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PRESENT STATUS OF TRADITIONAL AQUACULTURE AND SOCIO-ECONOMIC CONDITION OF FISH FARMERS AT PABA UPAZILA IN RAJSHAHI DISTRICT, BANGLADESH

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ABSTRACT

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Data were collected from 50 fish farmers through questionnaire interview and Focus Group Discussion (FDG) in Paba upazila, Rajshahi district of Bangladesh during the period of October, 2015 to May, 2016 to evaluate the present status of traditional aquaculture and socio-economic condition of fish farmers. In the study area, average pond size was 0.83 ha (2-7 feet depth) and 80% of the ponds were characterized with loamy soil. Ground water was the main source for 70% of the ponds where about 90% of the fish farmers were engaged in polyculture of carp species. Majority of fish farmers were in the age group of 41-50 years with fish farming experience of 16 years (44%). Activities of DoF were minimum regarding fish farming of the fish farmers. In the present study, 80% of the respondents were related to fish culture as their principal occupation and majority of the fish farmers (50%) have the annual income of BDT 51,000 to 100,000. 30% of the respondents were educated up to secondary level of education. Health and sanitary status are in good condition than before. 94% of fish farmers have improved their socio-economic condition through fish farming. Therefore, proper training on fish farming and advanced technical knowledge are necessary to improve high pond productivity.

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INTRODUCTION

Fisheries and aquaculture sector have emerged as the second most important contributors in export earnings of Bangladesh. Fisheries have a distinctive feature for its role in providing an essential source of animal protein and indispensable elements for the population. More than 17.5 million people are engaged with this sector on full time and part time basis (FRSS, 2015). In the year 2013-14, Bangladesh has produced 36,84,245 MT of fishes including 30,84,399 MT from inland fisheries and 5,99, 846 MT from marine fisheries. Inland fisheries include capture fisheries and culture fisheries (aquaculture). These two are the main contributors of total fish production from where 10,23,991 and 20, 60,408 MT of fishes were produced. The total fish production accounts for 3.69% to the GDP and its contribution in agriculture sector is 23.12%. In Bangladesh a total of 13.16 lakhs people are involved in fishing activities including 8.00 lakhs inland fishermen and 5.16 lakhs marine fishermen (DoF, 2016). However, a recent statistic has shown that number of total fish farmer (estimated) in Bangladesh is 138.64 lakhs. Also, 8.33 Million people are associated with fish and shrimp/prawn farming (DoF, 2016). In Bangladesh, no other sector depicted progress prospective more visibly than fisheries. Fish has traditionally been a staple of the Bangladesh diet. It plays a vital nutritional role especially in the diet to low income rural households, accounting for 60% of animal protein intake. In Bangladesh, per capita annual fish needed is 21.90 kg (DoF, 2016).

Though Bangladesh is provided with such potential resources but per capita consumption rate is still lower than that of required value. Considering these points, study on a particular water body, intervention of aquaculture, system of technological intervention, its production and its impact on natural fish species is very essential. Thus, the present study was conducted for describing the present status of aquaculture and fish farmers' socio-economic condition of Paba upazila, under Rajshahi district of Bangladesh.

MATERIALS AND METHODS

Study area and duration

The present study was carried out at Paba upazilla under the district of Rajshahi (Figure 1), Bangladesh from October 2015 to May, 2016. Paba upazilla was selected because pond fish culture is heavily concentrated in this area, various NGOs and DoF have been working with fish farmers to increase fish production, well communication facilities, relatively homogenous physiographic condition and finally suitability of the research work.

Methods of data collection

Data were collected from randomly selected 50 fish farmers by personal interview with a well-structured questionnaire. Participatory rural appraisal (PRA) tool such as Focus Group Discussion (FGD) was conducted to obtain more accurate data (Chambers, 1992) from the fish farmers to address particular issues such as existing fish farming technology, problems associated with it, constrains of fish production and their socio-economic condition. A total of 6 FGD sessions were conducted during data collection where each group size of FGD was composed of 6 to 12 people. FGD sessions were held in village shops, under the big trees and at the farmer's house. After collecting the data from the fishermen cross-check interviews were conducted with key personal such as Upazila Fisheries Officer (UFO).

