REPORT ON

COASTAL FISHERIES AND POVERTY: THE CASE OF INDIA

for

INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT (IFAD)

OCTOBER 2003

INTERNATIONAL COLLECTIVE IN SUPPORT OF FISHWORKERS (ICSF)

Contents

Coastal Fisheries and Poverty: The Case of India

TERMS OF REFERENCE

1. International Fund for Agricultural Development (IFAD), a specialized agency of the United Nations, is in the process of revising its Country Strategic Opportunities Paper (COSOP) for India during the current year. As part of this exercise, IFAD wishes to collaborate with the International Collective in Support of Fishworkers, (ICSF), Chennai, India to develop an understanding of issues in coastal fisheries and preliminarily identify areas for possible IFAD assistance:

2. As part of its collaboration with IFAD, ICSF agrees to contribute a background paper to the COSOP review exercise, based on the following TOR:

(i) Provide an overview of the state of coastal fisheries in India, indicating geographical spread, production systems, constraints and opportunities and medium-term outlook.

(ii) Examine the major issues affecting coastal fisheries, with particular reference to the role of these issues in the livelihood of poor coastal communities and the linkage between trends in the sector and coastal poverty. This section should cover, *inter alia*, policy, technical, marketing and production related issues.

(iii) Discuss the major livelihood strategies adopted by the poor in coastal regions and their response to changes in the sector in the past decade or so emphasizing also on the sustainability of these strategies in view of dwindling fishery resource base in coastal areas

(iv) Critically discuss current interventions, both official and private sector sponsored, in coastal fisheries and the impact of such interventions on rural poverty.

(v) List major issues that need to be addressed to strengthen the livelihoods of poor communities in coastal regions.

On the basis of the foregoing analysis, ICSF will suggest strategies that would increase the contribution of coastal fishing in reducing poverty in a sustainable manner. In addition, ICSF, in line with the suggested strategies, preliminarily identify thematic as well as geographical areas, in order of priority, for possible pilot intervention. These strategies would focus largely on the existing sources of livelihood, mainly fisheries, but may include shift to or enhancement of non-fishery-related activities as well.

ACRONYMS

AAI	Aquaculture Authority of India
ADB	Asian Development Bank
AFPRO	Action for Food Production
ARDAR	Association for Rural Development and Action Research
ARIF	Alliance for the Release of Innocent Fishermen
BFDA	Brackishwater Fish Farmers Development Agency
BOBLME	Bay of Bengal Large Marine Ecosystem Programme
BOBP	Bay of Bengal Programme
BOBP- IGO	Bay of Bengal Programme Inter-Governmental Organization
BPL	Below Poverty Line
CAN	Coastal Action Network
CASI	Campaign against Shrimp Industries
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMFRI	Central Marine Fisheries Research Institute
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CRZ	Coastal Regulation Zone
DAHD	Department of Animal Husbandry and Dairying
DFID	Department for International Development
DOF	Department of Fisheries
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FRP	Fibre Reinforced Plastics
FSP	Fishery Sector Product
GAIS	Group Accident Insurance Scheme
GDP	Gross Domestic Product
GEF	Global Environment Facility
GOI	Government of India
GOK	Government of Kerala
HACCP	Hazard Analysis and Critical Control Point
HDI	Human Development Index
HDR	Human Development Report
HP	Horsepower
HTL	High Tide Line
IFAD	International Fund for Agricultural Development
LTL	Low Tide Line
MASSES	Masses Association for Self-sufficiency and Economic Security
MFRA	Marine Fishing Regulation Act
MoEF	Ministry of Environment and Forests
MPEDA	Marine Products Export Development Authority
MSSRF	M.S.Swaminathan Research Foundation
MVS	Model Fishermen Villages
NABARD	National Bank for Agricultural and Rural Development

NFF	National Fishworker's Forum
NGO	Non Governmental Organization
NIRD	National Institute for Rural Development
NOAA	National Oceanic and Atmospheric Administration
NSSO	National Sample Survey Organization
OAL	Length Overall
OBM	Outboard Motor
PAR	People's Artificial Reefs
PCO	Programme for Community Organization
PDS	Public Distribution System
PHFP	Post Harvest Fisheries Programme of the DFID
PPP	Purchasing Power Parity
SCR	Savings-cum-Relief Programme
SEWA	Self-employed Women's Association
SHG	Self Help Groups
SIDA	Swedish International Development Cooperation Agency
SIFFS	South Indian Federation of Fishermen Societies
SNIRD	Society for National Integration through Rural Development
SP	Swadhyaya Parivar
SSLC	Secondary School Leaving Certificate
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USA	United States of America
WB	World Bank
WDR	World Development Report

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EXECUTIVE SUMMARY

1. Efforts to understand poverty issues in the fisheries sector must take into account the specificities of the sector. While the evolving understanding of the multidimensional nature of poverty is welcome, measurement of poverty in all its complexity remains a methodological challenge in fisheries.

2. Available evidence suggests that coastal fishing communities, in general, have lower levels of literacy, a lower sex ratio, and poorer conditions of housing, as compared to State and national averages. Evidence also suggests that communities are faced with a deteriorating quality of life as a result of pollution, sea erosion, increased pressure on coastal lands, degradation of the coastal environment and displacement.

3. Responsibility for fisheries is spread over several agencies and Ministries at the Central and State levels. While the Central government is responsible for fisheries in the exclusive economic zone (EEZ)—marine space beyond the territorial sea up to 200 nautical miles from the baseline—the responsibility for fisheries in the territorial waters—the marine space up to 12 nautical miles (22 km) from the baseline—rests with the State governments.

4. At the national level, the basic fisheries legislation is the Maritime Zones of India (Regulation of Fishing by Foreign Vessels) Act, 1981. Fisheries within the 12-mile territorial limits are managed under the Marine Fishing Regulation Acts (MFRAs) of the coastal States, which regulate fishing vessels in the12-mile territorial sea mainly to protect the interests of fishermen on board traditional fishing vessels.

5. An analysis of the Five-Year Plans highlights shifting emphasis in policy. From an emphasis on expanding production and better resource exploitation, there is now a recognition of the need for conservation and management, in view of the overfishing, particularly of coastal resources.

6. India's marine capture fish production has increased from 0.52 million tonnes in 1951 to 2.7 million tonnes in 2000-2001, with 67 per cent of the production now coming from mechanized fishing units. Exports of fish and fish products have increased from Rs 35 crore in 1970-1971 to Rs 5,815 crore in 2001 in value terms. Shrimp aquaculture has come to occupy an important place in exports, with 86 per cent of shrimp exports (in value terms) coming from cultured shrimp in 2001.

7. Along the east coast fish production tends to be dominated by the motorized and non-mechanized fleet, while on the west coast it is dominated by the mechanized fleet, except in Kerala where the motorized fleet dominates.

8. Signs of overfishing are evident, particularly in coastal waters, highlighting the need for better management, particularly of non-selective gear groups, such as bottom trawls.

9. Fisheries management, in general, is known to be weak, with the monsoon ban on fishing being the most effectively enforced measure. Provisions under the MFRAs, reserving inshore waters for traditional vessels, are not effectively enforced.

10. The past two decades have witnessed a rapid expansion in fishing capacity, including of the small-scale sector. Most affected in this process are the fishermen on non-mechanized craft, numerically in the majority, who face declining catches and increasingly vulnerable livelihoods as a result of non-selective fishing practices adopted by the motorized and mechanized fleet.

11. There has been a substantial increase in investment and in operating costs, for both mechanized and motorized vessels. This also appears linked to a trend towards greater concentration of ownership of craft. Higher costs and investments have led to greater indebtedness, and credit continues to be accessed mainly from informal sources at higher rates of interest. The operations of non-mechanized craft, especially in certain regions, are becoming unviable, as resources and returns decline.

12. Migration is increasingly being adopted as a survival strategy. Faced with declining resources in their own waters, several fishing units migrate along the coast to richer fishing grounds. There is also migration as crew to work on mechanized fishing vessels.

13. Fishing is justifiably considered a high-risk profession. This is supported by available data on deaths of fisherfolk in natural calamities and at sea, indicating the need to undertake steps to reduce vulnerability of fishermen and fishing communities.

14. Returns to fishers in most areas continue to be poor, indicating a lower market power for fishermen. Cooperatives, with a few exceptions, have not been able to play an important role in marketing.

15. Shrimp farming in coastal areas has increased in recent years with possible repercussions for small-scale fishworkers and their communities.

16. The fisheries sector is increasingly being affected by pollution and the impact of other land- and sea-based activities on coastal resources and their productivity. Impacts are most acutely felt by those fishing in coastal and inshore waters, particularly those engaged in gleaning and collection activities.

17. Small-scale fishworkers are increasingly finding themselves at the receiving end of ill-conceived and poorly implemented conservation initiatives that deprive them of their livelihoods.

18. The importance of community institutions and the traditional, but unwritten, rights of fishing communities to use and regulate resources, even where these have existed, have, in general, not been recognized.

19. Despite the high participation of women in fisheries-related work, this aspect has not received much policy attention. This neglect has had its impact in terms of the socioeconomic well-being of women and their families.

20. With centralized landings and greater competition for catch, smaller players, with access to meagre capital—including men and women vendors and headloaders, processors, cycle vendors etc.—usually get access to only low-value fish for local consumption, with correspondingly lower profit margins.

21. Small-scale vendors and processors continue to be constrained by, among other things, a lack of adequate credit, lack of ice and storage infrastructure, lack of transport, and by poor facilities at markets and landing centres.

22. There has been an increase in the exports of low-value species that enjoy high demand in the local market. Recent trends indicate that more fish is being utilized in fresh form, while the proportion of fish being utilized in cured form is declining, with implications for those that have traditionally depended on processing fish for their livelihood, and for food security.

23. Though export-oriented fish processing plants have opened up employment opportunities for women, the conditions of work and payment often leave much to be desired.

24. Many States have taken up the three Centrally Sponsored welfare schemes for fishermen and their communities. Some States, notably Kerala and Tamil Nadu, have additionally initiated their own welfare schemes. Both these States have also brought fisherwomen under the coverage of their schemes

25. Per capita expenditure for welfare schemes in the Ninth Plan period is highest in Tamil Nadu, followed by Kerala and Karnataka, and is lowest for Maharahtra and Andhra Pradesh.

26. While cooperatives in many States have been considered as failures, there are also examples of successful cooperatives. The experience with Self Help Groups in fisheries in some areas appear to have been positive. Such experiences, as well as the experiences of NGOs and other organizations that have worked to support fishing communities, need to be studied closely.

27. Addressing poverty issues in fishing communities would require a wide and comprehensive range of interventions. Issues of poverty in fishery-dependent communities have to be addressed together with issues of equity and sustainability in management of coastal and marine fisheries resources, especially as vulnerable groups in the fisheries sector tend to be highly dependent on these resources for survival.

METHODOLOGY

The study has focused mainly on the fisheries sector of the coastal States in India. It has primarily used secondary sources of information.

Sources of information have been as follows:

- Plan Documents, Reports of Working Groups, annual reports and other documents published by the Ministry of Agriculture, the Planning Commission and the Departments of Fisheries from coastal States
- Data on marine fisheries production from the Central Marine Fisheries Research Institute (CMFRI)
- Published and unpublished reports and research articles
- Newspaper reports
- Personal communication with fishworker organizations, NGOs and researchers working in the field
- Discussions with officials of the Department of Fisheries, Tamil Nadu

Effort was also made to collect below poverty line (BPL) information for fishing communities from the Department of Rural Development, the Planning Commission, and the Department of Economics and Statistics in Tamil Nadu.

A list of persons met during the course of the study is available in the Annexures, along with a selected bibliography.

It needs to be mentioned that reliable data on several aspects relevant for a study on poverty and fishing communities was not available. In cases data was also conflicting and this is a limitation that need to be kept in mind.

1. INTRODUCTION

With a coastline of over 8,118 km, and an exclusive economic zone (EEZ) of over 2 million sq km, marine fisheries is an important sector in India and has been for long an important occupation for the coastal communities of the country.

It is estimated that about 6.7 million people depend on fisheries for a livelihood, of whom about 2 million are dependent on marine fisheries. This includes roughly 725,000 full-time, and an equal number of part-time, fishermen engaged in fishing operations and over 1 million people engaged in pre- and post-harvest activities (Government of India (GOI) 2001a).

The country has experienced tremendous growth in the fisheries sector after independence. Technological changes have spurred production and exports. India's fish production, for example, increased from 0.7 million tonnes in 1951 to 5.7 million tonnes in 2000-2001. Of this, in 2001, 2.7 million tonnes was from marine capture fisheries. India is now the fourth largest fish producer in the world, accounting for over 4.39 per cent of the world's fish production. India's fish exports touched US$ 1.2 billion in 2002, or about 1.21 per cent of its GDP (GOI 2003).

At a macro level the sector presents a picture of dynamism and growth. However, as the Report of the Working Group on the Ninth Plan (1997-2002) points out, fishers still remain the poorest of the poor and continue to occupy the lower rungs in the social strata.

The following section will discuss some of the unique features of the fisheries sector and the challenges in understanding poverty in the sector in all its complexity.

1.1 Need for a fisheries perspective in analyzing poverty

Any discussion or analysis of poverty in fishing communities and efforts to measure it must keep in mind the unique features of the sector as distinct from agriculture and other natural-resource-dependent sectors. This is particularly a challenge in India, where an `agrarian, land-based perspective' tends to predominate. It would be useful to examine these specificities briefly, as they are closely linked to issues of poverty and vulnerability, and need policy responses that are specifically tailored.

An important feature of fisheries is that, unlike in agriculture, the nature of the resource makes it difficult to establish clear spatial boundaries indicating ownership over resources. While this is easier in the case of sedentary species, such as oysters and clams, in the case of most other species, this is not possible, fish being a mobile resource that moves across space.

The sea is thus often considered a resource that can be freely accessed, despite the fact that, in certain areas, communities have evolved systems to regulate access to, and use of, coastal fisheries resources. These systems, in general, have not received much recognition, leading to open access conditions, with implications for the social and economic well-being of these communities.

The fisheries sector is characterized by a sheer unpredictability and seasonality of catch (Kurien 1995), where both chance and skill play important roles. Moreover, prices obtained for catch on any given day can be highly uncertain and will depend on the species caught, total catches and prices prevailing on that day, and several other factors.

A high dependence on the market is another feature of the fisheries sector, as compared to agriculture, given the perishable nature of the commodity, and the fact that communities cannot live on fish alone. As Firth (1966) has pointed out, this aspect has also created conditions for the emergence of middlemen, often with overtones of a patron-client relationship.

In agriculture, investment is in the form of land that can be considered a more stable asset. However, in fisheries, investment takes the form of craft and gear, which have high maintenance costs, depreciate rapidly and are often lost or damaged (Alexander, 1982). A fishing family can, overnight, lose everything it has if the boat it owns, along with the men of the family, is lost at sea during a cyclone. The relatively higher risk to life, craft and gear are marked attributes of the sector.

At the same time, ownership or non-ownership of assets at a particular point in time cannot be interpreted in the same way as in agriculture. Fishers may, for example, sell off their craft or gear when a good price is to be had, and purchase the same at a later time, making a profit in the process. Thus, even a relatively well-off fisher may be `assetless' at certain periods.

Another distinguishing feature of small-scale fisheries has been the prevalence of the sharing system—earlier often kinship-based— implying a sharing of the risk between owner and crew. This also makes it a more equitable society, where class relations (landlord- worker) may not be so well developed, though the situation is now changing in several fisheries.

At the same time, fishing communities, particularly along the east coast of India, tend to live in remote settlements close to the sea, with little access to adequate education and health services, and distant from urban centres and centres of political power, increasing their vulnerability to processes of social and political exclusion.

The preference of fishing communities to living next to the sea, in a context where pressure on coastal resources is increasing rapidly, often leads to overcrowding and conditions of poor hygiene and sanitation. It also increases vulnerability to natural elements, such as cyclones and tidal waves, in States like Orissa, Andhra Pradesh, West Bengal and Gujarat, as well as to coastal erosion along several parts of the coast, as in Kerala and Tamil Nadu.

Any debate on poverty must necessarily keep in mind some of these unique features of coastal fisheries. Clearly, estimates of income or consumption alone cannot provide a good indicator of poverty in fishing communities. Lack of clear rights to the resource, variable and unpredictable catches from the fishery, the importance of the market and the

middlemen, an asset base that is less stable, are all dimensions that have an important bearing on understanding poverty issues in the fishery sector.

1.2 Measurement of poverty in fisheries

As noted by the FAO (2001): "In purely income terms, small-scale fishers may often compare favourably with small-scale farmers or agricultural labourers. But in terms of educational, health and nutritional status, participation in political decision-making, and vulnerability, small-scale fishers and fishing communities often appear to rank lowest in society."

There is clearly a need to move away from a unidimensional income-based understanding of poverty in the fisheries sector, to a multidimensional and dynamic understanding based on the unique characteristics of the sector.

In this context, some of the changes that have taken place in the concept of poverty and its measurement are welcome. From a time when poverty was considered to be a lack of adequate income, it is now widely understood that poverty is a multidimensional concept, implying not only a lack of adequate income, but a host of other factors, encompassing aspects such as lack of choice, sense of powerlessness, vulnerability, lack of assets, insecurity (resulting from ethnic, gender or social status) and social exclusion.

Agencies such as the World Bank, United Nations Development Programme (UNDP), International Fund for Agricultural Development (IFAD) and others acknowledge these aspects in their policy papers. Recent poverty assessments have thus been methodologically refined and cover more elements of poverty than the earlier ones.

The UNDP, for example, views poverty as "being deprived of those opportunities and choices that are essential to human development: for a long, healthy, creative life; for a reasonable standard of living; for freedom, dignity, self-respect and respect from others" (life situation approach). The Human Development Report (HDR) measures these aspects of human development. The UNDP employs life expectancy, literacy, child mortality and real purchasing power as factors that form the basis for measuring the degree of human development, which are combined into a "Human Development Index" (HDI).

According to the definition of poverty adopted by the World Bank, a person is considered poor if his or her consumption or income level falls below some minimum level necessary to meet basic needs. For the purpose of global aggregation and comparison, the World Bank uses reference lines set at US$1 and $2 per day in 1993 Purchasing Power Parity (PPP) terms (where PPPs measure the relative purchasing power of currencies across countries).

More recently, the Bank has been including aspects related to the non-income dimensions of poverty, as presented in the *World Development Report (WDR) 2000/01: Attacking Poverty*, published in September 2000. This work includes assembling comparable and high-quality social indicators for education, health, access to services and infrastructure. It also includes developing new indicators to track other dimensions—for example risk, vulnerability, social exclusion, access to social capital—as well as ways to compare a

multidimensional conception of poverty, when it may not make sense to aggregate the various dimensions into one index[1]. The report process engaged in an unprecedented, wide-ranging, participatory consultative exercise with development practitioners, policymakers, and directly with the poor in 23 countries.

The debate on poverty has been greatly influenced by the contributions of Amartya Sen's "capability and entitlement" approach to human development. The emphasis is not only on being well-nourished or educated (which could be relative, i.e. different for different societies), but, more fundamentally, on people's *capability* to achieve these states. Thus, there is an *absolute* core of *capabilities* (or level of functioning) required to achieve command over *commodities* for survival. A person's entitlement is the set of commodities he or she has the capability to command within the legal framework of their society—either directly (through production), or indirectly (through exchange of labour, assets or through State transfers, etc.). Within this framework, poverty is a failure of entitlements, not merely the failure to possess the commodities required for survival (Sen, 1987). Thus, the commodities required for well-being could be relative, but the capacities (good health, education) to attain them would be absolute. Central to this framework are two key concepts: that of poor people's entitlements to land, livestock, common property resources, or State welfare provisions, as well as to human dignity and freedom.

However, the difficulty of finding comparable indicators that make human poverty measurable in all of its complexity is also acknowledged. How, for example, can social exclusion, or the feeling of political and social powerlessness, be measured in quantitative terms? This continues to be a methodological challenge.

In the Indian context, the Planning Commission estimates the proportion and number of poor separately for rural and urban India at the National and State levels based on the recommendations of the Task Force on 'Projections of Minimum Needs and Effective Consumption Demands' (1979). The Task Force had defined the poverty line as the cost of an all India average consumption basket at which calorie norms were met. The norms were 2400 calories per capita per day for rural areas and 2100 calories for urban areas. The poverty line serves as a cut-off line for separating the poor from the non-poor. Survey data on household consumption expenditure collected by the National Sample Survey Organization (NSSO) are used for the purpose (Government of Delhi, 2002).

However, the limitations of this data in the context of fishing communities, given the high variability, uncertainty and seasonality in incomes, need to be kept in mind. Several of the specificities of this sector discussed earlier, that have a close bearing on poverty, are not captured by such data.

