

Shrimp culture

Expanding farms, shrinking lives

The trend in Bangladesh towards increasing the area under shrimp farms does not result in tangible local benefits

As a country with a large deltaic floodplain, Bangladesh has a long tradition of fishing and fish culture and enjoys enormous potential to produce all kinds of aquatic products. In recent decades, due to an increased demand in the international market, shrimp has become one of the most important export products. Seafood ranks third in export earnings, 85 per cent of which comes from shrimps.

The government has declared shrimp cultivation a priority industry and to boost its production, specific support programmes (both technical and financial) have been designed. However, there are many people who are critical of this policy of expanded shrimp cultivation. They are mainly concerned about the ecological and social impacts.

Shrimp cultivation is undertaken both inside and outside polders (areas protected by embankments from tidal inundation) in areas, which have access to saline water. Shrimp fields need to be protected with *bunds* (embankments, usually of earth). Once the *bunds* are ready, fields are flooded, and the water brings with it post-larval, juvenile shrimp and various fish species.

Cultivators used to depend completely on this natural intake of shrimp and fish. Nowadays, with a growing number of shrimp fields and prospects of greater profits, cultivators also buy post-larval and juvenile shrimp to increase stocking density in the fields.

This change in practice has opened up many new avenues for employment. Catching of shrimp larvae in the river with different types of nets is a common sight in the south-west of Bangladesh. Direct transactions between catchers and

growers do not normally take place. Traders of shrimp fry, who often also trade in adult shrimp as *farias* (middlemen), have emerged. Various kinds of credit and patronage relations are involved within a hierarchy of catching, trading and cultivation of shrimp.

Depending on the species, shrimp culture starts at the end of April or early May and continues until October. The harvest starts around August and continues until December. The production cycle of shrimp interferes to a certain extent with the production cycle of paddy.

This has several important implications. In the area of this study, the first commercial shrimp field of around 55 acres was established in 1979. Since then, shrimp cultivation has continued to expand, taking over new polders. By 1993, about 3,750 acres of land, divided into 70 fields, had been brought under shrimp cultivation.

From 1986 onwards, there was a massive increase in the number of shrimp fields. By end 1986, the number of fields was more than four times the 1985 level. This increasing trend continued until 1989, after which it showed a gradual decline.

Rising demand

In terms of increase and decline of the number of prawn fields, the specific years of 1986 and 1989 are particularly relevant. The demand for shrimp in the world market rose sharply from 1985 onwards. The expansion of shrimp cultivation between 1985 and 1986 was more a result of this increased global demand than local factors.

The impact of shrimp cultivation has three dimensions: economic, social and environmental. Many people believe

shrimp cultivation to be highly profitable. It is also said to stimulate employment in related areas, for example, the catching of shrimp fry, and trading.

However, this narrow perspective only compares the profitability of shrimp cultivation to paddy cultivation. No account is taken of sustainability, the total household economy, or the farming system as a whole.

A more comprehensive cost-benefit analysis shows that, while shrimp farming brings fortunes to some, it incurs significant loss of opportunities for almost every household. The opportunities lost include those for rearing poultry and livestock, growing fruit trees, kitchen gardening, culturing fish in homestead ponds, availability of cow dung and firewood for fuel, and access to fresh drinking water.

The consequences of this for each individual household and for the society at large are far-reaching. For example, the loss of livestock has multiple effects: loss of draft power for tilling, threshing and transportation of goods, and a decrease in milk production.

In many areas, shrimp farms replace agricultural crops like jute, paddy, sesame, mungbean, and pumpkin. If all the benefits, which a peasant household

derives from these sources (in terms of direct consumption, cash income and employment) are taken account of, then shrimp cultivation is far less profitable than is claimed.

There are also increased costs to health from a rise in certain water-borne skin diseases (resulting from stagnating and polluted saline water) and undernourishment due to the lower yield or total loss of the *aon* paddy (that grown during the dry season of September to December) because of delayed planting, and water salinity.

In shrimp culture, income distribution is heavily biased in favour of the owners or controllers of the field. Control over land is the crucial factor in cultivation of shrimp. According to a recent report, 70 per cent of the shrimp fields in the greater Khulna district are owned or controlled by outsiders, 20 per cent by local rich landowners and the remaining 10 per cent by small and marginal farmers.

