AN APPROACH TO COASTAL FISHERIES MANAGEMENT IN INDIA
(A review in the Bay of Bengal Region, India)

by

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1. Introduction

India ranks seventh in the world in fish production with an estimated annual production of about 4 million tonnes out of which marine fish production varies from 2.2 million tonnes to 2.6 million tonnes. Marine fisheries play a significant role in India's economy. The production has been rising steadily from 33,000 tonnes in 1950s with increase in fishing fleet, use of mechanised vessels especially trawlers and use of diversified gear, exploratory fishing and research and development programmes of Central Marine Fisheries Research Institute, Fishery Survey of India, Department of Ocean Development and Maritime State Governments. The marine fish production of India crossed the 1 million mark in 1970 and 2 million tonnes in 1989. From the sixties, there is continuous increase in export of prawns, lobsters and frozen fish with development of fish processing facilities along both the coasts. The country earns foreign exchange worth of Rs. 2,320 cores through export of 2,23,665 T of sea food.

More than 70% of the marine fish production of India is landed on the west coast and the rest from the bay of Bengal on the east coast. During the five year period 1984-1988, the marine fish landing on the west coast amounted to 71% and that on the east coast 29%. The trend is similar in the recent five year period 1989-1993, the percentages for the two coasts being 72% and 28%.

1.1 Trend of Marine Fisheries from Bay of Bengal:

An estimated 0.54 million tonnes of marine fish were landed annually in the four maritime states of India and the Union Territory of Punditry during the period Pondicherry 1985-1993 of the total exploited marine fish production by the various maritime states, 42.1% was accounted by the artisanal shore seines, gillnets, bagnets, hooks and lines, encircling nets, dip nets etc. followed by trawlers and 16.6% by other mechanised gears such as inboard pablo type gillnetters and outboard engine fitted units operating gill nets, drifts nets, hooks and encircling nets. Table 1 indicates the percentage of catch obtained in the maritime states by different gears during 1985-1993.

The impact of mechanized sector especially trawlers in Tamilnadu, Orissa and Andhra Pradesh for increased fish production in Bay of Bengal is clear.

The traditional sector also continues to play a vital role in Tamilnadu, Pondicherry and Andhra Pradesh.

It has been observed that exploitation of pelagic resources along the southeastern region (comprising Tamilnadu, Pondicherry and Andhra Pradesh) was almost steady while fluctuating trend could be noted along the north eastern region (comprising Orissa and West Bengal) (Table 2).

