

PROBLEMS AND PROSPECTS OF FISH FRY TRADE IN JESSORE DISTRICT, BANGLADESH

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ABSTRACT

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An investigation was carried out based on the survey of the problems and prospects of fish fry trade in Jessore district in Bangladesh. The survey was conducted on 82 nursery operators and 50 fry traders from different parts of the country. The objective of the study was to know the present status of the trade, identify the problems associated with the business, assessment of aids needed for the nursery operator and fry traders from Government and Non-government sector to make the business more furnished. The study was made on technical knowledge of the nursery operator, number of people involve, marketing channel, means of transportation, and facilities available. It was found that approximately 45000 kg hatchlings were produced from the 85 running hatcheries. But the actual number of hatcheries are around 200 in the study area. There were 400 nursery owners operating this business and 1621 lac fry of 1-4" size were produced from 82 studied nurseries. The fingerlings were distributed to 30 districts of the country. More than 200 fry traders came here and carried the fry by means of bus, truck, pick-up van, manual van and train. It was found that 45% fry were locally consumed and rest were distributed to the far way districts. It was also found that due to poor technical knowledge and improper transportation, fry mortality was high. Moreover, due to high lease value, lack of credit facility and terrorism, the nursery operators deprived of getting expected profit. Therefore, the government should give special attention in providing proper training and credit support for the development of this trade and to develop their technical skill.

Keywords: *Fish fry, trade, problems, prospects*

INTRODUCTION

Aquaculture is a traditional and age old practice in Bangladesh. Almost all the households possess a small to medium sized dugout earthen pond. In addition, most of the villages have relatively big sized community ponds. Other types of culture systems used are pen and cage culture, paddy cum fish culture and culture-based fisheries in lakes and seasonal water bodies. Aquaculture has been given importance in Bangladesh because of its potential for export earnings, generation of employment for the rural sector and its contribution to the supply of animal protein for the population. Bangladeshis are rice and fish eating people. Fish is an essential daily food item for the people and as such demand for fish is increasing with the increase of population.

Bangladesh is blessed with vast inland waters in the form of Ponds, Canals, Ditches, Flood plain, Haors (Natural depression), Baors (Ox-bow lake), Rivers, estuaries etc. covering an area of 5.31 million ha in which Pond and Ditches covering an area of 2.42 lac/ha. Fish production from this water body during the year 2000-2001 was 615,825 MT. Where as the total country fish production in the country in the year 2000-2001 is 17.81 lac MT. This is 34.5% of the total fish production (DoF, 2002).

Fish is the principal source of food, supplying some 80% of animal protein intake of the population. On per capita basis, fish availability is very low having declined from 12.0Kg per capita per annum in mid 1960's to 7.7 kg in 1988 and 7.4kg in 1995. Even to maintain the present low consumption rate, fish production was to be increased by nearly 40% by the year 2000. Fisheries sector provides employment to over 1.4 million full time fishermen, in addition to 11 million part time fishermen. It also contributes 9.12% of national income in 1995-96 (BBS, 1996) In the year 2001 Per capita annual fish consumption increased to 12 kg and decrease in the contribution of total animal protein supply to 63% and contribution to GDP was 5.3 % (DoF, 2002).

In the past Bangladesh had abundant wild fishes. These wild fishes were used to meet the requirements of the people and therefore people showed little interest in fish culture. During the last decades, however, over fishing and the increasing control of floodwater with polders have depleted the natural stock substantially. Tasi and Ali (1997) noted that construction of Farakka dam and other embankments, sedimentation of rivers and over exploitation from the natural stock are the major factors for the decline of major carps in existing open water bodies in the river system of Bangladesh. With the decline of the natural fish production and thinking about the increasing demand, aquaculture venture has been emerged as a most vital wing of aquaculture. Therefore, it has been realized that intensification of aquaculture could be the most effective means of increasing fish production to meet the worsening animal protein shortage situation.

