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Status of Fish Culture in Joypurhat District, Northern Bangladesh

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Abstract: The study was carried out for a period of 7 months (January to July, 2006) from 50 farm owners and 50 local people near the farms of different Upazilla (Joypurhyat sadar, Panchbibi, Akkelpur, Khetlal and Kalai) in Joypurhat District. The study indicated that most of the farms (46%) were established within last 10 years. Total 15 different fish species were cultured. The 3 types of farm were observed, such as own (48%), leased (38%) and both (14%). Fish farming (58%) was the major income source for farm owners. Most of the (72%) farms depend on under ground water. Various types of chemicals and toxic substances like rotenone (16% farm), phostoxin (10% farm), bleaching powder (6% farm), disel/kerosin (22% farm) and sumithion (4% farm) were used. Among all the farms 32, 56 and 34% were affected by tail and fin rot, oxygen deficiency and disease, respectively. Lime (76% farm), salt (34%) and sumithion (18%) were widely used as antibiotics for disinfection, prevention and control of fish disease. Total fish productions have gradually been increased in all the farms. The benefits of fish farm owners were increased in income (92% farm owners), social status (74% farm owners), employment opportunity (58% farm owners), ingestion of fish (42% farm owners) and poverty alleviation (70% farm owners).

Key words: Fish farm, fish production, poverty alleviation, Joypurhat District, Bangladesh

INTRODUCTION

Bangladesh has extensive wetlands that form an important fisheries resource which is very much potential for production of fish and fishery items. The total water resources of the country are estimated as 46,99,345 ha of inland water (DoF, 2013) that comprises of rivers, tributaries, estuaries, beels, haors, baors, ponds, lakes, tanks, etc. About 2.46% of the total export earning is contributed by fisheries sector (DoF, 2013). Fish and fisheries play a vital role in the socio-economic development, fulfilling the demand of animal protein, opportunity for employment, poverty alleviation of large number of population and earning foreign currency. Bangladesh is ranked 3rd in the aquatic bio-diversity in Asia behind China and India with approximately 300 species of fresh and brackish water species (Hussain and Mazid, 2001). Fish production from inland open water has been decreasing due to various reasons such as changing aquatic ecosystem, soil erosion, siltation in the river, construction of dam to control flood and irrigation, indiscriminate use of agro-chemicals, destructive fishing practices, over fishing, etc. Cultural fish production has come from a variety of farms ranging from small-scale owner-operated fish ponds to large scale co-operative and corporate farms, supported by auxiliary industries, such as feed and equipment manufacture. Fishes are cultured traditional extensive techniques in Bangladesh but now fish farmers are adopting scientific technologies instead of ancient culture methods. The present study was planned to know the status of fish culture in ponds of the study area. The proper production can be estimated with focusing the importance of pond in freshwater inland fish culture. Better fish production would be able to supply fish protein to the poor selection of the population and thus will increase the annual intake of protein of the population of the country. Therefore, the study was carried out to find out the status of fish culture in Joypurhat District, Northern Bangladesh.

MATERIALS AND METHODS

The study was carried out for a period of 7 months (January to July, 2006) of different Upazilla (Joypurhyat sadar, Panchbibi, Akkelpur, Khetlal and Kalai) of Joypurhat District. The data for this study were collected by questionnaire interviews through simple random sampling method. A total of 50 farm owner (Joypurhyat sadar: 14, Panchbibi: 11, Akkelpur: 8, Khetlal: 9 and Kalai: 8) were selected randomly for interview. All the data were analyzed by computer software MS Excel.

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RESULTS AND DISCUSSION

Farm establishment year and type: The surveyed farms were established from 1974-2006 (Table 1). It is found that 46% farms were established from 1996-2005, 24% were established from 1986-1990 and 30% were established from 1974-1985. Among all the surveyed farms 28% were homestead and 72% were commercial.

Size and category of land ownership of farms: The surveyed fish farms were three categories such as small farm (up to 2.0 ha), medium farm (2.1-8.0 ha) and large farm (8.1 to above). Surveyed fish farms were classified into 3 categories according to the ownership pattern of land use, such as own (48%), leased (38%) and both (14%). It has been observed that 56% farms were established on agriculture land. Pillay (1992) reported that productive agricultural land is an idea site for fish farms but such land is not easily available for fish culture. For this reason, there is a possibility to arise conflict between the farm owners and land owners. Rahman and Ali (1986), also stated that land use and land leased conflict were major constrains to the development of fish culture in Bangladesh.

