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Working Paper

THE BERGRAM MAJHIPARA COMMON POOL FISH POND-A
CASE STUDY

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Abbreviations and Acronyms

1. B.C. : Before Christ
2. CICFRI : Central Inland Capture Fisheries Research Institute (Barrackpore)
3. CPR : Common Pool Resource
4. CSO : Central Statistical Organisation (New Delhi;
5. OFO : District Fisheries Officer
6. FEO : Fisheries Extension Officer
7. FFDA : Fish Farmers' Development Agency
8. GOI : Government of India
9. GOWB : Government of West Bengal
10. Ha : Hectare (2.47 acres)
11. Kg : Kilogram
12. Mm : Millimetre
13. Qt : Quintal (100 kg).
14. R<>. : Indian Rupees
15. Sq. Km. : Square Kilometre
16. TSRD : Tagore Society for Rural Development

- 14. Samiti ^ association of people
- 15. Silver Carp A species of fish, Hypothal michthys molitrix
- 16. Tonnes 1000 ^{kg}
- 17. Vested ponds Ponds declared surplus under the
Ceilings on Land Holdings Act.
- 18. Zilla Parishad A _n elected body. responsible _F or
development administration at _E the
district level.

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THE BERGRAM HAJHIPARA COMMON POOL FISH POND: A CASE STUDY

Abstract

This case study presents an overview of inland fisheries and the State of West Bengal and an in-depth study of pool fish pond in Bergram Hajhipara village of Birbhum of West Bengal. On the basis of the overview, we could conclude that there exists a lot of potential in India in general and in West Bengal in particular to increase both production and of inland fisheries. In West Bengal, there are vested and other types of common pool fish ponds locally known as multi-ownership tanks whose productivity is much below their potential. This is so because, being a common pool resource, they are all victims of the 'tragedy of the commons'. The State Government has created, by enacting the West Bengal Inland Fisheries Act, 1984 and the West Bengal Inland fisheries Rules, 1985, and by launching a number of prorates for development of inland fisheries, an enabling environment for improving the productivity of the common pool fish ponds in the State through improved scientific management. The 1985 Rules seek, inter alia, to encourage collective/co-operative management of the multi-ownership tanks that are either lying unused, or are not managed properly.

The in-depth case study of a common pool fish pond in Bergram Hajhipara village, which is wholly inhabited by tribals, showed that pisciculture was an economically viable activity and that even large but homogeneous groups of villagers could collectively manage pisciculture in common pool fish ponds and increase their income and improve their nutrition. As to the three other fish ponds that we studied in the villages, the Bergram Hajhipara tank got the highest fish yield per rupee spent on fish feed and thus was most efficient.

What villagers need to be able to successfully manage their common pool fish ponds is a catalytic agent who could help them in organising themselves, and who could initially provide them some financial assistance and technical information about scientific pisciculture. A relatively low initial investment in their renovation and in initiating pisciculture could transform the almost unproductive common pool tanks into very valuable and dependable source of income, employment, and nutritious food for the poor villagers and avoid the 'tragedy of the commons'. Co-operative management of common pool tanks ensures equity in the distribution of their benefits among the members and inculcates among them the spirit of co-operation and reciprocity and therefore it should be preferred to other modes of management.

INTRODUCTION

Fishing is an occupation that dates back to time immemorial. In South-east Asia, it is mostly the poor landless people to take up fishing as an occupation. Sons born, to fishermen seldom have opportunity to move out of fishing and so fishing has become a hereditary and caste-bound occupation that is passed on from one generation to another. A fishery could be an open access resource such as the high sea fisheries beyond national Exclusive Economic Zones, a common pool resource such as coastal marine fisheries and inland fisheries in common property ponds or tanks and in common pool fishing spots in lakes and rivers, or a private property such as a private fish ponds or tanks. The fish is a renewable natural fugitive resource but it can be bred and raised under controlled conditions also. The practice of rearing/culturing the fish under controlled conditions is known as pisciculture. The history of aquaculture/pisciculture in India dates back to 321 B.C. However, the practice of culturing the fish remained more as an art than a science until the beginning of the twentieth century.

The average productivity of common pool fish ponds in India is miserably low vis-à-vis the potential that exists in the country as well as the actual yields realised under good management. To improve productivity and incomes in the fisheries sector, the Central and the State Governments in India have taken various policy measures such as organisation of fishers-en's co-operatives, establishment of Fish Farmers' Development Agencies (FFDA), Composite Fish Culture Schemes, fisheries research institutes etc. of all measures, co-operatives could play the most important role in increasing productivity and incomes in the common pool. Already, considerable progress has been made in India in the operativisation of the fisheries sector. In 1987, the organisational structure of the co-operative fisheries sub-sector in India consisted of one national-level federation, 13 state-level federations, 63 district/regional level federations and 7,857 primary co-operative societies and the membership of the primary co-operative societies was 8.08 lakh (Chandra, 1989).

In this chapter, we present an in-depth case study of a common pool fish pond located in Bergram Majhipara village of Birbhum district in West Bengal. The pond was managed by a co-operative

society. A compare and contrast of the management of the common pool fish pond with two other fish ponds managed under different systems is also presented.

