Perception of tribal farmers on fish culture practices in small water bodies: an exploratory study in Khowai district of Tripura, India

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ABSTRACT

Fish plays an important role in economic growth of Tripura, the state with the highest per capita fish consumption. Fish culture in small water bodies, a predominant practice in the state, is being duly promoted by the State Government in form of a scheme named "Fish culture in smaller water bodies", in which farmers have been provided with inputs and endowed with technical assistance. As far as the farmers' perception on this scheme was concerned, no such similar studies was found in place in the state. Thus, the present study was conducted among thirty fish farmers-cum-beneficiaries of the scheme from different villages of Tulashikhar block of Khowai district to understand their perception of satisfaction towards different aspects under the scheme. Structured interview schedule, consisting of a set of variables, was administered to the respondents and they were asked to rate those in a five point Likert scale with points very low (1) to very high (5). Rank Based Quotient (RBQ) has been calculated to sequence the constraints faced by the respondents related to the scheme. Findings of the present research revealed that majority of respondents were male (90%) and belonged to 31-45 years (70%) age group. As revealed, cent percent of the respondents belonged to Schedule Tribes (ST) with an average annual income of Rs.1,12,650 (SE ± 9129.44) and average pond area of 0.12 ha (SE ± 0.012). As part of the perception about the scheme was concerned, the variable, 'Socio-cultural acceptance' scored the highest (4.1), suggesting 'high' level of satisfaction. In contrary, other variables like usefulness, sustainability, sufficiency in allocated fund, implementation, timeliness, monitoring by the Department of Fisheries (DoF) officials etc. were scored in between 2 to 3, indicating 'low' to 'medium' level of satisfaction. Results of RBQ backed by further inquiry revealed that 'inefficient implementation', 'delayed departmental proceedings' and 'lack of timeliness in providing inputs' were perceived to be the three major constraints associated with the scheme.

*Keywords***:** Fish culture, perception, satisfaction, small water bodies, Tripura

India ranks second in global fish production with a contribution of around 1per cent to its Gross Domestic Product (GDP) and over 5 per cent to the agricultural GDP(PIB, 2019). The fish production during the year 2017-18 was recorded to be 12.61million metric tons (MMT), out of which 8.92 MMT from inland and 3.69 MMT from marine waters (DAHDF, 2018). The apparent per capita fish consumption in India varies between 5 to 10 Kg (FAO, 2018), where 60 per cent of Indian population, having different spatio-temporal pattern of consumption, intakes fish under heterogeneous social contexts (Salim, 2016).

Contextually, it is worthwhile to mention that 90 per cent population of North-East (NE) Indian states are fish eaters but a wide gap between production and demand has been experienced in recent past (Singh *et al*. 2017). Being the second smallest state (area wise) among eight land-locked North Eastern (NE) states,Tripura ranks top in per capita fish consumption with total fish production of 70433.42 Metric Tons (MT) during 2017-18(Department of Fisheries, 2018),where fish plays an important role in boosting the state's economy and ensures a low-cost availability of protein rich daily diets to its 95 per cent fish eating population (Saha and Pandit,

2014). As per the Census of India (2011), Tripura has 31.8 per cent of Tribal population which is connoted as 8.6 per cent of India's total tribal population. As reported, some districts of Tripura are dominated by tribal communities, in which Khowai is prime one in terms of availability of progressive and successful tribal fish farmers.

For ameliorating the lives and livelihood of fishers of Tripura, Department of Fisheries, Govt. of Tripura through block administration has been taking up several initiatives such as 'Pisciculture in non-perennial/seasonal water bodies' (unit area-0.10ha), 'Production of fingerlings (7cm and above) in private owned tanks of remote area' (unit area-0.08ha), 'Production of stunted growth fingerling in perennial nature of water bodies' (unit area-0.16ha), 'Conservation aquaculture of indigenous species Pabda (*Ompok bimaculatus*) in polyculture' (unit area-0.08ha), 'Aquaculture of freshwater giant prawn in polyculture' (unit area-0.08ha), 'Feed and seed support to the fish farmers' (unit area-0.10ha), 'Entrepreneurship development of Self-Help Groups (SHGs) for adoption of scientific pisciculture' (unit area-1ha), 'Entrepreneurship development of co-operative society for adoption of scientific pisciculture'