Fish culture as an income source of farm owners: It was observed that fish farming was the primary income source for 58% farm owner and secondary income source for 42% farm owners.

Sources and depth of water: It was observed that 72% farms depend on under ground water and rest 28% farm depends on surface water for fish culture in the study area. It was also observed that minimum water depth of 66% farms was 1.25-2.0 m and 34% farms were 2.1-2.5 m, respectively.

Species cultured in farms: A large number of species were cultured in the study area both indigenous and exotic carps. The highest percentage (98%) of the fishes was *Labeo rohita* and *Hypophthalmicthys molitrix* and lowest (6%) was *Clarias batrachus*. The cultured species and percentage distributions of farms are presented in Table 2.

Major inputs: Various types of chemicals and toxic substances like rotenone (16% farm), phostoxin (10% farm), bleaching powder (6% farm), disel/kerosin (22% farm) and sumituion (4% farm) were used in the studied farms for the controlling of aquatic weeds, pests, predators and undesirable species during pond preparation (Table 3). Uses of organic are an important means of nutrient supplement in order to produce natural food in the pond. It was found that almost all the farms, 86% used urea, 82% used TSP, 92% used cow dung, 66% used MP, 84% used poultry excreta, 8% used compost and only 4% used gipsum of the studied farm (Table 3). Supply of supplementary feeds and nutrients is a rising trend to increase farm fish production. In the studied, fish farm the most uses of supplementary feeds were mustard oil cake (96% farms), rice bran (90%) and wheat bran (64%) (Table 3). Mazid and Banu (2002) stated that indiscriminate and unplanned use of feed and fertilizer increase stress of fish and accelerates susceptibility to pathogen. So, there is a possibility to appear such types of adverse impacts of aquaculture in the surveyed farms. Belias *et al.* (2003) stated that environmental impacts depend on the amount of food given to the fishes, the mode of feeding and the fish density and per unit production.

Water exchange and discharging: It is essential to exchange the waste water from the farm to keep the

Table 1: Year wise total and average fish production in the studied fish farm

Years	Total area (ha) under culture	Total production (MT)	Yield (kg/ha/year)
2000-01	35.65	76	2130
2001-02	37.27	84	2254
2002-03	45.87	124	2703
2003-04	51.45	147	2857
2004-05	57.78	177	3063
2005-06	62.97	217	3446

Table 2: Cultured species and percentage distributions of farms of the studied area

Groups	Local name	Scientific name	Percentage
Exotic carp	Catla	*Catla catla*	96
	Rui	*Labeo rohita*	98
	Mrigel	*Cirrhinus mrigala*	90
	Kalbaush	*Labeo calbasu*	56
	Silver carp	*Hypophthalmicthys molitrix*	98
	Mirror carp	*Cyprinus carpio var specularis*	72
	Grass carp	*Ctenopharyngodon idella*	64
	Sarputi	*Puntius gonionotus*	66
	Thai pangus	*Pungasius sutchi*	60
	Tilapia	*Oreochromis mossambica*	42
	Common carp	*Cyprinus carpio*	38
	Bighead carp	*Aristichthys nobilis*	12
Minor carp	Bata	*Labeo bata*	20
Catfish	Shing	*Heteropneustes fossilis*	8
	Magur	*Clarias batrachus*	6

Table3: Uses of fertilizers, feeds, nutrients and chemicals of studied farm

Uses of fertilizers		Uses of feeds and nutrients		Uses of chemicals	
Name	Farms (%)	Name	Farms (%)	Name	Farms (%)
Urea	86	Rice bran	90	Rotenone	16
TSP	82	Rice Polish	56	Phostoxin	10
MP	66	Wheat bran	64	Bleaching	6
Cowdung	92	Wheat flour	42	powder	
Poultry excreta	84	Mustard oil cake	96	Disel/kerosin	22
Compost	08	Banana leaf	20		
Gipsum	04	Fish meal	36	Sumithion	4

quality of farm water and to get the optimum production. In the studied fish farm 52% farm owners were exchanged farm water and 48% did not exchange. In the studied area 33.77% were discharged water into surrounding area, 15.38% discharged into the canal and 11.54% discharged into the river. Various changes were observed due to the discharge of farm effluents in the receiving water area. It was observed that 22% farms were involved to increase the productivity of receiving area, 42% involved to increase turbidity, 6% involved to increase mud, 8% involved to deteriorate fishery and 10% involved to bad smell or odour.

