

## Final Evaluation Report

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Your Details	
<b>Full Name</b>	Mushagalusa Cirhuza Deo
<b>Project Title</b>	Some ecological evidence leading to sustainable management measures of littoral cichlid fish of economic interests at Lake Tanganyika (Congolese side)
<b>Application ID</b>	30748-2
<b>Date of this Report</b>	25.09.2022

**1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.**

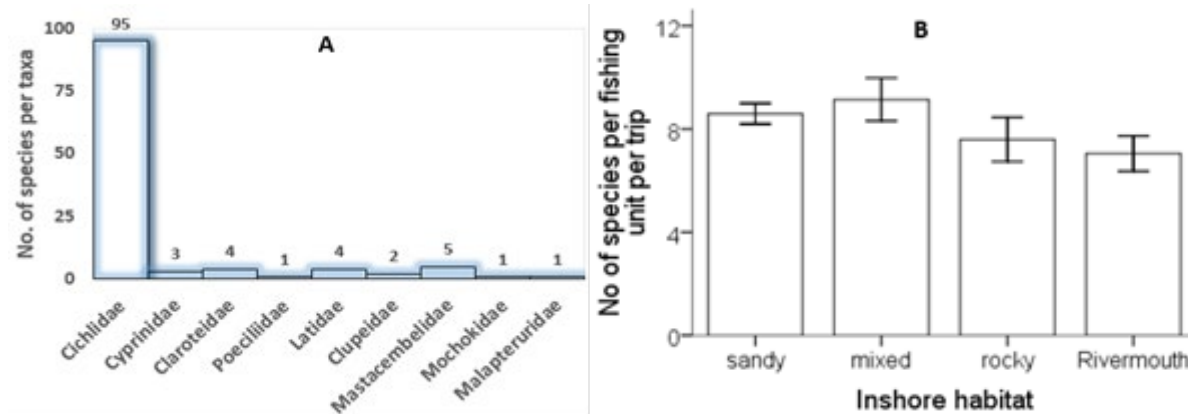
Objective	Not achieved	Partially achieved	Fully achieved	Comments
1-Visit additional sites at the northwestern of Lake Tanganyika, identify main stakeholders and share their knowledge on inshore fish.				In relation to previous work with four major sampling sites along the lake study area, two additional sites were chosen respectively at Uvira and Fizi for data collection and socio-environmental surveys on inshore fishing activities. Other sites were identified although sporadically visited and sampled for the key community-led fisheries stakeholders and the main fishing practices they employed. However, these sites still requiring further investigations in relation to our objectives as some information were not accurately gathered and all key stakeholders not involved. This was mainly due to: a) insecurity and difficult accessibility in some sites along the lake coasts, b) some logistical and local administrative constraints, c) the delay in the shipment of some equipments, and d) the Covid-19 pandemic outbreaks and sanitary restriction measures during the study period.
2- Conduct social surveys of local communities-led fisheries to gather further information on fishing effort of inshore cichlid fish.				Inshore fishing activities as well as communities involved were monthly surveyed using questionnaires and group discussions/interviews for at least 1 year, processed and analysed. This allowed to partially enhance the awareness and education stages on sustainable fishing practices in the main sampling sites along the northwestern lake shoreline. Although data was collected at irregular intervals in some sites, already partial results are indicative of the threats facing fish stocks and the role of fishing communities in fish resources management. However, further social surveys on fishing practices and dissemination (education outreach) among community-led fisheries

			stakeholders are still needed for the future at the study area.
3- Regularly collect field data on inshore cichlid fish, fishing gears and practices, and environmental features at each sampling sites for education outreach.			Data on inshore fish species and stocks in relation to fishing practices (gears and techniques) are collected monthly per fishing site for at least 1 year, using field forms and standardised guiding questions, processed and analysed. Although partial main results are interesting in term of species diversity, stock exploitation, actual conservation status and main pressures facing fish populations at the study area, some sites and fishing practices were not yet investigated regularly due to some reasons started above. Additional information on inshore fish and fishing practices are needed to get a global overview of inshore fisheries and to enable community-led fisheries sustainable co-management of resources.
4- Compile, share and disseminate results obtained on littoral cichlid fish throughout the communities-led fisheries stakeholders and other user's networks on sustainable fishing practices and resources preservation at the study area.			Critical socio-economic information of community-led fisheries organisations involved in the inshore fisheries at the study area was regularly collected but this was not possible in some sites where all key stakeholders were not identified or involved through education outreach activities and fisheries management process. Indeed, the data collected are partially disseminated and discussed within local community-led fisheries stakeholders at the study area where considerable efforts are still needed to reach out all stakeholders for sustainable use of fish resources.

