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# Problems in Adoption of Scientific Fish Farming in Selected Districts of North Eastern India

**Manas Pratim Dutta[1], Shah Mustahid Hussain[2] and B.P. Mishra[3]**

## ABSTRACT

The study was carried out on 120 fish farmers in Nagaon district of Assam and East Siang District of Arunachal Pradesh focusing on the bottlenecks in adoption of scientific fish farming practices. For collection of responses from the respondents about problems of scientific fish farming and related information, a structured questionnaire comprising of 17 factors was designed based on the preliminary survey and focus group discussion was personally administered during the personal interview. Constraint index (CI) was developed and used to measure and compare the constraints expressed by different respondents and the factors were thus ranked on the basis of fish farmers' perception in the studied area. The adoption level of scientific fish farming depending on their age group were also studied and 63.33 per cent respondent belong to the medium category age group.

**Keywords:** Questionnaire, Constraint index, Adoption, Scientific fish farming

## INTRODUCTION

Assam and Arunachal Pradesh are endowed with rich and varied inland water resources in the forms of ponds, tanks, reservoirs, rivers and lakes which have great potential for scientific fish farming practices and its aquaculture development. Assam is blessed with inland water bodies covering about 4.8 lakh ha in the form of rivers (2.05 lakh ha), *beels* (1.0 lakh ha), ponds and tanks (0.6 lakh ha), derelict water bodies (1.16 lakh ha), forest fisheries (0.05 lakh ha) etc. having a greater potentiality whereas Arunachal Pradesh, the largest of the Seven Sisters located in the North Eastern region of India. Arunachal Pradesh has abundant inland fishery resources in various forms viz. 15,560 ha of still water and 9338.80 km of flowing water. These resources are ideal for development of both culture and capture fisheries. By utilising the resources, the state can achieve landmark growth. Introduction of improved technology of scientific fish farming and the efforts of Fish Farmers' Development Agencies (FFDAs), the national average productivity of ponds and tanks under the programme had reached to 2900 kg/ha/year (DAHDF, 2016). In spite of having vast aquatic resources and location specific carp culture technologies, fish farmers have failed to achieve potential yield of fish from pond aquaculture in both the states. The development of fisheries and aquaculture has been affected by a number of constraints in most of the developing countries which leads to lower fish production as compared to its actual potential. There is relatively greater scope for the promotion of scientific fish farming activities in Assam and Arunachal Pradesh from the perspective of both increasing fish production from existing fish farms and also by the expansion of area under scientific fish farming.

A few studies conducted on scientific fish farming business in other Indian states have also revealed some

[1]Assistant Professor, College of Fisheries, Assam Agricultural University, Raha, Assam
[2]KVK East Siang, College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh
[3]College of Agriculture, BUAT, Banda, Uttar Pradesh

problems (Goswami and Sathiadhas, 2000). Although some studies have also been carried out in selected districts of Assam but no reports on such studies in Arunachal Pradesh. Goswami and Sathiadhas (2000) also found that no adequate attention has been paid on systematic analysis of perceived constraints of farmers on adoption of fish culture technologies in Assam. The present study was carried out in Nagaon district of Assam and East Siang District of Arunachal Pradesh focusing on the bottlenecks of scientific fish farming practices by the fish farmers. The main objective of the study is to find out the problems faced by the fish farmers of both the states and rank the problems according to their intensity and seriousness as perceived by the fish farmers.

## METHODOLOGY

The two districts Nagaon and East Siang were selected purposively from Assam and Arunachal Pradesh respectively. Three development blocks from each of the districts were randomly selected. From each of the selected blocks a list of fish farmers was prepared in consultation with fishery officials and Krishi Vigyan Kendras of respective blocks. Out of the prepared list, 20 farmers from each of the selected blocks were finally selected through simple random sampling. Altogether 120 fish farmers had been selected as sample from all development blocks. A pilot survey was also conducted among 50 farmers following authoritative sampling (Kothari, 2004) with an open ended questionnaire to identify the problems of scientific fish farming to understand their degree of seriousness.