INLAND FISHERIES IN INDIA: AN OVERVIEW

At present, India with the second largest fresh water resources in Asia ranks third in fresh water fish production in the world (CICFRI, 1988-89). Out of 1.65 million ha of water available in ponds and tanks in India, over 0.61 million ha is under fish production. Total fish production in India in 1988-89 was about 31.52 lakh tonnes which exceeded the target set for the year by about 2 lakh tonnes. Of the total fish production in India, 35-40 per cent is contributed by inland fisheries and about 10 per cent of the total inland fishery production is accounted for by culture fisheries (Nandeesh and Basuvaraja, 1989).

Fisheries is an emerging sector of the India's economy having high potential for augmenting food supplies, foreign exchange, and employment opportunities. The total population of active fishermen in India in 1986-87 was estimated to be about 8 million of which about 62 per cent were male fishermen. In 1984, the fisheries sector contributed about 2 percent of gross domestic product and about 3.3 per cent of the total agricultural Income of India (CSO, 1984). According to Jhingran (1979), scientific fish culture in 0.61 million ha of water presently under traditional fish culture can generate employment for 2.26 million persons every year. In 1988-89, the export of marine products alone fetched Rs. 600 crores to the national exchequer (Chandra, 1988).

The fisheries development strategy of the Government of India aims at doubling the present level of fresh water fish production estimated at 13.55 lakh tonnes in the next decade (Chandra, 1988).

India's fisheries sector is, however, still characterised by low productivity and predominance of traditional methods of fishing and fish culture. Most of the fishermen are small-scale operators, poor, down-trodden, backward, unorganised, and live in unhygienic surroundings. They do not get fair and remunerative price for fish and are exploited by middlemen from whom they borrow money and to whom, therefore, they are obliged to sell their produce at lower than the market price.

The average productivity in the fisheries sector in India is very low vis-a-vis the potential that exists in India itself and the actual productivity levels achieved in many countries such as Japan, Philippines, Israel etc. The average yield from farmers ponds in India in 1987-88 was about 1566 kg/ha per annum as compared to the average yields of 2520, 2445, and 2250 kg/ha per annum obtained in Haryana, West Bengal, and Punjab respectively (Sharma, 1988). In Israel, fish ponds producing less than 2500 kg/ha per annum are no longer considered economically viable. Thus, there is a lot of untapped production potential available in farmers' ponds in India.

The average productivity in common pool fish ponds, tanks, lakes etc. is much lower than in the privately-owned ponds and tanks. This is because the common pool fisheries, like other CPRs, suffer from "the tragedy of the commons". There are no reliable estimates available about the extent of common pool inland fisheries in India. In 1987, the extent of fresh water fisheries was estimated at 26.20 lakh ha consisting of 12.02 lakh ha of ponds and tanks and 14.18 lakh ha of reservoir areas. Besides, 20 lakh ha of brackish water area and 29 lakh ha of riverine area was also estimated to be available for fisheries. Most of these resources are CPRs and are highly degraded. There is urgent need for their restoration and development such that their productivity can be enhanced and sustained over time through appropriate management.

THE STATUS OF INLAND FISHERIES IN THE STUDY AREA

The State of West Bengal is located in the Eastern Region of India. It is one of the most densely populated states in the country. In 1987, it had an estimated population of over 54 million and a population density of 619 per sq. km. It has a unicameral legislature and a three-tiered Panchayati Raj structure. It is known for its pro-poor and progressive policies.

In West Bengal, pisciculture has been in vogue since long. Bengalis are very fond of eating fish. It is said that even fish smell is sufficient to whet their appetite. The Go of West Bengal (GOWB) has taken several measures to promote both inland and marine fisheries in the state. These measures include establishment of fishermen's cooperatives and FFDA's, launching of an Inland Fisheries Project and Integrated ; Fisheries Projects, training of fish farmers, fishermen, and fishermen group insurance schemes for fishermen, and the passage of the

West Bengal Inland Fisheries Act 1984. The West Bengal State Fishermen's Co-operative Federation limited is the apex organisation of the fishermen's co-operatives in the state. It is engaged in the development of fishermen's community as a whole through a network of 18 central and 769 primary inland fishermen's co-operative societies. The Federation has played a significant role in the supply of fish seed and marketing of fish y. The state has made good progress in the development of pond fisheries. By the end of 1988-89, over 74,000 ha of water area had been brought under the fold of pond fishery under the Inland Pond Fisheries. This had benefited some 2.13 lakh farmers and fishermen in the state. As a result of all these measures, fish production in the state had increased from 4.24 lakh tonnes in 1985-86 to 6 lakh tonnes in 1989-90 2J. Fisheries today are a highly profitable and emerging sector of the state's economy.