Data processing and analysis

All the collected data were tabulated, scrutinized carefully, analyzed and presented graphically by Microsoft Excel (version 2010).

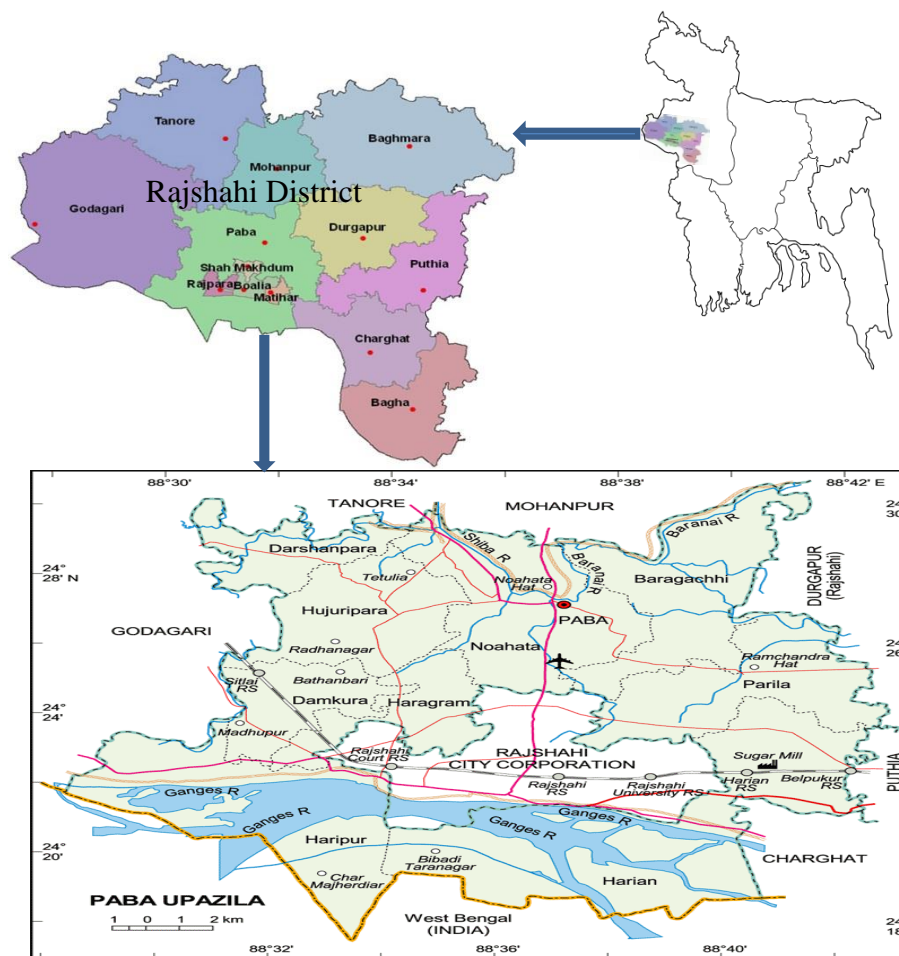


Figure 1. Map showing study area (Paba upazila in Rajshahi district).

RESULTS AND DISCUSSION

Present status of pond culture technologies

Pond size

In the present study, the average pond size was 0.83 ha whereas the smallest pond size was 1.5 ha and the largest one was 10 ha. Sarker and Ali (2016) found pond size in the range of 0.05 ha to 0.81 ha at Sreemangal upazila which is more or less similar to the findings of the present study. However, the average pond size recorded during the present study period was approximately four times larger than the average pond size in Dinajpur sadar (0.21 ha) and in Trishal, Mymensingh (0.22 ha) reported by Saha (2003) and Sheheli et al. (2013), respectively.

Ownership pattern of the ponds

In the study area, 100% of the farmers were found to have leased ponds with the lease value of approximately BDT 150000/ha/year. However, lease value of the land sometimes varied with the location, productivity and the size of the pond. Among the 50 fish farmers interviewed, majority (70%) were operated their pond in single ownership pattern and rest 25% were engaged in multiple ownership pattern. Similar observation was also made by Saha (2004) in Tangail sadar upazila where 52% ponds were found to operate under single ownership.

