PROBLEM ASSESSMENT: A CASE STUDY OF CATFISH CULTURE IN MYMENSINGH DISTRICT, BANGLADESH

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A B S T R A C T

The objectives of this study was to assess the extent of problems faced by the farmers in catfish culture with randomly selected 120 catfish cultivars in Trishal upazila under Mymensingh district. A structured questionnaire was used to collect data. Based on the level of problem faced by the farmers in catfish culture they were divided into three groups; less problem, moderate problem and high problem and it was observed through survey that the majority (60 %) of the farmers faced moderate problem while 22.50% percent of the farmers faced low problem and 17.50% farmer faced high problem. Farmers' problem face was influenced by their media contact for fish farming, training exposure, level of education and organizational participation. Farmers having higher media contact, higher training participation, higher educational level and higher organizational involvement faced lower problem in catfish culture. On the basis of Problem Faced Index (PFI) score calculated to rank the problems, it was observed that high price of feed ranked most severe problem followed by unavailability of quality feed, high price of vaccine and medicine and low production and lack of local market. The findings may contribute in formulating policies to reduce farmers' problem in catfish culture.

INTRODUCTION

Rivers and other forms of water sources such as ponds, streams, and lakes surround Bangladesh. Fish and fish-related businesses employ a large portion of the country's population, either directly or indirectly. It is endowed with vast open water resources and a diverse aquatic ecosystem. Bangladesh came in third place for inland open water capture production and fifth place for global aquaculture production. Bangladesh is currently ranked fourth in the world and third in Asia for tilapia production (DoF, 2018). Fisheries are an important part of agricultural activities, contributing to nutrition, employment, revenue generation, foreign exchange profits, and the overall economy of Bangladesh. Since time immemorial, the fish and fisheries sector has played a critical role in Bangladesh's socioeconomic growth, and it is a part of our cultural legacy (Akter et al., 2015). It is also crucial for Bangladesh's nutrition, employment, and export revenues. This industry accounts for the majority of animal protein (60.0%). It accounts for 3.57 percent of our national GDP and around one-quarter (25.3 percent) of agricultural GDP. Bangladesh is one of the world's major fish producers, with a total production of 42.77 lakh MT in FY 2017-18, with catfish production accounting for 5.22 lakh MT, and aquaculture accounting for 56.24 percent of overall fish production (DoF, 2018). There are two types of aquaculture practices are going on in Bangladesh - freshwater and coastal aquaculture. Freshwater aquaculture comprises mainly pond farming of carps (indigenous and exotic), Mekong pangasius catfish, Tilapia, Mekong climbing perch and a number of other domesticated fish though in lesser scale (Hossain, 2014). Now a day's the demand of catfish become high for this reason commercial and small-scale catfish farming business is gaining popularity. There are several catfish species available in Bangladesh. Catfish is a species-rich and exceptionally diverse group of fishes constituting the order Siluriformes. Fishes of this group are easy to identify because their body is usually naked (without scales) or covered with bony plates and the majority of them have barbels (whiskers) around their mouths (Talwar and Jhingran, 1991). This large group of fish is numerously represented in Bangladesh (Rahman, 2005) and all over the world (Lundberg and Friel, 2003). Because of their worldwide distribution and diversity, catfishes are of great interest to ecologists and evolutionary biologists, and are important in studies of biogeography from regional to global (Lundberg and Friel, 2003). Many catfishes around the world have huge economic value and are fished for human consumption and pet trade or recreation (Lundberg and Friel, 2003). After Cypriniformes and Perciformes, the two largest orders of fishes in terms of a number of species, Siluriformes, i.e., the catfish group, is very prominent in the freshwater fish fauna of Bangladesh. At least 55 species of catfishes belonging to 35 genera have been recorded so far in Bangladesh (Rahman, 2005).

Catfish species of Bangladesh show a great diversity in size. Boal freshwater shark (*Wallago attu*), Ayre (*Sperata aor*), Baghair (*Bagarius bagarius*), Rita (*Rita rita*) and Pangas (*Pangasius pangasius*) are among the largest sized members of the catfish group, often attaining over one meter in length, whereas *Amblyceps mangois*, *Hara hara*, *Hara jerdoni* etc. are among the smallest, rarely exceeding 5 cm in length (Rahman, 2005). In Bangladesh Pabda (*Ompok Pabda*), Shing (*Heteropneustes fossilis*), Magur (*Clarias batrachus*), Tengra (*Mystus vittatus*) are also considered as small catfish. Nowadays siltation has threatened the existence of most of the rivers and many are gradually being turned into small canals through which the inland open water fisheries have declined significantly during the last 3 to 4 decades. Other reasons are uncontrolled use of chemicals, fertilizers and insecticides, destruction of natural breeding and feeding grounds, harvesting of wild brood fishes (Azher et al., 2007). But now people are becoming interested in catfish farming and establishing large or small-scale catfish farm commercially. The specific objectives were: i) to assess the extent of problems faced by the farmers in catfish culture ii) to explore the contribution among each of the selected characteristics of farmers with their problems faced. iii) to determine the severity among the problems faced by the farmers in catfish culture.

