

Present Status of Fish Farming and Livelihood of Fish Farmers in ShahrastiUpazila of Chandpur District, Bangladesh

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Abstract: The present study was conducted to assess the status of fish farming and livelihood of fish farmer in the ShahrastiUpazila, Bangladesh from February to September, 2010. Data were collected through the use of well-structured questionnaire from the selected area. The survey revealed that average pond size was 0.24 ha with 85% of the farmers having ponds of single ownership. Indian major carps and exotic carps were mainly cultured where 10% ponds were seasonal and 90% perennial. Most of the fish farmers were belonged to the age groups of 41 to 60 years (44%), represented by 75% Muslims. About 10% had no education while 16%, 48%, 16% and 10% had primary, secondary, higher secondary and bachelor level of education respectively. About 20% of fish farmers were involved in fish farming as their primary occupation while 45%, 25% and 10% were involved in business, agriculture and service respectively. The provision of training facilities was insufficient as only 34% of the fish farmers received formal training on fish farming. About 94% of the fish farmers reported their socioeconomic conditions were improved through fish farming. Fish disease, non availability of fish fry, pouching, insufficient water in dry season, poor technical knowledge, lack of quality feed and lack of money for fish farming was identified as the major constraints.

Key words: Fish Farmer • Livelihood Status • Fish Farming • Bangladesh

INTRODUCTION

Freshwater fish farming plays an important role in the livelihoods of rural people in Bangladesh [1]. Apart from direct self-employment opportunities from fish farming, pond fish farming offers diverse livelihood opportunities for operators and employees of hatcheries and seed nurseries and for seed traders and other intermediaries. Pond fish farming has been proved to be a profitable business than rice cultivation. So many farmers in rural areas are converting their rice field into aquaculture pond. Many pond fish farmers in rural areas have taken fish farming activities as their secondary occupation and most of the people involved in fish farming improved their socio-economic condition through pond fish farming activities [2].

Chandpur district is located in the East-Central part of Bangladesh. Presence of large number of ponds, canals, floodplains and also the vicinity of the area to Meghna River estuary ensures the significance of the district in total fish culture and capture of the country. ShahrastiUpazila can be considered as one of the ideal fish production areas in the district. Therefore, if fishers adopt improved fish culture technology and community based fisheries management then fish production will be increased in this Upazila through good aquaculture practices. In Bangladesh, the major constraints to increase fish production are lack of technical knowledge, non-availability of credit and multiownership of pond [3].

Fisher folk are considered as one of the most backward sections in our society. Information on socio-economic framework of the fish farmers forms a

good base for planning and development of the economically backward sector [4]. Lack of adequate and authentic information on socio-economic condition of the target population is one of the serious impediments in the successful implementation of developmental programme [5]. 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 [2]. A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain to enhance its capabilities and assets both now and in the future [6]. The social content is especially important particularly access arrangement and assessments of benefits to livelihood [7]. Considering the above fact, the present study was carried out to assess the status of fish farming and livelihood of fish farmer in the ShahrastiUpazila of Chandpur district of Bangladesh.

MATERIALS AND METHODS

The present investigation was imposed on ShahrastiUpazila of Chandpur district in Bangladesh during the period between 15 February and 14 September, 2010. The study was based on collection of primary and secondary data. Before collecting the primary data, a draft questionnaire was developed which was pre-tested with a few pond fish farmer. In the pre-testing, much attention was given to any new information in the draft questionnaire in order to reach the objectives of the study. According to the experience gained in pre-testing, the final questionnaire was improved, rearranged and modified. Primary data were collected through household survey using multiple methodological Participatory Rural Appraisal (PRA) tools such as Focus Group Discussion (FGD) and Crosscheck Interviews (CI) with key informants. Land used data of the studied area; subject related annual reports and documents were also collected to validate the field observation. All the collected information were accumulated and analyzed by MS-Excel and then presented in textual, tabular and graphical forms to understand the present status of the livelihood of the pond fish farmers of the studied area.

RESULTS AND DISCUSSION

Fish Farming Status

Pond Size and Depth: Pond size is an important factor because all management measures are planned

considering the size of ponds. In the present study, it was found that the average pond size was 0.24ha (60 decimals). Khan [8] stated that fish culture efficiency varied with the size of ponds. The average depth of pond in the study area was found 3.45 meter. According to DoF [9] the average depth of ponds in Bangladesh is between 2 and 5 meter which correspond well with the present study.

