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RWANDA POLYTECHNIC
KITABI COLLEGE

RWANDA 12-YEAR PROJECT REPORT

Landscape in Rugezi Marsh / International Crane Foundation

Endangered Grey Crowned Crane nests in Rugezi Marsh / International Crane Foundation

The International Crane Foundation works worldwide to conserve cranes and the ecosystems, watersheds, and flyways on which they depend. We provide knowledge, leadership, and inspiration to engage people in resolving threats to cranes and their diverse landscapes.

ENDANGERED WILDLIFE TRUST
Protecting forever, together.

The Endangered Wildlife Trust is dedicated to conserving threatened species and ecosystems in Africa to the benefit of all.

RWANDA POLYTECHNIC
KITABI COLLEGE

IPRC-Kitabi's mission is to preserve and disseminate knowledge and skills related to biodiversity, tourism and cultural resources through innovative teaching practices.

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MESSAGE FROM INTERNATIONAL CRANE FOUNDATION PRESIDENT AND CEO

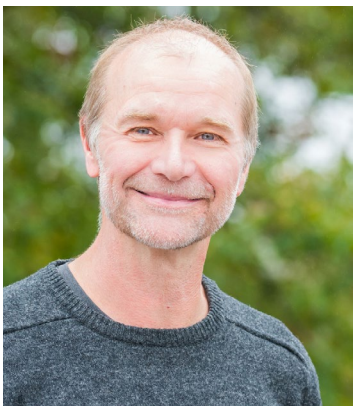
It is with great pride and a deep sense of purpose that we introduce this report highlighting the accomplishments of a 12-year conservation journey in Rwanda. In 2012, the International Crane Foundation, in partnership with the Endangered Wildlife Trust and IPRC-Kitabi, launched a bold initiative to protect Rugezi Marsh and other threatened wetlands. What began as a focused conservation effort has since grown into a national model for integrated landscape restoration and community-driven environmental stewardship.

Our work in Rwanda was inspired by the recognition that protecting cranes means protecting people, biodiversity, and critical ecosystems. Rugezi Marsh is more than a habitat—it is a lifeline for local communities, a sanctuary for endangered species like the Grey Crowned Crane, and a vital contributor to Rwanda's energy and water systems. Yet, it faced mounting threats from unsustainable agriculture, peat extraction, and the pressures of poverty.

This report captures a decade of transformative impact—from pioneering biodiversity assessments and wetland health surveys, to launching ambitious education programs, alternative livelihoods, and awareness campaigns. The results speak for themselves: more than 105,000 individuals reached, millions of Napier Grass cuttings distributed to reduce wetland pressure, avocado and mushroom farming initiatives launched, energy-saving stoves delivered, and hundreds of families supported with mattresses to reduce dependence on wetland resources.

Perhaps most importantly, this partnership has demonstrated that sustainable conservation must be rooted in community leadership. We have learned that success is not measured solely by species counts or hectares restored, but by how deeply communities understand, own, and shape the future of conservation in their landscapes. This model of collaborative planning, inclusive education, and locally driven solutions stands as a powerful example for others working across Africa and beyond.

As we look ahead, the foundation laid by this partnership will support the continued protection of Rwanda's wetlands and wildlife. Our next steps include building on this momentum to elevate Rugezi Marsh to national park status, expanding ecotourism, and deepening climate resilience efforts.



We are immensely grateful to our local partners, community leaders, government agencies, and supporters around the world. Your belief in this mission has helped create a legacy of hope, resilience, and renewal.

Dr. Richard Beilfuss, PhD
President & CEO
International Crane Foundation

1. BACKGROUND

In 2012, the International Crane Foundation/Endangered Wildlife Trust (ICF/EWT) Partnership entered into a hosting agreement with Kitabi College of Conservation and Environment Management (KCCEM) now Integrated Polytechnic Regional College- Kitabi (IPRC-Kitabi) to implement a project titled "Securing and improving the ecological integrity of Rugezi Marsh and other key wetlands under threat in Rwanda, for people, cranes and biodiversity. This project stemmed from the realization that the remaining wetlands in Rwanda were under severe threat of being degraded or lost as a result of encroaching agriculture and unsustainable resource use driven by climate change and declining agricultural productivity on hillslopes. The value of the ecosystem services that wetlands provide in this water and wetland rich country needed to be understood and managed sustainably by both local communities and national decision makers.

Since its start, the project covered Rugezi Marsh, Nyabarongo wetland, and Akanyaru wetland. The work at Nyabarongo and Akanyaru wetlands was limited to community awareness, youth environmental education, crane monitoring, and generating baseline information through wetland assessments and socio-economic surveys.

In 2017, there was a scaling down in project activities and a deep focus on Rugezi marshland, leaving the other two sites. This strategic decision was motivated by the fact that Rugezi Marsh is a hotbed of biodiversity supporting more than 40 resident bird species, including 20% of the country's population of the Endangered Grey Crowned Cranes and 60% of the global population of the Endangered Grauer's Swamp Warbler. The marsh is also home to three other wildlife species listed as Vulnerable - Martial Eagle, Papyrus Yellow Warbler, and Delany's Swamp Mouse - and a further three species listed as Near Threatened, namely, Rahm's Brush-furred Rat, African Clawless Otter and Bateleur Eagle. Moreover, more than 300,000 people depend on the 6,735-hectare wetland for their livelihoods by providing water, fodder for livestock, and plant materials for crafts and construction. In addition, Rugezi Marsh is a water source for three downstream hydropower stations, which generate 45% of the country's energy, making it an integral component of electricity supply to a developing country.

Despite its biodiversity and socioeconomic importance, Rugezi Marsh had been threatened with both widespread land degradation within the wetland and the steep hillslopes of its catchment and loss of natural forest cover due to extensive hillslope cultivation and associated erosion and siltation. Chronic poverty and population growth forced the local communities to utilize wetland resources in an unsustainable manner, including unsustainable harvesting of wetland products, clearing and drainage for crop production, overgrazing of livestock, and excessive wildlife poaching, among others. In addition, there was a lack of appreciation among resource users for the ecosystem services provided by the wetland and how these services sustained local livelihoods.

As a result, approximately 56% of the wetland was degraded to some degree with no monitoring system or plan for equitable harvesting of wetland products, despite the wetland's role in sustaining the livelihoods of local communities. The lack of comprehensive data on the region's ecology, hydrology and ecosystem services was also hindering informed conservation and development planning. There was also a lack of technical capacity and functional partnerships among local communities, conservationists, researchers, and government extension agencies to secure this vital ecosystem.

The ICF/EWT/IPRC-Kitabi Partnership delivered very successful conservation outputs at Rugezi Marsh. The partnership's effort to engage key stakeholders throughout the project was critical to this success, informing them of the progress and getting them committed to implementing all activities. Winning the trust and support of key stakeholders provided a strong basis for developing conservation interventions implemented at Rugezi Marsh today. This report provides an overview of key project interventions, impacts achieved, and key lessons learned.

