

Mainstreaming Freshwater Invertebrates Biodiversity Data into Government Decision-Making

Programme: BID

Project ID: BID-AF2020-169-USE

Project lead organization: The Nelson Mandela African Institution of Science and Technology

Project implementation period: 1/4/2021 - 31/3/2023

Report approved: 15/5/2023

Final Narrative Report

Executive Summary

The project has successfully accomplished its envisioned activities and associated outputs and made a significant impact on the importance and use of Freshwater Insects, Mollusks, and Crustaceans (FIMC) for sustainable freshwater and biodiversity conservation and management decisions in northeastern Tanzania. Notwithstanding the challenges faced in implementing project activities in some cases, the project was built and implemented through active co-engagement/involvement and participation of stakeholders (including data holders and users) from the start of the project which generated co-benefits within and among key stakeholders. A range of stakeholders came together to discuss FIMC data use with a common purpose. This was made possible through consultative meetings (both virtual and physical) and actively engaging stakeholders in the project plans, and activities, and learning from them about the needs of data users (see Appendix 1 for detailed project implementation plans, activities, and outputs). In doing this the project successfully created a science-policy interface.

To this end, the project has successfully mobilised and published a total of 22,366 FIMC occurrence records; developed a live Freshwater Biodiversity Data Portal for Tanzania (<https://www.fimc-biodiversityportal.org/>); developed FIMC occurrence maps for northeastern Tanzania; developed a FIMC brochure; developed a monitoring protocol; developed a policy brief; and successfully trained six young scientists to mobilise and publish biodiversity data who have become ambassadors of TanBIF and GBIF. In addition, the project has managed to categorize FIMC species according to the user needs i.e., species of conservation potential, indicators of habitat and ecosystem quality, species of human-health concern, and species of food and farming potential.

The project has made a significant impact on the importance and use of FIMC biodiversity data for sustainable freshwater ecosystem management and conservation. Key stakeholders, including Pangani Basin, Lake Victoria Basin, and Internal Drainage Basin, who are also data users and decision-makers, are now using the developed data and project products to address key freshwater biodiversity management challenges in their respective basins. The river basins, the Vice President's Office (Environment), and district councils in the project region are using the developed policy brief to implement the best freshwater management and conservation decisions.

Furthermore, through this project, a strong network of FIMC data holders and users in northeastern Tanzania has been established and strengthened, creating a platform where stakeholders are actively engaging in fostering conservation and sustainable use of freshwater ecosystems in the region. In the end, the project conducted a workshop involving all stakeholders to evaluate and validate project outputs and concluded that there was a need to continue strengthening data mobilisation, publication, and use among key stakeholders and institutions involved in freshwater conservation and management to achieve the National Biodiversity Strategy and Action Plan, Aichi biodiversity targets, and Tanzania Development Plan Vision 2025.

Despite the project's achievements, there have been technical and institutional arrangement challenges that have hindered the development of an architecture that was supposed to link existing FIMC databases from different institutions with TanBIF. Among the lessons learned from the project is that active involvement of the stakeholders and identifying user needs are keys to successful biodiversity data use projects. In addition, it was shown that most of the FIMC biodiversity data possessed by stakeholders was not standardised. Stakeholders needed to know more about biodiversity data standards to be able to share and use standardised biodiversity data.

Finally, the project envisages increasing the visibility and extent of communication of the project products through the presentation of the results at international conferences, national and international workshops, publication of the paper data, and the publication of a policy brief in the National Journal under the Ministry of Water (Tanzania). The project team members will also continue with the efforts to mobilise and mainstream freshwater biodiversity data in the decision-making processes; prior discussion has been made with the African Center for Aquatic Research and Education (ACARE) to partner in achieving this. Additionally, the project team is working to secure funding to sustain the project beyond its current scope.

Progress against milestones

Has your project completed all planned activities?: Yes

Has your project produced all deliverables: Yes

Report on Activities

Summary of the implementation of the project activities

The project management team responded well to all the project-planned activities for all three project phases through the active engagement of all key stakeholders throughout the process (see Appendix 1 for detailed information on all the project activities and achievements). Co-mobilization, co-production, and co-learning in the process of implementation of all activities in all the project phases have been instrumental in terms of deriving lessons and feedback that have been useful tools to produce intended project outputs that meet the user's needs.

