

Problems and Prospects of Fisheries Development in North Eastern India

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Abstract: The northeast region of India is bestowed with high aquatic resources. More than 95% of the population are fish eaters and there is a huge demand for fish. In order to fill the gap between supply and demand, efforts for aquaculture development and expansion is crucial. Aquaculture practices in this region can generate income and provide food security to the underprivileged population. Culture of ornamental fish species and ecotourism development can facilitate conservation of fisheries resources and safeguard for its future scope.

Keywords: Northeast India, Aquaculture, prospect, approaches, conservation

1.0 Introduction

North eastern region of India is located between 21° 57'N - 29° 30'N longitude and 89°46'E - 97°30'E. It covers an area of 262,179 km², accounting 8% of the India's geographical area. 70% of the area is embrace in mountainous terrain. According to 2011 census, the total population of NE India has 54, 86, 784 (GOI, 2011). The province is comprises of Assam, Meghalaya, Manipur, Arunachal Pradesh, Mizoram, Tripura, Nagaland and Sikkim settled more than 100 different tribes. The region is identified as freshwater biodiversity hot-spot (Kottelat and Whitten 1996). Only 3.4 % of the land is used for agricultural purposes and more than 66.1 % of the region is covered by forest. Various agricultural activities including fisheries have play a pivotal role in the socio-economic development.

People of NE India are dominant agrarian society. Majority of the tribal population lives in the forest and remote areas. Their livelihood are depends on the natural resources. Even the literacy rate of the region are high it fails to make any provision for imparting technical and commercial education. Professional guidance and training facilities are almost inadequate. Cultivators in the NE Region remain poor. Application of modern methods of agriculture on such uneconomic holding section may not be success. Population pressure, poor socio-economic and public health-care systems along with lack of employment and infrastructure facility, the poor people of this region leads to dwindling of aquatic resources. Communities of NE possesses unique mode of fishery activities. With the vast aquatic resources, the region has tremendous potential for expansion in aquaculture. Fish production in the North East India has been increased to 358.41 thousand tonnes in 2012-13 from 322.3 thousand tonnes in 2011-12 (DAHDF, 2013). Majority of the population are fish eater and have a high demand. In order the fill

the production demand gap, a large quantity of fish is procured from different states of the country like Andhra Pradesh, West Bengal etc. Greater adoption of modern farming techniques can get higher profit margins in fish farming. Therefore, aquaculture is required to meet the demand; it also relieves the strain on wild species to allow them to continue to be a significant source.

2.0 Prospects of Aquatic resources

North east India endowed high potential aquatic resources. The eco-climatic zones of freshwater fishery varied from warm water drainage system to coldwater condition. It has 5.63 lakh ha inland water bodies which includes, 20,875 kms rivers & canals; 0.33 lakh ha. reservoirs, 3.71 lakh ha. tanks & ponds, 1.59 lakh ha. flood plain lakes & derelict water bodies and 0.028 lakh ha rice-cum-fish culture area. The region is competent with 82,962 ha inland fisheries stock (NAAS 2001). North Eastern (N.E.) India represents approximately 33% of total 2,163 freshwater fish species of India. So far, 267 fish species belonging to 114 genera have been reported from the N.E. region (Bhattacharjya *et al.*, 2003).

The region has a huge potential for substantial growth in terms of aquaculture production and yield. There is immense scope for development of the farming to provide a source of employment to the hill people. Many suitable sites in different parts of the region could be utilized for fish production through aquaculture. These sites are lying along the banks of rivers, rivulets, beels/lakes, streams and streamlets. Extending aquaculture through establishment of ponds in both plain and hills help to generate employment for the people residing in the area. Rice field in the terraces spaced over mountain slopes provide opportunities to develop paddy cum fish farming system (Das, 2002). Operation of highly durable and flexible cage structure in different lakes/beels

of flood prone areas can get huge benefit to marginal fish farmers. Expansion of fisheries in ecotourism is a sustainable form of resource use. Conversion of fish farm into a multidimensional venture with beautification of the landscape and addition of infrastructure with restaurant, boating and angling facilities besides the annual routine fish production can be done. The fish production can be enhancing through combined strategies for filling the production and demand gap. It is possible to increase its production to 3, 90,000t from the current 3, 58,410t production.