Maximizing profits

Shrimp entrepreneurs tend to maximize profit by expanding, rather than intensifying, the area under cultivation. This is clearly reflected in low yields. Often expansion of shrimp farms is achieved through coercion of the poor. Not only do they lose their land (in exchange for very low rent), but they are also unable to find enough work for their

Getting women involved

Next to agriculture, aquaculture plays a very important role in the economy of Bangladesh. The country has 1.7 million ponds covering about 160,000 ha. About 1.3 million people are employed full-time in fisheries or related activities and another 10 million people work seasonally. Among the total persons employed, 10- 12 per cent are women.

Of Bangladesh's population of over 120 million people, women make up 48 per cent. Most of the rural women are engaged in different agricultural work in addition to their domestic responsibilities. But their participation in aquaculture activities is hampered by several constraints, mainly social and religious. The more important constraints are: the traditional thinking that aquaculture is a male-dominated work; difficulty for women to manage ponds far away from the house; unwillingness of the male-dominated society to accept the fact of women's involvement in income-generating activities; illiteracy; religious rules and cultural norms; and lack of access to funds and resources.

Yet, the fact is that pond fish culture needs less labour and involvement, which women can easily provide in addition to their family duties. The economic returns they get within a short period can help uplift them as well as empower them within the family and society.

Keeping this issue of women in mind, donors, several national and international NGOs and government agencies have come forward to eradicate poverty, create employment opportunities and associate rural women in the mainstream national economy through aquaculture practices.

The International Centre for Living Aquatic Resources Management (ICLARM) is executing a programme called Aquaculture Technology Transfer Through NGOs and Feedback to Research. Led by M .V Gupta, Senior Aquaculture Specialist and Team Leader of ICLARM, the project is in collaboration with the Fisheries Research Institute, Department of Fisheries, Bangladesh Agricultural Research Council (BARC).

Five national NGOs are implementing the programme, which covers 24 districts representing different agricultural parts of the country.

Under the programme, the participating NGOs demonstrate the technologies of fish culture in seasonal and perennial conditions. They also raise fry in 853 nursery ponds, covering an area of 93,908 ha. In the demonstration programme, 3,563 farmers are involved, of whom 54 per cent are women. ICLARM gives the technical support for implementing the programme and developing linkages between government organizations and NGOs.

The following are sketches of two women's groups, which have been participating in the technology transfer programme of the project:

RAHMA BEGUM, led by nine group members of TMSS, an NGO, operate a 0.12 ha pond. At the rate of 9,000/ha, they stocked fingerlings of catla, rohu, silver carp, mrigal, grass carp, common carp and thai sharputi during June 1994. After stocking, they fed the fingerlings daily with rice bran and agriculture by-products readily available from their homestead. They also applied cattle manure at the rate of 1,000 kg/ha/month and urea and TSP at the rate of 25 kg/ha, every 15 days. After five months, they started harvesting table-size fish, which they sold in the market. In nine months, they harvested 402.7 kg of fish from the pond (3,356 kg/ha) and earned a net profit.

Another womens group, ASHA MOHILA SOMITY of Banchte Shekha, consisting of 30 members operated five nursery ponds of 1.056 ha area. They started by stocking 15 kg five-day old carp hatchlings. After one month of rearing, they re-stocked the fry in separate ponds to produce fingerlings, which they started selling too. During the rearing period, they used a mixture of powdered rice bran and oil cake twice daily as feed. They supplemented this with cow dung. After a month of spawn stocking, they started selling the fry and, subsequently, fingerlings to hawkers and neighbouring fish farmers. In this way, they managed to take home a net profit as high as 280 per cent on the initial investment.

These two case studies show women's ability in carrying out all kinds of aquaculture operations by themselves.

—by Debashish Mazumder, Aquaculture Officer, International Centre for Living Aquatic Resources Management (ICLARM), Dhaka

family members. Compared to paddy cultivation, labour requirements for shrimp farming are low. Furthermore, most of the labour is hired from outside. Consequently, many (especially men) are forced to migrate to seek employment. This forced migration not only creates emotional tensions in the family, but also places additional responsibilities and burdens on women.

Shrimp cultivation also influences the process of social differentiation by directly affecting the land ownership pattern. Our study investigated the extent of land transfers among the villagers whose land is under shrimp cultivation, and found that for the period 1989-1990, almost 60 per cent of land sales were made by farmers owning less than three acres. A strong link was found between the sale of land by small-holder households and non-receipt of rent from the shrimp cultivators.

