Albertine Rift Conservation Society

Policy Brief

# Rwanda Wetlands Biodiversity: Valuable but Vulnerable Asset

## Executive Summary

Rwanda, the country of a thousand hills, is also endowed with nearly thousand valleys and 860 wetlands, covering 260,000ha and accounting for 10.8% of the total land of country. These wetlands constitute an important asset for the country by providing space vital habitats for biodiversity and maintaining important hydrologic processes which are essential in cleaning and protecting the surface and ground water, flood control and supporting a variety of local livelihoods. However, with more than half of the wetlands in Rwanda being used for agricultural activities, energy production, Rwanda's wetlands are the fastest lost and degraded compared to other ecosystems in the country, leading to significant loss of wetland's biodiversity and ecosystem goods and services. Wetlands are mainstreamed in national policy framework, but local policy implementation remains a big challenge due to increasing pressure from a growing population and development all accelerated by climate change and lack of information to guide decisions. There is a need to formulate a specific national wetland strategy, develop key individual wetland management plans, and implement wetland sustainable use models in the country, and regular wetland monitoring.

December 2019

# Introduction

Rwanda is endowed with rich wetlands a surface of 27,8536 ha corresponding to 10.6 % of national area with 860 swamps, 101 lakesss and 861 rivers (REMA, 2015). Rwanda Wetlands Ecological integrity Assessment covered 8 major wetland complexes namely (1) City of Kigali Complex, (2) Rweru-Mugesera Complex, (3) Akanyaru Wetlands Complex, (4) Southern Kirehe Wetlands Complex, (5) Eastern Kirehe Wetlands Complex, (6) Muvumba Wetlands Complex, (7) Rugezi Wetlands Complex, (8) Rusizi Wetlands Complex as Illustrated in Figure I bellow.

The wetlands of Rwanda provide numerous goods and services such as water, climate regulation, medecine, nutrients cycling, carbon sequestration, flood control, etc, which are the foundation of life in every scrape of this earth's long history from local to international levels.

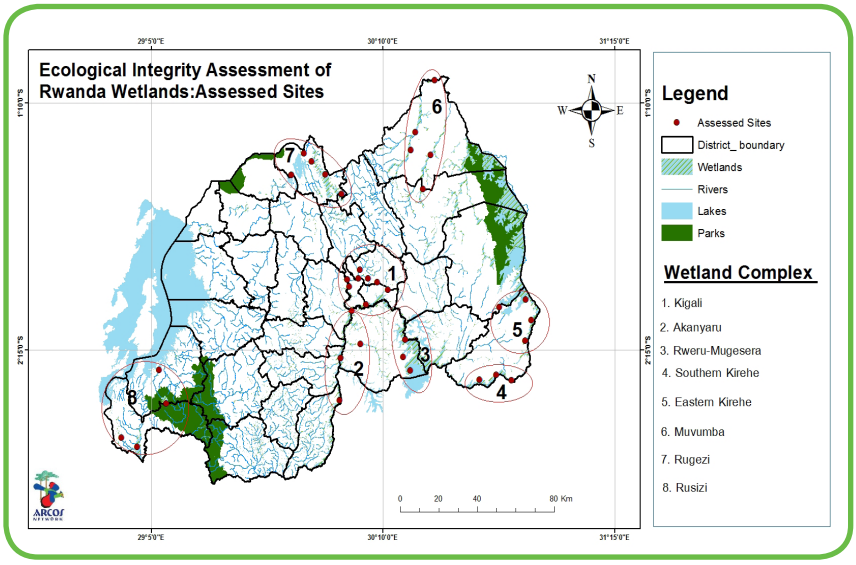


*Figure I: Rwanda Wetlands Ecological Integrity Assessment Sites*

However, the ways these goods and services are being used are disrupting their composition, structure and functionality or their integrity. Degradation, encroachment, unsustainable practices, fires, no coordination, climate change are highly contributing to the destruction of Rwanda's wetlands integrity and hence loos their ecosystem functions.

