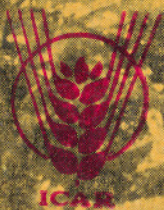
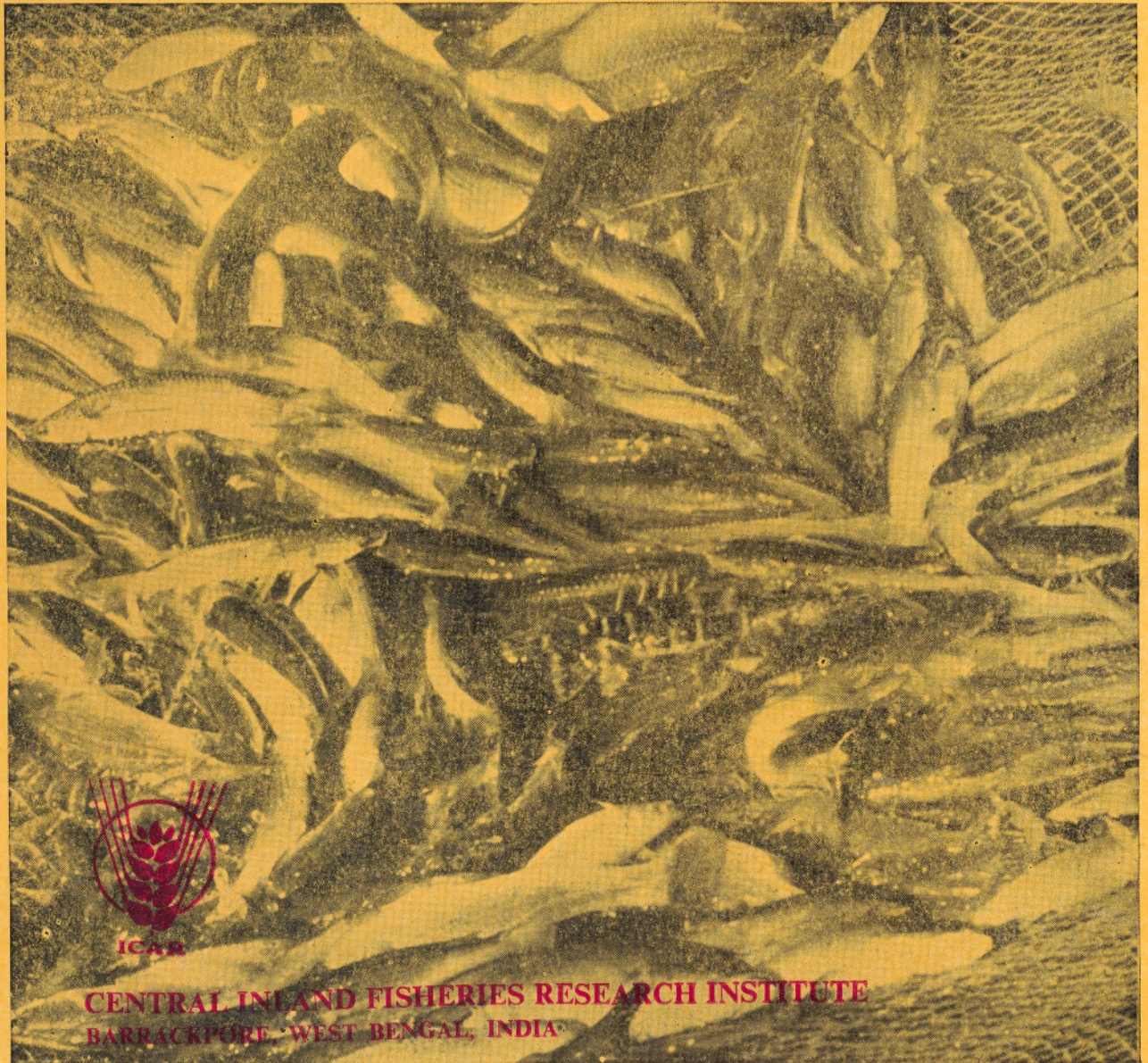