The Birbhum district lies in the centre of West Bengal. It had a total population of over two million in 1981 and a total geographical area of 4,545 sq.km. Agro-climatically, it is classified in the semi-arid lateritic zone of the state. The annual rainfall varies widely from area to area within the district from 300 mm to 1,250 mm. The major agricultural crops grown in the district are rice, wheat, potato, sugarcane, mustard and sesamum. The pace of industrialisation in the district has been slow. Hence, over 75 per cent of the total population of the district has to depend solely or partially on agriculture. Pisciculture is one of the emerging activities in the district which has a high potential of development of Inland fisheries, particularly fresh water culture. The scope of capture fishery is limited to only Mayurakshi and Ajay rivers and that too only once a year. Of course, many poor and traditional fishermen find fisherwomen are partly dependent for their livelihood upon this common pool resource.

There is a District Fisheries Office of GOWB in the district which is headed by a District Fishery Officer (DFO) who is assisted by three officers and 19 Fishery Extension Officers (FEO). One FEO is posted in each of the 19 blocks in the district. The DFO is responsible for planning, implementation, and supervision of all the fisheries activities in the district. The other institutions and organisations concerned with fisheries in the district include one FFDA, one Central Fishermen's Cooperative Society, 16 Primary Fishermen's Co-operative Societies, four fish seed farms, five block fish seed farms and 67 fish production groups/ clubs. The district has the highest number of

active fish production groups among all the districts in the country.

The performance of the district in the field of fishery has been good. The district has achieved self sufficiency in the production of fingerlings required for the culture in the district, and from 1984 onwards, the annual seed production has exceeded the requirement of the district, thanks to the initiation of the Mini Hatchery Scheme. In 1939-90, an estimated area of 17,000 ha under ponds and tanks in the district was covered under fish culture and the annual production of fish seen amounted to 60.6 crore fingerlings. Estimation of actual production of fish in the district is quite a complex and difficult task as a considerable amount of the total production is exported by private traders to the neighbouring districts of Dumka in Bihar and Burdwan, Halda etc. in West Bengal. According to the District Fishery Officer, Birbhum, the estimated annual production of table fish in the district in 1988-89 was about 29,000 tonnes 3/.

Bergram Majhi para is a small tribal hamlet lying within the jurisdiction of Bolpur Sriniketan block in the Birbhum district. It is located at a distance of 17 kra from Bolpur and lies on the side of the Bolpur-Suri road. Tropical climate prevails in this eastern part of the district. The hamlet was first inhabited some 250 years back when three tribal households settled there. Due to the existence of acute caste distinction and other social stratification, the tribals had to settle in a desolate place, 0.5 to 0.75 km away from the main village of Sergras. Now, they have grown into an independent and cohesive community consisting of 44 households and 402 people. Some other basic statistics of the hamlet are given in Table 1. As shown in the table, the village had a total geographical area of about 262 acres of which 34 acres (about 13 %) was under cultivation, about 9 acres (about 3 %) under common pool tanks and ponds, and 42 acres (about 16 %) was common pool land. There were three tanks and ponds in the village, of which two were common pool ones. Of the common pool pond is in the village, the larger one locally called Barobandh; measured 6.53 acres and was the only pond in Bolpur Sriniketan block which was used for fish culture. The other common pool pond in the village measured 1.2 acres. It remained dry for most part of the year except during monsoons and had been lying unused and neglected since long. The normal annual rainfall in the village was about 920 mm which varied widely from year to year with a minimum of 510 mm and a maximum of 1380 mm. Lateritic acid soil was the principal type of soil found in the tillage.

The general productivity of the ponds in this region varied from a minimum of 2.2 qt. to a maximum of 24 qt/acre per year.

Table 1 : A Profile of Bergram Majhipara Village

Total geographical area (acre)	262
Land under cultivation (acre)	34
Land in village tanks & ponds (acre)	9
Total number of tanks and ponds	3
Number of ponds having common access	2
Grazing land (acre)	14
Number of fishermen's co-operative societies	1
Vested land (acre)	42
Vested land distributed to the villagers (acre)	18
Literacy rate (percent)	16
Total population	402
Scheduled tribes population	402
Total number of households	44
Number of Mumu households	9
Number of Saren households	7
Number of Hansda households	4
Number of Kisku households	12
Number of Tudu households	12
Number of farm households	24
Number of share croppers' households	17
Number of agricultural labour households	32
Number of marginal farmers' households with land holding size of 2.5 acres to 5 acres	3
Number of animals (cattle)	94
Number of sheep, goats and swine	280
Number of hens and ducks	62
Number of households having electricity	Nil
Community drinking water tube wells	2

The literacy rate of 16 per cent in the village was extremely low. Only three households owned some land. Most of these tribals earned their livelihood by working on daily wages, or sometimes, on contract basis. They did not have any source of secured and regular employment. There were 17 share croppers' households in the village but they too had to have recourse to wage-paid employment to maintain their big-sized families.

Public facilities and amenities were totally lacking in the village. Only recently, a night school had been established by

the Tagore Society for Rural Development (TSRD). There was a primary fishermen's co-operative society also in the village. Despite their being backward, downtrodden and misery-ridden, the tribals had a highly unique and good, culture. They were a closely-knit and highly cohesive group having a high sense of responsibility towards their clan.