From the beginning the natural sources of rivers were the major source of carp seed production in Bangladesh. Millions of eggs and spawn were collected from the rivers during monsoon (May-August). In 1984 the spawn production in Bangladesh was estimated to be 23657 kg from Padma-Brahmaputra river system, 895 kg from Halda River and 625 kg from all hatcheries (Tasi and Ali, 1997). They contribute respectively 93.86% 3.55% and 2.59% of the total spawn supply (25203 kg) for pond fish culture in the country. But due to the destruction

of natural habitats the natural availability of carp seed has largely gone down and the aquaculture venture are now fully dependent on the hatchery-produced fry.

There are five large hatcheries and 106 fish seed multiplication farms established in public sector (Chowdhury *et al.*, 1996). Apart from Government hatcheries a large number of carp hatcheries had been built in the private sector in different parts of Bangladesh. In 1980 the total hatchery produced carp fry was estimated at about 22 million (Chowdhury *et al.*, 1996). In 1984 hatchery produced carp fry was estimated to be about 249 million, which is more than ten times of 1980 production.

Prior to 1982, the dependency on naturally caught spawn from various rivers was almost 100% but it has been reduced to 50% now in 1989 as more and quality seeds are produced under induced breeding. However after the spread of hatchery technology in the country, there is not a single study on the socio-economic impact on fish farmers and the economic analysis of the hatchery operation available in the country. On the basis of assumption and observation, we have to say that it has given positive impact to the fish farmers and fishermen in order to augment the production level (Nuruzzaman, 1989).

The country was depending solely on seed collected from rivers till the year 1978 when production of fish seed in hatcheries through hypophysation was initiated. Presently, fish seed is collected from rivers and also produced on a large scale in hatcheries. The species mostly cultured in freshwaters and the seed of which are produced are: Catla, Rohu, Mrigal, silver carp, Grass carp, Bighead carp species, promising results have been obtained in breeding Thai puti (Islam, 1989).

Public sector fish seed farms acted as centers of technology transfer and trained a large number of entrepreneurs who were interested in establishing hatcheries on their own because of the high returns from hatchery operations. In recent years, there has been a phenomenal growth in the number of hatcheries, especially in the private sector. In 1982 there were only 3 private hatcheries in Bangladesh. The number has increased to 40 by 1985 and to 214 by 1987, producing some 2.75 billion spawn annually, the rate of annual increment being 170 percent (Islam, 1989).

The output from nurseries is the actual fish seed production from the country. In Bangladesh, there are about 918 private nurseries, with an average area of 1ha each and 82 Government nurseries covering an area of about 60ha. In 1987, private nurseries produced about 666million fingerlings of 2-3" size. While the public sector farms produced about 30 million fingerling (Islam, 1989).

In view of the decline in fish availability, the Government of Bangladesh is laying more and more emphasis on increasing fish production. Studies conducted so far have revealed that the production from marine sources has almost reached the maximum sustainable yield, and there is hardly any scope for further increase in production. Hence, emphasis is being laid on the development of inland fisheries. Since management of inland capture fisheries is difficult, if not impossible, great stress is being laid to utilize the vast inland water areas of the country for aquaculture. As stated earlier, there are over 2.8 million ha of flood plains, where the Government of Bangladesh has taken up programs for the development of culture based capture fisheries, through stocking of these water bodies with fingerlings of suitable species of carps (Islam, 1989).

Since fish seed production technology has been successfully transferred to the private enterprise, as is evident from the fact that of the total hatchery produced spawn, 82% comes from private hatcheries, the Government encourages establishment of hatcheries in private sector.

It should be reasonable to say that production of carp through induced breeding has made a real progress in aquaculture in the country. The hatchery produced hatchling cannot be directly stocked in the culture ponds, as they need to rear an intermediate stage in a nursery pond before stocking in the culture pond. Associated with the development of carp hatchery operation, major expansions of private nursery operation in different part of the country have taken place especially in Jessore region. It has now become a potential and profitable business in this region. The fish fry produced in the nursery pond are distributed to the pond culturist through different channels or levels.