Depth and water sources of the ponds

In the study area, it was observed that the minimum water depths of 20% ponds were 2-5 ft and maximum water depths of 80% ponds were 5-7 ft. However, in Bangladesh the depth of ponds are varied from 2 to 5 meter (DoF, 2010) which corresponds well with the present study. Two main sources (rain water and ground water) were identified for water supplying in the culture ponds. It was found that majorities (70%) of the pond owner were depended on ground water and the rest (30%) were depended on rain water to fill up their ponds.

Soil types of the ponds

In the present study area, it was found that 80% of the ponds were characterized with loamy soil and 20% with clay soil. In loamy soil area, ponds were found to have high water holding capacity, less turbidity and high primary productivity that makes the ponds of this area more potential for land based aquaculture practice. As reported by Ali and Rahman (1986) sandy soil of the ponds in Rangpur district is a major problem for fish culture.

Culture types

About 90% farmers practiced carp polyculture in their farms where the main culture species were *Catla catla* (catla), *Labeo rohita* (Rui), *Cirrhinus cirrhosus* (Mrigel), *Hypophthalmichthys molitrix* (Silver carp), *Ctenopharyngodon idella* (Grass carp), *Cyprinus carpio var. communis* (Mirror carp), *Labeo calbasu* (Calbaus) and *Labco bata* (Bata). However, rest of the 10% fish farmers was found to practice tilapia monoculture in their culture ponds. Majority (90%) of the fish farmers were culture their fishes for 6 months and a minor amount (5%) farmers were found to extent their culture period for 1 year.

Feeding and feed management for fish farming

Supply of supplementary feeds, which can complement nutritional deficiency, is important to increase fish production. It varies according to intensity of cultivation. In the study area, it was observed that, all of the surveyed fish farmers used pellet feed. They mainly use floating feed. About 96% fish farmers used floating pellet feed and rest 4% used non-floating pellet feed (Table 1).

Disease occurrence in fish ponds

In the study area, 99% of fish farms experienced fish disease in their farmers and the main diseases of fishes were identified as gill rot, fin rot and tail rot. The surveyed farmers recently have found a new disease which they were called "Attack of suji poka" in their local terminology. Fish disease was also identified as trouble for fish farmers in Shahrasti, Chandpur as reported by Pravakar et al. (2013).

Problems of fish farming

From the present study it was found that the fish farmers in Paba upazila are facing a number of technical and social problems in fish farming. The major problems are high lease value, high price of quality feed, non-availability of quality fish seeds at proper time, marketing problem, poor technical knowledge and transportation. In addition, lack of scientific knowledge and suitable technology, lack of extension services on aquaculture training, occurrences of fish diseases, water scarcity during drought season, pond water irrigation for crop fields were found harmful for aquaculture production in the study area. Similar observation was also made by Zaman et al. (2006) in Mohanpur, Rajshahi.

Table 1. Types of pellet feed used the fish farmers at Paba upazila, Rajshahi district.

Types of feed	No. of fish farmers (n=50)	Percentage (%) of farmers used
Floating	48	96
Non-floating	2	4
Total	50	100

Table 2. Age structure of fish farmers at Paba upazila in Rajshahi district

Age groups (years)	No. of fish farmer (n=50)	Percentage (%)	Fishing experiences (years)	No. of fish farmer (n=50)	Percentage (%)
Less than 30	10	20	0-6	5	10
31-40	13	25	>6-12	15	30
41-50	22	45	>12-18	22	44
More than 50	5	10	>18-24	8	16
Total	50	100	Total	50	100

