

Bangladesh Prawn-Farming Survey Reports Industry Evolution

Summary:

Although many freshwater prawn farms in Bangladesh are small-scale operations, larger commercial facilities are driving production increases in the country. A survey of 100 prawn farmers from four prawn-farming areas indicated that nearly all farmers practice polyculture of prawns with carp. Primarily using hatchery fry, they apply modified extensive practices that include fertilization and supplemental feed.

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In recent years, the global production of freshwater prawns has increased steadily, with most production in Asian countries like China, India, Indonesia, Bangladesh, Thailand, and the Philippines. The farming of *Macrobrachium rosenbergii* in Bangladesh has emerged as one of the most important sectors of the national economy that offer export potential. Due to this importance, the government designed a support program to boost production.

Industry Overview

Freshwater prawn farming area increased from around 2,200 ha in 1991 to a current estimated area of 35-40,000 ha. Currently 400,000 people are directly or indirectly involved in Bangladesh's prawn production.

Total marine shrimp and freshwater prawn production in Bangladesh was estimated at 114,660 mt in 2004, but the contribution of prawns is not known because export statistics often do not distinguish between shrimp species. In 2004-2005, Bangladesh exported 46,533 mt of shrimp and prawns valued at U.S. \$335.5 million, of which 15-20% was contributed by freshwater prawns.

Industry Survey

The authors recently conducted a survey funded by the Aquaculture Collaborative Support Program to assess the current status of prawn-farming systems in Bangladesh. One hundred prawn farmers were randomly selected from four major prawn-farming areas: Mymensingh, Noakhali Sadar, Bagerhat Sadar, and Fakirhat.



Most farmers in Bangladesh use partial harvesting to sort out market-size prawns. Prawns yields are typically higher in monoculture production systems.

Many farmers implement a so-called “improved extensive” approach that combines tradition and technology.

Primary data was collected through face-to-face interviews and group discussions, while secondary data was gathered from governmental and nongovernmental sources.

Farming Practices

The cultivation of freshwater prawns in modified rice fields – locally referred to as “ghers” – has been a recent development in Bangladesh that is particularly prevalent in the southwestern part of the country. On the other hand, in places where prawn culture is not well developed commercially, farmers grow small quantities of prawns in ponds originally built for white fish production to ensure sustainability.

In southwestern Bangladesh, prawn farming alternates with paddy production. Most farmers avoid cultivating rice during the monsoons, when the prawns are in the ghers. Most traditional culture systems are extensive, but many farmers implement a so-called “improved extensive” approach that combines tradition and technology.

Initially, freshwater prawn culture was fully dependent on the collection of wild fry. But currently, this practice is gradually declining due to exploitation of broodstock and postlarvae. Moreover, prawn farming is expanding rapidly at 10%/year, which, when combined with declining wild catches and increasing demand for wild postlarvae, has resulted in higher prices for postlarvae. As a result, most farmers currently depend on hatchery postlarvae.

Preparation, Integration

Survey results showed that almost all farmers dried their ponds, repaired their dikes, and removed aquatic weeds during the dry season. Lime was applied at 0.5-2.0 kg/40 m² to improve water quality. Farmers usually removed undesirable fish species through drying, netting, and using rotenone. A few years ago, fertilization was uncommon, but the survey showed that 62% of farmers regularly used both organic and inorganic fertilizers during pond preparation.

Varied pond designs provide opportunities for production diversification while primarily growing prawns, fish, and rice. Some farmers reported growing vegetables on dikes to enhance family food security and gain income from the surplus crops that could be used for prawn feeds,

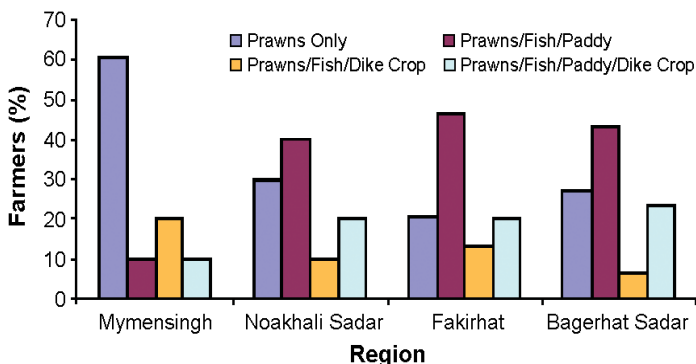


Figure 1. Integration of prawn farming with other production activities.