TECHNICAL AND PHYSICAL ATTRIBUTES OF THE CPR

As stated in the preceding section, the common pool fish pond under study was located in Bergram Majhipara village. It measured 6.53 acres and was perennial. It was fed by rain-water and a canal. Before it was declared vested, i.e., a CPR under the Land Ceiling Act of the GOWB in 1964, the pond belonged to a Choudhury Zamindar family, now settled at Bolpur. As per the Act, the vested wastelands and ponds in the states are held by the village panchayats in whose jurisdiction they lie. The culturable vested ponds are classified into three categories, namely, (1)productive; (2)semi-productive; and (3)unproductive. Although, the pond in question was classified as productive, it had been lying in a very bad shape since long due to lack of necessary maintenance and it was not producing anything. The pond was jointly used by all the villagers and it was not possible to exclude anyone from its use.

Ponds, like other water bodies, cannot easily be partitioned. Hence, vested ponds cannot be sub-divided and allotted to the poor villagers as was done in the case of vested lands under the land patta scheme in the state. The vested or common pool ponds can be best used and managed collectively by their co-owners.

RULES GOVERNING THE USE AND MANAGEMENT OF THE CPR

The use and management of common pool fish ponds or multi-ownership tanks as they are locally called in West Bengal is governed by the West Bengal Inland Fisheries Act of 1984 and the Rules framed by the GOWB in 1985. Some of the salient features of the Act and the Rules are given below.

1. Definitions

"Multi-ownership tank" means a reservoir for water, held by two or more persons by way of ownership, lease, mortgage, or otherwise. "Person" includes a Hindu undivided family, company,

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firm, institution (by whatever name called), fish production group, Gram Panchayat, Panchayat Samiti, Zilia Parishad, Co-operative society or other association of persons. "Public purpose" means any purpose having or being connected with the improvement or development of fishery, or the supply of fish to consumers from fishery (Sub-section 2).

2. Fish Production Group

Not less than eight and not more than twenty fishermen or other persons or both may apply to the District Fishery Officer for forming and registering themselves into a fish production group with the object of efficient production and sale of fish in a collective way; provided that no person who is a member of any fishermen's co-operative society, registered or deemed to be registered under the West Bengal Co-operative Societies Act, 1973 (West Bengal Act XXXVIII of 1973) shall be a member of a fish production group.

3. Management and Proper Utilisation of Multi-ownership Tanks

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- a) if the competent authority, on receipt of an Information or on his own motion or otherwise, is satisfied that a multi-ownership tank is not utilised in accordance with the prevailing norms of pisciculture and that it is necessary for any public purpose so to do, he may, after giving one month's notice to the owner and the possessor of such tank by order in writing, take over the management and control of such tank.
 - b) The management and control of such tank may be transferred by the competent authority to any person for proper utilisation of such tank.
 - c) Notice of transfer: Where the competent authority decides to transfer the management and control of a tank to any person for proper utilisation, he shall issue a notice stating such intention and the copies of such notice inviting applications shall be published in his own office and in the office of the Gram Panchayat having jurisdiction over the tank.
 - d) Every co-sharer or co-owner of a multi-ownership tank shall be entitled to receive rent for taking over the management and control of such tank by the competent authority at such rate as may be determined by that authority in the manner prescribed as follows:

Method of assessment of rent: The rent payable per annum by a person to the competent authority for taking the tank on lease shall be assessed at the rate of four and a quarter percent per annum of the market value of the tank. In addition, lessee shall also pay to the competent authority a reasonable non-recurring lumpsum amount on account of any fish not removed by the competent authority.

- e) The management and control of a multi-ownership tank may be taken over under sub-section (1) for a period not exceeding 25 years or transferred to any person under sub-section (2) for a period not exceeding 10 years at a time.

Manner of selection of lessee: (i) All eligible persons interested in taking the tank on lease shall be examined by the competent authority by giving an opportunity of being heard to all of them and thereafter the competent authority may award the lease to a person best suited for the purpose having regard to his experience and financial capability and any other factor incidental to the proper control, management and utilisation of the tank; and (ii) While selecting a person for the purpose, the competent authority may give preference to a fish production group, a fishermen's co-operative society or a co-owner or co-sharer of the tank if they are found otherwise fit.

- f) Execution of lease deed and transfer of possession: After selecting a person as per the foregoing rule the competent authority shall transfer the possession of the tank to such person on his execution of a lease deed.
- g) If the person referred to in sub-section (2) fails to utilise the multi-ownership tank in accordance with the prevailing norms of pisciculture, the competent authority may, after giving notice to such person, resume the management and control of such tank without payment of any rent or compensation to such person, and such tank may thereafter be managed by the competent authority or transferred to some other person for pisciculture.
- h) The prevailing norms of proper utilisation of multi-ownership or other tanks (as pertaining to - embankment, dewatering, stocking, liming, feeding etc.) must also be strictly followed.

4. These provisions shall apply, mutatis mutandis, to any tank owned or possessed by a single person, or a tank owned by the State Government jointly with other person or persons.

