

**Proceedings of the Two-day workshop on “Co-management of Fisheries and Aquaculture in Nagaland” jointly organized by College of Fisheries, Central Agricultural University (Imphal), Lembucherra & Directorate of Fisheries, Government of Nagaland, at Hotel Japfu, Kohima, Nagaland between 27 and 28<sup>th</sup> July 2016**

The inaugural session of the two days workshop on “Co-management of Fisheries and Aquaculture in Nagaland” was conducted on 27<sup>th</sup> July 2016, at Hotel Japfu, Kohima, Nagaland organized by College of Fisheries, Central Agricultural University (Imphal), Lembucherra and Directorate of Fisheries, Government of Nagaland. Shri. Ronsenungba, Joint Director of Fisheries, Nagaland, acted as the Chairman of the function and he felicitated the dignitaries with warm welcome. Shri. Nikhase Sema, Secretary to the Govt. of Nagaland, Dept. of Fisheries was the Chief Guest of the function.

The meeting was addressed by Mr. Himadri Saha, Asst. Prof., COF Lembucherra and state coordinator for Nagaland under the FAB-COE project. He mentioned about the aim and objectives of the FAB-COE project in Nagaland. He reported that from the two major rivers in Nagaland i.e., Chathe and Dhansiri, around 21 fish species belonging to 15 genera, 9 families and 4 orders have been recorded till date under the FAB-COE project. Nine of the 21 species have been DNA barcoded and more than 50 samples out of the total of 230 specimens, are still being identified. He also expressed his gratitude to the Directorate of Fisheries of Nagaland, on behalf of the College of Fisheries, CAU, Lembucherra, for their support and assistance for last two years in carrying out the work in Nagaland and also requested the authority for their support in the future as well.

The keynote address was given by Dr. R.K. Majumdar, Assoc. Prof and HOD, FPT, COF, Lembucherra. He stated that FAB-COE in COF Lembucherra, has been working since 2014 in the North East region to achieve self-sufficiency and improve quality fish production in the region. He further mentioned that the farmers need to culture fishes according to market demand and improved production management is one major aspect which will increase the fish production and productivity in the Nagaland state in particular and whole north east India in general.

Shri. Kevisa Kense, Director of Fisheries, Govt. of Nagaland gave a brief account on the present scenario of fisheries activities in the Nagaland state. He said, “Nagas are yet to become fish farmers”. In a special note, he mentioned that the Department, which has targeted self-sufficiency in fishes in the state by 2030 under the state vision plan, is planning to identify various species of fishes which will be suitable for the climatic conditions of the state, and also develop proper catchment areas to promote indigenous fishes. He briefed that the total fish production in the state is 8220MT and average production of fish from ponds was 2100MT/ha, paddy-cum-fish culture was 335-500 kg/ha and reservoir fisheries was 158 kg/ha. Nagaland has a per capita consumption rate of 6.1 kg while the per capita production is just 4 kg. The state imports more than 3850 MT fish annually to meet the demands of the people. The total fish seed

production in the state is 478 lakh. He also mentioned that the Department was very happy to notice that College of Fisheries, Lembucherra has taken immense interest in improving the fisheries status of the state. He also ensured that all kind of assistance and support will be provided by the Directorate of Fisheries, Govt. of Nagaland for the said purpose. He then gave a brief idea on the ongoing farming activities in different districts of the state. He also thanked the Dean, College of Fisheries (CAU, I) Lembucherra for organizing this workshop to help the fish farmers to learn the various technologies on fish farming and thus meet the burgeoning demand of fish in the state. He also requested the organizers to involve actively in the fisheries developmental activities of Nagaland.

He specified that the state has also plans to identify various fish species that will be suitable to culture in different climatic conditions in the state and also to promote the fisheries of indigenous fishes. Around 350-400 families are solely dependent on the catchment of Doyang Reservoir (2258 ha), thus elevating the socio-economy of that area. Recently, the state has declared Chocolate mahseer (*Neolissocheilus hexagonolepsis*) as the “state fish”, and has also taken up measures to increase fish production by constructing freshwater fish seed hatchery, conserving and promoting aquatic fishes of stream fisheries, promoting cage culture, breeding of giant freshwater prawn, and successful rearing of ornamental fishes, etc. Successful breeding of 17 exotic ornamental fish species have been conducted and further trainings on prospects of aquaculture and fisheries in the grassroots level have been conducted besides distribution of floating fish feed, to progressive farmers. Trainings were also given to fish traders on hygiene and sanitation in the fish markets. There are 8 District Demonstration Fish Farms in Nagaland, one cold storage with capacity of 10 MT in Dimapur, two ice plants of 5MT capacity, one each in Dimapur and Wokha district, one prawn hatchery in Mokokchung, one awareness centre, five farming centres, and one retail fish marketing outlet. He also mentioned that the state has an estimated potential total area of 30,000 ha for inland aquaculture (ponds/tanks) and 25,000 ha for integrated fish culture (paddy-cum-fish culture and livestock-cum-fish culture). The fisheries department also established fish kiosks under NABARD RIDF-XX at Chekiye village and Chumukedima in Dimapur and Jalukie in Peren.

Shri. Nikhase Sema, Secretary to the Govt. of Nagaland, Dept. of Fisheries was the Chief Guest of the function. He emphasized on the conservation aspect of the biodiversity of the region and mentioned that the biodiversity is getting lost due to the anthropogenic disturbances. He stated that the primitive method of fisheries practice in Nagaland needs to be upgraded technically with modern type of farming in order to produce sufficiently. He also urged the participants to acquire sufficient information and disseminate the knowledge to other farmer friends of their locality. He also appreciated the concept of the FAB-COE for promoting indigenous fish culture as food fish in comparison to conventional IMC culture. He also released the leaflet entitled, “Fisheries and Aquaculture Perspectives in Nagaland” prepared by Dean College of Fisheries, CAU, Lembucherra.