## 2. Describe the three most important outcomes of your project.

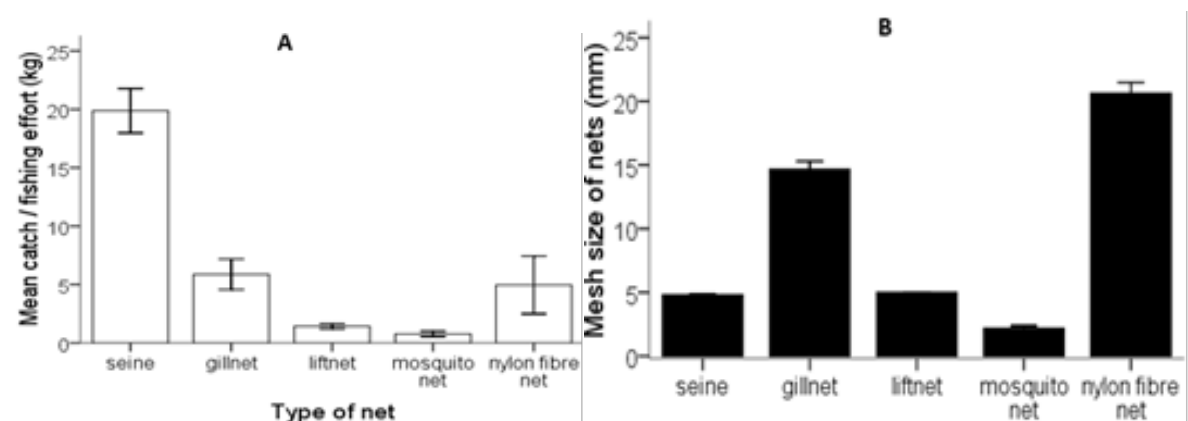
**a). Assessment of species richness and fish populations data base.** An updated list of inshore fish species and relative species abundances was created at the study area. The inshore fish species were diversified and currently more targeted by local fisheries. However, our figures indicated that there are globally very limited data on the exploitation status of inshore cichlid fish communities. 116 inshore species including 95 cichlids were reported at the study area, but clupeids were more abundant (by mass), especially for their juvenile sizes, which were mostly fished from inshore waters using destructive fishing practices are common. Fish catch was analysed according to the body sizes, ecological features such as the type of coastal habitat, season and fishing gear used. Therefore, most of these species

(98%), including those of economic interests, were Data Deficient or Least Concern (IUCN Red List, 2006) and our data presented strong evidence toward update and assessment of fish stock status in Lake Tanganyika.



**Fig. 1.** Number of teleost species per taxon (A) and according to the inshore habitat (B) per fishing unit effort (on average) at the study area.