Pond Type and Ownership: In the present study area, 10% of the ponds were seasonal and 90% were perennial (Table 1). The water level of perennial ponds declined during dry season and become unsuitable for fish culture. Some farmers pump water to their ponds during dry season. Seasonal ponds become unsuitable for fish culture during dry season. Ali *et al.* [10] found 46% of the ponds were seasonal and 54% ponds were perennial in Rajshahi district. It was observed that the highest number of ponds (85%) was occupied by the single owners followed by joint or multiple owners (15%) (Table 1). Hossain *et al.* [11] reported that multiple pond ownership was a major constrains for pond aquaculture.

Cultured Fish Species and Stocking Density: In the study area, the season of fish farming was from April to December. Fish fries were stocked when they became available in April to June and were harvested primarily from December to January. Most of the farmers (99%) carried out polyculture and among them 1% ponds were under integrated culture system. The idea of polyculture is based on the principle that each species stocked has its own niche that of other species. Therefore, a more complete use is made of the food resources and space available in polyculture than in monoculture [12]. In this system farmer cultured mainly Indian major carps viz., rohu, (*Labeorohita*), catla (*Catla catla*), mrigal (*Cirrhinus cirrhosus*) and Exotic fish silver carp (*Hypophthalmichthys molitrix*), grass carp (*Ctenopharyngodon idella*), common carp (*Cyprinus carpio var communis*), bighead carp (*Hypophthalmichthys nobilis*), Pangas (*Pangasius hypophthalmas*), Sarpunti (*Puntius sarana*) and Monosex Tilapia in the study area. Hatchery produced fingerlings were predominant in the fish culture of the study area. The average stocking density was found to be 14675 fry/ha. Alam [13] found the average stocking density was 17,262 fry/ha which was higher than the present study.

Table 1: Pond type and ownership

Pond type	% of farmers	Ownership	% of farmers
Seasonal	10	Single	85
Perennial	90	Multiple	15

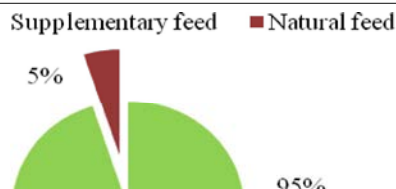


Fig. 1: Types of feed used by farmers (%)

Feed and Feeding Practices: Supply of supplementary feeds, which can complement nutritional deficiency, is important to increase fish production. From the survey, it was found that 95% of the farmers applied supplementary feed such as rice bran, mustard oil cake and commercially manufactured feed (Fig. 1). Rest 5% of the farmers depended on the natural food in the pond. Alam [13] found that 80% of the farmers applied supplementary feed such as rice bran and mustard oil cake. The use of rice bran and oil cake by the farmers varies from place to place because farmers often do not follow any standard of rate feeding and frequency.

Fish Production, Harvesting and Marketing: In the study area, the average yield of fish was found to be 2900 kg/ha/yr. Rahman [14] found average annual yield of 2925 kg/ha in Gazipur district. The annual production varies because of differences in farm size, feed, seed, other inputs and management measures. Although fish were harvested throughout the year, but the peak harvesting period was found from November to January. Rahman [14] reported that the peak period of fish harvesting was October to January which was similar to the present study. Farmers harvested fish by using cast net and seine net locally known as *Berjal*. Harvested fish were kept in aluminum containers or bamboo baskets. Around 80% fish were sold by the farmers to local *paikers* and the rest 20% consumed by the households and given to the relatives. The market chain from farmers to consumers passes through local agent/*paiker* to local market where retailer sells the fish to consumers (Fig. 2).

Fish Production Cost and Profit: The average total cost of fish production in the study area was observed as Tk.80850/ha/yr. Ahmed [2] found average fish production cost of Tk. 23,210 to Tk. 24,790/ha. The production cost of fish was higher due to the increase of the price of fingerlings, feed, fertilizers, drugs, chemicals and labor.