Below poverty line (BPL) surveys have also been undertaken at the State level under the guidance of the Union Rural Development Ministry, at the beginning of each five-year Plan, to identify persons living below the poverty line for targeting under the Ministry's programmes. Until the last survey in 1997, income was used as the main criteria to define

[1] World Bank website: http://www.worldbank.org/poverty/mission/up2.htm

the poor. However, the most recent survey undertaken in 2002 for the Tenth Plan period uses 13 scoreable socioeconomic parameters, including operational holdings of land, housing, clothing, sanitation, ownership of consumer durables, literacy, labour force, means of livelihood, status of children, type of indebtedness and migration. The new methodology would enable the ranking of each household in a village on the poverty scale. By using a wider range of indicators, it is likely to more accurately identify those who can be considered poor.

More recently, significant initiatives have also been taken by the Planning Commission at the national level and at the State level in bring out National and State Human Development Reports, informed by the concept of human development proposed by the UNDP. While clearly a step in the right direction, it needs to be kept in mind that fishing communities, even when residing in States or regions where considerable progress has been made on the human development front, tend to have been `left out' of the overall scenario of progress. In such a context, to draw any meaningful conclusions and policy directions, village-level disaggregated data specific to fishing communities would be required, to enable comparisons with indicators at the district, State and national levels.

It is also relevant to note that none of the methodologies mentioned above capture `ecological' poverty, or the increasing vulnerability of many fishing and other natural-resource dependent communities, as the resources they live and depend on are polluted, degraded or taken over. This is an aspect that will be discussed in more detail later in the report.

2. POVERTY IN COASTAL FISHING COMMUNITIES: AVAILABLE EVIDENCE

This section looks at available evidence that throws light on how coastal fishing communities in India compare with the rest of the population, as revealed by indicators related to education, health, sex ratio and housing. This section is based on available data and published research.

It needs to be highlighted that available information, even on basic aspects of human development in fishing communities, is scarce for all States, with the exception of Kerala, and, to some extent, Tamil Nadu. For a more meaningful analysis, it is imperative to have better data on these aspects. In Tamil Nadu, information about aspects such as literacy, housing and sex ratio in fishing communities is available as the Department of Fisheries conducts a regular Marine Fisherfolk Census. So far, four censuses have been conducted, in 1957, 1978, 1986 and 2000. Even though there have been some changes in methodology during this period, the censuses provides an important comparative source of information across time. In Kerala, several studies on socioeconomic aspects of fishing communities have been conducted by organizations, institutions and researchers.

However, in most other States, this is not the case. Data specific to fishing communities or villages is very difficult to obtain. In general, only district-level data is available. As fishing communities constitute a very small proportion of the district population, this data cannot be used to draw any meaningful conclusions. While the better option would be to use panchayat-level data on socioeconomic aspects (which would include data for several villages in the panchayat), visits to district or even panchayat headquarters would, in general, be required. Unfortunately, the Departments of Fisheries (DOF) in coastal States rarely have much socioeconomic information on fishing communities in their State. The annual reports published by State departments do not contain such information. This is a lacuna that needs to be seriously addressed, as only if such data is available, can policy target socioeconomic issues in fishing communities.

2.1 Poverty and coastal fishing communities in Tamil Nadu

Information from the Fisherfolk Censuses conducted by the DOF in 1957, 1978, 1986 and 2000 reveals that the population of fishing villages has almost tripled from 236,600 in 1957 to 679,700 in 2000, as has the population of active fishers (Table 1). This presently forms about 1.1 per cent of the total population of the State.

Table 1: Tamil Nadu Marine Fisherfolk Census: A Comparative Picture

	1957	**1978**	**1986**	**2000**
Number of coastal villages *Percentage increase*	242	402 *66.12*	442 *9.95*	591 *33.70*
Total fisher population (in 000s)	236.6	337.7	463.8	679.7
Percentage increase *(Annual rate of growth)*		42.7 *(1.9)*	37.33 *(4.66)*	46.55 *(2.90)*
Male population (in 000s)	84.4	173.17	236.50	348.3

	1957	1978	1986	2000
Female population (in 000s)	85.1	164.53	227.29	331.39
Children (in 000s)	67.62			
Active fisher population (in 000s) *(Annual rate of growth)*		80.03	101.86 *(3.41)*	231.81 *(7.97)*
Number of families *(Annual rate of growth)*		66,235	87,085 *(3.93)*	1,43,743 *(4.06)*
Average family size		5.09	5.33	4.68
Literate			197,232	399,067

Source: Compiled from Marine Fisherfolk Censuses: 1957, 1978, 1986, 2000. Department of Fisheries. Chennai

According to the data, the annual rate of population growth during the period 1986 to 2000 is 2.91, which is much higher than State average of 1.12 and the national average of 1.9 in the decade 1990-2000. This would indicate a higher rate of population growth in these communities. However, it is possible that this is a result of migration into these communities. The fact remains, however, that the population has increased, undoubtedly with implications for living conditions and pressure on resources.

A techno-socioeconomic survey of fishermen households in Tamil Nadu in 1987, (in 10 per cent of the marine fishing villages in the State, totalling 7,842 households) indicated that among all the districts in the State, Chennai and Kanyakumari districts had a higher density of marine fishermen population per km of coastal length, i.e. 1778 and 1,690, respectively. The average density in the State was 464 marine fishermen per km of coastal length. In 2000, the density of marine fishermen population per km of coastal length is 1,929 in Kanyakumari, while, in Chennai, it is as high as 3,740. The average density in the State has increased to 632 marine fishermen per km of coastal length.

The data from the Fisherfolk Census indicates, however, that average family size has reduced to 4.68 members per family in 2000, from 5.33 in 1986. This is in keeping with national trends.

The sex ratio in fishing villages, an indicator of the status of women, is seen to be as low as 957, as compared to the State average of 985, which, in itself is low, and reflective of the discrimination against women in the society. This is clearly a cause for concern.

The literacy rate in fishing communities, in keeping with the above trend, is also seen to be lower at 64.47, as against the State average of 73.5. It is worth noting that that the literacy rates in coastal districts of Tamil Nadu are even higher, at 76.35, indicating that fishing communities remain `outliers' even in districts which fare relatively better on indicators such as literacy and sex ratio (Table 2). While interpreting this data, however, the fact that it is drawn from two different sources, with possibly different methodologies, needs to be kept in mind.

Table 2: Human Development Indicators for fishing communities in Tamil Nadu: A comparative picture

	Tamil Nadu		
	All Districts	**Coastal Districts**	**Marine Fishing Villages***
Population (2001)	62,111,000	28,479,000	679,771
Population (1991)	55,859,000	25,910,000	463,800**
Annual Growth Rate	1.12	0.99	2.91
Literacy Rate	73.5	76.35***	64.47
Sex Ratio	985	1004***	957

Source: Tamil Nadu Human Development Report (2003)

** from the Marine Fisherfolk Census 2000. Department of Fisheries, Government of Tamil Nadu*

*** for the year 1986*

**** average for coastal districts*

The data from the Fisherfolk Census also shows that, while the numbers living in terraced and tiled houses have increased since 1978, indicating an improvement in housing conditions, even in 2000, the vast majority of fisherfolk (almost 36 per cent) live in thatched houses, while about 12.8 per cent live in houses not owned by them, an increase over the previous census (Table 3). It is worth noting that the data does not differentiate between houses with thatched roofs and walls, and those only with thatched roofs. Thatched walls would be clearly indicative of poorer housing conditions.

Table 3: Details on housing in fishing communities in Tamil Nadu

	1978	**1986**	**2000**
Number of houses *(Annual growth in percentage)*	63,315	8,441 *(4.14)*	1,41,340 *(4.21)*
Number of owned houses *(Percentage to the total)*		76,196 *(90.26)*	1,23,238 *(87.19)*
Number of not-owned houses *(Percentage to the total)*		8,214 *(9.73)*	18,102 *(12.80)*
Terraced *(Percentage to the total)*	9,174 *(14.47)*	17,200 *(20.37)*	28,783 *(20.36)*
Tiled *(Percentage to the total)*	12,503 *(19.72)*	18,966 *(22.46)*	31,928 *(22.58)*
Thatched *(Percentage to the total)*	41,632 *(65.68)*	48,244 *(57.15)*	50,845 *(35.97)*
Free house*			29,784

Source: compiled from Marine Fisherfolk Censuses: 1978, 1986, 2000. Department of Fisheries. Chennai

** Free House: In the case of Marine Fisherfolk Census 2000, "free house" could either be tiled or terraced, but the exact number of house under each is not provided. Free house is a scheme started by the Government of Tamil Nadu to distribute free houses for the fishing community.*

The earlier mentioned techno-socioeconomic survey of fishermen households in Tamil Nadu in 1987 indicated that sanitation facilities in the marine fishing villages surveyed

were poor, and that the open beach was used as toilet. It also revealed that none of the sampled households owned agricultural land, indicating an almost complete dependence on fisheries for a livelihood. This was also clear from the information obtained during this survey that 98.5 per cent of the total income of the villages surveyed came from fishing and allied activities. Based on information collected, the study concluded that the bulk of the fishermen lived below the poverty line.

Available data would, therefore, seem to indicate that fishing communities in Tamil Nadu do not fare well on indicators of human development, highlighting the need for a special focus on these communities. It needs to be kept in mind, however, that the above data presents only a partial picture. Other information, commonly available with other departments but unfortunately difficult to find in one place or to access easily—such as infant and maternal mortality rate in fishing communities, life expectancy, proportion of those in fishing villages living below poverty line, proportion of those without titles to the land they live on, etc.—would also be very meaningful to obtain a broader picture.

2.2 Poverty and coastal fishing communities in Kerala

In a study on the socioeconomic condition of marine fisherfolk in Kerala, a State which has achieved considerable progress in improving overall quality of life of its peoples, John Kurien (1995) noted: "… we are faced with a situation where fishing communities in Kerala have not benefited from the increased value of output in the sector or the State's overall efforts at improving the quality of life."

Kurien found that, while the overall literacy rate in the State (using 1981 data) was 85, in fishing villages it was only 66, with a female literacy rate of only 44. He also noted a lower sex ratio in fishing villages (972 as compared to the State figure of 1032) and a higher population growth rate (2.3 per cent as compared to the 1.9 for the State). Similarly, he found that 84 per cent of fishing households lived in thatched and semi-thatched huts, while the figure for the rest of the State was only 28 per cent.

He further notes that: "In a State where every household is entitled to a piece of homestead plot (as per the Kerala State Homestead Act) varying between 2 and 10 cents, we have data indicating that in 1979 as many as 16 per cent of the households in marine fishing villages do not possess their own homestead plots."

A rural appraisal survey of coastal fishing villages by Matsyafed in 1997 (GOK, 1997) revealed that in these villages, 4 to 20 per cent of houses belonging to fishing families are prone to sea erosion; that between 5 to 42 per cent of families live in huts with both thatched roofs and walls; and that anywhere between 3 and 22 per cent of families have no title deeds to the plots on which they live.

The Matsyafed survey further revealed that open beaches are the main toilets for men and children, and that in 93 per cent of the villages, the beaches are used as toilets. Only 5 per cent of the villages had any community or pay-and-use toilets. It needs to be kept in mind that such poor sanitary conditions are combined with a higher density of population in fishing villages. The population density in marine fishing villages was reported to be

around 2,113 persons per sq km, in comparison to the State figure of 655 per sq. km, which is already one of the highest in the country (Kurien, 1995).

Vijayan (1997) drew attention to the poor reproductive health of women of fishing communities and the high rate of maternal mortality. She also quotes a study that found that the infant mortality rate in Vizhinjam, one of the most densely populated fishing villages located near Trivandrum, was as high as 120 in 1991, as compared to the Kerala average of 40.

A survey by the South Indian Federation of Fishermen Societies (SIFFS) in Trivandrum district in 1996-97 (1998, unpublished) found that about 40 per cent of fisherfolk houses were not electrified, in a State that boasts of 100 per cent electrification of its villages.

A study in 29 selected coastal panchayats supported by the ADB (2003), using 1998 data obtained from the BPL survey of the State government, found that panchayats dominated by fishing populations tend to have a correspondingly high proportion of poverty-affected people.

It would appear reasonable to conclude that, from all available evidence, fishing communities have not benefited to the same extent from the overall scenario of progress within the State.

2.3 Poverty and coastal fishing communities: Evidence from other States

Evidence from other States is, at best, anecdotal. Several studies on socioeconomic aspects of fishing communities were conducted through the erstwhile Bay of Bengal Programme of the FAO, particularly in the 1980s. However, given the rapid subsequent changes in the sector, these need to be updated to take into account current realities. In general, as mentioned earlier, there is almost no current comprehensive socioeconomic information about fishing communities. Some information available from the literature is summarized below.

An evaluation of Centrally Sponsored National Welfare Schemes for Fishermen, conducted in 1995 in five States (Kerala, Andhra Pradesh, Tamil Nadu, Pondicherry and Uttar Pradesh), interviewed a sample of fishermen households (NIRD, 1995). The study found that a majority of those in the sample were landless. In Tamil Nadu, for example, 98 per cent of the sample was found to be landless, while the corresponding figures for Andhra Pradesh was 92. It is not clear though how landless is defined in the study: whether it means those who own no land or those who own no land other than the land they live on.

Following the devastating cyclone in Andhra Pradesh in 1996, AFPRO (1998) conducted a survey of affected villages. In Bhairavapalem village, a major fishing village near the mouth of the river Godavari, the study found that, prior to the cyclone 80 per cent of the houses in the village had been thatched, and that only 44 per cent had been electrified. General sanitation was very poor and there was a shortage of drinking water (available from an open tank). The situation in the three other villages surveyed (Balusutippa,

Masanitippa and Peddagadimoga) also indicated that the proportion of thatched houses ranged from 87 to 94 per cent.

In a recent study of coastal fisherfolk population in selected villages of Thane district of Maharashtra (Tewari, 2003), men and women in the sample reported that, in their view, the overall socioeconomic condition in the villages has improved appreciably. However, it was reported that basic amenities such as toilets, potable water and ventilation were still lacking, though a majority of fisherfolk households now lived in concrete houses.

A survey conducted in the major fishing villages in Ratnagiri district presented an alarming situation regarding the health of the fisherwomen and their children. Many of the women were found to be suffering from gynecological problems due to unhygienic conditions. Epidemic conditions for dysentery, diarrhea and scabies were prevalent in the fishing villages. Children were found to be suffering from scabies and ringworm infections (Mohite, 2003).

All these aspects need to be seen in light of the fact that marine fishing households in the coastal areas in India increased from about 350,000 in 1980 to 500,000 in 1998, while the marine fishermen population grew from 2 million to 3 million during the same period (Sathiadhas and Biradar, 2000).

Available evidence would thus seem to suggest that fishing communities, in general, have lower levels of literacy, a lower sex ratio, and poorer conditions of housing, as compared to State and national averages, indicative of a lower level of well-being in fishing communities, even though, as indicated in the Maharashtra study, it is likely that there has been overall improvement in socioeconomic conditions, as compared to past decades.

It is necessary to keep in mind that most of the available evidence on the socioeconomic situation of fishing communities is from Kerala and Tamil Nadu—States that are, in fact, better off in terms of human development indicators. The situation of fishing communities in States that are lower on the human development scale is certainly worth exploring.

2.4 Environmental and related issues: The link with poverty

The earlier-mentioned study in Maharashtra indicated that even though there has been an overall improvement in socioeconomic conditions, there has been, at the same time, an overall deterioration in the coastal environment, as a result of disposal of industrial wastes and dumping of garbage into the sea, increasing pollution and affecting catches. This is an important aspect that is not captured by current indicators of human development, and which is of particular relevance to communities that depend closely on natural resources for their survival.

Pollution, in particular, is becoming a huge problem for fishing communities, given the fact that many industries are being set up in coastal areas, for better access to ports and harbours and that some of the largest cities are located on the coast.

That coastal areas are at the receiving end of various types of pollutants is also shown by recent studies. The result of a study by De Sa, (1999) on the type and components of pollutants in the coastal ecosystem of India, indicates that large amounts of pesticides and fertilizers, along with sewage and industrial effluents, are reaching the coastal ecosystem. Clearly these have an impact on coastal biodiversity and on fish catches and livelihoods. There are also numerous reports of the impact of pollution on health, on ground water and other sources of water, and on marine biodiversity, particularly from States like Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu.

Other issues that have been highlighted by coastal fishing communities, such as loss of housing due to sea erosion, and displacement, also fail to be captured by current indicators, though they are equally relevant. Sea erosion, for example, is a significant problem in parts of Kerala, Tamil Nadu and Maharashtra. As coastal land gets lost to the sea, the area available to fishing villages for housing and other fisheries-related purposes, such as for drying nets and fish, declines.

At the same time, as the pressure on coastal land—for industry, tourism, development of ports and urban growth—increases, there are several reports of displacement of coastal fishing communities from the lands they have been occupying. Nayak (1997) mentions a fishing community in village Sondikud in Orissa that has been displaced twice: once to make way for the Paradwip port and then to make way for a university. Such cases of displacement are certainly not uncommon.

In urban areas, several fishing communities—earlier inhabitants of areas that later developed into big cities and towns, as in Mumbai and Chennai—are having an increasingly difficult time. In the absence of adequate urban planning that takes into account their culture, interests and livelihoods, many fishing households and communities are under pressure to relocate.

To conclude, it would appear that fishing communities tend to rank lower on standard indicators of human development, even though their situation may have improved in comparison with past years. It also appears that fishing communities are faced with a deteriorating quality of life, in environmental and socioeconomic terms, as a result of pollution, sea erosion, increased pressure on coastal lands, degradation of the coastal and marine environment and displacement of fishing communities as a result of pressures of urban, industrial and tourist growth. There are clearly direct links to be drawn between the state of environmental resources and access to them, and issues of poverty in fishing communities.

3. OVERVIEW OF MARINE CAPTURE FISHERIES IN INDIA

This section will provide information on the following aspects:

3.1 Marine Fisheries: Physical and Geographic Features
3.2 Marine Fisheries: Institutional and Legislative Framework
3.3 Marine Fisheries: An Analysis of Five-Year Plans and Working Group Reports
3.4 Marine Fish Production and Exports
3.5 Marine Fisherfolk Population
3.6 Current Status of Marine Fisheries Resources
3.7 Status of Marine Fisheries Management

3.1. Marine Fisheries: Physical and Geographic Features

India has a long coastline of 8,118 km, with an equally large area under estuaries, backwaters, lagoons, etc. The area estimated to be under the Indian Exclusive Economic Zone (EEZ) is 2.02 million sq km. The area covered by the continental shelf and EEZ is shown in Table 4.

Table 4: Area covered by the Indian Continental Shelf and EEZ

(in 000 sq km)

Region	Continental Shelf (0-200m)	EEZ (upto 200 nautical miles)
West coast	282.2	860.0 *
East coast	132.3	561.4
Andaman and Nicobar Islands	35.0	596.5
Total	449.5	2017.9

Source: Government of India. 2000. Report of the Working Group for Revalidating the Potential of Fishery Resources in the Indian EEZ. Department of Animal Husbandry and Dairying.

**Note: includes Lakshadweep Sea*

The east coast, along the Bay of Bengal, is characterized by a narrow continental shelf. The rivers that follow into the Bay are long, slow-moving and with extensive delta formation. The east coast has four major deltas formed by the Cauvery, Krishna, Godavari and Mahanadi rivers. All the rivers flowing into the Bay carry tremendous amount of silt during monsoon and this is the main reason why coral reefs are absent but mangroves grow well.

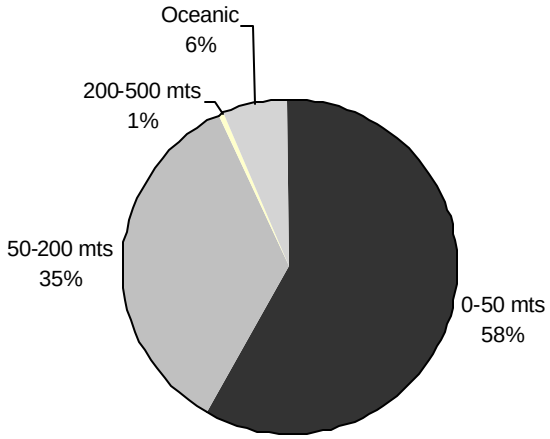
The west coast has a broad continental shelf and short, swift-flowing rivers, with little delta formation. The wind and current patterns, together with the heavy runoff from the several rivers flowing into the Arabian Sea, cause a nutrient- replenishing coastal upwelling, and account for the high productivity of the waters along the west coast. There is also the unique phenomenon of mud-bank formation, an area of extreme calm where fishes and shrimp aggregate in large numbers.

According to Vivekanandan (2002), the west coast contributes 70 per cent and the east coast 30 per cent to the total marine fish landings, with the inshore areas (< 50 m depth) of the west coast contributing 50 per cent more fish per unit area (8.8 t/sq km) than

the east coast (5.9 t/sq km). Higher production along the west coast can partly be attributed to oceanographic features such as upwelling and higher primary and secondary productivity.

Vivekanandan has further noted that 75 per cent of fish production in India is from coastal waters. In Figure 1 it can be seen that 58 per cent of the fisheries resources potential in India is within the 0-50 m depth. The higher productivity of coastal ecosystems is closely linked to natural habitats such as mangroves and coral reefs that provide rich breeding and feeding grounds for fish and other marine species. The higher productivity of coastal, inshore waters is also the main reason why maximum fishing effort is concentrated there.

