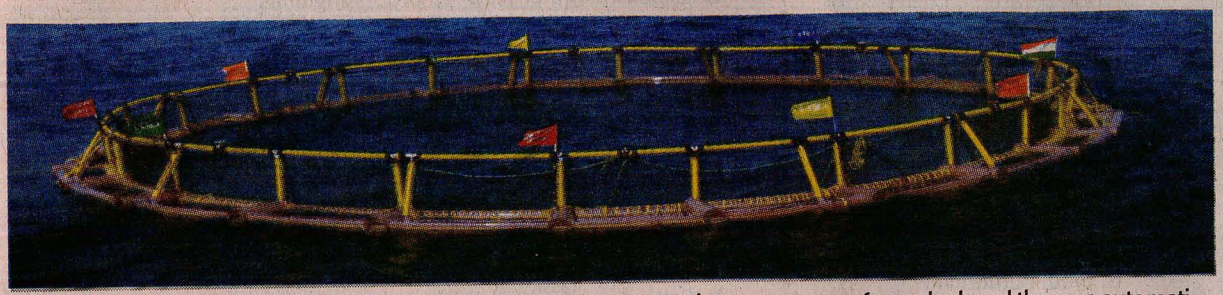
Marine Fisheries Management



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DR. G. SYDA RAO

India is one of the leading countries in marine fisheries production with a production of about 4 million tons. The marine fish caught in the Indian seas consist of many varieties (species) and wide size variations. Of these about 8 lakh tons valued about $ 1.4 billion are exported. In the last sixty years, the fishery has grown from five lakh tones to current level contributing to economy, livelihood and employment. About 50 million people in India depend on this sector directly or indirectly. At landing centers level the marine fish are worth about Rs 50000 crores per year and hence the government attaches much importance to the scientific management of marine fisheries.

The Indian marine fisheries are characterized by about 2000 varieties and caught mostly by mechanized trawlers, purse seiners, gillnetters apart from several mechanized and non-mechanized small boats. However in western temperate countries the marine fishery is mainly constituted by few large varieties of fish which will be little easy to manage under quota system unlike ours. In India the marine fish are characterized by short life (2-3 years age) with more generation turn over and caught by multi species gears(nets) making it very difficult to manage in spite of possessing huge scientific data over the years. Nevertheless, when compared to world scenario, the Indian marine fisheries are still showing upward trend in total catch and catch rates.

One of the major management measure adopted in India is the seasonal ban on mechanized fisheries for 47 days both on east coast and west coast with different timings. However the fishing by non-mechanized fisheries is allowed.Thus this has limited impact on conservation.

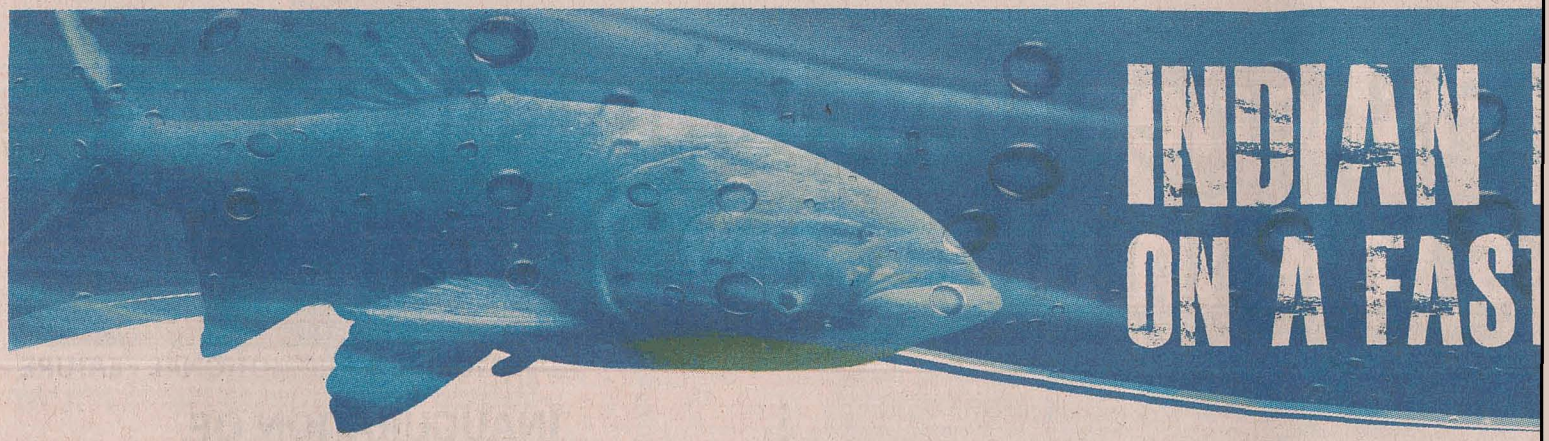
All the fish in the sea lay eggs which will be drifted close to the coast where the depth of water is less than 20m. This area is the best nursery ground for the larvae that comes out of these eggs as this is highly productive area rich with planktonic food essential for their survival and sustained growth. After their growth to juvenile stage they migrate to their habitats. Hence any fisheries management must address the protection of the nursery areas primarily for sustaining the fisheries.

