

## Project Update: January 2023

Following the first project update report, the remaining data collection for fish sampling and water quality measurements was carried out at all sampling sites. Almost all types of data were collected successfully. The remaining tasks include writing a manuscript, publishing articles, sharing the research findings with the concerned governmental office in order to create awareness, and developing future conservation strategies for the vulnerable *Labeobarbus* species.

The following are some of the major activities completed:

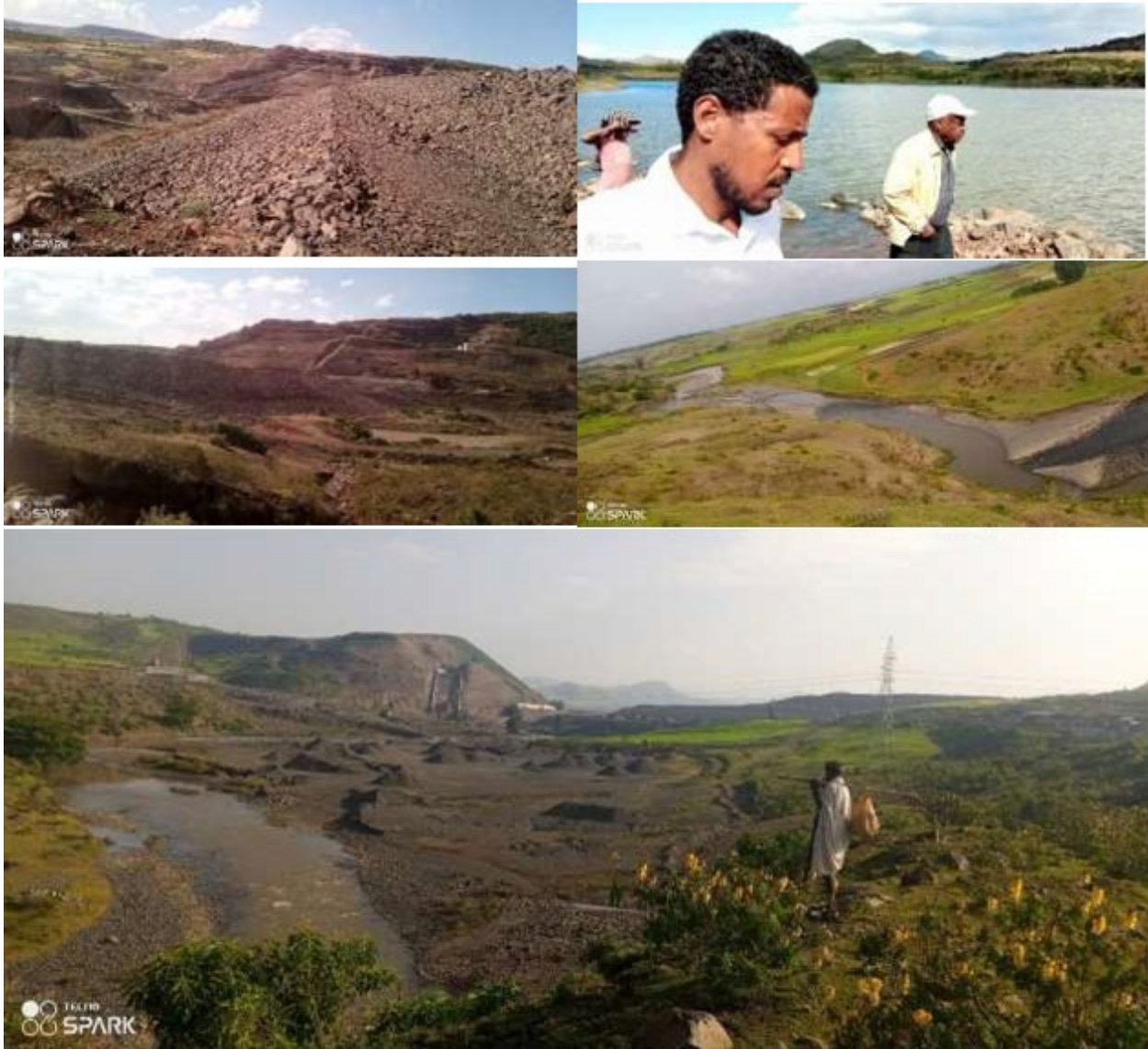
- Water pollution and other potential environmental degradation factors were identified in the upstream spawning grounds of *Labeobarbus* species (agriculture, urban effluent waste, irrigation dams and weirs, and river bed excavation for sand and stone mining).
- Important spawning routes of migratory *Labeobarbus* species were identified in the upstream and downstream sampling sites of Megech River.
- Data on the effects of the constructed irrigation dam on the distribution and upstream migration of threatened *Labeobarbus* species were analysed.
- Data related to peak spawning season, size at first maturity, and other biological traits of all the collected *Labeobarbus* species were collected and analysed.
- More than 1500 *Labeobarbus* specimens were collected from all sampling sites in Megech and its tributaries. The collected *Labeobarbus* species were: *L. nedgia*, *L. intermedius*, *L. beso*, *L. brevicephalus*, *L. tsanensis*, *L. crassibarbus*, *L. degeni*, *L. megastoma*, *L. trutiformis*, *L. platydorsus*, *L. gorgorensis* and one newly unidentified *Labeobarbus* species.
- Megech River watershed land use land cover change from 1990, 2005 and 2022 was prepared and the data helps to compare river biodiversity and other biological and physical data.
- The morphometric and meristic characteristics of the new species were measured and compared with other known *Labeobarbus* species. Among the measured specimens: the new unidentified *Labeobarbus* species (37), *Labeobarbus nedgia* (16) and *Labeobarbus beso* (15), *Labeobarbus intermedius* (eight) were measured and characterised. The data was analysed using PCA (principal coordinate analysis), the result indicates the new species had distinct features when compared with other known species.
- We investigated the local community and stakeholder perceptions about the conservation status of threatened *Labeobarbus* spp. So, an awareness creation workshop for local administrators, fishermen, and researchers will be one of the next conservation-related activities.