3.0 Approaches and Strategies

A key approach in protection of aquatic resources and development of aquaculture in North eastern region is conservation of fish germplasm resources. The entire area is blessed with aquatic resources in different agro-climatic conditions ranging from warm freshwater to cold water resources. Strategic plan to harness these resources to their optimal utilization will certainly enhance productivity and boost the economy of the rural people. Large water bodies other than riverine system like beels, reservoirs and lakes need special attention immediately. To supplement natural resources, culture of potential food as well as ornamental fish species would also be a good strategy (Sarkar and Ponniah 2000). This requires development of suitable breeding technology, well tested culture practice packages as well as the availability of quality seed in time. The region has several potential indigenous fish, which have good demand and price, for which culture technology can be developed. Game and sports fish is another area which can be developed and linked with the ecotourism. This will not only earn revenue for the region would also go very well with the conservation goals (Ghosh *et al.*, 2003).

Fishery based eco tourism is emerging potential area for employment generation. Eco tourism is a sustainable form of resource use, which contributes to environmental conservation, while providing accrued socio economic benefits to the people through the non-consumptive uses and indirect values of the natural biological resources (Shrestha, *et al.*, 2002; Ditton *et al.*, 2002). Considering the vulnerable nature of our environment, eco tourism based on optimum multiple uses of the resources on sustainable basis must be encouraged in North east states. The revenues from fishing licenses support fish and wildlife management agencies at all levels of government and the expenditures from recreational fishing contribute to local and regional economies, especially in North Eastern states where fisheries have been preserved pristine or near-pristine conditions. Angling or sport fishing is classified under eco-tourism as it has minimum adverse impact on the environment and also helps in retaining the beautiful natural environment, help to preserve and protect the river system and its

surroundings, helps in the growth of fisheries resources through protection and preservation for its future scope and aspiration of better fishing. Like bird watching, fish watching also has scope for its expansion. Moving shoals of different size, color and shaped fishes always provide joy to the visitors particularly to children. Many of the religiously protected water bodies, streams and rivers of Brahmaputra and Barak Valley in NE region are some examples of fish watching spots, which attracts thousands of tourists. Similar spots need to be developed near tourist sites for visitors.

North eastern India has a good potential of ornamental fish resources. Most of the fish species are caught from wild. Exploitation of indigenous ornamental fishes from wild leads to endangered of many species as well as habitat destruction in the region (Sarkar and Ponniah 2000; Lakra *et al.*, 2010; Khomdram *et al.*, 2014). Dissemination of breeding and rearing techniques to farmers can open new avenues which can pave the way for the development of a sustainable ornamental fish trade in the region. Ornamental fish culture has increasing interest due to assured domestic market and export possibility, and even the feasibility of its establishment as homestead cottage enterprise. Establishment of ornamental fish-culture units with full technical support is expected to create multiplier effect for growth of such enterprise in the area. It will not only improve the socio-economic status of the rural population in the state but it would also greatly benefit to the farmers. Skill development of the fish farmers from the existing level through introducing breeding techniques in which it can support income generation of the family.

In recent years, drastic reduction in abundance of freshwater fishes due to destruction of habitat, unscrupulous fishing methods, over-fishing from natural resources and other human influences have been observed. Increase of human population and pollution exerts enormous pressure on the aquatic environment of the region. Overexploitation of fishes including juvenile and brood fish is the major factor in depletion of fisheries stocks from aquatic resources (Baishya and Bordoloi 2007; Munilkumar and Nandeesh 2007). Thus, assessment of fish diversity and understanding common people's perception of fish germplasm conservation should be carried out through surveys. For optimal utilization and sustainable development of these resources, strategic plans and policies will certainly improve the rural economy of the region. In order to assess the status fish diversity and abundance, collaboration with local fishery experts from each states of North Eastern India should be work out. Lack of awareness among the fishers adversely impacts on fish stocks and their subsequent prosperity. Therefore, resource database should be developed for future planning and thus, helping in conservational strategies.

Live gene bank can foster in recovering of species, and thus, creating revival-based paradigm for fisheries resources conservation. For conservation of fish genetic diversity, both rearing and captive breeding of threatened and endangered species should take into account. Therefore, ranching of such threatened and endangered species should be made only after standardization of captive breeding. Habitat degradation is also a prime concern in the region due to human pressure and overexploitation of resources. Habitat protection is the main initiative for substantial long-term benefits. Traditional knowledge on fish and fisheries are often excluded from management strategies, although its significance to fisheries management. This lead to hindrance in adoption of sustainable fishing practices in North east India. Therefore, such valuable indigenous skills, knowledge and practices should be included in management strategies. Awareness regarding fish diversity, proper utilization, protection and conservation of aquatic resources should be made. For these, all section of communities or local people should involve in promoting sustainable aquaculture in North east India.