In the planning phase, the project conducted a seven-day (5th–11th July 2021) inception meeting, which was attended by nine project members representing seven institutions' project partners. The project also organised a seven-day data mobilisation training workshop, which was attended by stakeholders from River Basin Authorities, TAWIRI, CoSTECH, TAFIRI, MWECAU, UDMS, NM-AIST, and TANAPA. Through these meetings, awareness of the importance of mainstreaming FIMC data to support informed decision-making was enhanced among members; user needs were defined (whereby data on FIMC species of conservation potential, indicators of habitat and ecosystem quality, species of human-health concern, and food and farming potential needed to be mobilised), the capacity to effectively mobilise and publish FIMC biodiversity data was enhanced; a network of FIMC data holders and users was established; and awareness of the use of GBIF-mediated data to produce policy-relevant information products was created and increased.

In the mobilization phase, the project managed to conduct meetings (see Appendix 1) to mobilize and collate FIMC biodiversity data into Darwin Core standards in collaboration with data holders and users. In terms of extra effort, the ability to travel to where some data holders are stationed provided more opportunities for the collection of more data and for convincing data holders to share their data with the project after the project team had managed to give them convincing reasons on the benefits of sharing and publishing the FIMC data, which has led to more data being collected. The project's interaction with data holders and users provided more opportunities to work together in developing awareness of the importance of collating and communicating FIMC data to different users and also on emphasising the need to build strategically on existing and new partnerships to engage in more standard protocols for collecting FIMC data and monitoring activities at the local level without needing to start from scratch. The project managed to publish 22366 FIMC occurrence records (<https://doi.org/10.15468/yfv6qs>; <https://doi.org/10.15468/q48e66>; <https://doi.org/10.15468/bua68p>; <https://doi.org/10.15468/a8x4hu>; <https://doi.org/10.15468/pu3xma>), map key FIMC biodiversity areas, and identify geographical and taxonomic FIMC biodiversity data gaps for northeastern Tanzania. In this phase, the project also initiated activities to develop a FIMC module and portal, a FIMC monitoring protocol, a policy brief, and a FIMC brochure. This was done through active inquiry of stakeholders and expert inputs through both physical and vital meetings.

In the evaluation phase, the project finalised all the planned activities, including the publishing of the remaining datasets, and conducted meetings for the co-production of the project products and a meeting for the validation of the project products, which aimed at the integration of the biodiversity information into decision-making processes through the active involvement of data holders and users.

The project has developed a live FIMC module and freshwater biodiversity data portal for Tanzania (<https://www.fimc-biodiversityportal.org/>) and conducted meetings for the co-production of the project products and a meeting for the validation of the project products, which aimed at the integration of the biodiversity information into decision-making processes through the active involvement of data holders and users. The project has developed a live FIMC module and freshwater biodiversity data portal for Tanzania (<https://www.fimc-biodiversityportal.org/>), a policy brief, a FIMC brochure, FIMC distribution maps, and a FIMC monitoring protocol.

However, there have been technical and institutional arrangement challenges that have hindered the development of an architecture that was supposed to link existing FIMC databases from different institutions with TanBIF, as indicated in the project's early progress report. The project envisions continuing with this effort beyond the scope of this project. The project will continue with fund soliciting to be able to bring all key players and technical experts together to address the challenges faced in achieving this goal.

Completed activities

Activity: Brainstorming

Description: Team familiarization for project members, Identification of keystakeholders: (data providers and users) , Tasks allocations to team members and key stakeholders, Formulation of data mobilization plan, Identifying FIMC data gaps and defining FIMC data user needs

Start Date - End Date: 5/7/2021 - 11/7/2021

Verification Sources: Early progress

Annex 1: Meetings report

Annex 2: Data mobilization plan

Annex 3: Project work flow

Activity: Capacity Building

Description: Capacity enhancement workshop (Train-the trainers) : Data mobilization training workshop for project team members and keystakeholders