2. ICF/EWT/IPRC-KITABI PARTNERSHIP'S WORK IN RWANDA

The ICF/EWT/IPRC-Kitabi Partnership work in Rwanda directly contributes to numerous national priorities and global conservation agendas.

Nationally, our project actions respond to pressures reported in Rwanda's 2016 National Biodiversity Strategy and Action Plan (NBSAP). Specifically, this includes human population growth, gender inequality and poverty as drivers of wetland biodiversity loss, and reports that wetlands are rapidly being eroded for agricultural land and urban development. The NBSAP recognises the connections between these issues for wetland biodiversity and poverty alleviation.

At the global level, our work within Rugezi Marsh and the surrounding catchment contributes to the Cunming-Montreal Global Biodiversity Framework, the African-Eurasian Migratory Waterbird Agreement (AEWA), the Ramsar Convention, and the United Nations Framework Convention on Climate Change.

As the Grey Crowned Crane is a priority species under the African-Eurasian Migratory Waterbird Agreement (AEWA), our work in Rwanda also responds to the Convention on the Conservation of Migratory Species of Wild Animals. The International Single Species Action Plan for the Conservation of the Grey Crowned Crane was approved by the Meeting of the Parties to AEWA in 2015.

Rwanda, an AEWA signatory, uses the International Plan for Grey Crowned Cranes. Our project directly contributes to several activities in the plan by reducing the key threats of habitat loss and human and livestock disturbance. In addition, the project benefits people through alternative livelihoods while building resiliency.

Finally, our work in Rwanda speaks directly to the United Nations Framework Convention on Climate Change. By promoting the growing of Napier Grass as an alternative to harvesting wetland vegetation for fodder and the promotion of Climate Smart Agriculture, our project has reduced the amount of peat and soil carbon exposed to the atmosphere. Furthermore, our work on the "Peat to Power" project has allowed us to critique this proposed method of supplementing the country's power supply and recommend a more sustainable, less damaging approach. Both these initiatives have contributed to a reduction in greenhouse gas emissions.

Throughout the report, ICF/EWT/IPRC-Kitabi Partnership shares stories from the communities and the important work we have done in the Rugezi Marsh over the past 12 years.

3. OUR PARTNERS

We collaborated with organisations across many sectors; these range from casual friendly collaborations to close active partnerships. We are proud to have partnered with the Rwanda Ministry of Environment, the Rwanda Environmental Management Authority (REMA), the Rwanda

Development Board (RDB), Burera and Gicumbi local governments, as well as the Rwanda Wildlife Conservation Association to work with Ecorangers, aerial surveys and trade. We also had additional collaborations with Conservation International for Conservation Agreements and with the ARCOS Network. The ICF/EWT/Kitabi College acknowledges the support from Kansas City Zoo and Aquarium, Rainforest Trust, Critical Ecosystem Partnership Fund, Leiden Conservation Foundation, and MacArthur Foundation among others.

4. UNDERSTANDING ICF/EWT/IPRC-KITABI PARTNERSHIP'S IMPACT

4.1. Generating Information for Policy and Conservation Management

Since 2012, significant resources have been invested in generating data to inform policy and wetland conservation management. This allowed us to understand wetland systems better and generate ecological and socio-economic baselines to measure changes in wetland conservation and human well-being outcomes.

4.1.1. Biodiversity and Wetland Health Assessments Bioblitz

A key cornerstone of our work at Rugezi Marsh was to document the plant and animal species inhabiting the wetland and its immediate catchments. Not only would this provide information on how best to manage and conserve the area for the benefit of all, but it would also provide valuable data that could inform future ecotourism projects.

To this end, we conducted rapid biodiversity surveys (bioblitzes) to develop species lists. A bioblitz is an intense period of biological surveying that attempts to record all the living species within a designated area using varied methods across the different taxonomic groups and including line transects, visual, auditory, and indirect (spoor, tracks etc.) surveys, informal interviews, and vegetation quadrats. In total, 52 people, divided into teams of eight, took part in the bioblitz, following a two-day training session on survey techniques. Members of the team included

project staff, staff from Ruhengeri University and the National University of Rwanda, staff and students from our partner institution Integrated Polytechnic Regional College-Kitabi, and local community members.

A total of 123 bird species were recorded, including two species listed as Endangered – Grauer's Rush Warbler* (Bradypterus graueri) and Grey Crowned Crane (Balearica regulorum) – and three Near-Threatened species – Bateleur* (Terathopius ecaudatus), Martial Eagle* (Polemaetus bellicosus) and Papyrus Yellow Warbler* (Calamonastides gracilirostris). The 13 mammals recorded included the Vulnerable Delany's Swamp Mouse (Delanymys brooksi), the Near Threatened African Clawless Otter (Aonyx capensis) and Rahm's Brush-furred Rat (Lophuromys rahmi). A total of 13 amphibian and four reptile species were also recorded, as were 91 plant species from 50 families. The plant list made note of which species are introduced/alien species or species indicative of habitat degradation. This information is particularly useful when monitoring ecosystem health.

Unfortunately, the bioblitz did not record any Sitatunga, an antelope species considered locally extinct; however, the species could be a candidate for future reintroduction.

Wetland Health Assessment

We conducted a wetland health baseline assessment in two wetlands, namely Akanyaru and Nyabarongo. The choice of these wetlands was motivated by the fact that these wetlands are unprotected and face multiple human threats, including agriculture transformation, cattle grazing, hunting, and collection of building materials, materials for arts and crafts, and fodder grass.

In the Akanyaru wetland, results of the present ecological state of the floodplain in terms of hydrology, vegetation and geomorphology show a wetland system under severe pressure that is highly modified. The most significant impacts within this wetland system have been on wetland vegetation and the hydrological functioning of the floodplain. More than 12,000 hectares of the wetland area have limited to no natural wetland vegetation remaining. This is a concern for wetland-dependent species, such as the Grey Crowned Crane and others, as well as having a severe impact on the floodplain's ability to deliver key provisioning and regulating services, such as flood attenuation, sediment trapping, clean water provisioning, vegetation for craft making, and building supplies.

In Nyabarongo, the wetland area mapped and assessed was 26,460 hectares. In general, the Nyabarongo floodplain is in a better ecological state than the Akanyaru wetland. However, we noted two areas with significant impacts on geomorphology, vegetation, and hydrology. Those included a large-scale agricultural project near Gashora, where 750 hectares of the wetland have been cleared and drained for agriculture. The second area is directly south of Kigali and before the confluence with the Akanyaru River, where active cutting and burning of the wetland vegetation was observed during the assessment. The remaining floodplain area showed only moderate modifications to the vegetation and hydrology of the system, approximately a little over half the mapped area.

These baseline assessments provided means to identify areas suitable for conservation action, monitor changes in wetland states over time, and provide recommendations for future management of these wetland systems and the contribution these wetlands can make to human well-being and economic development.