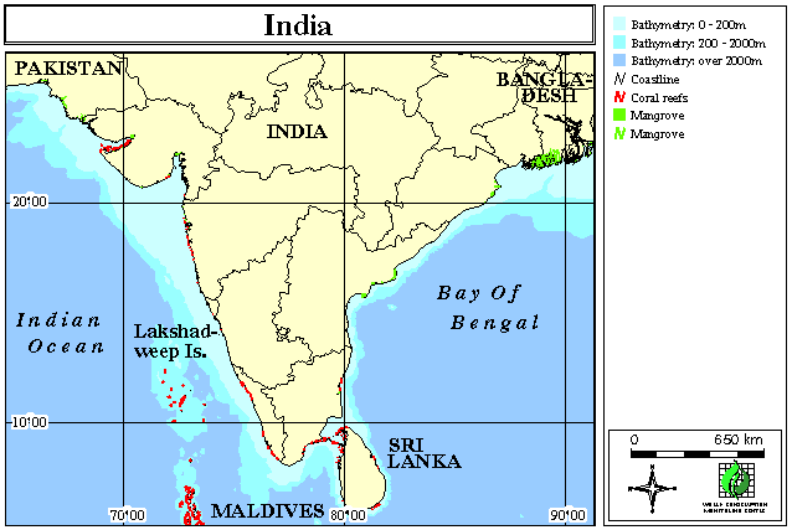
Figure 1: Depth-wise Estimate of Marine Fisheries Resources Potential in the Indian EEZ



Source: Government of India 2001c. Report of the Working Group on Fisheries for the Tenth Five-Year Plan.

The map in Figure 2 shows the physical features of the Indian coastline. The larger continental shelf along the western coast, particularly off Gujarat, can be seen. The map also shows the location of mangroves and coral reefs.

Figure 2: Physical features of the Indian coastline



Source: World Conservation Monitoring Centre (WCMC)

Coastal and marine areas in India are diverse. An indicative outlay of the ecosystem zonation along the coastline could be as follows: (a) Gulf of Kutch ecosystem; (b) Saurashtra coast; (c) South Gujarat coast; (d) North Maharashtra coast; (e) South Maharashtra coast; (f) Konkan coast; (g) North Kanara coast; (h) South Kanara coast; (i) Calicut-Cochin coast; (j) Cochin-Kanyakumari coast; (k) Wadge Bank; (l) Gulf of Mannar; (m) Palk Bay; (n) Coromandel coast; (o) Pulicat Lake; (p) North Andhra-South Orissa coast; (q) Chilka Lake; (r) Bhitarkanika; (s) North Orissa-West Bengal coast; (t) Sunderbans; (u) Andaman and Nicobar Islands; and (v) Lakshadweep Islands (Vivekanandan, 2003).

The characteristics of the coastline of various States and the accompanying physical features and zonation are presented in Table 5.

Table 5: Coastal Ecosystems of India

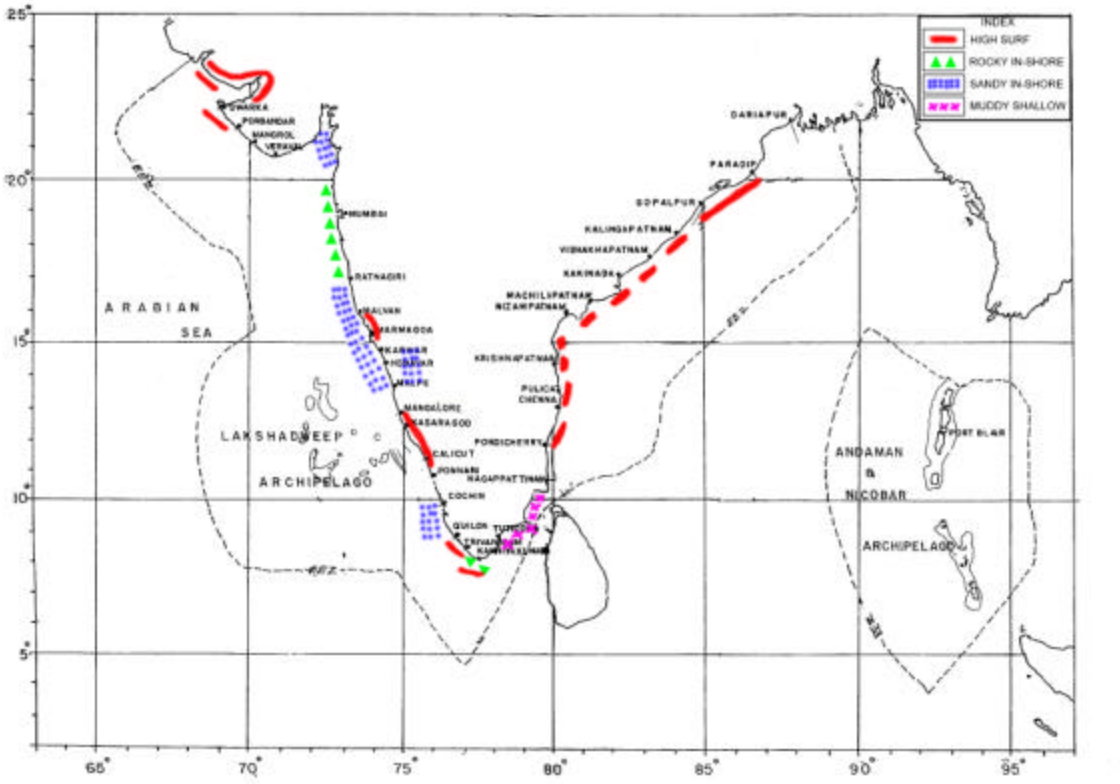
States	Coast type	Ecosystems	Ecosystem zonations
West Bengal	Muddy shallow	Coastal mudflats, mangroves, delta, salt marshes, beaches	Sunderbans, North Orissa-West Bengal coast
Orissa	High surf	Mangroves, beach, lagoons, estuaries	North Orissa-West Bengal coast, Chilka Lake, Bhitarkanika
Andhra Pradesh	High surf	Mangroves, delta, estuaries, lagoons	North Andhra-South Orissa coast, Pulicat Lake

States	Coast type	Ecosystems	Ecosystem zonations
Tamil Nadu	Muddy shallow (north) Rocky and high surf (southern-most)	Mangroves, estuaries, backwaters, delta, lagoons, Coral reefs (in the Gulf of Mannar region)	Pulicat Lake Coromandel coast, Gulf of Mannar, Palk Bay
Kerala	High surf (south) Rocky inshore (south) Sandy inshore (north)	Mangroves, backwaters, estuaries, lagoons, beaches, mud banks	Cochin-Kanyakumari coast, Calicut-Cochin coast, Wadge bank
Karnataka	Sandy inshore	Beach	North Kanara coast, South Kanara coast
Goa	Sandy inshore	Estuaries, beach	Konkan coast
Maharashtra	Rocky inshore (north), Sandy inshore (south)	Mangroves, estuaries, coral reef, beaches	North Maharashtra coast, South Maharashtra coast
Gujarat	Sandy inshore (south), High surf (north)	Beach, coral reefs, delta, mangroves seaweeds	South Gujarat coast Saurashtra coast, Gulf of Kachchh ecosystem

Source: Compiled from (i) Hornell, James. 1920. The Origins and Ethnological significance of Indian Boat Design, and (ii) Vivekanandan. E. 2003. Ecosystem Considerations for Managing Marine Fisheries in the Indian Ocean. In Proceedings of the Conference "Forging Unity: Coastal Communities and the Indian Ocean's Future". ICSF.

The map in Figure 3 shows the boundaries of the Indian EEZ and the characteristics of the coast—classified as high surf, sandy inshore, rocky inshore and muddy shallow. It is worth noting that the craft and gear combinations that have traditionally evolved in each region have been well suited to the particular characteristics of the coast, and reflect the ecological knowledge of the communities that have inhabited the ecosystem. Hornell (1920), in one of most comprehensive studies on the origin and ethnological significance of Indian boat designs, notes how the *catamaran*, traditionally used in Tamil Nadu, is a highly specialized craft well suited to for use in the surf-beaten Coromandel and Northern Telugu coasts, where there are few harbours to take refuge.

Figure 3: Characteristics of the Indian coastline



Source: Adapted from John Kurien. 1994. Technology Diffusion in Marine Fisheries: The concrete socioeconomic and ecological interrelations. A study of the diffusion of motorised plywood boats along the lower southwest coast of India.

The base map is from Fishery Survey of India (FSI)

The dotted line around India shows the boundaries of the Indian EEZ

3.2 Marine Fisheries: Institutional and Legislative Framework [2]

3.2.1. Institutional Framework

The responsibility for fisheries and marine habitat is spread over several agencies and Ministries at the Central and State levels. In this context, it is significant to note that fish production from the exclusive economic zone (EEZ) or 'deep sea'—marine space beyond the territorial sea up to 200 nautical miles from the baseline—as well as major fishing harbours, fishing vessel industry, seafood export trade, and marine and inland research and training are on List I, or Union List, of the Seventh Schedule of the Constitution of India, which makes them the responsibility of the Union Government. The Indian Parliament has exclusive power to make laws with respect to any of the matters enumerated in List I. Items under List 1 are dealt with by several agencies.

[2] This section is based on information from the `Government of India (Allocation of Business Rules), 1961", http://cabsec.nin.in, and on information contained in the following paper: Mathew S, 2003. Technical Support Document (TSD) on Fisheries. UNDP.

In the Union Government, the following ministries play an important role in the fisheries sector—Ministry of Agriculture, Ministry of Commerce and Industry, Ministry of Environment and Forests, Ministry of Food Processing Industries, and Ministry of Defence.

The various departments under the Ministry of Agriculture (Department of Animal Husbandry and Dairying, Department of Agriculture Research and Extension, and Department of Agriculture and Cooperation) are responsible for fisheries in the EEZ, survey and assessment of fisheries resources, exploration of resources in EEZ, fisheries development, fishery technology and fisheries management, in addition to education, research, training and extension, as well as for aquaculture development.

The Ministry of Commerce and Industry is responsible for the development and promotion of exports of fish products, quality control and for setting standards for the processing units. The various departments and agencies under this ministry related to the fisheries sector are the Department of Commerce, Directorate of Foreign Trade, Export Inspection Council, and the Marine Products Export Development Authority (MPEDA).

The Ministry of Food Processing Industries deals with fish processing (including canning and freezing) and is responsible for providing technical assistance and advice to the fish processing industry.

The Coast Guard, under the Ministry of Defence, provides protection to fishermen and assistance to them at sea while in distress, regulates fishing by foreign fishing vessels in the maritime zones, and preserves and protects the marine environment from pollution. The Coast Guard also has a mandate to protect endangered marine species under the Wildlife Protection Act 1972. The Ministry of Shipping is in charge of the fishing vessel industry and fishing harbours.

The Ministry of Environment and Forests (MoEF) protects and preserves the coastal and marine ecology and environment (excluding the marine environment in the EEZ). The Department of Ocean Development, under the Minister for Ocean Development, holds the responsibility for the preservation, protection and conservation of the marine environment in the EEZ, development of technology, mapping of resources and for the establishment of the ocean commission, which will draft policies and legislation relating to ocean and ocean resources.

While the Ministry of External Affairs is responsible for negotiations on the Law of the Sea matters, including the 1995 UN Fish Stocks Agreement, the Department of Ocean Development is the nodal agency for implementing the provisions of the 1982 United Nations Convention on the Law of the Sea (1982 Convention), including the provisions related to the protection and preservation of the marine environment, an integral part of the 1982 Convention.

In addition, there are a separate set of agencies, at the Central and State level, that deal with implementation of programmes aimed at poverty alleviation, social security,

infrastructure development (rural roads, rural water supply) and strategies for rural employment and development, including the Ministry of Rural Development, which is also responsible for estimating the percentage of population below poverty line (BPL). Issues related to poverty and human development in coastal fishing communities also fall under the jurisdiction of various other Ministries, including the Ministry of Health and Family Welfare, Ministry of Human Resources Development, Ministry of Water Resources, Ministry of Consumer Affairs, Food and Public Distribution, Ministry of Labour, Ministry of Petroleum and Natural Gas, and Ministry of Statistics and Programme Implementation.

The Planning Commission is responsible for the formulation of the Five-Year Plans for the most effective and balanced utilization and allocation of resources, while the policy and details of specific schemes are dealt with by the respective Ministries and departments.

In the case of inland fisheries, aquaculture, and marine fisheries in the territorial waters—the marine space up to 12 nautical miles (22 km) from the baseline—it is the State governments that have jurisdiction over these, as they are on List II, or the State List. The Union Government, however, also advises States on enactment of legislation for fisheries under their jurisdiction. A good example is the Marine Fishing Regulation Act (MFRA), which was adapted by all maritime States, from a Bill that the Union Government had prepared and circulated in 1979. There are also several Central Government schemes for fish production and fishers' welfare that are implemented by the State Fisheries Departments.

Other areas related to fisheries, such as the protection of wild animals and forests, including endangered species of wild fauna (for example, whale shark, marine turtles, several species of bivalves) and flora (for example, mangroves), protection of coastal zone and marine biodiversity, and prevention of land-based sources of pollution are on List III, or Concurrent List of the Seventh Schedule, which places the responsibility on both the Union and the State Governments. The List III also includes all ports other than major fishing harbours. Both the Indian Parliament and the Legislature of any State have powers to make laws with respect to the items in List III. The MoEF, at the national level, and the Department of Forests, at the State level, are responsible for the protection of wild animals and forests, and marine biodiversity. Minor fishing ports are under the Ministry of Shipping at the Centre, and under the Port Departments, at the State level.

The MoEF also looks into coastal habitat protection issues. It is the national focal point for the 1972 Wetland Convention called the Ramsar Convention; the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, or the Washington Convention), which applies to marine turtles and whale shark in the Indian waters; the 1979 Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention), which applies to species of marine turtles and shark species in the Indian waters, and the 1992 Convention on Biological Diversity (CBD), which has a marine biological diversity component called the Jakarta Mandate. The MoEF is also the nodal agency for the United Nations Environment Programme (UNEP).

3.2.2 Legislative Framework

The Territorial Waters, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act, 1976 of India recognizes the sovereign rights to conservation and management of living resources in the Indian EEZ, in addition to their exploration and exploitation. Section 15 (c) further gives power to the Central Government to make rules, *inter alia*, for conservation and management of the living resources of the EEZ, and Section 15 (e), for the protection of the marine environment. The basic fisheries legislation following this Act is the Maritime Zones of India (Regulation of Fishing by Foreign Vessels) Act, 1981 and the Maritime Zones of India (Regulation of Fishing by Foreign Vessels) Rules, 1982. It is worth noting that there is no mention of fisheries conservation and management in this Act.

Fisheries within the 12-mile territorial limits are managed under the Marine Fishing Regulation Act (MFRA) of the maritime States of India. The Act is based on a model piece of legislation prepared by the Ministry of Agriculture, Government of India, in 1979, in response to demand from fishers operating unpowered fishing vessels to protect their fishing space and equipment from bottom trawlers. It was drawn up at a time when there were tremendous conflicts between the two sub-sectors over access to fishing space and resources, sometimes even leading to destruction of life and property (Kurien, J and Mathew, S.1982). Table 6 summarizes the main aspects of the MFRAs in the maritime States of India.

Table 6: Main features of State-level Marine Fishing Regulation Acts

States	Year Adopted	Objectives	Area for traditional craft	Area for mechanized craft
Gujarat	2003	To provide for protection, conservation and development of fisheries in inland and territorial waters of the state of Gujarat and for regulation of fishing in the inland and territorial waters along the coast line of the state and for matters connected therewith or incidental thereto.		
Maha-rashtra	1981	To provide for the regulation of fishing by fishing vessels along the coastline of Maharashtra	5-10 fathoms	
Goa, Daman and Diu	1980	To provide for the regulation of fishing by fishing vessels in the sea along the coastline of the union territory of Goa, Daman and Diu	5 km	Beyond 5 km
Karnataka	1986	To provide for the regulation of fishing by fishing vessels in the sea along the coast line of the State	6 km	Vessels upto 50ft beyond 6 km. Vessels above 50ft beyond 20 km

States	Year Adopted	Objectives	Area for traditional craft	Area for mechanized craft
Kerala	1980	To provide for the regulation of fishing by fishing vessels	10 km	Mech. boats below 25 GRT – beyond 10 km Mech. boats above 25 GRT – beyond 23 km
Tamil Nadu	1983	To provide for the regulation, restriction and prohibition of fishing by fishing vessels in the sea along the holder part of the coast line of the State.	3 nautical miles	Beyond 3 nautical miles
Andhra Pradesh	1994	To provide for the regulation of fishing by fishing vessels in the territorial waters in the sea along the coast line of the State of Andhra Pradesh and for matters connected herewith	10 km	*Mech. boats – beyond 10 kms *20 m OAL and above – beyond 23 km
Orissa	1982	To provide for the regulation of fishing by fishing vessels in the sea along the coast line of the State	5 km	* upto 15 mts – beyond 5 km *above 15 mts – beyond 10 km
West Bengal	1993	To regulate marine fishing by fishing vessels along the coastline of the State	Non – mechanized: up to 9 mts – till 8 km. Non - mechanized above 9 mts – upto 20 km but not below 8 km	Mechanized up to 15m – up to 50 kms but not below 20 kms. Mechanized above 15m – beyond 50 kms

Source: compiled from State Marine Fishing Regulation Acts

According to the Marine Fishing Regulation Acts, a fishing vessel is defined as a ship or boat, whether or not fitted with mechanical means of propulsion, which is engaged in sea-fishing for profit (Tamil Nadu, Kerala, West Bengal, Maharashtra and Gujarat) and includes catamaran, country craft and a canoe engaged in sea-fishing (in the case of Orissa, Goa, Andhra Pradesh and Karnataka). The definition for mechanized fishing vessel is provided only by Tamil Nadu: "Mechanized fishing vessel means a vessel 15 to 120 HP, between 8 to 15 m length" and "Deep sea fishing vessel means any vessel above 120 HP and above 15 m in length."

In general, the main emphasis of MFRAs is on regulating fishing vessels in the12-nautical mile territorial sea mainly to protect the interests of fishermen on board traditional fishing vessels. Thus, the Act has been mainly used for the purpose of maintaining law and order at sea.

A significant legislation for regulating the use of coastal areas on the landward side is the Coastal Regulation Zone (CRZ) Notification, 1991, issued under the provisions of the Environment (Protection) Act 1986. This outlines a zoning scheme to regulate development in a defined coastal strip. The Notification defines the coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action in the landward side, up to 500 m from the high tide line (HTL) and the land between the low tide line (LTL) and the HTL, as the CRZ. The CRZ has been classified into four categories for the purpose of regulating development activities. Maximum restrictions apply to the ecologically sensitive areas of CRZ-I. The Notification provides for setting up coastal management authorities at the national and State levels to identify and prepare coastal management plans.

3.3. Marine Fisheries: An Analysis of Five-Year Plans and Working Group Reports

This section will analyze aspects of the Five-Year Plans and Working Group reports relevant to small-scale fishworkers in coastal and marine fisheries, as they relate to issues of equity and sustainability, in particular to technology and infrastructure development for small-scale fisheries, aquaculture, the post-harvest sector, conservation and management, and a socioeconomic and welfare orientation.

It is relevant to note that the objectives and priorities identified by successive Five-Year Plans *vis-a-vis* the marine fisheries sector have facilitated important technological and other changes in the marine fisheries sector in India.

In general, there has been a consistent emphasis on expanding production to enhance income and employment opportunities and to meet protein and food security needs across Plan periods, and, from the Third Plan onwards, to enhance exports. In the initial Plan periods, the focus was very much on `development' of the sector and on increasing production, and it is only in the later Plan periods that the need for conservation and management is explicitly recognized. The need for better exploiting resources in the deep seas through expansion of the mechanized fleet has been a consistent theme in all the Plans.

There has also been a consistent emphasis on improving landing, storage and transport infrastructure, and on improving productivity, by introduction of mechanized craft and gear, and by motorization/ mechanization of existing craft, with a view to improving the efficiency of traditional craft. Various Plans see the latter as an important way to improve the income to fishermen, and to draw them out of poverty.

Aquaculture has come to become an important area emphasized by the Five-Year Plans, particularly after the Fifth Plan period. It has been perceived as an important component of sustainable fisheries development, to enhance production, and to improve incomes and employment opportunities in coastal areas.

The emphasis in the First (1951-56) and Second (1956-61) Five-Year Plan was on introduction of mechanized boats (including purse-seiners on an experimental basis) and mechanization of existing craft, to enable fishermen to increase their production and efficiency.