Start Date - End Date: 12/9/2021 - 18/9/2021

Verification Sources: Early progress Annex 1: Meetings report

Activity: Data mobilization

Description: FIMC data mining, mobilization, identification and mapping of key FIMC biodiversity areas and prioritization

Start Date - End Date: 14/12/2021 - 20/12/2021

Verification Sources: 1. Midterm Annex 1: (Meetings report)

2. Links (published data): http://41.93.33.31:8080/ipt/resource?r=pangani_tanzania_2022&v=1.2

Activity: Data mobilization

Description: FIMC data mining and mobilization

Start Date - End Date: 7/2/2022 - 12/2/2022

Verification Sources: 1. Midterm Annex 1 (Meetings report)

2. Links (published data): http://41.93.33.31:8080/ipt/resource?r=pangani_tanzania_2022&v=1.2

3. Submitted financial report

Activity: Data mobilization

Description: FIMC data mining and mobilization

Start Date - End Date: 15/2/2022 - 20/2/2022

Verification Sources: 1. Midterm Annex 1 (Meetings report)

2. Links (published data): http://41.93.33.31:8080/ipt/resource?r=pangani_tanzania_2022&v=1.2

3. Submitted financial report

Activity: Data mobilization

Description: FIMC data mining and mobilization

Start Date - End Date: 25/2/2022 - 2/3/2022

Verification Sources: 1. Midterm Annex 1 (Meetings report)

2. Links (published data): http://41.93.33.31:8080/ipt/resource?r=pangani_tanzania_2022&v=1.2

3. Submitted financial report

Activity: Data mobilization

Description: FIMC data processing/validation/review and preparation of first FIMC data sets for

publication

Start Date - End Date: 18/3/2022 - 25/3/2022

Verification Sources: 1. Midterm Annex 1 (Meetings report)

2. Links (published data): http://41.93.33.31:8080/ipt/resource?r=pangani_tanzania_2022&v=1.2

3. Submitted financial report

Activity: Data mobilization and publication

Description: FIMC data processing/validation/review and publication

Start Date - End Date: 1/4/2022 - 30/12/2022

Verification Sources: 1. Midterm Annex 1 (Meetings report)

2. Links (published data): http://41.93.33.31:8080/ipt/resource?r=pangani_tanzania_2022&v=1.2

Links to the published data sets: <https://doi.org/10.15468/yfv6qs>; <https://doi.org/10.15468/q48e66>;

<https://doi.org/10.15468/bua68p>; <https://doi.org/10.15468/a8x4hu>; <https://doi.org/10.15468/pu3xma>

Appendix 1: Fina report

Activity: FIMC module and portal development

Description: Development of a live FIMC module and portal that will host FIMC data and other freshwater biodiversity for Tanzania

Start Date - End Date: 1/3/2022 - 30/12/2022

Verification Sources: A link to the freshwater biodiversity portal: <https://www.fimc-biodiversityportal.org/>

Activity: FIMC biodiversity distribution maps development

Description: Development FIMC biodiversity distribution maps for the northeastern Tanzania that in guiding (evidence-based) decision-making process

Start Date - End Date: 1/5/2022 - 20/1/2023

Verification Sources: Appendix 1: FIMC biodiversity distribution maps for the northeastern Tanzania

Activity: Policy brief development

Description: A policy brief that aid in policy formulation and implementation, and in decision making processes for sustainable management of FIMC biodiversity and freshwater ecosystems in the northeastern Tanzania

Start Date - End Date: 4/7/2022 - 10/2/2023

Verification Sources: Appendix 1: Policy brief

Activity: Development of FIMC brochures

Description: Brochures of FIMC biodiversity of northeastern Tanzania representing FIMC species indicators of habitat and ecosystem quality, FIMC of food importance and FIMC speies of conservation importance that help in generating awareness on the importance of FIMC species and guiding policy formulation and evidence-based decision-making process

Start Date - End Date: 4/7/2022 - 10/2/2023

Verification Sources: Appendix 1: FIMC Brochure

Activity: Development of FIMC monitoring protocol

Description: A monitoring protocol detailing on what should be done to monitor FIMC biodiversity in both permanent and temporary freshwater to aid in policy implementation and in decision making processes for sustainable management of FIMC biodiversity in the northeastern Tanzania

