SOCSCIENCE

Editor : K. Viswanathan

Social, Economic
and Policy Aspects of Fisheries

Fish Farming Through Community Participation in Assam

M. Goswami and R. Sathiadhas

Abstract

The community tanks and ponds in India are seldom used for fish culture. Fish culture as a community based activity has been shown to be economically viable in some parts of the country. This paper describes the success story of fish farming in a community tank in Assam.

Introduction

Rural aquaculture usually comprises farming of aquatic organisms by small-scale farming households or communities, usually using extensive or semi-intensive low cost production technology appropriate to their resource base. The village people are the ideal group for the adoption of location specific conservation and resource management techniques for sustainable aquaculture in remote areas (Dey and Saha 1998). There are many ponds and tanks in India that are not used for fish culture because they are usually a common property resource. A community effort to establish a productive venture is an economically viable use of these waterbodies.

Assam, situated in the eastern Himalayan region between 89º. 50' E to 97º. 4' E longitude, 24º N and 28º. 18'N latitude has rich fishery resources in the form of riverine fisheries (area of 205,000 ha), ponds and tanks (25,000 ha), swamps (10,000 ha), forest fisheries (4,000 ha), totalling 244,000 ha. These waterbodies are a habitat for various species of freshwater fishes of commercial importance. There is little information on the exploitation and utilization of these resources. The paper highlights the involvement of a rural community in Assam in fish farming in a community tank and how the revenue is used for the common welfare and development of the whole community.

Materials and Methods

The observations were made during January-July 1999 through personal interviews in five villages involved in fish culture in the community tank in Lakhimpur. The five villages studied are located in the Darang district in the plains of the northern banks of the Brahmaputra river. The climate is subtropical with a high rainfall (annual average 1,700 mm). The mean maximum (summer) temperature varies between 24.1ºC and 31.1ºC, while the minimum (winter) temperature varies between 9.4ºC and 25.6ºC. The soil and water are both acidic with the pH of water ranging from 5.5 to 6.5. The main occupation of the villagers is agriculture, with fish culture providing a supplementary source of income. Socioeconomic and demographic features of the villagers involved in the community activity were collected from 50 sample households using a structured interview schedule. The community tank development program,culture practices and their impact on socioeconomic development were also studied.

Results and Discussion

Socioeconomic Status

The socioeconomic status of the villagers is low. There is no awareness of family planning. They do not have electricity, telephones, clean water supply, and adequate health

facilities. Sixty percent of the households use ponds as a source of drinking water. The difficulty of accessing potable water and the long distance to the health center results in poor health. Most of them have thatched huts and soil toilets. The percentage of literacy is low at 30%, with a high drop-out rate recorded at the primary and secondary levels. The average annual income of the households was Rs20,000. As much as 75% of the income was spent on food, and the remainder on education, clothing, house repairs, household durables, and medicines.

Fig. 1 Hatchery for seed production adjoining the community tank.

Fig. 2 Nursery ponds along with the side view of the community tank.

Community Tank Development

The community tanks have the potential for increasing fish production through community participatory fish culture. These tanks are generally not used for fish production due to inadequate financial and technical resources. With government intervention and public support, some of them are now used for fish culture. Recognizing the potential of increasing fish production through the development of community tanks, the State Department of Fisheries has secured World Bank assistance under the Assam Rural Infrastructure and Agriculture Services Project (ARIASP) of Rs282.74 million for a period of eight years starting in 1995. Community tank development is also a component of this project, with the objective of producing 3 t $ha^{-1}yr^{-1}$ (Anon 1997). The fisheries department started the development of community tanks that are lying unused under the derelict pond development scheme of 1987. It gives financial assistance to selected villages for the preparation of their pond for fish culture. It also organizes training programs at district headquarters to disseminate the technology for fish culture to the remote areas.

The community tank development program started in Darang district in 1989. The program in the Lahkimpur tank was the most successful one in the district. The water area of the tank is 16 ha. About 400 families from the five villages formed a cooperative (Lahkimpur Anchalik Minmahal Samiti) and work together, irrespective of caste and community. The cooperative society has taken the responsibility for management, revenue collection, and other activities.

