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PRESENT STATUS OF AQUACULTURE PRACTICES IN SOME SELECTED AREAS OF DINAJPUR DISTRICT

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A B S T R A C T

An investigation was conducted to have a clear idea on current aquaculture practices of 67 fish farmers in Birganj upazila, Dinajpur district for a period of six months from October 2016- March 2017. Fish farmers were selected randomly from three villages of Moricha Union of Birganj upazila through questionnaire interview, FGD and cross check interview and secondary information were used to assess the performances in aquaculture activities. Most of the farmers (52.24%) had pond having the size range from 5 to10 decimal with the mean depth 4.44 ft. It was found that 79% of ponds contained water throughout the year and 21% pond had water for a period of 6 to 8 months. The major culture species was Indian major carps along with Small Indigenous Species. About 76% farmer used feed in culture pond and none of the farmers were found to take any measures for maintaining proper water quality. The total fish production was found as 1204 kg where Tilapia ranked highest with 22% in the study area. About 92.5 % farmers use the fish only for family consumption whereas the remaining farmers (7.5%) used for both family consumption and sales. The major problems identified during the culture period were high price of quality fish seeds and feeds, less protein in feed, poor technical knowledge etc. It is therefore, necessary to provide necessary training to the farmers, institutional and policy supports and proper credit facilities for sustainable fish production as well as sustainable livelihood of the poor farmers.

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INTRODUCTION

Fish is the second most important agricultural crop in Bangladesh and its production contributes to the livelihoods and employment of millions of people (Ghose, 2014). Fish play a crucial role in the Bangladeshi diet, providing more than 60% of animal source food, representing a crucial source of micro-nutrients, and possessing an extremely strong cultural attachment. Within the overall agro-based economy of the country, fish production is crucial for livelihoods, income, animal protein, employment opportunities, nutritional security and food supply (Sheheli, 2013). Aquaculture contributes more than 50% of the total inland fish production (capture and culture) indicating the importance of aquaculture in Bangladesh for food security (DoF, 2008). This sector contributes 3.65% to the national GDP and almost one-fourth (23.81%) to the agricultural GDP (DoF, 2016). Bangladesh is blessed with vast water area in the form of ponds, canals, ditches, flood plains, haors (natural depression), baors (oxbow lake), rivers, estuaries etc. covering an area of 47.66 lac hactre in which only ponds and ditches occupy an area of 3.71 lac hactre. Bangladesh is one of the world's leading fish producing countries with a total production of 42.77 lakh MT in FY 2017-18, where aquaculture production contributes 56.24 percent of the total fish production. Average growth performance of this sector is 5.26 percent for last 10 years whereas inland open water (capture) contributes 28.1 5percent (121.6 lakh MT) and inland closed water (culture) contributes 56.24 percent (24.04 lakh MT) to total production (DoF, 2018).

Aquaculture practice has become a promising and gainful methodology to attain self-sufficiency in food sector and also to alleviate poverty in developing country like Bangladesh (Ahmed, 2003). About 10% of the population directly and indirectly depends on fisheries for their livelihood (DoF, 2011). Many households in Bangladesh have a small pond located next to their dwelling area that is used to produce fish for home consumption as well as to be sold in markets (Bloomer, 2012). Therefore, the greater emphasis should be given to meet the animal protein deficiency among the people as well as to boost up fish production in this country through proper management of open water fishery and aquaculture. The northern district-the greater Dinajpur is situated at higher level from the Bay of Bengal and also the dry part of Bangladesh. Most of the ponds are leaky, hence the water retention capacity of the pond of this regions are very less. The farmers of the greater Dinajpur district are facing problems of scarcity of water throughout the year except the monsoon season. That's why the ponds are seasonal and backyard pond rather than commercial pond of other districts such as Mymensingh, Comilla and Jessore. In Birganj Upazila, fish are partially culture after cropping but it has become one of the important sources of livelihood for the people of that area. In addition, it has created livelihood movement followed by socio-economic vulnerability of the poor. For the improvement of cultural system and future planning, the information regarding present aquaculture practices at the grass root level is absolutely necessary. Based on the above context, this research work is commenced on current problem and constrains of aqua farming as well as socioeconomic condition of fish farmers in three villages of Birgang Upazila.

