

## Project update

Project title (Acronym):	Improving Community Health-Nutrition Linkages through Solar Energy Based Fish and Crop Integrated Value Chains- ("ICH LIEBE FISCH")
Geographical focus:	Malawi
Call reference:	Research cooperation for global food security and diversified agriculture for a balanced nutrition in Sub-Saharan Africa.
Cooperating partners:	<ol style="list-style-type: none"> <li>1. Fraunhofer Research Institution for Marine Biotechnology and Cell Technology (EMB)</li> <li>2. Association for marine aquaculture mbH (GMA)</li> <li>3. Lilongwe University of Agriculture &amp; Natural Resources, Aquaculture and Fisheries Science Department (LUANAR-AQF)</li> <li>4. Lilongwe University of Agriculture &amp; Natural Resources, Department of Human Nutrition and Health (LUANAR-HNH)</li> <li>5. Lilongwe University of Agriculture &amp; Natural Resources, Department of Food Science and Technology (LUANAR-FST)</li> <li>6. Quantum for Urban Agriculture and Environmental Sanitation (QUALIVES)</li> <li>7. Innovative Fish Farmers Network Trust (IFFNT)</li> </ol>
Duration:	1. March 2016 – 31. December 2020
Budget:	1.708.071,20 €



Quelle: <https://d-maps.com/m/africa/malawi/malawi25.gif>





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### **Aim of the project:**

Traditionally, Malawi is a nation where a lot of fish is consumed. The main foodstuff has become corn porridge. The overfishing of Lake Malawi since the beginning of the 1990s has led to the fact that the tilapia species *O. karongae*, in the national language "Chambo", is hardly affordable for most people in Malawi. Against this background, the project "I love fish" aims to improve the supply of the rural population with fish and vegetables. In detail, the following project objectives are in focus: i) Improvement of the production of native tilapia species through improved rearing conditions and the production of "all male" fingerlings, ii) the construction of a solar-powered larvae rearing facility to supply the rural population with set fish from *O. karongae* (Chambo), iii) the application of integrated aqua-agriculture (IAA) in order to use the nutrients produced by fish for plant breeding, iv) the implementation of training courses to impart expert knowledge and knowledge building in rural communities, v) the investigation of the health status and nutritional habits of families in rural areas, especially those of children and older people, before and after the implementation of the project measures, and vi) supporting the establishment of a network and a knowledge platform to promote the exchange between the different municipalities and thus to ensure the sustainability of the project measures also after the end of the implementation by the project. The project has also addressed another significant problem area, which is the lack of feed quality for growing and adult fish. One option is the production of insect larvae, which can be used in Malawi for the production of very cheap animal protein. This approach is now being pursued in the last project year until the end of 2020.

### **Results:**

In 2019, many tasks were completed, especially the solar-powered hatchery, the aquaponic units at Bunda College and Benga Parish, which are now in routine operation and already producing large quantities of seedlings and vegetables. Farmers, technicians and agricultural advisors have been trained in training courses on the appropriate techniques. As in previous years, the stocking measures and the monitoring of the fishing harvests in the communities were carried out according to plan. By the end of September, almost all the goals of the previous project part were achieved or even exceeded and were presented to the project executing agency and the management of Bunda College at a final meeting on the first project part. At the final meeting, the project hardware was officially handed over to the Bunda College by the project executing agency. After the final meeting a start meeting for the last project part "insect protein" was held. The end line survey was completed by the end of the year and the results will be presented in the report 2020. In the following, the most important results of the project achieved in 2019 are briefly presented:

#### **a) Training course "Solar Powered Hatchery Operation"**

From 12.03. to 14.03.2019 a 3-day workshop was held on the farm of the Bunda College to introduce the operation of the solar powered hatchery. Participants were active fish farmers, technicians and agricultural consultants.

#### **b) Third campaign on fingerling stocking for the communities participating in the project in March 2019**

The third, scheduled distribution of fingerlings of 2 species ("Chambo", *O. karongae*, *O. shiranus*) and hybrids for the ponds of the communities involved in the "I love fish" project was started in early March 2019. The stocking activities were carried out throughout March in the participating communities of Mjinchi and Nkhotakota districts. Throughout the growing season, the farmers also received suitable feed from the project.

#### **c) 2019 harvest results in the ponds of the fish clubs participating in the project**

The fingerlings put into the ponds of the farmers in Mjinchi and Nkhotakota in February and March 2019 were fished in October and November 2019 after about 6 months as planned. Overall, the growth of



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the fish was very encouraging and the farmers were very satisfied with the yield. The yields per hectare of pond area were again significantly increased compared to 2018.

**d) Aquaponic system on the farm of Bunda College installed and commissioned**

In addition to the simple barrelponics system that was built and tested during the project, one of the two larger aquaponics systems on the farm of Bunda College was completed in February 2019. The plant is now in routine operation and produces vegetables and fish. The system is currently used mainly for training purposes. A corresponding training course "Aquaponic" was held in March 2019 and June 2019, more are to follow.

**e) Aquaponics system commissioned at Benga Parish**

In addition to the aquaponics systems now available at Bunda College, a similar system has been installed and commissioned at Benga Parish in the Nkhotakota district. The plant at Benga Parish mainly produces high quality vegetables independent of the season. It also serves as a training facility for farmers from the region. The plant at Benga Parish uses locally produced expanded clay balls as plant substrate, as this substrate does not yet exist in Malawi. With the manufacturing techniques developed at Benga Parish, expanded clay spheres can now be produced in Malawi as an optimal substrate for aquaponic systems.

