conservation activities, executed by different organizations to ensure the successful implementation of the NBSAP.

Therefore, strengthening the Centre of Excellence for Biodiversity Conservation (CoE) in order to coordinate efforts of biodiversity conservation, sustainable management and equitable benefit sharing is an urgent need.

The proposed institution will act as the national forum for coordinating the biodiversity conservation efforts and integrate biodiversity conservation activities in a holistic manner. The CoE would require a formal institutional mechanism to operate efficiently and effectively and be responsible for affecting the following functions:

- Overall enforcement of biodiversity policy and legal framework;

- Integration of planning, programs and actions on biodiversity conservation by different agencies;

- Management of Clearing House Mechanisms in order to share databases information among all stakeholders involved in biodiversity conservation;

- Monitoring and evaluation of programs and actions on biodiversity conservation;

- Produce and disseminate annual reports on the current status of biodiversity conservation;

- Providing support to the Ministry of Natural Resources, REMA, RNRA, RDB on the multinational environmental interventions, including the CBD activities and events;

- Any other issues related to biodiversity conservation.

The institution will act as clearing/screening house for all biodiversity related projects to be adopted by the public as well as private sectors. It will have power to restrict and control biodiversity related research or any other works to be conducted in the country by foreign organisms.

Concerning the implementation mechanism proposed for the NBSAP, the most important aspects to consider are that:

- The implementation process should be participatory, cross-sectoral and involving all relevant government agencies, private sector and civil society members;

- It should mainly aim at (i) registering all work undertaken/accomplished which address biodiversity issues across the country, (ii) facilitating coordination between different organizations and sectors, (iii) exchanging experiences and lessons learned, and (iv) assessing general progress towards biodiversity conservation;

- An inter-ministerial body should be established to review and monitoring CoEôs activities;

The basic mandate of CoE will include providing conceptual guidance and promoting exchanges and inter-sectoral agreements related to biodiversity conservation.

### 9.2. CLEARING-HOUSE MECHANISM

During the Conference of parties (COP), it has been decided that each country should establish a Clearing House Mechanism (CHM), in conformity with Article 18.3 of the Convention, in order to promote and facilitate technical and scientific cooperation.

In substance, the CHM has a mission to contribute significantly to the implementation of the Conventionôs Strategic Plan for Biodiversity 2011-2020, through effective information services and other appropriate means dedicated to promote and facilitate: scientific and technical cooperation; knowledge sharing and information exchange, and to establish a fully operational network of Parties and partners.

At country level, the national clearing-house mechanism provides effective information services to facilitate the implementation of the national biodiversity strategy and actions plan. The CHM consists of a portal (website) where information on countryôs biodiversity needs to be posted.

All websites are hosted by the Royal Belgian Institute of Natural History, which has been charged to build the capacity of 18 African countriesô focal points (called Web managers).

In order to have an effective technical cooperation, knowledge sharing and information exchange, and CHM network has been developed at the level of CBD and the capacity of Focal

Points is regularly built by the CBD Secretariat. At national level, parties are only requested to customize the portal according to the situation of the country and start uploading info.

For Rwanda, the CHM has been established and is functional, hosted in REMA. What are actually needed concerns to build the capacity of a team of contributors involved in biodiversity management who would regularly post info and documents? Once the national capacity will be built, all institutions involved in biodiversity management and conservation will contribute on the enhancement of the portal and accuracy of information provided.

## 9.3. MONITORING AND EVALUATION

### 9.3.1. Monitoring and reporting System

Reference to Article 26 of the CBD, each Contracting Party is obliged to report regularly on the Convention, the implementation progress of its NBSAP, as determined by the Conference of Parties. Thus, for the successful implementation of NBSAP and its reporting to CBD, an effective and efficient monitoring and reporting system has to be put in place in our country.

The proposed Monitoring and Reporting system will involve:

- Collection of information about the current status of biodiversity and implementation of NBSAP activities by different involved stakeholders and;

- Periodically, reporting on the Convention issues to implementing government bodies and the public in general.

The proposed monitoring and reporting system will be undertaken to review the performance on implementation and the impacts of NBSAP implementation on the status of biodiversity. Monitoring and reporting system component will be directly handled by Departmental office of the CEBC.

**a. Monitoring System**

With regard to implementation performance, the monitoring system will start by looking at the activities and projects implemented by the different organizations and institutions on the basis of their reports deposited at the relevant authorities.

Concerning information on biodiversity status and trends, the monitoring system will:

- Begin by preparing a biodiversity status baseline report, including performance indicators, to be taken as the reference point for future comparisons;

- Collect secondary information and commission scientific studies on a regular basis to assess the status and trends of key specific issues relevant to the NBSAP;

- Conduct a new biodiversity status report every four years, the results of which are going to be compared with the baseline ones in order to find the different trends affecting biodiversity in different areas, and other issues relevant to biodiversity situation.

**b. Reporting system**

During regular meetings held by the NBSAP coordination institution, the reporting system will report periodically about its findings in the different areas. Additionally, the reporting system will report regularly to the public through the different communications media utilized by relevant institutions (newspapers, newsletters, website, radio, TV and others).

