Understanding Local Community Perception, and Potential of Sustainable Aquaculture Development in Ecologically Sensitive Areas of Lake Victoria Crescent, Uganda

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FINAL DETAILED PROJECT REPORT-2023

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1.0 Project Summary

In this project, we carried out suitability modelling of fishpond development. We responded to resource availability to develop aquaculture in the area sustainably. We sought to understand aquaculture's contribution to livelihood and its influence on the reduction of capture fisheries. We assessed factors influencing fish farmers' perceptions towards sustainable aquaculture development. Additionally, we trained communities on different approaches to develop aquaculture without interfering with area biodiversity. The project employed a mixed methods approach and utilized Geographical Information System. The outputs of the project formed the basis for sustainable aquaculture development amidst ecologically sensitive areas and informed policy makers on the resources needed for sustainable aquaculture development.

2.0 Introduction

Communities in the Lake Victoria Crescent, Uganda, believed that continuous declines in fish production had negatively affected their livelihoods, income, and food security. According to the farmer's point of view, declining fish catches were not attributed to a single cause but several of them (FAO, 2021). The reduction in fish species in Lake Victoria represented one of the largest documented losses of biodiversity in an ecosystem. The decline in fish species was attributed to overexploitation through increased fishing capacity and overdependence on the lake (FAO, 2021).

The decreasing catches of fish in Lake Victoria and the growing demand for fish protein ultimately resulted in the need to strengthen strategies to boost aquaculture production in the Lake Victoria Crescent to reduce pressure. As the second-largest freshwater body in the world, Lake Victoria yielded over 500,000 metric tons of fish each year, supporting the livelihoods of nearly two million people. However, the lake's fish stocks were declining amid growing demand, prompting communities and government authorities to enthusiastically turn to pond aquaculture to address the problem.

Several ponds were being established by fish farmers in the Lake Victoria Crescent, Uganda, as a way to increase production. However, the challenge was that some of these were sited in ecologically sensitive areas like the wetlands, threatening area biodiversity. Considering the upcoming fishpond developments in the area, there was a need to carry out fishpond suitability analysis and assess resource availability for aquaculture development in the area. This first phase of the project carried out modelling of suitable sites for pond aquaculture development with the

aim of providing guidance on sustainable aquaculture in the ecologically sensitive areas of the Lake Victoria Crescent.

The project further sought to understand how communities perceived aquaculture as an alternative to capture fisheries and trained communities on the sustainable development of aquaculture amidst ecologically sensitive areas without compromising biodiversity.

3.0 Objectives of the project

- ✓ Carry out suitability modelling of fishpond development.
- ✓ Respond to resource availability to develop aquaculture in area sustainably.
- ✓ Understand aquaculture contribution to livelihood and its influence on capture fisheries reduction.
- ✓ Assess factors influencing fish farmer's perceptions towards sustainable aquaculture development, and
- ✓ Train communities on different approaches to develop aquaculture without interfering area biodiversity.

4.0 Project area

The project covered districts of Mpigi, Masaka, Bwikwe and Wakiso, has been conducted. These districts, situated in the Lake Victoria agroecological zone and in close proximity to the lake on the Uganda side, consisted of hills and ridges dissected by streams and swamps. The altitude ranged from 1,100 m above sea level in the valley to 1,200 m above sea level at the hilltops. The vegetation in the area was tropical moist evergreen forest, with some Savanna mosaic patches.

Previously, hills in the area existed, but they are now covered by banana and coffee plantations. The three districts of Mpigi, Masaka, and Wakiso were selected because they contributed significantly to Uganda's sources of fish supply for both domestic and export markets. These areas held great potential for both capture fisheries and aquaculture, identified as among the districts with potential for fisheries and aquaculture development in the Lake Victoria crescent, Uganda (DFR, 2012).

