



OPERATIONAL RESEARCH PROJECT ON **AQUACULTURE**

IN WEST BENGAL

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CENTRAL INLAND FISHERIES RESEARCH INSTITUTE
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)
BARRACKPORE • WEST BENGAL • INDIA

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by

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BARRACKPORE - 743101 : WEST BENGAL

OPERATIONAL RESEARCH ON AQUACULTURE IN
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OPERATIONAL RESEARCH PROJECT
ON
COMPOSITE FISH CULTURE
CENTRAL INLAND FISHERIES RESEARCH INSTITUTE
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1 INTRODUCTION

The high yielding technology of composite fish culture developed at the Central Inland Fisheries Research Institute, has revolutionised the fish farm productivity. It has been possible to attain so far a maximum fish production of about 9400 kg/ha/yr in some of the experimental ponds of the Institute. Under the "All India Co-ordinated Research Project on Composite Fish Culture", productions ranging from 3000-6500 kg/ha/yr were generally obtained in different parts of the country under various hydro-biological conditions. Productions as high as 7284 kg/ha/8 months and 5900 kg/ha/6 months were also obtained. But all these experimental ponds were mostly of small size ranging in area from 0.1 to 0.4 ha. The project on Composite Fish Culture at Krishnagar was launched in 1973, jointly by the Institute and the Department of Fisheries, Government of West Bengal to test the economic viability and production potential of the technology under actual field conditions in large water bodies of $1\frac{1}{2}$ to 2 ha.

The project began to be called "Operational Research Project on Composite Fish Culture", in April, 1975 when besides the main task of maximising fish production, the objectives also included integrating aquaculture with combinations of Live stock rearing, Horticulture and Agriculture for integrated rural development and demonstration and training local fish culturists.

The work of the project was initiated in March, 1973 in three large ponds measuring 1.48, 1.93 & 2.15 ha at the Anjana Fish Farm (Krishnagar) of the West Bengal Fisheries Department. So far two sets of experiments have been completed. The third is in progress, under which the ponds of private farmers have also been taken up for demonstration of the technology and integration with one or more of the above stated disciplines.

2 FISH PRODUCTION

The first two sets of experiments conducted at Anjana Fish Farm, Krishnagar, Nadia (West Bengal) during the years 1973-76, with different combinations and stocking densities yielded productions ranging from 2654 to 4290 kg/ha/yr and 3552 to 4080 kg/ha/18 months respectively. Prior to the introduction of the project the very same ponds used to yield only 462 kg/ha/yr. The production has thus increased eight-fold from the very same water bodies.

3 ECONOMICS

The cost of production in the two experiments inclusive of all inputs, wages and other expenditure comes to Rs.2.94/kg and Rs.3.06/kg of fish against the wholesale market rate of Rs.8-12/kg in the local markets. This amply demonstrates the economic viability of the technology.

4 SALE OF FISH

For sale of produced fish the ponds were harvested 3 to 4 times in a year and harvesting was synchronised with important festivals such as Durgapuja, Kalipuja and Bhatri Diwitya etc. The fish catches from the project ponds were sold to the local public at Govt. fixed rates. In the first set of experiments the fish was sold @ Rs.4.50/kg and in the second and third sets @ Rs.6-7/kg (against the prevailing open market price of Rs.12-15/kg) through the District Fishermen Co-operative Federation, under the direct supervision of the District Magistrate, Nadia.

5 IMPACT

The impact of the project in the area of operation has been felt in many ways :-

5.1 The project has established beyond doubt that water bodies of 1-2 ha can yield fish of the order of about 4 tonnes/ha through composite fish culture and the technology is economically viable.

5.2 Based on the very promising results of this project, the West Bengal Fisheries Department initiated a scheme in 1975-76 for wide scale adoption of the technology in village ponds in 13 districts of the state. 91 village ponds were covered under the scheme and an average production of 4372 kg/ha/yr was achieved in these ponds. The scheme has since been extended further to 584 ponds.

5.3 The sale of harvested fish from the project ponds has had a very salutary effect on the price of fish in the local market. It has become a recurring feature of the area that during the season and on the days the project ponds are harvested and fish sold in the local market at the rates fixed by the Govt., the price of fish steeply falls in the markets of the area.

It is worthy of notice that such a small project covering only 5.5 ha water area and producing fish @ 4 tonnes/ha could make such a spectacular impact. It can easily be visualized that if this high yielding technology is adopted in all the available water areas of the country, it can go a long way in narrowing the country's protein gap and lowering the fish prices, in addition to revitalising rural economy.

6 INTEGRATION

Path breaking researches initiated under the project in the third set of experiments (1976-77) towards integration of aquaculture and live stock rearing have unveiled a new horizon of high production at low cost. Considerable success has already been achieved in integrating fish culture with piggery and duckery. Five fish farmers have also been adopted by the project for demonstration of the technology in their ponds.