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# ANNEX 1: PROPOSED NATIONAL PROTECTED AREAS PRIORITIES

***(Ranking each ecosystem based on criteria for Priority Conservation)***

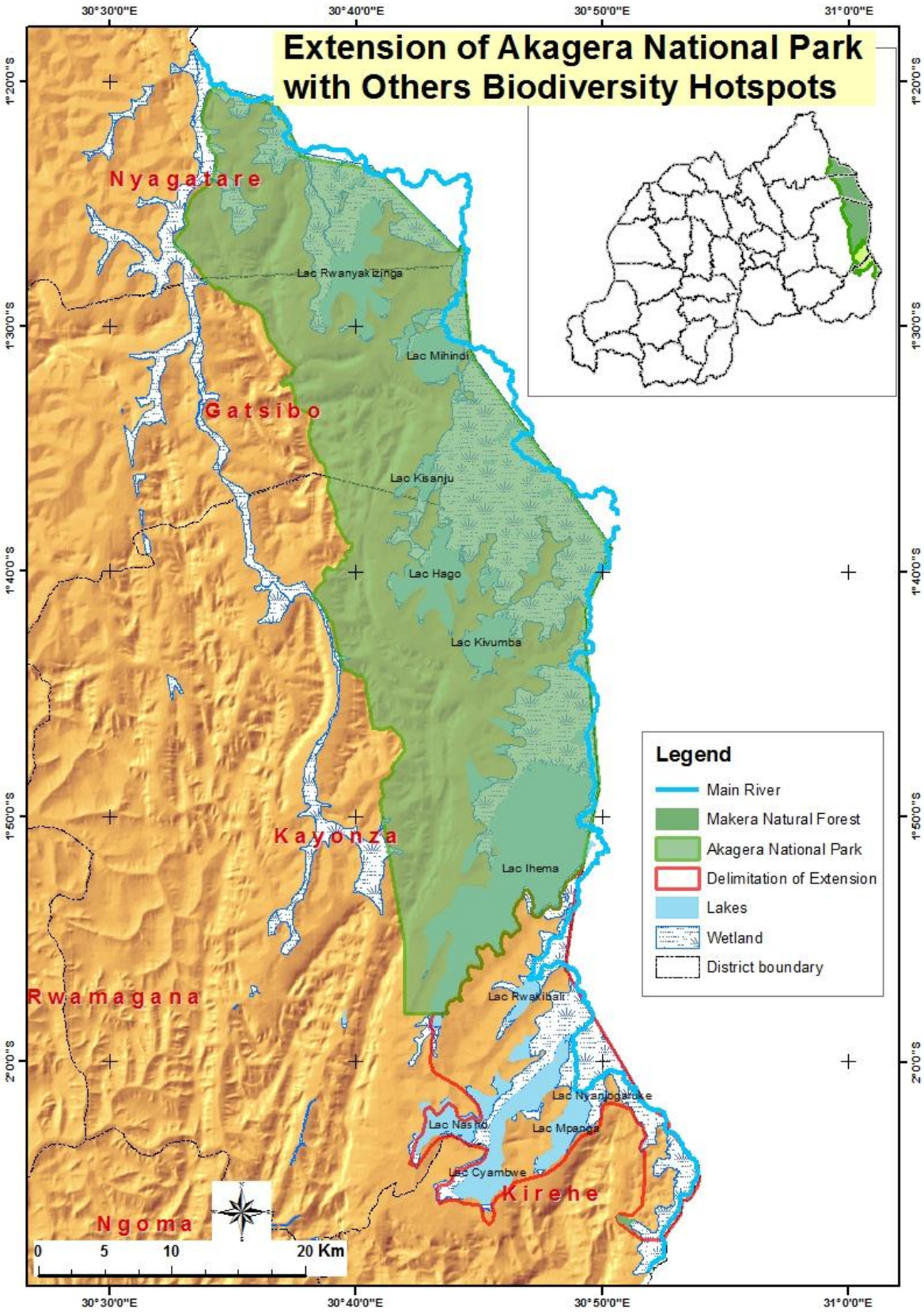
## 1. Complex Akagera NP-Akagera Wetland-Ibanda-Makera Forest

| Type of ecosystem | Criteria Fulfilled | Level of priority for conservation |
|---|---|---|
| **Akagera National Park (ANP)** | **Scientific and ecological criteria**<br>• Very rich biological diversity including 6 forest fringed lakes, the largest protected wetland in Central Africa, savannah plains, the Akagera River and the Mutumba hills reaching an altitude of nearly 2,000 meters.<br>• Very rich fauna including 7,892 of large mammals, 530 bird species with ***7 bird species*** protected by international conventions and 1 endemic to area (AMC, 2011)<br>**Scientific and hydrological criterion**<br>• ANP includes an important wetland area of the Akagera River, and its depression dotted with lakes and floating swamps. The area is important for the hydrology of the Akagera/Nile system and contributes to water cycle and the reduction of water loss by evaporation.<br>**Socio-economic criterion**<br>• Prosperous tourism industry which generated up to US$400,000 in 2011 from more than 15,000 visitors per annum (AMC, 2011). | **High** |
| **Akagera Wetland Complex (AWC)** | **Scientific and ecological criteria**<br>• AWC harbors an important biodiversity, composed of ***77 species*** of vascular plants, ***11 species*** of mammals**,** ***17 species*** of amphibians, ***13 species*** of reptiles and ***54 species*** of birds representing the highest diversity within all wetlands (Fischer, E., 2011)<br>• **3** species of amphibians and reptile area endemic to Great lakes and 1 endemic to the area. AWC is inhabited by **3** species of frogs *Phrynomantis* | **High** |