Brackishwater fish & prawn farming

CIFRI TECHNOLOGY



**CENTRAL INLAND FISHERIES RESEARCH INSTITUTE
BARRACKPORE, WEST BENGAL, INDIA**

BRACKISHWATER FISH AND PRAWN FARMING

Large quantities of marketable sized brackishwater fish and prawn can be harvested per unit water area by stocking with the quick growing compatible species of fish and prawn in appropriate combination and applying suitable kinds of fertilizers in desired quantities for the production of natural fish food organisms along with artificial feeding of fish. In recent years, the technique of 'polyculture of fish and prawn' in brackishwater ponds has been developed at Central Inland Fisheries Research Institute, and a production of 2600 kg/ha/year has been obtained.

The management techniques for attaining such high yield of fish and prawn per unit water area are furnished below :

POND PREPARATION

Prior to the stocking of fry and fingerlings in the pond, it is essential to eradicate the pests and predators and to remove the metabolites and excessive silt from the pond bottom.

Eradication of pests and predators

A pond free from predatory fishes and other harmful organisms is safe for survival and growth of stocked fish and prawn. The harmful fishes and other organisms except burrowing forms can be eradicated by dewatering and allowing the pond bottom to dry for a few days. The burrowing organisms like eels, crabs and gastropods are killed by application of organic toxicants like mohua oil cake, tobacco dust etc. @ 100-150 kg/ha. The toxicants are spread evenly over dried pond bed and water is drawn into, upto a depth of 2-3 inches. Toxin dissolves in water and enters into deep burrows and crevices where these animals hide. After 2-3 days, water is drained out and pond is flushed with fresh tidal water to wash away the toxic effects. In a prepared stocking pond measures should be taken to prevent subsequent entry of predatory fishes and

other harmful organisms and also to prevent the escape of stocked fishes by screening the inlet and outlet with fine bamboo mesh or nylon cloth netting.

Removal of metabolites

In any culture phase the pond bottom gets polluted due to deposition and accumulation of organic matters including unconsumed food materials, metabolites, faecal matters and dead organisms. To remove the accumulated metabolites and obnoxious gases, the water from the previous culture is to be let out and the pond bed should be exposed to sun for drying. If there is any heavy silt deposit, it should be removed during this time. Exposure of the bottom soil removes all harmful gases such as hydrogen sulphide (H_2S) from the mud and kills many pests and predators. The pond bed should be raked thoroughly to expose the lower layers and to increase the soil fertility.

POND FERTILIZATION

In order to supplement the natural fertility of the pond it is necessary to apply fertilizers that encourage the growth of fish food organisms. A combination of both organic and inorganic fertilizers is considered more effective than either of them alone.

At a salinity range of 5-20 ppt, poultry manure, urea and single superphosphate can be applied @ 91, 23 and 23 kg respectively per hectare on a monthly basis. The organic and inorganic manure may be mixed together and broadcast all over the pond.

Fertilizer is applied at monthly intervals in between water exchange period so that the nutrients do not escape through the outgoing water. The rate of manuring may be increased if salinity increases excessively beyond 20 ppt. The initial dose of manure should be applied to the pond bed. Then the water is drawn gradually to a depth of 10-20 cm and allowed to stand for 5-6 days. This encourages the thick growth of soil level food, algal mats. Then the water level should be increased and maintained at a depth of 100-120 cm which encourages the growth of water level food, the plankton.

WATER MANAGEMENT

Water quality has a great role for better survival and growth of fish and

prawn. Care should be taken to maintain the water quality. Under normal conditions, water of farm ponds should be exchanged with fresh tidal water for 3—4 days during spring tide at fortnightly intervals. The flow created by the exchange of water removes the metabolites and maintains the important physico-chemical and biological properties of the pond water. Periodic checking of the water quality should be carried out to maintain dissolved oxygen above 4ppm, salinity between 5—20 ppt. and pH around 8.