Under Indian circumstances the best measure is to deploy the artificial reefs along inshore areas at 20 m depth. These are nothing but triangular concrete structures/modules deployed to the bottom of the sea bed. They provide shelter to many brooder fish, juveniles. They also offer surface areas for attaching the eggs. Once the artificial reefs are deployed the area automatically becomes unfit for trawling and purse seine operations and become a natural "Marine Protected Area" (MPA), protecting the biodiversity, habitat, brood stock and help in supplying the younger fish to the fishing areas on a sustainable manner(Recruitment).

It is emphasized here that the major aim of marine fisheries management is mainly to sustain the fisheries with limited scope to increase production. In order to regulate the fishing vessel strength the potential of total wealth of sea is estimated by several methods. The novel method now under progress is assessing the chlorophyll production in the sea through remote sensing and deriving the fish production through a model. This will greatly increase the efficiency of regional management of marine fisheries in India. However, to increase the production of marine fish particularly high valued fish like pomfrets etc., is to grow them in the sea within the artificial reef areas by floating cages under natural conditions and stocking them with seed of high valued fish and feeding them with pellet/natural food.

About 5 Ton of fish can be produced from a 6 meter diameter cage in about 8 months valued about Rs. 7.00 lakhs. This technology is boon to land less people as they can practice this profession in open sea. One cage is equivalent to the production from 1 ha of pond area on land. For this we domesticate the fish as brood stock to lay eggs and seed are produced to be stocked in the floating sea cages. This is the only way of increasing the high valued marine fish production.

(The Writer is Director, Central Marine Fisheries Research Institute, Kochi)



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FISHERIES AND AQUACULTURE

DR. S. AYYAPPAN

Fisheries in India was recognized as an important allied sector of Indian agriculture only after independence. The vibrancy of the sector can be visualized by 11-folds increase in fish production in just six decades, i.e. from 0.75 million tonnes in 1950-51 to 8.3 million tonnes at present (2011-12). The unparallel average annual growth rate of over 4.5% over the years has placed the country on the forefront of global fish production, only after China. Besides meeting the domestic needs, the dependence of over 14.5 million people on fisheries activities for their livelihood and foreign exchange earnings to the tune of Rs 129 billion (2010-11) from the fisheries produce, amply justifies the importance of the sector on the country's economy and also livelihood security.

The term 'fisheries' in broader sense, includes both capture fisheries and aquaculture. Although the fish production from capture fisheries has witnessed steady increase since independence to reach 4 million tonnes at present, its contribution is over-shadowed by the spectacular growth made by aquaculture in the last three decades, which increased from 0.37 million tonnes in 1980 to 4.3 million tonnes at present.

The present production of 3.1 million tonnes from marine fisheries along 8129 kms coast line is not far behind the fishery potential of 3.93 million tonnes in our Indian EEZ and provides limited scope for further increase in production. However, the sector is considered to be equally important due the dependence of large section of poor fishermen communities for their livelihood avenues. Similar has been the case for the fishers living along the banks of rivers and other open water-bodies.

