SEA RANCHING FISHERIES — AN EFFECTIVE SYSTEM FOR AUGMENTATION AND CONSERVATION OF EXPLOITED RESOURCES

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SEA ranching or artificial recruitment of aquatic organisms into their natural habitat for stock improvement or enhancing the production or for conservation of resources, though practised intensely only in recent years, is an age old practice. It is said to have been originated in USA as early as 1870. Ranching of red and Pacific salmons was being carried out since 1964 in the Far East, and at the present level of ranching, it was estimated that an additional production of 10,000 - 20,000 tonnes/year was realised. In Japan, besides abalone and "kuruma" shrimp (*Penaeus japonicus*), the ranching of which started in 1975, about 45 species are ranched to supplement the natural stock.

The system of artificial recruitment has certain advantages. The exploitation of natural population though energy saving, is dependent on biomass availability and its abundance. The cultured population could produce the biomass for commercial requirements, but entails much energy, feed, labour and capital investment. Artificially recruitted population, on the other hand, permits to raise the population in the natural environment without spending much energy, feed or labour.

The sea ranching technique involves (1) brood stock development, (2) breeding, (3) larval rearing on large scale, (4) nursery rearing, (5) release of seed at suitable sites and (6) monitoring of the released and natural stocks to assess the impact. Ranching is advantageously carried out in bays, lagoons, shallow water bodies and in the protected ecosystems.

With the development of technologies of controlled breeding, seed production and nursery rearing, the programmes of sea ranching of marine prawn, pearl oyster, and clams was started in India in the mid-eighties. The results achieved by these programmes were reviewed in 1993 (*Mar. Fish. Infor, Serv. T & E Ser.* No. 124, 1993).

Marine prawns : Sea ranching of the green tiger prawn, *Penaeus semisulcatus*, which form the mainstay of the prawn fishery along the southeast coast of India and optimally exploited at present, was carried out during 1985-92 from Mandapam Camp. Hatchery produced postlarvae XV - XX of the species at an average of 7 lakhs per annum were released into the Palk Bay during this period. Although it has not been possible to assess the impact of the released stock on the fishery, the experiments conducted to study the survival, growth and recruitment pattern of the ranched stock have shown that the postlarvae released into the Pillaimadam lagoon at Mandapam moved out into the sea after 24 hours and the juveniles (60-110 mm total length) tagged and released into Palk Bay off Mandapam, were recruited to the commercial fishery within 5 to 53 days, indicating the prospects of ranching to supplement the natural stock if carried out on a large scale.

Pearl oyster : Following the success achieved in the large scale production of pearl oyster seed in 1981, experimental ranching of the species was started in 1985. During 1985-90,

a total of 10,25,000 spat of *Pinctada fucata* were released at 12 m depth at Van Thivu Arupagam Paar, Kuricham Paar and Fernando Paar off Tuticorin. The size of the spat ranged from 0.9 to 11.3 mm. Besides spat, several billion pearl oyster larvae were also released near these Paars. Although the effect of ranching on the survival, and in turn, enhancement of population in these Paars could not be conclusively proved, increased number of oysters recorded per diving hour in 1990 at these Paars and relatively dense populations of oysters observed indicated that ranching had helped to replenish the population.

Clam : Clams are ideally suitable for ranching in view of their almost sedentary nature of life in the shallow coastal waters and filter feeding behaviour in the low food chain. With the development of technologies of hatchery production of seed of *Meretrix casta, Anadara granosa* and *Paphia malaarica*, the ranching of clams was taken up in 1993. In consideration of greater demand of meat of *P. malabarica* in the export trade, this was selected as a candidate species for ranching. The backwaters at Delavapuram in Ashtamudi lake, Kerala and Munambam near Cochin were the sites of release of seed. *P. malabarica* seed produced in the shellfish hatchery of the Research Centre of CMFRI at Tuticorin were transported and a total of 64,000 seed (12.4 mm) were ranched in February 1993 in 25 m^2 area at 1 m depth. The site was fenced with 3.0 mm mesh nelton screen. At Munambam 8,500 seed were released in 10 m^2 area at 0.5 m depth. The percentage retrieval and production of clam were 7.05% and 62.1 kg/25 m^2 / 5 months and 17.64% and 14.25 kg/10 m^2/4$\frac{1}{2}$ months at Delavapuram and Munambam respectively.

General remarks : The above experiments on ranching of marine prawn, pearl oyster and clam are preliminary nature. Nevertheless, the results have indicated the prospects of application of the techniques for augmentation / conservation of the resources. Besides these species, ranching of sea cucumber (*Holothuria scabra*) has also been taken up in 1993 at Tuticorin. Similarly, the urgent need for ranching of species such as spiny lobsters whose catch is showing a declining trend, and of ornamental molluscs has been stressed.

The assessment of impact of ranching for stock improvement requires production and release of enormous quantity of seed. This necessitates adequate infrastructural facilities such as hatcheries and associated inputs, nursery and transportation facilities, identification of suitable release sites and facilities for continuous monitoring of the released stock. These require not only proper funding but also the agency(ies) that would undertake these developmental programmes in the larger interest of the fishery and the country.