MATERIALS AND METHODS

The survey was conducted for a period of October 2016 to March 2017 in the selected villages of Birganj upazila of Dinajpur district. A total of 67 small scale fish farmers were randomly selected from the three villages of Moricha Union of Birgan jupazila. A questionnaire was prepared and pre-tested through a field visit. Then the questionnaire was finalized and then primary data were collected from 67 small scale fish farmers through questionnaire interviews and FGD. After collecting through questionnaire interviews and FGD, crosscheck interviews were conducted with key informants such as Upazila Fisheries Officer, Assistant Fisheries Officer, Senior Scientific Officer (SSO), and other relevant NGOs workers of Birganj Upazila, Dinajpur. The collected data were entered into Microsoft Excel spreadsheet and analyses were carried out using SPSS, Version-22.

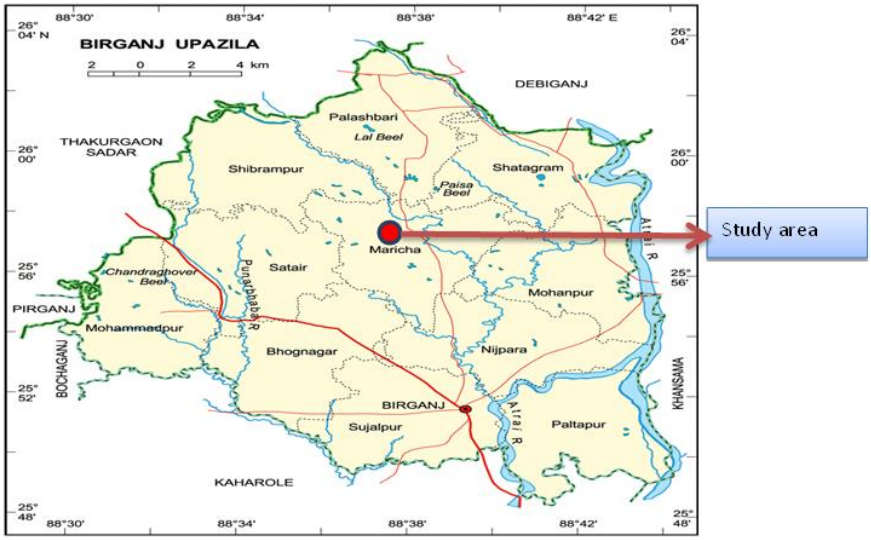

Figure 1. Map showing the study areas of Birganj Upazila, Dinajpur

RESULTS

Family size

The minimum and maximum family size of the fish farmers in the study area are depicted in Figure 2.

Age of farmers

The age of the respondent farmers varied from 22 to 68 years with a mean of 36.58 years. The respondent farmers were classified into five categories on the basis of their age are shown in Table 1.

Experiences of farmers in fish culture

The experiences of selected fish farmers in fish culture activities were presented in Table 2.

Table 1. Age, frequency and percentages of the selected farmers in each category

Age of farmers (years)	Frequency (n=67)	Percent
20-30	11	16.42
30-40	35	52.24
40-50	12	17.91
50-60	7	10.45
60-70	2	2.99

Table 2. Experiences of selected fish farmers in fish culture

Experience in fish farming	Number of farmers(n=67)	Percentage (%)
Non Experienced	24	36
2-5 years	16	24
6-10 years	13	19
11-15 Years	11	16
15+ years	3	5

Educational qualification

The educational status of the fish farmers was also surveyed. The distribution of the respondents on the basis of their educational qualification has been presented in Figure 3.