It was in this period that many intergovernmental projects were initiated, which, among other things, introduced trawlers in India. Thus, in 1952, a tripartite agreement between the United Nations, the United States of America and the Government of India was signed, under which, among other things, fishing vessels, ice plants, freezing and canning equipments, fishmeal plants, nylon nets and twine, fishing hooks, diesel engines, winches and gurdies were provided. This was closely followed by the tripartite agreement signed between the Government of Norway, India and the United Nations in 1952. It was agreed that the Government of Norway would assist the Government of India in carrying out a programme of developmental projects to contribute to the furtherance of the economic and social welfare of the people of India. This led to the Indo-Norwegian Project for fisheries and fishermen community development at Neendakara in Kerala, subsequently extended to other areas. During 1954-55, the Government of Madras successfully conducted a demonstration programme on fishing with assistance from the FAO by employing trawlers off the Tamil Nadu and Kerala coasts.

The First Plan document also noted the importance of increasing the market for fresh fish "not only to meet the large unsatisfied demand for fresh fish but also in the interest of the small fisherman, who will get a better return if it can be marketed fresh". It further noted that "preserved fish is very largely used by the poor because of its cheapness. The provision of quick transport and refrigeration plants would increase the supplies of fresh fish but would add to its cost and it would probably be beyond the reach of the poor man. Increasing supplies for the poor man will, therefore, depend on increasing the availability of preserved fish." It further emphasized the need for continuing government curing yards, as fish prepared under supervision were more hygienic. The establishment of planned market premises for improving quality of marketed fish and for reducing costs was also emphasized.

The First Plan also showed great sensitivity to the "need to protect prices obtained by small fishers if large catches by trawlers etc. become a reality". A Marketing Board with representatives of fishermen, consumers, traders and government, was proposed for this purpose.

The Second Plan emphasized a coordinated approach to the social and economic life of villages whose main source of livelihood is fishing.

The Fourth Plan (1969-74) lent support to the introduction of trawlers to fish in the deep sea. It advocated credit and subsidies for the development of an indigenous trawler fleet, to compete with imported trawlers.

The First, Second, Third and Fourth Plans were strong advocates of setting up and expanding cooperatives. Organizing cooperatives was seen as an "indispensable means for preventing exploitation by middlemen, removing the indebtedness of fishermen and increasing production" (Third Plan document). However, the problems facing the cooperative system were also recognized, and the Third Plan emphasized the need to revitalize cooperatives, by ensuring that they took up more active roles in marketing and processing, moving away from their primary engagement with providing credit. The need to promote cooperatives at landing centres for the storage, processing, transport and marketing of fish, was also emphasized by the Sixth Plan.

The Report of the Working Group on the Fifth Five-Year Plan (1974-1979) highlighted the fact that, according to studies by the Programme Evaluation Organization of the Planning Commission, the return per unit of investment of unpowered boats was twice that of powered boats, and that the former generated almost seven times more direct employment opportunities than mechanized boats. It recommended that not less that 15 per cent of the outlay on marine fisheries development should be earmarked for this sector.

The Fifth Plan (1974-79) proposed the creation of a special Trawler Development Fund "in order to help, in particular, smaller entrepreneurs and cooperatives to purchase and operate trawlers for marine fisheries".

The Sixth Plan (1980-85) proposed "programmes for assisting coastal fishermen using country crafts to improve their efficiency and economy through improvement in the design of boats and supply of modern gear material", with the objective of improving the socioeconomic condition of fishermen.

In the Sixth Plan, there is also recognition of the conflicts between the small-scale and mechanized sectors. The Plan states: "Conflicts between small fishermen operating traditional fishing crafts, mechanized boatowners and the operators of large fishing vessels will be sought to be avoided through suitable legislative measures and delimitation of fishing zones for each type of fishing vessels." It was at this time that several States adopted their Marine Fisheries Regulation Acts (MFRAs).

The Sixth Plan proposes special attention to mariculture and brackishwater farming "in order to provide economic benefits to coastal fishing communities through a blend of culture and capture fisheries", in continuation of the pilot projects that were started during the Fifth Plan.

The Eighth Plan (1992-97) again gives emphasis to the "motorization of traditional craft and introduction of intermediate craft of 12-16 m size for exploiting the offshore resources." The Eighth Plan also noted that "…except in Maharashtra, Gujarat, Tamil Nadu and Orissa, the fishermen cooperatives in other States do not play any significant role in the development of fisheries."

It is also the Eighth Plan that reviews positively the performance of the National Welfare Fund scheme for development of housing and drinking water facilities in fishing villages introduced during the Seventh Plan. It proposes the saving-cum-relief scheme for fishermen, under which fishermen make savings of a fixed amount every day during good fishing seasons, and this, supplemented by additional contribution from the State and Centre, is utilized to disburse a monthly amount to each fisher family during the lean periods in fishing.

The Report of the Working Group on the Ninth Plan (1997-2002) noted that fisheries cooperatives, with a few exceptions, continued to be plagued by organizational, managerial and operational weaknesses, making them unsuccessful, inactive or moribund.

Though Working Group Reports in earlier Plan periods had recognized that coastal resources were under pressure, it was only the Ninth Plan (1997-2002) that, for the first time, highlighted the importance of conservation of aquatic resources and genetic diversity, and referred to the need to conserve fisheries resources of the coastal waters. It also emphasized the need for programmes that help in "judicious exploitation of the coastal fisheries resources by the traditional and small-scale sector by protection of the fishing rights from overexploitation of the resources by the mechanized and deep-sea fishing fleet."

It is significant that fisherwomen are mentioned, for the first time, in the Ninth Plan, a focus that has continued into the Tenth Plan.

A greater impetus to brackishwater aquaculture was given during the Eighth and subsequent Plan periods, with the Ninth Plan proposing an integrated approach for the sustainable development of fisheries and aquaculture. The Ninth Plan also emphasized the need to promote brackishwater culture, by overcoming various constraints, including "legal intervention in brackishwater farming".

The Report of the Working Group on Fisheries for the Tenth Five-Year Plan attributed "depletion, economic waste and conflicts among user groups" in coastal waters to the open-access nature of Indian fisheries, and advocated an immediate adoption of a community-based and participatory approach to complement scientific fisheries management. It also drew attention to the 1997 National-Level Review Committee on Fishing Fleet, which, taking into account the problem of overcapacity, had recommended zero fishing fleet growth for vessels between 8 to 15 m overall length. The report also discussed the need to diversify the existing trawler fleet in the territorial waters into the EEZ as a management option.

The need for management and regulation, particularly of coastal fisheries, and for the strict implementation of scientific management measures, is thus explicitly mentioned in the Tenth Plan (2002-07). It noted: "Most of the major commercially exploited stocks are showing signs of overexploitation. Problems of juvenile finfish mortality and bycatch discards increased with the intensification of shrimp trawling. Plateauing of catches and

overfishing at several centres and inter-sectoral conflicts in the coastal belts have highlighted the need for caution." The emphasis in the Tenth Plan was on the introduction of a new generation of fishing vessels for development of offshore fishing, and the technological upgradation of traditional vessels.

The Tenth Plan continued the emphasis on development of aquaculture in coastal areas and noted that about 6,240 ha were brought under brackishwater aquaculture activities during the Ninth Plan through 39 Brackish Water Fish Farmers Development Agencies (BFDAs), though the performance of the programme has also been affected due to litigation. The need to promote aquaculture activities was emphasized.

The emphasis on cooperatives continued in the Tenth Plan, which proposed the setting up of a cooperative marketing network in the marine sector.

An analysis of the five-year Plans provides information on policy concerns and priorities for marine and coastal fisheries over various Plan periods, and highlights shifting emphasis in policy. For example, in the earlier Plan periods, the emphasis was on expanding production and technologies for better resource exploitation. There is a distinct shift in this perception in later Plan periods, and the acknowledgement that coastal resources, in particular, are overfished. There is also some recognition of the need to protect the fishing rights of the small-scale sector from overexploitation by the mechanized fleet.

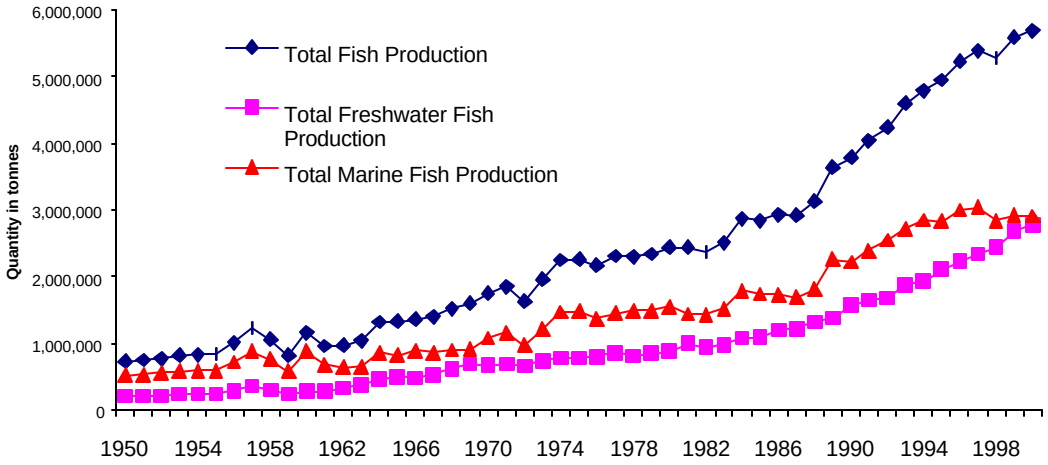
3.4 Marine Fish Production and Exports

As earlier discussed, mechanization of commercial fleet started in the late 1950s and, since then, the fishing industry has been undergoing continuous changes. From a subsistence level operation during the pre-independence days, the fishing sector has now attained the status of a capital-intensive industry, thanks to the efforts initiated by the Central and State governments through successive Five Year Plans (Vivekanandan 2002). This section will analyze the current trends in coastal and marine fisheries in India.

3.4.1 Marine fish production

As a consequence of State support, modernization, technological growth and growth in export and domestic markets, India's total fish production increased eight-fold—from 0.7 million tonnes in 1951 to 5.7 million tonnes in 2000-2001 (Figure 4), when it accounted for over 4.39 per cent of the world's total fish production. In 2001-02, fisheries contributed about Rs 25,378 crores to the Gross Domestic Product (GDP), which is about 1.21 per cent of the GDP of India at current prices (GOI, 2002a).

Figure 4: Total Fish Production - India

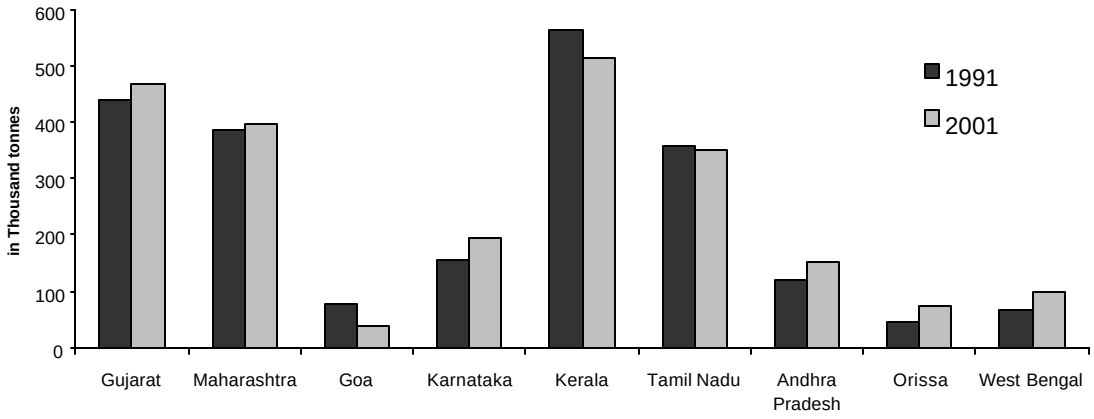


Source: FAO, FISHSTAT

However, as can be seen in the above figure, the growth in marine fish production is increasing at a lower rate, averaging 2.2 per cent during the period 1991-92 to 1999-00, as compared to the production from inland fisheries, which averaged 6.5 per cent during the corresponding period. In the latter half of the 1990s, marine fish production appeared to be levelling off.

From Figure 5 it can be seen that Kerala remains the leading producer of marine fish (though production in Kerala has declined since 1991), followed by Gujarat, Maharashtra and Tamil Nadu. It can also be seen that marine fish production from States on the West Coast, is, in general, higher.

Figure 5: State-wise marine fish production: 1991 and 2001



Source: CMFRI

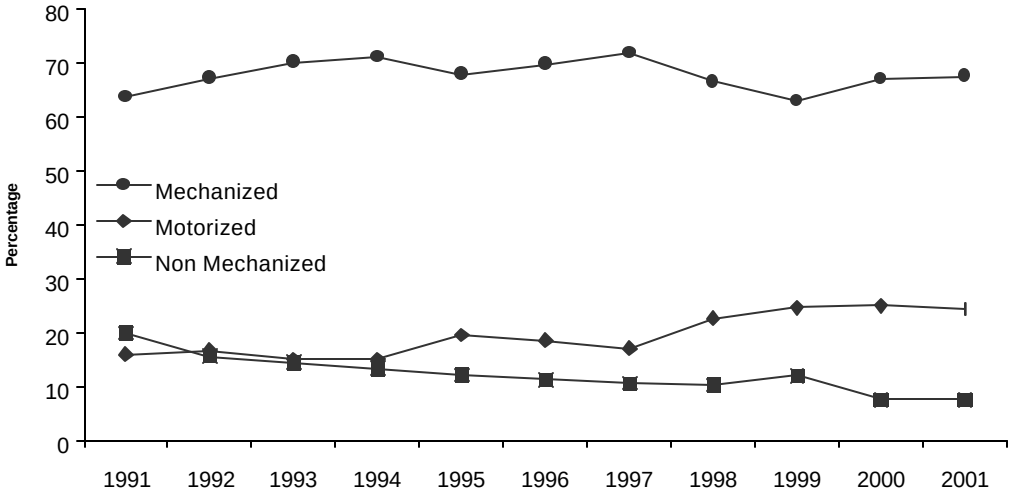
3.4.2 Production by mechanized, motorized and non-mechanized craft

It is informative to look at the contribution of mechanized, non-mechanized and motorized craft to marine fish production. According to the classification used by the Central Marine Fisheries Research Institute (CMFRI), mechanized craft are understood to mean craft using inboard engines for propulsion, motorized craft are those using outboard motors (OBMs) and non-mechanized craft are those that use either sail or manual means of propulsion.

From Figure 6 it can be seen that in 2001, 67 per cent of the production was from mechanized fishing units (using trawls, gill-nets and purse-seines), while 25 per cent was from motorized fishing units (using gill-nets, lines and purse-seines with outboard motors) and 8 per cent from unpowered fishing units. It is significant that half of total marine capture fisheries production was from the mechanized trawl sector in 2001.

From Figure 6 it can also be seen that production from the non-mechanized sector has declined from 20 per cent in 1991 to just about 8 per cent in 2001, while that of the motorized sector has increased from 16 per cent to 24 per cent in the same period. The trend towards mechanization and motorization is clear.

Figure 6: Percentage contribution of different sectors to marine fish production: India



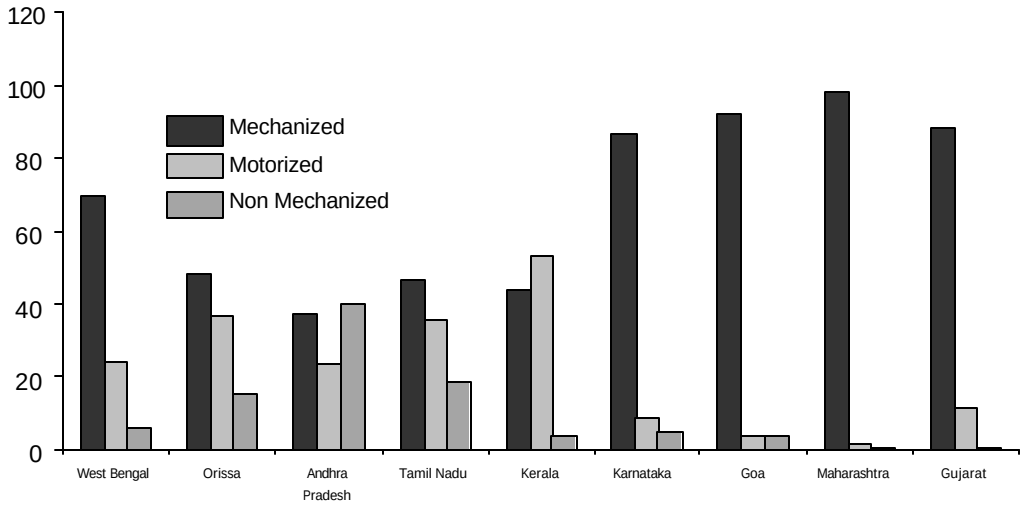
Source: CMFRI

It is also informative to note (Figure 7) that in Maharashtra, Goa, Gujarat and Karnataka—all States on the west coast—over 85 per cent of the production comes from the mechanized fleet. This is a reflection of both the greater policy thrust towards mechanization in these States, and the physical features of the West coast.

On the other hand, the non-mechanized sector still contributes significantly (more than 10 per cent) to fish production in the east coast States of Andhra Pradesh, Pondicherry, Tamil Nadu and Orissa. In Gujarat and Maharashtra, the non-mechanized sector is extremely marginal in terms of contribution to total production (though not in terms of number of craft and numbers employed), contributing less than one per cent to total

production. The contribution of the motorized sector is most prominent in Kerala, followed by Pondicherry, Orissa, Tamil Nadu and Andhra Pradesh. It is clear that along the east coast, fish production tends to be dominated by the motorized and non-mechanized fleet.

Figure 7: Percentage contribution of different sectors to marine fish production by State: India



Source: CMFRI

In terms of numbers, it can be seen in Table 7 that in 1998 there were 1,60,000 non-mechanized vessels (67 per cent), 32,000 motorized vessels (13 per cent) and 47,000 mechanized vessels (20 per cent) (Sathiadhas and Biradar 2000). It can also be seen that the non-mechanized sector employs the vast majority of active fishermen—approximately 64 per cent of the total, even though the annual per capita catch of these fishermen is only 328 kg, about 3 per cent of the annual per capita catch of an active fisherman on a mechanized vessel. In other words, in 1998, 64 per cent of fishermen harvested approximately 10 per cent of total catch (1998 data).

Table 7: Sector-wise marine fish production: India

	Active fishermen (in lakh)		Number of Fishing vessels		Production per fishing vessel (in metric tons)		Annual per capita production per active fisherman (kg)	
	1980	1998	1980	1998	1980	1998	1980	1998
Non mechanized	3.48	6.5	137,000	160,000	6.57	13.32	2,590	328
Motorized	-	1.7	-	32,000	-	156.77	-	2,951
Mechanized	1.14	2.0	19,013	47,000	15.00	415.61	2,560	9,767
Total	4.62	10.2	156,013	239,000				

Source: Sathiadhas and Biradar (2000)

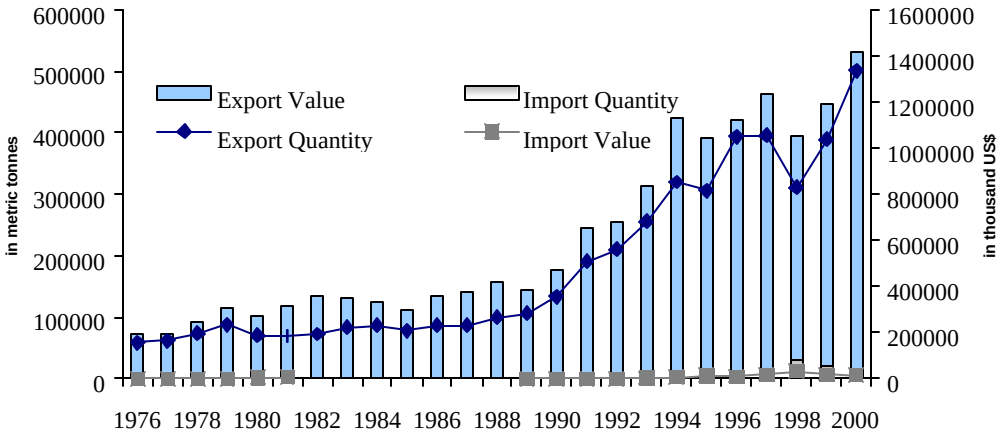
3.4.3 Production by species groups

The marine fish production of 2.81 million tonnes in 2000-01 originated mainly from about 44 species groups, of which 10 accounted for half the production, that is, oil sardines, penaeid prawns, croakers, perches, ribbonfish, non-penaeid prawns, mackerels, cephalopods, carangids and Bombay duck. Of these, species such as penaeid prawns, non-penaeid prawns and cephalopods, all demersal (bottom-dwelling) species, can be considered high-value species going primarily to the export market. Species such as oil sardines, croakers, ribbonfish, mackerels and Bombay duck, on the other hand, are low-value species, going primarily, in fresh or processed form, to the domestic market to serve the food security needs of local populations. In 2001, oil sardines constituted the largest proportion of the total catch, followed by perches, penaeid prawns, ribbonfish and croakers.

