Research and Development Strategy for Exploitation of Molluscan Resources of Andaman and Nicobar Islands

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ABSTRACT

The paper deals with prospects of exploitation/culture of different molluscan resources of the Andaman and Nicobar Islands. Resources like *Trochus* and *Turbo*, Pearl oyster, and other molluscan resources have been described with respect to their distribution and potential. An immediate need for R & D thrust in identified areas has been stressed before initiating development programmes.

The marine ecosystem of Andaman and Nicobar Islands differs vastly from that of the mainland. It offers a wide variety of environments with certain typical fauna of molluscs which are as yet not generally widely exploited. While there have been several expeditions and collections in the past recording the fauna, detailed investigations on the molluscan resources in the A & N Islands were only started with the work of Amirthalingam (1932), followed by Setna (1933), Prashad and Rao (1933, 1934), Rao, (1936 a, b, 1937, 1939) and Panikkar (1938) on *Trochus niloticus* and *Turbo marmoratus*, the two species of gastropods which come to be exploited commercially since 1929, perhaps even earlier. An indicative survey of the mariculture potential of Andaman and Nicobar Islands was carried by the Central Marine Fisheries Research Institute in 1978 which *inter alia* focussed attention on the molluscan resources and their culture potential (Alagarswami, K., ed., 1983 a). The present paper attempts to indicate the immediate R & D needs for the exploitation/culture of the identified molluscan resources of the islands.

Trochus and *Turbo* Resources

The top shell *Trochus niloticus* and the turban shell *Turbo marmoratus* are the two prominent members of molluscs which have received attention as they have been fished commercially for their mother-of-pearl shells for about six decades. Nayar and Appukuttan (1983) have supplemented the information already available (Rao, 1939). The shell fishing is controlled by the Fishing Rules of 1955 made under the Andaman and Nicobar Islands Fisheries Regulation, 1938 (Regulation 1 of 1938). Nine fishing zones have been demarcated and the boats are licensed for collection. Fishing is done by skin divers. Nayar and Appukuttan (1983) estimated the annual landings as between 400-500 tonnes

of *Trochus* and 100-150 tonnes of *Turbo*, and their market value as Rs. 16-20 lakhs and Rs. 10-15 lakhs respectively. The fishing methods for these species have not undergone any change over the years.

Except for fixing a minimum size of 9 cm for *Trochus* and 6.35 cm for *Turbo*, there has not been any management measure on the fishery. Scientific knowledge on them is fairly old (Rao, 1939), and there has been no detailed study on the resources since then. Production data show a general declining trend. These two species being very valuable resources for the country, as they are not known to occur either along the mainland coast or in the Lakshadweep, there is an urgent need to recognize them as national assets and proceed to work out appropriate management and development measures.

A major research effort is called for to understand the distribution, biology, population dynamics and ecology of both the species, and the effect o fishing effort on the resources. Data on these aspects are basic for suggesting any management and development measure. These gastropods have a relatively longer life span as compared to several other tropical molluscs, implying that exploitation has to be discreet and judicious and has to be governed by the success of progressive year classes from their recruitment. Ecological studies of their beds are very important as, being sedentary organisms, their habitat and nutritional requirements are specific. The long term plans for development of these two resources would be akin to the lines on which the abalone fishery has been developed in Japan. The programme would consist of a hatchery to produce the seed molluscs, a nursery phase giving them protection in the sea against predators and finally ranching them in appropriate areas taking into account the ecological and nutritional needs. Japan has reaped greater harvests of abalone by increased availability brought about by the above techniques. Her programme even includes 'afforestation' of sea beds with specific species of seaweeds upon which the abalone feeds.