OPERATION AND MANAGEMENT OF THE POND

In 1979, TSRD initiated the idea of reactivation of the pond (Dag No.110; Khatian No.581) which had been lying in a very bad state since long. The purpose was to provide the tribals of Bergram Majhipara with a source of supplementary income and employment. A Sabalaroban Samiti comprising all the households of the village was constituted to translate the idea into a fishery programme. TSRD got the necessary clearances from the GOWB and the permission to take up pisciculture in the pond. Besides, the required supervision and guidance, TSRD also provided to the Samiti financial assistance of Rs.18,745 for payment of wages to the tribals engaged for digging and renovation of the pond. Then, a resolution was passed by the Samiti that 2b percent of the net profit would be deposited with TSRD for creating a revolving fund to provide loans to the members and the rest 7b percent would be used to procure rice for the Dharmagola (an indigenous community granary made by the tribal?) for equal distribution to the members from time to time. Also, tree saplings, mainly eucalyptus and sonajhuri, were planted on the banks of the pond to provide shade to protect the banks from erosion, and to provide a source of additional income to the villagers in the long-run.

The pre-inception activities like digging, cleaning etc. are normally done in February to March every year. Cowdung is then evenly distributed in the pond. Apart from this, after stocking the pond, inorganic fertilizer (single super phosphate) is added once every two years for the production of phyto-plankton. In addition, artificial feed consisting of mustard oil cake is also given. Due to lack of funds, the Sabalamban Samiti did not use these inputs at regular intervals. The fingerlings were bought from the local Bolpur-Kacharipatty market which is about 18 km away from the village. The fingerlings, mainly consisting of the species of Katla, Rohu, Mrigale and Silver carp, were bought in units of 'Bati' (1 Bati = 10 kg), at the rates widely varying from Rs.250-275/bat1 at the early stages to Rs.125-135/bati at the later stages in the season. Transportation of fingerlings was mainly done manually by carrying on the shoulders beams with hanging baskets tied to both the ends. Thelas, bullock carts, and rickshaws were also used occasionally for the purpose. The pond

was stocked in June-July with the onset of monsoon. However, the time of stocking had greatly fluctuated over the last six years depending on the availability of funds to buy fingerlings and on the completion of the pre-inception activities. Protection and supervision was wholly done by the members of the Saaiti. For protection, they had developed a system in which each member did his watch and ward duty on a fixed date and time which were rotated among the members. Harvesting in the form of intermediate catches started after four months of inception and generally fish weighing over 400 gm were considered appropriate for sale. Before the final catch in February-March, three intermediate catches were taken at an average interval of 15-20 days. About 20 per cent of each catch was equally distributed among the members for home consumption and the rest 80 per cent offered for sale. The produce was mostly sold to the aratdars (commission agents) in the Bolpur (Hat-tala) fish market.

ECONOMICS OF PISCICULTURE IN THE POND

Estimation of benefits and costs of fish ponds involves identification and quantification of both direct and indirect benefits and costs of pisciculture. The direct benefits accrue to the members, mainly in the form of intermediate and final catches, employment, and of water required for so many purposes in everyday life. Besides, integration of pisciculture with agriculture, animal husbandry, horticulture etc. provides greater scope for higher incomes due to complementarities among these activities (Nandeeshha and Murthy, 1987). Measurement of direct benefits from pisciculture can be done fairly accurately. The indirect benefits from pisciculture include protection of soil from water and wind erosion, improvement in the micro environment and provision of a resort to the villagers. Valuation of these benefits is difficult, and hence, we have not attempted it in this chapter.

On the cost side, the direct costs include financial outlays for preparation of pond before stocking, raising and rearing the fingerlings feeding etc. The indirect cost in this case is the opportunity cost of the pond which is the net benefit sacrificed by not putting the pond to its next best alternative use. The opportunity cost of the pond was almost nil as it had no productive alternative use. Due to all these factors, we have not considered the indirect benefits and costs of pisciculture and have delimited our objective to determining the direct financial costs and benefits of the pond.

The returns from the pond under consideration started-flowing as early as 1980-81. However, due to some teething problems, in 1982-83, the pond was handed over to Md. N. Sheikh of a nearby village on a contract basis. According to the terms and conditions of the contract, the lessee was to bear all the operating costs and pass on 50 per cent of the net revenue obtained from the pond to the Sabalamban Samiti. But, after three years, the members of the society realised that they had been cheated in the sense that the amount paid by the contractor was very low vis-a-vis the amount retained by him. Therefore, the Samiti took back the pond and started pisciculture on its own once again. The entire cycle of stocking to harvesting of the final catch was completed in one year. Although, some amount of fish estimated to be less than two per cent of the final catch remained as a beneficial stock we did not consider its value while computing the benefits. Considering all the above mentioned factors, we present in Table 2 costs and benefits of pisciculture for the year 1988-89. The year-wise costs and benefits for the period, 1980-81 through 1988-89 are presented in Table 3.

As Shown in Table 2, the Samiti incurred a total expenditure of about Rs. 17,955 or Rs. 2,750~~750~~ per acre on pisciculture in the pond in the year 1988-89. On the benefit side, the tribals received a total of about Rs.47,927 or about Rs.7,340 per acre. Thus, the total net revenue to the Samiti amounted to about Rs.29,973 or Rs.4,590 per acre or Rs.749 per household. This is a substantial amount of revenue that accrued to the poor tribals as a result of pisciculture in the common pool fish pond of 6.53 acres which had been lying unused since long. There was no revenue accruing to the tribals from this pond before it was taken up for pisciculture by the Samiti and the pond was suffering from the tragedy of the commons. The TSRD's intervention, supervision, and guidance not only avoided the tragedy of the common pool pond but also made it a valuable and dependable source of income to the downtrodden and backward tribals.

