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Post Stocking Management Practices by the Pond Fish Farmers in Barisal District, Bangladesh

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Abstract: A survey was conducted to assess the post stocking pond management status of 200 fish farmers in Bakerganj, Gaurnadi, Barisal Sadar and Mehendiganj upazila under Barisal district from May to November, 2013. Data were collected through the use of well-structured questionnaire and Focus Group Discussions (FGD) from the selected area. About 98% of farmers were using the hatchery-produced fries but only 2% were using the natural fries. Most of the fish farmers directly stocked the fishes in grow out pond (63%), 12% stocked firstly at a nursery pond and 25% stocked in the hapa before releasing of the fry in the grow-out pond. Tilapia (49%) was found as the most cultured fish species in the area. The highest stocking density (69%) in the study area was found 100 to 200 fry/decimal and the highest (81%) fish farmers stocked the fingerlings size were from 0.5 to 2.0 cm. About 26% of farmers used balance feed but 74% farmer used the supplementary feed because of financial crisis. In case of any culture and disease related problem mainly they went to the Government fisheries officers (31%) and Drug and chemicals shopkeeper/sales persons (37%). As fish culture is the potential and profitable business in the country, it is therefore essential to provide the necessary training facilities with institutional and organizational supports, credit facilities and extension services for the proper management of the pond after stocking of fish fry as well as the sustainable fish production.

Key words: Post Stocking · Pond Management · Fish Farmers · Barisal District · Bangladesh

INTRODUCTION

Due to degradation or overexploitation of natural resources the household nutritional requirement is in critical condition in many countries of the world including Bangladesh. So, to overcome this situation increased aquaculture production is thought to be an important alterative. In order to mitigate the continuous demand of fish for the growing population of the country and to reduce the pressure of capture fisheries from natural resources it is a current issue to focus on culture fisheries in Bangladesh [1-3]. In the past, fish farming was an extensive system and subsistence in nature, stocked with wild fry and fingerlings caught in rivers and cultured without the use of fish feeds [4]. Following the introduction of technology for inducing carp to spawn in the late 1960s and the subsequent development of fishpond management technologies in the 1970s and 1980s, fish farming became widespread and market driven [5]. Culturing various carp and exotic fish species in ponds and lakes became popular all over the country. At present, most of the freshwater pond fish farming

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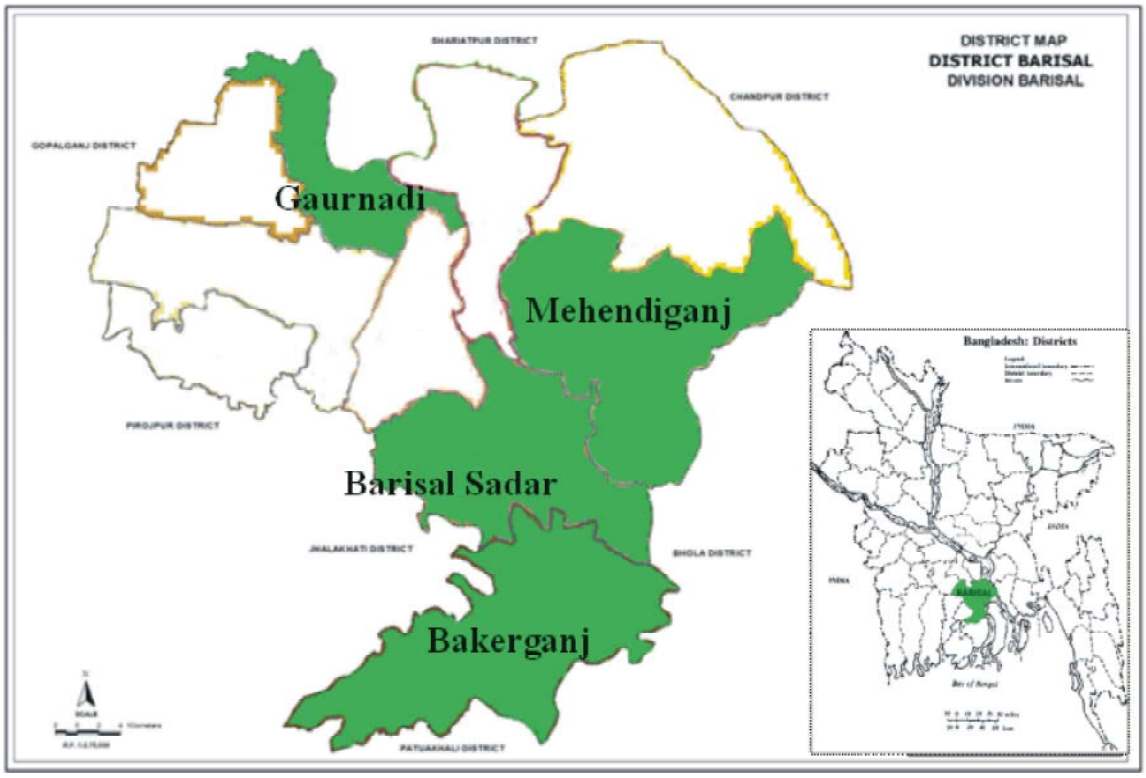

