

Experiences of an NGO in developing a decentralised fingerling production strategy in Bangladesh

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In Bangladesh, an important Asian fish producing nation, more than 90% of fish seed is produced from hatcheries.

Most of this is carp seed from the private sector hatcheries. Rearing of hatchlings or fry in nursery ponds is considered a key stage and in semi-intensive nursery ponds there is still around 60 % mortality of hatchlings. As a consequence the availability of quality fingerlings in rural areas is limited for existing fish farmers as well as new entrants.

The concept of Decentralised Seed Production Strategies (DSPS) was developed within farmer's rice field systems with the introduction of common carp in order to meet this perceived lack in the supply of quality fingerlings. CARE-Bangladesh promoted the idea to farmers in northwest Bangladesh in their INTERFISH project. Initially seed production was limited to common carp, however this developed with the introduction of GIFT (Genetically Improved Farmed Tilapia) in 1999 as part of a research trial with farmers in two communities in Rangpur District with support from the DFID-funded Northwest Fisheries Extension Project. The CARE INTERFISH project was followed by the CARE GO-INTERFISH project, which spread the concept of producing both common carp and tilapia fingerlings in farmers' rice fields. With the uptake of fingerling production in rice based systems the concept of rice fish cultivation has been strengthened, being a proactive model of IPM (Integrated Pest Management) for farmers with increased yields of both rice and fish and thus income, as well as decreasing the overall purchase and use of pesticides.

In conjunction with the WorldFish Center (Bangladesh and South Asia Office, Dhaka) the Institute of Aquaculture is looking at the livelihood and institutional impacts of the DSPS in order to develop a model of

sustainable fingerling production at the local farmer level within Bangladesh and further afield in Asia. The project, known as the Decentralised Seed Project and funded by the DFID Aquaculture and Fish Genetics Research Programme (AFGRP), is working in 8 regions of Bangladesh through 11 partner NGOs (non-government organisations). This article illustrates the experiences of one of those partner NGOs in delivering this new innovative concept of juvenile fish production in farmers' rice fields.

Case study - Foundation for Human Development (FHD): implementing decentralised seed production at the village level

A case study of FHD (Foundation for Human Development) was carried out between January and June 2004. Different methods including secondary information collection, observation, checklists, group discussion, and key informant interviews were used in order to study the experiences of FHD in piloting this rice field based juvenile fish production system in Hawraniz, a village in Sherpur District. FHD is a medium-sized, Dhaka-based NGO with regional/district offices throughout Bangladesh. Its Area Office is situated in Sherpur Sadar Upazila, 8km from Hawraniz, and is overseen by World Fish's Regional Office in Mymensingh. Figure 2 below illustrates the overall institutional framework of the aquaculture extension program of FHD supported by WorldFish.

Functions of FHD

The organisation started in 1994 implementing a number of different human development programmes including education, integrated food security, AIDS mitigation, women's empowerment, disaster rehabilitation, micro-credit support and fisheries development in different districts throughout Bangladesh. FHD receives technical and financial support from various national and international organisations such as Department of

Fisheries, Asian Development Bank, International Labour Organisation, CARE, BRAC, Proshika and Concern-Bangladesh. In addition, since 2001 it has successfully started to develop its aquaculture extension program supported by the Development of Sustainable Aquaculture Project (DSAP), a USAID funded project implemented by the WorldFish Center Bangladesh. Under DSAP, WorldFish Center has assigned FHD to pilot, observe and develop the DSPS trial activities at the village/farmer level in its working area.

Fish seed availability in and around Hawraniz

In the area of the DSPS trial of FHD there are no government or private hatcheries for fish seed production, with people buying fish seed from fry traders who collect it from hatcheries/nurseries in other areas. Farmers of Hawraniz village stated that the growth of fish in their household ponds was good over the last two decades indicating potential for aquaculture. The soil quality around the village is loamy and the source of water for irrigation for rice cultivation during the Boro season (irrigation period from mid February to May) is mainly shallow irrigation pumps. Development and availability of irrigation facilities at the farmer's level have made it possible for them to ensure availability of water to rice plots during the dry season, and as a result broodstock management, fish seed production and subsequent growth of fish have all notably improved.

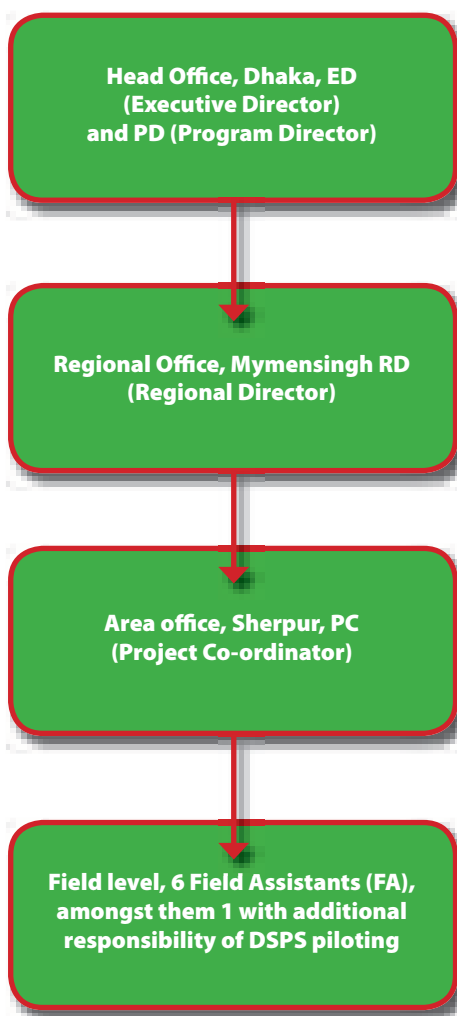
Initial training and livelihoods impacts