Pearl Oyster Resource

The black-lip pearl oyster *Pinctada margaritifera* is a resource which offers scope for pearl culture in Andaman and Nicobar Islands. This potential has been highlighted by Alagarswami (1983 *b*). On the reef flats, on the pillars of piers and in depths upto 10 metres, the pearl oyster has a scattered distribution in varying densities throughout the islands, notably in the areas of Mayabunder, Ritchie's archipelago. Hut Bay and Camorta. The species occurs in these islands as a naturnl western extension of its zoogeographic distribution in the Indo-Australian Archipelago. Along the Indian mainland coast the black-lip is a rarity and a zoologist's prized collection item. Alagarswami (1983 *b*), pointed out that the more valuable silver-lip pearl oyster *P. maxima* should occur in Andaman and Nicobar Islands, for the same zoogeographical reason that *P. margaritifera* occurs as a natural extension in the Indo-Australion Archipelago. This Archipelago is the home of *P. maxima*, may even be endemic. Owen Is. and Sir Malcolm Is. in Mergui Archipelago of Burma and Phuket of Thailand are the nearest areas where *P. maxima*, occurs. In Australia this species is taken at depths ranging from 5-75 metres, indicating its deep-water habitat. The species has not so far come on record in the Andaman and Nicobar Islands, may be due to the fact that there has been no survey of such depth zones.

The immediate need is a viable research project on pearl culture with the black-lip pearls oyster. The black pearl from this species have very high market value as compared to *P. fucata* pearls. Although the total technology of *fucata* based pearl culture is available in India, the one for *margaritifera* would differ in many respects. The latter is a delicate species to rear and implant nuclei successfully. A lot of research should go into it in adapting the available pearl culture technology to the black-lip pearl oyster. French Polynesia in the Pacific is one of the very few countries which has a very successful commercial project on this species. As regards the potential of *P. maxima* a detailed survey has to be planned and carried out with required facilities. The island ecosystem is ideally suited for pearl culture.

Oyster Resource

Ramadoss (1983 *a*) has reported on the distribution of the oysters *Crassostrea madrasensis* and *Saccostrea cocullata*. The latter is relatively more dominant than the former and the Andaman group has a greater resource of oysters than the Nicobar Group, The Karens, Nicobar fishermen and Bengali settlers are the people who exploit the oyster for culinary use. The amount of fresh empty oyster shells on the rocks in the intertidal flats would indicate constant removal of oysters.

The intertidal oyster beds are likely to be heavily exploited in view of their easy accessibility and demand at least in the regions where the consumer population lives. Oyster culture can meet growing demands. This envisages introduction of spat collection techniques and grow-out systems as appropriate to the reef flats, creeks and bays. Research input is required to develop location-specific oyster culture system in the Andaman and Nicobar Islands.

Other Molluscan Resources

The *Trouchus-Turbo*, pearl oyster and edible oyster resources referred to above are far more important to the Islands than the others in the current situation of exploitation and commercial potential. The other exploitable resource would be the giant clams *Tridacna crocea*, *T. maxima* and *T. squamosa* which occur at several centres, some of which are virtual giant-clam beds (Ramadoss, 1983 *b*.) The Nicobarese actually pick the meat of these clams for consumption, when other shellfishes are not available. Culture feasibility of giant clams is being investigated in Gilbert Islands and Papua New Guinea.

The green mussel *Perna viridis* has been reported from sippighat (Appukuttan, 1977) and its culture possibility has been indicated (Mahadevan, 1983). However, considering the very limited location-specific occurence of the species and the prevailling hydrographic conditions of the area, there does not seem to be much scope to consider mussel as a major resource of the Andaman and Nicobar Islands.

Abalone (*Haliotis* sp.) is reported to have been collected in some numbers in the Port Blair area not long ago. But during the survey of 1978, there was not any in this area and none, except a few shells, has been collected from other areas.

Remarks

Silas and Alagarswami (1983) made some recommendations with regard to the culture potential of the molluscan species in the Andaman and Nicobar Islands. They gave top

priority to pearl culture over and above prawn and fiish as having immediate potential. The brief sections in this paper on *Turbo-Trochus* and pearl oyster resources would show the immediate research update needs specific to A & N Islands. These two resources are commercial species, the end product being mainly the pearl or mother-of-pearl which have a ready market in the international trade. In the Indian subcontinent, these resources are unique for the Andaman and Nicobar Islands and hence acquire added importance. Well planned and executed research projects on various aspects of these resources, utilization and management would ultimately lead to commercial fisheries programmes to bring greater economic benefits to the islands. Oyster culture is a distinct possibility in the islands but may not be a commercial proposition at the present juncture considering the local clientele which wants this food. Improvement in tourism might provide some outlet for oyster.

The most immediate need for the development of molluscan resources is for an R and D thrust in identified areas, at least for a period of about five years, the results of which should form the basis for development programmes. A coordinated approach involving organisations with required expertise and appropriate funding would help gain time and be more effective.

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