There are some constraints for the development of the fry trade. Approximately 45,000kg spawn are produced per year in the study year (DoF, Jessore, 2002). But the survivability of the hatchlings is not satisfactory due to the lack of technical knowledge of the nursery operators and improper transportation. To find out the different problems of the trade an investigation was conducted. The investigation was carried out during the month of June to October, 2002. In this investigation a well formed questionnaire was used and a total of 82 persons involve in this business were made to collect the information. It was found that the nursery operators rear the hatchling in traditional method using the traditional equipment. Lack of credit support both for the nursery operator and fry traders was the major problems of the trade. Due to improper transportation the mortality of the fry was very high. Based on the market demand the business has been well flourished and a lot of people are involved in this trade and improved their socio-economic condition. However favorable soil condition, water

quality, good marketing and communication facilities provided a greater prospect for this trade. If necessary facilities including technical and credit support could be provided the trade would have been more developed and will create more employment opportunity. The main objective of the study was to identify exiting problem of the fish fry trade in Jessore region and make their probable solutions. However the study was based on the following objectives:

- To know the existing condition of the trade
- To know the fry marketing channel
- To know the existing nursery operation system
- To find out the technical problems associated in this trade

Justification of the study

Fish and fisheries sector contributes 6% of the total export earning and 5.3% of total GDP of the country. It contributes 63% of the animal protein consumption of the country (DoF, 2002). It creates full time employment of 1.4 million people and part time of nearly 11million people (Mazid, 1992). Total fish production from pond culture was 2.27 lacs MT in the year 1990 and now it increases into 6.15MT in 2000-2001 which contributes 40% of the total inland culture fish production. There is a total of 220,217 kg hatchling produced in the country in the year 2001 of which capture from the natural sources is 1872 kg hatchery produced spawn is 218,345 kg. The contribution of the private hatchery to the total hatchling production is 97.5%; Government hatchery produced only 1.6% and 0.85% from the natural sources.

In the year 2001 the carp hatchling production from private hatchery was 214,682 kg of which Jessore district contributes 45,000 kg that is 21% of the total hatchling production of the country. The carp nursery trade in Jessore region has been developed based on the increasing seed demand all over the country. The ultimate goal of this business in these regions is to meet the seed supply for pond fish culture all over the country, solve the employment problems and improve socio economic condition of fish fry trade community. Bangladesh has 2.42 lacs ha area of pond and ditches all over the country. All these water bodies are very much potential for fish production. In spite of being high potential all these water resources do not use for fish production due to lack of seed supply. Carp seed production through induced breeding in Jessore region has made a real progress in inland fresh water aquaculture. However, still now seed production is not sufficient. The nursery operators in Jessore region especially in Chanchra takes the carp nursery trade as a challenge to build up the trade as an industry .Through the study it was to be known the existing condition of the trade like marketing channel, distribution area, mode of transport, credit support on this trade. They are now partially successful and within very short time they will be completely successful if necessary supports can be provided from Government and Non-Government sources. The suggestion based on the findings of the study will help to improve the fish fry trade. The study may suggest an urgent inquiry into the overall business with a view to find out the actual problems and possible solution. As the study will show an overview of present status and future prospect of carp nursery trade in Jessore region, it will add a new knowledge in the field of fish fry trade and build a foundation for further research on this field. Finally, this study will helpful for planning and developing programme for improving efficiency in this trade.

MATERIALS AND METHODS

This chapter deals with the methodology which was adopted for selection of the study area and collection of data. The methodology that was used for this study is briefly described below.

Study area

The study was conducted on 82 nursery operators of Jessore district. Due to importance of fish fry trade Chanchra of sadar upazilla was taken as the main study area. Two other upazillas namely Monirampur and Bagherpara were also considered as study area and similar numbers of customers come from different parts of the country. Both the nursery operators and the customers were selected randomly.