The tribals, under the guidance of the Sabalamban Samiti, spent 75 per cent of ~~the net revenue~~ for buying rice, which is their staple food, for stocking their Dharmagola. The rice was distributed equally among the members of the Samiti. The remaining 25 per cent of the net revenue was deposited with TSRD which created a revolving fund for providing cash loans to the members of the Samiti in times of emergencies and crises and to meet the pisciculture expenses in the coming year.

Table 2 : Costs and Benefits of Pisciculture in the Common Pool Fish Pond in 1988-89

Item	(Rs.)	Total	Per acre (Rs.)
1.0	<u>Costs</u>		
1.1	Pre-inception/stocking cost: (e.g. digging, cleaning etc.)	---	—
1.2	Cost of stocking/inception: (cost of fingerlings, transport etc.)	12,315.00	1885.91
1.3	Cost of supervision and protection	—	—
1.4	Cost of feeds	3,212.50	491.95
1.5	Cost of intermediate and final catches	--	--
1.6	Cost of maintenance of equipment (net etc.)	365.00	55.90
1.7	Cost of transportation of the produce to the market	---	---
1.8	Depreciation charges @ 10 percent of the initial investment of Rs.18,745	1,874.50	287.05
1.9	Miscellaneous costs	187.75	28.75
1.10	Total Costs *	17,954.75	2,749.57
2.0	<u>Receipts</u>		
2.1	Amount received from sale of intermediate catches	24,497.50	3,751.53
2.2	Gross sale proceeds from final Catch	20,280.00	3,105.67
2.3	Value of fish consumed by the members at existing market price	3,150.00	432.39
2.4	Total receipts	47,927.50	7,339.59
3.0	Net revenue (2.4 - 1.10)	29,972.75	4,590.02

Source: Compiled from the records of the 'Sabalamban Samiti', Bergram Majhipara.

* The total costs do not include the costs of items 1.1, 1.3, 1.5, and 1.7; as those activities were done by the members themselves, on rotational basis, as per their assigned duty and they were not paid any wages for their work.

Table 3 : Year-wise Total Costs, Total Benefits, and Net Benefits from the Common Pool Fish Pond (Unit: Rs.)

Year	Total cost *	Total benefits	Net benefits	Actual net benefits to the Samiti **
1980-81	7,290	9,414	2,124	3,999
1981-82	10,602	7,482	-3,120	-1,245
1982-83 @	1,875	3,500	1,625	3,500
1983-84 @	1,875	2,250	375	2,250
1984-85 @	1,875	1,080	-795	1,080
1985-86	13,247	24,707	11,460	13,335
1986-87	16,136	30,582	14,446	16,321
1987-88	16,664	35,904	19,204	21,115
1988-89	17,955	47,928	29,973	31,848

Source: Computed from the records of the Sabalamban Samiti.

* Total costs include actual annual operating and maintenance costs plus 10 per cent depreciation charge on the initial investment of Rs.18,745.

** Since TSRD made a grant of Rs.18,745 to the Samiti, it did not incur this much cost and hence the net benefit that accrued to the Samiti was net benefit + 10 per cent of the initial investment that we added to the total cost as depreciation.

@ For three years, the pond was leased out to a contractor and hence the Samiti did not incur any expenditure in those years. The cost charged in these three years is the depreciation.

Table 3 shows that in the first year, i.e., 1980-81, the total cost was the lowest. In the first year, the pond had to be constructed afresh for pisciculture and TSRD contributed a sum of Rs. 18,745 to meet the wage-cost of construction of the pond. We considered this as an investment having an estimated productive life of 10 years and charged only 10 per cent of this investment every year. The net benefit was Rs. 2,124 but the net benefit that accrued to the Samiti was Rs.3,999 (Rs. 2,124 + Rs. 1,875 on account of depreciation). In the second year, the total cost substantially went up but the total benefits declined markedly with the result that the Samiti incurred a loss of Rs. 1,245 in its operations. When we added to it 10 per cent of the

investment cost, the loss was Rs. 3,120. For three years from 1982-83 through 1984-85, the pond was leased out to a contractor. As stated earlier, the contractor incurred all the operating expenditure and paid to the Samiti 50 per cent of the net revenue realised by him from the pond. In the first year of the contract, i.e., 1982-83, the net benefit received by the Saaiti was Rs. 3,500 which was a significant improvement over the preceding year when the Samiti could not cover even its operating expenditure and incurred a loss of Rs. 1,245. For each of the three years of the contract we have shown as total cost a sum of Rs. 1,875 on account of depreciation on the initial investment of Rs. 18,745 and have deducted this amount from the year's total benefits to compute net benefits in each year. But since the Samiti did not incur this expenditure and nor did it keep a depreciation fund, the net benefits that accrued to the Saaiti in each of the three years were higher by the amount of annual depreciation, i.e., Rs. 1,875. For the next four years, i.e., 1985-86 through 1988-89, the Saaiti's net profits kept on increasing year after year. This means that the Samiti had been doing a good job of managing of the pisciculture in the common pool fish pond.

