# Fishery Resources: Conservation Strategies

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## FISHERY RESOURCES : IMPLICATIONS AND CONSERVATIONS STRATEGIES

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# PERSPECTIVE PLAN AND STRATEGY FOR DEVELOPMENT OF MARINE CAPTURE FISHERIES IN INDIA

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## Introduction

Indian marine fisheries which existed as sustenance fishery for years, underwent a series of change with the advent of mechanisation in the fifties evolving itself into a multi-billion dollar industry. The demand for fish in the next decade is expected to increase due to the awareness of the people on the nutritive value of fish. Sustainability of marine fish landings at the projected level is a major concern and there exists limited scope to increase the capture harvest in future as the production is stagnating between 2.5-3.0 m t since mid-90s. The marine fishing sector is facing serious challenges like unsustainable harvesting, socio-economic conflicts, low catch per unit from an open access to a regulated regime which in turn demands the establishment of a scientifically informed marine fisheries management system. In the Indian context, management regulations are possible only by considering the socio-economic conditions as well as the intricacies of the multi species tropical ecosystem.

## A. Achieving sustainability

### 1. Development of scientifically informed marine fisheries management system

Any fishery has to be scientifically managed for it to sustain. For this, sustainable harvesting strategies have to be evolved by assessing

the status of the exploited stocks, potential yield and optimum fleet size. Such information should be generated on a regional platform and therefore regional management plans should be in place for effective management of the resources. Minimum legal size for capture of species should be prepared based on biological parameters and should be strictly adhered to. The information generated through research should also be effectively converted into information beneficial to the stakeholders and disseminated.

**2. Promoting deep sea fishing**

The deep sea resources like tunas, billfishes, pelagic sharks and oceanic squids have not been adequately exploited mainly due to lack of sound fishing technologies, less opportunities for public funding etc. Moreover, schemes which were implemented earlier for the conversion of existing vessels for deep sea fishing did not take off. Funding for conversion of existing vessels into long liners for deep sea fishing coupled with training and capacity building will empower the fishing communities to exploit these resources effectively. However, policies are to be in place to ensure that the converted vessels carry out fishing for the resources for which it was converted. Improved and better harvest and post-harvest techniques, introduction of mother boats for quick processing of tunas caught by long liners, catamarans and gillnetters, promoting marketing of value added forms of tunas and squids will further encourage more entry into the deep sea sector. Placement of FADs to attract tuna and facilitating their capture by tuna fishing fleet have been highly successful in many tuna fishing nations. Guidelines for monitoring of FADs have to be prepared and strictly complied as these are capital intensive projects. Tuna resources of FADs could be shared by large group of fishers thus generating employment and thereby improving all-round socio-economic development of the area.

## 3. Reducing by-catch and promote habitat conservation

Intensive trawling has adversely affected the benthic ecology and biodiversity. Annually, an estimated 3.5 lakh of bycatch is landed by trawl fishery. Therefore, it is essential to have the provisions introduced in the Marine Fishing Regulation Act (MFRA) of the coastal States/ UTs or further strengthened by making them more stringent and implementable to reduce the by-catch and promote resource conservation. In addition, destruction of natural habitats through deforestation of mangroves and reclamation of land has substantially reduced fish breeding and nursing grounds. Programmes towards strengthening of MFRA, optimization of fishing capacity for each coastal state, reduction in by-catch and other postharvest losses, habitat conservation for facilitating breeding and growth of juveniles, rehabilitation/alternate livelihoods of displaced fishers, stock enhancement through Artificial Reefs (ARs) and FADs, etc should be in place. The Tamil Nadu model of installing artificial reefs along the coasts for enhancing stocks and promoting indigenous fishery and livelihood should be tried in other parts of the Indian coast.

## 4. Climate change and coastal fisheries

Marine fishing communities mostly reside within 2-3 hundred meters of the coastline and are the most vulnerable group of people with respect to natural sea calamities. Climate change related adaptation and disaster management measures need to be put in place by taking into consideration the uniqueness of the different coastal regions. Although the fisheries sector is relatively a minor contributor to carbon dioxide emissions, nevertheless, the fishing boats have to reduce emissions by using fuel efficient engines, adhering to fuel emission norms by adopting suitable methods, such as use of sails for harnessing wind power etc.

Efforts towards green fishing or more use of solar power in fishing may also be attempted.

**5. Improving designs and construction of fishing vessels**

In India, there are neither standards for fishing vessel construction nor guidelines for boat yards in the country. The safety and living conditions in the fishing boats are very pathetic. The traditional fishing crafts have not undergone any major modification with respect to their design, efficiency or safety since the introduction of the FRP material for boat building in the mid-eighties. Over the years the same design has been stretched both length-wise and breadth-wise to suit the requirements by foregoing all norms of safety and stability of the boats. Therefore, it is essential that standards for both boats and boat building yards be prescribed in the country.

