CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
ERNAKULAM, COCHIN-682 031, INDIA

R & D SERIES FOR MARINE FISHERY RESOURCES MANAGEMENT

9. THE CLAM RESOURCES

The estuaries and backwaters along the coasts of India have immense clam resources which have been traditionally exploited by the coastal people. The clams form the basis of subsistence for the fishermen during seasons when sea fishing is at a low ebb and clam fishing is a regular activity in many coastal regions of Maharashtra, Goa, Karnataka and Kerala on the west coast. Along the east coast, clam fishing is restricted to a few centres such as the Kakinada Bay although, here and there, they are collected for culinary purposes elsewhere. This is an activity where, besides men and women, children participate. Clam marketing is highly localised in centres of collection. Apart from introduction of improved clam-scooping devices, the fishing method of hand-picking has largely remained unchanged over the years.

Besides forming food, the clam shells, both those obtained after shucking of meat from live-clams and the sub-soil deposits dredged, have found increasing use in the industry. Originally the shells were converted to lime for whitewashing of walls. Today they are used in paper, rayon, leather, carbide, cement and fertiliser industries, besides as shell-grit for poultry.

The scenario is changing with the increasing export of frozen clam meat. The export which started with a meagre 16 tonnes in 1981–82, reached 1033 tonnes in 1984–85, a 65 fold increase in a short span of three years. This quantum jump has a telling effect on the resource with the exploitation of even the 'baby clams' of very small size. Clams being a sedentray resource, it is theoretically possible to reach a point of no-return in short time. Clams basically support subsistence of sections of the coastal poor, providing some much-needed nutrition to them. Therefore, utmost care has to be exercised in management of this resource.

The Central Marine Fisheries Research Institute has carried out surveys of the clam resources and studied their biology and fishery at some centres. Clam farming, adopting simple methods of bed preparation and transplantation, would be appropriate at several centres for improving production and managing the resources.

Clam resources of the estuaries of Karnataka

Along the Karnataka Coast, there are 14 estuaries with varying abundance of clams. *Meretrix casta* (Dadda Maruvai), *M. metetrix* (Ane Maruvai), *Paphia malabarica* (Kesha Maruvai), *Katelysia opima* (Poo Maruvai) and *Villorita cyprinoides* (Kappu Maruvai) are commercially important. *Meretrix casta* is found in all the estuaries, *M. meretrix* in Coondapoor Estuary, *P. malabarica* in the Mulky, Gurpur, Udyavara and Coondapoor Estuaries and *V. cyprinoides* in the Nethravathi, Gurpur, Udyavara, Swarna and Coondapoor Estuaries.

Among these estuaries, Mulky, comprising Sambhavi and Pavanji, is the most productive and exploited estuary. The landings which were 40 tonnes in 1978–'79 rose to about 3,000 tonnes in 1983–'84. The landings from Dakshina Kannada estuaries were about 1,550 tonnes in 1979–'80 which increased to about 5,470 tonnes in 1983. About 98% of the clam production consisted of *M. casta, P. malabarica* and *V. cyprinoides* in the order of abundance.

During 1979–80, the standing stock of clams in all the estuaries of Dakshina Kannada was found to be about 5,300 tonnes. *M. casta* formed about 88% followed by *V. cyprinoides* (7%) and *P. malabarica* (4%). *M. meretrix* and *K. opima* are of minor importance, although the former is found in the Coondapoor Estuary in appreciable quantity. In the subsequent assessment during 1984, the standing stock of clams observed was about 4,800 tonnes. This decline was mainly due to very poor clam resources observed in the Udyavara, Swarna, Sita and Coondapoor Estuaries. In the case of Mulky, the stock of clams has shown considerable improvement. Fluctuations in the individual estuaries were wide. In general, there was a significant increase in the proportion of *P. malabarica*. The near-absence of *M. meretrix* in the Coondapoor Estuary was another noteworthy point.

The exploitation of clams is round the year. Generally, the peak season is from February to August, coinciding with the poor marine fish catches followed by southwest monsoon. During this period, most of the clams are used for food by all classes of people. September through January, the clams are mostly exploited for shells. The clams are marketed all along the coastal areas and in

some interior places. There are number of lime kilns (about 50) which produce about 15,000-20,000 tonnes of lime of different grades.

Besides these shells, substantial quantities of sub-soil shell deposits (about 50,000 tonnes) are being annually exploited from the Coondapoor and Swarna Estuaries. The demand is growing year by year. At present the clams from the Dakshina Kannada estuaries are not exported. However, clam freezing is done at Mangalore, the raw material for which comes from the northern Kerala estuaries.