Types of data collection

For collection of data a structured questionnaire was prepared. Before formulating the questionnaire, visits were made in the study area .Different information about carp nursery trade were collected during the visit. After finalizing the questionnaire relevant data were collected by interviewing both the nursery operators and the fry traders directly. The researcher himself colleted the data during pick season (June to October, 2002) of the business.

Questionnaire preparation

The questionnaire was prepared emphasizing the objective mentioned above. Before finalization of the questionnaire, it was pre-tested through a field visit. Then the questionnaire was finalized and prepared for survey work. The questions were specific and were free from any kind of influence.

RESULTS AND DISCUSSION

Carp seed production through induced breeding in Jessore region has made a real progress in inland freshwater aquaculture. About 47% of the total nursery operators used leased ponds in their business to grow out hatchlings to fingerlings. The lease value of Chanchra was doubled than what were in Manirampur and Bagharpara. Due to high lease value the nursery operators conduct more cycles in a year with a view to compensate excessive cost.

Among the 82 farmers, 28 farmers (34.1%) were used to complete 6-8 cycles/year and 24 farmers (29.2%) were used to complete 8-10 cycles/year. Cent percent of the nursery operators of this area followed two layer nursery systems. In this system 31.7% nursery operator completed their cycles within 25-30 days, 28.05% within 30-35 days, 25.6% within 20-25 days and 8.53% within 35-40 days respectively to get fingerlings up to 3 inch size. According to Islam (1989), in two stages nursing, fry are reared for a period of 4-6 weeks at a density of 1 million/ha, by which time they reach a size of 2-3 inch. Hatchlings, collected from natural sources or produced by induced breeding, reared for one to two months in earthen rearing ponds to a size of about 5-7 cm before being sold to the pond culturists (Hasan, 1990).

In the present study, it was found that 4-10 full-time labours were involved in each nursery. Besides this, 6-10 part-time labours were involved in the peak season. During the peak season, the nursery operators themselves and other family members like women and children were also involved in the work. They are not considered as full-time or part-time labour.

Survival rate of the spawn in different nursery varied considerably. This was due to lack of proper pond management, optimum level of water quality parameters and lack of technical knowledge. Transportation hazards also cause mortality to some extent. The average survival rate of fry was 76% which was ranged from 60% to 90%. FRI undertook a study, where the survival rate was recorded 70% (Islam, 1989).

The total fry production in the selected nurseries was 1621 lacs of which silver carp contributed the highest position in fry production (386.7 lacs) followed by Rohu (345 lacs), Catla (321.9 lacs) Mrigal (197.4 lacs), Common carp (183.5 lacs), Thai Puti (104.3 lacs), Grass Carp (51.7lacs) and pangus (30.5lacs). The price of the hatchling of different species was different. This was due to the variable demands of the species to the customers, availability and growth rate of the species and culture system. However, the price of same species also varied from starting to the end of the season.

The marketing of fingerlings was generally done by the middlemen, since a very few fish farmers buy the seed directly from the nursery farms. The fry marketing channel consisted of hatchery owner, Nursery operator, Aratdar, Fry seller and pond owner (consumers). Aratdar was the main customer of the nursery operator and it was reported by 45.2% farmers. Aratdar sold the fry to the middlemen or the retailers and they used to sell to the pond owners.

The middlemen bought the fingerlings from the nursery operators on cash payment and sold them to pond owners at a profit of 100-200% on credit (Islam, 1989). It was found that the problems associated with fry marketing were created by the invasion of intermediaries and the nursery owner did not get the actual price of fry which was paid by the pond owner.

Transportation of live fish is wide spread practice particularly in the rural areas of developing countries and often represents the only means of supplying fry/fingerlings for culture (Ross and Taylor, 1989). In the study area, the fry were transported by means of bus truck, train, pick-up van and manual van. About 53.6% fry traders used pick-up van and 30.4% fry traders used manual van for fry transportation in the local areas. In case of far way districts bus, pick-up van and train were used by 45.5%, 36.4% and 18.1% buyers respectively.

