

CMFRI

bulletin 44

Part Two

MARCH 1990



NATIONAL SYMPOSIUM ON RESEARCH AND DEVELOPMENT IN MARINE FISHERIES

MANDAPAM CAMP
16-18 September 1987

Papers Presented
Sessions III & IV

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
(Indian Council of Agricultural Research)
P. B. No. 2704, E. R. G. Road, Cochin-682 031, India

Central Marine Fisheries Research Institute
40
YEARS
1947-1987

CMFRI

bulletin 44

Part Two

MARCH 1990



**NATIONAL SYMPOSIUM ON
RESEARCH AND DEVELOPMENT
IN MARINE FISHERIES**

MANDAPAM CAMP

16-18 September 1987

**Papers Presented
Sessions III & IV**



CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

(Indian Council of Agricultural Research)

P. B. No. 2704, E. R. G. Road, Cochin-682 031, India

Bulletins are issued periodically by Central Marine Fisheries Research Institute to interpret current knowledge in the various fields of research on marine fisheries and allied subjects in India.

Copyright Reserved



Published by

Dr. P. S. B. R. JAMES

Director

Central Marine Fisheries Research Institute

E. R. G. Road

Cochin-682 031, India

Editorial Committee

Dr K ALAGARSWAMI

Dr K ALAGARAJA

Shri M S MUTHU

Dr K J MATHEW

Dr N GOPINATHA MENON

Limited Circulation

ROLE OF BRACKISHWATER PRAWN CULTURE IN THE FISHERIES DEVELOPMENT OF INDIA

S. V. Bapat

*6. Swarali Apartments, Near L. I. C. Colony, Paud Road,
Pune 411 038*

ABSTRACT

The Seventh Plan envisages an export target of Rs. 1000 crores from the fisheries sector. For attaining this target the emphasis appears to be on exploitation from fishing grounds away from the conventional/traditional grounds beyond the 30 fm line. These fishing grounds can be fished only by bigger trawlers, purse seiners and shrimpers which have the facility to remain at sea for a fortnight or more. Our experience has shown that the shrimp component from offshore grounds is negligible, less than 5%. Shrimp is the major component of our marine exports and if we have to achieve the targets laid down the shrimp catch has to be enhanced in a big way.

We have almost reached a saturation point in exploiting shrimp from coastal waters. Therefore the only alternative appears to be culture of shrimp on a large scale. Fortunately the country has plenty of Kharland along the east and west coasts. Pilot-scale projects in shrimp culture by research institutes have produced encouraging results. Hatchery production of shrimp seed in respect of commercially important species has been achieved. So we have the natural resources, and the technical know how. All that is needed is a boost to shrimp culture by the Government in providing incentives to farmers and industrialists by way of allotment of Kharlands on lease basis on easy terms, funding by banks, etc. If proper incentives are provided, as in agriculture, it should be possible to increase our shrimp production and achieve the export targets within five years.

The present world production of shrimps, realised mainly through capture fishery, is of the order of 1.8 million tonnes. The trend of production during the last ten years has been more or less the same although the effort expended was more. India is one of the leading

shrimp producing countries in the world, but here also the trend of production has almost followed the world shrimp production pattern. The peak production of prawns and shrimps in the country was of the order of 2,22,700 tonnes in 1975 and thereafter it declined to 1,85,000

tonnes in 1978 and has remained fluctuating around this figure since then. This is inspite of the fact that our fishing effort has been constantly on the increase all along the coast. Contrary to production, the global demand for shrimps and shrimp products is continuously increasing year after year. Nearly 90% of our export earnings from the marine sector come from shrimp and shrimp products. It is, therefore, necessary for the country to increase the shrimp production substantially if we want to have a hold in the international shrimp market. The Ministry of Commerce, Government of India has set a foreign exchange target of Rs. 700 crores from marine products by the end of the VIIIth Plan. How are we going to achieve this?

There are only two ways by which production could be increased.

- a) By identifying and exploiting new fishing grounds and
- b) by culturing shrimps in coastal waters.

Culture of shrimps in coastal brackishwater areas is emerging as a prospective sector and it should be possible to produce large quantities of desired species of prawns by adopting techniques which are relatively less expensive. About 1.7 million ha of brackish water coastal area is available for aquaculture in India. Out of this, a meagre 30,000 ha (1.75%) is currently under culture, mostly in west Bengal, Kerala and Karnataka. Considering the needs of the country in the matter of food, socio-economic and rural development, it is imperative to convert the unutilised derelict areas into productive lands by adopting the modern technologies developed in prawn culture in the country. The potential brackish water areas available in different states in the country are given below.