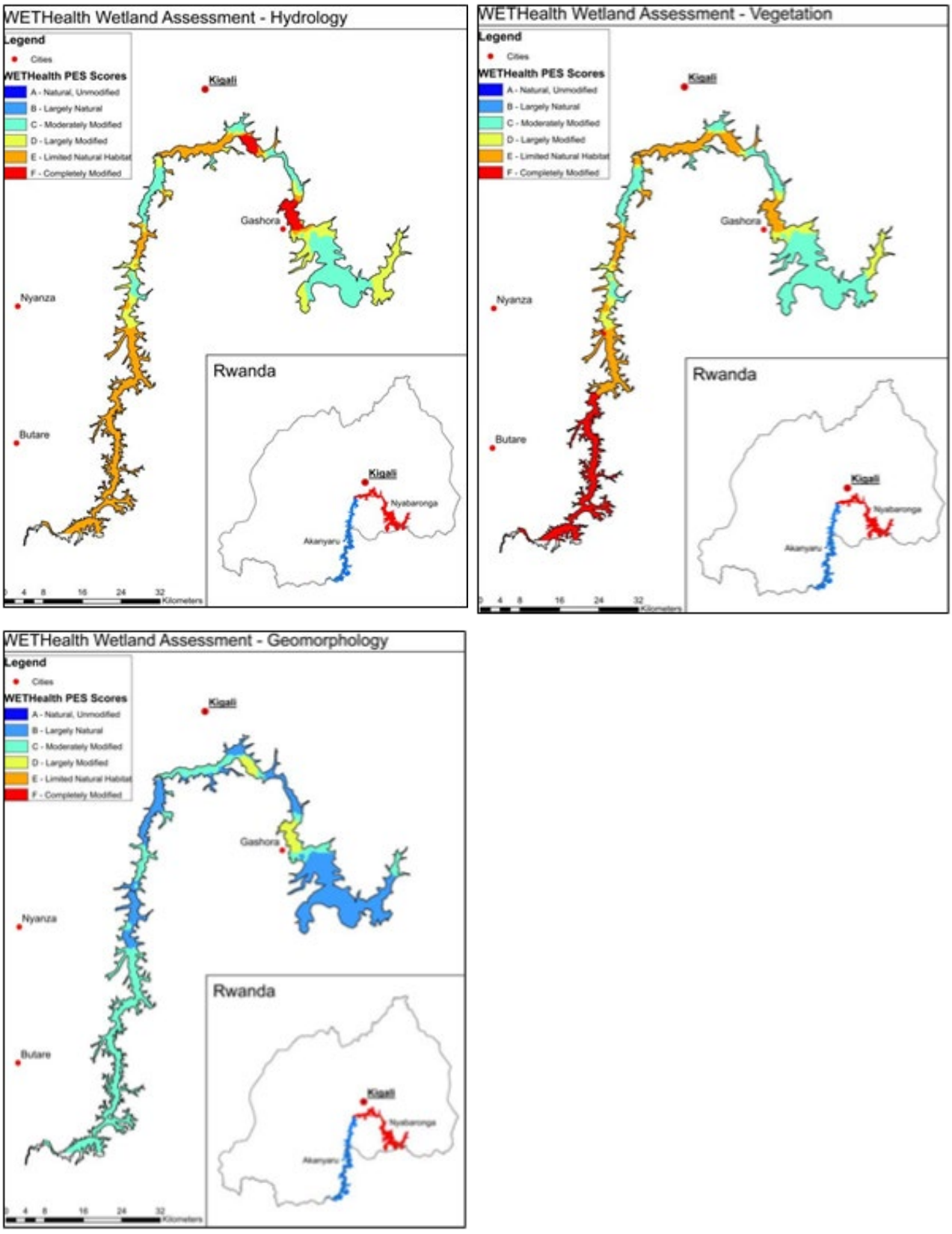


Figure 1: WET-Health Assessment for Akanyaru and Nyabarongo

4.1.2.Wetland and Agriculture

ECOLOGICAL AND HYDROLOGICAL IMPACTS OF WETLAND AGRICULTURE
Conversion of wetlands to agricultural fields involves the removal of vegetation followed by manipulation of the soil properties and water flow to create optimal conditions for the growth of crops and fodder. In cases where the soil is perennially waterlogged or flooded, farmers dig ditches and construct ridges to drain water from wetlands. It is common practice among farmers to cut, burn, or remove wetland plant rhizomes and tubers, thereby inhibiting the regeneration of specific native plant species. But native wetland vegetation reduces evaporation rate, traps sediments, retains nutrients, slows down surface water flow and facilitates infiltration. Once this vegetation is cleared as farmers prepare for crop and livestock production, a wetland loses its ability to provide these critical ecosystem services.

Based on its biodiversity value and contribution to hydropower, Rugezi Marsh was declared a RAMSAR Site (or a Wetland of International Importance) in 2005.

However, the more than 120,000 people dwelling within its steep catchment historically relied on intensive subsistence agriculture to survive. The most common crop subsistence farmers grow is the Irish Potato, but Maize, Runner Beans, and other legumes are also grown. While subsistence farming is not necessarily a massive threat to sustainability, the area has a high population density (approximately 500 inhabitants/km2), and the resulting environmental pressures pose an evident and substantial threat to the wetland's functionality.


Rice grows at Nyabarongo Wetland. International Crane Foundation.

In an attempt to address this issue of agricultural cultivation in the wetland, we need to fully understand the problem. We began by collating background technical information about physical processes, drivers and impacts of agriculture in the wetland. Our analysis of wetland agriculture revealed most wetlands have been inherently transformed from their natural state.

Although wetlands provide multiple ecosystem services, subsistence and commercial farmers generally view the services from an agricultural benefit perspective. Lack of knowledge on the full range of the ecosystem services provided by wetlands and limited technical skills on ways to manage wetland plots to maintain ecological health of the wetland was the underlying driver of unsustainable agricultural use of wetlands.

The valuable information collected during this process allowed us to tailor potential alternative solutions to ease agricultural pressure in Rugezi Marsh and the surrounding catchment. See sections on ecotourism, fodder, avocados, and beekeeping for further details on some of these initiatives.

4.1.3 Peat Power

Peat has been used for at least 2,000 years, as it can be dried and burnt for energy purposes. Peat accretes at a maximum rate of only one or two centimetres a year - in most regions by only a few millimetres per year. These days, commercial peat extraction physically removes peat and the associated stored carbon from the ground at a rate which substantially exceeds the original rate of deposition and accumulation. It is estimated that modern extraction methods typically remove 100x the peat accretion depth per year. Therefore, despite efforts being made towards sustainable management and post-harvesting restoration, the current manner of commercial peat extraction can be regarded as extractive mining, rather than sustainable harvesting. The footprint of peat mining consists of access roads, open water after the removal of peat, disturbed environments in the loading bay areas, and created corridors for the influx of invasive and generalist plant species. This, and the associated degradation which accompanies peat extraction, reduces the ecosystem services provided by the wetland.