Disease outbreak and prevention: Result shows that 32, 56 and 34% farms were affected by tail and fin rot, oxygen deficiency disease and argulosis, respectively. Several chemicals and antibiotics like lime (76% farm), salt (34%) and sumithion (18%) are widely used for disinfection, prevention and control of fish disease. Highly infected or dead fishes were thrown into the open environment (65% farm), put under the soil (22.50% farm), sold (7.5% farm) and given to the local people (5% farm). Pillay (1992) stated that there is a possibility of generating drug-resistant strains of pathogens by the use of antibiotics for treating diseases into the environment. As the resistance to antibiotic can be transmitted from one bacterium to another, there is a risk of transference of antibiotic resistance to normal bacteria in the human gut if antibiotic resistant bacteria are ingested in numbers. Boyd and Massaut (1999) reported about the risks associated with the use of chemicals in pond aquaculture.

Production of fish: Fish production was continuously increasing in the surveyed area (Table 2). It is clear that total productions have gradually increased and per unit fish production (kg/ha) also increased. In 2005-2006, the production was 3446 kg/ha/year. Biswas (2003) stated that per unit fish production was 4816 kg/ha/year which is higher than the present study. The lower production in study area may be due to acidic soil, turbid water and inadequate water during dry seasons, etc. (DoF, 2003). However, increased fish production was being achieved by the expansion of farm numbers, area of land and water under culture and the use of more intensive and modern farming technology that involve higher usage of inputs such as water, feeds, fertilizers and chemicals. The number of farms is increasing in each year which is shown in Fig. 1.

Benefits of farm owners and local people: The benefits fish farm owners after establishing the farm were

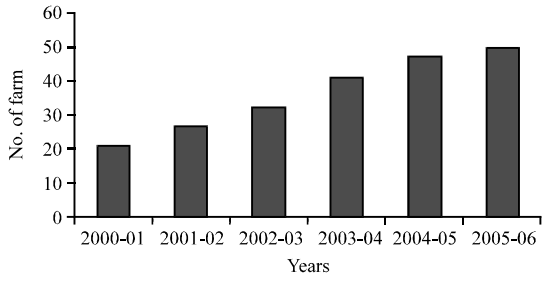

Fig. 1: Year wise increasing farms of the surveyed area

increased income (92% farm owners), increased social status (74% farm owners), employment opportunity (58% farm owners), increased ingestion of fish (42% farm owners) and poverty alleviation (70% farm owners). Local people were benefited from fish farm in many ways. It was found that the benefits were employment opportunity (38%), increase technical knowledge (20%) and motivation towards fish culture (22%), poverty alleviation (12%), increased ingestion of fish and obtain more money through leasing their land (8%). Dhawan *et al.* (1998), stated that aquaculture farming as one of the promising industry improved quality of life of the rural population through direct impact on their socio-economic status.

Problems: Several problems of fish farming were identified in the study area. It was found that technical problems were non-availability of land (24%), lack of scientific and technical knowledge (42%), acidic soil (24%) and fewer co-operations of concerned agencies (18%), turbidity (44%) and attack of fish diseases (24%) and deterioration of quality seed (40%). Habib *et al.* (1994), recorded the similar problems of pond fish culture in an area of Bangladesh. The economic problems were high price of various inputs (36%), low product price (20%), lack of credit facilities (32%), lack of marketing facilities (18%), loss of fish during flood (14%) and lack of capital (64%). The social problems were theft of fish and poisoning in the pond water which were problems of 66 and 24% farm owners, respectively. Saha (2003) stated that theft, poisoning, lack of capital and technical knowledge were the major problems of aquaculture in the Dinajpur District.

CONCLUSION

It is clear that long term and sustainable development can be achieved only through sound environmental management and the status of fish culture of Joypurhat

was not satisfactory. But, this experience will help the aquaculturists to improve the culture status and increase fish production with the find out of the solutions of the identified problems.

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