

RESEARCH ARTICLE

Constraints Faced by the Farmers Adopting Paddy-Fish Farming System in Bishnupur District of Manipur**Thongam Kanyalaxmi Devi¹ and Soibam Basanta Singh²**

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ABSTRACT

The study attempts to identify the major constraints faced by the farmers adopting Paddy-Fish farming system in Bishnupur district of Manipur. The study was conducted by employing a proportionate sampling system with a total of 110 sample farmers. It comprised of 76 Rotational, 24 Concurrent, 5 each of Paddy and Fish monoculture system farmers. The problems were ranked using the Garrett's Ranking Technique where each rank given by the farmer was converted into scores through the table of Garrett and Woodworth by classifying into three different categories. The findings revealed that water shortage was the most importance problem in all four systems followed by lack of sufficient funds. Other problems include flooding, high cost of fingerlings, lack of proper drainage system, lack of good quality seeds and fingerlings; high price of chemicals and fertilizers were the major problems.

Key words: Garrett's ranking; constraints; Rotational system; Concurrent system.

Rearing of fish together with paddy in India is an old practice. It is suggested that fish culture in paddy field was introduced into South-East Asia from India about 1500 years ago. It has largely been adopted in a traditional way in the state of Kerala and West Bengal. But it has not been popular in West Bengal, Assam, Bihar, Orissa and Andhra Pradesh (Ghosh *et al.*, 1985). Fish rearing along with Paddy gives a satisfaction of producing food organically. In the present context of Indian agriculture, out of 45.5 million hectares of cultivated land under rice, 20 million hectare is suitable paddy-fish culture mainly in rainfed medium land, water-logged or lowland and in canals commands. However, only 0.33 hectare is actually under paddy-fish culture. And most of the system being adopted in the country is the concurrent system of paddy-fish cultivation. The low adoption rate is due to the introduction of high yielding varieties, shorter growing days of fish, lack of sufficient water.

Traditional cultivation of paddy-fish production method has played an impact socio-economic status in the life of the farmers and fishers of North eastern part of India. Total area cultivated area under rice is 3.39 million ha in north-eastern states, of which 79,360 ha

are considerably suited for culture of paddy-cum-fish.

Pandey *et al.* (2014) reported fish farmers' perception about the constraints in the transfer of aquaculture technology in Bishnupur district of Manipur. Data were collected using structured interview schedule with constraints grouped under six areas- technological, social, administrative, economic infrastructural and extension. The intensity of the constraints was measured using five-point continuum. It was evident that extension constraints were emerged as main barrier in transfer of aquaculture technologies with mean score 4.06 and ranked I as perceived by the fish farmers in the study area. Haobijam *et al.* (2018) made a study on Paddy-Fish Cultivation and the Challenges Faced by the Farmers of Manipur, India. The analysis revealed that non-availability of insurances when the crop failed, lack of knowledge of paddy cum fish practices and the irregular visit of extension worker/scientist were top in their respective three main relative constraints. Churpal *et al.* (2015) on their study an economic analysis of rice cultivation and constraints in Dhamtari district of Chhattisgarh, India revealed that the major constraint in cultivation of rice was as pest and disease followed by weed problem and labour non-availability. Pani *et al.* (2018)

conducted their study on prioritization strategies for the resources of traditional paddy-cum-fish culture in Lower Subansiri District of Arunachal Pradesh, India. The study revealed that the majority of the farmers were dependent upon agriculture and traditional paddy-cum-fish culture. And the constraints faced by the traditional paddy-cum-fish farmers during production and marketing of traditional paddy-cum-fish culture. *Nirmala et al. (2009)* on their study on economic and constraint analysis of rice cultivation in Kaithal district of Haryana reported that pest and diseases incidence, lack of remunerative price and labour shortage were the major constraints in rice cultivation. It was observed that of 60 shrimp farmers studied, 39 belonged to high adoption and 21 belonged to low adoption category (*Swathi et al., 2013*). The findings implies that scientist and researcher should focus on developing and standardizing technologies in shrimp farming which are more efficient and feasible.