For collection of responses from the respondents about problems of scientific fish farming and related information, a structured questionnaire comprising of 17 factors was designed based on the preliminary survey and focus group discussion. The questionnaire was personally administered to 120 fish farmers. The degree of responsiveness to different problems in adoption of scientific fish farming practices, as perceived by the farmers was collected in the questionnaire.

Constraint index (CI) was developed based on Angral (2017). This index measured and compared the constraints expressed by different respondents.

CI= SC x 2+C x 1/N

Where, SC=Severe constraints

C= Constraint

N= Total number of respondents

The constraints themselves were classified into 3 sets viz; severe, most severe and no constraints. Constraints index were recorded using a scale of 1-6 with six indicating the most severe and one the least. The relevant data collected were tabulated and analysed using different statistical tools of SPSS package (Version-16).

## RESULTS AND DISCUSSION

Majority of respondents (63.33%) were found in the age group between 18-30 years. There were many problems faced by the fish farmers while practicing scientific fish farming. Various problems discussed by respondent fish farmers are discussed in descending order of severity (Table 1).

During the course of study, high cost of medicine (CI 1.65), unavailability of formulated feed (CI 1.62) and high cost of fingerlings/carried over seeds (CI 1.59) were the most common problems respectively in both Nagaon and East Siang (Table 1). It was observed that the fish farmers were not getting good quality seeds and feed from the concerned department as such the fish farmers had to purchase input from the local market on higher cost. It was also observed that, the perceived cost of medicine was very high in both Assam and Arunachal Pradesh leading to a major problem at the time of occurrence of disease.

Other major problems which were perceived by the fish farmers were low selling price at farm front (CI 1.55), exploitation by middleman (CI 1.48) and lack of proper distribution channels (CI 1.45). It was appraised that adequate marketing channels were not available in the study areas. Although in both the study area, fish has a high consumer preference and has a potential market but unavailability of organised distribution channel made it difficult for the fish farmers to sell the commodity. In both Nagaon and East Siang Districts of Assam and Arunachal Pradesh respectively, the fish farmers were marketing the fish through middlemen who took away

**Table 1: Farmers perception on problems of scientific fish farming**

| S. No. | Constraints | Severe constraints (sc) | Constraints (C) | No const-raints | Constraint index (CI) = Total score/ total respondent | Rank |
|---|---|---|---|---|---|---|
| 1 | Lack of quality fish seeds of required size and number at the time of stock | 61 | 38 | 21 | 1.33 | 9th |
| 2 | Difficult to identify good quality fish seed | 58 | 42 | 20 | 1.31 | 10th |
| 3 | Non availability of formulated feed | 75 | 45 | 0 | 1.62 | 2nd |
| 4 | Difficulty in getting good brooders during breeding | 78 | 15 | 27 | 1.42 | 8th |
| 5 | Lack of fishery input supplier in the locality | 42 | 52 | 26 | 1.13 | 13th |
| 6 | Lack of facilities for soil and water testing | 83 | 19 | 18 | 1.54 | 5th |
| 7 | High cost of fingerlings/carried over seeds | 85 | 21 | 14 | 1.59 | 3rd |
| 8 | Cost of fish medicine is high | 79 | 41 | 0 | 1.65 | 1st |
| 9 | Low Selling price at farm front | 76 | 35 | 9 | 1.55 | 4th |
| 10 | Difficulty in getting institutional credit | 50 | 50 | 20 | 1.25 | 12th |
| 11 | Inadequate number of visits of extension personnel to farm site | 43 | 26 | 51 | 0.93 | 15th |
| 12 | Exploitation by middlemen | 77 | 24 | 19 | 1.48 | 6th |
| 13 | Inadequate training programme on fish culture | 14 | 24 | 82 | 0.43 | 17th |
| 14 | Low water retention capacity of soil | 49 | 58 | 13 | 1.30 | 11th |
| 15 | Irregular Monsoon | 38 | 54 | 28 | 1.08 | 14th |
| 16 | Occurrence of flood | 31 | 49 | 40 | 0.92 | 16th |
| 17 | Lack of proper distribution channel | 69 | 36 | 15 | 1.45 | 7th |