Aquaculture is predominant and land-based, with numerous ponds established in these districts. Some land in these areas is gazetted for aquaculture, leading to an increase in land use, especially due to emerging commercial farmers. Most species of fish cultured are Nile tilapia (*Oreochromis niloticus*), red belly tilapia (*Tilapia zillii*), common carp (*Cyprinus carpio*), and African catfish (*Clarias gariepinus*). These fish species are being reared under polyculture systems in earthen ponds.

5.0 Activities carried out

5.1 Training on Sustainable aquaculture concept principles, and current initiatives in Uganda

456 participants were trained and equipped with the understanding of how to have sustainable aquaculture development in the Lake Victoria crescent, Uganda. The focus on that day was how best the ponds can be established in a way that does not threaten the ecosystems and the environment. During this session, comprehensive understanding on how best farmers can sustain fish farming, was comprehensively discussed.

During the training session on Sustainable aquaculture concept principles, and current initiatives in Lake Victoria resent, Uganda.

5.2 Training on formation of marketing unions and their role in sustainable aquaculture development

During the training we also focused on how we can promote sustainable aquaculture through formation of fish marketing unions. The focus on the training was organisation marketing of aquaculture products as one of the components of protecting producers and ensuring the environmental sustainability and economic

viability of the market in aquaculture products. It improves and strengthens key elements common market standards, consumer information and producer organisations, and introduces new elements, such as market intelligence for the fish farmers. We encouraged on making the participants understand why it is necessary to have the fish marketing association as they role in ensuring sustainability. The other key focus of the training under this session was to equip participants with the knowledge of how these producers can be protected with focus on, aquaculture and linking market considerations with resource management issues among the fish practicing farmers. Under this training we also ensured that the participants have knowledge on i) strengthen the competitiveness of aquaculture industry ii) improve the transparency and stability of the markets and improve consumer information and raise awareness, by means of notification and labelling providing comprehensible information.

Training session on formation of marketing unions and their role in sustainable aquaculture development.

5.3 Training on Alternative feeds for aquaculture Pathway to sustainable aquaculture development

As way to promote sustainable aquaculture, we also focused on practically training farmers on how to promote fishpond farming using feed which are sustainable in nature. In view of this we focused on training on black soldier fly leave as

alternative feeds for fish. We trained farmer on how to breed and rear the black soldier flies. Their advantages and how they can be alternative feed source.

In our training participants were equipped with knowledge that insect black soldier fly meal is being recognized as a feed ingredient in aqua feeds for their protein rich content similar to fish meal. Participants we able to appreciate that black soldier fly that meal has been utilized as a fish meal or soy meal substitution in aquaculture to improve the nutrition.

The participants were taken through the training on how to breed the black soldier flies and the entire breeding process, these were exposed to all this process practically.

Participants being taken through breeding of black soldier flies as sustainable alternative feeds for fish.

Participant observing the black soldier fly hatchery and the already processed meal.

5.4 Training on Sustainable Value addition to fish and entire value chain.
During the workshop, we also focused out training on how fish farmers can add value to their fish to ensure sustainability in income generation. During this session, fish farmers were able to appreciate that Value-added fish and shellfish

products usually undergo some level of processing that will inactivate and kill bacteria and pathogens, and in the process, this will result in shelf-life extension and can also provide new market opportunities.

Participant attending session on Sustainable Value addition to fish and entire value chain.

5.5Training on emerging sustainable aquaculture production technologies

During the workshop sessions, we also trained farmers and equipped them with new fish rearing technologies. Farmers were taken through the aquaponics system of fish rearing, they also practically observed how this can be done. In out trainings

we emphasized the use of locally and available cheap options to ensure that sustainable technologies can be adopted which are not complicated and are affordable to the fish farmers.

Participants practically observe the aquaponics system during the training session.