The water is drawn through inlets guarded with closed mesh screens, either of split bamboo or synthetic nets, to prevent entry of unwanted organisms and predators into the pond and the escape of stocked fish and prawn from the pond. Where tidal exchange is not possible the use of water pump may have to be resorted to for aeration and removal of water.

STOCKING

The combined culture of two or more species of fish and prawn with compatible feeding habits, is adopted as a means for increasing production from brackishwater farms. This is popularly known as 'polyculture'. In polyculture in brackishwater, the selective species of fish and prawn should have

- hardiness and ability to tolerate considerable fluctuations in salinity and temperature
- ability to grow rapidly in brackishwater ponds
- ability to accept natural as well as supplementary feed
- higher survival rate and
- good market demand.

Based on the above criteria the following species of fish and prawn are considered suitable for stocking :

Fish

Mullet—*Liza parsia* (Parse)

Liza tade (kalagachi bhangan)

Milk fish—*Chanos chanos*

Prawn

Penaeus monodon (Bagda chingri).

Ponds may be stocked with fish and prawn in appropriate combination. A desirable combination is that of the three species of fish viz., *L. tade* 3000, *L. parsia* 12,000, *C. chanos* 1000 and prawn, *P. monodon* 4000 at a combined stocking rate of 20,000 fry and fingerlings per hectare. The size of 80-100 mm for *L. tade*, 50-75 mm for *L. parsia*, 150-170 mm for *C. chanos* and 50-70 mm for *P. monodon* are considered ideal for stocking. In case the milk fish (*C. chanos*) is not readily available for stocking the species can be replaced by increasing the stocking rate of *L. parsia* or by stocking of other penaeid and metapenaeid prawns.

SUPPLEMENTARY FEEDING

The fluctuation of salinity affects the natural food production in the brackishwater pond and it is necessary to provide supplementary feed to the fish to maintain the growth. Feeding of fish should be done daily with a mixture of either maize powder mixed with equal weight of sieved rice polish/ wheat flour or rice polish mixed with prawn meal. The powdered feed may be broadcast daily on the water surface.

The quantity of supplementary feed should be given at the rate of 1-5% weight of total stocked population. The condition of the fish may be checked once in a month by sample netting to confirm their healthy growth.

HARVESTING

Based on the marketable size attained by the fish and prawn, the population can be gradually removed by repeated harvesting and the replacement can be made with new stock by equal number of harvested fish and prawn. For collection of prawn various traps are also employed. The total harvest of prawn and fish is possible only by draining the pond since major portion (80-90%) of prawn will remain in the pond even after repeated nettings. A production of about 2600 kg/ha/yr can be obtained from the polyculture of brackishwater fish & prawn.

ECONOMICS OF POLYCULTURE

The profit from polyculture of brackishwater fish and prawn can well attract the fish farmers. This is evidenced by the following figures of expenditure-income per hectare as calculated on the basis of culture experiments

conducted at Kakdwip (W. Bengal) during 1977-78. This economics is subjected to variation from place to place with time :

Expenditure (inclusive of labour)	Rupees
Pond preparation	500.00
Fertilization	1000.00
Seed	1000.00
Feeding	1000.00
Cost of management (Wages of two farm hands, depreciation cost of nets, seed carriers, buckets, bamboo screens, ropes etc.)	7000.00
Harvesting	200.00
Land rent	1000.00
Total expenditure	11,800.00
Fish production :	Market rate ,
Fish : 2085 Kg.	Fish : Rs. 6/Kg.
Prawn : 500 Kg.	Prawn : Rs. 30/Kg.
	(Bagda)
Income from sale :	Fish : Rs. 12510.00
	Prawn : Rs. 15000.00
Net profit from : culture/ha/year.	Rs. 27510 — Rs. 11800 = Rs. 15710 (say, Rs. 15700.00)

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