**6. Development of island fisheries**

The potential annual yield of skipjack tunas and the other fishes around Lakshadweep is estimated to be about 50, 000 t each against the current harvest of about 10, 000 t, which is only 10 percent of the harvestable potential. In Andaman & Nicobar Islands, future development of marine fisheries will largely depend on the level of exploitation of the potential tuna resources of about 1,00, 000 t and other varieties such as reef fishes, lobsters, etc. Fish production in Lakshadweep could be increased by i) scaling up of modified fishing craft (traditional boats, pole & line boats, gillnetter-cum-troll lines); ii) introduction of new craft (tuna longline-cum-gillnetter for *Sashimi* grade tuna, Maldivian type pole and line vessels, mother/collector vessels; iii) modernization of fishing gear; iv) improving communication network and v) adopting sea farming practices, wherever feasible. The location of the Andaman and Nicobar Islands is strategic with respect to the world tuna markets and good connectivity (by both air and sea) between the Islands and the markets coupled with better post-harvest facilities could be ideally used for export of high grade tuna products to the Far

East countries such as Japan. Further, a sound presence of the Indian fishing fleet in the waters surrounding the two island groups would reduce poaching of resources and also contribute to the overall security of the country.

### 7. Establishment of Marine Protected Areas

While MPAs are an important tool for conservation of coastal and marine biodiversity and in the long run are expected to contribute to the sustainability of the marine resources, in many instances the MPAs have resulted in loss of livelihoods of traditional and small-scale fisher folk. Recreational fishing and eco-tourism may be allowed in the outer zone of the MPA thereby increasing the economic value of the MPA and improving the life of the fisherfolk around the MPA.

## B. Improving MCS in support of sustainability

An effective and implementable Monitoring, Control and Surveillance (MCS) system is a prerequisite for management and conservation of fisheries resources in the Indian EEZ. An established MCS system can act as an assurance to the international community on India's commitment to promote sustainable marine fisheries and can strengthen country's position in international and regional negotiations on fisheries and related matters. The major components of the scheme are

### 1. Satellite-based Vessel Monitoring System (VMS)

A satellite-based VMS involves the monitoring of vessels within the EEZ of the state for the purpose of ascertaining the vessels location and/or the type of fishing activity in which they are engaged. Currently such systems have not been implemented in India, and these are very necessary for implementing the fishery regulatory (control) systems in vogue and also to ensure sea safety to the fishermen lives.

**2. Using zones as a tool to control fishing**

In this case, areas for authorized fishing are established by latitude and longitude and all other areas are closed to all fishing. Geographical zones or areas are recommended because they are often easier for fishers to understand and comply with, and also to enforce both in court (the evidence required is fairly straight forward) and by using administrative penalty mechanisms. These windows or zones will be established for different gear, size of vessels or based on fisher status (e.g. subsistence fishers) and can be patrolled by VMS. Windows or zone closures can be used effectively to reduce gear conflicts between offshore commercial and artisanal fishers. Another advantage of using windows or zones as a surveillance tool is that sea patrols can be concentrated on these areas for at-sea inspections.

**3. Introduction of log book system**

Use of log books for obtaining data is being increasingly practiced and recently the European Union (EU) has also introduced log books as a part of its certification scheme for fish catches destined for the EU member-states. With its pre-dominant small-scale fisheries, use of log books in India would be a daunting task, but a beginning could be made in the Twelfth Five-Year Plan, initially starting with the mechanized fishing vessels. The data generated by the log books can be used as an input for the fisheries information system.

**4. Licensing and Registration**

A fishing license establishes the legal rights, privileges and obligations of fishers. In order for a licensing regime to be introduced, legislation must be enacted to require licenses as a precondition for fishing access and penalties provided for violations of such conditions. Enforcement officers must be given the necessary authority to control compliance with license conditions.

A fisher loses his access to the resource by failing to comply with the terms and conditions. This license can in turn be used to gain a wide variety of information related to fisheries activities in the area to which it applies. Furthermore, it is the primary mechanism for a State to receive a resource rent for the privilege of fishing.

**5. Establishing a Fishery Governance Structure**

In fisheries management and governance a more dynamic partnership is needed, using the capacities and interests of the local fishers and community, complemented by the ability of the state to provide enabling legislation, enforcement and other assistance, specifically co-management. Co-management aims to achieve joint responsibility and authority for resource management through cooperation between the government and local resource users. A 3-tier governance structure following the co-management principle can be established. In the first tier there would be a Village Fisheries Council (VFC) with representatives from fishers and the government. The next higher level tier would be District Fisheries Council (DFC) and finally the State Fisheries Council (SFC). The DFC and SFC would have adequate representatives from fisher groups, fishery research institutions and the government.

**6. Enabling Positive Incentives/ Subsidies**

According to the FAO, a fisheries subsidy is a government action or inaction that is specific to the fisheries sector, as defined within a given economic policy context. The most common subsidy in the fisheries sector is that given as fuel tax rebates. Henceforth all subsidies would be linked to responsible fishing and given only to those vessels (registered and licensed) following MFRA. Besides an incentive scheme would become operational to encourage adherence to rules and regulations. Incentives/ subsidies would also be provided to those vessels which are converted from trawling (~50% overcapacity) to deep sea fishing such as long-lining, squid jigging and pelagic trawling.