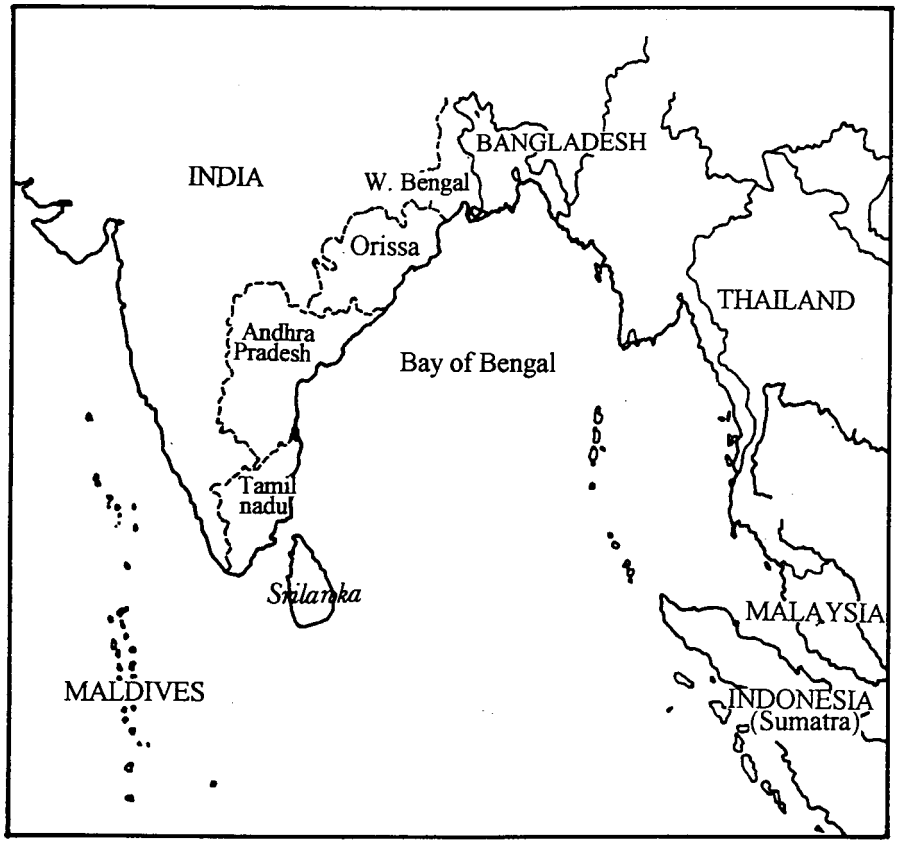

Table 1. Landings by different units (%) in Bay of Bengal during 1985-1993

States/U.T	Trawl net	Other mechanized units	Artisanal units
Tamilnadu	49.9	11.8	38.3
Pondicherry	28.3	3.3	68.4
Andhra Pradesh	32.6	4.2	63.2
Orissa	49.7	24.8	25.5
West Bengal	3.4	80.7	15.9

Table 2. Pelagic and demersal fish production along the southeast and northeast regions of Bay of Bengal

Year	Southeast		Northeast	
	Pelagic	Demersal	Pelagic	Demersal
1985	49.8	50.2	43.9	56.1
1986	54.8	45.2	43.6	56.4
1987	52.1	48.9	38.0	62.0
1988	53.3	46.7	30.1	69.9
1989	54.8	53.2	50.1	49.9
1990	51.4	48.6	52.0	48.0
1991	54.2	45.6	56.8	43.2
1992	56.7	43.3	58.6	41.4
1993	51.5	48.5	55.0	45.0
Average	**53.0**	**47.0**	**47.6**	**52.4**

Estuarine systems of southern Andhra Pradesh and Tamilnadu support local small scale fisheries. Resources of pearl oyster, Pinctada fucata are known for beautiful high quality pearls. The Central Marine Fisheries Research Institute has developed technologies for low cost techniques for culture as well as for hatchery of the above mentioned bivalve molluscs which could be utilised for proper exploitation of the molluscan shellfish.

About 12,00,000 numbers of the sacred chank, Xancus pyrum are fished by skin-diving from Raman athapuram-Rameswaram-Tuticorin region in Tamilnadu. The chanks are under the control of the Department of Fisheries, Govt. of Tamilnadu and fishing is done by licensed fishermen skilled in chank fishing by skin diving. Appreciable number of chanks are obtained in trawl nets and boat seines in South Arcot and Thanjavur districts of Tamilnadu. Several others gastropods like Babylonia spirate, Oliva spp, To Tonna spp, Raphana spp, Stombus spp, Turitella spp,

Archactoria sp, Murex ramous, Lambis spp, Cyprea spp etc. are caught in trawl nets or by diving especially along the southeastern region of Bay of Bengal.

1.2 Management of coastal fisheries of India

Organizations

In India various organizations like the Department of Fisheries and Co-operation, Ministry of Food and Agriculture, Government of India, Indian Council of Agricultural Research, Central Marine Fisheries Research Institute, Fisheries Survey of India, Integrated Fisheries Project and Department of Fisheries of maritime states and Union Territories deal with management of coastal fisheries. Recently Bay of Bengal programme is also engaged in management of the coastal fishery resources of India. The different organizations work in co-operation with the objective of increasing marine fish production in the coastal regions.