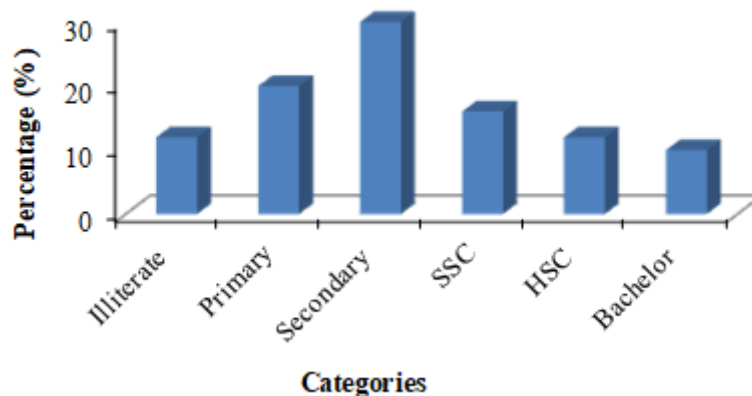
Socio economic condition

Age Structure and experience of fish farming

In the present study area, 20% of the fish farmers were found in the age group less than 30 years, 25% between 31-40 years, 45% between 41-50 years and 10% more than 50 years, respectively (Table 2). Most of fish farmers were in the age group of 41-50 years indicating that the fish farmers are more experienced in fish farming compared to the findings of Ali et al. (2009) where they showed that most of the fish farmers (50%) belonged to the age group 31-40 years in Mymensingh district. However, among the 50 sampled farmers, majority (44%) had the fish farming experience of 16 years. Whereas, 10%, 16% and 30% fish farmers had the experience of 6, 21 and 10 years, respectively (Table 2).

Educational status

The educational status of fish farmers revealed that most of the fish farmer attained secondary level of education (30%) and 12% were illiterate. However, 20% were found to pass primary level, 16% SSC level, 12% HSC level and 10% attained Bachelor level of education (Figure 2). The reported literacy rate during the present study was found higher than the national adult literacy level of 65% (BBS, 2002). However, education level was comparatively better than the fish farmers of *haor* fishermen reported by Mahbubur (2001) where he found the illiteracy rate as 68%. Zaman et al. (2006) also reported 23.3% farmers were illiterate in Mohanpur, Rajshahi.

**Figure 2.** Educational status of fish farmers at Paba upazila in Rajshahi district

Family size

The family sizes of the fish farmers were mainly divided into three categories according to the number of the family members. About 20% of the fish farmers had small family with 1-4 family members, 40% of the fish farmers had medium family with 5-6 members and about 40% of the fish farmers had large family with more than 7 members (Figure 3). Provakar et al. (2013) found that about 54% of farmers lived in joint families and 46% in nuclear families in Shahrasti upazila of Chandpur district. Ali et al. (2008) reported about 28% farmers lived with joint families and 72% lived with nuclear families in Bagmara upazila, Rajshahi which is more or less similar with the present study.

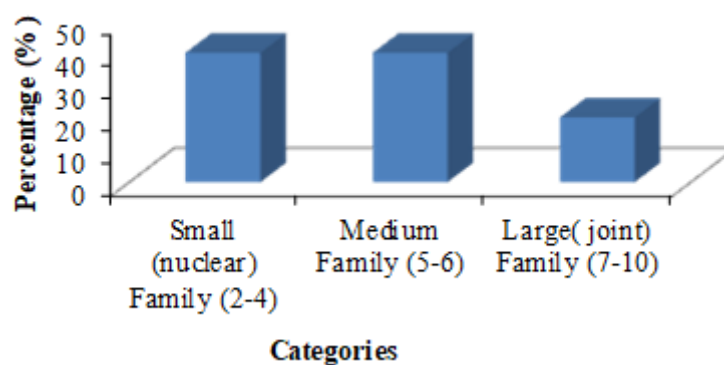


Figure 3. Family members of fish farmers at Paba upazila in Rajshahi district

Religious status

In the study area, 98% of the fish farmers were muslims and only 2% were Hindus (Table 3). Sarwer et al. (2016) reported 86% of the pond owners were Muslim and 14% were Hindus in Subarnachar, Noakhali area and Ali et al. (2008) reported 94% muslim and 6% Hindus fish farmer in some selected areas of Bagmara upazilla under Rajshahi district.

Table 3. Religious status of fish farmers at Paba upazila in Rajshahi district.

Religion	No. of fish farmers (n = 50)	% of total fish farmers
Muslims	49	98
Hindus	1	2
Total	50	100

Table 4. Occupation of fish farmers at Paba upazila in Rajshahi district.