| | | |
|---|---|---|
| | *bifasciatus*, *Hylarana albolabris* and new *Phrynobatrachus* which in Rwanda do not occur elsewhere (Fischer, E., 2011).<br>**Scientific and hydrological criterion**<br>• The area is important for the hydrology of the Akagera/Nile system and encompasses a large wetland which contributes to water cycle and the reduction of water loss by evaporation.<br>**Socio-economic criteria**<br>• Very important fishing area in lakes Nasho, Cyambwe, Mpanga etcé plus other marshland products. | |
| **Ibanda-Makera Remnant Forest** | **Scientific and ecological criteria**<br>• The importance of Ibanda-Makera forest is that it contains many endemic and rare plants species;<br>• The forest harbors around 90 tree species, 150 herb species, 78 bird species and the most significance record, a *rare Purple-banded Sunbird* **(*Cinnyris bifasciatus)*** and different migratory bird species including ***Merops apiaster.***<br>• Furthermore, the forest contains an isolated population of baboons ***(Papio Anubis)*** and several species of reptiles, including a python (Python sebae).<br>**Scientific and hydrological criterion**<br>• Ibanda-Makera gallery forest is crossed by a stream (Nyamporogoma) which makes this forest a water catchment for local people. Its papyrus swamp in the South extends to the Akagera River and contributes to the reduction of water loss by evaporation.<br>**Socio-economic criteria**<br>• Many of plant species are used in traditional medicine essentially *Blighia unijugata, Grewiaforbesii, Rhus vulgaris*, *Ficus acuta* and *Ficus thoningii*;<br>• Ibanda- Makera remnant forest is located in the drier region of Rwanda, therefore it contributes to climate | **High** |

| | | |
|---|---|---|
| | regulation, refreshment and certainly to climate change mitigation. It offers several forest products to people. | |

The current Akagera National Park, the large swamps all along Akagera River, plus remnant gallery dry forest of Ibanda-Makera and its savannah harbor almost a precious high biological diversity. Therefore, proposal is about an expansion of Akagera National Park, which shall encompass the present ANP plus newly delimited Akagera wetland complex and Ibanda-Makera (Annex-figure 1 below).