A COMPARE AND CONTRAST

To compare and contrast the performance of pisciculture in the common pool fish pond in Bergram Majhipara village, we studied three other fish ponds in the same area in which the common pool fish pond was located. The three fish ponds were located in Binuria, Lalbandh (Bolpur), and Uchkaran villages. A comparison of the four fish ponds in terms of few selected features/performance indicators is done in Table 4. Of the four ponds, the Bergram Majhipara was the largest in area. Bergram Majhipara and Binuria ponds were both common pool resources and were both managed by co-operatives. The other two ponds were both privately owned and managed, Lalbandh pond by a lessee and Uchkaran pond by the owner himself. The Bergram Majhipara pond had the highest number of co-users. The highest expenditure on chemical fish feed per acre was incurred and the highest fish yield per acre was obtained in Lalbandh fish pond whereas the lowest expenditure on feed was incurred and the lowest fish yield was obtained in the Bergram Majhipara fish pond. But the fish yield per rupee expended on chemical feed was the highest in the case of the Bergram Majhipara fish pond and lowest in the case of Lalbandh pond. This means that the co-operatively-managed Bergram Majhipara fish pond was most efficient in the sense of

Table 4 : A Comparison of Selected Features of Pisciculture in Four Fish Ponds under Different Management Systems

Feature	Majhipara	Benuria	Ulbandh (Bolpur)	Uchkaran
1. Size of pond (Acre)	6.53	2.80	2.50	1.33
2. Ownership	Common pool (Village Panchayat)	Common pool (Village Panthayat)	Private	Private
3. Management system	Co-operative	Co-operative (lease for 10 years)	Private (lease for 5 years)	Private proprietorship
4. No. of co-users/users	44	9	one	on-
5. Year of initiation of pisciculture	1900-81	1986	1987	1983
6. Expenditure on chemical feed in 1988-89 (Rs./acre)	492	871	3,140	1,466
7. Yield in 1988-89 (kg/acre)	396	467	681	450
8. Yield per rupee expended of chemical feed in 1988-89 (kg)	0.81	0.54	0.22	0.31
9. Average price of fish received in 1988-89	18.48	17.80	19.70	16.00
10. Mode of sale of fish	Commission Bolpur	Commission agents at Bolpur	Direct sale in local markets	Local middlemen and commission
11. Mode of distribution of net benefits	75% equally distributed among members in the form of rite and 25% deposited with TSPD	70% equally distributed among the members and 30% deposited with the Co-operative	100% retained by the contractor	100% retained by the proprietor

securing the highest fish yield per rupee of expenditure on fish feed. In terms of equity in distribution of benefits also, the Bergrara Majhipara fared best among all the four ponds. Thus, on the whole, we could say that the common pool fish pond of Bergram Majhipara was managed most cost-effectively and it benefited the largest number of poor people.

FISH MARKET AND MARKETING PRACTICES

During the course of our study, we found that about 85 per cent of the total produce of the Bergram Majhipara, Binuria, and Uchkaran fish ponds and about 55 per cent of that of the Lalbandh pond was sold in the Hat-tala (Bolpur) market. The most commonly followed marketing channel was: producer or local trader —> commission agent —> retailer —> consumer. There were 11 commission agents locally called aratdars and 110 retailers in the Bolpur market. The price for average quality fish in the market varied from Rs. 16/kg to Rs. 19.70/kg in 1988-88. We were told by the fish producers interviewed that they did not have any say in determining the price of their catch and that the price was solely determined by the commission agents. We were also told that the normal net margin of a commission agent was five per cent. An idea of the economics of operations of a leading commission agent of the Bolpur market can be had from Table 5. As shown in the table, the commission agent handled 727 qt of fish in 1988-89 and realised a sum of Rs. 14.01 lakh from the sale or Rs. 19.28 per kg of the fish sold. The net margin was 7.70 per cent and the rate of return on the working capital was about 152 per cent. The existence of such a high rate of return shows lack of perfect competition in the market or oligopsonistic tendency among the commission agents.

We asked a few fish producers and commission agents as to how the marketing of fish could be improved to assure higher prices to fish producers. The fish producers suggested that a co-operative fish marketing society be organised. One of commission agents, Md. Ismail, who had 28 years of experience in the business opined that establishment of fish stalls and creation of other basic infra-structure in the market would make it function like a perfectly competitive market and that would be in the interest of both producers and consumers of fish.

