

Fisheries, a source of livelihood

in Marngar Village Cluster, Ri-Bhoi District of Meghalaya

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Fish and fisheries products have played a major role in food security in the economy of the Northeast region in India. The district Ri-Bhoi in Meghalaya being a semi-hilly region has great potential for fisheries and aquaculture. However, majority of the farmers have little or no knowledge about the scientific fish culture. Therefore, a maiden attempt has been made through the Farmer First Programme of ICAR-Research Complex for NEH Region, Umiam to sensitize and motivate the farmers of Marngar village about the scope and profitability of fish farming venture by demonstrating different technologies recommended by the ICAR-Research Complex for NEH Region, Umiam for improving the livelihood and socio-economic condition of the local farmers through fish farming.

Key words: Cage culture, Composit fish culture, Farmer FIRST Programme, Integrated fish farming

FISHERIES and aquaculture sector has registered impressive growth in the country in recent years. Northeast India is considered as one of the hotspots of freshwater fish diversity in the world and also harbours about 422 fish species of which some are endemic to this region only. Moreover, India is the second largest producer of fish in term of global production and aquaculture. Meghalaya is one of the important states in Northeast where about 95% people consume fish and utilize fish for various social functions. The state produces about 5,000 MT annually against an annual requirement of about 11,000 MT. The remaining required quantity is imported from the nearby states mainly Andhra Pradesh, West Bengal and Uttar Pradesh. However, among the various districts of Meghalaya, Ri-Bhoi district being situated in the mid-hill condition has a wide scope for fisheries and aquaculture.

The Farmers FIRST Programme (FFP) of the Indian Council of Agricultural Research- Research

complex for North East Hill region, Umiam which is also stationed in the Ri-Bhoi district of Meghalaya, has adopted two clusters of villages Marngar and Sarikushi to increase the production and productivity of various agricultural products, livestock and fisheries in the region. These cluster of villages are located 10 km towards East from the Nongpoh (Ri-Bhoi district headquarters). The total populations of this cluster of villages are 3,009 out of which 1,523 male and 1,486 female are there who resides in more than 600 household. During the preliminary survey it was observed that almost 90% of the farmers in these villages are not aware of the techniques of scientific fish culture and most of the ponds are kept ideal or with very poor management despite of the fact that there are 167 numbers of ponds which were categorised as 72 small ponds (<0.02 ha), 58 medium size ponds (0.02 – 0.05 ha) and 37 large ponds (>0.05).

Interventions of FFP

To address the above drawbacks,

the Farmers FIRST Programme aims to enlighten the local farmers of Marngar and Sarikushi villages about the scope of fisheries and aquaculture in their villages by conducting awareness training programmes and field level demonstration.

Training cum demonstration programme on scientific fish culture under FFP

Apart from the different demonstration units established in the villages, some awareness training programmes were also undertaken under the fisheries module. A training cum demonstration programme on scientific fish farming, integrated fish farming and hatchery operation was conducted on the 8th March 2017, as a part of the 10 day long farmers training programme on “Entrepreneurial Opportunities in Agriculture and Allied Sectors” from 6th to 14th March 2017. The programme was also followed by a field visit to the fisheries farm to demonstrate the different activities performed in the Fisheries Division of ICAR-RC-NEH Region, Umiam.

The training was attended by 51 farmers from the 10 adopted villages under the FFP. During the training, the trainees were exposed to different steps in pond preparation and



Fig. 1. Fish cum piggery in Umtham

management, brood fish care, happa breeding, fish feed preparation, ornamental fish breeding, hatchery operation and nursery management.

Fish fingerling distribution cum training programme of fish farmers

On the 23 September 2017, a sensitization cum fish distribution programme was conducted at Marngar Village. During the programme, a total of 42 numbers of beneficiaries with ponds were selected from 9 villages i.e. Lalumpam, Purangang, Nongagang, Nalapara-Joigang, Mawphrew, Umtham, Sarikhusi, Borgang, and Borkhasari to popularize and demonstrate scientific fish farming at field level. Besides a programme on fingerling distribution at Nalapara was organised where Principal Scientists from ATARI, Umiam, Meghalaya and ICAR, New Delhi participated.

Different activities which are undertaken on fisheries module to popularize and demonstrate various technologies are - integrated fish farming system, composite fish culture, nursery seed rearing and fish cage culture

Integrated fish farming system

Integration occurs when outputs (usually by-products) of one production sub-system are used as inputs by another, within the farm unit. Livestock-crop systems (in which crop residues are consumed by livestock and manure is recycled to fertilize the soil) are widespread and rather well documented. In northeast India, the tribal people follow some of the integrated farming systems of which the livestock cum fish integration is mainly observed.