**Annex-Figure 1. Akagera National Park with proposed extension**

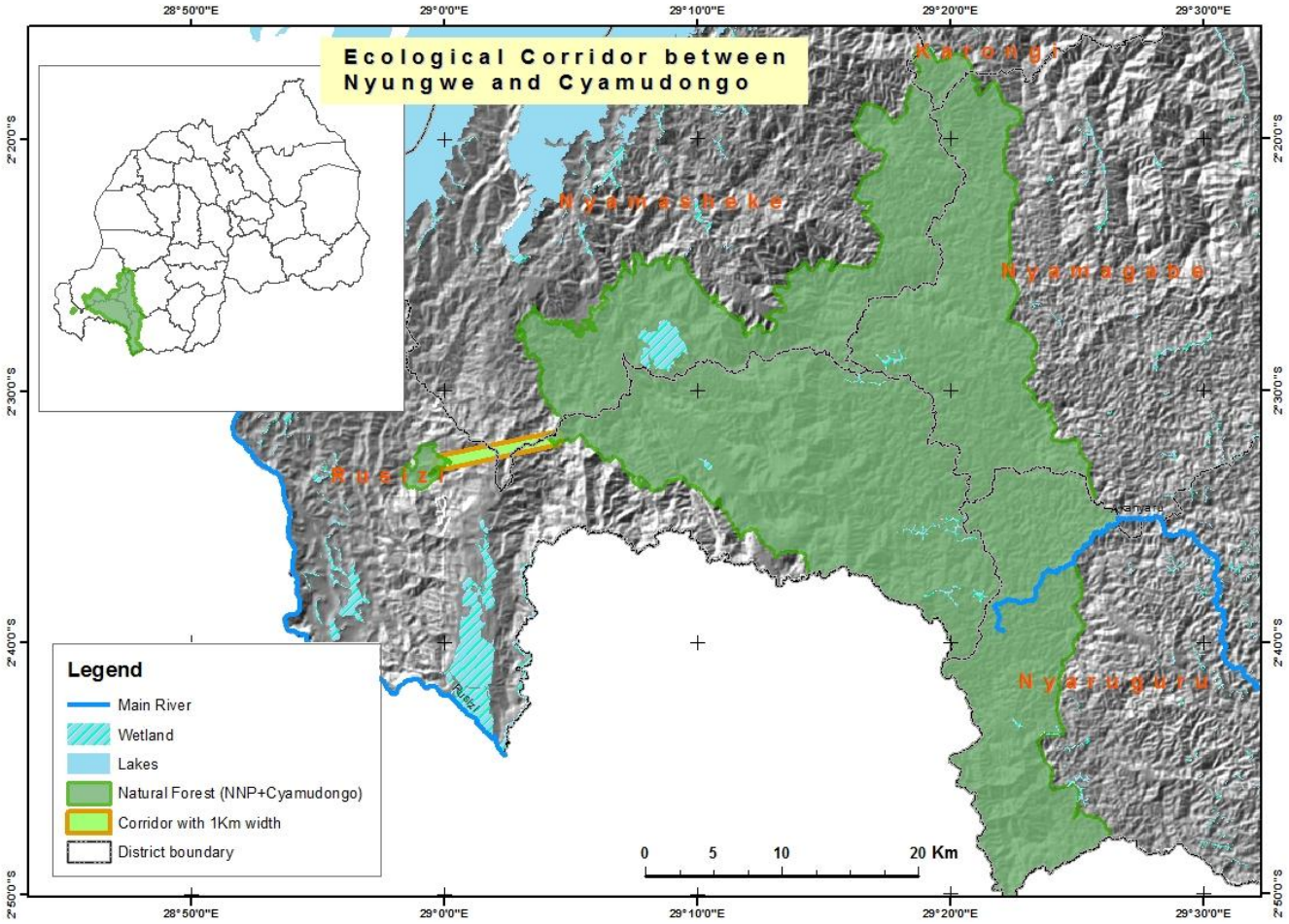
## 2. Nyungwe National Park

| Type of ecosystem | Criteria Fulfilled | Level of priority for conservation |
|---|---|---|
| **Nyungwe National Park (NNP)** | **Scientific and ecological criteria**<br>• NNP harbors many rare and endemic species, including the endangered Chimpanzee (*Pan troglodytes*) and the vulnerable Owl-faced monkey (*Cercopithecus hamlyni*).<br>• NNP is inhabited by ***129*** Endemic species to Albertine Rift including ***57*** vascular plants distributed in Kamiranzovu only**,** and ***72*** faunal species in the whole park. Three (***3)*** bird species listed as threatened by IUCN (***see NNP Management Plan 2012-2021***), namely Kungwe apalis (*Apalis argentea*), Grauerôs swamp warbler (*Bradypterus graueri*) and Shelley's crimson wing (*Cryptospiza shelleyi*).<br>**Scientific and hydrological criterion**<br>NNP provides vital watershed protection for Rwanda and important hydrological network for the Akagera/Nile system. It includes an important wetland, Kamiranzovu, which contributes to water cycle and the reduction of water loss by evaporation.<br>**Socio-economic criterion**<br>• Prosperous tourism industry which attracted almost 8,000 visitors per annum. NNP offered opportunity for income-generating activities, i.e. beekeeping cooperatives generated 18,000,000 Rwf in 2012. | **High** |

Reference to the common features of biodiversity between main Nyungwe National park and Cyamudongo remnant forest, an ecological corridor is proposed linking the two ecosystems, principally in order to preserve isolated 40 chimpanzees *(Pan troglodytes)* and a population of *Cercopithecus mona* living *in* Cyamudongo, previously dwelling in a large area with several

groups of the same species within the western part of NNP (Gisakura, Gasumo and Uwinka sites).

Furthermore, the following plant species distributed in both ecosystems: *Entandrophragma excelsum* (Umuyove), *Musangaleo-errerae* (Icyanyana) which is endemic species to NNP and a famous bird species, *Tockus alboterminatus* (*Crowen Hornbill*) inhabits both ecosystems should be conserved (Annex-figure 2 below).