5.6 Training on sustainable aquaculture across different fish farmers in project area

Sustainably and thoughtfully cultivated aquatic systems provide nourishing sustenance for an ever-expanding global populace, alleviating the pressure on

dwindling fish populations, all while fostering employment opportunities and enhancing the welfare of individuals. It's against this backdrop that fish farmers from various clusters underwent training in the advancement of ecologically responsible aquaculture within the confines of the Lake Victoria crescent. The training of the day focused on:

Educating and Engaging fish Cultivators and Other Aquatic Practitioners: This encompassed reaching out to fish farmers and other individuals engaged in aquaculture endeavours within the expanse of the Lake Victoria crescent. The training delved into comprehensive case studies of aquaculture administration within Mukono, Mpigi, Wakiso, Kampala, Masaka, and Buikwe districts. It additionally entailed a thorough assessment of aquaculture resources – gathering and deciphering pertinent data pertaining to aquacultural activities.

Guidance on Sustainable Aquaculture Principles: The training day's pedagogical focus was twofold. First, it delved into the underpinnings of the sustainable aquaculture concept its fundamental principles and concurrent undertakings within Uganda.

Formation of Collaborative Marketing Coalitions and their Role in Sustainable Aquaculture Advancement: Another key subject was the establishment of cooperative marketing associations and their pivotal role in driving the progression of sustainable aquaculture.

Exploration of Alternative Aquaculture Feeding Techniques: The training furnished insights into alternative sustenance approaches for aquatic organisms. This included pathways to cultivating sustainable feeds for aquaculture, thus reducing dependence on conventional feed sources.

Mapping the Route to Sustainable Aquaculture Development: The training emphasized a coherent trajectory toward sustainable aquaculture, outlining the key steps and components necessary for meaningful progress.

Value Addition in a Sustainable Context: The training expounded upon strategies for infusing sustainable value into the fish production cycle and the overall value chain, enhancing the overall economic viability of the sector.

Emergence of Forward-Looking Aquaculture Production Technologies: The last facet of the training revolved around the emergent technologies that underpin sustainable aquaculture practices, fostering innovation in the field.

In sum, this training day comprehensively immersed participants in the multifaceted landscape of sustainable aquaculture – from its core principles and

current national endeavours to the establishment of networks, innovative feeding strategies, and the integration of sustainable practices into the entire fish production process.

Educating and Engaging fish Cultivators and Other Aquatic Practitioners on sustainable aquaculture

The training brought together participants from various backgrounds, including fish cultivators, aquaculture researchers, government representatives, and industry professionals. The training was organized in response to the growing need for environmentally responsible practices in aquaculture to ensure the long-term viability of the industry and the health of aquatic ecosystems in Lake Victoria crescent Uganda.

The training highlights**:**
Expert Presentations**:** The training began with a series of expert presentations on various aspects of sustainable aquaculture. Topics covered included water quality management, responsible feed practices, disease prevention, and the importance of biodiversity conservation. These presentations provided participants with a solid foundation of knowledge to build upon during the interactive sessions.

An expert for the aquaculture and fisheries department explaining to participant

about sustainable aquaculture development-wakiso- Lake Victoria crescent, Uganda.

Interactive Discussions: Following the expert presentations, participants engaged in interactive discussions and breakout sessions. These sessions encouraged participants to share their experiences and insights, enabling cross-learning among participants from different regions and backgrounds. Case studies of successful sustainable aquaculture projects were presented, sparking discussions on replicable strategies for sustainable aquaculture development in the Lake Victoria crescent, Uganda.

Participants engaged in interactive discussions and breakout sessions.

Fishpond construction Practical Demonstrations**:** To provide participants with hands-on experience, practical demonstrations were organized. These included techniques for setting up efficient fishpond aquaculture systems, designing environmentally friendly fish habitats, and employing natural pest control methods and the participants observed this on ground.

The points covered during this session focused on:

Environmental Regulations and Permits: Participants were introduced to local, regional, and national regulations governing fishpond construction in sensitive

areas. The importance of obtaining the necessary permits and complying with zoning restrictions was emphasized to ensure legal compliance.

Site Selection: The criteria for selecting suitable sites for fishpond construction were discussed. Factors like water availability, soil type, topography, and proximity to ecologically important habitats were taken into consideration to minimize negative impacts.

