Marine Fisheries of India: An Approach to Responsible Fisheries Management

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The marine fisheries sector in India has registered a phenomenal growth during the last five decades both quantitatively and qualitatively. The subsistence fisheries during the early 1950s produced about 0.5 million tonnes annually. Currently, the total annual production is about 2.7 million tonnes. This growth in the marine fish production is due to innovative and efficient fishing practices, fisheries friendly government policies, well developed harvest and post-harvest infrastructure and increased demand for marine fish products both in the internal and external markets. Now, India is one among the top ten fish producing countries in the world contributing over 3% (6 million tonnes) of both marine, estuarine and freshwater fish to the world fish production.

The fisheries sector in India contributes to nearly Rs.220 billion which is 1.4% and 4.5% of the national Gross Domestic Product (GDP) and agricultural GDP respectively. The sector provides employment and income to over 5 million fishers and fish farmers. The marine fisheries sector of the country contributes about 50% to the total fish production and it is one of the major contributors to foreign exchange earnings through export to the Nation. The total quantity of seafood exported during 2004-05 was 4,61,329 t at a value of Rs.6646.69 crores. The growing demand for seafood resulted in fishing effort intensification, extended coverage of fishing grounds, increase in overall length and holding capacity of fishing trawlers and their fishing effort in terms of fishing hours. Increase in fishing effort was through multi-day fishing by the mechanised sector and enhanced fishing operations by the motorised sector. With the introduction of multiday fishing in the 1990s, the yield reached 2.7 million t in 1997, but the production has remained almost static since then.

The asymptotic production level in all the regions of exploitation indicates a very little scope for further increase. Thus, there is an urgent need to ensure sustainability of resources through appropriate management interventions as envisaged in the FAO Code of Conduct for Responsible Fisheries.

Status of Marine Fisheries

Resources: The availability and distribution of marine fishery resources in India follows a pattern typical of tropical waters. The fishery resource is constituted by a large variety of species (nearly 1,570 species of finfishes and about 1,000 species of shellfishes) co-existing in the same fishing grounds. The multispecies fishery comprises over 200 commercially important finfish and shellfish species. The important varieties belong to the pelagic groups such as the sardine, anchovy, mackerel, carangids, Bombay duck, ribbonfishes, seerfishes, tunas; demersal finfish groups such as the sharks, rays, croakers (sciaenids), perches, silverbellies, lizardfishes, catfishes; crustaceans such as the penaeid and non-penaeid shrimps, crabs and lobsters; and cephalopods *viz.*, squids and cuttlefishes. The abundance of these stocks varies from region to region and from season to season, with large pelagics like tunas being more abundant around island territories and small pelagics like sardines and mackerels supporting a fishery of considerable magnitude along the southwest and southeast coasts. The Bombay duck and non-penaeid shrimps form a good fishery along the northwest coast, while perches are dominant in the southwest and southeast coasts, especially in the Gulf of Mannar, Palk Bay and Wadge Bank. Among these, species/groups contributing to more than one lakh tonnes annually are oil sardine, mackerel, Bombay duck, ribbonfishes, carangids, perches, croakers, shrimps and cephalopods.

The annual catchable potential yield (of as many as 68 species/groups of fishes) in the Indian EEZ is validated by a Committee as 3.93 million mt consisting of 2.02 mt of demersal, 1.67 mt of pelagic and 0.24 mt of oceanic resources of which the present annual average production of about 2.6 million mt forms 64.8%.

Fleet-size: The growth of the fleets (Table 1) shows that the artisanal fleet (including the motorised) increased by about 110% from the 1960s to the 1990s and the mechanised fleet by about 570% during the same period. This increase has resulted in an over capacity of fleet operating in the inshore waters. Currently 2251 traditional landing centres, 33 minor and six major fishing harbours serve as base for 181,284 nos of traditional non-motorised crafts, 44,578 nos of small scale beach landing motorised crafts, 53,684 nos of mechanised crafts (mainly bottom trawlers, drift

Table 1: Growth in fleet size during the period 1961-2004

Year	1961-'62**	1973-'77**	1980**	1993*	2004*
Artisanal craft					
Motorised				26,171	44,578
Non-motorised	90,424	106,480	140,833	155,925	18,128
Mechanised boats		8,086	19,013	34,571	53,684
Trawlers		N.A.	11,316	N.A.	NA

*Source: Ministry of Agriculture, Govt, of India
*CMFRI, N.A. Not available

gillnetters and purse seiners) and around 40 deep sea fishing vessels of 23-27m OAL. The development of harbours and landing jetties, motorisation of artisanal crafts and rapid expansion of mechanised fishing have contributed towards a significant increase in fish production, employment generation and revenue earnings.