Some farmers grow vegetables on pond dikes to enhance family food security and gain extra income to cover prawn production costs.

gher maintenance, repayment of loans, and to finance the next production cycle (Figure 1). The survey also showed that 30% of respondents cultured only prawns, 40% integrated prawn farming with paddy, 10% integrated prawn farming with dike crops, and 20% integrated farming with paddy and dike crops.

Culture Strategy

Almost all farmers polycultured prawns with carp, the latter mainly for family consumption. In recent years, however, farmers have increasingly grown fish for sale with prawns due to the high cost of prawn seedstock and feed. Several carp species were grown, including silver carp, Indian major carp, and grass carp. In southwestern Bangladesh, most farmers also stocked black tiger shrimp, *Penaeus monodon*, with freshwater prawns. Their ghers received minimal water exchange to maintain 5 ppt salinity for several months.

Stocking depends on rain water supply and the availability of prawn seed. Farmers usually stocked prawn fry in June-July, when the ponds collected about 15-30 cm of rain water. Farms with a permanent water source were stocked as early as April-May with slow-growing animals from the previous year. Fish fingerlings were stocked around June and cultured as long as there was enough pond water. Average stocking densities were 16,920 prawns/ha in polyculture, and 22,440 prawns/ha in monoculture systems.

Feeding

Prawn farmers used various supplementary feeds such as commercial diets, home-made feed, and snail meat based on their experience and other factors. Farmers prepared feeds by combining oil cakes, rice polish, wheat bran, fishmeal, boiled vegetables, and other ingredients. Some farmers also used oil cakes, boiled wheat, and boiled rice directly without mixing.

The preferred feed was a local freshwater snail, *Pila globosa*, because it was believed to produce the best growth in farmed prawns. Survey results showed that farmers began feeding snail meat to juvenile prawns at an average of 63.7 kg/ha/day from June to October.

Health Management

Respondents reported a wide variety of prawn diseases due to various pathogens, inadequate water quali-

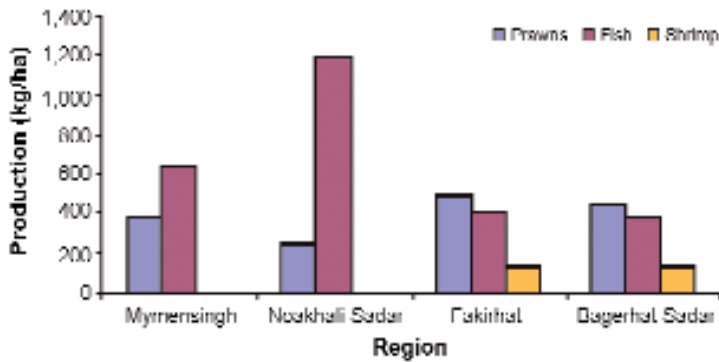


Figure 2. Average regional production of freshwater prawns, fish, and shrimp.

ty, and nutritional deficiencies. Common problems included soft shells, tail and antenna rot, curved rostrums, and black gills. Most farmers implemented preventive measures, including drying, lime treatment, water exchange, and removal of bottom mud. Farmers used a range of chemical products for disease treatment: lime, salt, alum, and some commercial products.

Harvesting

Survey results showed that partial harvesting of freshwater prawns peaked between October and January, with small prawns left in ponds for harvest during August and September. Some producers harvested their prawns throughout the year. Harvesting was done by cast-netting with barrier nets or hand picking, usually at intervals of a few weeks, depending on farmers' financial needs.

About 90% of the farmers used partial harvesting to sort out market-size prawns.

Production is variable because of the simple culture methods used. In monoculture systems, the average annual yield was estimated at 412 kg/ha, while yield for polyculture systems was estimated at 390 kg/ha. Average annual fish production was 660 kg/ha. In Bagerhat Sadar and Fakirhat, farmers grow shrimp with prawns in the same ghers, with average annual shrimp production of 124 kg/ha (Figure 2).

Constraints, Solutions

Survey participants identified the major constraints to their industry as the lack of access to institutional credit (32%), insufficient supply and high price of quality prawn seed (28%), and high cost of feed (18%). To a much lesser degree, additional constraints included a lack of knowledge in new farmers, transportation and marketing problem, natural disasters, and other problems like poaching and poisoning.

Responsible industry expansion will require greater financial access, improvements in the quality and availability of seed and feed, and additional education efforts that include the minimization of environmental risks. Rural aquafarmers in Bangladesh also need assistance with inexpensive and sustainable technology.

Future research should address postlarvae nursing technology and the introduction of all-male culture. Prawn culture in controlled periphyton-based systems and culture with overwintered juveniles could also advance freshwater prawn farming.