METHODOLOGY

The study was conducted at three Unions of Trishal Upazila under Mymensingh District. One farmer (who mainly operated the catfish culture) from each of the families was considered as the respondent. Representative sample from the population were taken for collection of data following random sampling technique. Thus, 120 catfish farmers constituted the sample of the study for conducting interviews.

Farmers were asked to furnish information about their age, education, experience in catfish culture, dependency ratio, area under fish culture, annual family income, annual income from catfish culture, organizational participation, cosmopoliteness, training exposure, and media contact for fish farming information. To measure the problems faced by

242

Res. Agric. Livest. Fish.   **Vol. 8, No. 2, August 2021: 241-248.**

the catfish farmers' twenty (20) items were incorporated in the interview schedule. Four (4) points rating scale viz. not at all, low, medium and high were employed against each of the twenty (20) items and a score of 0, 1, 2, and 3 were assigned against the items respectively (Alam et al., 2018). The problems faced by the catfish farmers were determined by adding the scores obtained by the farmers against twenty (20) problems/items. Problem Faced Index (PFI) was also calculated to make rank of the identified problems. The formulae for calculating PFI is given below-

$$PFI = PH \times 3 + PM \times 2 + PL \times 1 + PNA \times 0$$

Where,
　　PH = High extent of problems
　　PM = Medium extent of problems
　　PL = Low extent of problems
　　PNA = Not at All of problems

The primary data were collected through face-to-face interviews. Collected data were edited and compiled in order to make suitable for analysis. Statistical treatments such as percent, mean, standard deviation, range and frequency was done. The Multivariate regression coefficients was computed to explore the contribution of the selected characteristics of the respondents to their problems faced in catfish culture using SPSS (Statistical Package for Social Science) software package (version 22).

RESULT AND DISCUSSION

Socio-economic profile of the respondent farmers

Large portion (53.33%) of the farmers were middle aged group while 30.00 % and 16.67 % farmers fell in the young and old aged category respectively. Majority of the farmers (35.83 %) can sign only followed by secondary level of education (22.50%). A few of (19.67%) the farmers had above secondary level and 14.67 percent farmers had primary education with 7.50 percent of illiterate. However, the average literacy of the respondents was above primary level of education. Large number of farmers (62.50%) was medium experienced in catfish culture with an average of 10.23. About 77.50 % farmers maintained medium dependency ratio compare to low dependency ratio (13.33%) and had high dependency ratio (9.67%). The area under fish culture score ranged from 0.05 to 5.26 hectares with the average being 0.47 hectares. Majority of the respondents (49.17 %) were marginal farmers and small farmers (39.17 %). Farmers' annual family income ranged from 30 to 1200 thousand with an average of 265.42 thousand. Among the farmers, 81.67% were in low-income group followed by medium (13.33%) income and high (10.83%) income group. Annual income from catfish culture of the farmers ranged from 50 to 1400 thousand with an average of 372.50 thousand. Among the respondents 74.17 percent of the catfish farmers were in low income group followed by medium income (13.33%) and high (12.50%) income group. Organizational participation of the farmers ranged from 0 to 10 with an average of 2.18. Among the farmers 79.17% of the catfish farmers had low organizational participation while 12.50 percent had medium, 5 percent catfish farmers had high organizational participation and only 3.33 percent of the catfish farmers had no organizational participation. Training exposure of the catfish farmers ranged from 0-8 with an average of 2.60 days. Majority of the catfish farmers (35%) had no training. Media contact of the fish farming information ranged from 0 to 12 with an average of 4.45. About half of the respondents (50%) had medium media contact followed by low medium contact (26.67%) and high media contact (23.33%) (Table 1).