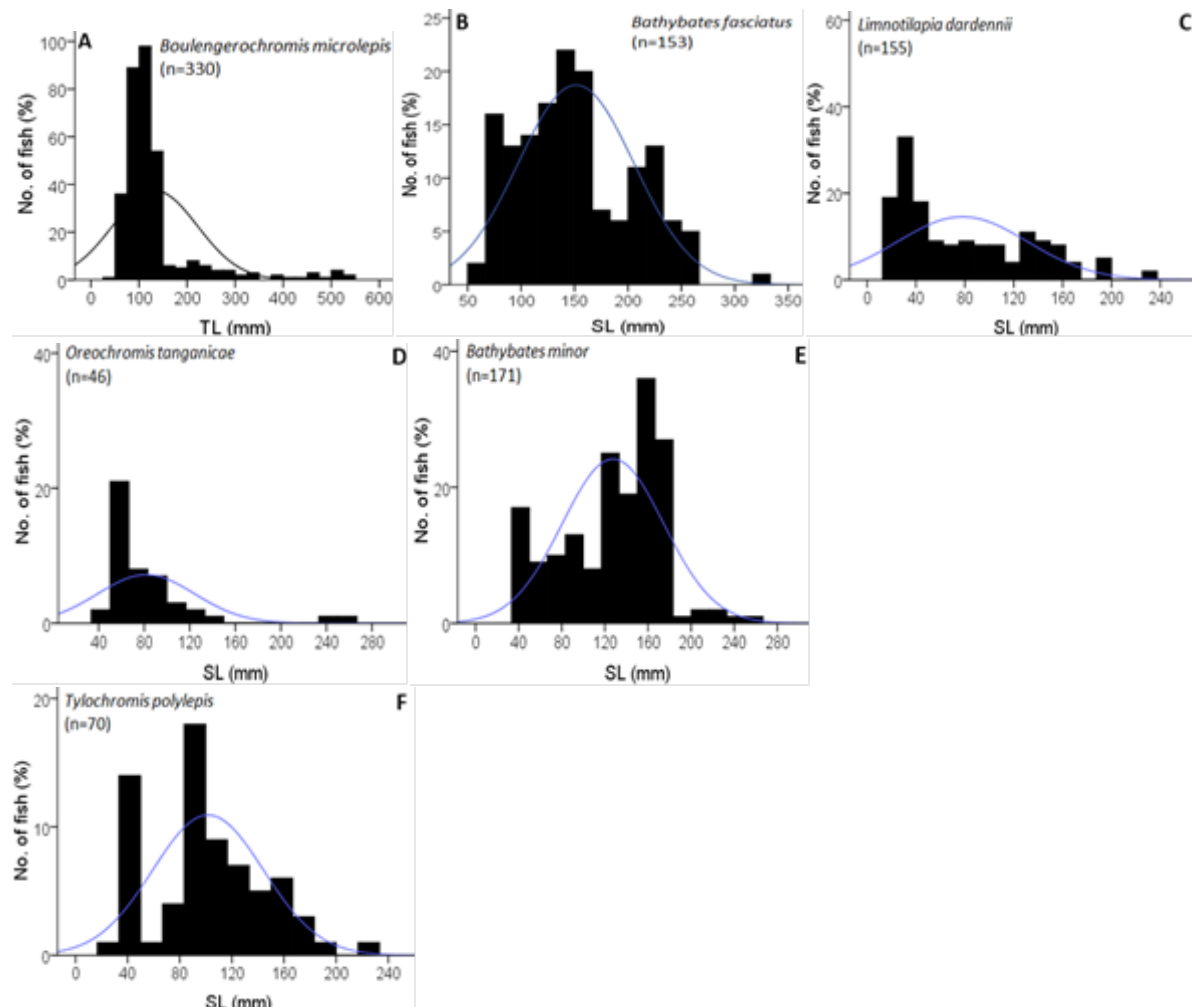
**b). Presence of intense inshore fishing activities likely unsuitable to fish stocks and critical habitats.** While still ignored in many respects, inshore fisheries were actively intense at the study area. Many involved actors are unaware of the threats and losses caused to fish resources from their activities whereas management measures are not followed. The main fishing gear used at the study area included the beach seines, the gillnets with many variants (dormant, monofilament, encircling and deep gillnets known as nylon fibre nets), liftnet and long- and handlines. Both gillnet (47.9%) and beach seine (45.9%) were common in the inshore fishery, followed by lift- and mosquito nets. As per our expectations, many cichlid species identified in our samples are threatened presently with populations shortages due mainly to unsuitable fishing practices.



**Fig. 2.** Mean catch reported per fishing unit effort per trip (A) and relative mesh sizes of fishing nets used (B) at the study area.

Furthermore, our data on fishing practices (techniques and gears) strongly indicated that these are unsuitable to fish populations and inshore fish diversity, which is declining. Fishing gear was with small-sized meshes; mostly reporting smaller-sized

immature (unknown sex) fish (see Fig.3 below for examples of some common species of economic interests in catch locally). Due to that, more efforts in fishery management should be developed by integrating all key community-led fisheries stakeholders.