- Photos were taken during measuring the morphometric and meristic characterisation of the new

*Labeobarbus* and other known *Labeobarbus* species



**Photo one:** New *Labeobarbus* species morphometric characterization (upper thick lip developed, a low jaw circular shape but not hard like *Labeobarbus beso*, and some specimens have a deep body shape like *Labeobarbus surksis*). The head and mouth profile indicates the presence of hybridization between *Labeobarbus nedgia* and *Labeobarbus beso*, but the morphometric and meristic measurements showed distinct features. So, further molecular study is necessary to determine either a new or hybrid species.



**Photo two:** Megech River view below and above irrigation dam and field visit with supervisor.

During study site visits with a supervisor, we observed the newly constructed irrigation dam, upstream sampling sites and reservoir. We also observe the potential effects of intensive sand mining and riverbed excavation on the riverine environment. Future conservation strategies in above and below the irrigation dam and implement fish ladder. More important spawning routes are found in the above irrigation dam rather than downstream sites.



**Photo three:** Angerebe River in-situ water quality measurements and fish sampling at upstream sampling site of Angereb river (near to Gomatit bridge). Angereb river is one of the upstream tributaries of Megech River.



**Photo four:** Fish sampling below Megech irrigation dam (October-December, 2022, post rainy season) Angereb River which is one of the polluted tributaries of Megech River. Upstream tributary of Megech.

The following injured fish samples were collected at the Angereb River: It shows how migratory species are suffering and affected while migrating to polluted water and intensive sand mining sites. One of the injured specimens was found near sand mining (when sand miners excavate the riverbed, fish and other aquatic organisms might be injured). For example, during sand mining, mining instruments affect the fish and spawning grounds, and fertilized and unfertilized fish eggs would be removed with the sand.



We found injured fish samples near sand mining sites.





We found *Labeobarbus beso* caught by belt buckle (when the size increase the buckle affect the fish). Angereb River receives different suspended and dissolved urban waste that arise from Gondar city.

Of the 18 *Labeobarbus* species, we only found 12. Where do missing species spawn? In downstream (river mouth), in the lake, or at upstream sites? Missing species are: *Labeobarbus gorgari*, *Labeobarbus acutirostris*, *Labeobarbus osseensis*, *Labeobarbus macrophtalmus*, *Labeobarbus dainellii*, and *Labeobarbus longissimus*. Thus, these research questions, awareness creation workshop and other in-situ conservation research activities will be designed and applied to the second round of The Rufford Foundation program.

The final project report will be prepared and submitted in a month.