Among the North eastern States, Manipur is the most suitable site for paddy-fish farming system as the region has 79,360 hectares of water body. Out of the total paddy cultivated area of 3.39 million hectare only 0.03 per cent is under paddy-fish cultivation. Peculiar feature of the district is that 50 per cent of the area is covered by Loktak lake. This provides a greater scope for paddy-fish farming system in the district. But the adoption rate of the Paddy-Fish farming system in the district is still low even though it is the highest adoption rate in the state. Thus, the study was undergone with an objective to identify the major prevailing constraints faced by the farmers and to suggest the appropriate measure to mitigate the problems.

METHODOLOGY

Bishnupur district of Manipur was purposively selected for the present study. In order to meet the stipulated objectives of the present study, a multi-stage sampling techniques was employed. The first stage of sampling plan was the selection of block (Stage I), second stage was the selection of villages from the selected blocks (Stage II) and finally, the last stage relates to selection of respondent farmers from the selected villages (Stage III).

Bishnupur district consists of three blocks viz., Bishnupur, Moirang and Nambol block. Out of these three blocks, Bishnupur and Nambol block was selected for the study using simple random sampling technique.

A list of villages where Paddy-Fish farming system is adopted was prepared with the help of Block Development Officer. Leimpokpam, Sanjenbam and Wahengkhuman was selected from Nambol block while Laishoi, Hameiban and Chingmei were from Bishnupur block using simple random sampling technique. Altogether six villages were selected from the two selected blocks.

In the final stage of sampling plan, a complete list of farmers adopting the Paddy-Fish farming system of each selected village was prepared with the help of respective village *Pradhans*' or *Panchayat* members. From the prepared list, using proportionate random sampling technique the respondent farmers were drawn for collection of relevant data and information with respect to Paddy-Fish farming system like different types of systems adopted in the region using pre-tested well-structured schedule. Thus, from the list, a total of 110 respondent farmers was selected as representative sample.

The selected farmers were contacted through opinion survey for analysing the problems and constraint faced by them in adopting the paddy-fish farming system. The constraints were ranked by using the Garrett's Ranking Technique.

$$\text{Per cent position} = \frac{100(R_i - 0.50)}{N_{ij}}$$

Where,

R_{ij} = rank given of the i^{th} item by the j^{th} individual

N_{ij} = number of the items by the j^{th} individual

The percent position of each rank was converted into scores by referring tables given by the Garrett and Woodworth. Then for each factor, the scores of the individual respondent were added together and divided by the number of respondents for whom scores are added. The mean scores for all the factors are ranked by arranging in descending order.

RESULTS AND DISCUSSION

The major constraints were identified and ranked based on the severity as perceived by the respondent farmers. The field survey results regarding constraints experienced by Paddy-Fish Rotational and Concurrent system farmers in the study area were in line with the opinion of the paddy mono-cropping farmers.

Constraint faced by the rotational paddy-fish farming system farmers : The Table 1 below represent the major constraints faced by the sample farmers in

Table 1. Problems faced by the rotational and concurrent paddy-fish farming system farmers

Problems	Rotational system		Concurrent system	
	Av. score	rank	Av. score	Rank
Water shortage	61.3	I	19.1	I
Lack of sufficient fund	55.14	II	17.13	II
Flooding	53.46	III	17.04	III
High cost of fingerlings	48.43	IV	15.82	IV
Lack of drainage system	46.1	V	15.18	V
High price of fertilizer	41.14	VI	13.01	VI
Lack of training	37.49	VII	12.45	VII
Disease	37.43	VIII	11.49	VIII
Pest infection	37.03	IX	11.13	IX
Lack of good quality seed & fingerling	33.19	X	10.23	X
Low mortality rate	32.49	XI	10.05	XI
Lack of contact with extension personnel	30.20	XII	9.62	XII
Non availability of labour	26.21	XIII	8.37	XIII
Theft	18.24	XIV	5.76	XIV
Water quality	10.64	XV	3.36	XV