Ecological Impact Assessment: Participants learned the significance of conducting ecological impact assessments prior to construction. The assessment process covered potential impacts on local flora, fauna, water quality, and other environmental factors to guide sustainable decision-making.

Design Considerations: Sustainable design principles were highlighted, encompassing pond sizing, shape, and depth. Design features such as buffer zones, wildlife corridors, and water management systems were explored to promote environmental harmony.

Participants being taken through sustainable design principles of fishponds.

Erosion and Sediment Control: Erosion and sediment control techniques were taught to prevent soil runoff into water bodies. Strategies like vegetative cover and silt fences were introduced as effective measures to mitigate erosion risks.

Water Management: The importance of proper water management was underscored for maintaining optimal pond conditions. Techniques such as water

circulation, aeration, and nutrient control were addressed to prevent water quality degradation.

Species Selection: Participants were educated on selecting appropriate fish species for stocking in line with the local ecosystem. A preference for native species was advocated to minimize the risk of invasiveness.

Habitat Preservation: The training stressed the preservation of surrounding habitats and natural features. Strategies like buffer zones, wetland protection, and avoiding disturbances were discussed to safeguard the ecosystem.

Waste Management: Effective waste management strategies were covered, including addressing fish waste and uneaten feed. Participants learned how to prevent pollution and nutrient enrichment of nearby water bodies.
Monitoring and Maintenance: Participants gained insights into regular monitoring of pond conditions and the environment. Water quality assessment, fish health evaluation, and ecosystem monitoring were focal points. Routine maintenance practices were also detailed.

Case Studies: Real-life case studies of successful fishpond construction initiatives were presented. These studies illuminated lessons learned, challenges faced, and positive outcomes achieved, offering valuable insights to participants.

Successful aquaculture farmers explaining fishpond construction projects in locality- fellow fish farmers paying attention.

Hands-On Exercises: The training integrated practical exercises and site visits to reinforce theoretical knowledge. Participants engaged in field trips to existing fishponds, hands-on construction technique demonstrations, and interactive training.

Site visits to reinforce theoretical knowledge by participants-observing existing fishponds.

Policy and Regulation**:** Representatives from governmental bodies shared insights into existing policies and regulations related to aquaculture. This facilitated a better understanding of the legal framework and how participants could align their practices with sustainability guidelines.

Representative from governmental bodies sharing insights into existing policies and regulations related to sustainable aquaculture development.

5.7 Training on feeding fish with black soldier fly as a sustainable fish feed source

The global agricultural and aquaculture sectors face increasing challenges in meeting the rising demand for protein sources while minimizing environmental impacts. In response, innovative and sustainable approaches are being explored. One such approach involves utilizing black soldier fly (*Hermetia illucens*) larvae as an alternative protein-rich feed for fish. Under this session, participants were taken through how to integrate black soldier fly larvae into fish diets.

Participants being taken through integrating black soldier fly larvae as alternative fish feed.

The focus of the session was:

Why black soldier fly in feeding fish as a sustainable feed source?
The presenter to through the participants on the need to integrate the black soldier fly larvae in fish feeding as the alternative and environmentally friendly feed source , the following were cited as key reasons:

Nutritional Value: Black soldier fly larvae are rich in essential nutrients like protein, fat, and amino acids. They provide a well-balanced diet for fish, promoting healthy growth and development.

Protein Content: Protein is a crucial component of a fish's diet, as it supports muscle development, immune function, and overall health. Black soldier fly larvae are particularly high in protein, making them an excellent protein source for fish feed.

Healthy Fats: Fish require healthy fats, such as omega-3 and omega-6 fatty acids, for various physiological functions. Black soldier fly larvae contain a favourable ratio of these fats, contributing to the overall well-being of the fish.

Digestibility: The nutritional composition of black soldier fly larvae makes them highly digestible for fish. This means that fish can efficiently absorb and utilize the nutrients present in these larvae.

Environmental Benefits: Using black soldier fly larvae as fish feed is environmentally sustainable. They can be reared on organic waste materials like food scraps, agricultural by products, and manure. This reduces the burden on landfills and contributes to a circular economy.

