KADALEKUM KANIVUKAL

(Bounties of the Sea)

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DEEP SEA AND OCEANIC RESOURCES

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Although the marine living resources are renewable, their unbridled exploitation causes irreparable loss to the habitat and the sustainable production of biota. Ever increasing population and demand for cheap fish protein together with the availability of a 8041 km long coast and more than 1,80,000 km^2 shallow coastal area have attracted not only the traditional communities but also small-scale entrepreneurs into fishing. The last fifty years' growth of Indian marine fisheries is commendable, which has transformed a subsistence-oriented traditional fisheries into a market oriented commercial fisheries with the support of technical advancements in harvest and post harvest areas and also gained considerable strength and capabilities in landing, storage and processing infrastructure. The growing demand for prime value species of marine resources in domestic and export market has encouraged the commercial exploitation and production of target species through mechanisation and motorisation. Similarly in Kerala the marine fish landings have made tremendous progress from 1 lakh tonnes in 1950 to 6.6 lakh tonnes in 1990. In spite of all progress in R & D, technological advancements, modernisation and upgradation, fishing is mainly centered around the more safe shallow grounds up to 50 m depth. With the result, the marine fish landing both at national and state levels, has either stabilised or crossed sustainable limit at least in the case of some vulnerable species. Perhaps the condition might change, when exploitation strategy shifts from coastal to deeper grounds or when technological breakthrough alter the fishing pattern and processes or when new management options and policies are accepted by the end-users. Thus today's challenging problem in this sector is to sustain the coastal production through appropriate, region, area and resource specific regulatory management, enhance production through mariculture and exploration and exploitation of deeper and oceanic grounds, for which new concepts and policies are inevitable.

The deep sea fishing is capital intensive, difficult and risk prone. Of late there is an increasing awareness among fisheries managers and entrepreneurs that additional production from the wild is possible by extending fishing inputs in the deeper and oceanic waters. However, often deep sea fishing is restricted to grounds of 50-200 m and the harvest is around 6 lakh tonnes. In spite of the scientific evidences obtained through exploratory surveys on the seasonal, geographic and bathymetric availability, abundance and seasonal migration of a few species of benthic finfish and shellfishes, and with an estimated potential annual yield of 10 lakh tonnes, our deep sea fishing industry is reluctant to diversify the fishing out in the ocean. Survey results revealed that the outer shelf and slope grounds within 100-500 m depth support commercial concentration of threadfin breams, lizard fish, ribbon fish besides the non-traditional bull's eye, green eye, Indian drift fish, penaeid prawns and lobsters. All these fishes make vertical migration to the column and seasonal shoreward migration for feeding and reproduction or to avoid unfavourable environmental condition. During this time they become vulnerable to gears operated in the middle and outer shelf waters. Although some of the non-traditional deep sea fishes are small, dull coloured and unattractive, they are nutritionally rich and tasty with high protein and fat content.

Bull's eye is a widely distributed deep sea groundfish within 50-400 m depth with commercial concentration in 100-200 m depth belt. Catch rates as high as 4900 kg per hour of trawling was reported from the southwest coast. They migrate to shallow areas in pre and post monsoon seasons. Their estimated potential yield is about 80,000 tonnes. Their meat is protein rich (17.5%) with low fat content. Indian drift fish is yet another deep sea resource occurring widely in 50-500 m depth grounds and appear in great shoals. It is abundant in 100-200 m depth during November-March. Production rate as high as one tonne per hour of trawling was commonly recorded during experimental surveys. This small fish has high edible quality with 17.5% protein and an equal quantity of fat. The green eye occurs in 200-360 m depth and their large shoals get entrapped in trawl net to the tune of up to 4.5 tonnes per hour. An estimated stock of 20-30 t/nm^2 is available off Kerala for exploitation. The protein content is 18%. Black ruff is reported from 200-500 m during

June-February. The region between Kollam to Ponnani in the depth belt 250-400 m yield deep sea prawns and lobsters. Their exploitation should be controlled for sustainable production. It would be possible to trawl them by medium range (15-20 m OAL) vessels, when they make nearshore or alongshore migration. In order to face the challenges the capabilities of the vessels should be improved and manpower trained in the handling and operation of modern fish finders and gears.

The Indian Oceanic realm within the EEZ has 2.02 million km^2 area and the animal diversity includes larger pelagic fish, squids, mesopelagic fish, shrimp and cephalopods and bathy pelagics. A few of them are commercially exploitable for food by gill nets, purse seines, hook & lines, jigs, pelagic and midwater trawls. Their annual potential for exploitation is 5 lakh tonnes. New technologies are available for their location, abundance estimation, mass harvest and processing and preservation. The most abundant oceanic resources like tuna, pelagic sharks and squids are in great demand in national and export markets. Their fishing is possible with the help of larger vessels of 25-35 m OAL fitted with sophisticated equipment for fish finding and with onboard facilities for modern fishing gear operations. The development of remote sensing techniques would further aid in oceanic fish detection, location and aimed fishing for tunas and allied larger pelagics. International co-operation could be appreciated to strengthen our capabilities and training wherever necessary.

Even though the mesopelagic realm is a very rich habitat of many diurnally migrating macroplankton, pelagic shrimp and a wide variety of mesopelagic fish (eg. Myctophids) from surface down to 800-1000 m, their commercial exploitation and utilization still remain at experimental or exploratory level. Further surveys and research inputs are needed to unfold more truths about their habitat and resources. The trans-oceanic migratory and straddling stocks of large pelagics require international management strategies for their sustainable production from oceanic areas.

The Indian deep sea fishing is a much discussed and debated area and there have been conflicts of user groups and traditional fishermen. It would be justifiable to empower our fishermen infrastructurally and technically for deep sea

fishing in the shelf and slope up to 500 m depth, for which the capability of their vessel should be improved, modernised and the manpower trained. As our oceanic fishery is still in the formative stage, international co-operation and joint-venture approaches are essential to exploit the resources in the epi-and mesopelagics of oceanic province beyond the 500 m depth line, until such time we become self reliant in this sector.