

State of the System Report: Fish Seed Quality in Northwest Bangladesh

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Abstract

The production of freshwater fish based on stocking hatchery-produced seed has become increasingly important in Bangladesh, like many other countries in Asia, in the recent decades. Hatcheries, especially those producing carp seed, are well established in Bangladesh where both Government and private entrepreneurs are involved in the production and supply of fish seed. Increasingly networks of private producers and traders dominate the supply of seed to farmers and are important promoters of fish production. Although fish seed is abundant and cheap, a common emerging concern is that of poor quality. Fish seed that survive or grow poorly undermine both attempts to promote farming fish among new adopters and the consistency required by commercial farmers to produce low-cost fish for poorer consumers. A major issue is whether the poor performance of stocked fish is due to sub-optimal seed quality or simply inadequate management by the farmer after stocking. Further, if fish seed quality is to blame, is the major cause of poor quality genetic or management related? As fish seed stocked by farmers is frequently handled by many “actors” poor management may occur at many stages. It is important to understand the different aspects in fish seed quality, and its impact on fish production, if resources are to be best targeted and policy decisions on future

investment and management options improved. Conventional data collection, analysis and dissemination typically produce information that is too little and too late to inform such decisions. Participative methods involving collection and synthesis of information on current practice and opinion from a broad range of stakeholders are the basis of a concept of State of the System (SoS) reporting. Intensive fieldwork followed by initial analysis and presentation of results to stakeholders, is followed by revision and production of a concise, readable report (SoS report) in Bangla and English. The SoS report as described in this paper was based on a survey conducted in 8 districts of the Northwest region in 1998 and 1999. Additional data were also collected from nurseries and hatcheries in Adamdighi area of Bogra district, as they are also the major supplier of fish seed in the Northwest. Representative grow-out farmers (150), fry traders (122), nursery operators (37) and hatcheries (17) were interviewed using a short semi-structured questionnaire. In an SoS workshop held at CARITAS Center, Dinajpur in February 1999, the information was presented, discussed and reviewed with the stakeholders (fish farmers, fry traders, nursery operators, policy maker and extension personnel). Besides specific outcomes, research and implementation agendas were identified by the stakeholders which are incorporated in the SoS report. As a participatory method such an exercise may be an example to understand the existing situation and may be of help to develop future plans for overall development of quality fish seed production and distribution in the country.

Introduction

Successful fish culture depends on the availability and quality of fish seed to farmers. Most aquaculture in Bangladesh has been based on carps to date, supplied mainly by the private sector through fry trading networks of private producers and traders, delivering fish seed to even remote parts of the country. At present fish seed are abundant and cheaper than before but the issue of quality of fish seed has become an important issue. Poor quality seed results in low survival and slow growth of fish, thus creating negative impacts for farmers practising fish culture and discouraging new entrants. It is still not always clear whether poor performance of fish seed is due to the fish seed quality itself or results from inadequate management by grow-out farmers. Furthermore, if fish seed quality is a problem, is it due to poor genetic quality or related to management? Many actors handle fish seed from its source of production to delivery; poor management may occur at any stage. Understanding the stakeholders, their current practices, the constraints they face, and the experience gained as entrepreneurs in fish seed production, distribution and use is important. Identification of researchable constraints on fish seed quality, the genetic and non-genetic management factors and implications of strategies through policy implications will be useful for further development of aquaculture in Bangladesh.

This paper tries to explain briefly the methodology used for the study on 'fish seed quality in northwest Bangladesh' and the main outcomes of the study, with emphasis on the recommendations suggested for research and policy implications for improvement of quality seed production, supply and use in Bangladesh.

Research Methodology

The SoS methodology comprises several steps, such as identification of stakeholders, collection of primary information from stakeholders, analysis and synthesis of information and presentation of outcomes to the stakeholders in a participatory workshop for more discussion, followed by preparation and dissemination of reports in Bangla and English for wider use. Unlike more commonly used methods of data collection and analyses by survey using structured questionnaires alone, the SoS method provided more opportunities for participation of stakeholders and triangulation of the results within a short time frame.