Till date, 5 IFS units have been established in Umtham, Nalapara and Borkhasari Villages under FFP. In Umtham village it was fish cum piggery system (Fig. 1), in Nalapara village, fish cum poultry and the last one at Borkhasari village was fish cum duckery. Economics of the systems installed in different locations is highlighted in the Table 1.

Composite fish culture

The technology developed for fish culture in which compatible and non-competing fishes are cultured simultaneously through the utilization of different feeding zones (all the natural niches) from a pond

Table 1. Economics of fish farming in Marngar cluster under FFP

Year 2017	Amount (₹)
Farmer name – Bipul from Umtham, pond size: 0.12 ha	
Investment (fish + feed)	6,000
Duration :	1 yr
Revenue	18,000
Profit	12000
Farmer name – Jiten Sohkhwai, pond size: 0.05 ha	
Investment	16,000
Duration :	1 yr 6 months
Revenue	118,000
Profit	102,000
Angling (contribution)	88,000
2018-19 - bulit IFS	
Investment (fish+manure+feed)	46,000
Duration :	7 months
Revenue (Without angling)	90,000
Profit	44,000
Final harvesting yet to be done	
Farmer name – Pilor Syiem, pond size: 0.15 ha	
Investment – (Fish+feed+manure)	10,000
Duration :	2 yr
Revenue	70,000
Profit	60,000
Angling (contribution)	40,000

so as to increase the total production from unit area of water is known as Composite Fish Culture and it is the most popular culture technique in the country.

The ten villages have numerous numbers of ponds and some of them are rearing fishes, however, the fish farmers were lacking the knowledge of scientific fish culture and did not maintain the water quality for the healthy growth of the fishes. Therefore, in order to demonstrate the profitability of fish farming, the farmers were trained under capacity building programmes and 200 fish fingerlings were distributed to all the



Fig. 2. Releasing of fish fingerlings in the pond



Fig. 3. Farmer saling fish in local market



Fig. 4 Newly constructed nursery fish ponds at (a) Nalapara and (b) Borkhasari Villages



Fig. 5. Distribution of cage fabrication materials in (a) Umtham and (b) Borkhasari Village

beneficiaries (Fig. 2) to encourage them to take up the fish farming venture scientifically. Some farmers have adopted scientific fish culture professionally and are selling the fish in the local market @ ₹ 250 to 300/kg depending on the size of the fish and the fish variety (Fig. 3).

Nursery seed rearing

Quality seed is often known as the basic foundation for successful aquaculture practice. However, lack of quality fish seed and its availability locally are the major issues faced by the villagers. In order to popularise aquaculture and also to meet the requirement of fish seeds for the project location 3, of nursery ponds were constructed at Nalapara and Borkhasari (Fig. 4) for initial phase to demonstrate the techniques involved in nursery seed raising.

However, nursery seed rearing is a complicated and challenging task where proper technique know-how is required by the farmers, most of the fish fingerlings could not be

recovered as most of the fish spawn died due to predation by other aquatic organisms like frogs, snakes, etc. Nevertheless, it is expected to improve and higher fingerlings recovery is expected in the upcoming season.

Cage culture

Intensive aquaculture is a major concern nowadays as the water bodies for fish culture are rapidly reducing day by day at the same time, the nutritional requirement is also increasing due to the growing population. In order to demonstrate intensive aquaculture for increasing the fish production per unit area, low-cost PVC pipe net cages are installed and demonstrated at Umtham and Borkhasari Village (Fig. 5). Short term culturing of fish fingerling to table fish will be demonstrated in this system with high stocking density and intensive feeding. The cages were installed recently and harvesting of the net cages is yet to be done.

SUMMARY

There is a high demand for meat and fish in most of the north eastern states of India and there exists a huge gap in the demand and local supply of fish in the market as the production from this region is low due to scarcity of resources. These states meet the requirement by importing from the nearby states like West Bengal, Andhra Pradesh, Uttar Pradesh, etc. With the help of Farmer FIRST Programme through integrated farming system and fishery based module, all possible attempts are made to promote the local farmers to take up scientific fish farming in all possible ways, either it may be in a small pond or a large pond, to improve their livelihood as well as enhance the fisheries production to meet the gap in the region.

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