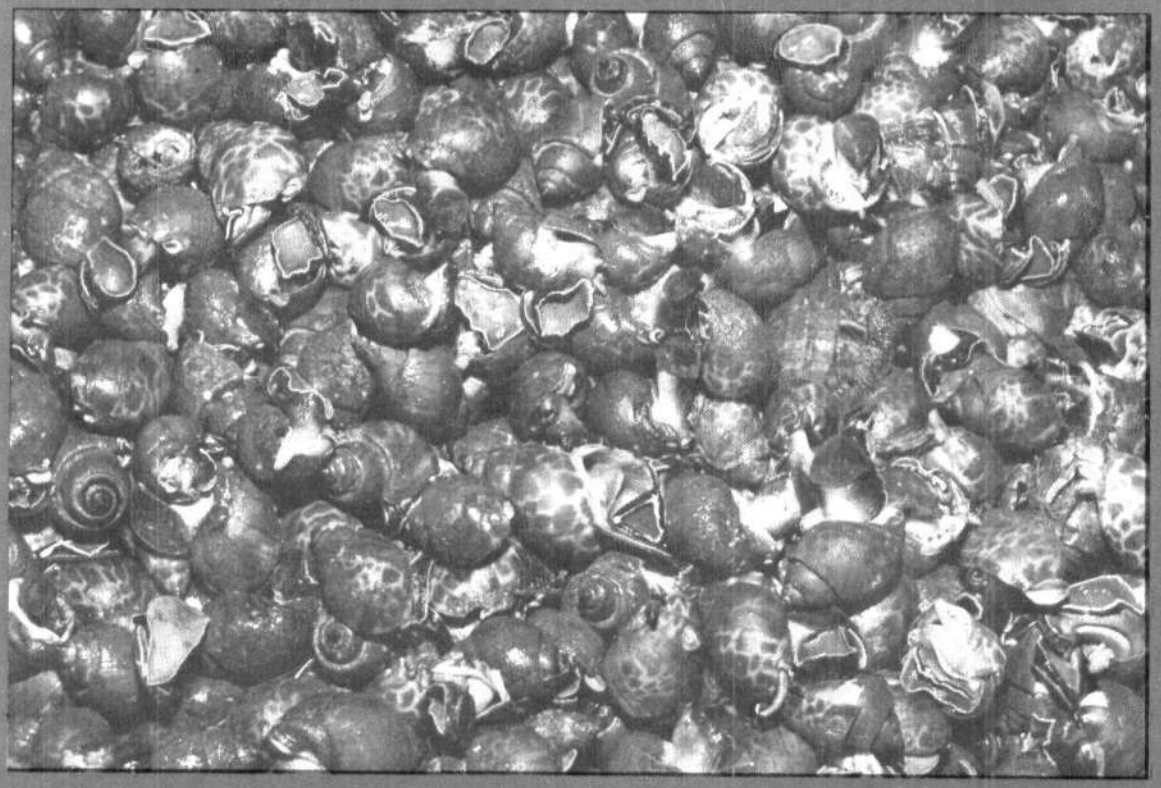
ISSN 0254-380 X

भाकृअनुप
ICAR

समुद्री मात्स्यिकी सूचना सेवा
MARINE FISHERIES INFORMATION SERVICE

No. 132

SEPTEMBER 1994



तकनीकी एवं विस्तार अंकावली
TECHNICAL AND EXTENSION SERIES

केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान कोचिन, भारत
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE COCHIN, INDIA

भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

TECHNICAL AND ECONOMIC CONSIDERATIONS FOR SHRIMP FEED PRODUCTION AT SOUTH CHELLANAM, ERNAKULAM DISTRICT

PART - I : BACKGROUND INFORMATION

Manpal Sridhar

Central Marine Fisheries Research Institute, Cochin - 682 014

Introduction

Supplementary feed accounts for nearly 40-60 per cent of the total operational cost in intensive farming operations and formulation of balanced feeds with low-cost protein ingredients can bring down the cost of supplementary feed to a great extent. The C. M. F. R. Institute has been actively engaged in nutritional research over the past few years and evolved biologically efficient practical feed formulations for the semi-intensive and intensive culture of *Penaeus indicus* and *Penaeus monodon* warranted to obtain high growth rates and maximum production in the laboratory. The testing for the economic viability of these feeds under field conditions was therefore initiated at South Chellanam.