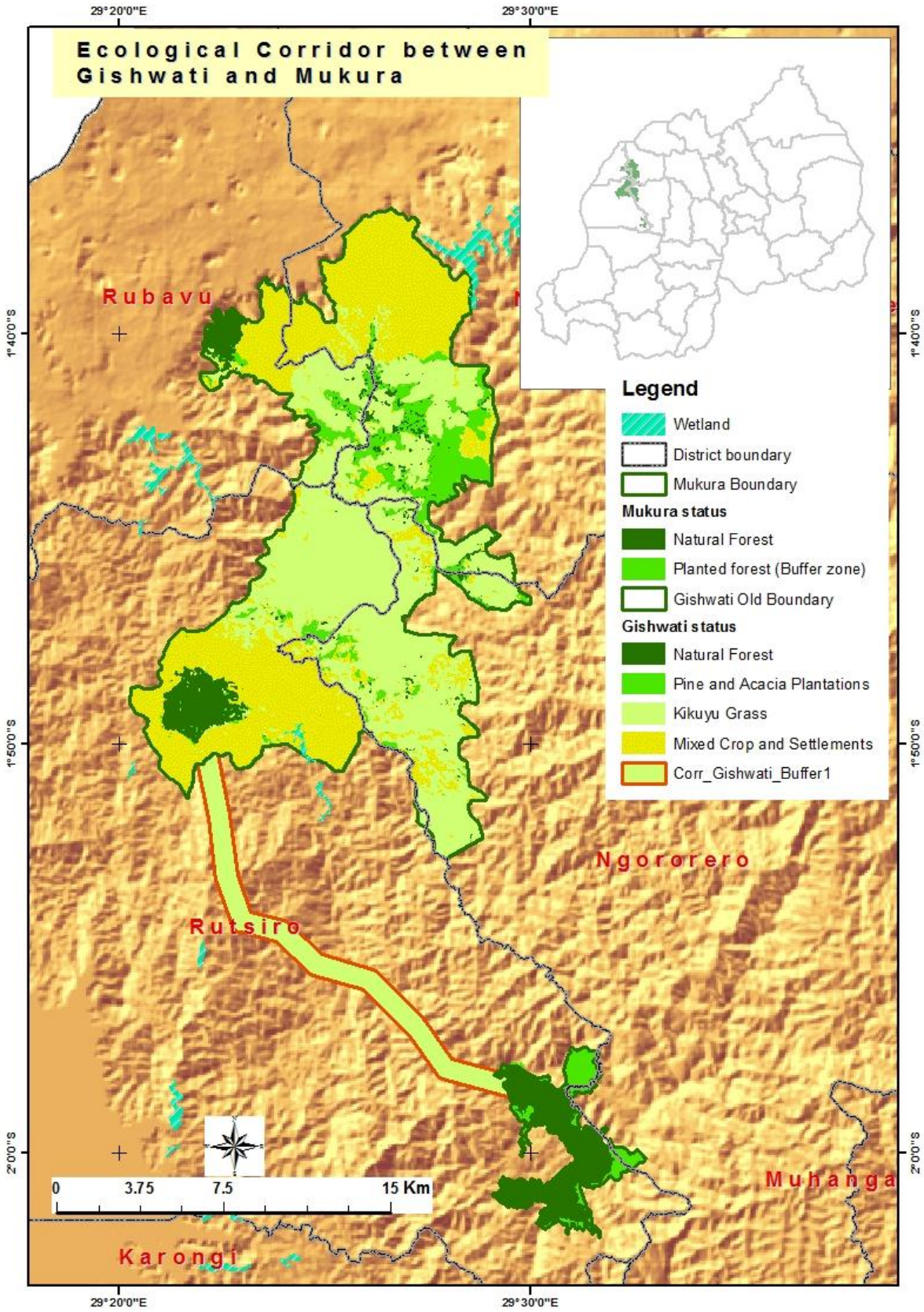

**Annex-figure 2. Ecological corridor between main Nyungwe and Cyamudongo**

## 3. Gishwati and Mukura National Reserves

| Type of ecosystem | Criteria Fulfilled | Level of priority for conservation |
|---|---|---|
| **Gishwati National Forest Reserve** | **Scientific and ecological criteria**<br>• Gishwati Forest Reserve harbors ***13*** plants species and ***14*** bird species which are endemic to the Albertine Rift as well as two vulnerable species Martial Eagle and Grey Crowned Crane. Three Turacos species are in small number (24 in total) and should be preserved.<br>• Gishwati has also 2 threatened monkey species which are on online IUCN index red list of endangered namely *Pan troglodytes schwenfurthii, and Cercopithecus mitiskandti.*<br>**Scientific and hydrological criterion**<br>Gishwati provides vital watershed protection for Rwanda and important hydrological network for the Akagera/Nile and Congo River systems. It contributes to water cycle and climate maintenance in the region.<br>**Socio-economic criterion**<br>Potential economic resource for the Ecotourism project planned by Gishwati Area Conservation Program (GACP). The reserve offers several forest products to local communities. | **High** |
| **Mukura National Forest Reserve** | **Scientific and ecological criteria**<br>Mukura forest reserve harbors 243 plant species, 77 birds including ***7*** endemic species to Albertine Rift and ***3*** IUCN threatened species namely Grauerôs Rush Warbler (EN), Grey Crowned Crane (EN) and Kivu Ground Thrush which is vulnerable (ARCOS, 2012)<br><br>Mammals were dramatically reduced from ***14*** to ***4*** species, which request appropriate conservation | **High** |

| | | |
|---|---|---|
| | actions.<br>• Mukura forest also acts as a sponge, absorbing excess water and preventing runoff and erosion, and then stabilizing agriculture in surrounding areas.<br>**Scientific and hydrological criterion**<br>Mukura forest provides vital local water catchment for Rwanda and an important hydrological network for the Akagera/Nile and Congo River systems. It contributes to water cycle and climate maintenance.<br>The main permanent 11 springs and streams having the source in Mukura Natural Forest are Ntaruko, Ndaba and Rutanzongera to name a few é .<br>**Socio-economic criteria**<br>Once Gishwati and Mukura will be restored and constituted one national park, there shall be potential economic resource for the Ecotourism project planned by Gishwati Area Conservation Program (GACP). The reserve offers also several forest products to local communities. | |

Reference to the common features of biodiversity between Gishwati and Mukura natural reserves, both ecosystems situated along the Congo-Nile divide with similar habitats, an ecological corridor is therefore proposed linking the two ecosystems (Annex-figure below 3), principally in order to allow the remained population of isolated chimpanzees *(Pan troglodytes)* to expand their foraging area and preservation of other bird (Turacos) and mammal species.




**Annex-figure 3. Ecological corridor between Mukura and Gishwati**

## 4. Volcanoes National Park-Rugezi wetland-Buhanga Forest Reserve

| Type of ecosystem | Criteria Fulfilled | Level of priority for conservation |
|---|---|---|
| **Volcanoes National Park (VNP)** | **Scientific and ecological criteria**<br>• VNP has sensitive Afro-Alpine habitats with ***13*** species of orchids listed by the CITES, ***10*** plant species endemic to Albertine Rift and wetland where inhabit rare and endemic species, including ***endangered and endemic Grauer's rush warbler*** (*Bradypterus graueri*).<br>• VNP is home of well known Mountain Gorilla, whose current population in the VVR is 480 individuals. ***13*** bird species and 16 subspecies endemic to the Virunga and Ruwenzori Mountains as well as two vulnerable bird species, Shelleyôs crimson-wing (*Criptospiza shelleyi*) and the Kivu ground thrush (*Zoothera tanganyicae*).<br>**Scientific and hydrological criterion**<br>• VNP constitutes an important area for the hydrology of the Akagera/Nile system and water catchment zone for the region. It contributes to water cycle and the reduction of water loss by evaporation.<br>**Socio-economic criterion**<br>• Prosperous tourism industry which attracted 23,800 visitors in 2012 and generated much money. The park offers several forest products to local people includes bee-keeping. | **High** |
| **Rugezi Wetland Complex (RWC)** | **Scientific and ecological criteria**<br>• Rugezi wetland harbors ***7*** endemic species to Albertine Rift and the worldôs largest population of Grauerôs Swamp warbler *Bradypterus graueri*. It contains one species of amphibian endemic to Rugezi wetland (Fischer, E., 2011) | **High** |