lions' share of their profits leaving a meagre amount for the fish farmers. Das and Goswami (2002) also mentioned the lack of efficient marketing structure as a major constraint perceived by the fish farmers of Nagaon and Morigaon districts of Assam. Another important observation was the lack of soil and water testing facility (CI 1.54) and absence of good quality brooders during breeding (CI 1.42) which are very important for scientific fish farming. Au and Enderwick (2000) explained that six beliefs, namely, compatibility, enhanced value, perceived benefits, adaptive experiences, perceived difficulties and suppliers' commitments, affect the cognitive process that determines the farmers' attitude towards technology adoption. The present study showed positive correlation with main occupation, scientific orientation, perceived difficulties, knowledge and problems and supplier's commitment. This study suggests a change in farmers' attitude for development of scientific fish farming in both the districts. The study further revealed that lack of good quality fish seeds of required size and number at the time of stock (CI 1.41) and difficult to identify good quality fish seed (CI 1.31) were some other problems faced by fish farmers. Difficulty in institutional credit (CI 1.25), lack of fishery input supplier in the locality (CI 1.13) and irregular monsoon (CI 1.08) were also a matter of concern to the fish farmers. Similar constraints were reported on the perceived problems of few communities of Andhra Pradesh in adopting composite fish culture by Mandal *et al.* (2011). The banks and financial institution were not granting the institutional credit for fisheries department for the reason best known to them which correlates with the findings of Angral *et. al*. (2017). As far as the irregular monsoon was concerned, the fish farmers also need to adjust the work calendar of scientific fish farming or induced breeding programme with the changing monsoon which was also observed by Bhuyan *et al*. (2017).

The factors which least bothered the fish farmers were inadequate visit of extension personnel to farm site (CI 0.93), occurrence of flood (CI 0.92), inadequate training programme on fish culture (CI.0.43). But the study

**Table 2: Distribution of respondents based on their level of adoption of scientific fish farming**

| Adoption categories | Frequency | Percentage |
|---|---|---|
| Low (<18) | 20 | 16.66 |
| Medium (18-30) | 76 | 63.33 |
| High (>30) | 24 | 20.00 |

Mean=20.8833; SD=4.3324 (n =120)

shows that the factor of flood occurrence is more prominent in the selected development blocks of Nagaon District of Assam than East Siang district of Arunachal Pradesh. Bhuyan *et al*. (2017) also observed that occurrence of flood contributes to the loss of fish stock in Assam. It was also observed in the two surveyed districts of Assam and Arunachal Pradesh that most fish farmers were satisfied with the extension machineries although a few percentages of them had a problem. It was perceived that training was arranged in the district headquarters where, it was not possible for them to participate due to a number of reasons.

It is also observed from Table 2 that majority of the respondents (63.33%) belonged to 'medium' category followed by 20 and 16.66 per cent in 'high' and 'low' categories of adoption of scientific fish farming, respectively. These results imply that high adopters of scientific fish farming could be characterized by their young age and higher levels of extension participation, economic motivation. It, thus, implies that those farmers, who have a tendency to maximize their earnings and strive towards this end, have higher adoption. This research finding is line with the findings of Haque and Ray (1985); Biswas *et al*. (1991); Ghosh *et. al.* (1993) and Talukdar and Sontaki (2005).

## CONCLUSION

It is also noted that most of the adopters are in the age group of 18-30 years who have high levels of extension participation and economic motivation. Economic benefits of scientific fish farming need to be vividly highlighted to convince fish farmers to adopt scientific fish farming. The result of the present study will help all stakeholders of the fisheries development process in both the states to take appropriate steps to motivate and help the fish farmers and overcome the observed problems faced by them.

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