Prior to 1989, there was no fish culture in the Lahkimpur community tank. The water in the tank was infested by aquatic weeds like water hyacinth, waterlily, collocasia, etc.,which made it unsuitable for fish culture. The villagers removed some of the weeds from the tank to use it for bathing and laundry. In 1989, the District Fishery Department provided financial assistance of Rs268,000 for the development of the tank. This was used for the removal of weeds and renovation of the tank. Lime was applied as a part of the pond preparation. Fifteen days after applying lime, fish seed fry and fingerlings were released into the tank.The composite fish culture technology developed by the Central

Inland Capture Fisheries Research Institute (CICFRI)(Sinha 1990) was used in this region. They adopted this technique with limited inputs and facilities. In addition to lime, Single Super Phosphate (1,000 kg) was applied once a year. The tank was also manured with 200 kg of cow dung per month. Rice bran and oilcake were the main feed items used in this system of culture. The ratio of rice bran and oilcake was maintained at 75:25. Natural as well as hatchery raised fry and fingerlings of Indian major carps (*Catla catla, Labeo rohita, Cirrhina mrigala, L. calbasu*), exotic carp (silver carp, grass carp, common carp), minor carps (*Cirrhina reba, L. bata*) were released in the tank. In addition, *Notopterus chitala, Clarias batrachus, Heteropneustes fossilis, Wallago attu,* and *Tilapia mossambica* were also stocked. Predatory species were stocked as they activate the other fishes as they try to escape. Stocking density was maintained at 9,000 fingerlings/ha which consisted of rohu 30%, catla 30%, mrigal 20%, silvercap 10%, common carp 5%, and miscellaneous 5%. The growth rate of the fish was quite good in spite of an irregular feeding and fertilizing schedule (Table 1). The fishes were harvested twice a year, in September and January.

The fish harvested were replenished by new stocks. Production and earnings are shown in Table 2. Higher fish production from village tanks is possible by using more scientific farming methods (Rout and Tripathi 1998).

Using extensive methods, a fish production of about 0.5 t ha^{-1} can generally be achieved, whilst with the application of advanced technologies 2-3 t ha^{-1} can be produced even in temperate climates (Sinha 1990). Although the yield obtained in this example was low, it was an encouraging start. The practices used were in a transition phase between traditional and scientific. Non-availability of inputs, disease outbreaks, inadequate financial and extension support, and frequent flooding problems were some of the constraints limiting the productivity. Once these constraints are removed, fish farming is expected to gain momentum in the study region. This will increase fish production and enhance the income of farmers.

Table 1. Average weight of some species in the Lakhimpur community tank.

Species	Weight (kg)
Labeo rohita	1.0
Catla catla	1.5
Cirrhina mrigala	1.0
Cyprinus carpio	1.5
Hypopthalmichthys molitrix	2.0
Notopterus chitala	2.0
Wallago attu	1.5

Table 2. Production and earnings of the Lakhimpur community tank

Year	Total fish production (kg)	Production per ha (kg)	Revenue (Rs)	Revenue per ha (Rs)
1991-92	8,316	519.75	249,460.00	15,591.25
1992-93	10,068	629.25	302,040.00	18,877.50
1993-94	10,304	644.00	360,640.00	22,540.00
1994-95	10,659	666.19	426,360.00	26,647.50
1995-96	12,428	776.75	564,897.00	35,306.06
1996-97	17,230	1,076.87	773,500.00	48,343.00
1997-98	22,222	1,388.87	1,000,000.00	62,500.00

Conclusion

The community fish culture program has played a significant role in improving the socio-economic status of the villagers. While the yield per hectare increased from 520 kg during 1991-92 to 1,389 kg during 1997-98, revenue increased four-fold from Rs15,591.00 to Rs62,500.00. The revenue has been utilized for the general development of the area. The Lakhimpur Min Unnayan Samiti is responsible for development activities. A school building and a library have been constructed near the tank for educating the village children. A herbal medicine garden is being maintained for supplying to Ayurvedic specialists. Seminars and workshops are organized to create awareness about fish culture and to develop human resources. Cultural activities are also arranged for the New Year celebrations to increase the solidarity and unity among the villagers. Initiatives are being taken to start a development center to improve fish farming and other activities. The tank is attracting an increasing variety of birds, and a bird sanctuary may be created as a tourist attraction.

Fig. 3 Banana plantation on the bank of the community tank.

Fig. 4 Herbal medicine garden on the bank of the community tank.

References

Anon. 1997. A status report on fishery development in Assam. Government of Assam, India.

Dey, H.K. and G.S. Saha, 1999. Rural aquaculture prospects and potentials. Indian farming 49 (4):17, 24-25 p.

Rout, M. and S.D. Tripathi. 1998. Effects of various inputs in fish production under composite fish culture in different regions of India. *In* M. Mohan Joseph (ecl.). The First Indian Fisheries Forum, Proceedings of Asian Fisheries Society, Indian branch, Mangalore, 45-48 p.

Sinha, M.1990. Polyculture of Indian and exotic carps - a techno-economic appraisal,47-58p. *In* V.V. Sugunan and U Bhaumik (ecls.). Technologies for inland fisheries development. Central Inland Capture Fisheries Research Institute, Barrackpore.

M. Goswami *is a Ph. D. scholar and* **R. Sathiadhas** *a Professor and Head, Department of Fisheries Economics and Extension, at the Central Institute of Fisheries Education Versova, Mumbai-400 061, India.*