Problems in management

The coastal fishery resources of India have typical problems of tropical regions. It is multispecies comprising of a very large number of species which are exploited with different types of gear, artisanal, trawling with other trawls either with single trawl net or paired trawls, high opening trawls, drift gill nets, bottom set gill nets, boat seines, shore seines etc. throughout the year. Some of the maritime states have attempted restrictions either by enactment of statutory regulations or by orders placing restriction on fishing by mechanised units beyond inshore waters; for example, beyond 5 km from the coast off Orissa, 3 nautical miles off Tamilnadu, beyond 10 km from the coast off Andhra Pradesh and beyond 7 fathoms depth off in Pondicherry. The non-mechanised units are to fish within the limits laid down. But often the mechanised sector conducts fishing in the zone restricted to the non-mechanised sector leading to conflicts. Another problem is incidence of classes between mechanised sector vessels belonging to different states. This causes serious problems which are resolved by the Departments of Fisheries of the concerned states. There is great need for co-operation between non-mechanised sector and mechanised sector as well as vessels of mechanised sectors of the neighbouring states in the implementation of regulations which are in force, so that the production, livelihood as well as the security of the fishing personnel and the fishing units are not jeopardized.

The production potential from the continental shelf of India has been estimated to be 4.5 million tonnes. The estimated marine fish production of India in 1993 was 2.2 million tonnes. Considering this, it could be stated that the production of the different groups could be increased by extending fishing operations to unexploited areas and to depth zones of 70-100 m where fishing is conducted only to a very limited extent.

Mesh size regulation of trawl net to 25 mm is one of the important requirements for obtained maximum sustainable yield. The importance of this aspect has been stressed by Central Marine Fisheries Research Institute and has to be

implemented for achieving the maximum production without affecting recruitment which is of paramount importance. Another management principle to be stressed is the prevention of exploiting breeders of fish and shellfish like prawns and cephalopods which will conserve the resources considerably.

Another problem is that the trawlers which go for long trip fishing cruises throw away large quantities of low quality fish caught and land only prawns and quality species of finfish. It this practice is stopped by increasing the fish hold capacity of the vessels, a substantial rise in production could be obtained.

If appropriate management measures are imposed on the fishing industry, there are possibilities for increasing the fish production from the continental shelf of India to the potential level by the year 2,000.

2. Government Policy and Present Management

For managing the marine fisheries, the Govt. of India issued a few guidelines to all the maritime states to formulate rules and regulations to be passed by the respective state legislative. These guidelines are intended mainly to avoid confrontation between mechanised and artisanal sectors rather than intimation suitable regulatory measures for the sustainability of the resources. The guidelines were first issued in 1978 and later modified as follows in 1980:

a) The non-mechanised artisanal crafts may be allowed to operate exclusively up to a distance of 10 km from the coast.

b) The small mechanised boats should operate beyond 10 km distance from the coast.

c) Vessels of OAL 20 m and above should operate beyond 23 km from the coast.

Among the maritime states bordering Bay of Bengal, Tamil Nadu and Orissa have passed Marine Fishing Regulation Acts. Other states are following adhoc measures to prevent or tackle conflicts between the artisanal and mechanised sectors. Tamil Nadu passed the Act in January 1983 and issued the rules in August, 1983. Orissa passed the Act in June 1982 and issued rule in January, 1984.

These Acts provided for (i) the registration of all fishing vessels, including non-mechanized country raft at their respective base ports; (ii) licensing fishing vessels for fishing in specified areas, (iii) regulation, restriction or prohibition of fishing in any specific area by such class or classes of fishing vessels as may be specified; (iv) regulation or restriction of the number of fishing vessels which may be used for fishing in any specified areas, and (v) regulation, restriction or prohibition of catching in any specified area of such species of fish and such period as may be specified.

These acts have thus equipped the State Governments with the authority to regulate and control fishing activities in their respective states according to the specific local needs. The salient features of these measures formulated by some states are briefly mentioned below:

Tamil Nadu:

a) Mechanised fishing vessels shall not be used within 3 nautical miles from the shore.

b) Non-mechanised vessels shall be used for fishing within 3 nautical miles from the shore.

c) Mechanised fishing vessels shall have the notified places of berth only after 5 a.m. and should report back at the place of berth not later than 9 p.m. and shall remain there till 5 a.m. of the following day.

d) As an adhoc measure to avoid clashes between fishermen using mechanised and indigenous vessels for night fishing which is prevalent in the Palk Bay region, the mechanised vessels are allowed to fish only on Monday, Wednesday and Saturday nights while the indigenous boats are operated on the rest of the 4 nights in this week. The mechanised boat owners association is entrusted with the work of issuing tokens to mechanised boats on the allotted day after collecting a nominal fee.