6.1 PIG-CUM-FISH CULTURE

Pig-cum-fish culture is being done in a pond (0.1 ha) owned by Don Bosco Agricultural Society, Krishnagar.

The pond was stocked with fingerlings of Indian and exotic carps at stocking density of 8500 fingerlings/ha in the month of January and February, 1977. The pond is manured with pig dung collected from the pig-sties which are situated a little away from the pond. No other management measures by way of providing feeds and fertilisers are adopted in this pond.

Under this heavy stocking density and without any supplementary feeding or fertilising, the fishes have recorded phenomenal growth rates. Silver carp and grass carp have grown to over 2 kg in about 10 month's rearing from their initial average weight of 9 & 5 g respectively. Catla, rohu, mrigal and common carp have attained average weights of 1.3, 1.0, 0.9 & 0.6 kg in about 11 months rearing from their initial average weights of 48, 28, 23 & 3 g respectively. Grass carp in this experiment has been fed purely on land cattle fodder and not on aquatic vegetation, which is its natural food.

The estimated standing crop of fish in this pond after about 11 months of rearing was 850kg which corresponds to 8500 kg/ha.

The pigs have also shown very good results. Eight piglets, each weighing 22.5 kg (land race variety) were kept for fattening on 30th January, 1977 and sold on 8th October, 1977, when each one had grown to 95.4 kg. Rs.3030 were spent on purchase of piglets and on feed given to them for about 8 months and Rs.4197.60 were received after selling these pigs. So a profit of Rs.1167.60 was made by pig rearing for eight months. A fresh lot of 5 piglets are now being fattened and their dung recycled in the pond. During the course of experiment an estimated 1600 kg pig dung has been recycled.

6.2 DUCK-CUM-FISH CULTURE

Duck-cum-fish culture is being done in a 1.48 ha pond at the Anjana Fish Farm, Krishnagar. Six species culture of Indian and exotic carps at a stocking density of 6000 fingerlings/ha has been taken up along with rearing of 100 ducklings. A floating duck house has been constructed in the pond from where the duck droppings directly go into the pond and are automatically recycled. The rate of droppings has been estimated to be about 10 tonnes/100 birds/year. The ducks are fed on balanced poultry feed. Duck culture work suffered a set back in July, 1977, when the ducks sustained mortality due to disease. The mortality is checked now and birds have started laying. So far 850 eggs have been collected.

Fish growth in this pond is quite encouraging. So far 3027 kg of fish has been harvested and it is estimated that this pond shall further yield about 5190 kg of fish.

Standardization of number of pigs and ducks per ha water area is being done. It is expected that such integration, when fully established will greatly reduce the cost of production of fish. The integrated technology holds tremendous promise and potential of raising farm productivity, rural economy and employment generation in the villages.

6.3 INTEGRATION WITH HORTICULTURE

Banana, Papaya & Coconut saplings have been planted on the embankments of the ponds. Some seasonal vegetables are also being grown on the embankments of pig-cum-fish culture pond.

7 DEMONSTRATION & TRAINING

With a view to demonstrate the technology to the local farmers, 104 step-by-step demonstrations were arranged for the benefit of the local farmers.

Four training courses were arranged by the project, when 45 farmers and 35 sons of the farmers were trained in the technology of composite fish culture.

Beside actual training, necessary guidance was also given to local farmers after making visits to their ponds.

8 CONSTRAINTS & REMEDIAL MEASURES

While the project has demonstrated methods of application and practice to the private fish farmers and educated unemployed, certain constraints which stand in the way of transfer of technology to the actual farmers were brought to light. These are :-

a) The project benefits fish farmers who own ponds and have the capacity to invest up to about Rs.10,000/- per ha/yr. The marginal farmers and landless labourers are not able to be benefitted by the project directly. This constraint can be over-come by the State Government leasing out water areas, after renovating them at nominal rates to the unemployed youth and private pisci culturists trained by the project. Lead Bank should provide inputs and not cash to the trained people to whom the water areas are leased against security of the State Government.

The State Government should stand security for these ventures.

b) Theft of fish as well as poisoning the pond by pesticides are very serious constraints. The first can be over-come to a limited extent by maintenance of proper law and order and the second by restraining the availability of pesticides to the agriculturists. The latter can be partially achieved by selling these on permits etc. Yet another way to prevent both poaching and poisoning of water is, provision of more secure fencing of the pond which will mainly be a one-time expense. It has been estimated that fencing of one ha pond with barbed wire and angle irons will cost Rs.9000 to 10,000 per pond.

c) Non-availability of the stocking material especially of the exotic carps is also a constraint. This can be over-come by the State Government establishing regional hatcheries in the districts and boosting production of stocking material.

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