In addition to encroaching agriculture and unsustainable resource use, Rwanda had outlined plans to meet the country's energy generation requirements by using the strategy of "peat to power" This practice involves the excavation of peat from wetlands to burn to generate electricity.

All peatlands that were not formally protected in the country were under consideration, and the country's Peat Master Plan outlined its desire to generate 200 megawatts of power by 2017.

Agriculture in a peat-rich wetland. International Crane Foundation.

Because the first people to bear the brunt of this would be the communities living adjacent to the wetlands, we deemed it important to improve our understanding of the process and how the communities may be affected, hoping our work could influence decision makers to secure as much peatland as possible, and where not possible, to ensure impacts are minimized.

A peat-to-power background document (with a focus on Rwanda) was initially compiled by sub-contracted wetland hydrologist specialists to provide the most up-to-date information available on the subject. An additional literature review of relevant and technical reports from within Rwandan government agencies on peat-to-power confirmed that both Akanyaru and Nyabarongo were target sites for peat extraction.

With an estimated 77% the estimated 155 million tons of the country's peat reserves found near the Akanyaru and Nyabarongo Rivers, these were key targets for "peat to power" schemes. Although this increase in electricity generation may prove economically profitable in the short term, it is disastrous in the long term due to the emission of greenhouse gases and associated habitat degradation and destruction. It was also noted that the extraction of peat had actually started at one site along the Akanyaru system.

A notable finding, from a policy perspective, was that there was a conflict of policies and interest

among government ministries in the peat to power schemes. This was a result of contradictions in policies, i.e., the need for power generation for economic development by the Ministry of Finance and Economic Planning versus the promotion of ecotourism at wetland sites by RDB versus actions to maintain ecosystem health by REMA.

We demonstrated that wetland conservation projects in Rwanda offered long-term benefits to wetland ecosystems as habitats for wildlife and sources of livelihoods outweigh the unsustainable short-term gains from exploiting peat for power generation. Our work in Rugezi presented an important opportunity to demonstrate a viable alternative to "peat to power": to show that the long-term sustained economic values provided by healthy peatlands like Rugezi far exceeds their destruction for short-term economic gain.

4.1.4. Wetlands and Peat Assessment

Past research has been difficult due to the lack of, or inadequate, baseline data. Our preliminary, broad-brush assessment of the situation at Rugezi from 2010 to 2012 revealed a site impacted by physical degradation and biodiversity loss. Generating research on critical ecological, geological, and hydrological information was identified as a key tool for future conservation planning.

Furthermore, enhancing our knowledge of ecosystem services, particularly carbon sequestration in the form of peat storage, was seen as a way of assessing the feasibility of entering the Voluntary Carbon Market and potentially tapping into that source of funding for future conservation and alternative livelihood projects within the region.

A desktop analysis of aerial photographs sourced from the national archive, combined with advanced mapping techniques and ground-truthing allowed us to categorise the landscape into zones we could use to assess changes in land cover and land use since the 1970s. Simultaneously, we conducted a review of outputs of previous research and conservation projects to assess trends in the use and status of natural resources over the past three decades.

We found that the human population in the project area had increased by more than 70% since the 1980s, resulting in intensified hill-slope cultivation, increased harvesting of wetland plants, agricultural encroachment onto the wetland, and hunting of animals by local communities. A notable finding of our review was that agricultural encroachment onto the wetland had declined significantly during the last decade, a positive impact of an initiative efforts undertaken by the Rwanda Environmental Management Authority (REMA) and one that gave us hope that focused conservation initiatives can work within Rugezi.

Evidence of degradation at Rugezi Marsh

Despite the supposed restriction on the harvesting of plant and animal products following the designation of Rugezi Marsh as a Ramsar site in 2005, our assessment showed that illegal activities,

such as fishing and harvesting of plant materials for weaving, construction, fodder, and energy provision, were still taking place in some sections of the marsh. Furthermore, our assessment revealed the majority of communities depend on water abstracted from hand-dug wells and seeps on hillslopes. This was shown to have implications for the national economy since almost half of all hydroelectric power produced in Rwanda is generated at three power stations associated with dams downstream of the Rugezi Marsh and excessive community abstraction reduces water flow and hence energy generation.

Another major achievement was the successful completion of the first ever detailed peatland assessment at Rugezi Marsh in September 2012. Peatlands are wetlands characterized by horizons of accumulated, decomposed, organic material. Although peatlands cover only 3% of land area worldwide, they contain 30% of the global organic carbon and therefore act as an invaluable carbon sink. Conversely, destroyed or degraded peatlands can significantly contribute to greenhouse gas emissions. Based on peat thickness measurements taken, the total volume of carbon was estimated to be 2.77 x 1010 m3, approximately 5 x 108 m3 more than previous estimates.

4.1.5. Socio-economic Baselines

Because Rugezi Marsh has a high population density and communities reliant on the land, conserving wetland integrity and ecosystem function is intrinsically linked to improving the socio-economic prospects of the community. However, one cannot assist communities if one does not understand their socio-economic dynamics. To address this, we conducted a baseline socio-economic study in 2012 with the objective of gathering information on human livelihoods and the socio-economic status of the communities around Rugezi Marsh.

The study was carried out within the Burera and Gicumbi districts and included members of the Butaro, Cyeru, Kivuye, Rusarabuye, Rwerere, and Miyove communities (Figure 2). Data was collected through a series of questionnaires, formal and informal interviews, and focus groups.

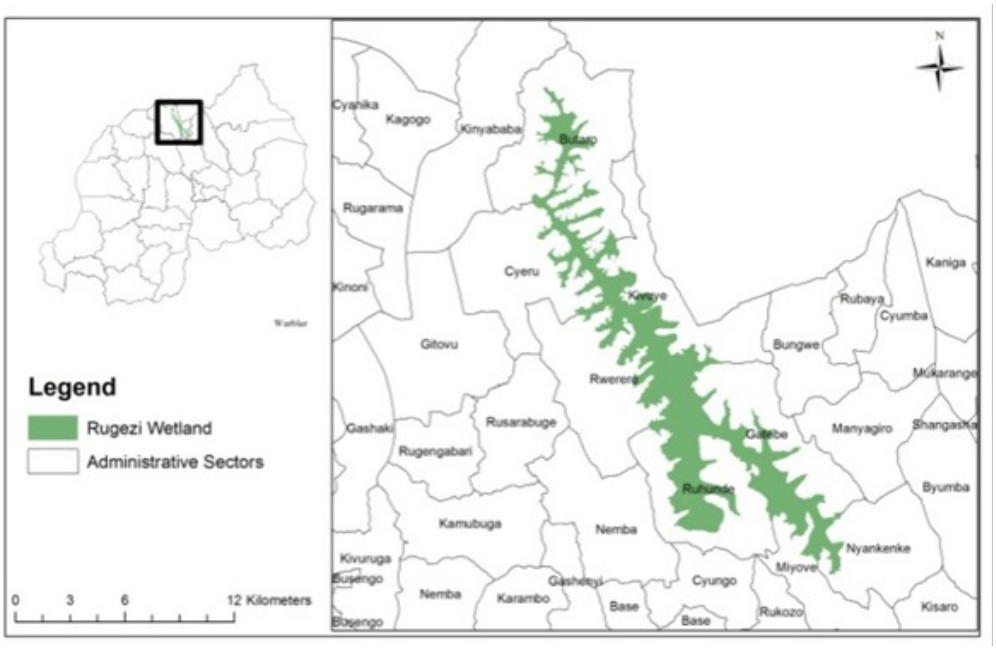


Figure 2: A map of the Rugezi Wetland showing the surrounding administrative sectors.