Pondicherry :

The Union Territory has not yet formulated any Marine Fishing Regulation Act. However, the following conventions are followed.

a) Mechanised fishing vessels should operate beyond 7 fathom depth.

b) Mechanised fishing vessels should operate only between 6 a.m. and 6 p.m. to avoid damage to non-mechanised craft operating during night time.

Orissa :

a) Non-mechanised fishing craft shall be allowed to operate freely without any restrictions. Waters up to 5 km from the shore shall be reserved exclusively for such fishing crafts.

b) Mechanised fishing vessels up to 15 m of length shall be allowed to operate beyond 5 km limit from the coast.

c) Mechanized fishing vessels of 25 GRT and above or above 15 m length shall be allowed to operate beyond 15 km from the shore.

Orissa is the only State which has fixed the optimum number of mechanized vessels of various categories for the different fishing bases.

Andhra Pradesh :

Although no Marine Fishing Regulation Act has been enacted, the State Govt. has issued orders to the effect that:

a) Only non-mechanised fishing craft should be allowed to operate up to 10 km from the shore.

b) Mechanised vessels should operate beyond the 10 km limit from the coast.

c) The large mechanised vessels above 20 m length should operate beyond 23 km from the coast.

Although the Government of India in their guidelines have defined these areas in terms of distances from the shore, many States have taken depth as the criterion for the purpose, because the fishermen can easily measure the depth, but not the distance from the shore. The orders of the Andhra Pradesh Government restricting the mechanised vessels to fish beyond the 10 km is unrealistic since the continental shelf is steep on the A P coast and at a distance of 19 km, the depth may be too great for small mechanised vessels to fish.

These guidelines, by and large, are not followed resulting in occasional conflict between the artisanal and mechanised sector, as the mechanised vessels encroach the fishing areas specified for artisanal sector. A recent development has been conflict between fishermen from the contiguous states over fishing rights in their territory.

3. Awareness Building

As there are indications of reduction in the stock of certain major species, it is time to start an act of awareness building among the fishermen, managers and policy makers about the fishery situation in the Coromandal coast and impress upon the need to initiate suitable regulatory measures for the sustainability of the resources.

3.1 Closed trawling season:

In Madras coast, trawling is conducted throughout the year. Enforcement of a temporary closure of trawling during the peak spawning season of the major species or when there is high proportion of juveniles in the population may effectively reduce large scale exploitation of spawners and juveniles. Though most of the fish, cephalopod and crustacean species in the tropical region are frequent/continuous spawners, northeast monsoon season is a period of intense spawning activity for most of the species. Hence, trawling may be closed for one month, preferably in November, when cyclone formation is regular over the Bay.

3.2 Closed trawling areas:

Encore estuary and Pulicat backwaters serve as nursery grounds for most commercial penaeid prawns. These nursery grounds and the area of configuration of estuary and the sea may be demarcated and trawling may be closed in these areas during and for one month after the spawning season.

3.3 Diversified trawling:

As the target of trawl exploitation if mainly prawns, intensification of trawling may pressurise the prawn stock more than any other resource. As the prawns are landed mainly by the shrimp trawl nets, operation of shrimp trawl nets may be suspended in November and December. The fish trawl net alsone may be operated in December.

A very few number of gill nets are operated in Madras. It is advantageous to convert some of the mechanised vessels as trawler cum gill netter, as in the northwest coast of India, facilitating operation of gill nets during November and December. As the gill net targets large fish and spares juveniles of fishes and prawns, increase in the number of gill netters will not be detrimental to the fishery.

3.4 Increase in cod and mesh size:

To reduce the exploitation of enormous quantity of juveniles of finfish and cephalopods, the cod and mesh size of the fish trawl nets may be increased, as a first phase, to 25 mm. This may result in decrease in the catch in the first year. After a time lapse (about 1 year), the non-retained juveniles will have grown to be retained by the larger mesh (25 mm). The increase in individual weight of the fish caught by the larger mesh will more than balance the reduction after the time lapse and the total catch will increase. Second phase in mesh regulation may be implemented after assessing the performance of the 25 mm cod end for about 2 years.