Table 1. Distribution of the respondents on the basis of selected characteristics

Characteristics	Scoring method	Categories	Percent	Range	Mean
Age	Years	Young aged (up to35)	30.00	25-75	40.75
		Middle aged (36-50)	53.33		
		Old aged (above 50)	16.67		
Level of education	Year of schooling	Can't read and sign (0)	7.50	0-18	5.42
		Can sign only (0.5)	35.83		
		Primary education (1-5)	14.67		
		Secondary education (6-10)	22.50		
		Above secondary (>10)	19.67		
Experience in catfish culture	Score	Low (up to 4)	19.67	1-25	10.23
		Medium (5-16)	62.50		
		High (above 16)	18.33		
Dependency ratio	-	Low (up to 15)	13.33	0-250	61.17
		Medium (16-107)	77.50		
		High (above 107)	9.67		
Area under fish culture	Ha	Marginal area (up to 0.20 ha)	49.17	0.05-5.26	0.47
		Small land (0.21-1 ha)	39.17		
		Medium land (1.01-3 ha)	10.00		
		Large land (above 3 ha)	1.66		
Annual family income	('000' Tk)	Low (up to 400)	81.67	30-1200	265.42
		Medium (401-800)	13.33		
		High (above 800)	10.83		
Annual income from catfish culture	('000' Tk)	Low (up to 466)	74.17	50-1400	372.50
		Medium (467-933)	13.33		
		High (above 933)	12.50		
Organizational participation	Score	No participation (0)	3.33	0-10	2.18
		Low participation (1-3)	79.17		
		Medium participation (4-6)	12.50		
		High participation (above 6)	5.00		
Cosmopoliteness	Score	Low (up to 7)	30.83	4-23	11.29
		Medium (8-15)	52.50		
		High (above 15)	16.67		
Training exposure	No. of days	No training (0)	35.00	0-8	2.60
		Low training (up to 1-3)	31.67		
		Medium training (4-6)	21.67		
		High training (above 6)	11.67		
Media contact for fish farming information	Score	Low (up to 2)	26.67	0-12	4.45
		Medium (3-6)	50.00		
		High (above 6)	23.33		

244

Res. Agric. Livest. Fish.   **Vol. 8, No. 2, August 2021: 241-248.**

Problems Faced by the Farmers in Catfish Culture

Problems faced in catfish culture of farmers were measured through 20 items scale. The problems score ranged from 28 to 53 against the possible range of 0-60. The average was 42.75 and standard deviation was 5.82 respectively. On the basis of mean± sd of problems faced score, the respondents were classified into three categories namely, low, medium and high problems faced (Islam et al., 2019). The distribution of the respondents according to problems faced by the catfish farmers under the study is given in Table 2.

Table 2. Distribution of the farmers according to problems faced in catfish culture

Categories (score)	Farmers		Mean	Standard deviation (SD)
	Number	Percent (%)		
Low (up to 37)	27	22.50		
Medium (>38-47)	72	60.00	42.75	5.82
High (above 47)	21	17.50		
Total	120	100		

Table 2 shows that the majority (60.00%) of the farmers faced medium problem while 22.50% percent of the farmers faced low problem. Comparatively few farmers (17.50%) faced high problem in catfish culture. Among the respondent most of the respondent catfish farmers confront their problem using their long experience and knowledge gathered from day-to-day practices in catfish culture.

Comparative severity among the problems faced by the farmers in catfish culture

The observed Problem Faced Index of the problems ranged from 124 to 360 against the possible range of 0-360. Problem Faced Index (PFI) of the selected problems is shown in Table 3. On the basis of PFI value, it was observed that "high price of feed" ranked first and disability of producing required fish eggs" were the least severe problems faced by the farmers in catfish culture. The second and third most severe problem was unavailability of quality feed and high price of vaccines and medicine (Table 3).

The materials required to prepare feed is relatively expensive which is one of the important reasons behind the high price of feed. Moreover, transportation cost is also involved with this price. The authority should take steps to reduce price of feed for the betterment of the catfish cultivars. In one hand, there is a high price of feed on the other hand there have a scarcity of quality feed. For this reason, the farmers often use feed which is locally made and question about hygienic. The price for vaccines and medicine is also another problem to them. This has direct effect on their profitability of catfish farming.

245

Res. Agric. Livest. Fish.   **Vol. 8, No. 2, August 2021: 241-248.**

Table 3. Problem Faced Index (PFI) with Rank Order

Statement on problems	Extent of problems				PFI	Rank order
	High	Medium	Low	No		
High price of feed	105	10	5	0	340	1
Unavailability of quality feed	101	10	5	4	328	2
High price of vaccine and medicine	97	16	3	4	326	3
Low production and lack of local market	97	15	4	4	325	4
Low market price in respect of production cost	84	21	10	5	304	5
High price of fish fry	76	24	12	8	288	6
Lack of quality fish fry	69	27	14	10	275	7
Lack of growth regulatory knowledge	69	26	15	10	274	8
Unavailability of fish fry in time	63	31	10	16	261	9
Lack of knowledge of feed production	61	27	20	12	257	10
Lack of available number of hatcheries	53	40	13	14	252	11
Lack of feed storage knowledge	49	39	19	13	244	12
Unavailability of vaccine	49	35	21	15	238	13
Unavailability of medicine	43	34	31	12	228	14
High mortality rate	42	32	35	11	225	15
Lack of fish health knowledge	40	29	37	14	215	16
Transportation is risky	37	30	41	12	212	17
High production cost	38	35	27	20	211	18
Low body weight	33	25	54	8	203	19
Disability of producing required fish eggs	25	20	9	66	124	20