Fig. 1: Showing the survey areas in Barisal District, Bangladesh

systems in Bangladesh are either extensive or semi-intensive and in very few cases intensive [3]. Barisal district situated at the southern part of Bangladesh is comparatively underdeveloped and until now there has been no research carried out on this aspect. So, the present study was conducted to be acquainted with the existing post stocking pond management systems in Barisal district and to make some suggestions for development and management of pond fish production. This research would work as a foundation for future development of the culture management system and hence increased fish production in this region.

MATERIALS AND METHODS

The study was conducted in the Barisal district at the southern Bangladesh. Its geographic location is 21°49'41" to 23°05'36" North and 89°53'18" to 91°01' East. Four upazilas namely Bakerganj, Gaurnadi, Barisal Sadar and Mehendiganj upazila of Barisal district were selected for the present study (Fig. 1). Data were collected from 200 pond owners randomly covering the selected study areas. The areas were selected considering the intensity of fish farming areas, dependency of farmers on fish farming, communication facilities in the area and activities of GOs and NGOs on fish farming. Among the fish farmers only some farmers are from solvent families and the majorities are small and marginal farmers, who are generally poor. The data were collected from May 2013 to November 2013 by individual and group interview of 200 farmers using questionnaire and Focus Group Discussion (FGD). A total of 20 FGD sessions were conducted having 5-7 farmers in each group. MS-Excel (2007) was used to analyze the data represented in tabular and graphical forms.

RESULTS AND DISCUSSION

Stocking Management: In this study, tilapia (53%) was the mostly cultured fish species and the other cultured species were Pangas (23%), Carp (17%) and Shrimp/Prawn (7%) (Fig. 2). The carp was cultured in polycultured system. Nurunnahar [6] observed net return and resource use efficiency of carp polyculture in the Kushtia district of Bangladesh and found carp polyculture to be a profitable business and other than human labor, inputs were used in an efficient manner. She also found that the polyculture farmers expected higher fish prices as production costs were higher due to higher prices of inputs, especially fish feeds.