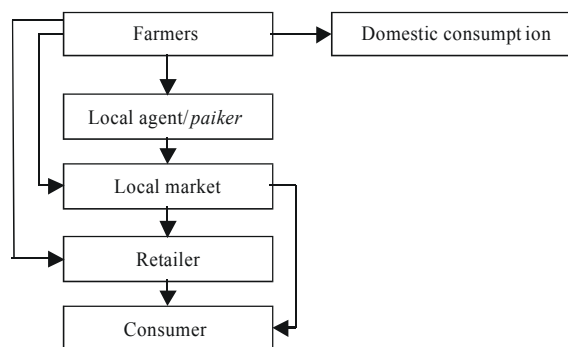


Fig. 2: Fish marketing channel in the study area

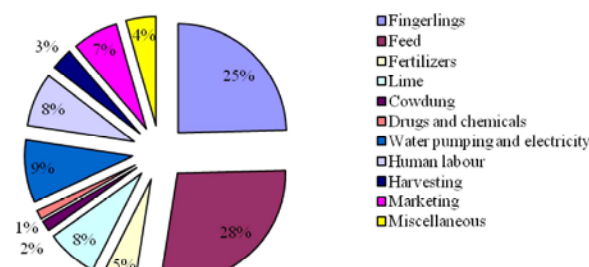


Fig. 3: Production cost of fish farmers

Highest amount of production cost was spend for fish feed (28%) followed by fingerlings (25%), water pumping and electricity (9%), labor (8%), lime (8%), fish marketing (7%), fertilizers (5%), miscellaneous (4%), fish harvesting (3%), cow-dung/organic manure (2%) and drugs/chemicals (1%) Fig. 3. The average profit/ha from fish culture was found to be Tk. 119400/yr. Qudduset al. [15] observed that in case of extensive, improve extensive and semi-intensive categories of culture net profit from fish culture were Tk. 46,600, Tk. 63,000 and Tk.92,000 respectively in Demra, Dhaka. The profit in fish culture was found relatively higher in the study area.

Livelihood Status of Fish Farmers

Human Capital

Religion and Age Structure: Religion plays a vital role in the social and cultural environment of people in a given area. It acts as a notable constraint and modifies social pattern of people. Muslims were featuring as the absolute majority of the fish farmer in the study area. About 75% and 25% of the pond fish farmers were Muslims and Hindus respectively. Different categories of age groups: young (20-30 years), middle aged (31-40 years) and old (41-60 years) were considered to examine the age structure. It appeared (Fig. 4) that age group of 41-60 years was the highest (44%) and 20-30 years was the lowest (20%) considering all fish farmers. Ali *et al.* [16] found that most of the fish farmers (50%) belonged to

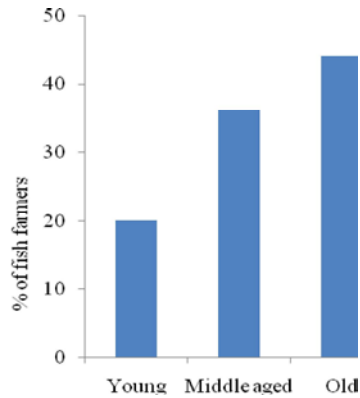


Fig. 4: Age distribution of fish farmers in the study area

age group of 31 to 40 years in Mymensingh district. Bhaumik and Saha [17] reported that age structure of fishermen at Sundarbans was ranged from 20 to 70 years which more or less agreed with the present findings.

Family Size and Type: In the present study, families were classified into two types as nuclear family and joint family. About 54% of farmers lived in joint families and 46% in nuclear families. Joint family was predominant in the study area which also corresponds well with the findings of Ali *et al.* [16] in Mymensingh district. The family size has considerable influence on the income and expenditure of the family.

Education: Fish farmers were categorized into 5 categories on the basis of the level of education. Out of 50 fish farmers, 10% had no education, 16% had primary level, 48% had secondary level, 16% had higher secondary level and 10% had bachelor level of education (Table 2). The reported literacy rate was found higher than the national adult literacy level of 65% [18]. Zaman *et al.* [19] found that 23.3% farmers were illiterate whereas 14.4%, 8.9% and 6.7% were educated up to primary, secondary and higher secondary or above level respectively. Khan [8] stated that the level of education is a factor affecting utilization of pond for fish farming.

Natural Capital: Natural capital of people involved in fish farming represent the natural resources such as land, pond area, open water, fish seed, soil type, snail and tubifex for larvae and wider environmental goods that are critical for farmers and associated groups to support production. Large areas of land, water and natural resources had been used for fish production. Rapid population growth had to some extent led to accelerate natural capital depletion that had affected their income.