State	Potential area available for culture (Mill. ha)	Area under culture (ha)
Gujarat	0.376	88
Maharashtra	0.081	—
Goa	0.019	—
Karnataka	0.008	4,800
Kerala	0.243	5,700
Tamilnadu	0.080	—
Andhra Pradesh	0.200	—
Orissa	0.299	—
West Bengal	0.405	20,000
	1.711	30,588

Although, this estimated area may not be entirely suitable for aquaculture, the surveys carried out so far have shown that considerable extent of this potential area is suitable for immediate conversion into culture fields. Further, we have also biologically and economically suitable species for culture.

The technology for prawn culture on a scientific basis is now available in the country. Considerable research work on prawn breeding, hatchery production of prawn seed of the cultivable species, their feed requirement at different stages of growth have been carried out in the national research laboratories such as the Central Marine Fisheries Research Institute, the Central Institute of Fisheries Education, the Central Inland Fisheries Research Institute and the Agricultural Universities with fisheries faculty (the University of Agricultural Sciences, Bangalore; Konkan Krishi Vidyapeeth; Tamil Nadu Agricultural University, Kerala Agricultural University). Considering the results of these researches, it should be possible to organise small hatcheries along the coast to produce the seed of cultivable species of the particular area. Already the Government of Kerala and Maharashtra have put up hatcheries at Azhikode and Bada Palkhran respectively, as demonstration units as well as on commercial basis. In the private

sector, M/s. Hindustan Lever Ltd is operating a prawn hatchery near Madras. Hatcheries are also being established in Orissa, Andhra Pradesh, Tamil Nadu, Kerala and Karnataka by the Marine Products Export Development Authority and the State agencies.

From the published information on the yield of prawns from the culture operation, we can easily expect to realise about 400 kg/ha of quality prawns within 90-120 days. This production rate works out to about 800-1000kg/ha in a year by taking at least two harvests if not three in a year. Besides the realisation of relatively higher unit production rate through the culture source, the sector affords other advantages relating to employment to technical, skilled and unskilled persons, establishment of ancillary industries to meet the requirements of inputs such as ice and cold storage, feed compounding units, construction of sluice gates, transportation and marketing.

Against these advantages, there are several constraints deterring the accelerated development of brackishwater prawn and fish culture fisheries in the country at present. The main developmental constraints encountered relate to the land and water use strategies and the connected policies and guidelines. Endeavours to develop large-scale operation of prawn culture in most of the states are severely handicapped because of non-availability of lands to entrepreneurs, the land distribution policy of the state, conflict between the use of land for agriculture versus aquaculture and ownership of land by different agencies. The other important constraint relates to the timely availability of finance, seed and feed.

In spite of these constraints, it is desirable to introduce coastal aquaculture in a big way. Shrimp is an important foreign exchange earner and we can easily double or even treble our marine exports in the next ten years by utilising these fallow, derelict lands along the coasts of India. Realising the importance of aquaculture,

the National Planning Commission and the Government of India have assigned priority for this development activity, particularly prawn culture in all the maritime states.

It is now realised that establishment of aquaculture enterprises is not simple, but involve complex operations entailing cultivation of prawns to marketable size under several environmental and socio-economic conditions. In this context economic feasibility of the enterprise forms the foremost concern of the entrepreneurs. A comparison, is therefore attempted below to understand how the economics of aquaculture of prawns compare with the capture fisheries in the offshore/deep sea fishery sector employing larger trawlers.

In the model for discussion on aquaculture, estimates are made for the development of 400 ha of Kharland into farms and culture of prawns involving stocking, feeding, maintenance of farms, harvesting and marketing.

