**PROCEEDINGS OF THE TWO DAYS WORKSHOP ON "CO-MANAGEMENT OF FISHERIES AND AQUACULTURE IN MEGHALAYA" ORGANIZED BY COLLEGE OF FISHERIES, CENTRAL AGRICULTURAL UNIVERSITY, IMPHAL IN COLLABORATION WITH DIRECTORATE OF FISHERIES, GOVERNMENT OF MEGHALAYA DURING 18-19 AUGUST, 2016 AT ICAR-RC NEH REGION UMIAM, MEGHALAYA**

In view of increasing demand for fish in the state of Meghalaya, the College of Fisheries, Central Agricultural University (Imphal), Tripura took keen initiatives in conducting a two days workshop on "**Co-management of Fisheries and Aquaculture in Meghalaya**" in collaboration with Directorate of Fisheries, Govt. of Meghalaya during 18-19$^{th}$ August, 2016 under the DBT sponsored project "Centre of Excellence in Fisheries and Aquaculture Biotechnology (FAB-COE)". The main focus of the workshop was to bring a collaborative and integrated management of the fisheries resources of the state and to bring a sustainable aquaculture enhancement programme in hands involving various stakeholders of the state. The workshop was attended by more than 80 participants including researchers, department officials and most importantly by more than 60 farmers from different districts of the state.

The inaugural ceremony of the workshop was held on 18$^{th}$ August 2016, at the ICAR Research Complex for NEH Region, Umiam, Meghalaya. The Chief Guest of the function, Shri Ram Singh (IAS), Director, Directorate of Fisheries, Govt. of Meghalaya stressed upon developing an entrepreneurship mindset among youths of the state to narrow down the demand-supply gap and further emphasized the role of the research institutes like ICAR and CAU in generating expertise and problem oriented research for the farmers of the state. Dr. Pramod Kumar Pandey, Dean, College of Fisheries, CAU (Imphal), Tripura presided over the function and in his speech pointed out the need for region specific aquaculture species and system diversification for production enhancement in the state. He noted the contribution of the NE region towards ornamental fish export and asked the participants to take up backyard ornamental fish culture. Dr. S. Chandra, Director (i/c), ICAR RC for NEH Region, Umiam placed before the house, the need for water harvesting system for year round fish production and also utilizing the available water resources of the state efficiently through introducing suitable culture systems. Further, Dr. B.C. Deka, Director, ICAR-ATARI, Barapani pointed out the role of fish component in various integrated farming system approach and urged the farmers to take up such profitable and sustainable culture approach. Other dignitaries on the dias were Prof. J.R. Dhanze, former Dean, CoF, CAU, Shri David Kharwanlang, Principal, MSFTRI, Ri Bhoi and Dr. Md. M. Islam, Programme Coordinator, KVK, Ri Bhoi.

The technical session comprised lectures on various aspects of fisheries and aquaculture in the state by subject experts from the College of Fisheries, CAU, ICAR RC for NEH Region and officers from the Directorate of Fisheries, Meghalaya.

Dr. P. K. Pandey, Dean, College of Fisheries, Lembucherra delivered a lecture on "Vision of College of Fisheries on the fisheries and aquaculture development of NE states". During his presentation, he briefed the various components of the project and the time-line of activities undertaken in the NE states. Further, he highlighted that the focal aim of the workshop

in addressing the grass-root problem faced by the resource poor farmers of Meghalaya. He reminded the rich fish faunal diversity gifted to the region and the timely need for systematic identification and characterization through modern molecular tools for cataloging and documentation. He stressed upon the recent application of DNA bar-coding for identifying the indigenous fishes and establishing a barcode based museum which shall provide valuable fish database information of the entire NE region. He emphasized the urgent need to strengthen the linkage among different stakeholders who are associated with fisheries and aquaculture.

Prof. S.K. Das, Principal Scientist of ICAR-RC NEH region, Umiam, Meghalaya mentioned that the biggest problem of the ornamental fish industry in India is that we do not regard our indigenous fishes as ornamental while the whole world has high appreciation for our fishes and put a highly valuable price on them. Many fish species are found limited to specific North east states and people need to know the importance and values of these fishes. One of the biggest threats to ornamental fish industry is smuggling of these fishes internationally. Good transportation and proper marketing facilities are urgent needs for well establishment of ornamental fish industry.

Prof. J. R. Dhanze, Consultant, FAB-COE project discussed on **"**Hydrodynamics of run-off water harvesting technology: a prerequisite for the sustainable farming system in the North Eastern hills". He reminded that hills of NE States are endowed with rich diversity of aquatic and biotic resources, which needs judicious and scientific exploitations with sustainability and diversification needs of fish based farm practices. However, the lack of viable technology for harnessing of run-off water for aquaculture becomes a concern and need to be taken seriously as despite most of the regions receiving good amount of rainfall, the precipitated water gets drained off leaving the regions dry in most part of the year. The critical example can be taken from the state of Meghalaya itself where Cherrapunji, regarded as the wettest place globally retains fairly small amount of the water due to improper water harvesting systems.

Dr. M.K. Datta, College of Fisheries, CAU (I) Lembucherra pointed the acidic nature of the soil as a major problem in NE region where the soil pH ranges between 4.5 to 6.5. He stressed upon various scientific farming exercised elsewhere and its further scale up in state of Meghalaya citing the example of pond liming which becomes mandatory practice especially in the region with low soil pH. He made his views on the scientifically less sound practices in the state which is an unfortunately story. Further, he cited composite farming as best suited and can be practiced in different systems in a small state like Meghalaya.