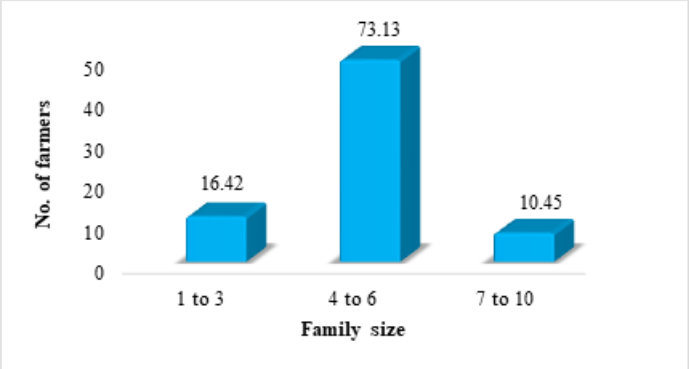

Figure 2. Family Size of the selected fish farmers

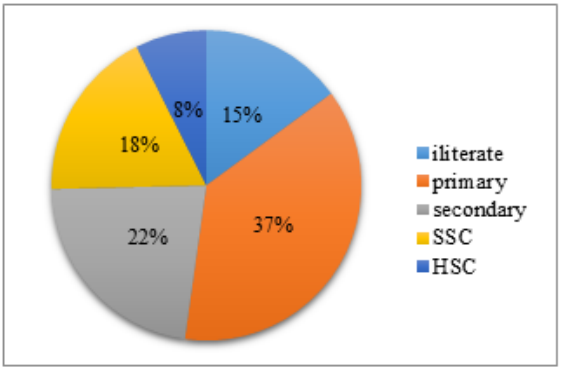

Figure 3. Level of educational qualification of the selected fish farmers

Table 3. Size of fish ponds in the study area

Size of ponds (decimal)	Number of farmer (n=67)	Percentage (%)
<5	21	31.34
5 to 10	35	52.24
11 to 15	10	14.93
>15	1	1.49

Pond Size

The size of the ponds is an important factor manipulating the use of inputs in the fish pond. The area of the pond depends on the farmer demand. In the present study, ponds were categorized on the basis of total volume that is presented in Table 3.

Depth of the pond

The majority of the ponds in the study area were 5 ft. while the lowest pond depth was 1.5 ft. are shown in Figure 4.

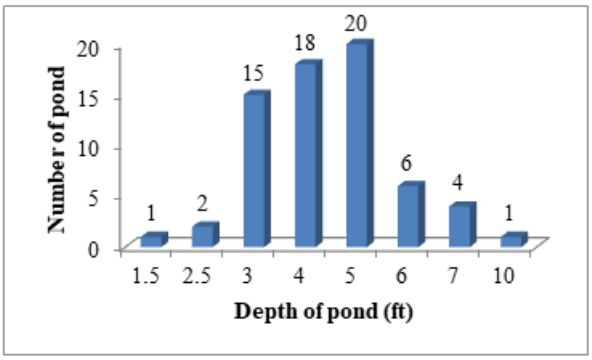

Figure 4. Distribution of ponds based on the depth of water

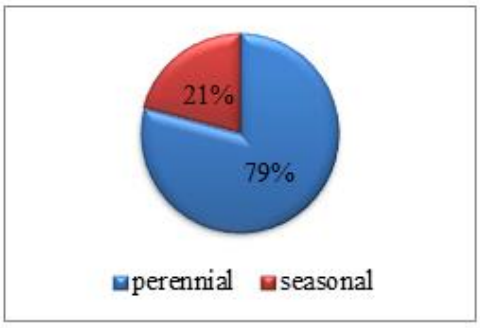

Figure 5. Availability of water in the selected ponds

Availability of water

According to the availability of water ponds were categorized into two groups that are shown in Figure 5.

Species preferences by the selected farmers

In the study area, a great diversity of the species was found to culture in the ponds. Mostly in the homestead aquaculture Indian Major Carps (IMCs) is dominated, but in this study it was found about 13 species were stocked. The species included Indian Major Carps and Small Indigenous Species of Fish are presented in Table 4.

Water quality management

Water quality testing is an important part of environmental monitoring. In the study area, majority of fish farmer did not manage pond water.

Use of Feed

In the study area, it was recorded that most of the fish farmers used fish feed such as wheat bran, rice bran, helencha, malancha, mustard oilcake and molasses in their fish ponds. The total percentages of fish farmers are shown in Table 5.