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Table 5 : Economics of Operations of a Commission Agent
in the Fresh Fish Market of Bolpur (1988-89)

S1. No.	Particular	Unit	Magnitude
1.	Working capital	Rs.	70,000
2.	Business volume		
	(a) Quantity handled	Qt.	727
	(b) Value of sales	Rs.	14,01,546 (100)*
3.	Gross margin	Rs.	1,81,728 (12.97)
4.	Operating costs		
	(a) Ice	Rs.	3,375
	(b) Salary	Rs.	26,140
	(c) Wages	Rs.	1,450
	(d) Packing	Rs.	2,114
	(e) Transport	Rs.	9,112
	(f) Travel	Rs.	3,515
	(g) Rent	Rs.	4,170
	(h) Interest @ 18%	Rs.	12,600
	(i) Miscellaneous	Rs.	11,396
5.	Total operating costs	Rs.	73,872 (5.27)
6.	Net (margin profit) (before tax)	Rs.	1,07,856 (7.70)
7.	Actual net profit (after deducting tax)**	Rs.	1,06,623
8.	Return on Investment	%	152.32
9.	Working capital turnover ratio		20.02

Source : Sample survey.

* Figures in parentheses represent the percentage of the total value of sales.

** Payment of tax is largely manipulated through collusion between the government officials and the commission agents; the latter bribing the former for their connivance at tax evasion.

OPINIONS AND ATTITUDES

We interviewed a sample of 20 tribals in Bergras Hajhipara and a few selected officials and non-officials in the area to find out their opinions and attitudes about pisciculture in common pool fish ponds.

All the tribals interviewed expressed their utmost satisfaction with the fish culture as practised in the pond and their gratitude to TSRD for making that happen. However, six of the tribals interviewed strongly felt that they had not been provided with any guidance, and financial or other assistance by the block or district level government officials till date. They hoped that they might be given 14,000 fingerlings free of cost from the block in April 1990. On the other hand, the Pradhan of the Korba Panchayat reported that necessary help had always been extended on demand to the tribals for effective operations and management of the common pool fish ponds. When asked his opinion about the scope for replicating this model in the other similar areas of the Panchayat, he said that this could be done if availability of all the required facilities and resources is assured in those areas.

In our interview with him, Sri taña, FEO, Solpur Block, who, at the time of interview, was very busy with the settlement of financial accounts before the close of the current financial year, admitted his ignorance regarding the functioning of this pond and advised us to contact TSRD. However, he stated that in the Block only the programmes like Regional Demonstration Centre, National Demonstration Centre etc. were given prime importance. Sri RP Bhattacharya, DFO, Birbhum, consented that there was ample scope for developing the vested ponds of the district through collective action. He added further that, till date, no remarkable effort had been made to renovate the common pool fish ponds in the district. On further interrogation, he suggested that a thorough survey for identification of all such ponds in the [district be made and a collaborative action plan involving the Fishery Department, Land and Land Reforms Department, Panchayat Samitis, Zilla Parishad and villagers be prepared to achieve the maximum possible socially productive uses of these ponds.

By a sheer chance, our visit to the block headquarters on March 15, 1990 coincided with a meeting called by DFO to review the progress and problems of fishery development in the district. We observed that only 7 out of the 19 FEOs in the district attended

the meeting. Though a solitary case actually noticed, it shows an attitude of negligence and apathy on the part of the government officials towards their responsibilities. Sri Pulin Mazumdar of TSRD expressed his satisfaction in being able to play a catalytic role in organising and enabling the tribals to take up pisciculture in a common pool fish pond. He, however, complained that lack of funds, manpower, and infrastructural facilities constrain his organisation in extending the scope of its developmental activities.

CONCLUDING REMARKS

On the basis of the overview of pisciculture in the state of West Bengal and the in-depth case study of a common pool fish pond in Bergram Majhipara village of Birbhum district in the state presented in this chapter, we could conclude that the common pool (vested) ponds lying unused in the state could be put to better and more productive use under pisciculture. The State Government has created, by enacting the West Bengal Inland Fisheries Act, 1984 and the West Bengal Inland Fisheries Rules, 1985, and by launching a number of programmes for development of inland fisheries, an enabling environment for utilizing the common pool (multi-ownership) fish ponds for pisciculture. The 1985 Rules seek, inter alia, to encourage collective/ co-operative management of multi-ownership tanks and ponds lying unused in the state. The economic analysis of the performance of the Bergram Majhipara common pool fish pond over the last nine years attempted by us showed that pisciculture was an economically viable and sustainable activity and that relatively homogeneous groups of villagers like tribals could collectively manage pisciculture in common pool fish ponds if some financial assistance and technical guidance are provided to them initially preferably by a non-governmental organisation. A relatively low investment in common pool ponds could transform them into very valuable and dependable sources of income and employment to poor villagers and avoid the 'tragedy of the commons'. Co-operative management of common pool fish ponds ensures equity in the distribution of benefits among the members of the community and inculcates among them the attributes of collective action and reciprocity and therefore it should be preferred to other modes of management. Besides, indivisibility of common pool fish ponds is another argument in favour of their collective management.

Endnotes

- 1/ Personal communication with Sri Bhaskar Kulbe, Managing Director, West Bengal State Fisheraan's Co-operative Federation Ltd.
- 2/ Personal communication with the Joint Director, Inland Fisheries Project, Directorate of Fisheries, Government of West Bengal, Calcutta.
- 3/ Personal communication with Sri RP Bhattacharaya, District Fisheries Officer, Birbhum.

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