Despite being mainstreamed in various national policies and having in place national regulations on wetlands classification in terms of protection, use and bufferzone management, the implementation of the existing policies and regulations remains limited and there is patchy information to guide decision-making.

This policy brief aims to provide to decision-makers, wetland managers and the public in general the status and values of wetlands in Rwanda in order to guide their sustainable use. The information given in this policy brief was obtained from both literature review and field studies conducted by the Albertine Rift Conservation Society (ARCOS Network) through a multi-disciplinary team of experts from different institutions in 2019 under the project entitled "Using Ecological Integrity Assessment and advanced Information Management to Guide Wetlands Management and Decision-Making in Rwanda", funded and supported by JRS Biodiversity Foundation. It constitutes the first policy brief in a series of papers focusing on Wetlands Integrity in Rwanda.

# State of Rwanda Wetlands' Biodiversity

Although most of the wetlands of Rwanda have been drained and converted into agricultural lands, they are still supporting high biological diversity. Rwanda Wetlands of Rwanda are home to biodiversity of high conservation importance.The biodiversity survey team confirmed Rugezi and Nyungwe wetlands as Key Biodiversity Areas in Rwanda, with the presence of Albertine Rift endemics and endangered bird species, and several typical wetland species,

| Taxon/Species | IUCNCategory | KGK | RWE | AKA | SKR | EKR | MUV | RGZ | RSZ |
|---|---|---|---|---|---|---|---|---|---|
| **Birds** | | | | | | | | | |
| Grauers's Swamp Warbler | Endangered | | | | | | | ✓ | ✓ |
| Grey Crowned Crane | Endangered | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Malagasy Pond Heron | Endangered | | ✓ | | ✓ | | | | |
| Martial Eagle | Vulnerable | | | ✓ | | | | ✓ | |
| Marabou Stock | Vulnerable | | | | ✓ | ✓ | | | |
| Shoebill | Vulnerable | | | | ✓ | ✓ | | | |
| Madagascar Squacco Heron | Vulnerable | | ✓ | ✓ | ✓ | ✓ | | | |
| Papyrus Gonolek | N Threatened | ✓ | ✓ | ✓ | | | | ✓ | |
| Mammals | | | | | | | | | |
| Hippopotamus | N Threatened | ✓ | | ✓ | ✓ | ✓ | | | |
| Congo clawless Otter | N Threatened | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| Spotted-necked Otter | N Threatened | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| Fish | | | | | | | | | |
| Synodontisrwandae | | | | | ✓ | ✓ | | | |
| HaplochromisErythrmaculatus | | | | | | | | | |
| Amphibians | | | | | | | | | |
| Long Reed Frog | Endemic | | | | | | | | ✓ |
| Reptiles | | | | | | | | | |
| Three-Horned Chameleon | Endemic | | | | | | | | ✓ |
| Great Lakes Bush Viper | Endemic | | | | | | | | ✓ |
| | | 5 | 6 | 7 | 9 | 9 | 1 | 4 | 5 |

*Table 1: Species of Conservation Concern in Rwanda Wetlands (KGL=Kigali, RWE= Rweru Mugesera, AKA=Akanyaru, SKR=Southern Kirehe, EKR= Eastern Kirehe, RUG=Rugezi, RUS= Rusizi),*

Wetland biodiversity plays a critical role in providing food, energy, medicines and genetic resources and a variety of ecosystem services fundamental for people's physical well-being and national economy. Rapid assessment of Rwanda wetlands identified the following ecosystem services (full assessment to be conducted soon).

## Regulating services

- Climate regulation: Microclimate temperature, precipitation, temperature, and precipitation.
- Water purification and waste treatment: Removal of nutrients, industrial pollution
- Flood control: Holding of soil and sediments from surrounding hills
- Pollination: Habitat of pollinators such as bees and others insects
- Carbon sequestration: absorb the carbon through photosynthesis and store it.