Start Date - End Date: 4/7/2022 - 10/2/2023

Verification Sources: Appendix 1: Monitoring protocol

Report on Deliverables

Deliverables - Summary

The project made significant efforts towards achieving all its planning, mobilisation, and evaluation phase deliverables. This includes (i) publication of 22366 FIMC occurrence data sets through GBIF (<https://doi.org/10.15468/yfv6qs>; <https://doi.org/10.15468/q48e66>; <https://doi.org/10.15468/bua68p>; <https://doi.org/10.15468/a8x4hu>; <https://doi.org/10.15468/pu3xma>), (ii) development the FIMC module and freshwater biodiversity information portal for Tanzania (<https://www.fimc-biodiversityportal.org/>) (iii) a policy brief, (iv) FIMC brochures, (v) FIMC distribution maps, and (vi) a FIMC monitoring protocol (see Appendix 1 for the project products). However, as indicated earlier, an architecture that was supposed to link existing FIMC databases from different institutions with TanBIF was not developed due to technical and institutional arrangement challenges. The project will continue with the efforts to

realize this objective in beyond the scope of this project.

Deliverables produced by the project

Dataset deliverables

Other deliverables

Deliverables - Project planning phase

Potential users and suppliers of freshwater invertebrates biodiversity data identified and mapped

Description: Potential users and providers of FIMC biodiversity data identified and mapped

% complete: 100%

Status update: All potential users and providers of FIMC biodiversity data identified and mapped

Sources of verification: Early progress report Annex 1. Meetings report Appendix 1. Final report

Data mobilization plan and project workflow

Description: Data mobilization plan and project workflow developed

% complete: 100%

Status update: Data mobilization plan and project workflow developed and used in project implementation

Sources of verification: 1. Early progress Annexes 2 and 3 2. Appendix 1. Final report

FIMC data mobilization team

Description: FIMC data mobilization team formulated

% complete: 100%

Status update: FIMC data mobilization team formulated and used to mobilize FIMC data

Sources of verification: 1. Early progress Annexes 1 and 2 2. Appendix 1. Final report

Deliverables - Project data mobilization phase

FIMC occurrence data sets

Dataset type: Occurrences

Dataset scope: FIMC species occurrence of northeastern Tanzania

Number of records: 20,000

Data holder: TanBIF, PBWO, TAFIRI, TAWIRI, LVB, UDSM, NM-AIST.

Data host institution: NM-AIST and TanBIF

% complete: 100%

Status update: 22366 FIMC occurrence records published through GBIF

DOI: <https://doi.org/10.15468/yfv6qs>; <https://doi.org/10.15468/q48e66>;

<https://doi.org/10.15468/bua68p>; <https://doi.org/10.15468/a8x4hu>; <https://doi.org/10.15468/pu3xma>

Expected date of publication:

Deliverables - Project evaluation phase

Policy briefs

Description: A policy brief that will aid in policy formulation and implementation, and in decision making processes for sustainable management of FIMC biodiversity and freshwater ecosystems in the northeastern Tanzania

% complete: 100%

Status update: A policy brief developed in consultation with stakeholders and shared to the relevant stakeholders in the government and non-government institution

Sources of verification: Appendix 1: Final report

FIMC speices occurrence and distribution maps

Description: FIMC species occurrence and distribution maps of northeastern Tanzania that help in guiding(evidence-based) decision-making process

% complete: 100%

Status update: FIMC distribution map full developed and shared to stakeholders

Sources of verification: Appendix 1: Final report

Brochures of FIMC biodiversity of northeastern Tanzania

Description: Brochure detailing on distribution of FIMC speices in northeastern Tanzania, including FIMC speies of conservation importance from north eastern Tanzania that help in generating awareness on the importance of FIMC species and guiding policy formulation and evidence-based decision-making process

% complete: 100%

Status update: Brochure detailing on distribution of FIMC speices in northeastern Tanzania full

developed and shared to stakeholders
Sources of verification: Appendix 1: Final report