Based on secondary information and working experience in the northwest, stakeholders related to fish seed production, distribution and use were selected. They included hatchery operators, nursery operators, fry traders and grow-out farmers. The government officials and NGO staff working on fish culture extension and development were also identified as stakeholders in the study. Information was collected from 150 grow-out farmers, 122 fry traders, 37 nursery operators and 17 hatchery operators for the study. Most of these stakeholders were located within the Northwest region but some hatchery operators were from Adamdighi, Bogra. This area produces a large proportion of the hatchlings used in the Northwest. Semi-structured questionnaires were used to collect the information. The information collected was analyzed, synthesized and presented in a two day workshop held at the CARITAS regional center in Dinajpur district town. The NFEP-2 extension personnel carried out all the activities for the studies with assistance from the local Department of Fisheries field level officials as part of their project activities. NFEP-2 was the local collaborator for the regional project on 'Fish Seed Quality in Asia' (FSQA) The different stakeholder groups assembled informally in different parts of the Caritas Center and information obtained from each of the stakeholder groups was presented to them in turn for comment and discussion. This allowed the different groups to assess the information independently and without the social pressures that typically occur in larger mixed groups. The method of presentation was tailored to each group, depending on literacy levels and delivery was pitched to ensure good communication and to stimulate discussion. This led in one instance to the research framework being critiqued and resulted in additional information being collected in the field after the workshop before its incorporation into the report. A further activity

was the identification and prioritization of an agenda for both issues by the different groups of stakeholders. This was in two parts - issues that could be actioned immediately, i.e. did not require further research and those for which new knowledge was required i.e. a research agenda. Immediately after the workshop, project staff drafted a summary report in both English and Bangla and this was quickly disseminated to participants.

A more detailed report, again both in Bangla and English, entitled the 'State of the System on Fish Seed Quality in Northwest Bangladesh' has also been produced a draft of which was presented at the NFEP-2 end-of-project workshop in February 2001 in Dhaka, and the final report has now been completed and is being distributed to a wider audience.

Results and Discussion

In the northwest of Bangladesh, initially riverine hatchlings were the main source of seed. In the 1980s, hatchery hatchlings were produced and supplied from Jessore in SW Bangladesh. In recent times, besides hatchlings produced and supplied from government hatcheries (including NFEP) and a few private hatcheries within the region, a large amount of seed is supplied from Adamdighi, Bogra. The hatcheries surveyed in the northwest and in Adamdighi were classified into three categories based on the amount of hatchlings produced in a season: small (<500 kg), medium (500-750kg) and large (>750kg). Most hatcheries surveyed were small or medium in size, and all the operations in the Northwest were small.

The number of nurseries in the region has increased as demand for fingerlings increased. However, 70-100 million fingerlings are still imported from outside the region. Nursery operators normally nurse 8-9 species on average stocking 16-30g hatchlings per decimal in their ponds. Adamdighi nursery operators tend to fence their ponds with fine meshed nylon net to protect them from predators like frogs and snakes. Most nursery operators purchase hatchlings from private hatcheries but some operations both produce and nurse hatchlings. Nursery operators have observed that hatchlings produced in the middle of the season survived better in ponds and provided better outcomes compared to the early or late season hatchlings. The production period of nursery operators in the northwest region is short (April - August) because of limitations on the availability of water in ponds and the lower availability of quality hatchlings.

Most farmers in rural Bangladesh purchase their fish seed from itinerant traders carrying fry in open aluminium containers by foot, or increasingly by bicycle or rickshaw van. Traders are poor people but their numbers have increased substantially

since hatchery seed has become available and aquaculture has expanded. The fry-trading network originated from Parbatipur railway station with the riverine hatchlings. The development of hatchery hatchlings and supply of fry/fingerlings from outside the region resulted in a longer trading season with increased involvement of middlemen and fry traders. Fry traders are the last link in the trading network, receiving the lowest benefits but bearing the greatest risks in their business. Traders reduce risk in several ways. For long distance transportation fry traders rest fry/fingerlings by keeping them in hapas in ponds or in nursery ponds before delivery to farmers. The fry traders also use different kinds of chemicals or additives to reduce mortalities.