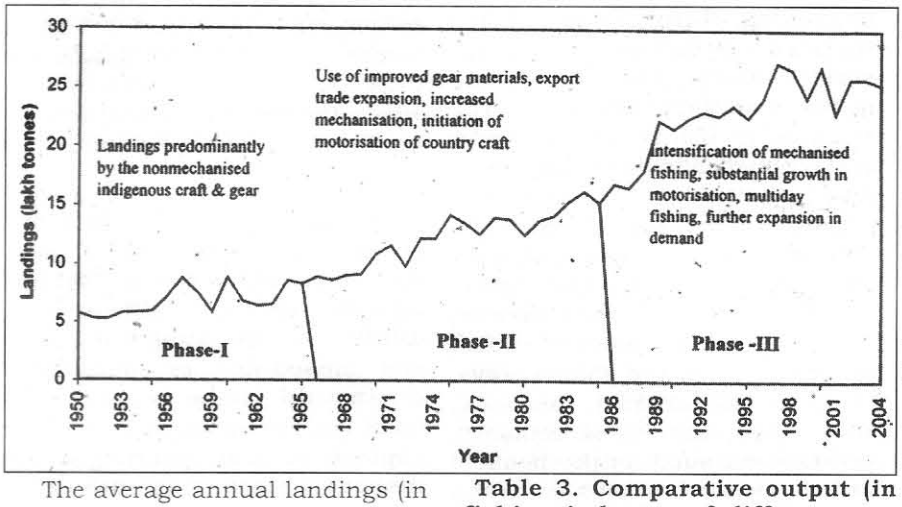
Production Trends: The total marine fish production in the country during 1947-48 was 3.73 lakh tonnes. From this level, the estimated annual marine fish production in India had risen to about 2.7 million tonnes in the year 2000. However, the annual growth rate since 1981 had been on the decline and during 1991-2000 it was only 1.9%. The trend in the production since 1961, over different phases of development of marine fisheries is depicted in the Figure-1.

Table 2: Annual Average landings (in 1,000 tonnes) in the 5-year periods of the major exploited resources

In 1000 t

Resource	5 – year average		Landings in 2004
	1985-89	2000-04	
Elasmobranchs	53.5	60.3	58.6
Catfishes	50.6	53.9	52.1
Oil sardine	141.7	353.0	381.4
Other sardines	75.5	87.4	87.1
Bombayduck	93.2	109.8	113.0
Perches	89.1	197.1	193.3
Croakers	103.3	131.7	120.2
Ribbonfish	79.1	166.7	131.0
Carangids	105.1	122.2	133.4
Silverbellies	60.2	51.3	51.4
Pomfrets	37.1	38.9	39.1
Mackerel	123.0	114.1	141.8
Seerfish	34.8	47.9	47.5
Tunnies	28.6	42.3	38.0
Flatfish	29.7	43.0	36.2
Penaeid prawns	144.2	194.2	171.6
Non-penaeid prawns	58.8	137.6	116.2
Cephalopods	40.3	109.4	112.8
Total (including others)	**1769.0**	**2532.1**	**2538.1**

Fig. 1: The three phases of marine fisheries development



The average annual landings (in 1,000 tonnes) of the major exploited resources are given in Table 2.

It is observed that, after a rapid growth from 1985, the production levels during the last five years have levelled off, as seen from the little variation in the current yields from the average production over the recent five years.

Comparative output of the marine fishing sector of different coastal States in 1985 and 2004 is given in Table 3. Marine fish landings in the various maritime States during the last two decades (1985-2004) were characterised by either a slow rate of growth or plateauing in some States (Kerala, Karnataka, Andhra Pradesh and Tamil Nadu) and rather fast in other States, as indicated in Table 3.