Later, the farmers introduced themselves and the inaugural session ended by a vote of thanks from Shri. Neitho-o Kuotsu, Deputy Director of Fisheries, Nagaland.

During the technical session, various lectures were given both by the officials of the State Fisheries Dept. and the scientists from COF Lembucherra. An “Overview on the Fisheries Activity of Nagaland” was presented by Shri. Kevisa Kense. The Director of Fisheries, Nagaland announced that the state is targeting to become self-sufficient in fisheries by 2030. Nagaland has a good scope for the development of ornamental fisheries market, coldwater fisheries, giant freshwater fisheries, integrated fish farming etc., through joint ventures between fishermen and the fisheries department.

Several of the officials from the Nagaland state fisheries department briefed about the various activities in their respective districts. Shri. Ketusielie Angami, DFO Kohima talked about “Fisheries and Technology adopted in Kohima district in Nagaland”. Shri. Yhunsenlo Kent, DFO Phek also talked about “Fisheries and Technology adopted in Phek district in Nagaland”. Dr. Vimezo Kire, COE, FFDA, Dimapur talked about “Fisheries and Technology adopted in Dimapur district in Nagaland”. Smt. C. Dory Yanthan, SDFO Peren talked about “Fisheries and Technology adopted in Peren district in Nagaland”. Shri. Imtisunep, SDFO Mokokchung also talked about “Fisheries and Technology adopted in Mokokchung district in Nagaland”. Mokokchung district and Dimapur district led other districts in fish culture. Recently in Mokokchung district, Chocolate Mahseer hatchery has been established in collaboration with the Directorate of Coldwater Fisheries and Research, Bhimtal and the district is also famous for carp culture in Nagaland.

On the second day (28<sup>th</sup> July 2016) of the workshop, technical session started around 9.30 am. Dr. R.K. Majumdar, Assoc. Prof., College of Fisheries spoke on “Various activities under FAB-COE” and also on “Value added fish products in context to NEH region”. He explained the present scenario of the college and gave a detail idea of the different objectives of “Centre of Excellence in Fisheries and Aquaculture Biotechnology” Project implemented by the College. He also briefed about the outcome of last two years activities of the project in the different north eastern states of India.

Dr. Sagar. C. Mandal, Asst. Prof. COF, also talked on “Scope and Avenues in Developing/ Enhancing Ornamental Fish Trade” and also on “Potentials in Diversification of Fisheries in North East India”.

Mr. Himadri Saha, Asst. Prof. COF, gave a lecture on the topic “Fisheries & Aquaculture in North Eastern States-Recent and Future”. He gave a brief background of the fisheries activities on the mainland and the differences between the north eastern hill region aquaculture and mainland aquaculture. He explained the importance and scope of ornamental indigenous fish business in north-east India.

The technical lectures were followed by plenary session, which started from 2 pm. Dr. R.K. Majumdar, Assoc. Prof., College of Fisheries welcomed the various dignitaries present namely, Shri. Kevisa Kense, Director of Fisheries, Govt. of Nagaland, Shri. Ronsenungba, Joint Director of Fisheries, Nagaland, Shri. Neitho-o Kuotsu, Deputy Director of Fisheries, Dr. Vimezo Kire, COE, FFDA, Shri. Ketusielie Angami, DFO Kohima, farmers and all others who gathered in auditorium into the plenary session.

Dr. Sagar C. Mandal, Asst. Prof., COF Lembucherra, Tripura, presented the plenary notes based on the deliberations made during technical session (Detailed plenary notes appended).

Shri. Kevisa Kense, Director of Fisheries, Govt. of Nagaland in his speech complimented the various fishery development activities of FAB-COE in Nagaland and wished that in near future the state would come out with better fish production in collaboration with COF, CAU, Lembucherra.

The meeting ended by certificate distribution followed by vote of thanks proposed by Mr. Himadri Saha, state coordinator of FAB-COE Project in Nagaland and Co-ordinator of the workshop.

## Appendix

### PLENARY NOTES

1. Majority of the fish requirement is met from the imported sources and hence, pressing need to increase local fish production
2. There is huge deficit in local feed resources/locally produced feed. It is important to explore local ingredients like rubber seed kernel, root crops namely taro (colocasia), cassava, etc., as protein or starch source and duckweeds as protein source.
3. District-wise resource inventorization including aquatic resources and others.
4. Exploration of alternative indigenous fish species for culture as food fish.
5. Standardization of indigenous ornamental fish breeding technology specially *Channa stewartii*.
6. Substantial area of reservoirs is there in the state but aquaculture production from these ecosystems is meagre /negligible.
7. Selective breeding and introduction of new promising/ improved strains for better growth
8. Establishment of soil and water testing laboratories as well as fish disease diagnostic laboratories at different districts
9. Monitoring and Surveillance of disease for health management and advisories on mahseer culture practices.
10. Location specific standard package of practice including feeding and manuring should be developed to avoid environmental problem
11. Latest technology on paddy cum fish culture should be disseminated to the interested farmers of Nagaland.
12. Alternative indigenous minor carp or other species for aquaculture.
13. Adequate training and skill development on fish farming, fish breeding, ornamental fish culture and entrepreneurship building etc.
14. HRD and technical support on processing and value added products for marketing and profitability.
15. Arrangement of tour for the farmers to visit the modern technology implemented fish farms in the main land for their better understanding.
16. Officials of Department of Fisheries, Govt. of Nagaland expressed their keen interest to know the story behind the success of State Tripura in achieving self-sufficient fish production in order to replicate the protocols in their own state.

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