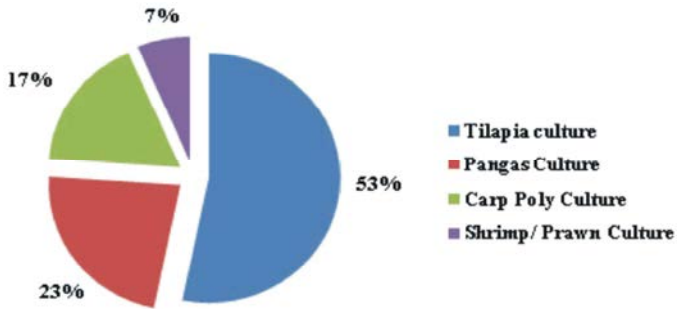

Fig. 2: Different types of fishes cultured in the pond

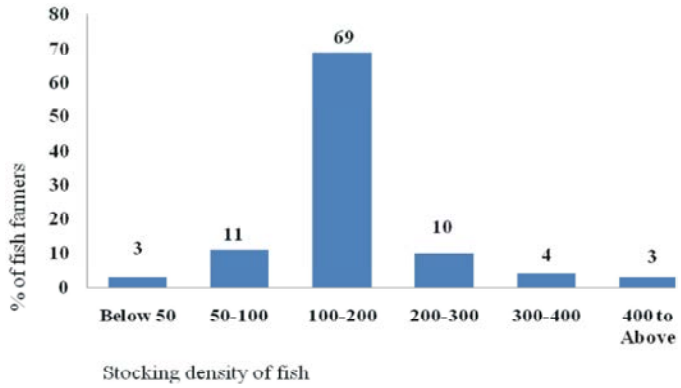

Fig. 3: Stocking density of the fishes in the Pond

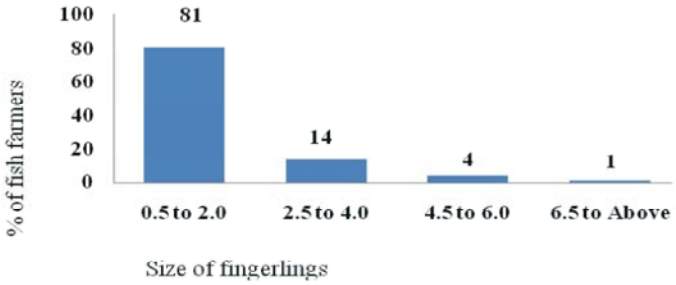

Fig. 4: Size of the fingerlings (cm) in the culture pond

Stocking density is important for fish culture in terms of culture technique. Growth and production of fish mainly depends on the stocking of fingerlings at fixed number in different layer of pond which make less competition for food. The standard stocking density for carp culture is 35 to 40 per decimal [7]. From the study it was found that all traditional farmers used unbelievably high stocking density (averagely more/less 200 fingerlings/decimal without any concern of layer wise distribution). Similar findings were observed by Debnath *et al*. [5] in culture ponds within Patuakhali district. The highest stocking density (69%) in the study area was found 100 to 200 fry/decimal, below 50 fry/decimal were 3%, 50 to 100 fry/decimal were 11%, 200 to 300 fry/ decimal were 10%, 300 to 400 decimal were 4% and 400 to above were 3% (Fig. 3) [8] found that the average stocking density was 25,250/ha in Gazipur. Hassanuzzaman [9] stated that the average stocking density was 16,196 fry/ha in the district of Rajshahi. Hossain *et al.* [10] observed that the range of stocking density was from 10,000-31,000/ha in a village of Mymensingh district which was almost similar to the present study. Size of the fingerlings in the pond also increases the survivability of the fishes. If there are the large sizes of the fry there is the low risk of mortality. In the present study most of the fish farmers (81%) stocked the fingerling size are from 0.5 to 2.0 cm. But in 2.5 to 4.0 cm were 14%, 4.5 to 6 cm were 4% and 6.5 cm to above occupied 1% (Fig. 4).

Fry from the natural sources are comparatively better as it is pure strain and do not contain hybrids. But natural fries often contain predatory and undesirable species.

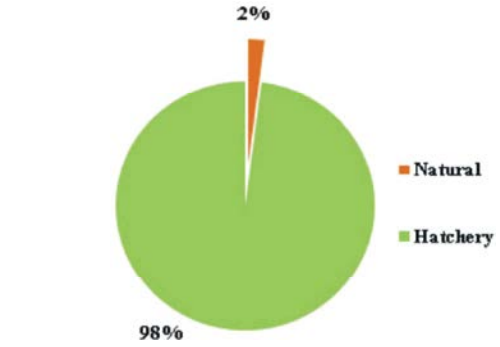

Fig. 5: Source of the seeds for the culture systems

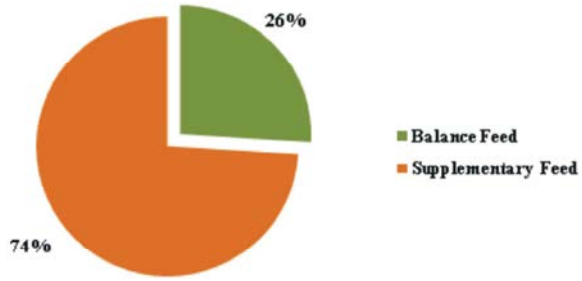

Fig. 6: Types of feed used in the pond

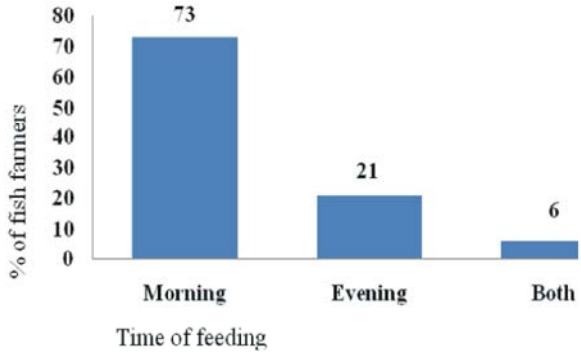

Fig. 7: Time of feeding in the pond

Fig. 8: Exchange of pond water in the study area

At recent times due to unavailability and the required time, people use the hatchery produced fry. In this study there were the use of hatchery produced fry by the 98% of farmers and 2% only used the natural fry (Fig. 5). Most survivability of the fry occurs in the first stocking on the nursery pond before the stocking of the fishes in grow-out ponds. In the study area there were the different practices for the first stocking of the fry. Most of the fish farmer directly stocked the fishes in grow out pond (63%). On the other hand 12% stocked firstly at a nursery pond and 25% stocked in the hapa before releasing of the fry in the grow-out pond (Table 1).

