



Food and Agriculture  
Organization of the  
United Nations



**KOICA**  
Korea International  
Cooperation Agency

# FAO and Korea International Cooperation Agency in partnership with Zanzibar Government transform mariculture sector



Farming of marine fish in Zanzibar has made a major leap forward following a successful establishment of a state of the art semi-commercial, multi-species marine hatchery financed by the Korea International Cooperation Agency (KOICA) through technical support by the Food and Agriculture Organization of the United Nations (FAO). The Korea-Zanzibar Friendship Hatchery Centre was recently handed over to the Revolutionary Government of Zanzibar to boost the growing demand for marine fish species on the isles and beyond.

The Development of Mariculture Sector in Zanzibar project involved capacity building in aquaculture, construction and operation support of a semi-commercial hatchery, linkages to model grow-out farm support, aquaculture value chain development, and a public-private partnership component.

The project outputs aimed to support the development of an aquaculture sector that provides positive environmental, socio-economic and food security outcomes and recognizes the importance of a market driven enterprise associated research. It registered outstanding outcomes, including:



*Zanzibar Second Vice President, Amb. Seif Ali Iddi (3rd from left), explaining a point to KOICA President, Ms. Lee Mi-kyung (1st left) after the inauguration of the Korea-Zanzibar Friendship Hatchery Centre in April 2018. Centre is FAO Representative, Fred Kafeero (in a red tie).*

## A. THE CONSTRUCTION OF A STATE OF THE ART SEMI-COMMERCIAL MULTI-SPECIES MARINE HATCHERY HAS BEEN COMPLETED AND ITS OPERATIONS HAVE BEGUN

Initially, it focused on three marine species i.e. sea cucumber, milkfish and mud crab. However, recently another marine specie i.e. tilapia was introduced and its reproduction will start this year following positive results from first trials.

### Sea cucumber

A total of 12 sea cucumber reproductions were made. They produced a total of 16 340 000 larvae and subsequent 36 300 juveniles that were distributed to farmers in both Unguja and Pemba.

### Milkfish

As the hatchery awaits to get milkfish broodstock ready to produce eggs, the project captured 81 juvenile-adult size broodstock from aquaculture ponds in Zanzibar and are now raised at the hatchery to be used as breeders.

To cover the gap in the current demand, the hatchery imported 20 000 milkfish fries, which raised into fingerings and distributed to pilot farms and fish farmers in both Unguja and Pemba.



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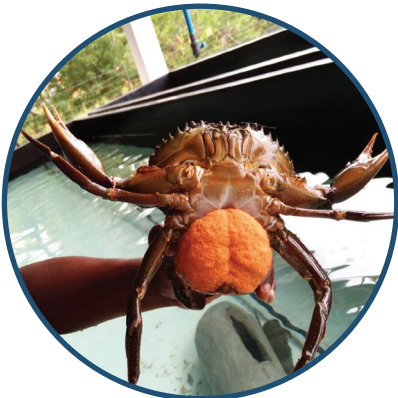


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## Mud Crab

Several crab hatching and larvae rearing experiments were conducted between December 2017 and September 2019. These trials were performed to set up procedures for broodstock handling, spawning monitoring, larvae collection and selection and to perform larvae production through the different metamorphosis stages.

A total production of over eleven million larvae have been made during these production trials successfully reaching stage five of reproduction.