In this paper an attempt has been made to weigh based on personal observations made and information gathered after working for a period of over one year the prospects for dissemination of technology with regard to shrimp feed and culture to what is currently practised at South Chellanam both from technical and economic angles.

Traditional shrimp culture practices at Chellanam

The culture of shrimp at South Chellanam, has largely been associated with rice production, whereby rice is intercropped with naturally stocked shrimp seed which have been washed over the rice field perimeter bunds during high tides. Impoundments or 'Pokkali' fields range in size to a maximum of 100 hectare of water area without subdivisions. Scientific pump-fed prawn farming is also practised by a few farmers though on a smaller scale and size of ponds ranged from

a minimum of 1 to a maximum of 3 hectares. The other areas under prawn cultivation are the canals around the coconut groves.

In the traditional perennial culture no feed supplementation is practised and shrimp are dependent upon natural pond fauna and flora as the sole feed sources. Some enterprising shrimp farmers at Chellanam are also supplementarily stocking their tidal ponds with wild or hatchery reared shrimp post-larvae. The shrimp farming practices can be broadly classified into three categories—extensive, improved extensive and semi-intensive, representing the stocking density of 10,000 to 30,000, 30,000 to 60,000 and 60,000 to 3,00,000 individuals, respectively per hectare. The corresponding production ranges in kg/ha/year are 200 to 500, 500 to 1,000 and 2,000 to 3,000 respectively, the extensive farming being adopted on a larger scale.

As hatchery-bred seeds become a reality and pelletised feeds come to market more and more farmers are adopting the improved system of culture simultaneously pushing up the production rates.

Technical and economic considerations

Production intensity of a shrimp farm depends on the technology employed and there is more than 14 fold increase in costs of production per hectare as we move from extensive farming with supplementary feeding to semi-intensive farming. However, in all systems of shrimp culture, production and profits deviate to varying degrees depending upon the extent to which the multiple combination of various factors which determine the success of the different farming practices viz. the site, farm, seed, water quality and its management, feed and feed management and diseases. The bearing of these on the culture practices and their economics are briefly discussed below.

Site

The important considerations that go into the selection of site for shrimp culture are technical, social and economical. At Chellanam the social atmosphere does not seem to be very congenial and along with technical and economic considerations have to be given prime importance. There is a clash between the supporters of the traditional paddy cum prawn culture and those in favour of scientific prawn farming. The profits from prawn culture average around Rs. 25,000/hectare/crop in comparison to a meagre Rs. 5,000/hectare for the paddy culture of 130 days duration. As for the former there may be 2 to 3 crops per year to only one crop in the case of the latter, more and more farmers are being attracted to scientific prawn culture practices.

Technically most of the sites are of an uneven topography without uniformity in shape and depth and with sandy clay soils not easily approachable and with no proper access to the main canals, hence suitable only for improved extensive or semi-intensive farming. Salinity remains more or less stagnant between 15-20 ppt for around nine months in a year.

Farmers who are capable of investing more go in for bigger farms with better farm infrastructure facilities, while others rely on external agencies for loans, as fiscal constraints prevent them from extracting the maximum profits out of farming. Adequate funds is also a major area which requires the attention of the developing agencies and financing bodies.