| | | |
|---|---|---|
| | **Scientific and hydrological criterion**<br>• Rugezi plays an important hydrological role as reservoir of water flowing down to Bulera and Ruhondo lakes. It contributes to Akagera/Nile system and local water reserve for communities. The wetland contributes to water cycle and the reduction of water loss by evaporation.<br>**Socio-economic criteria**<br>• Important Hydropower generation for the country and potential eco-tourism development. It offers various marshland products to local communities. | |
| **Buhanga Forest Reserve** | **Scientific and ecological criteria**<br>• Buhanga is inhabited by some animal species threatened with extinction: the porcupine (*Hystrix africae)*, the jackal, the partridge, and leopard.<br>• The reserve has two migratory species, African Pitta (*Pitta angolensis*) and Wahlberg's Eagle (*Aquila wahlbergi*) and ***4*** species endemic to the Albertine Rift.<br>**Scientific and cultural criterion**<br>• Buhanga is with a greatest originality by the fact that it is seen by history and folk traditions as the cradle of Rwandan civilization.<br>**Socio-economic criteria**<br>• With its touristic assets, Buhanga mini Park presents natural and cultural opportunities for the promotion of scientific cultural and ecological tourism. | **High** |

The rational exploitation of tourism in Rwanda constitutes an economic imperative for the country's development. Reference to the rich biodiversity harbored by the three ecosystems, the hydrological and economical roles played by Rugezi wetland as well as cultural values of Buhanga forest reserve, recommendation is about to assign to Rugezi wetland and Buhanga

Forest Reserve a higher protection status, through their inclusion as entirely part of Volcano National Park.

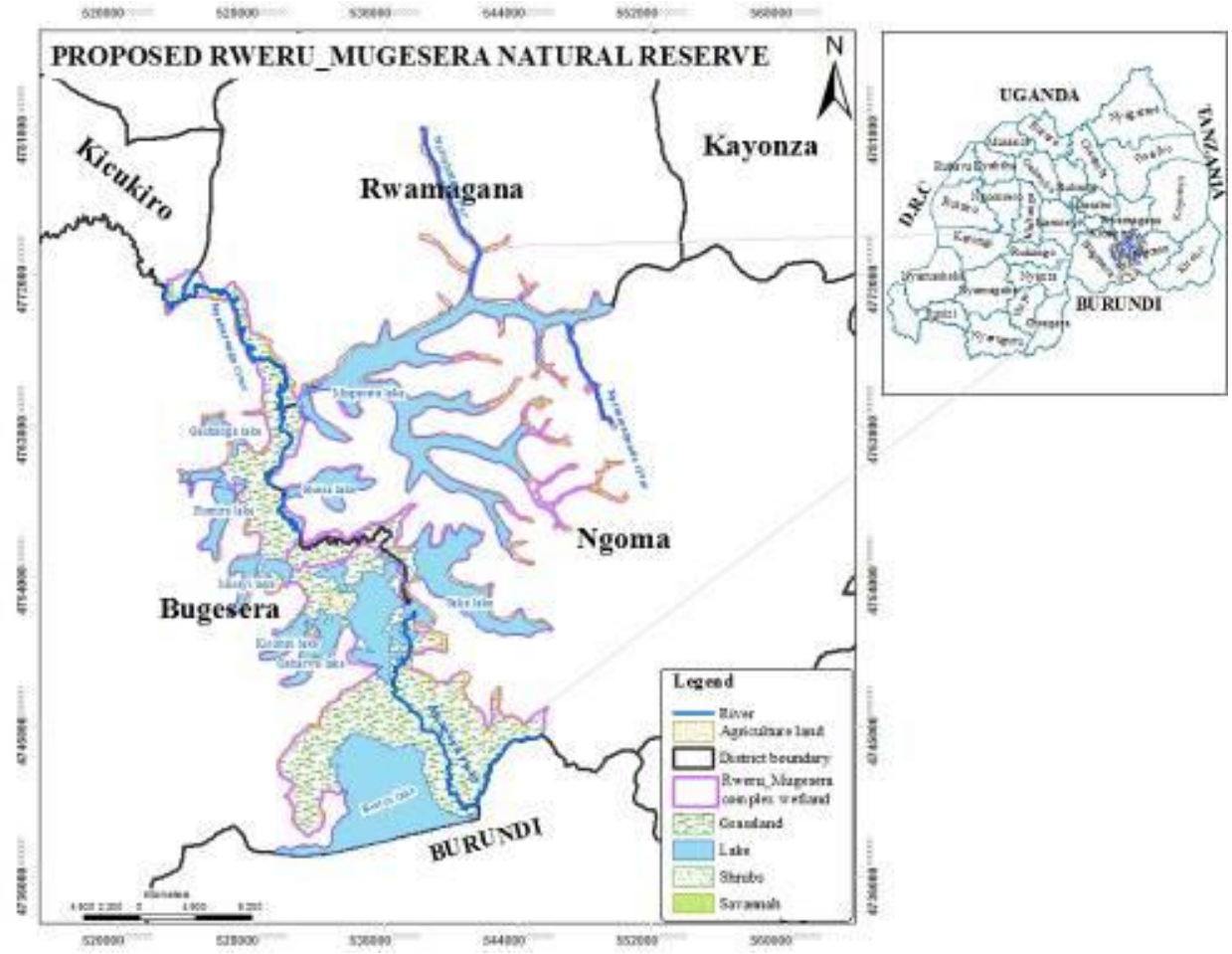
Furthermore, a management plan is required for Rugezi wetland that will help to delimitate the ecologically most important areas of the marsh that should be preserved for eco-tourism.