Reduced Competition with Human Food: Utilizing black soldier fly larvae as fish feed can help alleviate the pressure on global fish stocks and reduce overfishing. Instead of using traditional fishmeal made from wild-caught fish, which can impact ocean ecosystems, the larvae can be used as a more sustainable alternative.

Economic Viability: Producing black soldier fly larvae can be cost-effective and efficient. Their rapid growth and ability to thrive on various types of organic waste make them a relatively low-cost option for producing high-quality fish feed.

Feeding Behaviour: Many fish species are naturally inclined to consume insect larvae in the wild. Feeding fish with black soldier fly larvae aligns with their natural feeding behaviour, making it a suitable and attractive food source.

The training /workshop went successfully, and the way-forward was discussed with the participants.

These were the key highlights:

Sustainable aquaculture development in the Lake Victoria Crescent region of Uganda requires a comprehensive and well-planned approach that considers environmental, social, and economic factors. The key steps and strategies that were discussed by the participants are:

Participants observing the black soldier fly larvae an alternative sustainable fish feed during the training.

Prioritising an ecosystem-based approach that takes into account the health and balance of the Lake Victoria ecosystem. Ensure that aquaculture practices do not harm the natural habitat, water quality, and biodiversity of the lake and its surrounding areas.

Strengthening and enforcing regulations and policies related to aquaculture development. These should cover issues such as water use, waste management, species selection, and disease control. Collaboration between government agencies, local communities, and industry stakeholders is essential.

Identifying suitable areas for aquaculture activities. Avoid environmentally sensitive zones and areas with high biodiversity. Conduct thorough environmental impact assessments before establishing new aquaculture sites.

Choosing appropriate fish species for aquaculture that are well-suited to the local ecosystem and have a low risk of becoming invasive. Native species should be prioritized over exotic ones.

Implementing integrated farming systems that combine aquaculture with other agricultural activities, such as crop farming and livestock rearing. This can help minimize waste generation, enhance resource utilization, and improve overall system sustainability.

Implementing strict biosecurity measures to prevent the introduction and spread of diseases among aquaculture stocks. Regular health monitoring and appropriate use of veterinary medicines should be part of the management plan.

Providing training and education to aquaculture farmers on sustainable practices, modern techniques, and best management practices. This can help improve productivity while minimizing negative impacts.

Involving local communities in decision-making processes regarding aquaculture development. Their traditional knowledge and insights can contribute to more informed and sustainable choices.

Investing in research and development to improve aquaculture practices, breeding techniques, and disease control methods. Encourage innovation and collaboration between researchers, industry experts, and farmers.

Developing market linkages for aquaculture products. This can involve creating value-added products, improving processing and storage facilities, and establishing partnerships with local markets and export channels.

Regularly monitoring and evaluating the environmental, social, and economic impacts of aquaculture activities. This information will help identify potential issues and guide adaptive management strategies.
Providing financial support and incentives for small-scale farmers to adopt sustainable aquaculture practices. This can include access to credit, grants, and subsidies.

Raising awareness among consumers about the importance of supporting sustainable aquaculture products. Educate the public about the benefits of responsible consumption and its positive impact on the environment.

Principal investigator taking through the participants on the way forward for sustainable aquaculture development in the Lake Victoria crescent Uganda.

Other Field Photos

5.8 Modelling suitable fishpond sites for small scale aquaculture in the ecologically sensitive areas of the Lake Victoria crescent Uganda-

In the pursuit of advancing sustainable aquaculture practices within the Lake Victoria crescent, this phase of focused on modelling suitable sites for pond aquaculture. This pivotal activity aimed to identify and assess areas within the Lake Victoria region that are conducive and non-conducive to the establishment of pond-based aquaculture considering the ecologically sensitive areas.

We were able to define and establish comprehensive criteria for selecting suitable sites based on environmental, geographical, and ecological factors, collaborated with experts and stakeholders to ensure a well-rounded understanding of the requirements for successful small-scale aquaculture.