In West Bengal the annual marine fish catch increased progressively from 39,350 t in 1985 to 1,93,898 t in 2004. The catches mainly comprised *Hilsa*, Bombay duck, croakers, catfishes, ribbonfishes, pomfrets and penaeid and non penaeid prawns. In Orissa, the landings increased gradually from 14,686 t in 1977 to 84,622 t in 2000. The major landings included the croakers, ribbonfishes, catfishes, pomfrets, *Hilsa*, sardines

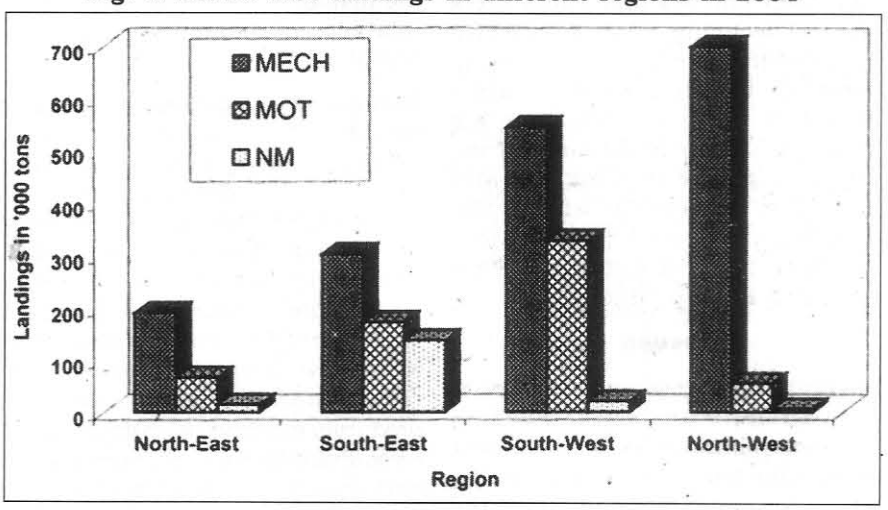
Table 3. Comparative output (in tonnes) of the primary marine fishing industry of different coastal States/union Territories of India in 1985, 2000 and 2004

States/Union Territories	1985		2000		2004	
	Output (in t)	Rank	Output (in t)	Rank	Output (in t)	Rank
West Bengal	39,350	9	1,71,500	5	193,898	6
Orissa	49,205	7	84,622	8	79,194	9
Andhra Pradesh	1,26,848	6	1,66,482	6	201,348	5
Tamilnadu	2,57,000	4	3,93,000	4	392,753	3
Pondicherry	19,913	10	38,620	10	18,416	10
Kerala	2.95,339	2	5,75,500	2	616,839	1
Karnataka	2,00,828	5	1,65,653	7	192,816	7
Goa	39,927	8	61,460	9	83,147	8
Maharashtra	3,88,088	1	3,97,901	3	350,712	4
Gujarat	2,88,500	3	6,70,951	1	408,982	2

and penaeid prawns. Marine fish landings in Andhra Pradesh fluctuated from 54,966 t in 1961 to 2,33,276 t in 1999. Ribbonfishes, croakers, sardines, mackerels, nemipterids, penaeid prawns and crabs were the dominant catches. Marine fish landings in Tamil Nadu varied from 1,06,029 t in 1965 to 4,72,513 t in 1997. The major catches comprised sardines, silverbellies, sharks & rays, croakers, mackerels, threadfin breams, perches, penaeid prawns, crabs and cephalopods. A progressive increase in the catch was noticed in Pondicherry from 6,462 t in 1977 to 21,274 t in 1997. The landings were dominated by mackerels, oil sardines, silverbellies, perches, penaeid prawn and crabs. Marine fish landings in Kerala reached their maximum during 1990 with a catch of 6,62,890 t. Sardines, mackerels, carangids and anchovies formed the major landings followed closely by the threadfin breams, perches, croakers, ribbonfishes, flatfishes, penaeid prawns, crabs and cephalopods. The landings in Karnataka declined from 2,00,828 t in 1985 to 1,83,063 t in 2003. The catch was dominated by sardines, mackerels, carangids, anchovies, threadfin breams, penaeid prawns and cephalopods. In Goa the catches fluctuated from 1,246 t in 1967 to 1,21,998 t in 1993. Sardines, mackerels, ribbonfishes, carangids, flatfishes, penaeid prawns and cephalopods dominated the landings. Marine fish landings increased steadily from 1,23,915 t in 1968 to 4,49, 599 t in 2002 in Maharashtra and from 75,846 t in 1972 to 7,03,105 t in 1998 in Gujarat. Subsequently, the landings declined to 408,982 t in Gujarat and to 350,712 t in Maharashtra in 2004. In both the States croakers, Bombay duck, catfishes, ribbonfishes, *Coilia*, elasmobranchs, threadfin breams, pomfrets, penaeid and nonpenaeid prawn and cephalopods formed the major catch.