Collated results showed that communities are dominated by subsistence farming (97% of respondents; predominantly of potatoes and maize); however, agriculture was deemed insufficient to cover all food needs of the communities. This was attributed mainly to a shortage of land (74% of respondents owned less than 1 one hectare of land). Communities tried to supplement their income predominantly through handcraft production, but also through activities such as beekeeping, casual labour, and small-scale mining. Despite these activities, half of the respondents lived under the poverty line and over a third said it was hard to see any activity that will flourish in the area.

Regarding access to amenities, 40% of respondents reported it took less than 10 minutes to access a water source point and return home, with a further 38% reporting this activity took between 10 and 20 minutes. The remaining 22% of respondents required more than 20 minutes to collect and return with water. Concerning access to healthcare and education, 76% of respondents confirmed it took less than an hour to access a clinic and 86% of respondents reported they dwelled within 20 minutes of school.

Other topics covered in the survey included family planning and size, knowledge of NGOs working in the region, and use of resources from the wetland itself. This latter question was particularly pertinent as it would help guide future work around education.

Communities depend heavily on the wetland's resources with some activities evidently posing threats to ecological integrity of the wetland going forward. This included grass cutting, hunting, fishing, trade of chicks of Endangered species such as the Grey Crowned Crane, cultivation of land within the wetland, and harvesting of wetland products. These threats were found to be largely driven by limited income and lack of appropriate development projects to improve human livelihoods within communities.

4.2. Awareness and Education

One of the biggest issues affecting conservation within Rugezi Marsh and its surrounds is low environmental conservation awareness among communities. We aimed to address this by implementing an environmental education and awareness program, focusing on Grey Crowned Cranes and wetland conservation at three wetland sites (Akanyaru, Nyabarongo, and Rugezi) and more broadly at a national level.

Our Crane Awareness program started in 2015. Initially, we conducted meetings with the Rwanda Environmental Management Authority (REMA), Rwanda Development Board (RDB), and local government District Officers involved in education, environment, agriculture, and security to get their buy-in. In addition, information on the impacts and challenges of existing or previous education and awareness programs were gathered.

As a result, different strategies in the education and awareness program were designed and implemented. These included media campaigns across national television and radio stations, on-site conservation campaigns coinciding with market days, the revival of school environmental clubs, a conservation comic book for local learners, workshops with local leaders, and community awareness roadshows.

A two-week national media campaign was conducted in partnership with RDB (Tourism and Conservation Department) and the Rwanda Wildlife Conservation Association (RWCA) to raise

awareness on the status of Grey Crowned Cranes and the need to stop poaching and protect species. The campaign called for people to register captive cranes to better understand the extent of the illegal trade and ultimately reintroduce cranes back into the wild. The campaign also involved radio advertisements and talk shows, providing opportunities for members of the public to call in to ask questions, As a result, by the end of January 2016, the number of registered cranes was 192, with 30 having been registered in that month alone. Furthermore, the campaign resulted in 28 formerly captive Grey Crowned Cranes being successfully transferred from a quarantine facility in Kigali to the rehabilitation facility in Akagera National Park.

We also developed and implemented a school program, where we worked with nine schools' environmental clubs around Rugezi (380 members), two schools' environmental clubs around Nyabarongo wetland (122 members), and at Akanyuru wetland with the G.S. Mamba school. The students participated in activities including tree planting, and school drama competitions aimed at raising conservation awareness and the reporting of illegal activities. Furthermore, we organized field trips to Akagera National Park for GS. Gaseke Club, the deserving winners of the drama competition around Rugezi Marsh. Around Nyabarongo wetland, we distributed 125 T-shirts to members of the environmental clubs to motivate them to spread conservation messages in their communities. Finally, we also developed a conservation comic book to be used to engage children in conservation education and awareness.

Another impactful and model program is the Crane Ambassador Program, where 40 volunteer community members were selected from all eight Sectors around Rugezi marsh and trained on how to effectively deliver crane conservation message in their communities through different platforms including community meetings, church services, at schools, etc. This program has been instrumental in promoting community engagement and raising awareness for the conservation of the Grey Crowned Cranes, around Rugezi Marsh. In addition, they provide information on illegal activities in and around Rugezi marsh, contributing to law enforcement efforts.

The dedication and enthusiasm of the Crane Ambassadors have resulted in remarkable success in disseminating conservation messages across various community platforms, fostering a deeper appreciation of the importance of preserving Rugezi Marsh and its rich biodiversity.

4.3. Crane Monitoring

We developed protocols for monitoring crane population trends, breeding site status, crane sightings, crane incidents and breeding success. These protocols enabled us to collect long-term data and establish a database from which we can understand these aspects of crane ecology.

4.4. Sustainable and Resilient Livelihoods

Beekeeping

Apiculture (beekeeping) can be an important conservation tool in developing countries as it is environmentally friendly and can be a source of food and employment for many rural households, thus playing a role in alleviating poverty. A primary goal of our work in Rugezi Marsh is to reduce pressure on the wetland by promoting alternate livelihood options which do not rely on unsustainable resource extraction. Beekeeping was deemed one such activity with the potential to reduce human impacts on the wetland, while simultaneously benefiting the socio-economic prospects of community members. We began by initiating a situational analysis, consulting members of beekeeping cooperatives and

other individuals that were involved in the beekeeping business, to help shed light on the level of technical skills, nature and impact of previous trainings, current beekeeping methods, challenges faced, and opportunities for improving knowledge and skills. A questionnaire was designed and administered to members of seven cooperatives with a total of 75 people interviewed.

The results showed that beekeeping around Rugezi was not yet considered as a real income-generating activity with very little technical support from the government and NGOs. The bulk of the honey harvested from the beehives was consumed at household level, or to a lesser extent used for brewing local beer and as traditional medicine. Marketing of the honey was done locally and bought directly from the beekeepers by friends, neighbours, and other villagers. However, beekeeping has been extensively promoted in communities neighbouring Volcanoes National Park and the success of beekeeping in these villages indicated a potential to upscale the current beekeeping ventures within the vicinity of Rugezi.