**Fig. 3.** Length frequency histogram (in %) from catch of some economically important Cichlidae fish species from the study area. The name of each species is respectively indicated with sample size.

**c). Socio-environmental surveys urged immediate need for inshore fisheries management through communities-led fisheries stakeholders' involvement.**

At the study area, group discussions and interviews as well as questionnaires were carried out with community-led fisheries stakeholders. Preliminary data indicated the lack of sustainable fishing measures at the study area. Many stakeholders mentioned that fisheries have become very poor now compared to the past and that the lake conditions and fish catch have changed negatively, including the catch decreases, the poor lake conditions and unsuitable fishing practices, the lack of management effort, the increase in the number of fishermen and their daily fishing effort; all compounded by the current rapid increase in population with high demand for fish proteins in the subregion. As reported previously, many stakeholders involved in the inshore fisheries do not seem to be sufficiently educated neither on the threats

facing fish resources nor on the existence of fisheries management measures. Indeed, more efforts on community-led fisheries education on the fish resources preservation and dissemination of fisheries legislation are more needed at the study area. This will help to reduce illegal fishing gears and practices and preserve fish stocks and inshore habitats of Lake Tanganyika.

**3. Explain any unforeseen difficulties that arose during the project and how these were tackled.**

Overall, some difficulties appeared during the project implementation, therefore most of them were manageable. Their impact has been much more on the sampling schedules and regular access in some sampling sites where stakeholder engagement process could be slowed with temporary interruption of activities:

- a) Insecurity and difficult accessibility (limit in facilities/resources) observed in some selected sites along the lake coasts in Fizi area. These sites could not be fully accessed or surveyed, and sampling was irregular whereas all key stakeholders would not be engaged in project activities. To overcome this, sporadic sampling and survey were carried out in nearby sites where more sampling efforts are needed in the medium-term.
- b) Some logistical (e.g., delay in some equipment shipment/delivery) and local administrative (e.g., grant fund local management) constraints which delayed implementation of some planned activities. As an alternative, available equipment from other ongoing or passed research projects locally were used until the project ones were acquired. The funds management issue was amicably resolved between the CRH staff and the project team, under the Trustees' facilitation, so that the project activities continued after some administrative fees were deducted by the CRH, in a consultative manner.
- c) The Covid-19 pandemic outbreaks and sanitary restriction measures during the study period impacted the project activities planning in terms of data collection as some sites were restricted from fishing activities and the field team could neither meet with community-based fisheries stakeholders nor travelling on the lake and have access to laboratory facilities. For this, the project regularly reviewed its approach to relevant emerging impacts from the Covid-19 crisis in the study area by targeting sites where implementation approach was likely adapted. Field visits and lab analyses continued while applying Covid-19 protocol (distancing, systematic sanitary measures, mouth/nose mask, provision of disinfectant soap and masks for meetings, etc.).
- d) Irregularity observed in carrying out data collection and stakeholder engagement process during surveys in some sites. Some stakeholders refused to provide fish samples from their catch or accurately respond to our questionnaires during surveys. I administratively involved their community leaders or local authorities in the awareness raising activities in addition of kindly negotiating with fishermen so that they agree to provide team with samples or by buying.



#### **4. Describe the involvement of local communities and how they have benefited from the project.**

Local communities were involved in the project activities at various stages, especially in the community awareness raising and education outreach activities from which they directly or indirectly benefited:

- Members of the community-led fisheries organisations or beach management committees were involved in group discussions and interviews. Local community-led fisheries leaders at each village, including the village head, were asked to assist in selecting at least 8-10 members daily involved in fishing activities at the lake for discussions on their fisheries activities. This allowed us to understand community views on the environmental and social benefits provided by fish resources as well as to investigate fisheries issues at the lake. Community members were given the opportunity to share their opinions and to provide a diversity of perceptions on fisheries issues, which can positively motivate decision-making on fish resources management. Furthermore, a workshop/seminar was carried out respectively in Uvira and Fizi where key community-led fisheries stakeholders discussed fishing activities and current lake conditions as well as provided ways forward for resources management. At the same moment, the project's main findings were presented and shared among their networks.
- Individual fishermen using a given fishing technique and gear in each site during fish sampling and fishery surveys were actively involved in project activities. Their local knowledge of fish stocks were incorporated into our sampling designs and data collection at the study area. 1-2 fishermen were involved in experimental fishery techniques with the field team while filling out the questionnaires.