We utilized advanced modelling techniques to analyse the collected data and identify potential and non-potential sites with optimal conditions for small scale aquaculture with focus on ponds. In this case, we employed Geographic Information System (GIS) technology to create detailed maps highlighting potential and non-potential sites considering ecological sensitivity. In our analysis, we integrated various layers of data to produce comprehensive visual representations for informed decision-making for the local leaders in the Lake Victoria crescent districts. We were able to map areas that are very suitable (VS.), (Suitable(S)), (Moderately (MS)) and (Unsuitable (US)) (Figure 1).

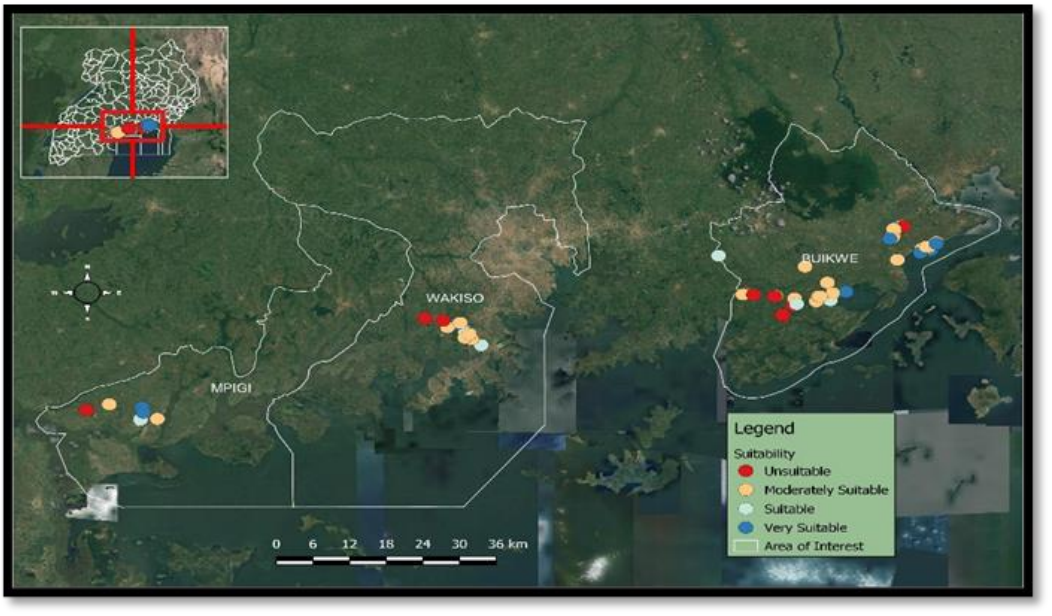

Figure one: Suitability modelling of pond sites in the project area.

5.9 Data collection on the small-scale aquaculture technology in the lake Vitoria crescent Uganda

We gathered data from more than 169 community members to gain a comprehensive understanding of their perspectives on sustainable small-scale aquaculture. The collected data underwent thorough analysis to extract clear and insightful information. The objective was to provide policymakers in the project areas with valuable guidance based on the community members' perceptions. This process ensures that decision-makers have a well-informed foundation for crafting effective policies in support of sustainable aquaculture development.

Status of fishponds established in the Lake Victoria crescent.

5.10 Consultation with the key informants and fisheries officers within the project area

To establish a robust foundation for a thorough comprehension of community perceptions of sustainable aquaculture, we took additional steps by actively engaging district fisheries officers in the project area. This was help us to gain a clear insights and in-depth perspectives from these officers, who possess valuable expertise and local knowledge. By involving district fisheries officers, we sought to enhance the depth of understanding, ensuring a more comprehensive and nuanced grasp of the community's outlook on the sustainable aquaculture in the Lake Victoria crescent, Uganda.

Figure 2: Project principal investigator interacting with the district aqauacture officer project arae Districts about the state of sustainabe aquaculture in the lake victoria cresent Uganda.

