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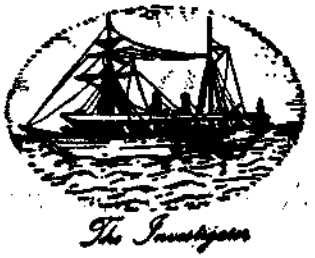

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EXPERIENCES IN THE TRANSFER OF TECHNOLOGY OF OPEN SEA MUSSEL CULTURE UNDER THE OPERATIONAL RESEARCH PROJECT

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ABSTRACT

The paper deals with the problems encountered while implementing a programme on the transfer of technology of open sea mussel culture to the fishermen at Kovalam, near Madras under the Operational Research Project on 'Blending Sea Farming with Traditional Capture Fisheries'.

INTRODUCTION

MARINE fisheries development in the country has been impressive during the past three decades. But the benefits accrued have not helped the poor fishermen engaged in artisanal fisheries and their per capita income has hardly improved. In order to benefit the fishermen and their family members, it was felt that blending of culture fisheries with traditional capture fisheries would help to enhance production and the earning capacity of the rural community.

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OPERATIONAL RESEARCH PROJECT

An Operational Research Project on ' Blending Sea Farming with Traditional Capture Fisheries ' was started in April, 1978 at Kovalam, a fishing village, 35 km south of Madras. This fishing village has 175 families comprising a total of 975 fishermen. The per capita income is Rs. 369 per annum. The main aim of the project is to train fishermen in the methods of mariculture of fishes, prawns and molluscs so that these could be undertaken along with capture fisheries.

The Institute's field laboratory established at Kovalam in 1976 has found the feasibility of culturing mussels, lobsters and prawns. In phase I of the programme it was decided to introduce open sea mussel culture. One hundred youth of the village in the age group of 15 to 25 years were enrolled and grouped in batches of ten with an elected leader for each group. These people were trained for taking up mussel culture in the open sea off Kovalam.

Selecting a suitable area was a problem as traditional fishing areas and chartered navigational routes had to be avoided, which left only a part of the open coastal waters available for taking up the mariculture programme.

Kovalam has a small bay with a maximum depth of 8 m. There is a chain of huge submerged rocks in the 8 m depth range at a distance of one and a half kilometres from the shore. These rocks locally called as ' pavai ' form the eastern boundary of the bay. Within

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the bay area the sea bottom is mostly sandy with a few submerged patches of rocks.

At Kovalam the sea is calm from December to April *i.e.* post north-east monsoon period. From May to June which is the transition period from the north-east to the south-west monsoon, the sea becomes rough with high swells. These swells are more marked as the sea breeze starts blowing in the afternoon. From July to September there is a change in the direction of the wind and current. At this time the sea is calm whenever the current and wind are in the same direction and rough when they are variable. With the onset of the north-east monsoon in October there is a reversal in the direction of the current and wind. Cyclonic conditions with very rough sea and huge swells prevail in this area.

In 1976 when the experiments on open sea mussel culture were started at Kovalam, both seed and adult mussels *Perna viridis* were transplanted from Ennore a place 20 km north of Madras. The mussels established themselves well at Kovalam. There was spatfall from January to September at regular intervals and mussel spat settled profusely on the interdidal rocks.

A floating raft of size 4 metre square (16 sq. m area) was made out of Casuarina poles tied with coir and nylon ropes and mounted on four sealed 200 litre barrels which acted as floats. The raft was anchored in 8 metres depth with 4 grapnel type anchors of 20 to 25 kg weight each. Subsequently the raft size and anchoring arrangements were changed to reduce costs.

The minimum time required for seed mussels of size 15 to 20 mm to gorw to marketable size of 75 to 80 mm is 5 months. The high swells of May/June and cyclonic conditions of October/November, however, did not permit the rafts to be kept at sea. The mussels seeded in January/February grew well and reached 45 to 50 mm by May. Due to the roughness of the sea in May/June the raft got washed ashore. The second seeding done in July/August also had the same problem and the mussel could not reach marketable size before the north-east monsoon.

Earlier, in 1978, it was proposed to go in for pole culture in the shallower regions on the northern side of the bay. Teak wood poles of 9 m length and 50 to 60 cm girth at the bottom were pile driven to a depth of 2 metres below the sea bed using water jet. The area selected was in the 4 to 6 m depth range just outside the breakers.

The first seeding on poles was done in July/August. There was also profuse natural seed settlement on some poles, but soon the bark peeled off resulting in the loss of mussels attached to the poles. Fresh seeding was done after removing the bark, In November/December, 1978 and also in May, 1979 most of the poles were dislodged due to cyclonic conditions.

The results of these experiments at Kovalam showed that for a surf beaten coast, exposed to variable currents and winds and prone to cyclonic storms, the rafts must be more rugged and streamlined. It was then decided to try a submerged raft and the first such raft was designed and anchored in June, 1979. While the raft design was the same as for surface rafts, the float design was changed to keep the raft in the column water.

A new type of conical float was fabricated by cutting and shaping empty oil drums. The apex of these conical floats were weighted inside and to this was fixed a ring. To this ring a swivel was also provided. One end of a two metre long chain was shackled to the swivel. Six such floats were fixed to the raft, *i.e.* three on two opposite sides by shackling the free end of the two metre chain around the teak poles. The raft now slowly got submerged to

1½ m below the surface of the sea, *i.e.* the length of free chain between the conical float and raft. The buoys themselves now floated with the broadside up and their apex in the water partially submerged. The streamlined shape of the floats allowed waves to pass over without resistance. The swivel used in the float was to counteract the current action which tended to twist the chain. As the mussel ropes grew in weight the buoys got half submerged in water. The number of buoys to be used depends on their buoyancy in relation to the weight and number of ropes put on the raft which could easily be adjusted by experience. With the development of the submerged raft it was possible to keep the raft in position long enough for a harvest. The first harvest of mussels from such a raft was taken on 26th October, 1979 at Kovalam. A submerged raft is therefore considered better suited for this area at places where the sea bottom permits pile driving of the poles to half their length and where the tidal range is also high permitting easy handling. Submerged raft will perhaps be the only solution in places where there are strong winds and currents.