In the prawn fishery, however, increasing the mesh size with a view to catch large sized prawns would prevent capture of adults of the smaller species, which will be lost to the fishery. Hence, mesh regulation may not be applicable to the shrimp trawl net. But in the estuarine prawn fishery, where juvenile prawns are exploited in large numbers by stake nets, the mesh regulation of minimum 29 mm in the cod end of the stake nets may be implemented.

4. Conclusion

Intensification of trawling has reached a stage in which management of the resources has become imperative. Implementation of management measures involving restriction/reduction of effort, enforcement of closed seasons/areas or a

change in mesh size, requires information on the response of the fishermen and on the impact of such measures on their livelihood. Their income from other sources, other income generating activities, the potential for expanding these activities also need to be assessed. Introduction of management measures must be preceded with elaborate dialogue between the managers and the fishermen. This is useful in awareness building and also helps to get their cooperation and support. A meaningful linkage of bioeconomics and socioeconomic parameters may be established by assessing the possible differences in catch rates and species composition in different fishing seasons due to the management measures proposed to be undertaken.

The management measures may be implemented as follows:

(i) The management plan may be prepared scientifically.

(ii) Awareness building on the scientific management at all levels.

(iii) There must be a negotiated agreement between the fishermen and the managers on the proposed measures.

(iv) The negotiated management has to be legitimised.

(v) The management plans are time bound and have to be regularly revised and modified.

Acceptance and implementation of fisheries management ideas are slow and gradual process and can take a long time for full implementation. Hence, it is not realistic to be too ambitious and optimistic. However, a socio-economic approach coupled with bioeconomic approach handled with understanding, tact and foresight may help in overcoming the challenge and ensure sustainability of the resources.

COASTAL AQUACULTURE RELATED FISHERIES MANAGEMENT PROBLEMS

Aquaculture is emerging as a successful bioindustry. The Government of India has categorised it as an "Extreme Focus Sector" for development. Thus land-based aquaculture especially shrimp culture in the coastal zone is poised for rapid growth in India. Planned aquaculture development in the coastal zone, besides augmenting production of organisms of nutritional, therapeutic, ornamental and economic values, helps utilise wastelands and water resources, affords generation of enormous gainful employment opportunities, support growth of auxiliary industries, stimulate a vibrant commercial activity (local, regional and international trade), and substantial improvement in the socio-economic status of the rural and urban beneficiaries.

However, the fast growing shrimp culture sector is a serious concern due to the possible/proven adverse impact on the coastal environment, especially in the nursery grounds of commercially important species, and the fisheries of coastal ecosystems.

1. Status of coastal aquaculture

The total area surveyed and identified as potential for culture in the Bay of Bengal coastal zone of India is about 6,43,000 ha. The area under brackishwater culture increased from 27,000 ha in 1985 to about 52,000 ha in 1993, and the total estimated production from 14,875 tonnes in 1985 to 34,500 tonnes in 1993 for the coast (Table 3). West Bengal has the largest area under culture. The average production rate for 1992-1993 is highest for Tamil Nadu (2075 kg/ha/yr) followed by Andhra Pradesh (1,347 kg/ha/yr) due to the adoption of scientific farming (improved extensive and semi-intensive) techniques.

In scientific farming, *Penaeus monodon* and *P. indices* are the two species preferred for monoculture. Mixed culture of the two species is also being done by some farmers. In some low-saline areas, *P. monodon* is also stocked along with carps in a few farms in Andhra Pradesh.

Traditional extensive methods are followed in most of the farms in west Bengal coast. In the Coromondal coast, pump-fed drainable farms are used and scientific extensive and semi-intensive practices are mostly followed, with occasional reports of intensive culture with production rate exceeding 10 tonnes/ha/crop. Farms are operated by individuals or families or small-industrial groups or hi-tech integrated aquaculture units belonging to large industrial houses.

2. Problems

Several environmental and socio-economic problems have been recently reported from areas of large concentration of shrimp farms in the Coromondal coast (e.g. Nellore dist. of Andhra Pradesh and Nagai Qaide Milleth and Thanjavur districts of Tamil Nadu).