When fields are flooded with saline water, most of the vegetation begins to die, and salinity of the soil increases. Shrimp fields are under water for almost eight months. Consequently, the soil remains soft, and does not require tilling for planting. Over

time, this increases the salt content of the soil, and replaces some of the nutrients. Monsoon rainfall and the reduced tillage are not sufficient to wash or work the salt out of the soil. Microbiological systems, which regenerate soil fertility through fixing nitrogen from the air can not function during the long inundation periods. This hampers the mineralization process and decreases the soil fertility significantly.

Long-term inundation destroys traditional fish populations in lakes and canals. This has a major impact on the incomes of the poor, whose livelihoods and subsistence depend on these common property water resources. Fish stocks are also depleted by the increased catching of shrimp fry in fine-meshed nets. This also creates ecological imbalances, affecting species composition, since only the shrimp larvae are retained. All the other species are discarded on the ground, dead.

Finally, the rapid expansion of shrimp culture has had a major impact on the mangrove ecosystem. Aerial photographs taken in 1975, 1981 and 1983 dramatically depicted the changes in the Chakaria Sundarban area. To offset some of these

Health Warning: Prawn Farming can Seriously Damage your Community and the Environment

Pak Phanang Bay is located on the eastern side of Thailand's southern isthmus. The region comprises a deltaic habitat with rich coastal resources. It is perhaps typical of Thailand's southern coastline, suffering from economic under development, with a per capita income less than half that of the rest of the nation. In 1991 CORIN (Coastal Research Institute of the Prince of Songkhla University) made a study of the Pak Phanang region. Some of their findings are summarized below.

Rice had been the staple crop for centuries, but paddy production is no longer very profitable. Increasingly, farmers are switching to vegetable, fruit and shrimp farming. Deforestation due to rubber plantation development in the mountains, and increasing use of agrochemicals in intensive paddy cultivation, are straining fresh-water supplies.

In the past, the region was also very dependent on the fish economy. As much as 95 per cent of the population were dependent for their incomes on fishery-related activities. However, catch size and revenues have decreased drastically over the last 10 years. For example, a reasonable catch from a lift-net in 1980 was 10 kg for two to three hours work. In 1990, it could take a whole day to catch just two or three kg. It is claimed that the loss and degradation of the coastal environment, and of crucial habitats like mangrove areas and wetlands are major causes of declining fish production.

The rapidly expanding shrimp farming industry has brought with it much-needed jobs and wealth. However, it has also brought environmental and social problems, following as it does a cycle of boom and bust. In 1979, shrimp farms numbering 3,378 covered some


25,000 ha. By 1989, this had risen to 10,374 farms occupying 78,209 ha. Much of the land for shrimp farms was derived from rice paddy and mangroves. The intensive farming method and the nature of the environment mean that each pond has a profitable life of only five years before its production is reduced by infection or other difficulties. These include market-related difficulties. Rapidly increasing supply has outstripped demand, bringing prices crashing down and rendering many shrimp farms unprofitable. After five years, ponds are generally abandoned, leaving salt-laden scars on the landscape.

The pollution caused by the shrimp farms is considerable. Shrimp farm effluent, consisting of toxic and organically loaded sludge, is released into the irrigation canals, polluting rice fields and the downstream coastal environment. Salt water is brought into the shrimp ponds by canals, and this has intruded into the fresh-water systems. Reduced river flows (brought about by siltation and increased irrigation) has facilitated salt-water intrusion through tidal effects. Drinking water now has to be collected from rainfall. In drought years, it has to be collected from an inland river.

The cycles of boom and bust, degradation of local resources and conflicting development objectives create many social and economic problems. Shrimp farmers, rice farmers, mangroves and urban settlements all compete for limited land and water resources. The end result is a depleted ecosystem, and a divided community in conflict.

— from *Coastal Resource Management in Pak Phanang Bay, Thailand* by Somsak Boromthanarat, Bussabong Chaijaroenwatana and John Rowe

negative impacts, the government and the donors have started to include NGOs in shrimp projects.

However, NGOs, while minimizing local conflicts through socio-economic activities, are not able to halt the process of environmental and socio-economic degradation. 

This article by Anjan Datta is based on his paper presented at the European Network of Bangladesh Studies' Fourth Workshop In the Netherlands, 25 to 27 August 1994