### 7. Voluntary vessel/ license buy back scheme

The mechanized sector (particularly trawl fisheries) in most of the maritime state is reportedly having 50% overcapacity. Therefore, a voluntary vessel/ license buy back scheme is to be introduced. The exact number of vessels to be decommissioned is to be decided with rates determined by resale value. Alternate livelihood options will also be provided to fishers opting to return their licenses.

## C. Infrastructure development

The infrastructural requirements of the fisheries sector are manifold. Ranging from construction of Fishing Harbours (FH) and Fish Landing Centres (FLCs) to establishment of hygienic domestic markets and setting up of cold chains, the prime objective is to ensure that spoilage is reduced and fish reaches the consumers in the best possible condition.

### 1. Setting up of fishing harbours (FH) and fish landing centres (FLC)

Presently, the infrastructure facilities set up in the country for safe landing and berthing of the fishing vessels cater only to about 25 percent of the fleet, leading to congestion in most of the FHs/FLCs. Moreover, due to the limited number of FHs/FLCs available along the coastline, large numbers of boats land their catch on sandy beaches, where no back-up facilities are available to allow for auction, packing or storing, etc. Therefore, more modern FH and FLCs have to be constructed along the maritime coast of the country.

### 2. Improving marketing of fish

In India, post-harvest infrastructure is grossly inadequate in the fisheries sector. As spoilage of fish starts right from the time it is caught, proper storage, preservation and prompt disposal or transport services is essential. Presently, fish markets, both wholesale and retail in the

country are in a pathetic condition, leading to a product that is contaminated and unsafe from food safety point of view. Further, the cold chain concept, which again is in rudimentary stages in the country, needs to be strengthened in the present plan, and calls for action of integrated facilities to retain the quality of refrigerated or frozen fish from the time of harvesting till it reaches the consumers in distant parts of the country.

### 3. Public - Private Partnerships

While the PPP concept has picked up in many other infrastructure development sectors, it is yet to take roots in the fisheries sector. Establishment of FH/FLCs and cold chains are some of the areas where PPP mode can work well and the NFDB could facilitate the process.

## D. Welfare of fisher community and human resource development (HRD)

The Indian fisher community, marine or inland, could perhaps be the poorest of the poor and most disadvantaged amongst all rural communities in the country. The available information does point towards a very low base in respect of most of the vital human development indices, such as education, health, economic well-being, etc. The following measures are required to improve their socio-economic condition:

### 1. Increasing risk coverage

Safety at sea is also a function of fisheries management and, therefore, the development programmes need to consider the elements of safety while formulating/implementing a scheme. In the Eleventh Five-Year Plan, a scheme on 'Safety at Sea' provided subsidy to the tune of 75 percent of the unit cost of Rs.1.50 lakh per kit consisting of GPS, communication equipment, echo-sounder and search and rescue beacon. This has to be further improved upon and the fishermen trained in the

effective use of communication, navigation, sound weather warning equipment.

### 2. Human resource development training and capacity building

HRD activities in the fisheries sector in India have so far been inadequate and do not meet the requirements of the sector, especially in the wake of growing challenges such as social mobilization of the community and their empowerment, getting access to information and services, developing technical and managerial skills, etc. Their low status compared to counterparts in the agriculture or other allied sectors is also a de-motivating factor, which needs to be addressed, while looking at the overall requirements of the sector.

## E. Fisheries information system

### 1. Database on marine fisheries

Presently, the statistics on marine fish landings are being collected by the DoF of the respective coastal State Governments as well as the CMFRI, Kochi. On the other hand, CMFRI has been continuing with its data collection programme, which unlike the DoF information is more robust and is carried out systematically following standard methodology. Additionally CMFRI's advanced facilities and the detailed biological studies on species of commercial importance and correlating them with fluctuations in the marine ecosystem, including global warming can further lead to improving of methodologies and survey designs for data collection and processing, which in turn can be passed on towards capacity building of the DoF staff.

### 2. GIS based resource mapping of distribution and abundance of fishery resources

The plan aims to make temporal and spatial mapping of commercial and non-commercial resources in their different stages of life (juveniles and adults) in fishing grounds especially in trawl fishing ground of Indian waters with the help of GIS. The programme will help to suggest

operation based policies for the management of bycatch reduction in trawl fisheries and will help to identify the most sensitive fishing grounds which have a significant role in determining the sustainability of the fishery and to suggest "Critical No Fishing Zone" and identify "Marine Protected Area" for the conservation of fish resources. Ultimately help to prepare comprehensive participatory fisheries management plans.

To improve the fisheries sector in the future plans, greater and stronger collaborative linkages should be formed between the research, management and stakeholders in the sector wherein cross table dialogues and programmes are formulated involving all concerned. This will help reduce intersector conflicts, improve the understanding of the research activities and plans formulated for the sector, improve the socioeconomic condition of the community, thereby contributing to the sustainability of the resource.