### 5. Rweru-Mugesera wetland Complex

| Type of ecosystem | Criteria Fulfilled | Level of priority for conservation |
|---|---|---|
| **Rweru – Mugesera Wetlands** | **Scientific and ecological criteria**<br>• The complex harbors a rich biodiversity composed of 53 species of vascular plants, 14 species of amphibians, 6 species of reptiles, 40 species of birds and 16 species of mammals.<br>• The complex has also a large population of the bird *Laniarius mufumbiri, 3* species of anuran and 1 of reptile endemic to Great lakes region.<br>**Scientific and hydrological criterion**<br>The wetlands complex plays an important hydrological role for Rwanda and the Victoria-Nile region and water reservoir for a large population of the region. It includes an important swampy area which contributes to water cycle and the reduction of water loss by evaporation.<br>**Socio-economic criterion**<br>• Important fishery activities are developed in numerous lakes and in Nyabarongo/Akagera River. A ray of agriculture products and other wetlands goods are benefited to local communities | **High** |

Due to its important hydrological role played for the Victoria-Nile region and rich biodiversity inhabiting lakes and swampy areas, including several migratory birds from palearictic regions, which sojourn in the region during winter, the recommendation is to confer the **protection**

**statute of the Rweru-Mugesera wetlands complex (*Figure 4*) as Natural Reserve with specific reglementations for its use.**




**Annex-figure 4. Rweru-Mugesera wetland complex, proposed as Natural Reserve**

## 6. Mashyuza Natural Forest

| Type of ecosystem | Criteria Fulfilled | Level of priority for conservation |
|---|---|---|
| **Mashyuza Natural Forest** | **Scientific and ecological criteria**<br>The Mashyuza Natural Forest hosts particular rare species that do not exist elsewhere in Rwanda such as *Sterculia tragacantha* and endemic species that cannot be met anywhere else in the world, namely *Nymphaea thermarum.*<br>**Scientific and hydrological criterion**<br>Mashyuza forest contributes enormously in protecting the several water sources feeding the large hot spring located in the downward plain. It is likely useful for water retention<br>**Socio-economic criterion**<br>• This hot spring is very attractive and potentially important for recreation, scientific research and income generation from tourism.<br>Mashyuza is considered by local people as containing healing properties that can treat fracture and bodily fatigue. | **Medium** |

Mashyuza Natural Forest harbors some rare and endemic species that cannot be met elsewhere in the world, namely *Nymphaea thermarum.*

According to IUCN protected areas categories, Mashyuza ecosystem fits better to the category II: ***area managed mainly for ecosystem protection and recreation.*** Thus, Mashyuza Natural Forest constitutes uniqueness and does not exist elsewhere in Rwanda. The recommendation is about to confer Mashyuza Natural Forest a conservation statute as ***Natural Reserve***.

## 1. Lake Kivu Islands

| Type of ecosystem | Criteria Fulfilled | Level of priority for conservation |
|---|---|---|
| **Lake Kivu Islands** | **Scientific and ecological criteria**<br>• Rich biodiversity composed of 142 plant species, 80 species of birds, 52 invertebrates, 6 mammals, 6 reptiles, 5 species of amphibian and 26 fish species.<br>• Islands have endangered species, already registered on IUCN red list, such as Marsh Mongoose (*Atilax paludinosus*: inzibyi), some water birds and snakes like *Bitis nasicornis* and *Naja melanoleuca.*<br>• Islands hold 15 endemic fish species and three migratory species (*Cossypha natalensis*, *Milvus migrans* and *Bulbucus ibis.*<br>**Scientific and hydrological criterion**<br>Lake Kivu constitutes the big water reservoir for the region, regulates water cycle and by the way climate change.<br>**Socio-economic criterion**<br>• Prosperous fishery industry in Lake Kivu, methane gaze exploitation and transport facilities.<br>High Eco-tourism potentiality in Kivu islands, which can become a relevant income generation source for Rwanda and ecosystem services | **High** |

In order to protect the great richness of Lake Kivu Islands and raising incomes generation for the country, there is an urgent need for elaboration of their Management plan taking into account key zones for biodiversity conservation, tourism development and recreation etc...

Lake Kivu and its islands have high potential for income generation and sustainable enhancement of local community livelihood.

Based on previous studies conducted on Lake Kivu and its biodiversity, the recommendation is about the creation of Biosphere Reserve for Lake Kivu Islands, but more investigations are needed to support the proposition.

Eco-tourism development constitutes a high priority for the Lake Kivu islands in order to create more employment opportunities for local communities and reduce pressure on natural resources. The development of tourism will increasingly lead to more off-farm employments thus improving the living standards of people.