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(unit area-1 ha), 'Estimate for raising of brood stock of Pabda/Prawn in poly-culture' (unit area-0.10ha), 'Encouraging production of *Shidal* (A fermented fish products) for supplementary livelihood of un-employed youth/women/fishers/fish farmers', 'Low cost input technology in composite fish culture' (unit area-0.16 ha), 'Feed based intensive fish culture for higher productivity' (unit area-0.16ha), 'Integrated fish farming among the farmers having pig' (unit area-0.16ha), 'Fish culture in smaller water bodies'(unit area-0.04-0.06ha) etc. (Department of Fisheries, 2018). Out of which, the scheme named, 'Fish culture in smaller water bodies' has widely been practiced in many parts of Tripura as it generates significant income and improves the lives and livelihood of poor fish farmers. The added benefits under this scheme is reported to be the low input cost in which small and fragmented water bodies can easily be brought into scientific fish culture. Considering the popularity of the scheme, it is being duly promoted by the state Government in which farmers have been provided with inputs and endowed with technical assistance. As far as the farmers' perception on this scheme was concerned, no such similar study was found in place in the state. Thus, the present study was conducted with the objectives to understand their perception of satisfaction about different aspects under the scheme and enlist problems associated with the scheme.

MATERIALS AND METHODS

Out of 8 districts of Tripura, Khowai district ranks 4th in total fish production with a production of 8745.45 MT and among 6 blocks of the district, Tulashikhar block tops in total fish production with a production of 2197.072 MT during the year 2017-18.Total water area used for fish cultureand total number of fish farmers have been reported to be730.66 ha and 4076 respectively in Tulashikhar block (Department of Fisheries, 2018). Apart from these, discussions with block fisheries officials revealed that the block has significant numbers of Tribal Fish Farmers, involved in scientific fish culture in small water bodies. Thus, 30 tribal fish farmers-cum-beneficiaries of the scheme, 'Fish culture in smaller water bodies' from different villages of Tulashikhar block of Khowai district were purposively selected for the present study during the year 2018-19. For selection of beneficiaries, the lists of beneficiary farmers along with the details of the scheme were procured from Fisheries Department of Tulashikhar Block. Data were collected by using structured interview schedule. Appropriate parametric/nonparametric statistical tests were used to analyse the results. As part of primary data collection, a structured interview schedule consisting of different socio-personal variables along with qualitative variables like usefulness, sustainability, sufficiency in allocated fund, implementation, timeliness, monitoring by the DoF's officials, relative advantage, extension linkage and social/cultural acceptance were administered to the respondents and they asked to rate those in a five point Likert scale with points very low (1) to very high (5) (Ghosh *et al.*, 2013). Further, Weighted Average(Ghosh and Sharma, 2014) of those scores were calculated for drawing a conspicuous interpretations. Rank Based Quotient (RBQ) has been calculated to sequence the constraints faced by the respondents related to this scheme by using the formula given by Sabarathnam and Vennila (1996). Based on the constraints faced, respondents were open-endedly asked to suggest some measures so as to bring improvement under this scheme and those were corroborated to get it formally listed for further implications. Along with these, descriptive statistics and appropriate parametric/non-parametric statistical tests were used to analyse the data. The formulae of calculation of RBQ and Weighted Average are as follows :

Rank Based Quotient (RBQ)

$= \Sigma [F_i (n+1 - i)] / (N \times n) \times 100$

Where,

F_i = Number of respondents giving the particular point at i[th] rank.

i = i[th] rank.

N = Total number of respondents.

n = Number of topics

RESULTS AND DISCUSSION

The secondary information related to the scheme were collected from the Fisheries Office of the Tulashikhar block. As reported by the block fisheries officials, the implementing authorities of the scheme were the Fishery Officers of the respective blocks and the beneficiaries were selected from different villages by the members of the Gram Panchayats. Under the scheme, beneficiaries were provided with monetary support for controlling the fish pond predators. For pond manuring and fertilization, raw cow dung were provided and natural zeolite, quick lime were supplied for maintenance of good water quality parameters. Different fish seeds like Catla, Silver carp, Rohu, Mrigal and Common carp were distributed to the farmers (Catla-25%, Silver carp-10%, Rohu-30%, Mrigal-15% and Common carp-20%) along with sinking and floating pelleted feeds. Medicines like CIFAX/Aqua Health/Aquaneem were also provided to the farmers. The details of unit cost estimation of the scheme is given in the table 1.