4.0 Constraint

Even the huge potential for augmentation their fish productions, many constraints in the path of fisheries development in the north eastern states are exist. Productivity of the capture based fishery sector in the region shows a very less increment over the year due to over fishing due to environment constraint. Besides, abundances of fish species have also rapidly declined in course of time. Non availability of quality fish seed for successful aquaculture is often suggested as a major constraint for aquaculture in the region. Low temperature regime at the high altitude areas such as Arunachal Pradesh, Meghalaya and Nagaland are difficult in breeding and rearing. Their breeding and hatching arrangements are inadequate. Shortage of fish feed and some other basic input such as fertilizers are also difficult to procure in remote location of the region. The availability of plain land for pond establishment are less and difficult in terrace areas of high altitude hills. Lack of availability of suitable technologies for fish culture in high altitude are insufficient. Both fishing and post harvest technologies and infrastructure are traditional method resulting in low production.

5.0 Reference

- Baishya, A. & Bordoloi, S. (2007). Effect of Anthropogenic Stress on the Production of Fish in the Wetlands of Hajo, Kamrup District, Assam. *In Proceedings of Taal2007: The 12th World Lake Conference* 152, 155.
- Bhattacharjya, B. K., Choudhury, M. & Sugunan, V. V. (2003). Ichthyo-faunistic resources of Assam with a note on their sustainable utilization. *In: Participatory approach for fish biodiversity conservation in NE India, (Mahanta and Tyagi eds)*. National Bureau of Fish Genetics, Lucknow, India, 85–105.
- DAHDF, (2013). Handbook on Fisheries Statistics 2013, *Department of Animal Husbandry, Dairying & Fisheries, Government of India*, New Delhi.
- Das, D. N. (2002). Fish farming in rice environments of North Eastern India. *Aquaculture Asia* 7(2), 43-47.
- Ditton, R. B., Holland S. M. & Anderson, D. K. (2002) Recreational fishing as tourism. *Fisheries* 27(3), 17-24.
- Ghosh, A., Mahapatra, B. K. & Datta, N. C. (2003). Ornamental fish farming-successful small scale aqua business in India. *Aquaculture Asia*, 8(3), 14-16.
- Government of India, (2011). Census of India, 2011. Registrar General of India. New Delhi. <http://www.censusindia.gov.in>.
- Khomdram, B., Dhar, B. & Ghosh, S. K. (2014). Jiribam, the Ornamental Fishes' Hot Spot Zone Of Manipur, India. *Journal of Agriculture and Veterinary Science*, 7(1), 85-91.
- Kottelat, M. & Whitten, T. (1996). Freshwater biodiversity in Asia with special reference to fish. *World Bank Technical Paper* 343, 17–22.
- Lakra, W. S., Sarkar, U. K., Gopalakrishnan, A. & Kathirvelpandian, A. (2010). Threatened freshwater fishes of India. *NBFGR publication*, Lucknow.
- Munilkumar, S. & Nandeesh, M. C. (2007). Aquaculture practices in Northeast India: Current status and future directions. *Fish Physiology and Biochemistry* 33, 399–412.
- NAAS, (2001). Strategies for Agricultural Research in the North-East, *National Academy of Agricultural Sciences, India. Policy paper* 9.
- Sarkar, U. K. & Ponniah, A. G. (2000). Evaluation of North East Indian fishes for their potential as cultivable, sport and ornamental fishes along with their conservation and endemic status. *Fish Biodiversity of North-East India*. NATP Publication 2, 11-30.
- Sarkar, U. K. & Ponniah, A. G. (2000). Evaluation of North East Indian fishes for their potential as cultivable, sport and ornamental fishes along with their conservation and endemic status, *In: Fish Biodiversity of North-East India*. NATP Publication, 2, 11-30.
- Shrestha R. K., Seidl, A. F. & Moraes A. S. (2002). Value of recreational fishing in the Brazilian Pantanal: a travel cost analysis using count data models. *Ecological economics*, 42(1), 289-299.