# ANNEX 2: PERSONS CONSULTED

| Names | Positions | Institutions |
|---|---|---|
| Dr Rose Mukankomeje | Director General | REMA |
| Ir Coletha Ruhamya | Deputy Director General | REMA |
| Ms Laetitia Busokeye | Director of Research, Environmental Planning and Development; CBD Focal Point | REMA |
| Mr Canisius Kayitera | NBSAP Project Manager | REMA |
| Ms Gisèle Umuhumuza | Research Officer | REMA |
| Emmanuel Kabera | Cartagena Protocol on Biosafety (CPB) Focal Point | REMA |
| Nsanzimana Djuma | CHM manager | REMA |
| Kabalisa Vincent de Paul | Deputy DG in charge of Water | RNRA |
| Dismas Bakundukize | Director of Forest Management Unit | RNRA |
| Anastase Niyigaba | Water data and Information Manager | RNRA |
| Manikuzwe Marie-Gorette | Biodiversity Officer | RNRA |
| HAKIZA S.Jackson | Professional in charge of Tourism Policy | MINICOM |
| Dr Mudakikwa Tony | Head of Veterinary service | RDB |
| Bizimungu François | Head of Research and Monitoring service/ Focal Point | RDB |
| Telesphore Ngoga | Head of Conservation Department | RDB |
| Faustin Karasira | Head of Tourism Department | RDB |
| Musana Abel | Conservation Warden | VNP/RDB |
| Nasasira K. Richard | Principal | Kitabi College of Conservation and Environment Management |
| Hategekimana Joseph | Park guard | RDB/VNP/Buhanga |
| Rurangwa Raphael | Director General of Planning | MINAGRI |

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|---|---|---|
| Twagirayezu Emmanuel | Professional in load of Soils Conservation and Policy Mechanization | MINAGRI |
| Dr Hirwa Marie Claire dôAndree | Coordinator of Livestock program | RAB |
| Nishimwe Immaculee | Researcher in Banana program | RAB |
| Kajuga Joelle | Researcher and RAB Biosafety Representative | RAB |
| Dr Ngaboyisonga Claver | Coordinator of Maize program | RAB |
| Gapusi R. Jean | Curate of Rwanda National Gene Bank | RAB |
| Munanira Emmanuel | Manager of Ibanda-Makera forest | RAB |
| Nsengimana Joseph | Lecturer | UR |
| Nshutiyayezu Samuel | Assistant Lecture | UR |
| Jes Gruner | Park Manager | ANP |
| Birasa André | Agrostologist | RAB-Karama |
| Nsengimana Serge | Coordinator | ACNR |
| Mugabo Buda | Former Research and Monitoring Warden | ANP |
| Nsabagasani Claudien | Landscape Conservation Program Manager | ARCOS |
| Mukunzi Emile | DFO | Bugesera District |
| Uwambajemaria Florence | Vice Mayor Social Affairs | Burera District |
| Nkezabera Come | District Environment Officer (DEO) | Burera District |
| Manirafasha Sylvestre | REMA-District Environment Facilitator (DEF) | Burera District |
| Gasasira Juvenal | Community member | Community around Makera-Ibanda remnant forest |
| Mubirigi Augustin | Community member | Community around Mukura forest |
| Rumiya Patrice | Community member | Community around Mukura forest |
| Ntaganda Jean Damascene | Community member | Community around Mukura forest |
| Zigiranyirazo Joseph | President | COOPAV-MARIRO |
| Uwiringiyimana Francois | Member | COOPAV-MARIRO |
| Bonheur Innocent | President | Cooperative Uburumbuke |
| TUYISINGIZE Deogratias | Researcher | DFGFI |

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|---|---|---|
| Vecellio Veronica | Gorilla Program Manager | DFGFI |
| Abiyingoma Jules | ITC manager | DFI |
| Karambizi Benjamin | CBO member | Gishwati CBO/community |
| Mbonyimpa Silas | Ex Conseiller Cyambara | Gishwati community |
| Safari Patrick | Regional Coordinator | Global Water Partnership |
| Mukamana Béatrice | Deputy manger/Accountant | Gorilla Organization (GO) |
| Manassé | Coordinator | Green Cover Initiative-Bugesera |
| Rurangwa Eugene | TBNRM/Advocacy Coordinator | IGCP |
| Kayijamahe | Research and Monitoring | IGCP |
| Bititi fred | DFO | Kirehe District |
| Mfashingabo Mathiew | DEO | Kirehe District |
| Alexis Murasira | REMA-District Environment Facilitator (DEF) | Musanze District |
| Musoni Protais | District Forest Officer (DFO) | Musanze District |
| Jean Pierre | DEO | Musanze District |
| Minani Vedaste | Researcher | NIRDA |
| Ndikubwimana Innocent | Research and Monitoring Warden | NNP/RDB |
| Habyarimana Emmanuel | Executive Secretary | Nyabihu District |
| Karambizi Benjamin | DEO | Nyabihu District |
| Nabimana Jen de Dieu | DEF | Nyabihu District |
| Mutsinzi Aimé | Project Environmentalist | PDAB/PAIRB/MINAGRI |
| Rwigyema Othieno Andrew | Head of Research and Policy Analysis | PSF |
| Birungi Yvone | Administrative Assistant | SACOLA |
| Dr Masozera Michel | Rwanda Country Director | WCS |
| Hakizimana Vincent | Beekeeping Development Officer | WCS |
| Nyiratuza Madeleine | Project Manager | WCS/FHA |