#### **5. Are there any plans to continue this work?**

- Of course, additional fish data collection and community-led fisheries social surveys will be important for the next stages of this project to enhance effective conservation measures of fish stocks at the study area. Some key information was not accurately gathered to develop sustainable approach enhancing substantial community awareness activities and key stakeholder engagement in fish resources preservation. Thus, our future objective consists of collecting more data on fish species and populations to assess fish stock and update species status on the IUCN Red List. This will allow covering a wide range of information and get a global view on inshore fish species composition from each site and the level of their exploitation; these features will enhance good awareness and education outreach activities on inshore fish resources of Lake Tanganyika. Socio-environmental surveys aiming at the community-led fisheries involvement in fisheries resources sustainable co-management process at the lake will be targeted.
- From first findings, additional social surveys, communication and awareness-raising activities within stakeholders in fisheries should be strengthened at the

study area. Local communities need to be involved in both planning and implementing long-lasting fisheries co-management measures. Thereby, the communication and awareness techniques will look at involving stakeholders to constantly collaborate through a community-based co-management structural and legal institution regrouping mainly their beach management committees and associations.

## **6. How do you plan to share the results of your work with others?**

During each phase of the project, a detailed report on the main findings will be produced with recommendations for the decision making on fisheries resources at Lake Tanganyika. Main project results will be presented at the regular workshop/seminar activities to community-led fisheries key stakeholders and other resources users and through international scientific conference attendances. Those findings will then be prepared as scientific manuscript to submit and publish in acclaimed peer-review journals. Also, social networks and articles in the local/national media will be used and on The Rufford Foundation and JRS Biodiversity Foundation official websites.

## **7. Looking ahead, what do you feel are the important next steps**

Important next steps are including:

- Additional fundraising for further fish data collection and monitoring, as well as social surveys for regular community-led fisheries awareness and resources co-management in Lake Tanganyika.
- Sharing and dissemination of the main project results obtained among community-led fisheries stakeholders by encouraging sustainable use of resources and orienting long-lasting decision-making on fisheries resources at the study area.
- Implementation of additional activities on communities-led fisheries education to adopt sustainable fishing gear and practices and abandon illegal ones in the inshore fisheries at Lake Tanganyika.
- Collection of additional data on inshore fish stocks, prioritise some critical shoreline sites for biodiversity and conduct further social surveys with community-led fisheries organisations.

## **8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?**

Yes, the Rufford Foundation logo was used for many respects during project activities implementation: interviews and questionnaires during social community surveys, field sampling and laboratory forms, visibility and sensitisation materials. The logo was also useful during workshop presentations and social medias and community-led fisheries awareness activities.



**9. Provide a full list of all the members of your team and their role in the project.**

The project team members, mainly working at the Centre of Research on Hydrobiology (CRH, Uvira), are including:

**Dr. Mushagalusa Cirhuza Deo:** researcher, team leader and project management (shared), research design, data collection, processing and analysis, data reporting, project drafting and education outreach activities,

**Mr. Lubunga Dunia:** education and outreach activities, project management (shared), and data processing (shared), social survey and communication (via social, local and national media), data collection and lab analyses.

**Mr. Mukerania Simon and Mr. Kimanuka Moise:** scientific technicians, data collection, monitoring, field and lab works and logistics management, socioeconomic surveys/interviews.

**Mr. Mbirize Joseph and Mr. Amisi Aochi:** boat and car driver respectively, field assistance, data collection.

2-3 experienced local fishermen, some communities-led fisheries or beach management committee (BMU) leaders and fisheries managers: field team assistance, sites selection guidance, data collection, community communication and facilitation, education activities.

**10. Any other comments?**

I would like to express my sincere thanks of gratitude and acknowledgement to The Rufford Foundation for supporting this research and for the collaboration throughout the implementation period of the project activities. I therefore remain confident for future collaboration and support.