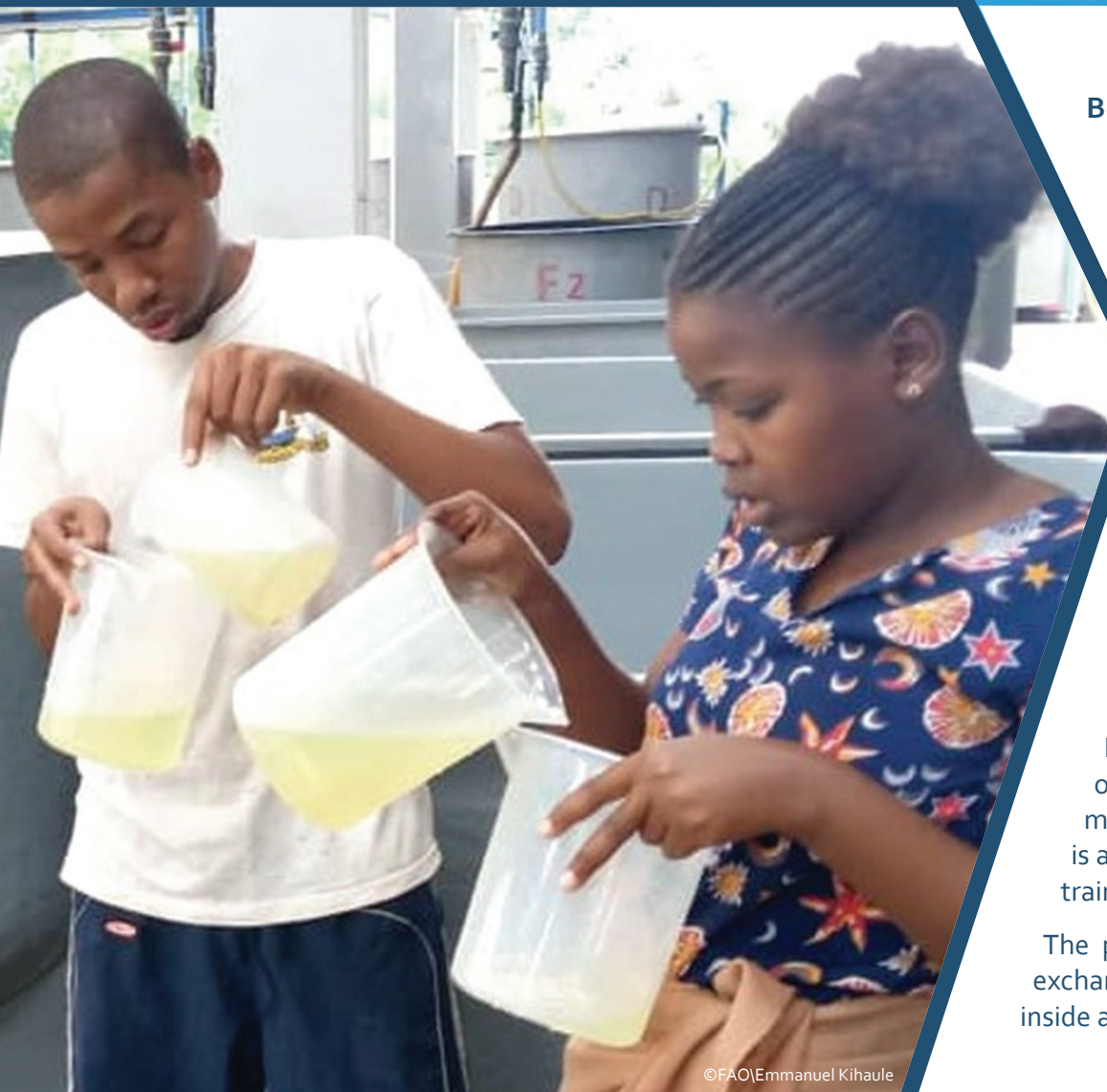
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## Live feed production

The hatchery is carrying out live feed production including algae production of seven different strains, among others. It has a total algae production capacity (without outdoor tanks) of 8 200 litres of fresh algae which is an equivalent of daily production of above 1 800 litres. This capacity can be increased.



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## **B. THE PROJECT STRENGTHENED CAPACITIES OF FARMERS, GOVERNMENT OFFICIALS, UNIVERSITY STUDENTS AND HATCHERY STAFF**

These were empowered on good aquaculture practices and business orientation, as well as through the running of pilot/demonstration farms across Pemba and Unguja.

### **HATCHERY PERSONNEL**

The project has built capacity of 12 hatchery technicians including some from the Ministry of Agriculture, Natural Resources, Livestock and Fisheries (Zanzibar) on culturing of different marine species including live feed, mud crab, sea cucumber, tilapia and cockles. This is a continuous process that is facilitated through trainings by local and international experts.

The project also facilitated international learning exchanges and trainings for the hatchery technicians inside and outside the country.

## FARMERS AND GOVERNMENT OFFICERS

More than 300 farmers, fishermen and government officials in both Unguja and Pemba were trained on commercial marine species farming and various aspects of aquaculture. The trainings also included practical field sessions on pilot farms and introduction of new techniques including combination of marine species growing and seaweed farming.

## STUDENTS AND UNIVERSITY PERSONNEL

The project has built strong links with universities including the State University of Zanzibar (SUZA), the Institute of Marine Sciences (IMS) of the University of Dar es Salaam and the University of Dodoma whereby it provided learning and research opportunities to students and personnel.

By December 2019, over 40 students of various levels including PhD, masters and undergraduate degrees conducted their researches and field attachments at the hatchery. Several other university personnel have also visited the hatchery for learning and research.