3.4.4 Exports

There has been a consistent growth in exports following the Third Plan period, when, for the first time, emphasis was placed on the development of export trade.

Figure 8: Trade in fishery commodities - India



Source: FISHSTAT, FAO

Exports of fish and fish products have increased from Rs 35 crore in 1970-1971 to Rs 5,815 crore in 2001 in value terms (GOI, 2003). Fish now constitutes an important export item, and, in 2001, fish was the fourth largest export item (in terms of net value) after textiles (knitted), textiles (non-knitted) and cotton. As mentioned earlier, in 2001-02, fisheries contributed about Rs 25,378 crores to the GDP, which is about 1.21 per cent of the GDP of India at current prices. Most of the exports are in the frozen form.

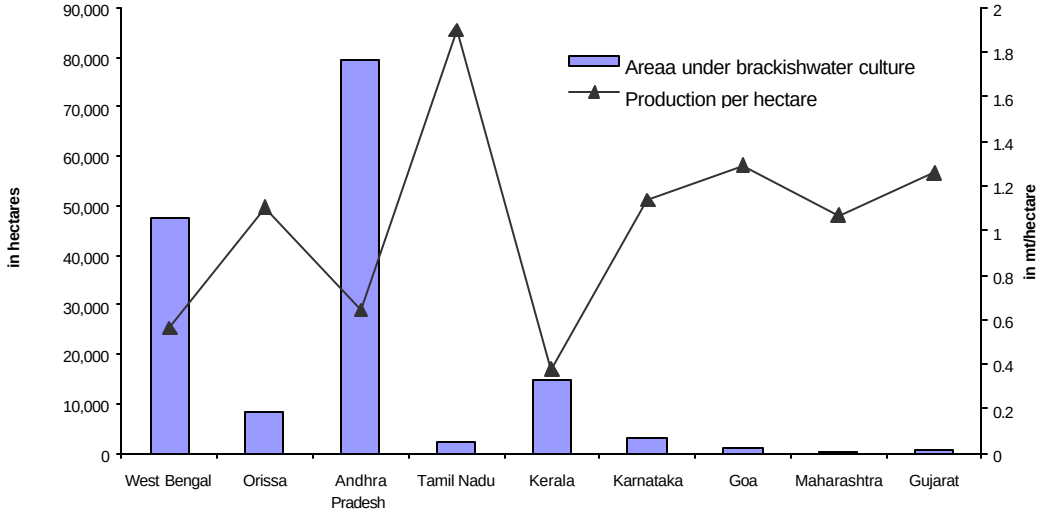
3.4.5 Aquaculture

Starting in a small way in the late 1980s, commercial brackishwater shrimp aquaculture in coastal areas became a significant activity in the early 1990s. Commercial shrimp farming developed on account of the government's policy to promote shrimp culture in

view of its potential to utilize the vast saline tracts along the coastline, provide employment opportunities to coastal rural populations and to earn valuable foreign exchange

In 2002, an area of about 157,400 ha was under shrimp farming, with an average production of about 100,000 tonnes of shrimp per year. The States with the highest concentration of shrimp culture farms are Andhra Pradesh, Tamil Nadu and Orissa (Figure 9). Some of the west coast States, like Maharashtra and Goa, also developed commercial shrimp farms, but the overall area is much less, compared to the States on the east coast. In Kerala, most of the area is under traditional extensive forms of shrimp farming. It can be seen that the per hectare productivity is highest in Tamil Nadu and lowest in Kerala.

Figure 9: Area under brackishwater culture and per hectare production, by State: 2002



Source: MPEDA

As can be seen in Table 8, about 91 per cent of the shrimp farmers in the country are reported to have holdings of less than 2 ha, 6 per cent between 2 -5 ha and the remaining 3 per cent have holdings of 5 ha and above, indicating that, especially in Andhra Pradesh, most shrimp farming is undertaken by small farmers. About 65 per cent of total area under shrimp farming is reported to be farms below 5 hectares in size, implying that in India, small farmers dominate the sector (AAI, 2001). Shrimp farming reportedly provides direct employment to about 0.3 million people and ancillary units provide employment to 0.6 – 0.7 million people (AAI, 2002).

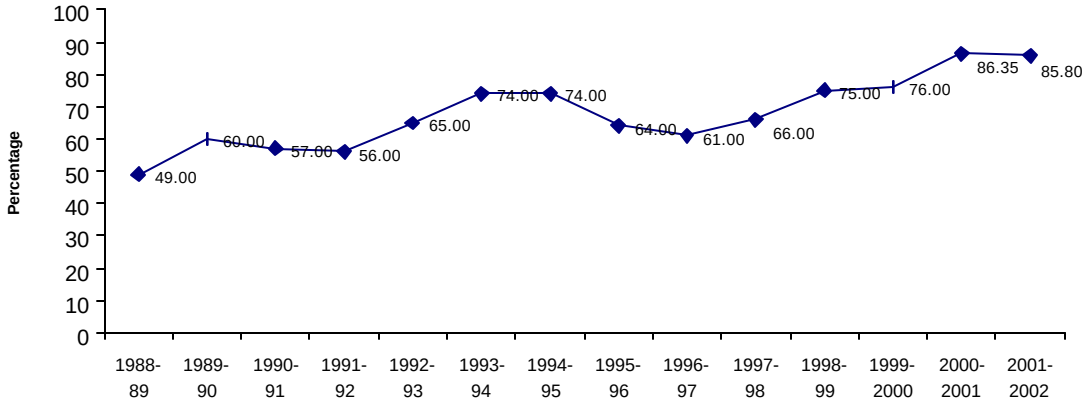
Table 8. Distribution of shrimp farms based on the area holdings by individual farmers/ entrepreneurs in the coastal States of India

	< 2.0 ha		2.0-5.0 ha		5.0-10.0 ha		> 10 ha		Total
State	No. of farmers	% **	No. of farmers	% **	No. of farmers	% **	No. of farmers	% **	No. of farmers
Gujarat	22	15.60	103	73.05	10	7.09	6	4.26	141
Maharashtra	74	54.00	36	26.00	13	10.00	13	10.00	136
Karnataka	393	61.69	94	14.76	48	7.54	102	16.01	637
Goa	41	24.55	19	11.36	97*	58.08	10	5.99	167
Kerala	1,297	50.00	699	27.00	234	9.00	362	14.00	2,592
Tamil Nadu	352	42.00	349	41.00	107	13.00	36	4.00	844
Andhra Pradesh	69,738	96.19	2,190	3.02	336	0.46	238	0.33	72,502
Orissa	7,580	97.88	100	1.29	51	0.66	13	0.17	7,744
West Bengal	4,327	55.00	1,778	29.00	1,077	13.00	646	8.00	7,828
Total	83,824	90.57	5,368	5.80	1,973	2.13	1,426	1.54	92,591
**Percentage of total farmers in the state									

Source: Shrimp Aquaculture and the Environment – An Environmental Impact Assessment Report.AAI.2001.

It is worth noting that as shrimp catches from capture fisheries decline as result of excessive pressure, the contribution of cultured shrimp to total shrimp exports has been rising steadily. The share has grown from 33 per cent in 1988-89 to 59 per cent in 2001-02, in quantity terms. In terms of value, the share has grown from 49 per cent to 86 per cent during the same period (Figure 10). India was the fifth largest shrimp producer through aquaculture in the world, as per the available data of 1999. The growing importance of shrimp aquaculture, particularly in view of the decline in shrimp resources in the wild, is evident.

Figure 10: Percentage contribution of cultured shrimp to total shrimp exports (value)



Source: MPEDA, 2003

3.5 Marine Fisherfolk Population

According to CMFRI, the total marine fishermen population in India is 3 million and the number of active marine fishermen is 1.025 million (Table 9).

Table 9: Information on Marine Fisherfolk Population

Marine fishermen population	3 million
Marine fishermen households	0.50 million
No. of active fishermen	1.025 million
Ratio of active fishermen to total	1:3
Marine fishing villages	3638
Average no. of sea going fishermen per village	282
Average no. of fishermen population per village	825
Fish landing centers	2251

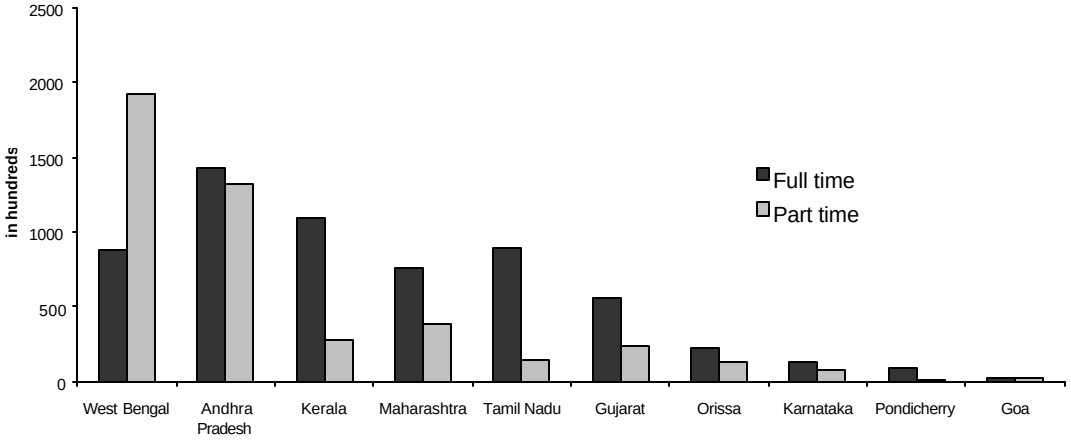
Source: CMFRI (www.cmfri.com)

According to the Handbook of Fisheries Statistics (2000) brought out by the Department of Animal Husbandry and Dairying (DAHD), using data from the Livestock Census of 1992, India has a total fisher population of 1.06 million in both the inland and the marine sector, of whom 57 per cent are full time and 43 per cent are part time, spread across all coastal States and Union Territories. Data on the marine fisher population is not published separately.

The discrepancy in the data on fisher population between CMFRI and DAHD is worth noting. A possible reason is that the DAHD uses data from an earlier period. It is also worth noting that gender disaggregated data on the number of women involved in fisheries-related work is not available, except where published separately by the States, as in the case of Tamil Nadu.

Using data from the Handbook of Fisheries Statistics, the population of part time and full time (inland and marine) fishers in the coastal States and Union territories of India can be seen in Figure 11.

Figure 11: India Fisher Population (Full time and Part time)



Source: Government of India.2000. Handbook of Fisheries Statistics 2000. Department of Animal Husbandry and Dairying.

The data indicates that the East Coast has a greater proportion of inland and marine fishers (66 per cent) as compared to the West Coast. The East coast though also has a higher proportion of part-time fishers (approximately 50 per cent) as compared to the West Coast (approximately 28 per cent). The greater number of part time fishers on the East Coast indicates the presence of sources of livelihood other than inland and marine fisheries, which could perhaps be agriculture related.

3.6 Current Status of Marine Fisheries Resources

While data on marine fish production shows an increasing trend and does not, *prima facie*, signify any cause for worry, numerous reports indicate that there is indeed cause for concern, and that territorial waters are already under pressure, as is evident from the observations below:

> *"Marine fish production level has risen from 0.53 mt in 1950-51 to 2.81 mt in 2000-01 with a growth rate of 3.43 per cent. Most of the major commercially exploited stocks are showing signs of over exploitation. Problems of juvenile finfish mortality and bycatch discards increased with the intensification of shrimp trawling. Plateauing of catches and overfishing at several centres and inter-sectoral conflicts in the coastal belts have highlighted the need for caution." (GOI, 2002b).*

A publication by the Government of Kerala (2000) similarly notes that the depletion of species earlier abundant in Kerala's waters and the diminishing average size of fish, is indicative of resource depletion.

According to Vivekanandan (2002), "In recent years, the following adverse effects on the inshore fish stocks have been diagnosed: (i) decline in catch rate, (ii) high fishing mortality, (iii) decline in recruitment and yield/recruit, (iv) decline in biomass, (v) shift from the regular landing patterns, and (vi) drastic changes in the biological characteristics

of the exploited fish populations. These are considered to be the warning signals on the health of the fish stocks."

Devaraj and Vivekanandan (1999) found that the catch rate of fishing vessels in several fishing centres is on the decline. They found, for example, that the catch rate of trawlers based in Chennai had declined from 110.8 kg/h in 1991 to 29.7 kg/h in 1997.

They further note that while fast growing and high fecund fishery groups such as prawns, cephalopods and many teleosts have been able to withstand exploitation, the slow-growing and/or low-fecund groups such as lobsters, sharks and catfishes are showing signs of vulnerability.

Mathew (2000), notes that in the State of Gujarat, which is in the forefront of market-led development, and one of the biggest producers of fish in India, is now facing a major crisis in its marine fisheries with signs of economic and biological overfishing. He notes that marine fish production in absolute terms suddenly dropped by over 27 per cent to 552,000 tonnes in 1998-99, from a peak of 702,000 tonnes in 1997-98.

Studies have also indicated the impact on the trophic food chain of the excessive pressure on certain species. One such evidence on the effect of trawling on the trophodynamics has been obtained for the Bombayduck (*Harpodon nehereus)* along the northwest coast of India. In the 1950s, prior to the introduction of trawlers, the major diets of the Bombay duck were the penaeid and non-penaeid prawns and cannibalism was insignificant. With the intensification of trawling, the abundance of prawns reduced and the Bombay duck has resorted to cannibalism. In the 1980s and 1990s, the smaller Bombay duck contributed 30 per cent to the diet of the larger ones (Vivekanandan, 2003).

It is also relevant to analyze some of the reasons that have been put forward to account for the current situation. As mentioned earlier, approximately half of India's total marine capture production in 2001 was from the mechanized trawl sector. Several studies refer to the destructive and non-selective nature of trawl gear. Devaraj and Vivekanadan (1999) point out that non-selective trawls indiscriminately exploit almost every fishery group—clupeid to flatfishes, crustaceans to cephalopods and jellyfishes to sea urchins. They further note that the very small mesh size in the cod end of the net used by trawlers is responsible for the exploitation of large quantities of juveniles of all the economically important large sized fishes (bycatch), which are either used as fishmeal for poultry or discarded in the sea.

There can be no doubt that trawl gear, including mini-trawls, in combination with other non-selective small-meshed gear targeting pelagics, such as purse-seines and ring-seines (modified purse-seines), have contributed in no mean way to the problem of resource exploitation evident particularly in the coastal fisheries in India.

Devaraj and Vivekanandan (1999) thus note: "The improvements made so far on the craft and gear technologies with an objective to increase fish production are becoming counterproductive. Inappropriate exploitation patterns such as concentration of 80 per

cent of the total fishing effort in the inshore waters and over dependence on trawlers are showing signs of detrimental effects on the fisheries. There is undoubtedly a need for better management and regulation, particularly of non-selective gear groups."

3.7. Status of Marine Fisheries Management

As mentioned earlier, jurisdiction over inland fisheries, aquaculture, and marine fisheries in the territorial waters —the marine space up to 12 nautical miles (22 km) from the baseline—is with the States. It is worth recalling that coastal waters are the most productive and that most of India's fish production comes from these waters. It is also resources in the coastal and territorial waters that are under maximum pressure of overfishing, and in urgent need of management. Undoubtedly coastal States have a very important role to play in fisheries management.

A purview of the Marine Fishing Regulation Acts (MFRAs) enacted by all States shows that all States, except the Union Territories, have defined an artisanal zone—based either on distance from the shore or on depth—in which the mechanized fleet is not allowed to fish. However, implementation of this provision is known to be poor, and regular intrusions by mechanized trawlers in the artisanal zone are known to be common, with consequences both for the resource and the livelihood of the small-scale sector.

Other fisheries conservation and management measures are mainly confined to technical management measures like minimum mesh size, closed area/seasons, and prohibitions on catching certain species and listing species that cannot be exported below a minimum size. With the exception of closed area/season, and prohibition on catching certain species, other measures, however, are not effectively implemented.

A proposal to introduce uniform ban on fishing by mechanized vessels during the monsoon season, was, for the first time, implemented by all States in 2003. On the east coast, the ban was from April 15 to May 31, and on the west coast, from June 10 to August 15. A detailed, scientific impact assessment of this ban and the benefits from it will be required, particularly as its usefulness and rationale had been questioned by various groups.

In general, the most significant drawback in the legal system for marine fisheries in territorial waters is that, in spite of resources being overfished, there are no effective provisions for better management of resources, such as entry restriction into marine fisheries, programmes to retire fishing fleet, especially old fishing vessels, or to take effective and deterrent legal action against fishing vessels that violate fishing regulations. Also, there are no legal mechanisms to address inter-State movement of fishing vessels or problems arising from such movement. This situation is also true for fisheries in the EEZ.

4. ISSUES FACING FISHWORKERS IN SMALL-SCALE MARINE CAPTURE FISHERIES

This section will look more closely at the some of the trends in marine capture fisheries and their implications for the livelihoods of artisanal and small-scale fishworkers engaged in fishing activities. It will also look at the impact of some developments outside the fisheries sector on the livelihoods of small-scale fishworkers.

4.1 Expansion in Fishing Capacity

The marine fishing sector in India comprises a wide spectrum—from the 6.5 lakh fishermen on board 1.6 lakh non-mechanized craft, reporting a per capita annual production of only 328 kg of fish, to the approximately 2 lakh fishermen on board 47,000 mechanized vessels, reporting a per capita annual production of as much as 9,767 kg of fish (1998 figures). In the middle ranges are the motorized sector—about 1.7 lakh fishermen on 37,000 motorized vessels, with an estimated per capita annual production of 2,951 kg of fish. The total number of vessels has expanded from about 156,013 in 1980 to 239,000 in 1998 (Sathiadhas and Biradar 2000).

The greater competition for resources and the lure of profitable markets have fuelled investments in the sector and led to an expansion in fishing capacity. State policies oriented towards expanding production and exports have contributed to this situation.

The 1970s and 1980s, for example, saw an expansion of mechanized trawling for shrimp. During this phase, in most States, it was capital from outside the sector that supported the expansion of activities such as trawling. Platteau et al (1985), for example, in their study of the impact of mechanization in one village in Kerala, found that almost 66 per cent of the boatowners had never been regular fishermen in their lives. It was also such a situation that led to the great conflicts between the mechanized trawl sector and the artisanal sector in several Indian States, including Goa, Kerala and Tamil Nadu, which continue to this day.

The later years saw rapid increase in capacity in the small-scale sector as well, with the adoption of outboard motors (OBMs), enabling the small-scale sector to access resources in deeper waters at greater distances. According to Vivekanandan (2002), by 1998, following the introduction of OBMs in the late 1970s, nearly 40 per cent of artisanal craft had been fitted with OBMs.

The small-scale fisheries sector has thus undergone rapid changes, particularly in the last two decades. Apart from the shift to OBMs, there has been a shift from nets made of natural fibre to nets made of synthetic yarn, from boats made of wood to those made of fibre-reinforced plastic (FRP), and to the use of ice for onboard and onshore preservation and processing. There have also been changes on the marketing side, and from supplying almost exclusively to the domestic market, the small-scale sector in States such as Kerala and Tamil Nadu is also targeting high-value species such as prawn, to supply to the export market.

Motorization and adoption of related technologies was, in a sense, a reaction from the small-scale sector, both to the competition posed by the mechanized fleet over the same resources and, often, the same space. It was also a response to market signals, given the high prices commanded by export species such as shrimp and cuttlefish. The process was facilitated by State policies, such as those subsidizing purchase of OBMs and making available kerosene at subsidized rates.

Thus, according to a study by SIFFS (1999 and 1998), in Kerala, starting with a few OBMs in 1981, the number of OBMs increased rapidly from 11,621 in 1991 to 16,466 in 1998. While the numbers of OBMs increased only by about 40 per cent, the total horsepower (HP) capacity of these engines increased nearly 100 per cent (1.30 lakh HP to 2.54 lakh HP). This means that the average HP of the OBM increased from 11 HP in 1991 to 15 HP in 1998.

The past 20 years have, thus, witnessed a rapid expansion in fishing capacity, including of the small-scale sector. During this period, the small-scale sector has also adapted many of the gear earlier used by the mechanized sector. For example, Kerala has witnessed the emergence of the ring-seine (a modified form of purse-seine) and the mini-trawl net. These gear types, known to be highly non-selective, have contributed to substantial increases in production.

It is clear that the small-scale sector in many parts of India, forced to compete for resources, has itself been transformed. In fact, from an earlier context where the small-scale sector primarily comprised non-motorized craft using passive gear, a whole range is visible within what is called the motorized and non-mechanized sector today—from the highly capitalized ring-seine unit of Kerala to the non-motorized catamaran. There can be no doubt that, along with the mechanized sector, parts of the small-scale sector are also contributing to the problem of overcapacity and overfishing, particularly in coastal waters, in the absence of an effective management system regulating the use of resources.