Table 4. List of fish species are found to be cultured by the selected farmers

Local name	English name	Scientific name	Number of fish stocked
Mola	Mola Carplet	*Amblypharyngodon microlepis*	38
Tilapia	Indian Tilapia	*Oreochromismossambicus*	63
Shing	Stinging catfish	*Heteropneustes fossilis*	34
Magur	Walking Catfish	*Clarias batrachus*	35
Koi	Climbing perch	*Anabas testudineus*	33
Sarpunti	Olive barb	*Puntius sarana*	35
Common Carp	Indian Major Carp	*Cyprinus carpio*	41
Bighead Carp	Indian Major Carp	*Hypophthamichthys nobilis*	13
Grass carp	Indian Major Carp	*Ctenopharyngodon idella*	6
Catla	Indian Major Carp	*Catla catla*	12
Bata	Bata	*Labeo bata*	9
Silver carp	Indian Major Carp	*Hypophthalmichthys molitrix*	43
Rui	Indian Major Carp	*Labeo rohita*	44

Table 5. Use of Feed by the selected fish farmers

Feed use	Frequency (n=67)	percentage
Yes	51	76
No	16	24

Purpose of fish production

In the surveyed area, most of the fish farmer's used the produced fish for consumption purposes to full-fill their nutritional demands. 92.5 % farmers use the fish only for consumption purposes, the remaining farmers (7.5%) used for both consumption and sales Table 6.

Table 6. Use of produced fish by the selected fish farmers of the study area

Purpose of fish production	Frequency(n=67)	Percent
Consume	62	92.5
Sale + Consume	5	7.5

Harvesting of Fish

In the study area, most of fish farmers harvested their produced fish from their pond by using cast net, borsi, jhakijal etc. All the farmers in the study area used to harvest fish partially from their cultured ponds. The harvesting was associated mostly with the need and availability of guest members in their home.

Production of fish

In the study area, the total fish production was 1204 kg from the selected pond during the data collection. Species wise percent fish productions are shown in Figure 6.

Problems of fish farming

From the survey it was found that the fish farmers in the study area are facing a number of technical and social problems in fish farming. The main problems are lack of capital, high price of quality fish seeds and feeds, less protein in feed, poor technical knowledge, lack of social awareness about the benefits from aquaculture etc. However, the farmers reported some other problems, which are water quality deterioration with massive micro algal blooms, presence of aquatic vegetation, lower fish growth comparing to previous year. Some farmers also reported that, the fish stock destroyed by the flood and poaching.

DISCUSSION

In the present study area, the average family size was 5. The total number of family members ranged from 2 to maximum 8. The highest 73.13% farmer has family size between 4-6 members. Azad et al., (2018) found that the average family size was 6.24 (members) in syedpur upazila of Nilphamari district which is very close to the findings of present study. Olaoye (2013) reported that 68.5% population had household size between 4 to 7 members, which more or less same to the present study. Information regarding the age structure of farm owners is important in estimating potential productive human resources (Rahman et. al., 2018). The age of the respondents varied from 22 to 68 years with a mean of 36.58 years in the present study. The field survey shows that 52.24 percent of the respondents belong to the age group of 30-40. It was observed that 80 percent of the respondents' age in the study area was above 25 years. Azad et al., (2018) observed that the highest numbers of the fish farmers age were 26 to 50 (68%) and lowest age (10%) were up to 25 which is similar to the outcomes of present investigation. Rahman et al., (2018) conducted a study on Nilphamari district and observed that majority of the farmers (71%) were between 41 to 60 years of age groups which is higher than the present study. Paul et al., (2013) revealed that most of the fishermen were belonging to the age groups of 35-40 years old (30%) in Birulia which also less than to the present study. Fish farming experience is play significant role for higher level of fish production. If farmer wants to get higher fish production, fish farming experience is essential. The average fish farming experience was found 5.78 years. Pandey, (2013) reported that 69.16% farmer had highest fish farming experience 4-10 years. The lowest 12% percent fish farmers have fish farming experience above 10 years, which was more than present study. Olaoye, (2013) survey that 40.5% farmer highest fish farming experience belongs to 11-15 years, on the other hand 8.1% percent fish farmers has more than 10year fish farming experience, which was more or less similar to the present study. Nwosu and Onyeneke, (2013) revealed that 18% of the farmers had 8-14 years of experience in fish farming, while only 12% of the fish farmers had over 15 years of experience. Educational qualification of farmers can play a significant role for the successful pond management strategies. From the present study it was found that majority (37%) of the fish farmers had complete primary education level, 22% of the fish farmers had secondary education level, 18% had SSC and very lowest 8% had HSC education while about 15% of the farmers were illiterate. Reza et al., (2018) found 20% fish farmers had primary education level (up to 5 classes) while 44% fishermen had no education in their study which more or less similar to the findings of the preset study. Olaoye, (2013) found that 3.2% were illiterate, 19.8% had primary level, 27.8% had secondary level and only 39.6% had tertiary level of education which is not similar to the results of present study. According to the present study, 31.34 percent ponds was less than 5 decimal; 52.24 percent ponds are 5 -10 decimal; 14.49 percent ponds are 11 to15 decimal and 1.49 percent pond above 15 decimals. Azad et al., (2018) observed that 84% of the sample farms were of small farm, 4% were medium farm and only 10% large farm which are more or less similar to the findings of the present study. Pandey, (2013) reported that the majority (46.66%) of fish farmers had medium size of ponds (1-2 ha), followed by small (43.34%) and large (10%). In the study area, the mean depth of the pond 4.44 fit. The highest 29.4% pond depth in the study area was 5 fit. Lowest 1.5% pond depth in the survey area 10 fit. Khan (1986) stated that the average depth of pond in the study area was found 3.20 meter. According to DoF, (2010) the average depth of ponds in Bangladesh is between 2 to 5 meters that can match the output of the present investigation. Water is an indispensable input in fish rearing. Fish need water to grow and that is one of the reasons why adequate and constant source of water is a must for every farmer that wants to achieve the best in terms of raising fish either for fingerling or table size. In the survey area most the farmers have perennial pond (79% pond) and rest seasonal (21% pond). The mean of the availability of water 1.2

