

Productivity or Profitability?

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One of the main trends in fish culture is towards capital intensive, high-input, high-yield systems. Projects have demonstrated that the dissemination of the right technology package in rural Bangladesh could boost current pond production levels by 10 fold or more, from 500 kg/ha/year to more than 5 tonnes/ha/year. However, these systems of relatively high-input fish culture have been developed under the ideal conditions of research stations where water supply, quality feed inputs and management are not constrained by financial or resource limitations. However, the fact of life in rural Bangladesh is that the growing season may be shortened by ponds drying out or overflowing. Most ponds have no water exchange facility and are not drainable. There is also intense competition for scarce resources. Inputs that may enhance fish production in ponds, agricultural residues such as rice husk or oil seed cake and organic materials such as cow dung or compost, are also required for other purposes. This creates seasonal and locational scarcities, and supply and demand factors keep prices relatively high.

Understanding the merits

Production oriented technology packages for semi-intensive fish farming do not allow for the fact that in Bangladesh fish pond farming is mainly a secondary occupation. A general lack of skill, knowledge, capital and access to resources means that most would-be-fish-farmers are unable to provide all the necessary inputs correctly, at the right time, of the right quality and in the right quantity. Fish farming is but one of several production and survival options undertaken by poor producers. Their decision to invest their meagre capital, their time, labour and other resources is based on what they consider to be the comparative advantages of fish culture. It is therefore important to understand the relative merits, as well as the actual potential of fish culture against other options (e.g. labouring, chicken rearing, share cropping) before it is promoted.

Comparative research

This analysis led the Rural Enterprise Project (REP) of the Bangladesh Rural Advancement Committee (BRAC) to undertake an action research carp polyculture project in 1991. There were two main objectives:

- to compare the productivity and profitability of fish culture in ponds under 3

different regimes (only pond preparation; with pond preparation and fertilization; pond preparation, fertilisation and supplementary feeding).

- to develop an appropriate, manageable and profitable system of carp polyculture for BRAC groups of landless and other disadvantaged people.

The experiment was carried out by the farmers, who received training and technical support. Regular weekly meetings were held to discuss progress and problems at pond level. Monthly meetings were with all participating farmers, where they could share experiences and where the next month's activities were planned. All ponds were typical "village" or "homestead" ponds. They were assumed to have similar physical and chemical characteristics. None had water exchange facilities and all ponds were multi-use, used for bathing, clothes washing, etc. The materials used for supplementary feeding were purchased locally and, due to their unprocessed form, their nutritional quality was poor.

Set up of the experiments

A total of 12 ponds were selected in 2 of BRAC's working areas in the District of Sathkira, Southwest Bangladesh. They were divided into 3 groups of 4 ponds, with each regime applied to 4 ponds. The project was carried out over the period July 1991 to August 1992. To remove unwanted species, the ponds were poisoned and limed. 7-10 days later, an initial dosage of 600-1000 kg/acre of cow dung, 20 kg/acre of urea, 10 kg/acre of Triple Superphosphate (TSP) and 5 kg/acre of Muriated Potassium (MP) was given. The ponds were stocked at a rate of 8,400 fingerlings/ha. A mixture of Silver Carp

(35%), Catla (15%), Rohu (23%), Mrigal (18%), Common Carp (6%) and Grass Carp (3%) was used. Regular dosages of an average of 20-70 kg/acre cow dung, 7-15 kg/acre of urea and 3.5-7.5 kg/acre of TSP were supplied weekly. Fertilisation rate varied with temperature, water quality, soil type, pond age, etc. Additionally, the third group of ponds were daily supplied with a mixture of rice bran and oil cake in a ratio of 1:3 at an initial rate of 5-6% of total body weight. This was gradually reduced to 1-1.5%.

Monthly, the mud on the bottom of the pond was agitated with a rope to release harmful gasses. For times per year, liming (25-30 kg/acre) took place. Harvesting took place 4 months after stocking (15-20%), 3 months after the first harvest (15-20%) and 2-3 months later all the remaining fish were harvested.

Minimum investment, maximum return

The ponds under the regime with both supplementary feed and fertiliser inputs produced on average 10% more fish than the ponds where only fertiliser was applied and 125% more fish than the pond with no inputs. However, its profitability is less than half of that of the pond with fertiliser only. The pond with no-input treatments made a loss. The main reason cited for this unexpected result is that the costs of the supplementary feed inputs are relatively high. Moreover, additional input costs require increased credit and thus increased interest payments. In this regard the ponds where both feed and fertiliser were applied incurred interest payments 57% higher than the ponds with applications of only fertiliser.

Given poor producers' lack of capital, poor access to credit and their lack of knowledge about modern fish farming techniques, BRAC recommends that NGOs and other development agencies which focus on this group of the population adopt the strategy of low-input but relatively profitable fish farming, rather than promoting more productive semi-intensive fish culture, which is only marginally profitable.

The BRAC project described above is but one of the several strategic action research initiatives being implemented by NGOs in Bangladesh. It provides but one example of the many attempts in Bangladesh to develop technology options both with and for the poor.



The profitability of ponds with only fertilisers applied had maximum returns.

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