The exploitation of sub-soil shell deposits in the Karnataka estuaries appears to have adversely affected the clam resources. In the Coondapoor and Swarna Estuaries where extensive shell mining is going on, the live clam resources have become negligible. Several such areas in other estuaries have been leased out to different persons/organisations for future mining. Mining for shell deposits may be restricted to areas away from the live clam beds. Since clams are found in beds, with limited mobility and are vulnerable to heavy exploitation, the younger clams need protection against indiscriminate exploitation, particularly so during October–January when seed clams are in abundance.

Clam resources of the estuaries/backwaters of Kerala

In the order of abundance *Villorita cyprinoides, Meretrix casta, Paphia malabarica, Katelysia opima* and *Meretrix meretrix* are the species fished from the Kerala estuaries. *P. malabarica* which is having high export potential is a major fishery in Koduvally, Azhikkal, Karyamgod and Chittari Estuaries. It is also observed that Ashtamudi, Vembanad, Azhikkod, Kadalundi, Beypore, Korapuzha, Mahe, Koduvally, Azhikkal, Karyamgod, Chittari, Chandragiri and Mogral Estuaries support a good fishery for clams, but in many of these areas meat of all the species are not fully extracted and utilised.

As a case study for formulating future management programmes for clam resources, a special study on the exploitation of clam resources of Vembanad Lake and its socio-economic implications was taken up by the Institute in 1979. The Vembanad Lake with an area of 200 sq.km, has an annual production capacity of around 25,000 tonnes of *Villorita cyprinoides* which indicates the high convertion rate of calcium carbonate from the lake by these animals. The shell deposits collected by clam fishermen societies are around 53,000 tonnes annually and three factories in the area are collecting about 95,000 tonnes for making cement, calcium carbide and sandlime bricks.

Seed resources of 1,500 to 2,000 tonnes of *V. cyprinoides* are also available at the northern part of the lake which is at present collected and destroyed annually. If this resource is rationally utilised for

transplantation and culture, as is practised in Taiwan, it will definitely increase the production.

Recommendations

The working of the 12 lime shell co-operative societies with 4,700 members has been studied in detail. Based on this study, the following suggestions are made:

As observed in many of the clam fishing areas, the exploitation of seed clams for using as duckfeed or manure is to be discontinued. Fishing implements used for seiving out clams from the sand and mud should not have mesh size lesser than 15 mm to prevent collection of seed clams. Seed clams can be transplanted and cultured in shallow areas having similar water conditions of the clam beds. Transplantation of clams from one estuary to another may be attempted wherever some of the species that occurred earlier has completely disappeared due to over exploitation or topographical changes of the estuarine beds. Hatchery systems can be developed for breeding clams. Monitoring systems are to be developed for all the clam resources areas for rational exploitation and for maintaining uniform standard of production.

Clam resources of Kakinada Bay

Anadara granosa popularly known as the blood clam (in Telugu *Buditha gulla*), forms a fishery of considerable magnitude in the Kakinada Bay. Although this species occurs at several other centres along the coastline, it does not form a fishery elsewhere.

In the Kakinada Bay, *A. granosa* is distributed along the southern and western sides in 46.6 km^2 area where the depth is below 2 m. This species prefers soft muddy bottom which is sheltered from strong wave action and a salinity range of 14.46–35.53 ‰. By a survey, the total stock in the clam bed was estimated at about 6,000 t and the actual landings at 2,000 t/year; the potential for additional landings is estimated at another 500–1000 t above the current yield. In the present state of the fishery the age at first capture (t_c) is one year; the natural (M), fishing (F) and total (Z) mortality rates have been estimated at 1.3, 2.6 and 3.9 respectively. The yield in weight per recruit (Y_w/R) increases with increased F (which is a function of fishing effort). Under the current values of F and t_c the Y_w/R is about 9.5 g and the same is 10.3 g with the same t_c and F at 5.1. It is thus clear that any increase in the fishing effort would give only marginal increase in the yield, which may not be remunerative.

Prepared by Shri K. A. Narasimham, Shri G. Syda Rao and Shri G. P. K. Achari, edited by K. Rengarajan and published by Dr. P. S. B. R. James, Director, C.M.F.R.I., Cochin-682 031.

The conclusions/recommendations made in this series are subject to revision with addition of further information on the resource.

February, 1986