Post stocking Management: Supply of feed is important to increase fish production. In the study area, 26% of framers used balance feed but 74% of farmers used the supplementary feed (Fig. 6). Farmers normally do not use pellet feed because it is costly and not available. Rahman [8], Hassanuzzaman [9] and Saha *et al.* [11] observed the use of the supplementary feed by the majority of the farmers. But the farmers in the study area, did not follow any scientific methods, their feeding practice was more irregular. Time of feeding is also an important factor for the proper growth of the fishes. In the study area 73% of farmers practiced their feeding in the morning, 21% farmer in the evening and 6% practiced their feeding both morning and the evening (Fig. 7). Good water quality is the principle criteria for good production. For good water quality it was suggested the exchange of pond water regularly. But only 8% of farmers exchanged their pond water and 92% of farmers did not exchange the pond water in the culture period (Fig. 8). Monitoring of water quality is of utmost important. But for lacking of the proper technical knowledge there were a poor monitoring of the water quality parameters. Only 2% of farmers measured temperature, 1% of farmers measured salinity and 3% of farmers measured pH. But no farmers measured the ammonia and the nitrate (Table 2).

Problems of Fish Culture in Barisal: Most of the pond in Barisal district was under traditional culture system from where yearly production is very low. Furthermore different types of fish diseases, low growth rate, water pollution lowered the fish production. Lack of knowledge on fish culture is the main cause of the less production from large water body. In the study area it was seen that 23% of farmers faced the water quality problem and 77% had no problem, 11% pond flooded in the rainy season and 91% had no such problem, disease outbreak occurred in 29% of ponds and 71% were free from any harmful disease, 71% had the capital problem and 29% had no problem on capital, lack technical knowledge were 54% of people and 46% had not the same, 35% faced the unavailability of the fish fry and 65% had the adequate supply of fish fry (Table 3).

Table 1: Fish stocking in ponds

Culture units	No. of the Fish Farmers	% of the Fish Farmers
Nursery pond	24	12
Grow-out pond	126	63
Hapas	50	25

Table 2: Monitoring of some selected water quality parameters in the fish pond

	% of the Fish Farmer	
Parameters	Yes	No
Temperature	02	98
Salinity	01	99
pH	03	97
Ammonia	0	100
Nitrate	0	100

Table 3: Problems of fish culture in the study areas

	% of the Fish Farmer	
Problems	Yes	No
Water quality problems	23	77
Flooded of the pond	11	89
Disease outbreak	29	71
Lack of capital	71	29
Poor technical knowledge	54	46
Unavailability of fish fry	35	65

Table 4: Suggestion gained by the farmers when problem/disease occurs

Category of People	No. of the Fish Farmers	% of the Fish Farmers
Government fisheries officers	62	31
Local/NGOs expert	8	04
Drug and chemicals shopkeeper/sales persons	74	37
Hatchery personnel	24	12
Seed traders	32	16

Rahman [12] explored the contributions of key variables to the production process of pond fish farming. He observed that disease outbreak, water quality problem and poor technical knowledge are the major problems of pond fish production in the study area.

Culture period is the crucial time for the farmers. In this time there are the outbreaks of many diseases. Khan [13] found that lack of extension work for fisheries improvements caused the highest difficulty in pond fish culture. In the study area 31% of farmers went to the Government fisheries officers, 4% to the Local/NGOs experts, 37% Drug and chemicals shopkeeper/sales persons, 12% to the Hatchery personnel and 16% to the seed traders for the suggestions if any problems/ disease occurred (Table 4).

CONCLUSION

Bangladesh has the highest density of population but it has a very few resources against its demand and also the proper utilization of the resources are very limited. The current results show the lightening future of aquaculture sector if improve traditional technology can be adapted to the fish farmers. From the obtained results it can be assumed that utilization of improve technology can increase the fish production two and half time more than that of current production. For this Government and other related NGO's should have to take proper step to make the fish farmers adapted with improve technology. Government and other organizations should play their assigned role by disseminating information to the farmers

and arranging necessary training for scientific methods of fish production in pond. This not only increases the fish production but also fulfill the protein demand of the country.

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