## Provisioning services

- Food: Production of fish and meats, vegetables, fruits, mushrooms, honey
- Fresh water: For domestic use, irrigation, industries and construction
- Energy: Firewood, peat, biomass, and hydropower
- Medicine: Traditional from plants and animals.

## Supporting services

- Soil formation: Sediment retention and retention of organic matter
- Nutrient cycling: Storage, recycling, processing, and acquisition of nutrients

## Cultural services

- Recreational area: Opportunities for eco-tourism activities.
- Educational: Opportunities for education, training and research.

# Threats to Rwanda Wetlands

Wetlands of Rwanda are under high pressure from unsustainable agriculture practices in and around wetlands, peat mining, pollution from industries, invasive species, (Water hyacinth), bush fire, grass cutting, grazing, urban and infrastructures (roads) development, bricks making, dam and sand mining, limited and unsustainable use of wetland buffer zones, use of exotic species along the buffer zone. This situation is aggravated by high population growth in Rwanda (9.708 million in 2008 and 12.63 million in 2018 which is projected to be 15.4 million people in 2032) and increased climate change and related hazards.

Overall, the intensity and frequency of threats vary with different wetlands. The (Figure II) below shows that the intensity and frequency of wetland is high (80%) in Kigaliand Muvumbawetlands, while Rugezi and Kamiranzovu are at lowlevel (<30%,)due to legal protection.

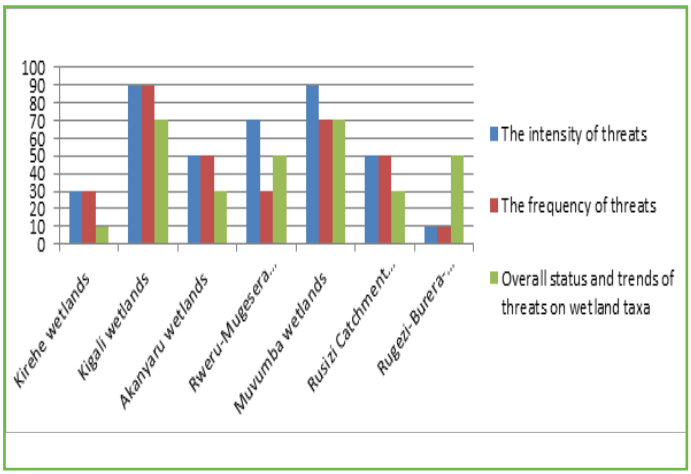


*Figure II: Threat intensity and frequency per wetland complex in Rwanda*

**Key Wetland Services**

Maintaining water quantity and quality
Micro-climate regulation

Moderation of water flows

Water Purification

Food provision

Aesthetic, ecotourism, recreational and other values

| Major Threats | KIG | RWE | AKA | SKR | EKR | MUV | RGZ | RSZ* | Key Effects |
|---|---|---|---|---|---|---|---|---|---|
| Agriculture expansion | H | H | H | L | L | H | | 0-H | Loss of wetlands habitat, eutrophication, presence of nitrates and pesticides in drinking water, decreased evaporation |
| Pollution | H | H | H | L | L | H | L | O-H | Loss of source of water, presence of nitrates and pesticides in drinking water, impact on human food and health, loss of aesthetic and recreational values |
| Peat Mining | | | H | | | | | O-H | Loss of habitat, Peat layer reduction and disappearance, degraded soil quality, reduced water storage, climate change emissions |
| Sand/Clay Mining | m | L | M | H | | | | O | Water turbidity, biodiversity loss, fish production, siltation |
| Invasive/Exotic species | H | H | H | H | H | L | L | 0-L | Loss of biodiversity, loss of food potential |
| Bushfire | L | H | H | L | M | L | | O-L | Loss of habitat and biodiversity |
| Infrastructure development | H | L | M | | L | L | | O-M | Habitat loss, pollution, water scarcity |