Sectoral Production Trends: The mechanised sector accounted for 67.9%, motorised sector 25.0% and artisanal sector 7.1% of the total production. The sector-wise landings in different regions during 2004 are given in Figure 2. The pattern of marine fish landings in India during the past fifty years clearly reveals that the contribution by the artisanal sector to the total production was significant only up to 1960s, while presently, the contribution by the mechanised and motorised sector accounts for 93% of the marine fish catch.

Fig. 2: Sector-wise landings in different regions in 2004



The share of the mechanised sector to the total landings increased from 20% in 1969 to 68% during the year 2004. The total landings increased from about 1.8 lakh t in 1969 to 17.3 lakh t in the year 2004 with peak landings of 19.4 lakh t in 1997. More than 80% of the landings was by the trawlers. The motorised fishing craft accounted for 25% of the total landings in India. The landings by this sector have increased from about 1.8 lakh t in 1986 to 6.2 lakh t in 2004. Kerala accounted for the bulk of the landings by the motorised craft in the country. In other States the contribution by this sector has been gradually increasing. The unit operations by the mechanised craft during the last 15 years has been fluctuating at around 3.05 million operations annually. However, the unit operations by the motorised sector have significantly increased from about 0.94 million unit operations in 1986 to about 6.0 million unit operations in 2004. The constancy in the unit operations by the mechanised sector does not however imply that the fishing activity has remained constant over the years.

The amount of time expended for actual fishing by this sector has almost doubled during the last 15 years, rising from about 17.4 million hours during 1986 to 34 million hours during the year 2004. This was mainly due to introduction and increase in multiday fishing along the entire coastline. Thus the increased catch per unit landed may not perhaps indicate the true status of the exploited stocks. Rather, it would be appropriate to examine the trend in the catch per actual fishing hour to understand the true status of the fishery. In the motorised sector not only has there been increase in the unit operations but also in the fishing hours from about 3.3 million hours in 1986 to about 25 million hours during the year 2003. Consequent on the growth in these sectors, the artisanal sector has gradually been marginalised over the years. In Gujarat, Maharashtra, Karnataka and to some extent in Kerala, the sector has been totally marginalized.

Status of Exploitation: From the resource monitoring programmes of CMFRI, it is observed that there is a general decline in resource availability as evidenced by decline in catches and catch rates and incidence of a large proportion of juveniles and young fish in the landings and decrease in the average length at capture. It is also reported that there is a considerable volume of discards of non-target resources by the multi-day

trawlers. Stock assessment studies have also revealed that most of the stocks are overfished, especially the demersal stocks, mainly exploited by the mechanised sector. The stocks of shrimps in regions of exploitation along the entire Indian coast, Bombay duck and pomfrets along Maharashtra and Gujarat, sharks, catfishes, mackerel, croakers, pomfrets, squids and cuttle fish in the southwest and south east are heavily exploited and their catches and catch rates are fast declining. Studies have also revealed that there is an increasing tendency to fish down the marine food web, which is threatening the resource balance in the marine food chain. Excessive trawling was also found to adversely affect the biodiversity and ecosystem productivity, which would negatively impact the fish production.

Issues

From the foregoing it is evident that there is an urgent need to reorient the fisheries management regime for long term sustainability of the resources and enhancing the economic efficiency of the fisheries sector. The issues that need consideration for a rational management strategy are: 1) Excess fleet size, capacity and over-capitalisation; 2) Inappropriate exploitation pattern; 3) Fish stock decline; 4) Exploitation of juveniles; 5) Discards utilization/reduction; 6) Environmental degradation; 7) Natural and man-made disasters; 8) Biodiversity decline; 9) Increasing fishing cost and diminishing returns; 10) Under exploitation of oceanic stocks; 11) Inter and intrasectoral conflicts; 12) Inefficient internal marketing system; 13) Ineffective regulatory measures; and 14) Resistance to regulation.