Most affected in this process are the fishermen on non-mechanized craft using passive gear, numerically in the majority, who face depleting catches and increasingly vulnerable livelihoods as a result of non-selective fishing practices adopted by the motorized and mechanized fleet. As a study on motorization in Kerala (1991) noted: "Motorization has created conditions where the surviving non-motorized units are forced to concentrate in the shallower near-shore waters creating further fishing pressure in these waters." It further noted that the enhanced output of the motorized units has also led to depressing the physical output of the non-motorized units that remain. In the prevailing open-access situation, it is clearly the poorer fishermen who are losing out.

Though most States enacted the State-level Marine Fishing Regulation Acts in the 1980s, which reserved inshore waters for the small-scale fleet, conflicts between the mechanized trawler fleet and the small-scale fleet continue to be reported, especially as trawlers often fish in inshore waters, destroying the nets of small-scale fishermen and affecting their catches. This problem has been further compounded by the emergence of efficient and non-selective technologies within the small-scale motorized sector.

4.2. Increase in Investments and Operating Costs

This trend has also meant an exponential increase in investments required. A study by Sathiadhas et al (2000), found, for example, that, while a motorized catamaran using hooks-and-lines required an investment of Rs 35,000, a canoe using ring-seine in Kerala required an initial investment of as much as Rs 5 lakhs in 1993-94. According to reliable sources, the investment for the latter is now in the range of Rs 12 to 15 lakhs, almost the same or more than the investment needed to purchase a mechanized trawler. Needless to say, such an increase in investment increases the compulsion to earn higher profits to pay back loans, and, thereby, to fish more.

The increase in investment has been accompanied by a corresponding increase in operating costs, particularly for fuel. Narayana Kumar et al (2000), in their 1997 study of Tamil Nadu fisheries, found that 65 and 14 per cent of total operating cost in a mechanized unit goes towards fuel and labour, respectively, while the corresponding figure for a motorized unit is 31 per cent and 45 per cent. Annual expenditure on fuel alone was calculated to be Rs 368,111 for a mechanized craft, while it was approximately Rs 90,000 for motorized crafts. On the other hand, the main components of expenditure for traditional craft were for labour (55 per cent) and ice (22 per cent). In all likelihood, expenditure on fuel in motorized and mechanized vessels has since increased, given the increasing length and distance of fishing trips. One report, for example, suggests that Chennai-based trawlers fishing in Andhra Pradesh and Orissa now have fuel tanks with the capacity to carry between 1,000 to 1,500 litres of fuel, from 150 litres in 1977, when they were fishing within a 60-km radius around Chennai (Subramanian, 2003).

An ICM (2002) study on the impact of globalization and seafood trade legislation on poverty in Andhra Pradesh, notes the growing trend in districts like Srikakulam, East Godavri and Prakasam, for boatowners to remove the engines from their boats during certain periods, to operate them as non-motorized boats, in view of the high costs of operation, poor catches and uncertain returns.

The implications of such high initial investments and operating costs for ownership patterns of craft and gear need to be explored. According to Sathiadhas and Biradar (2000) in 1997 only 23 per cent of the active fishermen in the marine fisheries sector owned fishing implements, compared to 34 per cent in 1980, and this appears to be indicative of a trend towards greater concentration of ownership.

According to a report from Sanna Arjipalli village in Orissa (ICM, 2000), the number of boatowning fishers has declined, and many of the earlier owners have started to work as crew on motorized boats. At least a quarter of the total fishing boats were reported to be owned by outside traders.

Narayana Kumar et al further noted that while the initial investments were lowest for traditional craft and gear (Rs 37,711), the internal rate of return was also the lowest, as compared to mechanized and motorized units. In other words, given the availability of capital, there is a clear incentive to motorize or mechanize in order to increase profits and

incomes. It also means that those who cannot motorize and mechanize are faced with lower returns and incomes. This could explain why many traditional fishermen now work on mechanized and motorized vessels during certain seasons.

Higher costs and investment has also meant more **indebtedness**. Sources of credit are both the formal sector (banks, cooperatives) and the informal sector (traders, moneylenders), though the latter continue to be more important. The finding of a survey by Matsyafed in Kerala (GOK, 1997) revealed that banks exist in only 53 per cent of fishing villages.

A techno-socioeconomic survey of fishermen households in Tamil Nadu in 1987 revealed that most of the families (62.6 per cent) were indebted, with a debt amount averaging Rs 3,100. As many as 58 per cent had borrowed from moneylenders (at an interest rate of 36 per cent), 13 per cent from banks, and about 8 per cent each from traders, cooperative societies and other relatives, respectively, while the rest had borrowed from boatowners. Clearly, the informal sector was the most important source of credit, while only about 20 per cent of the credit was accessed from formal sources. This is also linked to the fact that formal sources of credit are not adapted well enough to the realities of the sector, making it more difficult to obtain and repay loans.

Where credit is obtained from traders and merchants, it often means that the fishermen are bound to sell their fish to the trader who has advanced them money, implying that they are unable to sell to the highest bidder. As in other sectors, it is likely that fishermen with few or no assets find it more difficult to access credit from formal sources, and have to resort to informal sources of credit, often at much higher rates of interest.

There is, however, very little current information on the sources of credit and patterns of indebtedness existing among fishermen, and this is an issue that needs to be better understood.

4.3. Migration

Migration can take various forms and can be for a variety of reasons. Fishermen in India have traditionally migrated along the coast, but, in recent years, such instances of migration have increased, as resources in nearshore waters get overfished.

Migration can take the form of the migration of an entire fishing unit, or only of the labour/crew. Migration as crew can be to other States within India and even to other countries, as to countries in the Gulf. It can be migration of traditional or mechanized craft. It can take the form of migration to another part of the Indian coast, or to waters outside the Indian EEZ. It can also involve locating to a rich fishing ground on a seasonal, or even a longer-term, basis. Migration to work in sectors other than fisheries is also common.

Faced with depleting resources in their own waters, several fishing units now migrate along the coast to richer fishing grounds, as a survival strategy. Trawlers from Tamil Nadu, for example, are increasingly fishing in waters of Andhra Pradesh and Orissa

(Subramanian, 2003), while trawlers from Andhra catch shrimp in Orissa and West Bengal. Gujarat trawlers are known to fish beyond the territorial sea and also in the waters of Maharashtra. Such forms of migration are now increasing.

Migration can also take the form of crew movements. A report by Nayak and Vijayan (2003) on the fishing harbour of Veraval in Gujarat, notes that a large number of crew on the trawlers operating from the harbour belonged to the Srikakulam district of Andhra Pradesh, working for wages that could approximate Rs 2,000 a month, depending on catches.

Hapke (2001), in her study of fishing villages in Trivandrum district in Kerala, noted that in Kochethop, a predominantly Christian village, men in the village generally do not take up nonfishing second jobs. Rather, a number of them migrate during the local offseason to work in the mechanized sector or on boats in other parts of the State, or, in the case of boatowning households, they attempt to intensify and adapt their fishing efforts, with limited success, given the general context of overfishing. Another strategy, she noted, was to rely on the returns from women's work in fish marketing.

Thus, it is clear that migration, particularly as crew, continues to be a response of fishworkers, to secure their livelihoods, particularly for those whose fishing operations have become unviable. It is also clear that it is a strategy increasingly being adopted by the mechanized fleet facing depletion in its own waters, a form of migration that is being resisted by fishermen in areas where they migrate to, particularly when they perceive that their resources are being overfished by `outside' fleets.

There are all kinds of socioeconomic implications of this trend. What, for example, does the increasing length of fishing trips, or migration as crew for long periods, mean for the family lives of fishermen, for their wives and children? What are the risks that fishermen who migrate as crew to other States or countries face? It is reported, for example, that fishermen from outside Gujarat who work as crew on Gujarati vessels, cannot claim accident or death insurance. As trawlers from Tamil Nadu and Andhra move up the Bay in search of richer fishing grounds, what will be the long-term impact of this on local communities and the fisheries they depend on? What is the role the State should play?

4.4.Arrests and Detention in Third Countries

In recent years, the arrest and detention of Indian small-scale fishermen fishing in waters outside the Indian EEZ has become common. Fishermen have been arrested and/or imprisoned and their vessels confiscated in India, Pakistan and, to a lesser extent, Maldives. It is as common for Sri Lankan and Pakistani fishermen to be arrested and/or imprisoned in India. According to V. Vivekanandan (2003), a total of 85 Indian fishermen were killed and 276 injured in 176 incidents with Sri Lankan authorities between 1983 and 2000. During the same period, six boats were sunk.

Reasons for crossing the maritime boundaries tend to vary and are complex. In part, these relate to overfishing in coastal waters and better resource availability in waters across the boundary. In some cases, these may also relate to the fact that fishers have traditionally fished in waters that subsequently were declared as falling outside the Indian EEZ.

Fishing in the Palk Bay, for example, has traditionally been undertaken by Tamil fishermen of both Sri Lanka and India.

The fact remains that Sri Lankan, Indian and Pakistani fishermen regularly find themselves imprisoned—often for years at a time—by authorities on the other side for crossing the border. There can be no doubt that the `punishment' meted out to such small-scale fishermen for the `crime' of fishing a few tonnes of fish is completely disproportionate to the scale and nature of the offence. The implications of such arrests and even deaths for the families of fishermen are also severe, given the absence of a breadwinner.

4.5. Safety at Sea

Fishing is justifiably considered a high-risk profession. The risk is particularly high during cyclones and other natural calamities. For example, the cyclone in Andhra Pradesh in 1996 took a total of 2,760 people lives, of which 1,435 were fisherfolk (AFPRO, 1998). Of these, a significant number were women and children engaged in collection of shrimp seed to supply to shrimp hatcheries.

The hurricane that hit Gujarat and Pakistan in May 1999 left 300 people dead on the Indian side, almost all of whom were fishermen. The super cyclone that struck Orissa in October 1999 affected all coastal districts in the State. According to the National Fishworkers Forum (NFF, 2000) 468 people from fishing communities died in this cyclone, while 1,280 people were injured. Further, 29,818 fishing boats and 59,174 fishing nets were damaged. 6,767 houses were completely damaged, while 9,542 houses were partially damaged. In total, almost 67,102 fisher families were reported to have been affected by the cyclone.

Cases where fishermen are lost at sea and assumed dead are also quite common, particularly in certain States and during certain seasons, when conditions of the sea are rough. Data on the Group Insurance Programme of Matsya board in Kerala indicates that compensations were paid for 1,096 deaths between 1986 and 1998 (an average of 84 deaths per year), implying that one fisherman dies at sea once in about four days (Kurien and Paul, 2000).

In the case of Tamil Nadu (Table 10), according to official statistics, 708 claims for compensation for death and partial disability were cleared between 1997-98 and 2002-03.

Table 10: Number of Beneficiaries under Group Accident Insurance Scheme in Tamil Nadu

YEAR	Number of Beneficiaries
1997 – 1998	64
1998 – 1999	183
1999 – 2000	183
2000 – 2001	+82
2001 – 2002	120
2002 – 2003	76
Total	708

Source: Department of Fisheries, Government of Tamil Nadu

During discussions with the Directorate of Fisheries, Tamil Nadu, it was noted that an average of about 100 fishermen die each year in accidents at sea resulting from engine failure, rudder and vessel damage, lack of fuel, navigational problems, etc.

The reasons for the high number of deaths need to be explored. It has been noted that many of the smaller craft do not carry any safety equipment on board. It is possible that risks have increased, with the increase in distances travelled and the length of trips. Fishermen themselves have noted that, given their access to higher levels of technology, compared to the past, their own stamina and strength to deal with accidents has been reduced.

4.6. Return to Fishers (share in consumer rupee)

The fisheries sector continues to be plagued by an age-old problem—the poor returns to the fish producer, often because of the control over the market by fish merchants and traders. Many factors determine the return to fishers, including proximity to urban centres, volume of landings on a particular day, the species landed, availability of transport and refrigeration facilities, ability to sell to the highest bidder, etc.

It has also been noted that, other things being equal, the greater the number of smaller buyers at the landing site, the higher the market power of fishermen (GOK, 1997). The rural appraisal survey by Matsyafed in Kerala (GOK, 1997) revealed that a fair auctioning process was adopted only in a quarter of the villages in the State and that, in 10 per cent of the villages, fish was rarely auctioned. It also noted that in about a quarter of the villages, large merchants dominated, indicating a lower market power for fishermen.

According to Sathiadhas and Kanagam (2000), fishermen's share in the consumer rupee tends to be higher in Gujarat and Maharashtra, indicating a higher return to fishermen and a more efficient marketing system. This could be linked to aspects such as better roads and transport infrastructure and better storage and refrigeration facilities on the west coast.

On the other hand, the fishermen's share in the consumer rupee tends to be lower in Karnataka and Andhra Pradesh. For example, according to data from 1996-97, fishermen receive only 17 per cent of the consumer rupee in the case of shark in Andhra Pradesh. It is likely that the returns to fishers in States such as Orissa are low as well, where, in general, transport and other infrastructure are poor.

In this context, it is important to note that though the cooperative system was set up to enable fishermen to get better prices through better marketing, available reports, including by the Planning Commission, have indicated that this objective, in general, has not been achieved, except in some cases in Maharashtra, Kerala and Karnataka.

At another level, the implications of current trends towards higher quality and hygiene standards for fisheries products exported from India, on prices obtained by small-scale producers, need to be explored. It is likely, for example, that such standards may make it more difficult for small producers to access the export markets, which offer higher prices, given the high costs of compliance with stringent standards.

On a related issue, it has been reported that, in recent years, the development of communication technology such as wireless sets and mobile phones, has increased the ability of those fishers able to afford these gadgets, to get higher prices, as they are able to find out the prices of fish in various markets and land their fish accordingly. This is an aspect that needs to be better understood.

4.7. Aquaculture

While aquaculture in coastal areas, as for shrimp, is being projected as the answer to depleting stocks and an important avenue for improving the socioeconomic condition of coastal communities, there have been several concerns about the way brackishwater shrimp culture activities have been undertaken in India. Muralidharan (1995) notes that most of the problems created by the development of shrimp aquaculture in the 1990s were a result of improper site selection, development beyond the carrying capacity of the ecosystem, unplanned layouts of farms, technical risks due to the adoption of intensive and semi-intensive systems, and so on.

For fishing communities, unregulated expansion of shrimp farms often implied many things, including: loss of direct access to the sea; biodiversity loss as a result of clearing mangroves to make way for shrimp farms and as a result of effluent discharge from aquaculture farms; depletion of catches as a result of destructive practices adopted in collection of shrimp fry, etc.

Coastal communities living near aquaculture farms had often to contend with land alienation as well as salinization and pollution of groundwater and other sources of water. In many areas, where rice farms were converted to shrimp farms, they also had to contend with a loss of employment opportunities.

Massive resistance to the development of shrimp farming took the form of a public interest litigation filed in the Supreme Court of India in 1994 (S. Jagannath vs. Union of

India and others) against shrimp aquaculture activities in the coastal zone. The Court ruled that no shrimp culture farm can be set up within the Coastal Regulation Zone (CRZ), except traditional and improved traditional types of ponds.

The Aquaculture Authority was subsequently set up under the Environment (Protection) Act 1986 to perform the functions indicated in the Supreme Court judgement of December 1996, with the primary objective of regulating shrimp farming in coastal areas. The Authority has taken several steps, including publication of guidelines for adopting improved technology for increasing production and productivity in traditional and improved traditional systems of shrimp farming and incorporation of effluent treatment systems in shrimp farms above 5 ha (AAI, 2002).

It would be relevant to monitor closely, though appropriate studies, the implications of coastal shrimp aquaculture for small-scale fishers and their communities, including the impact of aquaculture production on prices for shrimp caught in the wild, the employment generated for coastal communities through shrimp farming, and the environmental impact of aquaculture on coastal biodiversity, and thereby on livelihoods of fishing communities. This would enable an analysis about the extent to which fishing communities in coastal areas are benefiting, if at all, from the growth of shrimp culture.

4.8. Pollution and Degradation of Coastal Resources

There is enough evidence to indicate that the fisheries sector, being at the tail-end, as it were, is highly vulnerable to the activities of other land-based sectors, including industry, agriculture, tourism, urban expansion, etc. Resource productivity is affected by degradation of natural habitats like coral reefs and mangroves, by pollution from upstream and coastal activities, by dam construction and the resultant reduction of fresh water and sediment inflows, etc. The fisheries sector is also at the receiving end of pollution by sea-based activities, including shipping and oil exploration. All these activities take a heavy toll on coastal and marine ecology and biodiversity, and directly impact on productivity of fisheries resources and fish catches.

Pollution, in particular, is becoming a huge problem for fishing communities, given the fact that many industries are being set up in coastal areas, for better access to ports and harbours. As a result of pollution from the 155 factories in the Lote industrial area in Ratnagiri district, Maharashtra, for example, around 3,000 Bhoi fisherfolk from 42 villages are reported to have lost their livelihood as chemical effluents discharged into the Dabhol creek (8 km away from the industrial estate) have destroyed marine life. Pollution has also affected the health of children and adults in the village (Bunsha, 2001).

Again, the impact of such negative developments are most acutely felt by those traditionally fishing in coastal and inshore waters using non-mechanized craft who are not able to relocate to fish in less polluted or more resource-rich fishing grounds. Negative impacts are also experienced by those fishing, collecting and gleaning in coastal and intertidal areas without boats, many of whom are women, such as those who engage in gleaning activities—work that involves wading in water for many hours. This also

exposes them to serious health risks, as in the estuarine area near the Cuddalore industrial area in Tamil Nadu.

4.9. Ill–conceived Conservation Initiatives

While better conservation and management of marine resources are clearly to the benefit of small-scale fishworkers, in recent years, they have found themselves at the receiving end of conservation initiatives that do not take into account their interests. A case in point is the measures adopted for the protection of sea turtles in Orissa. India declared Gahirmatha, the largest known olive ridley turtle rookery in the world, as a Marine (Wildlife) Sanctuary in 1997, under the Wildlife Protection Act of India, 1972. Fishing activities were also banned in the sanctuary. The Fisheries Department of Orissa, the State where Gahirmatha is located, followed with a Notification in the same year prohibiting all fishing within the seaward radius of 20 km from Gahirmatha area round the year to protect olive ridleys. With the same intent, another Notification was issued prohibiting all fishing to a seaward distance of 20 km from the high tide line around Devi and Rushikulya river mouths, two other nesting sites in Orissa. Not only bottom trawls but all fishing activities, including artisanal fishing that involved only manual retrieval of nets, have been banned from the closed areas. In a State with significantly high levels of poverty, this measure has affected hundreds of small-scale fishers using non-destructive gear with minimal impact on the sea turtle population (Mathew, 2000).

Another recent case is that of the Jambudwip island in the Sundarbans mangrove belt in West Bengal. The island has been used on a seasonal basis as the site of a fisheries camp since 1955, for drying fish caught in waters at some distance off the island. The stake-net fishery of Jambudwip provides income and employment to about 10,000 people. However, in the name of forest and mangrove conservation, efforts are under way by the Forest Department to remove all `encroachment' on this island, on the grounds that the seasonal occupation of the island for the purposes of fish drying is leading to mangrove destruction. The issue is not yet resolved. At stake are the livelihoods of 10,000 people employed in the fishery, who, given the chance, would be keen to be part of mangrove conservation and management initiatives, which they see as benefiting them.

It is clear that this is an issue that is likely to come up increasingly in the future, given the greater emphasis on conservation measures such as setting up marine protected areas, with strong implications for livelihoods of small-scale fishers and their communities.

Concluding comments

In conclusion, it is evident that the small-scale sector, impacted by changes in technologies and markets, has itself changed. While there are those who have been able to benefit from the changes, others are struggling to cope. A range of livelihood strategies can be observed. Many in the traditional sector have gone in for motorization and use of related technologies, even though this may or may not have left them better off, depending on the investments involved and the kind of debts they may have accumulated, as well as the income they are able to obtain from an increasingly vulnerable resource base.

Others, especially those with low access to capital, may adopt strategies that vary through the year, including fishing only in certain periods, working as crew on mechanized and motorized vessels in others, migrating to other areas, taking up work in non-fisheries related work as agriculture labour, coir workers, etc. It needs to be kept in mind that the vulnerable among the sector tend to be characterized by low levels of education and skills that make it difficult for them to take up skilled work outside the sector, given that they have spent most part of their lives fishing for a living.

In general a greater stratification within the sector can be observed, with a significant proportion comprising those who have not been able to join the technological race, and who find their livelihoods increasingly vulnerable.

This segment would certainly include owners of non-mechanized craft and crew on non-mechanized craft, by far the majority of the active artisanal fisher population. It would also include fishers, collectors and gleaners, fishing in inshore waters, often for subsistence purposes. It could also include crew on motorized and mechanized craft, who often work under difficult working conditions and poor employment security. It may well also include those small-scale fishers who have gone in for changed technologies, often taking large loans, but find themselves deep in debt, given the limited profits possible from an overfished resource base.

In most fishing communities there is an awareness today of the limitations of the resource base in supporting livelihoods. There is a greater emphasis on education for the younger generation, and many of the educated in the community are taking on jobs outside the sector. These are trends that need to be examined in greater details, to enable suitable policy interventions that increase livelihood options for the vulnerable in fishing communities.