The fry traders usually followed the traditional approach of fry carrying. They normally used aluminum pot or plastic barrel with no specified densities. For oxygen supply they always agitated the water in the pot or plastic barrel continuously during transportation. For long period of transportation they also changed water of the pot or plastic barrel. In Bangladesh, Fish seed-spawn, fry and fingerlings are transported traditionally in earthen/aluminum hundies (pots). Density of fish seed transported through this method is not based on any scientific basis, but on empirical knowledge resulting in high mortality. Traders are aware of the fish seeds' requirement for oxygen and thus they continuously agitate the water in the hundies during transportation (Haq *et al.*, 1991).

The transportation of fry and fingerlings was a problem in the study area. Not only the transportation system as a whole was unsatisfactory here; the mode of carrying the fry and fingerlings also leaves much to be desired. The prevailing fry transportation system is traditional as described by Saha and Chowdhury (1956), and results in lowering of vitality of the fry and resultant mortality. In the study area, it was reported that twenty to thirty percent mortality of fry were caused due to transportation claimed by 44% customers.

Modern technique of fish seed transportation is by using polythene bag filled with oxygen and fish hauling tank with agitator. This could not only reduce mortality rate and extend survival time, but could bring down the carrying cost considerably (Haq *et al.*, 1968). The densities of fingerlings computed for transportation in eight

liters of water under oxygen packing at 30°C temperature are 150, 80 and 4 fingerlings for 6, 12 and 24 hours duration of transport respectively (Santhanam *et. al.*, 1999).

Lack of credit support was another vital problem in developing the business. The nursery operators needed credit support at the beginning of the season for pond preparation and collection of necessary inputs. The main sources of capital of fry traders were from their inherited and own sources, bank loan, local money lender and other family sources. In the present study, it was found that only 18% of the local community got bank loan and only 32% took loan from local moneylenders and the interest was 12% and 36% per year respectively.

Credit for investment in aquaculture has traditionally come from non-institutional sources, most commonly from family members, village money lenders, fish brokers, fry/fingerlings suppliers and fish merchants. Pond owners frequently receive fingerling on credit from nursery operators where the cost of credit is high. In the banking system of Bangladesh, there is provision for credit in aquaculture. Bangladesh Bank co-ordinates and monitors the credit activities of other Banks like, Sonali Bank, Janata Bank, Agrani Bank, Rupali Bank, Bangladesh Krishi Bank, etc. About 90% of the pond fish culture credit was granted by Bangladesh Krishi Bank with a recovery rate of 20% (Ahsanullah, 1989).

Availability of suitable credit system in aquaculture operations is a problem. The institutional credits operated by a few commercial banks in Bangladesh are not easily available to all types of farmers. The poor and marginal farmers have no access at all to the institutional credits; although reportedly, a few of the rural banks viz., The Grameen Bank operates credits to the rural farmers with a high success of utilization. The poor have the inherent difficulty of interacting with the situation of credit utilization and recovery (Shah, 1991).

It has been observed in Bangladesh that, large-scale farmers have been the main beneficiaries for institutional credit. Most of the small farmers have limited or no access to institutional credit, most of which is short term credit. Providing security is always a problem with small fish-farmers and some kind of arrangement has to be made to guarantee loans to them for investment and working capital. It should also be accepted that credit administration costs are relatively higher for smaller loans. Recent experience suggests that supervised credit is at present the only alternative now available to replace the traditional ways of providing security, namely collateral or mortgage (Bhuiyan and Chowdhury, 1995).

Multi-ownership is another problem for getting institutional credit in fish fry trade. Bank officials are not familiar with fisheries activities and not trained in identifying credit request. The weekly or fourth nightly return of NGO's credit is another problem for collection of these loans for the fry traders.