Although there is a management control in the form of ban on mechanised fishing, its efficacy, scope and impact on long-term sustainability of the fisheries is still being debated. In the context of globalisation of trade, growing demand for sea food, enormous pressure on the resources and increased awareness of ecosystem based management and eco-labeling, there is an urgent need for developing a management regime based on the principles of responsible fishing for ensuring livelihood security, resource sustainability, economic efficiency and ecosystem integrity.

Management Approach for Responsible Fisheries

Code of Conduct for Responsible Fisheries: As per the FAO Code of Conduct for Responsible Fisheries, the management objectives and the related measures that should be provided are:

Management Objectives: *Recognizing that long-term sustainable use of fisheries resources is the overriding objective of conservation and management, States and sub regional or regional fisheries management organizations should, inter alia, adopt appropriate measures, based on the best scientific evidence available, which are designed to maintain or restore stocks at levels capable of producing maximum sustainable yield, as qualified by relevant environmental and economic factors, including the special requirements of developing countries.*

Such measures should provide inter alia that:

a) excess fishing capacity is avoided and exploitation of the stocks remains economically viable;

b) the economic conditions under which fishing industries operate promote responsible fisheries;

c) the interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries, are taken into account;

d) biodiversity of aquatic habitats and ecosystems is conserved and endangered species are protected;

e) depleted stocks are allowed to recover or, where appropriate, are actively restored;

f) adverse environmental impacts on the resources from human activities are assessed and where appropriate, corrected; and

g) pollution, waste, discards, catch lost by damaged or abandoned gear, catch of non-target species, both fish and non-fish species, and impacts on associated or dependence species are minimised through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost-effective fishing gear and techniques.

Management of fisheries is not managing the fish stocks alone but it should also take into account the stakeholders who are directly or indirectly involved such as the fisherfolk, traders, those in fishery allied activities and consumers. It is well recognised that fisheries resources must be managed to harvest stocks at sustainable levels for ensuring livelihood security for the benefit of the present and future generations. Fish stocks live in a highly variable habitat, which is a complex ecosystem and are affected by human intervention and vagaries of nature caused by environmental variations. The management should incorporate this uncertainty factor also in its strategies. Single species management practices prevalent in temperate waters will not be suitable to multi species and multi gear systems of tropical waters such as those of India. In such a multi-species system it is impossible to maximise returns from all the constituent stocks. Thus the goal of management should be to promote sustainable fishing practices that do not decrease the stock levels, but ensure livelihood security, resource sustainability, and economic efficiency and ecosystem integrity.

There are different kinds of management measures that can be taken. They are:

(a) Input Control Measures: 1) Access to fisheries (for *e.g.* licenses); 2) The size and power of boats; and 3) The amount of time each month a boat can fish;

(b) Output Control Measures: 1) Catch quotas; and 2) Total Allowable catch for a fishery;

(c) Technical Control Measures: 1) Size limits (capture and marketing); 2) Closed areas for fishing; 3) Closed seasons for fishing; and 4) Size of the nets used.

In the Indian context, output control measures are not ☞

practicable as they involve enormous cost of monitoring and accurately quantifying the catches. Input control measures are relatively easy to implement and they also require an efficient monitoring system. For ensuring a sustainable and responsible fisheries management regime, the following measures are suggested.

Shift from Open-Access to User Rights: The policy measures likely to be the most effective for resources management and protection of critical fish habitats in the aquatic environment are those which avoid the system of free and open access to resources and choose introduction of appropriate measures to allocate resources and establish user rights. Where it is possible to introduce such measures, they will, *inter alia,* provide greater incentives to reduce excess fishing capacity/pressure, which has been one of the major factors responsible for overfishing and unsustainable development. In addition, in artisanal fisheries, the establishment of user rights is particularly important in protecting the interest of artisanal fishers from unequal competition with industrial vessels. The policy should aim at ensuring socio-economic security for the artisanal fishermen whose livelihood depends solely on this avocation. Thus, the measures suggested are: a) Mandatory registration and licensing of all motorised and mechanised boats, b) Review of registration and licensing every five years; and c) Upward revision of the registration, licensing fees and berthing charges to discourage new entrants.