- Conversion of agricultural fields into shrimp farms.
- Conversion of mangrove wetlands.
- Conversion of salt pans
- Salinisation of fresh water aquifers due to excessive abstraction of sub-soil water and seepage of saline water from shrimp farms, feeder and drainage canals.
- Discharge of untreated effluents from shrimp farms into coastal water bodies.

- Development of infrastructure for hatcheries and farms affecting free accessibility of the fishermen to transport fishing materials, equipment, fish, and marketing and drying of fish.

The aspects that are of concern and likely to have impact on the coastal fisheries are:

- Indiscriminate collection of seed of desired species of prawns, *Penaeus monodon* and *P. indicus*, from nursery grounds for culture and destruction of "shrimp seed by catch"

- Another area requiring attention relates to wild shrimp spawner collection. At present, hatchery operation of *P. monodon and P. indicus* depends entirely on the spawners collected from the fishing grounds. Large scale exploitation of wild spawners for the shrimp hatcheries is likely to be detrimental to the coastal fishery, especially for species like *Penaeus monodon.*

- Discharge of untreated effluents from shrimp farms into estuarine creeks, backwaters and saline lagoons, which are the predominant nursery grounds for a large variety of commercially important species and the consequent degradation of the environmental conditions, are likely to affect the coastal fisheries as well as aquaculture since many farms rely on these systems for their water input. The characteristics of these effluents are high organic matter, high BOD, COD, H_2S, turbidity, nitrogen, phosphorus and trace elements. Such effluents when released into the nursery grounds are likely to reduce the dissolve oxygen levels leading to anoxic conditions, production of H_2S, plankton and microbial blooms. Such a condition could deter the entry of seed of the commercially important species. Residues of antibiotics and chemicals used in the farms are also likely to reach the environment. The problem is likely to be more pronounced in the Coromandal coast, which has relatively low rainfall, no major rivers, low tidal amplitude, and formation of sand-bar during certain years across the estuarine mouths, which cuts off water exchange between these systems and the sea.

- Recently, there have been several reports on outbreak of diseases in farmed shrimps in the Nellore district and most of the farms in the Khandleru Creek, which sustains the largest number of shrimp farms in Nellore. How far the natural populations in the nursery grounds are affected by disease transmission from farms is not known. While effluent treatment may be made compulsory, greater emphasis should be on pollution reduction methods by improved farm production techniques.

- There should be a ban on disposal of inadequately treated water from disease affected farms as these could transmit the disease into the nursery areas to post-larvae, juveniles and sub-adults and may affect even the coastal fishery.

- Dumping of dead prawns, prawn heads, shells etc. into estuarine creeks and backwaters must be banned and awareness created among the farmers.

3. Government policy and present management

Fisheries is a state subject and most of the regulations are formulated and enforced by the State Governments. The Ministry of Environment, Forest and Wildlife, Govt. of India promulgated an Act in 1986 which was subsequently modified in September 1990. As per these regulations, the coastal stretches of sea, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action (in the landward side) up to 500 metres from the High Tideline (HTL) and the HTL (Spring Tide) are declared as Coastal Regulation zones. This nitrification applies to rivers, creeks and backwaters as modified on a case by case basis for reasons to be recorded while preparing the coastal Zone Management Plans. However, this distance shall not be less than 100 m or the width of the creek, river or backwater, whichever is less.

The following restrictions are imposed in setting up and expansion of industries. Industries directly related to water front or directly feeding foreshore facilities, hatcheries and natural fish drying in permitted areas, and facilities required for discharge of treated effluents into the water course are exempted.

Discharge of untreated wastes and effluent from industries prohibited. Existing industries must implement these regulations within 3 years.

Harvesting or drawal of ground water construction of mechanisms thereon with 200 m of HTL prohibited; in 200 m to 500 m zone, it shall be permitted only for manual use for fisheries.

Areas that are ecologically sensitive and important such as national parks, marine parks, sanctuaries, reserve forests, mangroves, coral reefs, areas close to breeding and spawning grounds of fish and other marine life, areas rich in genetic diversity, and such other areas as may be declared by the Central Govt. and the concerned authorities at the State/Union Territory level from time to time are prohibited for any industrial activity.

