

SUMMER INSTITUTE IN
CULTURE OF EDIBLE MOLLUSCS

HELD AT

TUTICORIN RESEARCH CENTRE OF
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

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ECONOMICS OF PRODUCTION AND SOCIO-ECONOMICS OF CULTURE

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ECONOMICS OF PRODUCTION

Coastal cultivation of edible molluscs is an efficient method of converting marine phytoplankton into nutritious and palatable food. The economic components of different systems of culture varies considerably depending mainly on the various methods adopted in the culture systems. The cost of labour and raw-materials required for culture also affect production cost. As in any other commercial venture the molluscan culture farm also depends on the profit it earns. Profit for a particular period is the excess of revenue it received for the commodity it produced over the total values of the services of the resources used in the production process during that period. Therefore, the economic evaluation of a culture farm is the evaluation of the profit or loss, which is the difference between the farm's total revenue and total cost for particular period.

As an example the economics of an experimental mussel culture carried out in the open sea at Calicut is given below. Since the life of one raft is 3 years the income statement is given for 3 years.

CAPITAL COST OR FIXED COST OF ONE RAFT FOR 3 YEARS

	Rs.
1. Teak poles 10 Nos. @ Rs.25/- per pole	250.00
2. Bamboo poles 12 Nos. @ Rs.15/- per pole	180.00
3. Anchors 100 kgs. 2 Nos.	1000.00
4. Anchor chain 100 kgs.	1400.00
5. Nylon ropes 6 kgs.	170.00
6. Shackles etc.	250.00
Total	<u>3250.00</u>

RECURRING EXPENDITURE OR VARIABLE COST

1. Oil drums 5 Nos. @ Rs.100/-	500.00
2. Coir ropes 300 kgs.	1500.00
3. Knitted cotton cloth	400.00
4. Seeding expenditure	200.00
5. Expenditure for farm management	400.00
Total	<u>3000.00</u>

ie., The total expenditure for 3 years $\left\{ \begin{array}{l} 3250 + (3000 \times 3) \end{array} \right\} = 12250.00$

Salvage value of the raft after 3 years	Rs. 500.00
Depreciation of the raft after 3 years	Rs. 2250.00

One mussel culture raft can hold 100 mussel culture ropes and the average production per rope in one year 50 kgs. of mussels.
So the total yield from a raft per year

$$= 50 \times 100 = 5000 \text{ kgs. of mussels.}$$

Average price for 1 kg. mussels = Rs. 1.25

The total return for 1 year $5000 \times 1.25 = \text{Rs. } 6250/-$

ie., The average return for 3 years = $6250 \times 3 = \text{Rs. } 18750/-$

Total profit at the end of 3 years =

Total revenue - (Total cost including depreciation - Salvage value) = $18750 (12250 + 2250 - 500)$

$$= 18750 - 14000 = 4750.00$$

Therefore the profit for 3 years per raft = $\text{Rs. } 4750/-$

SOCIO-ECONOMICS OF CULTURE

The importance of coastal aquaculture in the context of augmenting production of economically important molluscs and improving rural economy was recognised only very recently in India. Our country possess the essential basic resources required for immediate development of coastal aquaculture. The potential coastal waters available in our country includes about 8.9 million hectare of productive inshore waters. A variety of suitable molluscs (Mussels, Oysters, Pearl oysters and Clams) possessing high productive capacity, short larval development, fast rate of growth, and physiological feature to adjust to wide changes in environment are available in our coastal waters. As the active fishermen engaged in the coastal fisheries form only 21% of the total marine fisher population in the country, there are large number of unemployed and underemployed fishermen who could advantageously take up the coastal aquaculture. The impact of introducing any labour intensive, income generating marine farming programme aimed at uplifting the socio-economic condition of the fishermen has to be properly assessed by the farm scientists before embarking