Reduction of Fishing Effort: The fishery regulation through effort reduction that is in vogue in different maritime States is chiefly aimed at the trawl fishery. In recent years, there has been significant increase of effort in the motorised sector, especially the ring seine fishery and the mini-trawl fishery along the Kerala coast, causing concern for sustenance of some of the exploited stocks. There have also been dimensional changes in the gear, giving wider coverage and efficient catchability. Similarly, the increase in the time spent for fishing in the mechanised sector by undertaking multiday voyage and use of sophisticated electronic devices for fish finding and communications has resulted in increased fishing efficiency. Action points suggested are: a) Fixing and capping the size and power of the boats in each sector by imposing upper limits for the length and horsepower, especially the large ring seiners operating in Kerala, b) Restriction of multi-day fishing by fixing upper limit for absence from the shore in all the States; and c) Discouraging further entry into the fishery through refusal of licensing to new boats.

Closed Season/Closed Area/ Marine Protected Areas (MPAs): Recognising the necessity for ensuring sustainable yields from the exploited stocks, certain maritime States have enacted Fishery Regulation Acts which would enabling effort reduction, rebuilding of the stocks and ecosystem rejuvenation by closure of fishery for a specified period of time. Restriction of the number of days of fishing during monsoon season is the most common method followed in India, the objective being to protect the spawning stocks from capture by mechanised fishing vessels and allowing natural replenishment of the fish stocks. The effect, extent and scope of the ban across different fisheries continue to be a debatable issue without conclusive evidence on the merits. However, there is consensus about the fact that the intensive exploitation of the coastal waters does adversely affect the ecosystem resulting in low productivity from different trophic levels. Recently, based on discussions with coastal States/UT and CMFRI and FSI, the Ministry of Agriculture, Govt, of India has initiated a move to impose a uniform ban on trawl fishing during the monsoon months along the entire Indian coast.

Areas of fish spawning and feeding (Marine Protected Areas) in which fishing is prohibited allow rapid build-up of fish spawning stock biomass The idea behind reserves is that if the fish are protected from fishing, they live longer, grow larger and produce an exponentially increasing number of eggs. It is observed that adult fishes tend to remain in the protected areas while their larvae help replenish adjacent fisheries. Declaring marine reserves in the Gulf of Mannar, Gulf of Kutch and Andamans is a right step in this direction. The suggested measures are: a) Mandatory closed fishing season from 15th June to 31st July for the west coast; b) Mandatory closed fishing season from 15th April to 31st May for the east coast; c) Only non-motorised and low horse powered motorised (up to 10 HP) OBM/IBM vessels be allowed to operate during the closed season; and d) Dolnet operations off Maharashtra and Gujarat to be controlled by closure of fishing area in specified fishing zones.

Mesh-size Regulations and Curbs on Destruction of Fish Juveniles: The fine meshes of gears like trawls and bag nets cause large-scale destruction of juveniles of many important commercial fishes. The codend mesh size (CEMS) of the trawls prevalent in India is uniformly very small (10-15 mm stretched knot to knot) while the recommended minimum stretched mesh size is 35 mm. It may be recommended that a codend mesh size of 35 mm may be enforced in Indian waters to ensure sustainable exploitation of the fish and shrimp stocks. As regards lobster resource, Central Marine Fisheries Research Institute (CMFRI) has recommended the Minimum Legal Size (MLS) for capture of four species of lobsters to ensure sustainable exploitation of the resource. Based on the recommendations of CMFRI, the Ministry of Commerce, Govt, of India, has issued orders specifying the Minimum Legal Weight fixed for *Panulirus homarus* as 200 g, for *P. polyphagus* as 300 g, for *P. ornatus* as 500 g and *for Thenus orientalis* as 150 g.

The fishing for shrimp seed along the coastal waters of the east coast is yet another example of the destruction of valuable ichthyoplankton. For every shrimp

seed collected, hundreds of other larvae and juveniles of commercially important species of finfishes and shellfishes are destroyed. The juvenile fishing should be stopped forthwith and interventions required in this regard are: a) Complete ban on landing and marketing of juvenile fish; and b) Minimum export size of high value resources should be fixed.

Diversification of Vessels and Targeting Specific Resources: To ease out fishing pressure in the inshore waters, the existing vessels may be suitably upgraded/modified as multipurpose/combination vessels to harvest the undertapped resources like tunas, bill fishes, pelagic sharks and oceanic squids available in the oceanic and deeper waters. The suggested options are: a) Diversification of fishing to passive fishing by gill nets, squid jigging and hooks&lines; and b) Promotion of open sea fishing by resource specific craft and gear to tap the tuna resources.