Table 1: Unit cost estimate for scheme on Fish culture in smaller water bodies (unit area-0.04ha. to 0.06ha.)

Items	Quantity	Amount (Rs.)
1. Control of predators by pesticide / repeated netting.	'Lump-Sum	400
2. Application of quick lime (quantity in kg)	19	247
3. Natural Zeolite (monthly, quantity in kg)	3	195
4. Manuring (Mustard Oil Cake, quantity in kg)	3	2415
5. Raw cow dung – organic manure (quantity in kg)	1600	1120
6. Micronutrient (Agrimin / Any other of similar nature), (10kg micronutrient / 1000kg feed) (quantity in kg)	2.41	385
7. (a) Stocking of fingerlings (7cm & above) (a) Catla- 25% (quantity in no.)	120	240
(b) Silver Carp – 10%, Rohu – 30%, Mrigal – 15%, Common Carp – 20% (quantity in nos.)	360	306
8. Artificial feeding with sinking feed -– 20 days in a month (quantity in kg)	241	6266
9. Medicines for prophylactic measures (CIFAX / Aqua Health / Aquaneem / Any Other of similar nature) (quantity in no. of bottle each @ 100ml)	1	180
10. Misc. For procurement of plankton net / signboard – flex / charges for netting etc.	L.S	500
TOTAL		**12255**
Farmer's contribution		**2101**
Government's Contribution		**10154**

Source: Department of Fisheries, Govt. of Tripura, (2018)

Table 2: Socio-economic profile of the fish farmers

S. No.	Variables	Categories	Frequency	Percentage
1.	Age	18-30 years	7	23.33
		31-45 years	21	70
		45-60 years	2	6.67
	Age average (*years*)			37.6
				(SE±1.34)
2.	Gender	Male	27	90
		Female	3	10
3.	Caste	ST	30	100
4.	Family type	Joint	2	6.67
		Nuclear	28	93.33
	Average family size			4.53
				(SE±0.21)
5.	Educational qualification	Graduation	1	3.33
		Secondary	2	6.67
		Matriculation	9	30
		Primary	18	60
6.	Annual income (*Rs.*)	50,000 – 1lakh	13	43.33
		1lakh – 2lakh	16	53.33
		2lakh – 3lakh	1	3.34
7.	Possession of wealth and equipment	Fishing net	8	26.67
		Fishing gear	15	50
8.	Type of fish culture	Traditional	3	10
		Semi-intensive	27	90

Socio- economic profile of the beneficiaries

Results of the present study in table 1 showed that maximum number of respondents were male (90%), followed by 10 per cent female and they belonged to the age group of 31-45 years (70%) followed by 18- 30 years (23.33%) and rest were in the age group of 45- 60 years (6.67%). As revealed, cent percent of respondents belonged to Schedule Tribes (ST) and majority of them had an educational qualification up to primary level (60%). Average annual income of the respondents was enumerated as Rs. 1,12,650 (SE ± 9129.44) and 53.33 percent of the respondents had an annual income in the range of 1 lakh to 2 lakh. It was evident from the study that the average size of pond area, possessed by the respondents, was 0.12 ha (SE ± 0.012) in which, majority of the respondents practiced semi-intensive fish culture (90%). However, respondents reported that they practiced the scheme within 0.08 ha of their total available water areas. Family size of the respondents was 4.53(SE ±0.21). A total of 6.67 per cent of the respondent had a joint type family structure while 93.33 per cent had nuclear families and 66.67 per cent of the respondent had fishing net while no one owned aerator.