In the present investigation, it was found that only 25% of the nursery operators attained training and the rest had no technical knowledge. The training was provided by the Department of Fisheries and the Youth Development Department. Modern equipment like test kit, DO Meter, P^H meter, aerator and the like were used by only 8.5% of the nursery operators and the rest did not get opportunity of using the equipment.

The most vital problem of carp nursery in the study area was the lack of technical knowledge of the nursery operator. There was no nursery operator with fisheries technical education. Most of them practice the nursery operation on the basis of their own knowledge that they attained by observation. The most important problem of the nursery operator commonly faced was the disease outbreak of the stocked hatchlings in the nursery ponds. The nursery operators in the study area possessed no facilities of using modern scientific equipment. The other problems were high price of various inputs, terrorism, unexpected market competition, record keeping system and lack of policy.

Availability of spawn/fry is the key point for the development of the pond fish culture in the country. But the production of carp seed is still very poor in Bangladesh so that it cannot meet with the demand. In the field of nursery operation in Bangladesh no striking technologies have so far been practiced by the nursery operators as like hatchery technology. Nursery operation is the consecutive step of hatchery operation as well as pond fish culture. But it is very good news that nursery trade in Jessore region playing a vital role in producing the carp spawn/fry and is providing not only in Jessore region but also throughout the country. It has now become a potential and profitable business at this region. In spite of high potentiality, there are some barrier in nursery trade at this region such as lack of technical knowledge, modern equipment, credit facility, transportation facility, lengthy marketing channel, availability of inputs in right time, lack of nursery trade, lack of fingerling development strategy, terrorism etc. Among all the problems technical knowledge and credit facility is most important. If it is possible to remove these problems of this business of the region, the production of carp spawn/fry will increase and will create more employment opportunity for the people of this area. This will also help the development of their overall socio-economic condition. The increased production will be able to meet with the demand of carp fry in Bangladesh. The carp nursery trade in Jessore region has been developed based on the increasing seed demand all over the country. The ultimate goal of this business is to meet the seed supply for pond fish culture, solve the employment problems and improve socio-economic condition of fish fry trade

community. But there were some problems which hinder the prospects of this trade. To mitigate the problems the following recommendations can be made:

1. Government should take step for the improvement of the technical knowledge of the nursery owner through training programme with the help of NGO's, FRI and other related institution.
2. There should be monitoring programme set up in the nursery owner's pond as well as in all aspects of fry trades through Department of Fisheries.
3. An effective mechanism for information exchange between the researcher, extension worker and the nursery operator has to be developed through arrangement of workshop and seminar. There should be provision for exchange of information among the nursery owners of the Jessore district.
4. Nursery operators and fry traders should be trained up on conditioning of fry that is very important for transportation of fry to far away districts.
5. Credit supply is one of the important issues in fish fry trade. Government should take step with the help of Bangladesh Krishi Bank for easy disbursement of loan. In that case they can follow the way of crop loan. Credit facilities should be made available to buy their inputs in time, in quality and in quantity with easy repayment conditions.
6. Involvement of too many steps-the process is a problem that demands attention for improvement of the trade. Elimination of certain stages in the trade not only would allow cutting down the time of transportation, it would also keep down the prices.
7. In order to solve the fry transportation problems, Government can encourage private sector for the development of transport system. There should be Bank credit facility on easy access.
8. Private sector should be encouraged on the use of modern equipments in businesses related to fry trading. There should be some facilities on behalf of Government like tax free access of these equipments. This will reduce the cost of these equipments.
9. An effective mechanism for information exchange between the researcher, extension worker and the nursery operator has to be developed.
10. Off-season breeding venture should be undertaken with necessary environmental modification so that the fry traders could be engaged during off-season months in as early as February and in as late as November of every year.
11. A planned fingerling development strategy has to be developed throughout the country, by which quality fish fingerling can be supplied largely from local sources.
12. The government should give special attention in providing proper training and credit support for the development of this trade. The government can give emphasize on the further research and extension for this particular technology.

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