To this end, we hired consultants to run workshops on modern beekeeping techniques, business and financial management practices, and the marketing of honey and other beekeeping products to members of seven beekeeping cooperatives. Following the workshops we facilitated the transfer of seven modern beekeeping equipment kits to each cooperative. Kits contained CAB hives, wax sheets, protective suits and gloves, and other tools utilized in modern beekeeping. The quantity of honey collected from traditional beehives ranged between four and seven kg; however, through the modernization of techniques and equipment this has now been increased to 10 kg or more. The total membership for the beekeeping cooperatives was 189, with a further 352 extended family members benefiting from the initiative. A particular highlight was our facilitating the establishment of a new cooperative, comprising entirely of unemployed youths and individuals previously involved in poaching activities.

Though our project was primarily designed to improve the knowledge and technical skills of beekeeper cooperative members, it also provided a platform to emphasize their role and increase their sphere of influence in conservation matters in the broader catchment. Following our workshops and supply of equipment, cooperatives committed to reduce their impact on the wetland through halting livestock grazing, stopping all illegal activities such as hunting of Grey Crowned Cranes and igniting fires within the wetland, and to participate in awareness events promoting conservation within Rugezi Marsh.

Community members practice beekeeping skills. International Crane Foundation.

The beekeeping initiative has seen minor complications; however, following reports of bee abscondment from cooperatives' hives, we hired an expert from Makerere University in neighbouring Uganda to assess the situation. In line with his findings and recommendations, our field staff worked with the beekeepers to clean the hives and relocate them to areas where they could easily be re-colonized.

After the successful recolonisation, the hives were taken to a shelter to protect them from rain. A refresher training course was organized for the beekeepers in February 2019 to improve their knowledge of colony management, product harvesting, and handling. Five members were selected from each of the seven cooperatives to attend this refresher course. However, through a multiplier effect, this knowledge spread to other members of the cooperatives. Currently, the colonies are doing well. To consolidate the work under this project initiative, we are currently facilitating the process of integrating the seven beekeeping cooperatives into one umbrella organisation to strengthen the social connections between the community members.

Avocados

One of the outcomes from our socio-economic baseline study of local community leaders was the need for increased avocado production to address malnutrition among children and to meet the ever-increasing market demand for avocados locally. We deemed this an ideal way of improving the livelihood of communities and set up a project to distribute avocado seedlings.

Since 2019, 20,285 Hass avocado seedlings have been distributed to 4,037 households in all eight sectors around Rugezi Marsh and one school (G.S Gaseke). This provided an avocado orchard for learners and educators to manage and learn from. Before the distribution, beneficiaries were selected with the support of the local government at the sector level and engaged on the importance of cranes and Rugezi and their role in conserving them. In addition, they signed conservation agreements with ICF, highlighting their roles in conserving Rugezi and cranes and ICF's roles in responsibility, including supporting them in livelihood improvement.

The acquisition of seedlings does not guarantee future harvests, especially if beneficiaries do not have experience in growing the crop. Therefore, hiring a consultant to train the 100 beneficiaries (53 men and 47 women) in good agronomic practices, avocado tree management, fruit harvesting and handling, and basic business management was important. The training aimed to equip the beneficiaries with key skills key for growing and marketing avocados. Furthermore, we secured a commitment from sector authorities to provide continued mentorship to the project's beneficiaries.

Community members receiving avocado seedlings. International Crane Foundation.

Napier Grass

In 2006, the government of Rwanda started a *One Cow per Family Program* (also known as the *Girinka Program*) in which a poor family received a cow free of charge. Once the initial cow reproduces, the first female calf is given to a neighbor who passes on a female calf to another neighbor, and so on. By providing the poorest households with cattle, this program sought to reduce the rate of child malnutrition and increase household incomes for poor farmers. These goals are directly achieved through increased access to and consumption of milk by providing poor households with a heifer.

The challenge was this arrangement necessitated fodder to feed the cows. Most households that received cows owned small parcels of land under crop cultivation with no vegetation to feed the cows, and they were not allowed to graze cows outside their homesteads due to the zero grazing policy under enforcement in Rwanda. This forced communities living near Rugezi Marsh to resort to harvesting vegetation from the wetland. This had negative impacts on the ecosystem integrity of the marsh as harvesting grass from the marsh exposed the marshland peat, leading to it drying out and releasing CO2; while human presence in the marsh scared the Grey Crowned Cranes away and led to abandoned breeding attempts; and human (and cattle) presence in the marsh led to trampling of chicks and eggs, while entry by humans and cattle into the marsh created paths into the marsh that made capture easier of remaining chicks for the pet trade.

To help remedy this situation, we initiated a project to give Napier Grass cuttings to community groups to plant on their private land, especially along terrace bands. Through a long-standing partnership, Burera District provided three-hectares of land that we used to establish a Napier Grass nursery to support the distribution of Napier Grass.

Since 2018, we have **distributed 8,668,150 Napier Grass cuttings to 13,702 families.** These were planted on **2,188 hectares** of land. In addition to providing fodder for livestock, the Napier reduced soil erosion on hillslopes.

Cenchrus purpureus, commonly known as Napier grass, Elephant grass, or Uganda grass, is a species of perennial tropical grass native to the African grasslands. It has low water and nutrient requirements, and therefore can make use of otherwise uncultivated lands. Historically, this wild species has been used primarily for grazing. With its' high yield (plantations produce about 40 tonnes of dry biomass per hectare per year) and ability to be harvested many times per year (every 1 to 3 months), it is an ideal fodder for animals. Furthermore, Napier grass can improve soil fertility and protect arid land from soil erosion. More recently it has been used as a source of fuel in the form of charcoal, biogas and bio-oil.

Uzabakiriho Jeannette: *"Fodder has helped me to get animal feed, since I got them, milk production has doubled and I thank so much the ICF/EWT/IPRC KITABI project for supporting us with Napier Grass."*

Uwiragiye Chantal: *"My children do not miss school nowadays. Before I got the fodder from ICF/EWT project they had to spend many hours to look for animal feed in the marsh and often missed attending classes."*

Mattress Distribution

Grass harvesting by local communities for making traditional sleeping mats poses a key threat to the Grey Crowned Cranes, which use Rugezi Marsh as their key breeding site. To address this threat, identified and initiated support to 200 women in two groups in the Ruhunde Sector.

Women receiving mattresses from ICF/EWT/IPRC-Kitabi Partnership. International Crane Foundation.

Since 2021, a pivotal funding initiative from the Kansas City Zoo & Aquarium enabled the purchase and distribution of 600 mattresses to these two women groups, where each family received three mattresses, including one mattress for parents, one for boys, and one for girls.

Initial empirical evidence shows a significant decrease in people harvesting grass from the marsh. This reduction in disturbance is expected to contribute to the breeding success of Grey Crowned Cranes and increase their population. On the other hand, this support allowed 200 families (approximately 1,000 beneficiaries) to sleep comfortably, and these families attributed Grey Crowned Cranes for this comfort. The beneficiaries of the mattress intervention reported that the time they would spend going to the marsh looking for grasses for mat-making is now being used for other productive activities that benefit their households. In addition, this support contributed to the improved hygiene in beneficiaries' homes and increased school attendance by children. It reduced gender-based violence in beneficiaries' homes, which came as an unintended positive impact from this intervention. Below are some testimonies from some of the beneficiaries.