adopting the Rotational and Concurrent system. Farmers in the study area, revealed water shortage to be the most severe constraint in adopting both Rotational & Concurrent Paddy-Fish farming system scoring a percentage of 61.3 and 15.18 and is assigned as the first rank. Irrigation system adopted in the study area was mainly rain-fed and thus water shortage was the common problem faced by the sample farmers resulting in decreased of yield and smaller fish size. About 55.14 and 17.13 per cent of the Rotational and Concurrent farmers reported that lack of sufficient fund was one of the major problems for them and was given the second rank. Most of the farmers were not economically solvent to run the farm smoothly without any financial support. They did not get sufficient loan from financial institution. They had to borrow money from local NGO's at higher interest rate for conducting a Paddy-Fish culture.

Around 53.46 and 17.04 average score of Rotational & Concurrent Paddy-Fish farmers reported the problem of flooding as one of the major constraints and was assigned the third rank. It caused many inconveniences like running away of fingerlings as the field is over-flooded resulting in decreased of yield and reduction of paddy yield due to lodging.

Input is one of the most important factors for Paddy-Fish culture. High fingerling price create

constraints to successfully run Paddy-Fish culture. About 48.43 and 15.82 per cent of Rotational & Concurrent system sample farmers complained that high price of fingerling was one of the most important problems for them is identified as the fourth rank. The fifth rank was assigned to the lack of proper drainage system. Around 46.1 and 15.18 average score of Rotational & Concurrent system farmers claims the lack of drainage system as constraint in adopting the system efficiently. A proper drainage system is very essential and one of the most important factors in Paddy-fish farming system which prevent excessive flooding of the field.

In the study area, an average score of 41.41 & 13.01 for Rotational and Concurrent system was associated with high price of chemicals and fertilizer and was ranked as the sixth rank. Training plays an important role in adopting Paddy-Fish farming system. It provides improved and scientific method & knowledge to the farmers suitable for the system. But a few numbers of farmers are aware of the importance of training and not many attended the training programme due to information gap. About 37.49 and 12.45 per cent of Rotational and Concurrent farmers claimed that they lack of training was assigned the seventh rank. Attack by diseases and pest were assigned as the eight & ninth rank. About 37.43 and 37.03 per cent of Rotational & 11.49 and 11.13 of Concurrent Paddy-Fish farmers reported that their paddy and fish were attacked by diseases and pests. To overcome these problems, training programme should be arranged to upgrade the knowledge on scientific fish culture. Scientific use of chemicals should be ensured.

Lack of quality seeds and fingerlings was one of the main problems for Paddy-Fish culture and was given the tenth ranked. About 33.19 and 10.23 per cent of Rotational & Concurrent farmers complained about absence of quality seeds and fingerling. Around an average score of 32.49 was reported for low mortality rate in Rotational system and 10.05 for Concurrent system, 30.2 for Rotational system for lack of contact with extension personnel and 9.62 for Concurrent system, 26.21 and 8.37 per cent of Rotational system & Concurrent system for non-availability of labour, average score of 18.24 & 5.76 for Rotational and Concurrent system for theft problem. And 10.64 and 3.36 per cent of Rotational and Concurrent system for water quality were considered less important

Table 2. Problems faced by the paddy monoculture farmers.

Particulars	Av. score	Rank
Water shortage	3.56	I
Flooding	3.51	II
High cost of chemicals and fertilizer	2.48	III
Diseases problem	2.46	IV
High cost of machinery	2.18	V
Pest attack	1.78	VI
Non availability of labour	1.05	VII

according to the sample farmers as compared to others that occupied the top five ranks.

Problems faced by the paddy monoculture farmers : From the survey it was observed that water shortage to be the most severe constraint for paddy cultivation in the study area. 3.56 per cent of the respondent farmers identified water shortage with the top rank. 3.51 per cent of the respondent farmers pointed out flooding as the second issue of importance. Flooding is one of the factors which influences yield reduction due to lodging.