Main Occupation	No. of fish farmers (n = 50)	% of total fish farmers
Fish Farming	40	80
Agriculture	5	10
Services	5	10
Total	50	100

Table 5. Drinking water facilities in the study area

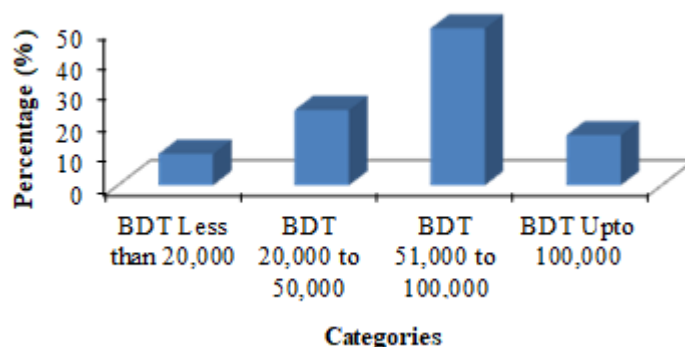
Drinking water facilities	No. of fish farmers (n = 50)	% of total fish farmers
Own tube well	30	60
Shared tube well	15	30
Collected from neighbors tube well	5	10
Total	50	100

Occupation

Fish culture was the men occupation for most of the fish farmers in the study area where 80% were involved in fish farming as a principal occupation. However, the studied fish farmers also involved in other activities and 10% fish farmers were found involved in agricultural activities and 10% were worked as day labour as their secondary occupations (Table 4). Sarker (2004) found that 17%, 52%, 3% and 28% farmers were related to agriculture, fish culture, business and others as secondary occupation in Habigonj district.

Income level of pond fish farmers

The selected fishermen were grouped into four categories based on the level of annual income and majorities (50%) were found to have an annual income of BDT 51,000 to 100,000 (Figure 4). In the studied area fish farming were found positive in improving income generation, food security and to meet basic needs of the fish farmers. It was observed that about 94% of fish farmers have improved their socio-economic condition through fish farming. Now, they have better food to eat, standard cloths to ware, improved housing surroundings and ability to contribute in their children's education.

**Figure 4.** Income levels of the fish farmers at Paba upazila in Rajshai district

Drinking water facilities

Among fifty respondents, 60% of the fish farmers used own tube well for drinking and 30% of the fish farmers used joint tube well and rest 10% of respondents collected drinking water from neighbors tube-well (Table 5). Kabir et al. (2012) also found that 100% fishermen used household tube-well water for drinking purposes, among them 40% had their own tubewell, 50% used shared tube-well and remaining 10% used neighbors tube-well. However, according to Sarwer et al. (2016) About 72% pond owners had own tube-well in Subarnachar, Noakhali district.

Sanitary facilities

In the stud area three types of toilet were found to be used by fishermen: (i) *kancha* (made of bamboo with leaf shelter and inadequate drainage disposal), (ii) semi *pucca* (made of brick with leaf or in tin shelter and inadequate drainage disposal) and (iii) *pucca* (made of brick with good drainage disposal). In the study area, maximum 63% toilets were *pucca*, 25% semi *pucca* and 12% were *kancha*. Therefore, the sanitary conditions of the fishermen were satisfactory. Similar findings was also reported by Ali et al. (2009) who found that 62.5% of the farmers had semi-*pucca*, 25% had *kancha* and 12.5% *pucca* sanitary systems in Mymensingh district.

Health facilities

The present study showed that 42% of pond operators were dependent on village doctors, while 20% and 38% received health service from upazila health complex and MBBS doctor, respectively. Rahman (2007) found that 44% of the farmers received health service from village doctors, 29% from upazila health complex and 27% from MBBS doctors. According to Sarwer et al. (2016) 79% of pond operators were dependent on village doctors, while 17% and 4% got health service from upazila health complex and MBBS doctor in Subarnachar, Noakhali.

CONCLUSION

In the present study, it is clearly indicated that fish farmers in Paba upazila are showing improvement in their life style through fish farming. Although management practice is not properly followed in all the sampling ponds, they somehow managed to cope with the present productivity status of their ponds. Therefore, proper initiatives made by the governing body can help them to increase their productivity. Apart from some adverse socio-economic condition and constraints of fish farming, farmers in this region contribute a remarkable part of inland fish production in Bangladesh.

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