FIMC monitoring protocol

Description: A monitoring protocol detailing on what should be done to monitor FIMC biodiversity in both permanent and temporary freshwater to aid in policy implementation and in decision making processes for sustainable management of FIMC biodiversity and freshwater ecosystems in the northeastern Tanzania

% complete: 100%

Status update: FIMC monitoring protocol developed and shared to stakeholders

Sources of verification: Appendix 1: Final Report

FIMC module and Freshwater biodiversity data portal

Description: FIMC module and Freshwater biodiversity data portal that serve as one stop centre for all freshwater biodiversity in Tanzania

% complete: 100%

Status update: A live FIMC module and Freshwater biodiversity data portal that serve as one stop centre for all freshwater biodiversity in Tanzania developed and shared with stakeholders

Sources of verification: A link to the freshwater biodiversity portal: <https://www.fimc-biodiversityportal.org/>

Events

Project inception workshop (Brainstorming)

Dates: 2021-07-05 - 2021-07-11

Organizing institution: The Nelson Mandela African Institution of Science and Technology

Country: Tanzania

Number of participants: 9

Comments: Through this meeting all team members familiarized one-another and got a common understanding of the project goals and expected outputs. Awareness of the importance of mainstreaming Freshwater Insects Mollusks and Crustaceans (FIMC) data and enable effective decision-making from this was enhanced among team members. Through consultation of data users; user-needs had been defined. By the end of the meeting, the team was able to produce a FIMC data mobilization plan (Annex 2), develop project workflow (Annex 3), identify key data providers and users, identify FIMC data gaps, and allocate tasks to all stakeholders. For project progress monitoring purpose, a timeline (Annex 4) for delivering the planned project activities and outputs was reviewed and accentuated to all project members.

Website or sources of verification: Early progress (Annex 1. Meetings report Annex 2. Data mobilization plan Annex 3: Project workflow) and Final report Appendix 1

Events

Capacity Building/ Enhancement (Data mobilization and publication) Workshop

Dates: 2021-09-12 - 2021-09-18

Organizing institution: The Nelson Mandela African Institution of Science and Technology

Country: Tanzania

Number of participants: 21

Comments: The workshop has enhanced the capacity for effective mobilization of biodiversity data and highlighted the importance of biodiversity data publishing. Through this workshop, a network of FIMC data holders and users has been established, a FIMC data mobilization team established, and awareness of the use of GBIF-mediated data to produce policy-relevant information products has increased. The workshop has also given capacity to graduate volunteers who will participate in data mobilization

Website or sources of verification: Early progress (Annex 1. Meetings report) and Final report Appendix 1

Events

Data mobilization meeting

Dates: 2021-12-14 - 2021-12-20

Organizing institution: The Nelson Mandela African Institution of Science and Technology

Country: Tanzania

Number of participants: 15

Comments: Through these meeting we have managed to mobilize more than ten thousand FIMC

records and we have managed to publish the first data set through GBIF
Website or sources of verification: Midterm Annex 1: Meeting report ;
<https://doi.org/10.15468/yfv6qs>

Events

Data mobilization meeting

Dates: 2022-03-18 - 2022-03-25

Organizing institution: The Nelson Mandela African Institution of Science and Technology

Country: Tanzania

Number of participants: 15

Comments: Through these meeting we have managed to mobilize more than ten thousand FIMC records and we have processed, validated and published the first data set through GBIF

Website or sources of verification: Midterm Annex 1: Meeting report ;
<https://doi.org/10.15468/yfv6qs>

Events

Co-development of monitoring protocol, policy brief and brochure

Dates: 2022-11-29 - 2022-12-03

Organizing institution: The Nelson Mandela African Institution of Science and Technology

Country: Tanzania

Number of participants: 16

Comments: The workshop enhanced the co-development of policy brief, brochure, and monitoring protocol while incorporating stakeholders needs

Website or sources of verification: Final report Appendix 1 and attachments

Events

Co-development of monitoring protocol, policy brief and brochure

Dates: 2022-12-06 - 2022-12-10

Organizing institution: The Nelson Mandela African Institution of Science and Technology

Country: Tanzania

Number of participants: 16

Comments: The workshop enhanced the co-development of policy brief, brochure, and monitoring protocol while incorporating stakeholders needs