The present study showed that 76% farmer used feed in their culture pond and remaining 24% farmer were not used feed in their culture ponds. Fish farmers used wheat bran, rice bran, helencha, malancha, mustard oilcake and molasses in their fish ponds. Islam et al., (2017) found that around 90% fish farmers provide feed to their cultured species and remaining 10% farmers depended on only natural food produced in the pond which more or less similar to the findings of the present study. Rahman et al., (2018) found that 100% farmers provided feeds with the cultured fishes which are slightly higher to findings of the present study. Saha et al., (1995) also observed that the farmers used rice bran and oil cake in rice-fish farming. Akter, (2001) observed that the total rate of feed used was 6,751 kg/ha which were separately given as rice polish (1,598 kg), wheat bran (870 kg), oilcake (2,540 kg), vitamin (41 kg) and fish meal (1,702 kg). In the study area

most of the farmer was used domestic feed and sometime used commercial feed which not adequate information to the farmers. All the farmers in the study area used to harvest fish partially from their cultured ponds. The harvesting was associated mostly with the need and availability of guest members in their home. Parvin, (2011) was found that about 43.33% farmers done partial harvest to sort out fish by size or weight and 56.7% farmers not followed partial harvest of fish. Ahmed, (2003) stated the best harvesting season was April to July and found that 65% of farmers harvested their fish completely while only 35% of farmers were harvested their product partially. In the study area, the total fish production was 1204 kg from the selected pond during the data collection. Among the total production, Tilapia ranked highest with 22% produced fish and followed by Silver carp (18%), Rohu (13%), Common carp and Thai sarpunti (11%), Koi (6%), Shing (4%), Bighead carp, Magur and Mola (3%), and the least was catla, bata, grass carp (2%). Azad et al., (2018) found that the average annual yield was 2593.5 kg/hac/yr during their study in Nilphamari district which was almost doubled than the present study. Akter, (2001) conducted a survey in Trishal upazila under Mymensingh district and found that average production of was 20,112 kg/ha which is very higher than the finding of the present study. In a separate study observed by Shohag, (1996) who reported that the average annual fish production was 5,229.44 kg which is very higher than the finding of the present study.

CONCLUSION

Fish farming plays a major role in uplifting the livelihood and socioeconomic status of fish farmer in Birganj upazila of Dinajpur district. The present study explored some problems reported by the farmers which were lack of capital, high price of quality fish seeds and feeds, adulterated feed, less protein in feed, poor technical knowledge, lack of social awareness on the benefits from aquaculture etc. If the farmers are given appropriate training, financial credit on easy terms and conditions, greater benefit will be reflected. Thus it can be concluded that fish culture is a lucrative business that can help the farmers to improve their livelihood condition as well as economic situation.

CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

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