246

Res. Agric. Livest. Fish.   **Vol. 8, No. 2, August 2021: 241-248.**

The Contribution of the selected characteristics of the respondents to their problems faced in catfish culture

Contribution of eleven selected characteristics (age, level of education, experience in catfish culture, dependency ratio, area under fish culture, annual family income, annual income from catfish culture, organizational participation, cosmopoliteness, training exposure, media contact for fish farming information) of the farmers with their problems faced in catfish culture have been shown in table 4.

Table 4. Linear regression coefficients of the contributing variables related to problems faced in catfish culture

Dependent variable	Independent Variable	β	P	R^2	Adj. R^2	F
Problems faced in Catfish Culture	Age	-0.027	0.801			
	Level of education	-0.199	0.040*			
	Experience in catfish culture	0.165	0.123			
	Dependency ratio	0.076	0.296			
	Area under fish culture	0.087	0.230			
	Annual family income	0.060	0.409	0.584	0.542	13.797
	Annual income from catfish culture	0.059	0.223			
	Organizational participation	-0.218	0.042*			
	Cosmopoliteness	0.090	0.357			
	Training exposure	-0.236	0.012*			
	Media contact for fish farming information	-0.370	0.002**			

**= Significant at $p<0.01$; *=Significant at $p<0.05$

Table 4 shows that media contact for fish farming information, training exposure, level of education and organizational participation of the respondents had significant negative contribution with their problems faced in catfish culture. Of these, media contact for fish farming information was the most important contributing factor (significant at the 1% level of significant) and training exposure, level of education and organizational participation of the respondents were less important contributing factors (significant at 5% level of significant). Coefficients of other selected variables don't have any contribution on their problem faced in catfish culture. The value of $R^2 = 0.584$ means that independent variables account for 58% of the variation with their faced in catfish culture. The F ratio is 13.797 which is highly significant ($p<0$).

Extension media contact was found the most important factor influence to reduce catfish farmers' problem. The b-value of extension contact was (-0.370). So, it can be stated that as extension contact increased by one unit, farmers' problems faced in catfish culture decreased by -0.370 units. Based on the above finding, it can be said that farmers had more extension contact decreased farmers' problems faced in catfish culture. The finding is similar with the study of Kabir and Rainis (2015) where they mentioned that extension media contact help farmers to use more sustainable agricultural practices.

Training exposure had significant and negative effect on reducing farmers' problem in cat fish culture. The sign of the co-efficient indicates that higher the training lower the problem face by the farmers in cat fish culture. Kabir and Rainis (2017) mentioned that training program is important to adopt environment friendly agricultural practices. Training helps farmers to gather more knowledge on catfish culture which ultimately helps farmers to reduce their problems faced in catfish culture.

Based on the above finding, it can be said that farmers' education lead to decrease the farmers' problems faced in catfish culture. Education plays an important role to reduce problems faced in catfish culture in many cases. Education enhances knowledge on many aspects such as training, participation, extension contact and so on. The findings is consistent with the result found by Alam et al., (2018).

247

The b-value of organizational participation is (-0.218). So, it can be stated that as organizational participation increased by one unit, farmers' problem decreased by -0.218 units. Based on the above finding, it can be said that farmers' had more organizational participation decreased farmers' problems faced in catfish culture. So, Organizational participation has high significantly contributed to the farmers' problem decreased. Organizational participation increases farmer's knowledge about various aspects which helps farmers make enough reduce their problem faced in catfish culture.

CONCLUSION

An overwhelming majority (77.50%) of the farmers faced medium to high problem in catfish culture, therefore, it is necessary to take steps by concerned authority to reduce the problems so that they can make their catfish culture profitable by increasing yield with less production cost. Media contact for fish farming information, training exposure, level of education and organizational participation of the respondents had significant negative contribution with their problems faced in catfish culture. This means higher these characteristics lower the problem face in catfish culture by the farmers. Therefore, these characteristics should be given priority to formulate polices so that the farmers can reduce their faced problem. Actions may be mass education, training and motivational program, increase extension contact through individual, group and mass media to increase farmers' knowledge and awareness about catfish culture which might have a positive effect to reduce the farmers problem in catfish culture.

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248

Res. Agric. Livest. Fish.   **Vol. 8, No. 2, August 2021: 241-248.**