5.11 Physical identification and documentation of established ponds in the lake victoria crsent, Uganda

We were able to map and identify various ponds and assess their condition in the ecologically sensitive area. Our focus was on determining the locations of existing ponds. In this effort, we actively engaged with local communities through focus group discussions to gain insights into the factors influencing the selection of pond locations. By understanding the community perspective, we aimed to enhance our efforts in preserving and managing these vital ecological features.

Research assistants observing and recording fishponds established in the area during data collection process.

The key output

- ✓ We successfully assessed the most suitable and non-suitable locations for fishpond development he we focused on factors -water availability, soil quality, and ecological compatibility and we believe the result map or set of guidelines indicating optimal areas for establishing fishponds.
- ✓ We successfully assessed the resource availability for Sustainable Aquaculture this involved understanding resource availability - water availability, feed sources, and land suitability. The information was shared with the district aquaculture officers and we hope it insights into how aquaculture can be developed sustainably without straining local resources.
- ✓ We empowered over 456 farmers; this was through designing and delivering training programs on sustainable aquaculture practices. Out training sessions focused on pond management, species selection, water quality, and biodiversity conservation and alternative fish feeds –focused on black soldier fly larvae.

6. Conclusion

The progress made in the project "Understanding Local Community Perception and the Potential of Sustainable Aquaculture Development in Ecologically Sensitive Areas of Lake Victoria Crescent, Uganda" is significant and promising. The activities undertaken have contributed valuable insights to the overarching goal of promoting sustainable aquaculture practices in the ecologically sensitive areas of the Lake Victoria crescent. We modelled suitable fishpond sites for small-scale aquaculture. Through the integration of advanced modelling techniques and Geographic Information System (GIS) technology, we successfully identified and mapped areas with varying degrees of suitability for pond-based aquaculture. This comprehensive approach, considering environmental, geographical, and ecological factors, provides local leaders in the Lake Victoria crescent districts with informed decision-making tools for the establishment of sustainable aquaculture practices.

Additionally, we engaged with the local community by collecting data from community members to understand their perspectives on sustainable small-scale aquaculture. The analysis of this data not only provided valuable insights into community perceptions but also served as a foundation for crafting effective policies to support sustainable aquaculture development. The emphasis on community input ensures that decision-makers have a well-informed understanding of the needs and preferences of the people in the project areas.

The project took proactive steps by consulting with key informants and district fisheries officers within the project area. This engagement aimed to deepen the understanding of community perceptions by tapping into the expertise and local knowledge of these officers. The collaboration with district fisheries officers enhanced the overall comprehension of sustainable aquaculture in the Lake Victoria crescent, contributing to a more nuanced and comprehensive perspective. We believe as we move forward, the progress made in these critical areas sets the stage for the next phases of the project, emphasizing the importance of sustainability, community involvement, and informed decision-making. The insights gained from modelling, community engagement, and consultation with key informants and fisheries officers will serve as a solid foundation for the development of strategies and policies that promote the sustainable growth of aquaculture in the ecologically sensitive areas of Lake Victoria Crescent, Uganda.

Other Project Field Photos










7. Acknowledgment

I extend my heartfelt gratitude to the Rufford Foundation for their generous support in funding the project titled "Understanding Local Community Perception

and Potential of Sustainable Aquaculture Development in Ecologically Sensitive Areas of Lake Victoria Crescent, Uganda" (Project ID: 38553-2).

The financial assistance provided by the Rufford Foundation has been instrumental in enabling the successful execution of this project endeavour. This project aimed to explore and comprehend the perceptions of the local community and assess the potential for sustainable aquaculture development in the ecologically sensitive areas of the Lake Victoria Crescent.

The Rufford Foundation's commitment to the advancement of scientific research and conservation initiatives has played a pivotal role in facilitating our efforts to better understand and address the challenges faced by this project area.

I express my sincere appreciation for the Rufford Foundation's dedication to supporting projects that contribute to the sustainable development and preservation of our natural environment. Thank you for being a vital partner in the mission.