Livelihood strategies adopted by vulnerable groups also needs to be examined at the level of the household. It is known, for example, that even where the men continue to earn their primary income from fishing activities, the women in the family often taken up diversified work, within or outside the fisheries sector, to bring in an income. This is an aspect that will be discussed later.

5. COASTAL FISHING COMMUNITIES: SOME CROSS-CUTTING THEMES

This section will take a look at fundamental cross-cutting issues that need to be kept in mind in any discussions on poverty and livelihoods in coastal fishing communities. The first part will look at the issue of property rights in coastal fisheries, and the second part will focus on women's participation in fisheries, a much-neglected area.

5.1. Property Rights and Coastal Fisheries

Fishing communities have inhabited coastal areas for generations and have well-evolved social and cultural institutions. Available literature suggests the existence of community institutions organized along caste, kinship or religious lines, which, in some cases, played a role in regulating resource use, resolving conflicts, ensuring equitable access to resources and in providing some form of social insurance. Though many of these institutions still exist, it is not known how relevant they remain in the present context.

For example, in the 1962 study of a fishing village, Mofusbandar in Srikakulam taluka of the Srikakulam district, in Andhra Pradesh (GOI, 1962), mention is made of the way the daily catch was shared. It was noted that fishermen reserved about 36 per cent of the catch—18 per cent for charity and another 18 per cent for home consumption. The study notes that it was common practice for old men and women, the blind and other crippled persons to go from catch to catch as the fishing groups come ashore. The presence of similar systems of sharing and social insurance have been reported from other States as well.

The literature also makes reference to institutions that exist within communities. Kurien (2000) refers to the role of the *kadakodi*, the "court of the sea", an age-old community institution among the Hindu fishing communities in the northern part of Kerala State, India, which dealt with issues relating to access, conservation and conflict resolution in fisheries. He notes that this institution provides a forum for all fishermen of the village to participate, with the village elders, in discussions, and to arrive at decisions that could be imposed by social sanctions.

Similarly, Baavinck (2001), in his study of fisheries along the Coromandel coast of Tamil Nadu, notes that, while there is a notion of open access to fishing grounds, there exists as well a sense of territoriality, which allows each hamlet panchayat to impose restrictions on those fishing in its waters. Reports from other coastal States also support this observation. In fact, most major technological interventions in fisheries have met with initial resistance from many within the community, before being accepted in cases where their utility was proved. Such resistance has taken the form of banning use of the technologies within waters adjacent to the village, traditionally fished by people from the village.

However, it has been noted that the importance of community institutions and the traditional, but unwritten, rights of fishing communities to use and regulate resources have not been recognized. As Kurien (1995) points out, this led to the creation of an "…open access regime in the coastal waters where *anyone who had the capital resources could freely enter*." Kurien suggests that this lack of recognition of access, regulation and

use rights is one of the most important reasons for the poorer socioeconomic condition of marine fisherfolk today.

Open access conditions have also been facilitated by the dissolution of many of the earlier existing caste- and skill-based barriers regulating entry into the fisheries—as a result of high profits that attracted outsiders into the sector, and as a result of improvements in technology that made redundant some of the skills earlier confined to fishermen.

It is significant that the State-level Marine Fishing Regulation Acts, defining an artisanal zone where only small-scale vessels can fish, were adopted as a result of strong demand by small-scale fishworkers. However, enforcement of their provisions is known to be weak, leading to *de facto* open access conditions.

Those able to benefit most from the prevailing open-access situation are the technologically efficient larger vessels, while the ones losing out—affected both directly and indirectly by the activities of the former—would include those on non-mechanized crafts who have few other livelihood alternatives in a situation of worsening resources.

5.2. Women's Participation in Fisheries

Women's participation in fisheries-related work is often not recognized. Given the close interlinkages of this neglect with issues of poverty and vulnerability, it is worthwhile to explore the issue further.

Many traditional fishing communities are characterized by a gender-based division of labour, in which women take on several shore-based tasks in the fisheries, ranging from fish vending, processing (mainly salting and drying), making and mending nets, weaving baskets, and, more recently, collecting and selling shrimp seed for aquaculture, peeling shrimp, sorting bycatch and preparing fishmeal. While women's participation in actual fishing is known to be limited—given also the taboos associated with women going to sea—in several areas, it is common for women to fish in inshore, intertidal and mangrove areas, particularly for subsistence purposes.

The important role of women in fisheries-related work has been reported in various studies. Kurien (1984), in his study on fish marketing within Kerala noted: "The role of women as facilitators of fish distribution, particularly in regions of Kerala that formed the erstwhile Travancore State, was indeed significant. For the period during which data is available (1901 to 1921), there is evidence that their numbers were large and also more than that of the men fish distributors."

A survey by Matsyafed (GOK, 1997) of coastal fishing villages in Kerala revealed that in 10 per cent of the villages in the State, women are involved in fishing, in 78 per cent, in processing and in 71 per cent, in marketing. In about half the villages in the State, women migrate to other States in India to work in prawn processing factories. On an average, 70 to 80 girls migrate from each village, but the numbers were higher from Allapuzha and Ernakulam districts.

The 1962 study of the fishing village, Mofusbandar in Andhra Pradesh (GOI, 1962), notes that "fish trading is entirely in the hands of the womenfolk of the fishing community", though a re-study of the same village 20 years later noted that fish marketing was mainly in the hands of outside merchants.

Vivekanandan et al (1998), in their study of the marine fisheries sector of Andhra Pradesh, noted that while the participation of women in drying and salting of fish, especially for catches belonging to the family, was near universal, the percentage of women involved in marketing was much lower and varied from location to location. Many of those involved in marketing and vending, they noted, were older women and widows, generally the main breadwinners of the family.

This is an important aspect, as several other studies have also indicated the greater presence of older women, widows and women heads of household in marketing activities. The relationship between gender, age and economic activities in the fisheries is an aspect that needs to be better understood.

Studies also suggest that it is common for women of coastal fishing communities to take on work outside the sector, especially as agriculture labour, in salt pans, etc. The 1962 study of Mofusbandar, for example, noted that "while the main economic activity of the two hamlets under survey is marine fishing, the subsidiary occupational pattern has a base attached to agriculture and trade." It further noted that while the men work exclusively as fishermen, it is " the women workers that have caused the diversification of occupations along the lines of wage labour in agricultural operations, wholesale and retail selling of fish, and selling of eatables." This is an important aspect that needs greater focus—the role that women of fishing communities play in taking on income-generation work outside the sector, stabilizing, to some extent, the uncertainty of income from the fisheries. This continues to be a pattern observed today.

Policy neglect

It is unfortunate, that, as discussed in an earlier section, the participation of women in fisheries did not receive much policy attention, and even a reference to fisherwomen appeared only in the Ninth Plan (1997-2002). This neglect has had its consequences for livelihoods of women of fishing communities.

Though the First Plan recognized the importance of preserved fish in meeting the food security needs of low-income consumers, the underlying assumption was that if fish were diverted for curing, this would not be advantageous for fishermen, as prices obtaining for fresh fish were higher.

Apart from the fact that this analysis ignored the role traditional curing activities played in stabilizing prices, especially during periods of huge landings, when prices offered to fishermen crashed, what was also not acknowledged was the fact that thousands of people, particularly women—many of whom are the wives of fishermen—depended for their income and livelihood on processing fish at the artisanal level. The focus was clearly on the fisherman, and not on the family or on the total returns to the family in

terms of income and employment. Recent research emphasizes the importance of women's income to the socioeconomic well-being of the family, given that women spend all or most of their income within the family, while the same may not be true of men. In fact, it is well known that a major expense item for men of many fishing communities is alcohol.

In the case of marketing too, the focus has largely been on fishermen and, except in a few cases, on the development of fishermen cooperatives, not taking into account the role women have played in marketing fish.

Similarly, ignoring the fact that many women worked in home-based net weaving has had its consequences. This was particularly the case in Kanyakumari district of Tamil Nadu. According to data from the Tamil Nadu Marine Fishefolk Census, 3,398 women were involved in net-making in 1985. By 2000, this figure had dropped to 352. It is worth noting that data on women employed in fisheries was not gathered in the 1978 Fisherfolk Census. It is likely that the numbers of women in net-making would have been even higher in 1977, before net-making factories were set up in the area in 1979.

In sum, it can be concluded that government policy has tended to provide greater support to fish harvesting activities and to high-technology options in the post-harvest sector. There can be little doubt that there has been considerable neglect of the role women have played in fisheries-related work. There can also be little doubt that this neglect has had its impact in terms of the socioeconomic well-being of women and their families. That women have continued to survive in the sector is clearly a reflection of their own dynamism and resilience.

6. ISSUES FACING FISHWORKERS IN PROCESSING AND MARKETING

This section will look at some of the trends in the post-harvest sector and the implications for the livelihoods of those engaged in post-harvest work, in marketing and processing fish.

It is relevant to mention that shore-based work in the fisheries provides significant employment opportunities. This includes the entire gamut of those persons employed in net-mending and weaving, supply and repair of fishing equipment and gear, boatbuilding and supply, vessel repair and maintenance, provision of ice, marketing, processing and transport of fish, fish exports, etc. It has been estimated that for every person who goes out to sea, there are four persons employed in allied land-based activities.

It also needs to be mentioned that there are no accurate estimates of the number of those engaged in fish marketing and processing, and in other shore-based work.

6.1. Changes in Fish Harvesting Trends: Implications for the Post-harvest Sector

The major changes that have taken place in harvesting have had implications for those on the post-harvest side as well. Given that landings have gone up, it is likely that employment opportunities for those engaged in fish processing and marketing have gone up as well.

However, it is also clear that with the growing trend towards mechanization and motorization, landings tend to be more centralized and harbour-based, from a situation where landings were decentralized and beach-based across the hundreds of villages dotting the Indian coastline. This has repercussions for the employment and incomes of small-scale fish processors and vendors, as it is well known that where landings are decentralized and small-scale, so are processing and marketing operations.

In several areas, it is now common for vendors and processors to travel longer distances, such as to distant harbours, to purchase fish, where, earlier, they purchased the fish at the beach in their own villages. This could mean spending the nights at harbours and landing centres, given that most of the boats return in the early hours of the morning. In the case of women, there are clear risks involved, including of sexual harassment. There are also implications for the family and children of these women.

With larger catches and centralized landings, especially of high-value export species, the situation at landing centres is highly competitive. It is those with greater access to capital, credit and infrastructure—export agents, commission agents, traders and merchants—who are able buy up the higher-value species, meant for export and upmarket domestic consumption. The smaller players, with access to meagre capital—including men and women vendors and headloaders, processors, cycle vendors, etc.—usually get access to only the low-value fish for local consumption, with correspondingly lower profit margins.

In this context, it is relevant to mention that women's access to formal sources of credit continues to be low, except in the few cases where they have organized as cooperatives

and self-help groups. The only option then is to approach informal sources of credit, including moneylenders, charging high rates of interest.

Nayak (1993) noted that in Kerala, fish auctions are increasingly being conducted on a ready-cash basis. This, she noted, adversely affects the position of smaller processors and vendors, because, lacking enough capital or storage infrastructure, they are unable to participate in auctions when landing are large.

Vending, processing and trading of low-value fish, where profit margins are low, continues to be a sector in which women of fishing communities play an important role. Ward (2000), in his study in Andhra Pradesh, estimated that approximately 95 per cent of the estimated total of 50,000 small-scale processors in the State were women.

Even in the case of low-value fish, it is the headloaders who sell fish on foot, or use, at best, public or shared transport, that have a more difficult time, as they have to compete not only for resources, but also for markets. Vendors/ traders on cycles or even motor-cycles (as in Andhra Pradesh and Kerala) can reach markets faster and have a distinct advantage. This is clearly an issue which affects women more, as culturally and socially, it is more difficult for them to own and operate their own transport, and this puts them at a disadvantageous position economically as well.

Several reports have indicated that small-scale vendors and processors continue to be constrained by, among other things, a lack of adequate credit, lack of ice and storage infrastructure, lack of transport, and by poor facilities at markets and landing centres. These are serious issues because they also imply that the post-harvest handling of fish, particularly for the domestic market, continues to be poor. Many studies have referred to the high post-harvest losses in India, in essence implying that fish that could have gone for human consumption has to be discarded or used as fishmeal. Constraints such as lack of ice and appropriate transport, lack of water and sanitation facilities at landing centres and markets, also have implications for the hygiene of the final product and the health of the consumers.

For fish vendors and small traders, the implications are no less serious. Among other things, getting access to credit and ice, finding transport, and trying to operate in markets that are dirty and badly maintained, with little or no access to water and sanitation, and where they face constant harassment from local officials, are recurring issues that have to be dealt with. Several reports have indicated that women vendors are often denied access to public transport, given the `smelly' nature of the product they deal with.

Those in the sector are also known to have evolved various ways to try and cope with the situation and to survive. In a study in Orissa, it was observed that in some areas, particularly in Konark and Gopalpur areas, production and marketing systems are gradually becoming more cooperativised, with four or five women coming together to work as a unit, in order to share the work and, more importantly, the risks (ICM, 2000, unpublished). Women vendors in many areas are commonly known to share costs of hired vehicles. Women at fishing harbours, such as in Vishakapatnam are engaged in

handling low-value bycatch and trash fish from trawlers (ICSF, 1997). Others have found work in peeling shrimp for processing plants.

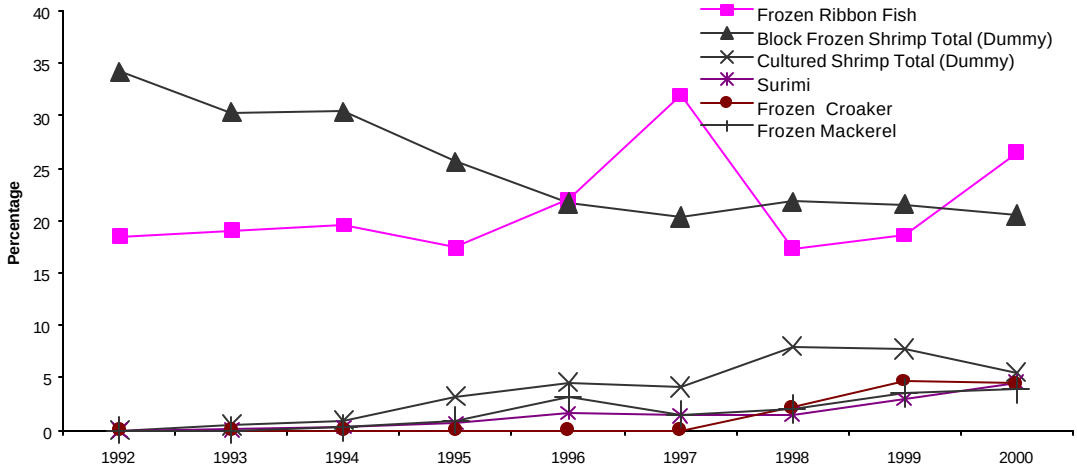
The small-scale fish marketing sector is marked by dynamism where women and men vendors show great resilience in earning a livelihood, often against all odds. Studies to analyze the constraints facing those in the sub-sector are clearly in order, given the scale of employment the sub-sector provides and the importance of the work they do for food security.

6.2.Growth and Changing Composition of Fish Exports

In the light of the above discussion, it is also meaningful to take into account the fact that fish exports from India are not only expanding, but also diversifying. Shrimp, which was the major export item till the mid-1980s, declined from 77 per cent in 1987 to 30 per cent in 2001-02 in quantity terms, though in value terms it continues to be 47.4 per cent of total exports.

Figure 12 shows species-wise quantities of fish exports from India between 1992 and 2000, in percentage terms. It is relevant to note that there has been a substantial increase in the exports of frozen ribbonfish, which is now the single largest species exported from India in quantity terms—26.53 per cent of the total—though in value terms it is only 4.73 per cent of total exports. It would be meaningful to analyze the implications of this trend, given that ribbonfish has traditionally been considered a low-value species, providing employment and income to thousands of fish processors and traders, and meeting food security needs of low-income consumers, often in remote areas. It is also relevant to note the increase in export quantities of frozen croaker and mackerels, also considered as low-value species with good domestic market.

Figure 12: Species wise fish exports from India between 1992 and 2000 (quantity)



Source: compiled from MPEDA Statistics

In Gujarat, Mathew (1998, unpublished)reported that the export market for ribbonfish and croaker, in fresh and frozen form, expanded mainly after 1991. These species were,

until then, used mainly for salting/drying and were being sent to markets in Kerala, Tamil Nadu and Assam, in the process providing significant employment and income to thousands of processors, traders, vendors and transporters, and catering to the food security needs of low-income consumers in distant areas. However, with the development of the export market, the price of raw silver croaker and ribbonfish in Veraval went up to Rs 10-15 per kg in 1995 from just Rs 2 per kg in 1990. Moreover, with the arrival of a surimi plant, offering Rs 9 per kg, dry fish traders had to offer a higher price than that being offered by the surimi plant. It is likely that these trends have had an implication for the livelihoods of those who depend on processing and trading activities.

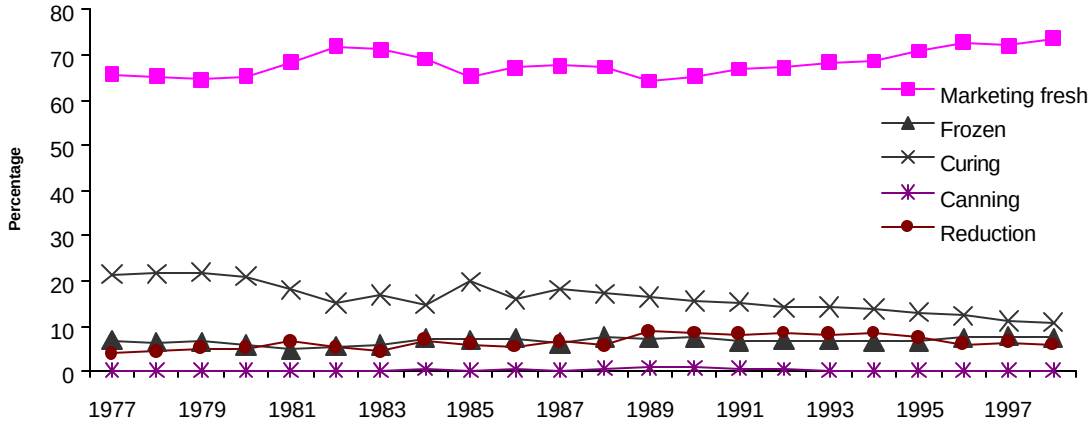
Given the importance of low-value pelagic and other species to local employment, income and food security, the implications of such species entering the export market need to be carefully considered. This is undoubtedly a difficult task, given the fact that there is little information or data on the employment and income generated in the handling, processing and marketing of these species, whereas accurate data about export earnings from these species are available. This implies that there are no figures that can indicate what is lost (in terms of employment, income and food security) but there are figures that can say how much is gained (in export earnings). The balance, in terms of according visibility where it is due, clearly needs to be restored.

6.3. Changing Patterns in Disposition of Fish Catch

Trends at the national and State level indicate that there is a change in the pattern of fish utilization and that more fish is being utilized in the fresh and frozen form, both for export and for domestic consumption (Figure 13). It can be seen that between 1977 and 1998, the proportion of fish being utilized in the fresh form has increased from 65 to 74 per cent and in the frozen form from 6.9 to 7.5 per cent. However, the proportion that is being cured has fallen from 21 to 10.8 per cent during the same period.

The Report of the Working Group on the Fifth Five Year Plan (1974-1979) had noted the changing trend in disposal of catches, observing that, while fish curing, also for export to countries like Burma (Myanmar) and Ceylon (Sri Lanka), accounted for more than 50 per cent of the catch before independence, this had since dwindled to about 25 per cent. In 1998, this figure was down to 10.8 as mentioned above.

Figure 13: Disposition of fish catch: India (1977-1998)



Source: Government of India, 2001a. Handbook of Fisheries Statistics 2000. Department of Animal Husbandry and Dairying. New Delhi

The trend towards fresh fish could, in itself, be a positive trend from a socioeconomic perspective, particularly if it has meant that small-scale vendors and traders have been able to benefit from the changing trend toward fresh fish. This is an aspect that needs to be better explored, for it is likely that as traditional avenues of employment have declined, others have come up in their place, given that landing have gone up so sharply in the past decades.

However, the fact that utilization of fish in the cured form has declined is certainly an issue with repercussions for those who had been employed in fish curing activities—generally low-income small-scale processors—as well as for consumers in remote areas likely to remain untouched by `cold chain' technologies in the foreseeable future.

States where significant quantities of fish are cured include Maharashtra, Tamil Nadu, Gujarat, Orissa, Andhra Pradesh and Kerala. The most drastic decline has been in Andhra Pradesh, where the amount of fish cured has fallen from 25 per cent in 1989 to 5 per cent in 1998. In all these States, particularly in Andhra Pradesh, there has been an increase in fish utilization in the fresh form.