Table 2: Education level of pond fish farmers in Charbata Union

Education level	No. of farmer	% of total fish farmer
Illiterate	05	10
Primary	08	16
Secondary	24	48
Higher secondary	08	16
Bachelor	05	10

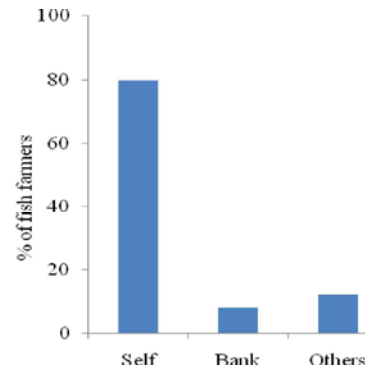


Fig. 5: Sources of credit facilities for fish farming in Shahrasti Upazila

Presence of canal, ponds and existence of floodplains in the vicinity of the study area offer tremendous scope for harnessing natural resources for sustainable livelihood management of the fish farmers and fishing community.

Financial Capital

Sources of Credit: It was found that 80% of the farmers used their own money for fish farming, 8% of the farmers received loan from bank for farming activities and 12% of the fish farmers received loan from other sources like different NGOs (Fig. 5). Quddus *et al.* [15] found that, only 34% farmers got bank loan for fish culture while majority (53%) of farmers expend from their own sources. Small farmers were found in disadvantageous situation due to poor financial resources for fish farming and they did not have financial support from institutional credit.

Occupational Status: Most of the fish farmer in Shahrasti Upazila was involved in fish farming as their secondary occupation. The present study revealed that 20% of fish farmer were engaged in fish farming as their main occupation while 45% was in business, 25% agriculture and 10% in service (Fig. 6) which was more or less similar to the findings of Alam and Bashar [20].

Annual Income: Annual income of fish farmers were varied from 24,000 to 1,00,00 BDT. The selected fish farmers were grouped into five categories based on the level of their annual income (Table 3). The highest

Table 3: Annual incomes of the fish farmers in the study area

Annual household income (BDT) (1 US\$ @ 80 BDT)	No. of fish farmers	% of total fish farmers
Upto 300	01	02
300.01-625	09	18
625.01-937.50	13	26
937.51-1250	17	34
> 1250.01	10	20

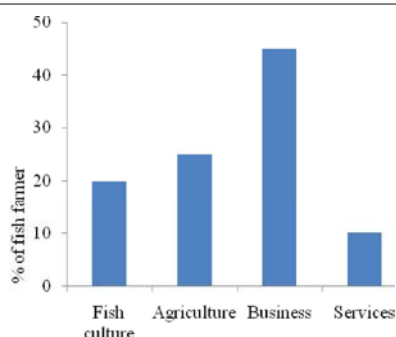


Fig. 6: Main occupation of the fish farmers

percentage (34%) fish farmers earned BDT 75,000 to 1,00,000 per year, which was higher than the national average BDT 28,430 [21]. The present findings of annual income of fish farmers correspond well with the findings of Rahman *et al.* [22].

Physical Capital

Housing Condition: The nature of house indicates the social status of the people. During the survey, attempts were made to find out the condition of living house of the people. Shahrasti was not developed as like as the main town of Chandpur district, so most of the house of fish farmers (70%) was made of tin-shed. 20% half cemented building and 10% cemented building (Fig. 7).

Health Facilities: Health facilities of the fish farmer were poor and it was found that 70% of the fish farmers were dependent on village doctors, while 20% and 10% got health service from upazila health complex and MBBS (Bachelor of Medicine, Bachelor of Surgery) doctors respectively (Fig. 8). Ali *et al.* [10] found that 46% of the farmers received health service from village doctors, 18% from upazila health complex, 14% from district hospital and 20% from MBBS doctors.