*Fig III. Effect of Threats on Rwanda Wetland Biodiversity and key Ecosystem Services:Kigali wetlands. 2= Rweru-Mugesera; 3= Akanyaru; 4= Southern Kirehe; 5= Eastern Kirehe, 6=Muvumba, 7=Rugezi; 8=Rusizi(* Rusizi complex includes Kamiranzovu swamp which is inside Nyungwe National Park (the average ranking is based on Kamiranzovu status and other wetlands*

# Wetland Management Responses

The Government of Rwanda and its partners recognise the importance of wetlands. A number of measures have been undertaken to ensure that wetlands are used sustainably by providing habitat for biodiversity, contributing to national economy and people's livelihoods.

The following actions and commitments can be highlighted among others:

- Proposing 74%of wetlands to be exploited under conditional use based on Environmental Impact Assessment, 20% of wetlands to be totally protected, while 6% of wetlands can be used under certain conditions (REMA 2015, PM Order 2017);
- Incorporating wetlands into national policies, laws and regulations;
- Signing and ratifying conventions/treaties/ protocols on wetlands and water resources;
- Legalizing protection of some wetlands including Rugezi which has been gazetted as Ramsarsite;
- Implementing different actions on the ground (wetlands buffer zone) and catchement management;
- Developing Wetlands Master Plan for City of Kigali(CoK) and Conservation Investment Plan.

Overall, while most of the wetlands in Rwanda have benefited from different initiatives, our assessment found that the level of action is still very low (35%), except the wetlands of Rugezi and Kamirazovu where the level of action is approximately 80% (note that when combine with Rusizi wetlands, the average reduces).

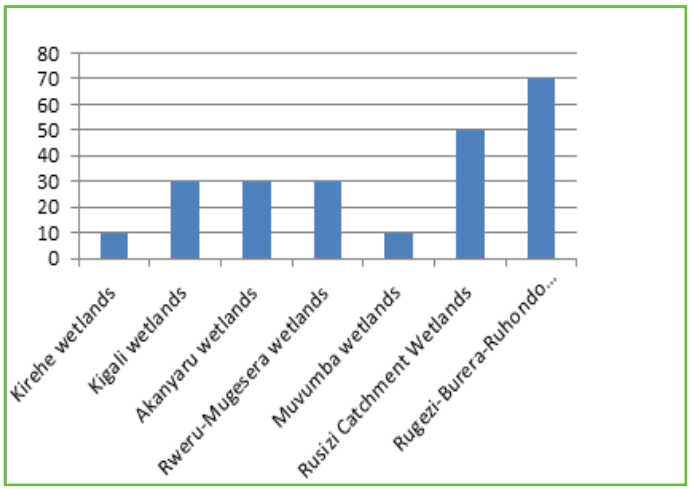


*Figure IV. Levels of actions undertaken per wetland complex in Rwanda*

# Overall Rwanda Wetland Ecological Integrity Status and Importance

The description of Rwanda wetland ecological character followed the pressure-state-response model and different indicators were measured to estimate the overall conservation status, in terms of ecostystem status and trend, ecosystems and habitat connectivity and fragmentation, population status and trends, intensity and frequency of threats, and assessment of any measures for the protection, protection or conservation of the wetland and its catchment. For each indicator, the status was ranked from very low (0-20%), low (20-40%), medium (40-60%), high (60-80%) and very high (80-100%) (Faber-Langendoen et al, 2016) and assessed the status of state, pressure and responses.