The officials from various districts of Meghalaya presented the fisheries developmental activities during the next session as:

Mr. Pioneer Lyngdoh reported about the various mission schemes in the East Khasi Hills District of Meghalaya. He prioritized the importance of Meghalaya State Aquaculture Mission (MSAM) which was launched on 5$^{th}$ March 2012. He mentioned that prior to the mission, the district had only 117.25 ha under aquaculture however after the mission was launched, 180 ha of land was brought under aquaculture. Through the mission, the district now has 5 hatcheries, 1 feed mill, 13 sanctuaries and 1 aqua park. Most cultured fishes in the district are *Labeo gonius*

and grass carp contributing hugely to the total fish production of 446.223 MT in the district in 2015-2016. Some of the constraints faced by farmer's points to the topographical features of the region, no proper fish disease diagnostic facilities, etc. The district also face seed crisis which are presently more dependent on fish seeds bought from Assam.

Ms. Evaloris Samati, East Jaintia Hills, Meghalaya reported that the district has two community ponds, 60 beneficiaries and most of the ponds are marginal with 0.1 ha in size. The district conducts various awareness programs for the immediate beneficiaries. The district also has a lake of 4 ha and fishes were released during 2015 for conservation purpose, mostly with fish seeds brought from Assam.

Smt. J. L. Nonglait reported the soaring fish demand in West Jaintia Hills amounting to 2000 MT wherein the district could produce around 250 MT only. The district has three blocks with 42 ha water area under aquaculture. Total production from capture as well as culture fisheries in the district was 351.9 MT in 2015. The district has only one concrete hatchery in Amlarem with a production capacity of 50,000 fingerlings in 2015. There exist two FRP hatcheries with a potential to produce 3 lakh fingerlings during 2016. Non-availability of proper disease diagnostic facilities remains one of the major constraints faced by the farmers.

Mr. Balkam R. Sangma reported that West Garo Hills is the second largest populated district in Meghalaya and consists of five blocks. The required amount of fish for consumption is 5500 MT but the district could produce only 2300 MT of fish. There are 6 fish sanctuaries. The main constraints faced by the farmers are less availability of manpower, poor water quality, non availability of technical know-how, lack of storage facilities, and distress in sale of fish. Construction of feed mill is under progress.

Ms. Rijke M. Momin of North Garo Hills District reported that the district has individual ponds of 0.1 to 1.0 ha sizes and community ponds of 0.5 to 2.0 ha in size. The private hatchery is of 1 ha and two FRP hatcheries of 2 ha size. There are also two sanctuaries in the District. Poaching of fish by the locals and high cost of feed are some of the major problems faced by the farmers of the region.

Mr Panshang reported that the South West Garo Hills District has two blocks. There is one eco hatchery constructed in 2013-14 which has a capacity to produce 2 million fish seeds. There is also a magur hatchery which produced 4 lakhs of fish seeds in 2014-15.

Ms. Fairylife Kharryja also reported that East Garo Hills District has one FRP hatchery which is used to produce seeds of grass carp, rohu and catla and there are five fish sanctuaries.

Mr. Ricky Donald Marwein also reported that Ri Bhoi District of Meghalaya has around 750 beneficiaries covering 75 ha water bodies. There are two private hatcheries, one of which is functional and another is yet to be completed. There is one feed mill which is yet to be functional. The department releases fish seeds of mostly Indian Major Carps, grass carp and common carp. Pengba and amur carp are also released into the lake.

Ms. Dawan L. Marshillong reported that South West Khasi Hills District has 110.8 ha of water bodies and two community ponds of 4 ha. There is one eco-hatchery of 1.2 ha which produced 6 lakh fish seeds in 2015-16. Total production in the District in 2015-16 was 243.3

MT. There is one sanctuary of 200 x 100 m in Rohbah. There are three main rivers. The main constraints faced are lack of cooperation from the entrepreneurs, problem of breeding due to temperature fluctuation, insufficient seeds thus forcing them to procure from the other state and lack of responsibility of the farmers.

Mr. David B. Kharwanlang, Principal, MSFTRI, Ri Bhoi also gave lecture on an "Overview of fisheries and aquaculture in Meghalaya". He mentioned that the annual fish production in Meghalaya is only 8000MT. Meghalaya has 11 districts and 136 river/streams measuring 5600 km, 4 reservoirs of 8,488 ha, 15 lakes of 49 ha, 39 bheels of 170 ha, 12 numbers of swamps/ low-lying areas of 24 ha water areas. With the inception of MSAM in 2012, the area covered by aquaculture has increased from 800 ha to 2461 ha in the whole state; 26 hatcheries, 3 feed mills, 54 sanctuaries, have been established till date. Under the Mission, the Department also conducted awareness and training programs to the officials and farmers of the state. To acknowledge, recognize and reward the extraordinary and innovative work done by the farmers and encourage them to produce more fishes, the Department organized State Aqua Fests where awards for "Excellence in Fisheries sector" were distributed to best farmers.

The lectures were then followed by an Interaction session with farmers, scientists and department officials.

Some of the constraints faced by the farmers are listed below:-

- Acidic nature of soil
- Absence of water quality analysis instruments
- High cost of feed
- Little knowledge of feed and its availability
- Little knowledge on pond management
- High cost of feed for trout and little or no knowledge of other alternative feed

**Recommendations:**

- Need based trainings should be provided to the fish farmers to inculcate different skills pertaining to fisheries and aquaculture and to provide better opportunities for entrepreneurial development.
- Costly fish feeds ingredients should be replaced with locally available and cheap ones.
- Awareness programmes should be conducted for conservation and management of fisheries resources in the state.
- Diversification of fish species in aquaculture should be encouraged.
- More extension activities should be conducted with the participation of different stakeholders who are associated with fisheries and aquaculture to strengthen the linkages among them
- Farmers-scientists interaction programmes should be conducted regularly to understand the problems of grass root workers/farmers.