Drinking Water Sources: The provision of clean and safe drinking water is considered to be the most valued element in the society. The study showed that 100% of the fish farmers used tube-well water for drinking purposes. It indicates a positive sign for health facilities in the study area. 90% of them had own tube-well and

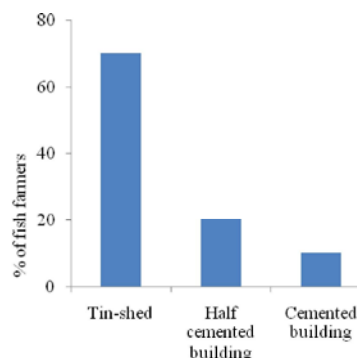


Fig. 7: Housing condition of fish farmers in Shahrasti Upazila

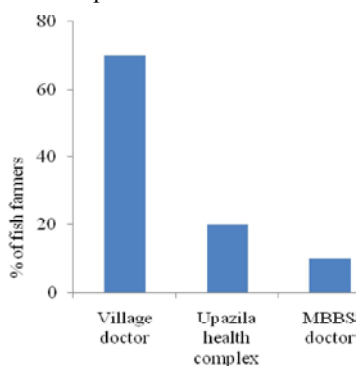


Fig. 8: Health facilities for fish farmers in the study area



Fig. 9: Sanitary facilities used by the fish farmers in the study area

10% of them collected drinking water from neighbors tube-well. Kabir *et al.* [23] also found that 100% fishermen's household used tube-well water for drinking purposes, among them 40% had their own tube-well, 50% used shared tube-well and remaining 10% used neighbors tube-well.

Sanitary Facilities: Two types of toilets were used: 1) semi-pucca toilet: made of tin or wood with inadequate drainage disposal and 3) pucca toilet: made of brick with good drainage disposal. It was found that 76% and 24% of fish farmers used semi-pucca and pucca toilet respectively (Fig. 9). The present study revealed that the sanitary conditions of the fish farmers were relatively satisfactory than fish farmers in Mymensingh district where Ali *et al.* [16] in his study found that 62.5% of the farmers had semi-pucca, 25% had kancha (made of bamboo with leaf shelter and inadequate drainage disposal) and 12.5% had pucca toilet.

Table 4: Problems faced by the fish farmers in the study area

Problem	No. of fish farmers	% of fish farmers
Fish disease	15	30
Non availability of fish fry	10	20
Pouching	7	14
Insufficient water in dry season	8	16
Poor technical knowledge	5	10
Lack of quality feed	2	4
Lack of money	3	6

Social Capital

Training on Fish Farming: Only 34% of the fish farmers received necessary training on improved fish farming from Upazila Fishery Office with the help of Department of Fisheries of Bangladesh (DoF).

Social Status of Fish Farmers: Most the fish farmers (80%) had ordinary social status, 4% were local leaders and 16% were respectable persons in the society.

Constraints of Fish Farming: The fish farmers were found to face with many technical, social and economical problems. Present survey revealed that 30% of the fish farmers identified fish disease as the single most important problem in fish farming in the study area. While 20%, 14%, 16%, 10%, 4%, 6% respondents identified non availability of fish fry, pouching, insufficient water in dry season, poor technical knowledge, lack of quality feed and lack of money to be the most important problems respectively (Table 4). Ali *et al.* [24] and Ali and Rahman [25] reported that lack of scientific knowledge, multiple ownership of ponds, attack of fish disease and non availability of good quality fish fry werethe major problems in pond fish culture in Bangladesh. The main constraints in improving this living standard were the lack of inputs and the persistent indebtedness to the usurious traditional credit system.

Livelihood Outcomes: Livelihood outcomes can be thought of as the inverse of poverty. Contributing to the eradication of poverty and food insecurity depends on equitable access to resources, access of disadvantaged groups to sufficient, safe and nutritionally adequate food [26]. Livelihood outcomes of fish farming and related activities were positive and most of the people had increased their income. Institutional and organizational supports, extension services, more fish farming knowledge and marketing were needed for sustainable livelihoods [27]. The survey suggested that farmers had improved their socio-economic conditions through fish farming, as confirmed by 94% fish-farmers (Fig. 10).



Fig. 10: Improved socio-economic condition through fish farming

Only 6% of the farmers had not improved their socio-economic conditions due to poor knowledge on fish farming, high price of fish feed, poor marketing facilities and lack of money for fish farming.

CONCLUSION

Considering the different observations during the present study, ShahrastiUpazila was found to be potential area for fish culture and capture. In conclusion it can be said that, farmers should be given facilities on training program and input availabilities, they should also be provided with credit facilities, motivated to utilize all types of water bodies for fish culture as well as integrated culture should be adopted. The fish farmers should be given amenities for education so that they can be well aware of their problems and prime rights. All the water resources should be utilized for fish culture to get maximum production by using suitable technology. More hatcheries should be established, so that farmers can get quality seeds easily.

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