Website or sources of verification: Final report Appendix 1 and attachments

Events

Project Validation Workshop

Dates: 2023-01-27 - 2023-01-30

Organizing institution: The Nelson Mandela African Institution of Science and Technology

Country: Tanzania

Number of participants: 30

Comments: The validation workshops brought together key stakeholders from government and non-government institution with common purpose to validate the project products and also act a dissemination gateway

Website or sources of verification: Final implementation report, Appendix 1 (final report) and attachments

Communications and visibility

The project made efforts to actively involve key stakeholders, including River Basin Authorities, TAWIRI, CoSTECH, TAFIRI, MWECAU, UDSM, NM-AIST, NIMR, and TANAPA, from the start of the project for easy uptake of the project results. The project has been able to publish four data sets through GBIF, presenting 22366 FIMC occurrences. This has increased the visibility of the project results, as some scholars are already citing the published data. The freshwater biodiversity portal web link has been shared with key stakeholders and is to be hosted on different institutional websites, including the Ministry of Water, TanBIF, NM-AIST, and VPO. At NM-AIST, the project has shared the project results through the ongoing university seminars, where scholars are aware of the project and

are using the generated information in their research activities. The project intends to publish data papers in the Journal of Limnology. The paper will be submitted to the journal in June 2023. The policy brief will be published in the journal under the Ministry of Water to reach a broader audience. Through this publication, the project envisions increasing the visibility of the project results. Dissemination of the project has been done through physical meetings and online platforms (email) for the distribution of policy briefs, the FIMC brochure, FIMC distribution maps, and the FIMC monitoring protocol to the relevant stakeholders and users. The project coordinator has also presented the project results in different workshops, including the International Maji Scientific Conference in March 2023. The project team members will continue their efforts to extend the visibility of the project beyond the scope of this project through the sharing of the project results at international conferences and national and international workshops. There is ongoing communication and discussion with the Ministry of Water and the VPO office for the public launch of the developed freshwater biodiversity data portal. In addition, the project will collaborate with the VLIR-OUS project at NM-AIST to further disseminate the project products through organizing workshops and reaching out to schools.

The project would like to add the following materials to the project page;

A link to the freshwater biodiversity portal: <https://www.fimc-biodiversityportal.org/>

Links to the published data sets: <https://doi.org/10.15468/yfv6qs>; <https://doi.org/10.15468/q48e66>;

<https://doi.org/10.15468/bua68p>; <https://doi.org/10.15468/a8x4hu>; <https://doi.org/10.15468/pu3xmat>

Project activities pictures

The policy brief, brochure, monitoring protocol, distribution maps

The project reports

Monitoring and evaluation

Final Evaluation

Co-engagement of the stakeholders from the start of the project ensured that there are co-benefits among and within stakeholders in using FIMC biodiversity information to guide informed management decisions. This made the project successfully achieve over 98% of all its activities and intended deliverables. A range of stakeholders from government and non-government institutions come together to discuss FIMC data use with a common purpose. This ensured the creation of a science-policy interface and enable easy uptake of the generated products to aid in the conservation and management of FIMC biodiversity and freshwater ecosystems at large.

The best practices identified through the course of the implementation of this project; (i) the active engagement of stakeholders ensured that the products produced met the needs of data users and policy and decision-makers and thus allowed easy uptake of the generated informed to mainstream it into decision-making processes (ii) the created network of data users and providers will ensure continual update FICM species and collaboration to further mainstream freshwater biodiversity into decision-making process beyond the span of this project. In addition (iii) the implementation of this project followed all quality insurance institution guidelines under research and innovation which are internationally recognised.

The conclusions from this project are that (i) stakeholders (data users and decision makers) need data to be able to make informed decisions, particularly in freshwater biodiversity conservation and management. The stakeholders proposed continual updates of freshwater biodiversity information beyond the scope of this project. (ii) There is a strong need to continue providing awareness to data holders on the importance of biodiversity data standards, sharing biodiversity data and possibly providing incentives (where possible) to them to be able to provide data for a common and wider benefit. There is also a strong need to continue building and strengthening the capacity of stakeholders on biodiversity data mobilization and use (following biodiversity data standards) to ensure long-term and sustainable conservation and management of freshwater biodiversity in the country. This was also highly recommended by all stakeholders.