From 400 ha derelict Kharland on conversion into farms, we would get 240 ha of farm under water. The remaining 40% would be covered by bunds, partition bunds, canals etc. The construction would be in stages of 40 ha, 60 ha, 60 ha and 80 ha in the I, II, III and IV years. The yield is assumed at 400 kg/ha in the II year, 600 kg/ha in the IIIrd year, 800 kg/ha in the IV year, 1000 kg/ha in the V year, 1200 kg/ha in the VI year and 1500 kg/ha in the VII year. Value of farm bred prawn is taken at Rs. 50/-kg and incidental fish catch at Rs. 4/-kg. At the beginning i. e. in the I st year, the farm will be managed by 43 personnel (5 Scientists + 38 labourers) and from the IV year onwards by 225 personnel (23 scientific + Technical and 202 labourers). Increase in the yield is possible by providing suitable *compounded* feed to the stocked population. The project provides for hatchery of its own to meet the seed requirements of the farm. The anticipated expenditure and results are as below at the end of the VII year.

A. Capital outlay :	Rs.
Cost of construction of bunds, Sluice gates with filters, etc. at Rs. 60,000/-ha. Construction of laboratory and office, construction of hatchery, essential staff quarters, feed compounding units, pumpsets, vehicles, Electrical installation, compressors and other machinery etc.	2,00,75,000
B. Operational Cost :	
Cost of seed, cost of brooders, manure and fertilizers, compounded feed, repairs to plant, machinery and vehicles, fuel and electricity, etc.	38,90,000
C. Establishment charges :	
Salary of staff, casual labour wages, Contingencies.	1,21,66,000
D. Depreciation on Capital Cost A at 10% over a period of 7 years.	1,00,43,000
E. Interest on Capital at 15% over a period of 7 years.	1,43,63,000
F. Lease rent of Farm at Rs. 20,000/year for seven years.	1,40,000
Total expenses B + C + D + E + F	4,07,02,000
Income from sale proceeds of Prawn and fish	5,57,88,000
Net Profit at the end of VII year	1,50,86,000

It will thus be seen that with a capital investment of Rs. 2.00 crores and working capital expenditure of Rs. 4.07 crores (which includes operational investment at 10%, interest on capital at 15%, lease rent on farm land over a period of 7 years, there would be a net profit of Rs. 1.50 crores at the end of VII year. The break even point of the project is reached at the end of the IV year.

In the capture fisheries sector, it is proposed to introduce 500 bigger trawlers/tuna

liners/purse seiners at an estimated cost of Rs. 1000 crores in the VII Five Year Plan. What will be the likely production from these 500 vessels with 250 fishing days? Assuming each boat lands 2500 tonnes of catch in a year, the total landing would be 12.50 lakh tonnes giving a return of Rs. 1.250/- crores. The working expenses of the 500 boat with wages of crew, fuel expenses, port dues, cost of ice, loading and unloading charges, maintenance and repairs of machinery, engines, gear, etc, would be more than Rs. 1000 crores. With all these expenses, the quantity of exportable variety of shrimp would be less than 1%, and fish, less than 10%.

Thus, the return from aquaculture enterprise as against that of the capture fisheries in the deep-sea/offshore fishing shows profit and greater economic feasibility. At present, the Government of India is subsidising the cost of trawlers imported/built within the country. It is also subsidising the cost of fuel by giving excise duty rebate on fuel consumed. Similar facilities for aquaculture, may be extended by the Government, as aquaculture as an industry is not yet established. These facilities may include-reduction in land value as given to salt pans, subsidising construction costs to the extent of 25% of the capital outlay, provision of lower interest rates on capital through agencies such as NABARD.

Further, the Kharland available in each coastal District may be proposed to be allotted to small individual farmers, co-operative societies of fishermen. It is suggested that in each District or two adjoining coastal districts, an area of 500 to 1000 ha of land may be allotted to industrially established entrepreneurs with the following conditions :

1. The Entrepreneur should establish a hatchery within three years to produce required prawn seed.
2. He should spare at least 10% of the seed produced by him to small farmers in the area and meet their requirements.

3. He should also buy the produce in the vicinity of his farm at market prices for processing and export.
4. He should set up a feed compounding unit on the premises to meet his needs as well as those of the small farmers around his farm in the District.
5. All technical know-how and assistance to be provided to small farmers as they cannot afford to employ Scientists/Technicians for 5-10 ha. farms.

If programme on these lines are drawn up and executed by the Government at State and Central level with the incentive proposed, it should be possible for the country to achieve the target of Rs. 1000 crores in the next 5-8 years. In this context, the recent announcement by the Union Agriculture Ministry to throw open brackish water fish farming to the private sector to exploit its full potential is most welcome. It should be implemented by the States in letter and spirit if the country has to achieve the targets of the VII Plan.