The technological interventions made in the development of fish harvest technologies in areas of modernization of boats and fishing gears, mechanization of propulsion system, introduction of synthetic gear material; developments in acoustic fish detection and satellite-based remote sensing techniques; advances in electronic navigation; enhancement of the fishing capacity, provisions for on-board fish processing and preservation; and improvement of the working conditions not only have been able to sustain the growth of the marine capture fisheries, but also reduced the drudgery of fishermen to a great extent. Appropriate management interventions viz., restriction of fleet size, regulation of mesh size, declaration of closed season, ban on operation of the destructive gears, installation of artificial reefs, promotion of sanctuaries, ranching of commercially important and threatened species and above all implementation of effective code of conduct for responsible fishing have been suggested as a management measures for long-term sustenance of fisheries.

In inland sector, while the rivers, estuaries, backwaters, lagoons, etc., have witnessed higher level of exploitation, the reservoirs and floodplain wetlands possess high potential for enhancing fish production, at least 4-5 folds through culture-based fisheries, with regulated stocking based on the biogenic capacity of the system.

Aquaculture in India has evolved as a viable farming practice over last three decades with considerable diversification in terms of species and systems, and has been showing an impressive annual growth rate of 6-7%. While the carp-based freshwater aquaculture, mainly constituted by the Indian major carps, viz., catla, rohu and mrigal, has been contributing over 90% of the aquaculture production satisfying the domestic need, the shrimp-based coastal aquaculture with only about 5% share contributes much of the export earnings.

Induced breeding of carps and catfishes, hatcheries for mass-scale spawning, seed rearing and carp polyculture are some of the epoch-making technologies actually guided the freshwater aquaculture development. The sector also has shown considerable diversification in recent years with adoption of other species like catfishes and freshwater prawns, owing to their higher market demand and economic advantages. While production of 4-5 tonnes under carp polyculture is quite common, farmers of several regions are able to produce 8-12 tonnes/ha/year. Integrated fish farming with livestock and horticulture has not only been able to utilize the byproducts/wastes as principal inputs, but also made the farming practice highly remunerative and farmers' friendly. Development of improved rohu (Jayanti) through selective breeding with record of 17% higher growth response per generation after seventh generations, availability of balanced supplementary feed for different life stages for diversified cultivable species and appropriate disease management measures are some of the important developments. Almost five-folds growth in mean national pond productivity in last four decades, i.e. from about 600 kg in 1970s to 2900 kg/ha today is a testimony of the sector's vibrancy. With the cap of second largest aquaculture producer in the world, aquaculture today is also considered as a sunrise sector for meeting the increasing fish demand in coming years.

Development of protocol for ornamental fish breeding and management has provided important livelihood options for marginal and land-less farmers in certain localities. Promotion of trout and mahseer farming in upland coldwater region has also shown significant potential for aquafarming.

Brackishwater aquaculture in India has been concentrated around the black tiger prawn as the single most important species. Recently, culture of exotic Pacific white shrimp, Litopenaeus vannamei, however, has attracted the farmers because of its fast growth, low incidence of native diseases, availability of Specific Pathogen Free (SPF) domesticated strains and culture feasibility in wide salinity range. With the production levels of 10-12 tonnes/ha/crop of 3-4 months the production of this species has reached to a level of 80,000 tonnes at present

Mariculture in India although was at very low key with farming of mussels and edible oysters undertaken in some coastal region of Kerala over the years, successful demonstration of sea cage farming in recent years, initially with seabass and most recently cobia, however has shown the prospects of mariculture in the country.

It is estimated that the fish requirement of the country by 2025 would be of the order of 16 million tonnes, of which at least 10 million tonnes need to come from aquaculture. Therefore, development of road map based on available resources, at least at district levels, necessary to be formulated to achieve this target.

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Technologies/ Products

Green Algal extract(GAe)

Green Mussel extract(GMe)

VARNA: The Marine Ornamental Fish Feed

Cobia broodstock and seed

Open sea cage

Cobia fingerlings

Harvested lobsters from cage

Pompano fingerlings

Harvested Pompano from cage

Brood stock and seed of marine ornamental fishes

Pop Up Satellite Tagging of Yellowfin Tunas

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