### C. COMMERCIALY VIABLE AQUAFARMS ARE ESTABLISHED AND ARE OPERATIONAL

In line with its goal of developing commercially viable aquafarms across Unguja and Pemba, the project supported the development and improvement of seven model/pilot farms in collaboration with the Ministry of Agriculture, Natural Resources, Livestock and Fisheries (Zanzibar).

Several studies were conducted and their findings gave the opportunity to center the training contents and adapt the design of the pilot farms accordingly to aquaculture improvement technics.

To ensure sustainability of the project's results, FAO, KOICA and the Government of Zanzibar in collaboration with other stakeholders developed a comprehensive exit strategy. A feasibility study on how to attract private sector into hatchery investment was conducted and the Public-Private Partnership structure was prepared. A number of private companies from Tanzania Mainland, Kenya and Mozambique have expressed interest in the hatchery activities with some already making formal orders for quality seeds.

### BENEFICIARIES' TESTIMONIES

#### Sea cucumber farming improves fishermen, seaweed farmers' incomes and livelihood diversification in Pemba

Fishermen and seaweed farmers at Kukuu village in Central region of Pemba North, Zanzibar are all smiles following a successful implementation of a project by the Revolutionary Government of Zanzibar through the technical support of the Food and Agriculture Organization of the United Nations (FAO).

Funded by the Korea International Cooperation Agency (KOICA), the Development of Mariculture Sector in Zanzibar also dubbed 'Korea-Zanzibar Friendship Hatchery Centre' project aimed to develop the mariculture sector beyond solely depending on seaweed farming practised in the island and support the farmers and fishermen with additional income generating activities to improve their livelihoods.

It enabled farmers and fishermen to produce a variety of marine species including sea cucumber, milkfish and mud crab as part of efforts to improve their incomes, food security and nutrition.

"We were depending on two activities – fishing and seaweed farming," says **Salum Mohamed Juma**, one of the Kukuu villagers who is also the chairperson of a local group dealing with farming sea cucumber growing and seaweed farming.

According to him, fishing was had become unpredictable due to dwindling of fish stocks in the sea as time went by.



“We’re happy since we no longer depend on fishing and seaweed farming alone. We look forward into prosperity of our village in a short time from now. So far the sea cucumber we’re growing are doing well,” Juma concludes.

On her side, another villager **Tabia Mohamed Omar** says that the training they got for improving seaweed farming and how to mix it integrated with sea cucumber growing is a great milestone in improving their livelihoods.

“This is good news to us women. We feed our families, we pay school fees and medical expenses through seaweed farming,” she says.

**Ali Rashid Hamad** is a Planning and Administrative Officer in the Marine Development Department of the Ministry of Agriculture, Natural Resources, Livestock and Fisheries (MANRLF), Pemba Office. He is one of the experts that are working with FAO in conducting the trainings in collaboration with farmers in the development and running of pilot farms.

“As part of the project and roll-out to some farmers, we started carrying out the trainings for farmers that were followed by the establishment of the pilot farms for educating other farmers., and here in Pemba Kukuu village was lucky to be part of this project. For starting, they opted for sea cucumber farming. This area has all the prerequisites for their farming,” he says.




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Hamad concludes by calling upon other partners including private sector to come and invest there in the Island to boost sea cucumber growing farming and the provision by providing the farmers with of incentives and necessary equipment necessary for large-scale production in order to meet the high market demand.

### **BUILDING LOCAL CAPACITIES BY IMPROVING PROFESSIONAL KNOWLEDGE AND SKILLS AMONG YOUTHS**

**Yusuph Salum Yusuph** is a student who is in his final stages of completing his Doctor of Philosophy (PhD) at the Zanzibar based Institute of Marine Sciences (IMS) of the University of Dar es Salaam. At the moment, he works with the University of Dodoma in Tanzania Mainland.

He has specialized in sea cucumber production and how to raise them to reach acceptable size and weight ready for distributing to farmers for growing.

Yusuph says he started his studies early 2016 before the Development of Mariculture Sector in Zanzibar (Korea-Zanzibar Friendship Hatchery Centre) project had started. “Towards the end of 2016 is when the project started. That is when I began working with the Food and Agriculture Organization of the United Nations – FAO at a small hatchery that was set up at the Zanzibar State University - SUZA,” he explains.

At the moment Yusuph is doing final touches on his studies preparing to present his findings and defend his thesis.

“Frankly speaking the construction of the hatchery through this project here in Zanzibar has helped me a great deal and enabled me to complete my studies,” he recalls.