"Having mattresses in my family has helped us improve hygiene because we were struggling with harsh sleeping conditions. For example, the children would not sleep well, leading them to wake up early in the morning, which negatively affected their success in school. Additionally, the cost of hygiene materials has decreased. I would like to express my gratitude to ICF and its' partners for providing us with mattresses."
Liberata UZSBINO - Member of Turwanyubukene Women Group

"The fact of benefiting from mattresses and awareness raising about Grey Crowned Cranes helped us understand the importance of conserving [Cranes] and their habitat, which is Rugezi Marsh. Before, we would not mind chasing them and destroying their eggs; and some of us were involved in capturing young ones and trade them. However, after advocacy from our partner, ICF, in collaboration with our government leaders, we took initiatives to protect them and we feel eager to conserve Rugezi Marsh as we expect to gain more from protecting them."
Francoise UWIMANA - Member of Dusasirane Women Group

Energy-Saving Cooking Stoves

In 2006, the Government of Rwanda and partners established a buffer zone along the boundaries of Rugezi Marsh by planting Anus acuminate, a fast-maturing tree species. However, due to a lack of wood fuel, local communities started cutting down the buffer zone to get firewood for cooking energy and stakes for climbing beans.

To reduce the amount of fuelwood used by the communities, we provided 80 energy-saving cooking stoves to 40 families in the Ruhunde Sector, where each family received two cooking stoves. ICF intends to scale up this intervention to reach more households.

Ecotourism

Rugezi Marsh is only 25 km from the Volcanoes National Park, a primary tourist attraction in Rwanda, renowned for its gorilla viewing. Early on during our work in Rugezi Marsh, ecotourism was identified as a key strategy to add value to the wetland, generate socio-economic benefits for local communities, and help create a shift away from extractive resource use - ultimately ensuring the region's conservation going forward.

Initially, we hired a consultant to draft an assessment detailing the current state of ecotourism in the region, key challenges facing future ecotourism initiatives, potential ecotourism opportunities, and a marketing plan. The report found there were no existing tourism activities present, and challenges hindering future initiatives may include a lack of English language skills amongst existing and potential guides, little tourism experience and know-how, limited access and long driving times unsuitable for day visitors, limited existing infrastructure (e.g., restaurants), and relatively poor connectivity between different sites across the wetland.

The report outlined a way forward: to build ecotourism opportunities from the ground up. A first step sought to introduce volunteer tourism, followed by the possibility of expanding into the backpacking market and, eventually, looking for more mainstream tourism opportunities. The volunteer tourism market was deemed particularly attractive as a base, as the volunteers can bring business planning, ecotourism, and related skills for a designated period. As a result, the community can slowly start to understand tourism and how to service tourists effectively. Simultaneously, the paying volunteers can generate much-needed income for the community from tourism of a slightly different nature.

The Rugezi Marsh Volunteer Housing project, an initiative to kick-start the ecotourism industry, is the first step toward establishing enjoyable and ecologically responsible tourism infrastructure. Volunteer housing marks a critical starting point for the Rugezi Marsh's long-term engagement toward preservation and rehabilitation goals. We commissioned an assessment addressing the feasibility of securing this "ecolodge." The report included a detailed analysis of site selection, architecture and building systems. Below is the housing plan that the project designed.