on large scale propagation of the venture in question over wider areas. In a vast country like India, this aspect has to be studied region-wise since conditions differ from one place to another. For example mussel culture can be profitably carried out along the Malabar coast. In this region nearly 3000 fishermen families depend mainly on mussel fishing. Their average family income is less than Rs. 2000 per annum. A family may be comprised of about 5 to 10 members out of which mostly a single member may be engaged in mussel fishing. They can easily practise mussel farming if they are given some preliminary financial assistance for the fabrication of rafts. During their normal fishing, seed collection can be carried out without any extra effort. Seeding can be done at home with the assistance of all the members of the family including women and children. The seeded ropes can be suspended from the rafts by the fishermen while going for mussel picking in the next day morning. Thus mussel culture can be carried out by these families without much extra effort. In the same way oyster culture can be practised at Tuticorin by fishermen engaged in traditional fishing and clam culture at Kakinada. Since the availability of the seed is the main factor in the success of the molluscan culture, any economically important molluscs can be cultured in areas where seed is available. Since the production rate in almost all molluscan culture is high and growth very fast, the culture operations will give quick results. Harvesting can be adjusted according to the market demand for better profit. This generates more employment opportunities and improved economic condition of the fishing village.

AT VIZHINJAM .

K.K. APPUKUTTAN

"Raft culture" has been adopted for the farming of brown mussel both in the bay and in the open sea. Rafts of different sizes, ranging from 6 x 6 metres to 8 x 8 metres were fabricated with teak and bamboo poles lashed by coir or nylon ropes. Metal drums of about 200 litres capacity, treated for anticorrosion, were used to give buoyancy to the rafts. The rafts were moored by anchors, by required length of anchor chains. While the rafts could be maintained in the bay throughout the year, those in the open sea could be kept in position only during the calm season from January to May. The depth of Vizhinjam Bay varies from 10 to 15 metres and the bottom is muddy.

Open-sea mussel culture experiments were carried out about 1 - 2 km away from the shore at depths ranging from 15 - 25 metres. The sea is usually calm from the end of December to the end of May when the rafts could be kept in position. Rest of the year, the sea is subject to heavy wave action making it difficult to maintain the rafts.

Seed availability

Brown mussel starts spawning in May which lasts till September. The period of peak spawning is July-August. Settlement of mussel seed begins by July and dense settlement of seed is seen during September-October. The young mussel attains the mode of 15 - 19 mm in length in July, 25 - 29 mm in August and 30 - 34 mm in September. Seed in the size range of 20 - 35 mm were collected from the natural beds from September to November. The rocky area between the Light House and the breakwater of Vizhinjam Bay, Avaduthura and Mulloor, Enayam, Colachel, Muttom and Neendakara are all good seed collection areas. Good spatfall also occurs inside the bay on split ropes suspended from rafts. The seed thus collected on the ropes were also used in the farm.

Seeding

The seed were washed in sea water and the fouling organisms were removed. They were then wrapped around a rope and secured by cotton netting or handage cloth. Both coir ropes and nylon ropes were used for seeding, but nylon rope was found to be more economical considering the longevity of the rope. The length of the ropes seeded ranged from 5 to 10 metres. To avoid slipping of seed in the initial stage, wooden pegs were inserted at regular intervals in the rope. The average weight of mussel seed per metre length of rope (seeded portion) ranged from 1.4 to 2.0 kg. The seeded ropes were suspended from the rafts.

Growth of mussel and production

In the Vizhinjam Bay, the brown mussel reaches the size of 55 - 60 mm in 8 months, giving an average growth of 2.94 mm per month. In 1979 the growth rate observed was 3.54 mm per month. The size 55 - 60 mm is marketable. The ratio of flesh weight to shell-on weight is 41.31% in May. After June, due to influx of freshwater into the bay and also increase in weight of ropes, there is a tendency for the farm-grown mussels to fall out. Hence May-June appears to be the appropriate time for harvesting the tended stock.

In the open sea culture experiments the growth of mussel was relatively faster. A modal size of 60 - 65 mm was attained in 5 months recording a growth rate of 5 mm per month. The flesh weight constitutes 43.33% of the total weight of mussels in May.

The average rate of production was 10 - 12 kg of mussel per metre length of rope in the bay in 8 months and 15 kg in the open sea in 5 months.

Prospects and problems

In the existing sustenance fishery for the brown mussel at Vizhinjam the production ranges from 50 - 150 tonnes a year. Based on

the results obtained in experimental culture of the mussel in the bay as well as the open sea, it is possible to increase mussel production in the area by adopting raft culture techniques. One major area of current research relates to developing suitable methods for year round operations in the open sea since the growth of mussel and production rate are higher in the open sea than in the bay. Experiments on this aspects are being carried out at Madras, Calicut and Vizhinjam.

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