The main season for fry trading extends from March to July. Early season trading based on over-wintered fingerlings appears to be increasing. On some occasions, fry traders suffer heavy mortality of their fry/fingerlings, and sometimes do not get the desired species most in demand from the nursery operators. Fry traders assess demand for fingerlings of different types from personal contacts within the daily market or during their visits for trading. Fry traders can transport fry/fingerlings for delivery to farmers even in remote areas, but typically risks are higher and benefits lower.

Almost 70% of farmers purchase fingerlings from fry traders at the pond side. The grow-out farmers in distant areas have limited choices to purchase fingerlings, as there are limited sources for them to purchase from. The stocking time of fingerlings for grow-out depends on the availability of water in their ponds. Of the species the farmers stock in their ponds for grow-out, Indian major carps and Chinese carps (especially silver carp) are most preferred.

A total of 17 policy recommendations and 15 research recommendations were developed by the stakeholders for implementation. Such policy recommendations may be of help to the policy makers to implement the activities with an objective to improve the production, supply and use of quality fish seed in the country. The research agenda, which was prioritised by a range of stakeholders should allow research organizations to ensure their research programme is needs driven [DP1]. For the stakeholders involved in these studies, this was an opportunity to share, to increase awareness on such emerging issues and may be of importance for development of their future activities. The policy and research recommendations are presented below.

Policy recommendations

- 1 Ban and monitor cross breeding and hybrid production.
- 2 Introduce cryopreservation techniques.
- 3 Develop and disseminate best practices for using anesthesia for transporting broodfish.
- 4 Improve information flow from government to farmers on broodstock quality and management.
- 5 Monitoring and certification of seed quality produced by private hatcheries by Government.
- 6 Dissemination of BFRI guidelines on size and age characteristics suitable for broodfish by species.
- 7 Set up a broodfish bank network – certain lead/regional centers to hold and keep broodfish, including introduction and importation of original strains from original sources.
- 8 Set up a dissemination programme on improved strains to private hatcheries.
- 9 Organise diploma-level training for seed producers.
- 10 Introduce training programmes for hatchery and nursery skill development.
- 11 Enforce controls on chemical uses including prohibition on the use of unsafe chemicals.
- 12 Develop and disseminate recommendations for nursing 5-day old hatchlings.
- 13 Develop and disseminate best practices for over-wintering different species.
- 14 Make facilities available to traders such as clean water during transportation.
- 15 Disseminate guidelines for using GIFT strains of Nile tilapia.

Research Recommendations

- 1 Factors caused growth deterioration of stocked fingerlings.
- 2 Information on good quality seed and its dissemination strategy.
- 3 Practical methods to monitor quality of fish seed before stocking.
- 4 Quality comparison of over-wintered and new season fingerlings.
- 5 Disease tolerance of different fish species stocked.
- 6 Use of additives/chemicals during transportation and their effects on quality and growth of fish.
- 7 Comparison of different transport containers based on cost and effect on seed quality.
- 8 Methods of testing of seed quality with traders during transportation.
- 9 Transport problems of more sensitive fish species.
- 10 Safer and cheaper alternatives for pesticides currently used in nursing.
- 11 Feasibility of nursing fry/fingerlings in polyculture.
- 12 Improved techniques for over-wintering carps.

- 13 Impact of multiple spawning on seed quality.
- 14 Possibility of broodfish exchange between hatcheries to improve seed quality.
- 15 Riverine and hatchery produced broodfish on their effects on seed quality and grow-out performance.

Conclusions/recommendations

The draft of the State of the System (SoS) report as distributed during the NFEP-2 end-of-project workshop has already elicited interest especially among researchers looking for suitable topics towards improvement of quality seed production, supply and use., some of which have received support from the SUFER (Support for University Fisheries Education and Research), [DP2] With wider dissemination in different research, academic, extension and development institutions, this report along with similar reports produced by the FSQA Project for other countries (Northeast Thailand, Northern Vietnam and Southern Vietnam) will enhance the lessons learnt across the Region and contribute to better policy and more needs-driven research.

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Page: 73

[DP1]Needs rewording

Page: 75

[DP2]Needs rewriting