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He is of the opinion that the government should ensure that the major investment by the project becomes sustainable to enable farmers and fishermen to continue to benefit.

For those who got opportunities to get trainings or conduct researches at the centre, Yusuph has a message for them. He advises them to use the knowledge they got to support the efforts by the government in running the project so that the benefits can be vivid.

“Let it not be that once the donor funding ends, then the whole project collapses. Once we manage to carry on with what has already been established here, this project will solve many challenges related to shortage of marine resources,” he advises.

On his side, **Omar Haji Omar** studying a Master’s Degree at Bremen University, Germany majoring in Master of Science in International Studies in Aquatic Tropical Ecology (ISATEC) says that the project has been a great support to him.

“The marine hatchery helps me a lot in my studies. I am now doing my research on live feed and their production and the data I collect will be used in preparing my thesis,” he says.

*Yusuph Salum Yusuph  
(left) with colleagues*

Omar obtained his first degree at the University of Dar es Salaam in 2014 where he studied Bachelor of Science in Aquatic Environmental Sciences and Conservation.

He says he has benefitted a lot from the hatchery because of its state-of-the-art facilities that were useful for his research. "If this centre never existed I would have done my research elsewhere but the costs would have been very high. Also here in Zanzibar we don't have another place with such modern infrastructure," he says.

**Said Juma Shaban** is one of the local staff working at the hatchery. He is an expert in production of marine species including milkfish, mud crab and sea cucumber. He has been working here since June 2017. Before coming here, he was working in a hatchery at SUZA.



"Through this centre, I have learnt a lot of things that I did not know before. I now know how to do commercial fishing, establishment of marine species farms and cages for rearing crablets," he says.

Said also discloses that through the project he got opportunities for training abroad including those which were conducted in the Philippines in 2019.

He says his dream is to study the sector even further so that he may be recognized at the international level one day.

## SEED PRODUCTION IS ESSENTIAL TO DEVELOP SUSTAINABLE AQUACULTURE AND ECOSYSTEMS

"We started growing milkfish in 1998. But for all these years we were raising them in a traditional way," so says Inspector Badru Ali Makungu, Acting Commander of the Zanzibar Prisons Department in Bumbwini, North Unguja.

He says they did not have reliable places for sourcing out fingerlings and that even the ponds they were using were not well done.

"This project has improved the way we keep our fish. We now do it in a modern way. We have a reliable source for sourcing fingerlings and we have also improved our ponds. It was very difficult to get fingerlings. This project has been our savior. The skills we got through the trainings have not only benefitted us but even the people from neighboring villages," he says.

The Development of Mariculture Sector in Zanzibar (Korea-Zanzibar Friendship Hatchery Centre) provided them with 4500 juveniles that are being raised in two large ponds.

"Our market is there and it is very reliable. We feed the inmates and the government pays," he says.

His explanation echoes that one given by Mohammed Khamis Ali from Uzi Island, in Southeastern Unguja. For him, besides



Inspector Badru Ali Makungu

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being one of the sea cucumber farmers, he is also an officer with the marine resources department for the Central District, Zanzibar.

“Previously, we used to collect sea cucumber from the open sea. This was not sustainable and time came when the species became scarce and in some others areas it became completely extinct. This resulted into price hikes due to shortage,” he explains.

For Mtumwa Hamis Haji of *RabiTuokoe* farmers’ group at Mafufuni village in Bumbwini, northern Unguja, the project has created for them opportunities for increasing their production in order to meet market demand especially for milkfish whose market seems promising. “We started at a small scale and we discovered that it was not enough. We then decided to sell all the fish from it and expanded it. We have already got fingerlings. Milkfish have a big market. We too eat them. They’re very delicious and they do well in the market,” she says.

On his side, Mahadhi Jumbe Haji of *Mungu Tupe Baraka* farmers’ group also from Mafufuni village, says that they started the production of milkfish in 2018. “After the training we became interested. We started on our own fish farm,” he says. The project has provided them with 500 fingerlings based on the size of their pond. According to him, a few died due to changes of conditions from the hatchery to the pond but they have added some more from the open sea.

“We want to make this sustainable. We have learnt about modern fish farming. We now know at what age and size they are ready for the market. Milkfish grow very fast,” he joyously says.

#### Editorial

- Fred Kafeero : FAO Representative to Tanzania  
 Ana Menezes : Aquaculture Officer and Lead Technical Officer (FIAA-FAO)  
 Emmanuel Kihale : National Communications Officer, FAO Tanzania



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