The major livelihood strategy of villagers in the area is rice based agriculture. In addition, people have small-scale businesses trading in agricultural products such as vegetables and fish, part-time jobs rickshaw pulling and labour selling during the rice harvesting season. The six trial farmers all had suitable rice plots adjacent to their households with good soil quality, water holding capacity,



Field Assistant Mr. Aziz working for DSPS trial (first from the right) with other staff

Organogram of FHD



ditches and raised dykes enabling them to successfully stock and grow fish in their rice fields. In July 2002 the Project Co-ordinator of FHD and a Research Assistant from WorldFish Center received training on broodfish rearing from WorldFish Center Bangladesh. This was passed on as structured training to FHD's Field Assistants in August. The Field Assistants and Projector Co-ordinator jointly selected 6 farmers for the trial – their main criteria being the afore-mentioned appropriateness of their plots as well as choosing farmers who were clustered together in one community. FHD provided 2 days foundation training in September 2002 to these 6 farmers in broodstock rearing through a household approach which involved at least 2 members from each household. Afterwards assistance and technical advice was provided through bimonthly group meetings. All farmers in the DSPS trial received the tilapia fry, hapa and a scoop net. The GIFT fry were purchased from the BFRI (Bangladesh Fisheries Research Institute) hatchery in October (average size 2-3cm). These fry were grown up in hapas by the farmers to 80-100g by February 2003 (survival rate 50 -60%). At the end of February they were stocked as broodfish into the rice plots. Finally by the end of February 2003 the trial farmers received training on the management and techniques involved in fingerling production in rice fields. After 5-6 months all of the farmers except one succeeded in producing tilapia fingerlings from their own rice fields. These farmers' first attempt at fingerling production ranged from 4,000 – 15,000 juveniles which corresponded to a 5-30% increase in their seasonal income.

Their households greatly benefited with the following direct and indirect livelihood impacts:-

- farmer's increased knowledge on DSPS
- improved culture and management system of tilapia
- increased areas of rice-fish production
- increased supply of fish seed, food fish and rice production
- increased household level fish consumption and extra income from selling fish
- reduction of pesticide use in rice plots
- reduced water contamination because of reduced use of pesticides
- reduced frequency of farming family poisoning and reduced public health risks
- increased profits with reduction of farming cost
- development of farmers group, improvement in communications skills and problem solving;
- farmer's increased ability to deal with risk and opportunities
- farmer to farmer dissemination resulting in more than 20 new farmers (secondary adaptors) producing fingerlings in the locality

- farmer's stronger relationship and access to NGOs such as FHD and other service providers

One of the potential concerns of promoting such a system is the maintenance of effective broodstock management practices by the farmers. The Decentralised Seed Project through FHD is presently monitoring the quality, growth rates and genetic diversity of successive generations of fingerlings produced in rice fields in order to produce realistic and workable recommendations and guidelines for farmers. Not all of the farmers involved have access to annual water supplies and holding ponds for broodstock, whilst those that do also have the added problem of flooding and potential deleterious breeding with incoming non-improved tilapia and carp stocks.

Overall, the farmers were very pleased with their new means of increased fish production and income. Farmers are even intending to expand their plots in order to increase production and its associated benefits. The staff of FHD are very active in their supervision and have built up a good relationship with the farmers. One of the trial farmers, Md. Jaynal Abedin, has played an integral role in acting as informal facilitator between FHD and farmers in the community. As such this farmer is a good example of an effective rural extension agent for other communities in Bangladesh.

It is still early days yet for the farmers in NW Bangladesh producing fingerlings in their rice fields and it will take time to see how the system and its potential benefits develop in a district/regional context. However results and secondary adoption rates from the trials have been encouraging and following the initial introductions of GIFT tilapia broodstock the availability and sale of fingerlings in the area has been dramatically increasing. It is presently too early to comment on the limiting of genetic deterioration within successive generations of the introduced stocks grown in rice fields, however it is an area of the research that will give us good data in future years. The role and approach of NGO's such as FHD working in developing and sustaining such local seed production systems is also likely to change as it aims to make farmers more self reliant and, as is beginning to happen already, those existing farmers producing and selling fingerlings in their rice fields acting as catalysts for change in encouraging others to follow.



More information on this work is available at www.dfid.stir.ac.uk/afgrp/seed.htm. The story is also covered in an upcoming edition of Earth Report on BBC World, BBC News 24 and BBC2.