Seed

A major factor contributing to shrimp survival and ultimate yield is the seed quality, and it constitutes some 40% of the total cost component of shrimp production. Hatchery bred seeds, because of their uniform size and tendency to moult synchronously, reduce cannibalism during the culture resulting in better survival rate. These seeds are preferred for the improved extensive and semi-intensive farming, while the natural seeds because of their sturdiness and lower price are preferred for extensive farming. There is no hatchery for seed of both *P. indicus* and *P. monodon* in the area, hence the gap between supply and demand is considerable. The wild seed collections are made from Alleppey while the hatchery reared seed are procured from either Madras or Karnataka @ Rs. 350 per 1000 number for *P. monodon* and Rs. 60 per 1000 number for *P. indicus*. Thus the establishment of hatcheries in the area is also necessary for the augmentation of shrimp farming.

Water quality management

For extensive farming initial pond preparation with fertilization (lime) is only resorted to. Eventhough electrification is absent at the pond site at most places, 8 to 10 H.P. motors are utilised for water pumping during emergencies.

Apart from this, no regular monitoring of the important water quality parameters is adopted

by most farmers who depend on blind water exchange or tidal exchange for water quality mangement. Taking into account all the factors which cause oxygen depletion in pond water, adequate management practices have to be taught. Feeding rates influence pond dissolved oxygen concertrations. The farmers are not aware of feeding rate (amount of feed to be given per day) but feed a particular quantity of ration thrice daily at dawn, dusk and night based on radio broadcasts by MPEDA. Aeration facilities are also not observed in most farms.

Feed and feed management

Few of the farmers use farm-made feeds and hence the quality and composition vary depending on the availability of raw materials. Clam meat (average price Rs. 6.50/kg), ground nut oil cake (average price Rs. 6.00/kg), soyabean flour avarage price Rs.12.00/kg) and cassava powder (average price Rs.5.00/kg) are the most commonly used ingredients. Clams are locally collected from Alleppey while all the other ingredients are purchased from the open market. A few farmers use rice bran and dried mantis shrimp also in thier feed formulations with or without vitamin and mineral supplementation. The proximate composition analysis of a few feeds prepared by the local farmers is presented in Table 1. Excepting feed No. 2 which meets the standards prescribed for shrimp nutrition, all the other feeds are concoctions prepared without any basic knowledge of the nutritional requirements of shrimp.

Most of the extensive farmers fed the feeds in the form of moist handmade balls while only the farmers engaged in semi-intensive culture used pelleted feed. In the former, survival ranged from 60-79% while for the latter it was >70%. Though farmers are becoming conscious of the advantages of pelletised feed there are no feed mills in the area. The cost of the extensive locally prepared feed ranges from Rs.10 to Rs.15/kg while that of the Higashimaru commercial extensive feed is Rs.20/kg. The cost of the local feeds for semi-intensive culture works out to be Rs.30/kg while the imported counter part is priced at Rs.40 - Rs.50/kg.

No strict feed management is adhered to by most of the farmers. When procured from standard companies, the guidelines of the feed manufacturers are followed. Feeding, however, is carried out by the help of earthen plates or wire baskets suspended with floats and on an average number 30 to an acre. No weekly adjustments of feed rations are carried out by the farmers who also lack knowledge about feed conversion ratios.

Diseases

As only low-density stocking and extensive culture are being practised at present, no disease out break has been observed, but as practices are intensified risks will surely increase and farmers should be educated on this topic as well.

Research needs

There was great potential at South Chellanam for the development of feeds for prawn culture. With the intensification of culture operations the need to develop nutritive and economical feed mixtures for all stages of cultivable prawn species based on less expensive locally available feed ingredients was felt since these contribute greatly to the commercial success of the culture operation. As research inputs are necessary at every stage of shrimp feed development and production technology, we aimed at a transition from minimal input, extensive shrimp culture to that of low input, semi-intensive culture by the provision of laboratory tested compounded feeds. We also aimed at increasing the yields from a single harvest for these farmers with a minimum change in the pond management practices followed by them.