High cost of chemicals and fertilizer was assigned as the third rank with an average score of around 2.48. Sample farmers claimed that chemicals and fertilizer like pesticide, weedicide, urea, diamond, etc. were important inputs which reflect on the yield of the crop. The fourth rank was assigned on disease problem by 2.46 per cent of the respondent farmers as it results in yield loss.

Around an average score of 2.18, 1.78 and 1.05 high cost of machinery, pest attack and non-availability of labour were ranked as fifth, sixth and seventh respectively according to the severity as responded by the famers. The ranking of the constraint was given in the Table 2 below.

Problems faced by the fish farmers : The major problems faced by the sample farmers were rank accordingly and the data is illustrated at the Table 3 given below. The tables showed that apart from the top ranked constraint of water shortage there was slight difference in the opinions of the Rotational and Concurrent system farmers. 3.17 per cent of the sample fish farmers felt that lack of proper drainage system as one of the important factors and is assigned as the second rank. A proper drainage system is a must in the study area to prevent over-flooding of the pond during monsoon period. With an average score of 3.17, lack of sufficient fund was rank as the third problem by the farmers as fish monoculture required

Table 3. Problems faced by the fish farmers

Problems	Av. score (%)	Rank
Water shortage	3.94	I
Lack of drainage system	3.17	II
Lack of sufficient fund	3.11	III
Lack of training	2.81	IV
High cost of fingerling	2.44	V
Flooding problem	2.38	VI
Non availability of labour	1.90	VII
Theft problem	1.55	VIII
Water quality	0.95	IX

large sum of financial source to increase the yield. The farmers claimed that the lack of sufficient fund was a major constraint to them in order to practise fish monoculture. Lack of training was assigned as the fourth rank with an average score of 2.81.

Around 2.44 per cent of fish farmers claimed the high cost of fingerling as one of the major problems and was ranked as the fifth problem. As fingerling is an important input in the farming system, high cost of it is one of the major hurdled faced by the sample farmers which also influences the net return of the farmers. The other constraints like flooding problem, non-availability of labour, theft problem and water quality were ranked as the sixth, seventh, eighth and ninth respectively.

Suggestions to mitigate the problems faced by the farmers : To increase the productivity of Paddy-Fish farming system in the study area, it is necessary to provide institutional and organizational support, training facilities and extension services for sustainable rice-fish farming. Training and technical support would help to increase the knowledge of farmers, improve profitability and reduce risks.

The provision of low-interest credit would also help the switch to rice-fish farming by resource-poor farmers. Access to credit at reasonable interest rates and with appropriate repayment schedules will be essential if rice-fish farming is to become accessible to poorer farmers. Thus, the government as well as national banks and NGOs should provide adequate access to interest free credit or credit at very low interest rates.

Being rain-fed irrigation system provision of having a proper drainage is a must to increase the efficiency of the farming system in the study area. And to decrease the problem of lodging and runaway of fish due to flooding as well as water scarce problem, a systematic approach to fish farming development is

needed at irrigation system level which will alleviate most of the constraints that are met when trying to promote fish farming in rice fields only.

It will be useful if socioeconomic studies are conducted before and after the introduction/ promotion of paddy-fish culture. Baseline data on income status and diet will be important in assessing the full impact of rice-fish technology.

Popularization of the concept must be done to make the farmers more aware about the Paddy-Fish farming system and its advantages. Rice-fish farming should become part of public awareness so the culture of fish in rice fields becomes as integral to rice growing as fertilizer application.

CONCLUSION

With regard to the major constraints faced by the farmers, the findings revealed that water shortage was the most importance problem in all the system followed by lack of sufficient funds. Therefore, in order to improve Paddy-Fish farming system, it can be concluded from the present analysis that if modern inputs and production technology can be made available to farmers in time, yield and production of Paddy-fish may be increased which can help the farmers to increase income and improve livelihood conditions. Arranging training programme to upgrade the knowledge on scientific fish culture; educating the people to develop social consciousness by strengthening local security service through private and public initiatives. The government should also take some measures for ensuring availability of inputs at reasonable prices at proper time.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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