State Governments have been asked to prepare regulation within 1 year of notification.

The Ministry of Environment and Forests and the Governments of State, Union Territories and other designated authorities shall monitor and enforce these provisions.

Govt. of Andhra Pradesh and Tamil Nadu are to shortly issue specific regulations on Coastal Aquaculture and Coastal zone development.

4. Conclusion

Shrimp culture is poised for rapid growth in the Coromandal coast. Govt. of India has identified shrimp culture as a premier sector for development for its enormous positive socio-economic benefits. Recent developments in Nellore. Qaide Milleth and Thanjavur districts on environmental and social issues, however, should be viewed seriously and management strategies should be evolved to promote sustainable shrimp culture. Awareness building is essential on the following issues:

(1) Sustainable development of the coastal areas for aquaculture, clearly outlining the essential elements of sustainable aquaculture.

(2) Sustainable exploitation of shrimp seed from nursery grounds and importance of releasing the seed by-catch.

(3) Regulation of wild spawner collections for hatchery operation.

(4) Advantages of eco-friendly culture techniques; on farm pollution reduction strategies judicious stocking, application of fertilizers, feed management, water management, disease management.

(5) Effective effluent treatment and disposal strategies considering the specific problems of Coromandal coast.

(6) Regulation of shrimp farm effluents into nursery grounds.

5. Institutions and organizations engaged in activities related to coastal zone management in India:

Ministry of Agriculture, Govt. of India:

Nodal ministry for fisheries and aquaculture development through the respective State Governments have issued guidelines for optimum utilization of the coastal fishery resources; for classifications, use and lease of brackishwater areas; and assistance to set up BFDA's.

Ministry of Food Processing, Govt. of India:

Off-shore fishery development, joint ventures with foreign fishing vessels.

Ministry of Environment & Forests, Govt. of India:

Regulation relating to coastal zone use and enforcement.

Indian Council of Agricultural Research:

Research, technology improvement, training, extension and human resource development for capture fisheries and for aquaculture through Central Marine Fisheries Research Institute, Central Institute of Brackishwater Aquaculture,

Central Institute of Fisheries Education and Central Institute of Fisheries Technology.

State Fisheries Departments:

Responsible for capture fisheries and aquaculture development within their states in conformity with the policies and regulations imposed by the Govt. of India.

Central and State Pollution Control Boards:

Pollution monitoring and control

Marine Products Export Development Authority, Ministry of Commerce:

Primary function export promotion of marine products; extension support for capture fisheries and for prawn farming.

Brackish water Fish Farmers Development Agencies:

Rendering assistance to beneficiaries in brackishwater farming in conformity with State Govt. policies.

Financial Institutions:

National Bank for Agriculture and Rural Development and other nationalized and scheduled banks offer credit facilities. SCICI and ICICI offer credit facilities to promote integrated aquaculture and EOU'S in Aquaculture.

Department of Ocean Development:

Development of living and non-living resources National Institute of Oceanography (CSIR) Research on oceanography including living resources.

International Organizations:

Bay of Bengal Programme of FAO-Coastal Fisheries Management.

World bank-Schemes proposed by Govt. of India

Non-Govt. organizations:

- M.S. Swaminathan Foundation, Madras-Biovillage and sustainable development projects.

- Aquaculture Foundation of India, Madras-Aquaculture Consultancy.

- Center for Research on New International Economic order- Integrated fisherfolk development.

Other:

- Fishermen Cooperatives

- Fishermen Federations

- Environmental Conservationists

- Federation of Small Industries Associations.

Table 3. Area utilised for shrimp culture and estimated production in the maritime States of Bay of Bengal

States	Area utilised for culture (in ha)		Estimated total productio (in T)		Averrage production (kg/ha/yr.)	
	1985	1992-1993	1985	1992-1993	1985	1992-1993
West Bengal	25,000	34,050	13,750	16,300	550	478
Orissa	1,450	7,760	580	4,300	400	554
Andhra Pradesh	560	9,500	500	12,800	280	1,347
Tamil Nadu	68	530	28.5	1,100	300	2,075