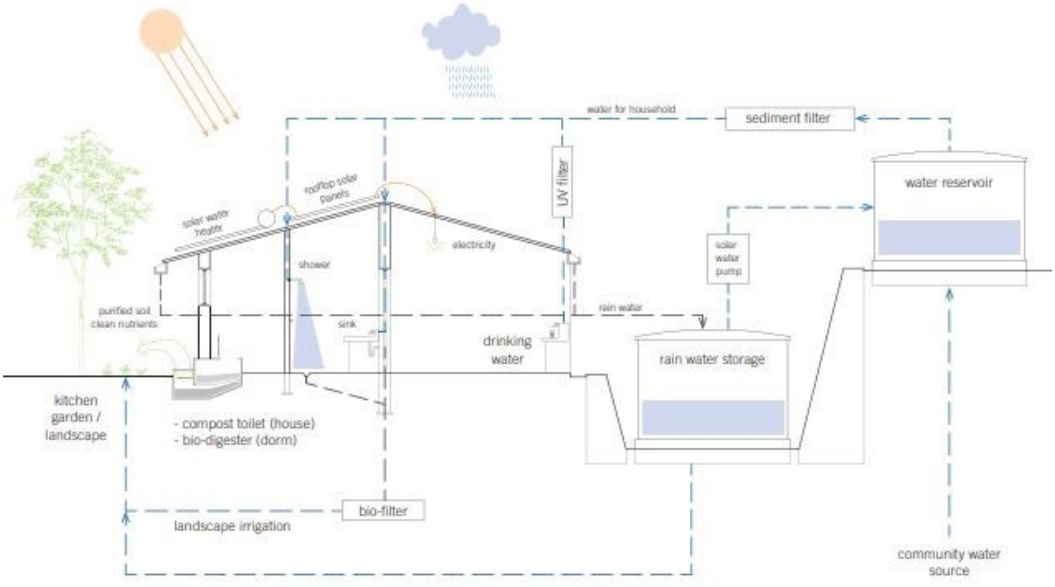


Figure 3: Architectural Plan for a Volunteer House

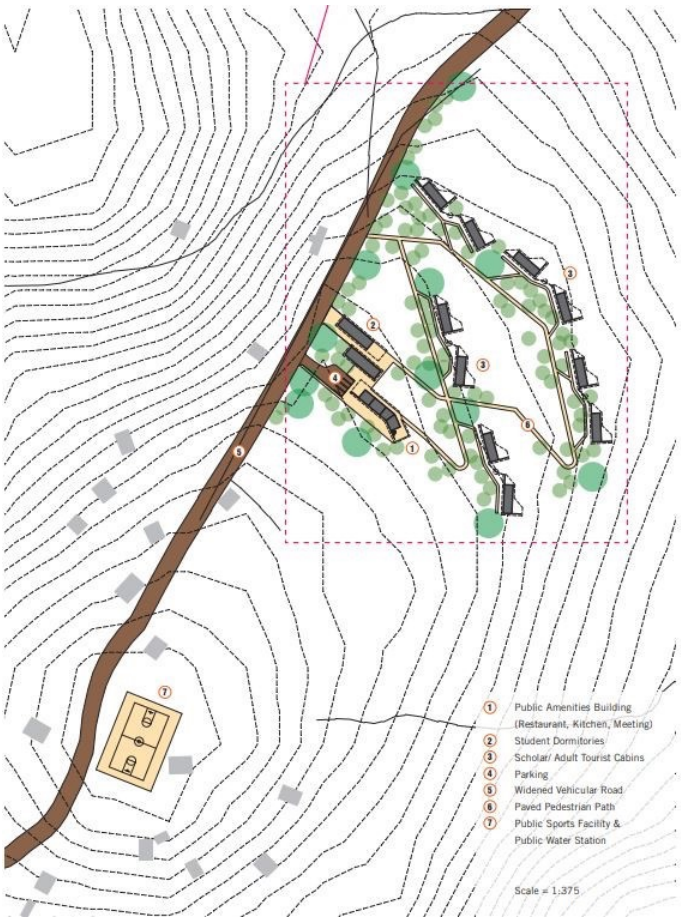


Figure 4: Plan of an Eco-lodge

A further option for ecotourism is marketing the wetland as a birding hotspot. Since Rugezi Marsh was declared a Ramsar site in 2005, it has been publicized as a destination for birdwatchers due to the occurrence of threatened or rare species such as the Papyrus Gonolek, Lesser Swamp Warbler, Grauer's Swamp Warbler, and Grey Crowned Crane. Plans to use the rich avian fauna as a basis for advancing ecotourism have been considered since then, though funding limitations have hindered the implementation of the concept.

To address this and provide capacity for community members to profit when visitor numbers increase, we ran bird identification and avitourism training workshops with community members in the Butaro sector of the Burera District. Through class presentation and field exercises, trainees gained basic skills on how to identify the local bird species and their connection to the environment, ways to effectively communicate birding and bird information to clients, planning of a birding itinerary, and use of field equipment (bird guides and binoculars). Part of this initiative included the acquisition and donation of binoculars to the future guides.

4.5. Climate-Smart Agriculture

One of the biggest threats to Rugezi Marsh is unsustainable subsistence in agriculture. Historically, a significant portion of the marsh was transformed into agricultural land due to increased demographic pressure in the areas around Rugezi since the late 1970s. In 2006, the Government of Rwanda relocated agriculture outside the wetland to restore its natural state. This intensified hillside agriculture, contributing to soil erosion, reducing soil fertility, and causing wetland siltation. The changing climate exacerbated this issue through extended drought periods and concentrated rains over a short period of time.

In 2023, we started promoting climate-smart agriculture practices in several landscapes across East Africa, including Rugezi Marsh, aiming to help farmers increase their productivity and incomes sustainably while enhancing their resilience to and protecting against climate-related shocks. Around Rugezi, 60 farmers from two cooperatives, COABUTA and COAIRUGA in Butaro Sector, were trained as facilitators through the Farmer Field School training approach. Through, this learning-by-doing approach, ICF conducted two season-long training where these facilitators were supported to establish a demonstration plots and provided all the required agriculture input, including high-quality Irish potato and maize seeds for season one and season two respectively, while supporting

them through the entire process of establishing demo plots, planting, maintaining the demo plots, monitoring crop growth, harvesting and post-harvesting best practices. After two seasons, the facilitators graduate, and they will be supported in training five community members each.

Community members are being trained to make composite manure. International Crane Foundation.

4.6. Improving the Protected Status

Although not quite a silver bullet to success, we believe in declaring Rugezi Marsh as a national park while supporting sustainable livelihoods for local communities through ecotourism-based activities. We conducted a feasibility assessment study to assess the viability of elevating Rugezi to a national park.

Through engagements with key stakeholders in Rwanda, we learned there is heightened support for the declaration of Rugezi Marsh as a national park. Both the Rwanda Environmental Management Authority, the current custodian of the marsh as a Ramsar Site, and the Rwanda Development Board, under whom it would fall once declared a national park, expressed full commitment to this move. In addition, most of the community members around the marsh and catchment support elevating its status to a protected area. The motivation for this is the anticipated benefits from increased tourism and livelihood opportunities that they believe will result from protecting the marsh and its wildlife.

With high levels of support for the declaration of Rugezi Marsh as a national park, ICF and Rwanda Wildlife Conservation Association (RWCA) teamed up to secure funding from the Rainforest Trust to work with the government to elevate Rugezi to a protected area. We believe that achieving this proclamation will ensure that "Rugezi Marsh Protect Area" becomes a well-established ecotourism destination, valued by community members and stakeholders who draw on the economic potential of the protected area, and from the livelihood projects in the catchment, to build a green economy, thus reducing threats to the marsh and its biodiversity for the benefit of all.

PROTECTED AREAS AND THEIR IMPORTANCE TO CONSERVATION

Protected areas are clearly defined geographical spaces, recognized, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. Currently, more than 200,000 PAs exist across the globe, spanning an area of approximately 20 million km^2. Protected areas are the cornerstone of global biodiversity conservation strategies and provide an array of ecosystem servies. There is cosiderable evidence that well managed protected areas are effective in reducing biodiversity loss. Although not the only effective measure, protected areas are considered the most fundamental tool for conserving biological diversity and will undoubtedly play an essential role in arresting the alarming decline of species and degradation of natural habitats that we are seeing today.

5. LESSONS LEARNED AND NEXT STEPS

Throughout our projects, we learned that the success of any livelihood enterprise depends on the degree to which local communities understand, own, and manage that enterprise and incorporate it into their community planning and vision. This enabled us to focus strongly on strengthening local capacity to develop and manage livelihood options in a sustainable manner through training and mentorship. We also learned that communities always have high expectations regarding how they will benefit from the project. Project staff must carefully deal with this expectation by being as transparent as possible in disclosing the benefits communities will receive.

Through engagements with key stakeholders in Rwanda, we learned there was heightened support for the declaration of Rugezi Marsh as a Protected Area. Both the Rwanda Environmental Management Authority, the current custodian of the Marsh as a Ramsar Site, and the Rwanda Development Board, under whom it would fall once declared a Protected Area, expressed full commitment to this move.

Through interaction with community groups, we learned that gender training and self-esteem training should be essential components of the early stages of any community livelihood intervention. Gender training enhances women's participation and induces equal contribution from both women and men.

We have also learned that integrating extension services in livelihood programs is paramount. It creates a strong link between communities and local governments that provide extension services.

Next Steps

The International Crane Foundation will focus on scaling up its transformational conservation interventions to reduce threats to cranes, wetlands and catchments while increasing the resilience of communities and agricultural landscapes. Through forming strategic partnerships, ICF will work to increase farmer adoption of, which can transform agriculture into a more vibrant, resilient system that protects wetlands, soil, air, and water quality. Using an approach that integrates conservation, human health and livelihoods, ICF is committed to securing the population of Grey Crowned Cranes.

The International Crane Foundation will continue to build the organizational capacity of local community groups and community-based organizations to improve their governance structure and ability to manage enterprises and financial resources effectively. To achieve all this, the International Crane Foundation has registered as an international NGO in Rwanda and established an office in Kigali.

THANK YOU TO OUR DONORS

We are deeply thankful to the donors who have supported or continue to support our work and believe in our mission.

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