Participatory Management: Management of fisheries can be made more effective if the principal stakeholders are involved in the decision-making and its implementation. Fishermen's cooperatives can be formed and these can be vested with the responsibility of protecting the fisheries resources they harvest. They should be made aware of the biological and environmental basis for sustainability of fish stocks by constant interactions with the scientific community. Such interactions will be mutually beneficial to the fishermen, fishery scientists and the policy makers and make the implementation of the management measures/ options smooth and effective. Awareness on benefits of conservation of fish stocks has to be created through extension services of Central and State Fisheries institutions/agencies with a participatory management approach.

Strengthening of Management Information System: It has been now well recognised that the basic requirement for knowledge based fisheries management is availability of reliable and adequate data on the resources and their dynamics including economics of fishing. For this, an effective data acquisition mechanism is needed. The maritime States must develop mechanisms to generate reliable data on marine fish landings and fishing effort, which could be used for understanding dynamics of the fisheries as well as for regulating their exploitation.

Conclusion

Marine fisheries in India, beset with problems of over capitalisation, over capacity, increased operational expenses and reduced catch rates, is at cross roads seeking proper direction and guidance. In the context of globalisation and challenges of global competition in trade and economics, there is an urgent need for policy interventions at the State and national levels to meet the increasing domestic and export demand of seafood and to ensure better livelihood for the fisherfolk. A comprehensive national fishing policy namely, *Marine Fishing Policy* - 2004 has been released by the Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Govt, of India. The policy objectives are: (1) to augment marine fish production of the country up to the sustainable level in a responsible manner so as to boost export of sea food from the country and also to increase per capita fish protein intake of the people of India, (2) to ensure socio-economic security of the artisanal fishermen whose livelihood solely depends on this vocation, and (3) to ensure sustainable development of marine fisheries with due attention towards ecological integrity and biodiversity. In the policy, the need for a shift from the open access to the limited entry concept in the territorial waters besides enforcing stringent management measures for sustained production is stressed.

Fisheries management is a continuous and interactive process, where, economic, social and ecological costs and benefits are to be understood and interventions designed. A road map for ensuring sustainability, equitability, ecosystem conservation, eliminating destructive gears, reducing by-catch and discards and juvenile destruction, extension of fishing into new areas, diversification of fishing to cover new resources, ensuring conservation of endangered and threatened species groups, putting into practice the FAO Code of Conduct for Responsible Fisheries, and ultimately evolving a working model for a participatory management of marine fisheries resources of the country is the need of the hour. This can be achieved only jointly by all the stakeholders including fishers, scientists, policy developers and implementers.

Status of Shrimp and Scampi Culture (2005-06) in Various Maritime States of India (as on 31.3.2006)

State	Area under (Ha)	% of Total Area	Production (MT)	% of Total Production	Productivity (MT/Ha/Yr.
Andhra Pradesh	91,268	49.56	1,07,772	57.94	1.18
West Bengal	54,758	29.74	46,087	24.78	0.84
Orissa	11,560	6.27	10,419	5.60	0.90
Tamil Nadu	5,452	3.0	7,641	4.10	1.40
East Coast Total	1,63,038	88.54	1,71,919	92.43	1.05
Kerala	15,122	8.21	7,247	3.89	0.47
Karnataka	3,406	1.85	1,886	1.01	0.55
Gujarat	1,337	0.72	3,362	1.80	2.51
Maharashtra	881	0.48	917	0.49	1.04
Goa	331	0.18	659	0.35	1.99
West Coast Total	21,077	11.44	14,071	7.56	0.68
Total	**1,84,115**	**100.00**	**185990**	**100.00**	**1.01**

Details of Hatcheries, Feed Mills PCR Labs and LCMSMS (as on 31/3/2006)

State	Hatcheries		Feed Mills		PCR Labs	LCMS Labs
	No	Capacity in Million	No	Capacity in LMT		
Gujarat	2	45	Nil	Nil	1	1
Maharashtra	8	345	Nil	Nil	2	1
Karnataka	14	321	Nil	Nil	4	1
Kerala	29	567	1	0.20	11	2
Tamil Nadu	83	3078	1	0.40	21	1
Andhra Pradesh	199	9735	25	0.85	41	3
Orissa	15	475	Nil	Nil	5	1
West Bengal	11	166	1	0.05	2	1
Total	**361**	**14700**	**28**	**1.50**	**87**	**11**