Farmers' perception about the scheme

As depicted in the table 2, the variable, Social/Cultural Acceptance' scored the highest (4.1), suggesting 'high' level of satisfaction. The reason for such perception of high level of satisfaction was manifested from the further inquiry that the fish species, being provided under the scheme, had higher acceptance among the respondents at their community level, which also satisfied their cultural cognizance.In contrary, other variables like usefulness(2.5), sustainability (2.4), timeliness (2.2), implementation (2.1), monitoring by the DoF's officials (2.0) etc. scored in between 2 to 3, indicating 'low' to 'medium' level of satisfaction. 'Sufficiency in allocated fund', 'Extension linkage' and

'Relative advantage' scored 1.9, 1.8 each, respectively, indicating low level of satisfaction among the respondents. However, in a similar study, it was reported that the beneficiaries are quite satisfied with the variable like usefulness, timeliness etc. as they were getting the inputs in time (Ghosh *et al*., 2013).The overall weighted average score was enumerated to be 2.3, suggesting low level of satisfaction among the beneficiaries. The reasons behind such low level of satisfaction were further enquired and it was found that the beneficiaries under the scheme did not receive expected amount/quantity of inputs as they supposed to be provided (Table 1). Apart from this, the respondents raised their concerns regarding the ratio of different fish species as well as the timeliness in providing so. However, they expressed their optimism in experiencing the betterment in next phase of the scheme and posed faith on the implementing authorities.

Table 3: Farmer's perception about the scheme

Parameters	Average scores
1. Social/Cultural Acceptance	4.1
2. Usefulness	2.5
3. Sustainability	2.4
4. Timeliness	2.2
5. Implementation	2.1
6. Monitoring by the DoF's Officials	2.0
7. Sufficiency in Allocated Fund	1.9
8. Relative Advantages	1.8
9. Extension Linkage	1.8

Constraints associated with the scheme

Respondents were asked to rank the constraints faced by them in connection with the present scheme in descending order based on their perception. Rank based quotient(RBQ) which was introduced by Sabarathnam and Venilla (1996) was used to determine the ranks of

Table 4: Constraints faced by the respondents

Constraints	RBQ value	Rank
1. Inefficient implementation	96.00	1
2. Delayed Departmental proceedings	84.67	2
3. Lack of timeliness in providing inputs	76.67	3
4. Lack of coordination with the DoF staffs	72.00	4
5. Un-sustainability	64.67	5
6. Poor seed quality	43.00	6
7. Transportation problems	42.00	7
8. Improper selection of beneficiary	31.67	8
9. Corruption	19.33	9
10. Political influence	10.67	10

ten (10) constraints based on the calculated RBQ values. Results of RBQ calculation revealed that inefficient implementation of the scheme was considered as the main constraints faced by the respondents as they were not getting the expected benefits/inputs under the scheme except the fingerlings, followed by delayed departmental proceedings and lack of timeliness in providing inputs and the RBQ valuesof the aforesaid variables were 96, 84.67 and 76.67 respectively. Out of a set of ten (10) constraints, others constraints which were also ranked are Lack of coordination with the DoF staff (72.00), Unsustainability (64.67), Poor seed quality (43.00), Transportation problems (42.00), Improper selection of beneficiary (31.67), Corruption (19.33)and Political influence (10.67) (Table 3).

According to Ghosh *et al*. (2013), scarcity of the water during the supply of fish seeds in summer month was reported by the respondents as the major constraint but the present study revealed that the respondent considered improper implementation of the scheme as the major constraint as they were dissatisfied with unavailability of quality of inputs like fingerlings and supplementary feedsof desired quantity and quality.

The present study has revealed that the respondents-cum-beneficiaries of the scheme were not satisfied with the scheme. The main constraint, which the farmers faced, was inefficient implementation of the scheme, which included the concerns like not getting the expected inputs as specified under the scheme for each beneficiary, unavailability of the fish seeds as per standard stocking ratio, lack of timeliness in providing the seeds etc. Further inquiry revealed that there was a lack of awareness among the respondents about the scheme. The respondents expressed a need of conducting some training programmes with a field exposure and regular field visits. It was suggested that the scheme needs to be monitored regularly by the concerned authority for its successful implementation and ensuring the higher effectiveness in endowing the benefits among the beneficiaries.

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