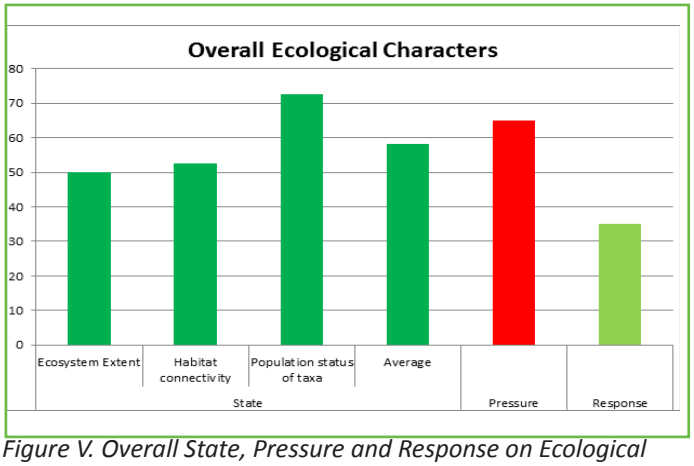


*Figure V. Overall State, Pressure and Response on Ecological Integrity for Rwanda Wetlands*

The rapid wetlands ecological integrity assessment showed that the average condition and status of wetland complexes in Rwanda is at 53% of its potential, with the state level at 58%, the pressure at 65% and the response at 35%, showing that the current level of responses is not enough to address the threats faced by wetlands in Rwanda. Given the trend in wetland habitat loss and fragmentation, the population status of different species risk to be significantly affected over time. The ecological integrity of Akanyaru and City of Kigali wetland complexes was ranked low (20%-40%), and very low (0%-20%) for Muvumba wetland complex. These wetland complexes require special attention in terms of restoration.

Assessing the importance of Rwanda wetlands at local, national and international level (adapted from Ramsar criteria), we found that all the wetlands in Rwanda are important in terms of their biogeographic location, ecological and/or hydrological role in the natural functioning of a major wetland system/ complex, habitat for biodiversity or ecotourism.

# Recommendations

- There is a need for transformational change in human behaviour to adopt sustainable use practices for these important and yet fragile wetland ecosystems.
- There is a need to formulate a national strategy, key site management plans and coordination among sectors andgazettement of key wetlands of national and international importance;
- Long-term monitoring for Rwanda wetlands should be established to guide their management and decision-making.
- There is a need to implement wetland buffer zone regulations by making efforts to use indigenous species and avoid the growing spread of bamboos in wetland zones, and developing options for community livelihoods in wetland buffer zones.
- Plan for restoration and sustainable use of most wetlands should be developed, as they are still important for biodiversity and various ecosystem functions despite the extent of their degradation.

# Acknowledgment

ARCOS and partners wish to thank the hard working team including:Dr Sam Kanyamibwa (Overall supervision and Birds Team), GIS and Remote Sensing (Dr Elias Nyandwi and Janvier Hitimana), Birds (Martin Sindikubwabo,Gilbert Micomyiza* and Claudien Nsabagasani*), Plants (Uwitonze Narcisse and Bizambanza Charles and Prof Elias Bizuru), Fish (Rashid Mwimba and Theodore Nshimyumuremyi), Macroinvertebrates (Jean-Paul Kubwimana, Christella SuavisIradukuna and Yvette Umurungi*); Alge (Bertrand Uwimana and Alphonse Nzarora) - *= Participated partially.

We are grateful for the people and institutions that contributed technically or financially to the Wetland Ecological Integrity Assessment in Rwanda, under which this policy brief was developed.

We wish to express our special appreciation to JRS Biodiversity Foundation for providing funding support for the project ''Using Ecological Integrity Assessment and advanced Information Management to Guide Wetlands Management and Decision-Making in Rwanda''

## ABOUT ARCOS Network

**The Albertine Rift Conservation Society (ARCOS Network) is an international organisation with the mission to *"enhance biodiversity conservation and sustainable management of natural resources in the Albertine Rift region, Africa Great Lakes region and African Mountains through the promotion of collaborative conservation actions for nature and people".***

**ARCOS' Vision is All-important ecosystems are healthy, viable and rich in biodiversity.**

**They provide sustainable benefits to people, whose livelihoods are much improved as a result of effective policies, respect for nature and strong participation of stakeholders in natural resource management".**