GBIF secretariat has been an instrument for the successful implementation of the project activities through the creation of a BID region support team that has helped in guiding the implementation of the project activities in the project phases. We recommend the same approach in future programs

Best Practices and Lessons learned

The best practice that has been learned through the implementation of this project was co-engagement of the stakeholders from the start of the project and active participation which generated co-benefit among and within stakeholders. A range of stakeholders came together to discuss FIMC data use with a common purpose and enhanced linking science-policy interface. The project included

the most relevant stakeholders during its implementation who could contribute and learn about FIMC biodiversity data mobilization, and its importance and uptake of the generated information to aid policy formulation and decision-making processes.

During project meetings and stakeholders' training on FIMC biodiversity data mobilization, another lesson learned was that most of the data possessed by stakeholders were not standardized. Stakeholders needed to know more about biodiversity data standards to be able to share standardized FIMC biodiversity data amongst themselves for sustainable FIMC biodiversity conservation.

Through stakeholder participation, it was possible to gather insights from stakeholders and co-develop documents, e.g. policy briefs and monitoring protocols that stakeholders can easily understand and effectively use to make informed decisions about FIMC biodiversity and freshwater ecosystems conservation. It was learnt that involving stakeholders in co-developing decision support tools, e.g. policy brief maximises an intervention's success chances.

Post Project activities

The project will continue with the efforts to mobilize and publish FIMC data beyond the scope of this project. The project will also continue to disseminate the products produced through this project to reach a wider community. For example, the project has made arrangements with VLIR-OUS project at NM-AIST to collaborate in the dissemination of freshwater biodiversity information by preparing workshops and reaching schools. The project will also continue to mobilize funds to upgrade the freshwater biodiversity information portal to include more environmental variables that are key for sustainable management and conservation of freshwater biodiversity and the freshwater ecosystem at large. By doing this the project envisages continuation and sustainability of the project beyond the scope of this project.

Sustainability

Sustainability Plans

The project implementation plan insured the sustainability of the project beyond the scope of this project. The developed freshwater biodiversity portal will ensure continual sharing and use of the FIMC data beyond the scope of this project. Stakeholders involved in this project have gained capacity and knowledge on data mobilization, sharing and use and some have started soliciting funds for the same in their respective institutions. For example Ms . Kilimba (from TAWIRI) through a capacity enhancement workshop on data mobilization, publication and use gained knowledge and applied and won JRS funds to collate invertebrates species in the highlands of east Africa. The policy brief will act as a guide and a framework to support stakeholders on FIMC biodiversity, land and freshwater management beyond the scope of this project. Furthermore, the developed monitoring protocol will aid key stakeholders from basin authorities to effectively monitor FIMC species in freshwater ecosystems following international standards and local stakeholders' needs. The network of stakeholders created through this project has created a platform of collaborations in research and fund mobilization to continue with the efforts to sustainably conserve FIMC biodiversity. For example, through this network two proposals have been submitted for funding that will support continual updates of FIMC species in northeastern Tanzania. Through this network, there is also a discussion with the ministry of water and VPO to see the possibility of funding the hosting of the developed freshwater biodiversity portal beyond the scope of this project. The FIMC brochure will continue to create awareness of the importance of FIMC species beyond the scope of this project. The FIMC data will also be used by researchers to perform ecological modelling and thus providing more relevant information on FIMC biodiversity that will be used by decision and policy-makers.

Impact of COVID-19 pandemic on project implementation

Mobilization and other project activities progressed across our BID project despite Covid 19 situation- mainly because of many of the necessary precautions and the fact that our country has not had a big hit after the disastrous Covid wave that had badly hit Tanzania before May 2021. The project continued smoothly with the implementation of its activities to the end while closely observing World Health Organization (WHO) safety measures and precautions for Covid-19.

GBIF leads the Biodiversity Information for Development (BID), a programme funded by the European Union. The programme provides supplementary support for activities addressing the needs of regional researchers and policymakers through mobilization and use of biodiversity data.