**f) Nkhotakota farmers on training tour in May 2019**

In May 2019, one of the aquaculture pioneers in Nkhotakotas District, Mr. Msyali, who had started to grow fish and vegetables in agri-aquaculture (IAA) more than 15 years ago, was joined by a field trip for farmers from 9 different clubs. The training course was evaluated as very useful by all participating farmers.

**g) Final meeting at Bunda College for the first project phase of the "I love fish" project in September 2019**

On 25 September 2019, a final meeting was held at Bunda College for the end of the first project phase of the "Ich liebe Fisch" project on 31 September 2019. The measures implemented in the project up to that point were presented and the "hardware" brought in by the project was officially handed over to Bunda College. Following the final meeting, a "kick-off" meeting was held to discuss and plan in detail the implementation of the second project phase, the construction and commissioning of a pilot plant for the breeding of the black soldier fly and the production of insect proteins.

**h) Project extension to build a pilot plant for the production of insect proteins approved.**

As of October 1, 2019, the work on the project extension for the construction and commissioning of a pilot plant for the breeding of the black soldier fly and the production of insect proteins was started.

**Key statements and policy advice:**

The "Ich liebe Fisch" project has achieved a number of important successes in areas where significant deficits have prevented more efficient aquaculture production. These were mainly the lack of sufficient tilapia seedlings for the ponds of rural communities (especially of the species *O. karongae*, "Chambo"), lack of knowledge about pond and fish stock management as well as the problem of the permanent failure of the public power grid with the consequence that intensive seedling rearing in well controllable "indoor" holding tanks was not possible so far. Furthermore, the project has successfully established the technology and operation of aquaponics plants in Malawi and has convinced many farmers to produce vegetables in this way through practical knowledge transfer on integrated agri-aquaculture. Nutritional-physiological advice with cooking courses for the preparation of



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"child-friendly" meals with fish have improved the awareness for healthy nutrition among rural farmer families. The problem of poor feed quality among rural aquaculture farmers for growing and adult fish is now being addressed in the project extension. At Bunda College, a pilot plant for the production of high-quality proteins from insect larvae of the black soldier fly is being built, which will then serve as a training facility for the rural farmers. A fundamental problem in sub-Saharan Africa, which goes beyond the achievable goals of this project, is the loss of food through decay. The FAO estimates that about 37% of food is lost to consumption due to a lack of preservation methods. Since the rural population in Malawi does not have refrigeration or freezing facilities, there is almost no possibility to preserve food for a longer period of time. Due to the high seasonality, fruits and vegetables in particular are only available for a short time. Another important step towards a safe basic supply of healthy food is the implementation of preservation methods in Malawi. This would have several positive aspects, such as the production of jams and sun-dried fruits which could not only be produced for own consumption, but could also be sold. In addition, the daily expenditure of time for the procurement of fresh food could be reduced.

Especially against the background of the negative consequences of the Corona Pandemic for developing countries such as Malawi, measures that support the storage of food by means of preservation possibilities are also helpful.

Below are some impressions of the activities in the project in 2019 (if required, the following pictures can be provided in a larger resolution upon request):



*From left to right: Lectures in the morning training course. "Hands on" training. Participants determine the water quality in the Hatchery (ammonium, nitrite, nitrate, pH). Measurement of oxygen and temperature*



*From left to right: seedlings for the ponds of the farmers from Bunda Farm. Transport of the seedlings to the ponds of the farmers. Temperature adjustment of the transport bags before release.*



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*From left to right: The aquaponics system on the premises of the Bunda College farm. View over the plant beds shortly after installation (still without substrate). Training course in Aquaponic, here demonstration of the Barrelponic version.*



*From left to right: Group picture with the farmers who took part in the excursion to Mr. Mysali's farm. Mr. Mysali reports about his experiences with fish farming and IAA. Besides fish, the farm also produces vegetables and fruits and fertilizes them with pond water.*



Above, from left to right: adapting the tanks for the pump sump of the aquaponic system. As above left. Clay ball production with village members on the Benga Parish site. 2nd row from top, from left to right: Setting up the plant beds. Optimized kiln for the clay balls. Aquaponic plant with plant beds made of expanded clay balls produced in the Benga Parish. 3rd row from top, from left to right: Aquaponic system in Benga Parish, control of plant growth. Healthy vegetable plants in a plant bed made of expanded clay balls (mustard leaves, Mpiru, first time grown under aquaponic conditions). 4th row from above, from left to right: Volunteer T. Knörr with employees of Benga Parish. Volunteer from the association abacus e.V. from Rostock training employees of Benga Parish. Ready configured aquaponic system.



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From left to right: Final meeting for the first phase of the "I love fish" project at the end of September 2019, with a symbolic handshake for the handover of the hardware between Ariana Bystry (Project Administration, BLE) and Dr. Agnes Mwangwera (Bunda Campus Director). Discussions between the villagers and Ariana Bystry and with a district fisheries officer (right, Dr. Rakers, A. Bystry).



From left to right: Fish harvest in a partner community in the Mjinchi district (Chikondi Fish Club). The fish are measured randomly and the measurements are immediately digitized for further analysis. Typical size of the harvested fish in this community after a 5-6 month monitoring period (about 120-170g). The picture shows an *O. shiranus*.