A DFID report from ICM (2000, unpublished), for example, notes that in Bada Arjipalli, a small fishing village in Ganjam district, almost 80 per cent of the catches from the village were being dried and traded by the women until the early 1990s. However, a decade later, less than 50 per cent of the catches are available for drying or petty fresh-fish trade, forcing the women who depended on this activity to seek work elsewhere as labourers.

It is worth analyzing the implications of this trend for those who have traditionally depended on income from sale of processed and cured fish, usually the women of fishing communities. It is clear that few policy measures have been taken to develop the skills and the capacity of small-scale processors, to enable them to retain their livelihoods by improving the quality and marketing of their products, or to diversify into other forms of

fresh-fish trade. It is well known, for example, that cured fish products continue to have a good market in remote regions, such as in tribal areas and in parts of northeast India but there appear to have been few policy initiatives to support trade in cured fish products to these markets.

6.4. Poor Conditions of Work in Processing Plants

The boom in shrimp and fish exports created a lot of employment opportunities, and several thousands, including women, found employment in shrimp peeling and in processing plants. According to the Report of the Task Force appointed by Ministry of Labour (2001b), the estimated total number of workers in the fish processing industry is about 150,000, with about 100,000 workers directly engaged in fish processing.

Research has, however, thrown light on the poor conditions of work existing within processing plants. A survey by Nishchith (2001) of 16 seafood-processing plants located on the east coast (in the States of Orissa, Andhra Pradesh, and Tamil Nadu) indicated that women dominate the industry with a male to female ratio of 3:10. It also indicated that the industry generally employs young, unmarried women, primarily in the age range 21-30, educated, and primarily from Kerala. His study also showed that women were overworked and underpaid, and that there existed a conspicuous disparity in favour of men, in terms of wages and benefits paid.

The wage rates of women workers, calculated on a piece-rate basis, were found to be almost half those of the men, which is perhaps one reason why greater than required numbers of women were employed in these units. The women employed in the processing plants were also found to be experiencing certain job-related health ailments. The long hours of work, constant exposure to cold water and chlorine resulted in muscle cramps, skin irritation, eczema and respiratory illnesses. Other studies have also referred to the poor wages and working conditions of women workers, especially migrant women workers most of whom are from Kerala, in processing plants, particularly in Gujarat. According to the Report of the Task Force mentioned above, most of the workers in processing plants are now employed on a contract basis.

Reports on conditions of work in peeling sheds (pre-processing plants supplying to export plants) in Kerala are also revealing. Women are employed for peeling the shrimp on a piece-rate basis. There is dearth of information about the number of peelers at the State level working in the 728 peeling sheds located mostly in districts like Alappuzha, Ernakulam and Kollam (GOK, 1997). It has been reported that peeling women are paid about Rs 5 for every 1.5 kg of prawn and that, as it is possible for one woman to peel up to 15 kg a day, an income of Rs 50 per day is possible. Conditions of work are difficult, as women have to sit for long periods on their haunches in damp conditions. Continuous peeling, without the use of gloves and protective equipment, often lead to bleeding of fingers. Job security is absent as work is only available when catches are good and labour laws do not apply as the women are considered casual labour.

It is also worth keeping in mind that with the application of HACCP (Hazard Analysis of Critical Control Points) and other standards on the fish processing and export industry,

many of the women working in pre-processing plants are likely to lose their jobs, as work such as shrimp peeling will have to be conducted within factory premises under hygienic conditions. Thousands of women in States like Kerala are thus in the process of losing access to even this form of work, and this is an aspect that needs to be monitored.

Additionally, it is worthwhile to look at the nature of employment generated by fish processing plants, to examine whether an expansion of processing capacity will be able to benefit workers in the sector, and the regulations that would be needed to ensure dignified and safe conditions of work. In this context, it would be worthwhile to examine and implement the recommendations of the Task Force that had been appointed by the Ministry of Labour, for improvement of the living and working conditions of women workers in the fish processing industry.

Concluding comments

It is clear that while the post harvest sector provides employment to thousands of workers—a majority of whom are almost certainly from the economically weaker sections—the livelihoods of many of them are increasingly vulnerable. Such groups would include women and men involved in vending and headloading, small-scale traders, workers in processing plants and peeling sheds, small-scale processors engaged in salting and drying fish, etc.

It is also clear that even as some forms of employment appear to be shrinking new forms are appearing. It is likely, for example, that the opportunities in handling and utilizing by catch and trash fish have gone up, as have openings for work in pre-processing and processing units. However, the nature of employment that has been generated and the incomes possible from engaging in them, need to be closely monitored and regulated.

This section has identified many of the constraints facing those in the sector, which need to be addressed, to ensure dignified and viable livelihoods to those in the sector. It has also identified trends, such as exports of fish products with good local demand, that need to be closely monitored from the perspective of poverty and sustainable livelihoods.

7. INTERVENTIONS IN COASTAL FISHERIES

This section will discuss current interventions—both official and private-sector sponsored—in coastal fisheries and their impact on poverty in coastal fishing communities. The aim is to analyze some of the important interventions, without attempting to provide an exhaustive overview.

7.1. Interventions by Fisheries Line Agencies

The discussion below will limit itself mainly to an analysis of direct interventions by fisheries-line agencies in the area of welfare and development of cooperatives and self-help groups. Selected interventions that directly relate to poverty issues in fishing communities will be discussed.

In general, most policy directions and interventions by the State have implications for the socioeconomic well-being of fishing communities. The earlier sections discussed State policies for modernization of the fisheries sector and for fisheries management, and some of the impacts of these policies particularly on small-scale fishworkers in harvest and post-harvest activities. These aspects will not be discussed again.

Interventions by many other State and Central-level agencies, apart from the fisheries-line agencies, have significant impacts on poverty in coastal fishing communities. Important interventions of this nature would include the public distribution system (PDS), the provision of free education and healthcare, etc. However, discussions on these are beyond the scope of this report.

7.1.1Welfare Schemes[3]

At the Central level, the Ministry of Agriculture launched the Centrally Sponsored National Welfare Scheme for Fishermen in 1992-93, with three components: Group Accident Insurance Scheme (GAIS), Development of Model Fishermen Villages (MVS) and Savings-cum-Relief (SCR) Programme. Before this period, each of these programmes constituted a full-fledged scheme in itself (NIRD, 1995).

The objective of GAIS is to provide insurance cover to fishermen actively engaged in fishing. Active fishermen in the age bracket of 18-65 only are covered under the programme. The scheme has been revised and the fishermen are now insured for Rs 50,000 against death or permanent disability and Rs 25,000 against partial disability. The premium amount of Rs 14 per beneficiary per annum is shared equally between the Central and State Governments (GOI, 2001). The amount given to fishermen under this scheme may vary from State to State.

The objective of the MVS component is to provide basic civic amenities such as housing, drinking water and community halls for fishermen villages. The cost of houses constructed under the scheme is Rs 40,000.

[3] Information on welfare schemes has been obtained from Annual Reports of the Department of Fisheries of various States and of the Department of Animal Husbandry and Dairying (DAHD), Ministry of Agriculture, GOI.

The objective of SCR is to provide financial assistance to the fishermen during the lean fishing periods. The rate of contribution by the fisherfolk is Rs 75 per month for eight months. This contribution is matched by a contribution shared equally between the Central and State governments, and the accumulated amount is distributed back to fishermen in four equal installments of Rs 300 per month.

Each of these schemes involves an outlay from the State as well, and, in this context, it is relevant to note that not all States have taken up these schemes, as can be seen in Table 11. While five States have taken up all the schemes, Goa has not taken up any and Maharashtra has taken up only one of them. It is also worth noting that the coverage and implementation varies even between the States that have taken up these schemes. An Evaluation of Centrally Sponsored National Welfare Scheme for Fishermen conducted by the National Institute of Rural Development (NIRD), Hyderabad, for the Ministry of Agriculture in 1995, noted that malpractices were reported in the savings-cum-relief scheme, particularly in Andhra Pradesh, where coverage was also reported to be poor.

Table 11. Centrally sponsored welfare schemes and States that have taken them up during the Ninth Plan period (1997-2002)

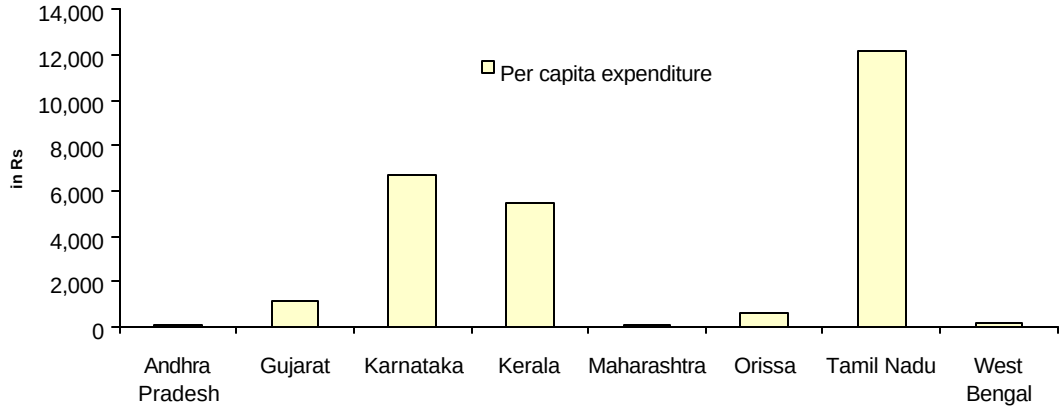
State Name	Group Accident Insurance Scheme (GAIS)	Savings-cum- Relief Scheme (SCR)	Model Fishermen Village (MVS)
West Bengal	√		√
Orissa	√	√	√
Andhra Pradesh	√	√	√
Tamil Nadu	√	√	√
Kerala	√	√	√
Karnataka	√	√	√
Maharashtra			√
Gujarat	√		√
Goa			

It can be observed that almost all the States have taken up the MVS (provision of housing) scheme. In terms of expenditure as well, the maximum expenditure by all States taken together is on the housing (MVS) component, followed by the Savings-cum-Relief Scheme. Clearly, better housing has been seen as a priority by most States.

Apart from the above Centrally sponsored schemes, many States, notably Tamil Nadu and Kerala, have initiated their own welfare schemes. These will be discussed in greater detail later.

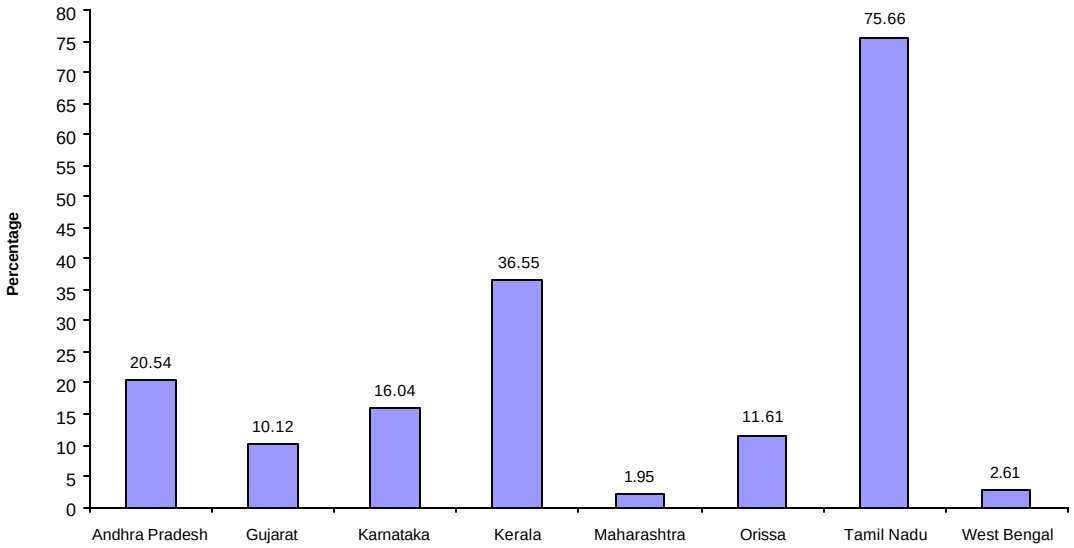
Figure 14 shows per capita expenditure for welfare schemes for coastal States. It is clear that per capita expenditure is highest in Tamil Nadu, followed by Kerala and Karnataka, and is lowest for Maharashtra and Andhra Pradesh.

Figure 14: State-wise per capita expenditure for welfare schemes for fisheries during the Ninth Plan Period (1997-2002)



Note:
- Full time and part time fisher population has been considered as total fisher population. Estimates from Government of India, 2000. Handbook of Fisheries Statistics 2000. Department of Animal Husbandry and Dairying.
- Information on expenditure is from various Reports of Department of Fisheries

Figure 15: Expenditure on welfare programmes by Departments of Fisheries as a proportion of total State Plan expenditure, Ninth Plan period



From Figure 15 it can be seen that the Plan expenditure on welfare programmes, as a proportion of total Plan expenditure by the Department of Fisheries, is also highest in the case of Tamil Nadu, followed by Kerala and Andhra Pradesh, and lowest in the case of Maharashtra.

7.1.2. State-level Welfare Schemes

Tamil Nadu

In Tamil Nadu, the maximum emphasis, in terms of expenditure, is on housing. The Tamil Nadu government has also formulated a Group Insurance Scheme (State) for an additional insurance coverage of Rs 15,000, over and above the existing Central scheme.

There is also an innovative scheme to provide assistance to families of fishermen arrested in Sri Lanka, whereby Rs 50 per day is given to the families of those arrested. This reflects the gravity of this problem in Tamil Nadu.

Significantly, Tamil Nadu also has a group accident insurance scheme for fisherwomen (State scheme). This clearly shows the recognition that the State in Tamil Nadu is giving to women's work in fisheries. According to informed sources, Tamil Nadu is also extending the savings-cum-relief scheme to fisherwomen, a long-standing demand of many women's groups.

Kerala

Kerala is the only State which has set up a Fishermen's Welfare Fund Board constituted as per the provisions of the Kerala Fishermen's Welfare Fund Act, 1985. The main sources of income of the board, apart from contributions from the Centre and State, as envisaged in the Act, are contributions from various categories, including fishermen, exporters, other dealers, and owners of craft and gear. Significantly, the Act requires fish exporters to contribute one per cent of their sales turnover. However, in response to a case filed by fish exporters from Kerala, the Supreme Court of India declared this requirement as unconstitutional.

The Kerala Fishermen's Welfare Fund Board implements about 21 welfare schemes for fishermen and 9 schemes for allied workers. The schemes are designed in such a way that fisherfolk may get the benefit of these schemes at each phase of his or her life. Significantly, there are several schemes for fisherwomen and wives of fishermen.

Apart from the usual Centrally sponsored schemes, there are also some unique schemes implemented by the Board, including: financial assistance for the marriage of daughters of fishermen; financial assistance for the death of dependants; old-age pension schemes; financial assistance for temporary disability due to accident; financial assistance to the dependents for the death of fishermen; SSLC (secondary school leaving certificate) cash awards and scholarships; financial assistance for the treatment of fatal diseases; maternity benefit scheme; cash award for higher education; and widow pension and financial assistance to handicapped and mentally retarded children of fishermen.

Another innovative scheme is the Allied Workers Welfare Scheme that aims to induct workers engaged in the fishery-related activities as 'members' of the welfare fund. These allied workers are divided into five categories, namely, beach workers, small-scale fish distributors, fish curers, peeling workers and processing workers.

There are nine schemes for Allied Workers, including Group Accident Insurance Scheme, old age pension, maternity benefit scheme for women allied workers, SSLC cash award and scholarship, financial assistance for treatment of fatal diseases of allied workers, financial assistance for the marriage of daughters of allied workers and widow pension.

In terms of range and coverage, the schemes are really impressive. Kurien and Paul (2000) note that the enhancement of the social security system in Kerala was also in response to the pressure exerted by fishworker groups and organizations in the State.

However, it is also reported that the severe shortage in funds, particularly as a result of the abovementioned judgement exempting exporters from contributing to the fund, as well as the high administrative costs of the fund, make it difficult to implement many of these schemes. Kurien and Paul report, for example, that delays in receiving old age pension can be up to two years.

Kurien and Paul also point to the recommendation by the United Nations that at least 5 per cent of the GDP should be spent by developing countries to sustain a minimum level of social security assistance for their citizens. In the case of Kerala, taking the ratio of the annual average of the social security payments to the fishery sector product (FSP), it was found that, between 1986 and 1998, this was 1.71 per cent, lower than the recommended 5 per cent. The question, therefore, remains whether the social security provisions are adequate.

Nevertheless, it is clear that there is much to learn from the examples of Tamil Nadu and Kerala, regarding the role of the State in provision of social security and welfare, and the impact of these schemes on poverty in fishing communities. There can also be little doubt that these schemes have great relevance, given the high-risk nature of the profession and the uncertain incomes characterizing the sector.

A closer study of the impact of these schemes is clearly warranted, with a view to ensuring the dissemination of positive schemes in States where they have not been taken up, or have been taken up in a limited way.

7.1.3. Cooperatives

As mentioned earlier, there has been a consistent emphasis throughout the Plan periods on setting up and expanding cooperatives, seen as indispensable for preventing exploitation by middlemen, removing the indebtedness of fishermen and increasing production. There has also been a consistent recognition of the problems facing cooperatives. The Eighth Five Year Plan (1992-97) explicitly states that, except in Maharashtra, Gujarat, Tamil Nadu and Orissa, the fishermen cooperatives in other States do not play any significant role in the development of fisheries.

The Expert Committee Report on the Fisheries Policy of Tamil Nadu (1997), for example, notes: "The performance of the fishermen cooperative societies in the State is generally poor and to a majority of the fishermen the cooperatives are only a means to

channel government credit, etc., and for other purposes they are as good as non-existent." Reliable sources indicate that membership in cooperative societies in Tamil Nadu is sought mainly to facilitate access to the various welfare schemes run by the State (GAIS, SCR and housing). It is also reported that repayment of loans taken, has, in general, been poor.

However, it is also known that, in some cases, particularly in Maharashtra, cooperatives have been functioning well, and are in good financial health. In the case of Kerala, a rapid assessment of Kerala fisheries in 1997 by Matsyafed, the official government-sponsored State-level apex body of cooperatives, observed that credit is in short supply and is available only at very exorbitant rates of interest leading to a situation of permanent and increasing indebtedness. The presence of fishermen societies initiated by organizations such as Matsyafed and SIFFS were seen as important in breaking this credit and marketing nexus. But the survey also indicated that among the Matsyafed societies, with the exception of Kannur district, where the repayment is considered to be good, in other districts, repayments were rated between fair and poor (GOK, 1997).

It would also be meaningful to look at the experience with the fisherwomen's cooperatives known to exist in Kerala, Tamil Nadu and Maharashtra. It has been reported, for example, that the cooperative society in Versowa, Mumbai, has helped considerably in solving the transport problems of its members. Following this, exclusive fisherwoman cooperatives were formed in Maharashtra, with the main objective of solving the problems of transport to distant market areas.

One of the best examples of this is the Mirkarwada Mahila Macchivyasaikanchi Seva Sahakari Sanstha, Ratnagiri, the first women's cooperative. society in Ratnagiri district. The society has a membership of 150 to 175 fisherwomen and owns two trucks and two buses. Members pay a fixed amount for their daily or weekly transport, which helps them in covering different weekly markets at distant villages. This system has been working very efficiently. Another example is the Sakharinate fisherwomens co-operative society, also in the same district, which owns one truck (Mohite 2003).

There is a clear need to understand better the reasons why some cooperatives have succeeded, even as others have not, and to address effectively the issues identified, including the legal and institutional issues constraining the functioning of cooperative societies. From the example of well-functioning societies, it is clear that cooperatives do have a significant role to play in improving the socioeconomic conditions of its members.

7.1.4.Self-Help Groups

There is a significant emphasis today in States like Tamil Nadu, Andhra Pradesh, Orissa and Kerala, both by governmental and non-governmental organizations, to set up self-help groups (SHGs), including among fisherwomen. In Tamil Nadu, both the Department of Rural Development and the Fisheries Department are putting great emphasis on developing SHGs. The Fisheries Department is of the view that there is great potential in promoting such groups, given the experience so far. They also consider this to be a useful intervention in improving the socioeconomic condition of women in fishing

communities. The Department of Rural Development has brought out several `success stories' with SHGs, of which about four are groups in fishing communities (see Box). In this context, it is worth mentioning the role of the National Bank for Agricultural and Rural Development (NABARD) in supporting the emergence of such groups through the provision of credit. In the fisheries sector, NABARD has identified certain key activities that can be taken up by women SHGs, including composite fish culture of Indian major crops and exotic crops, prawn culture, integrated fish culture along with horticulture and animal husbandry, backyard hatcheries, traditional fish farming in rural areas, fish-feed manufacturing as a cottage industry, fish harvesting/fishing, organic farming, fish marketing (wholesale/retail), fish curing, fish processing and packaging, value addition to otherwise uneconomic fish species (pickles/sauce preparation, etc.), fish trading/vending, transport operations, net mending/repairs, ornamental fish farming, biotechnological projects like spirulina, artemia, azolla culture, etc., and tiny- and small-scale industrial units for fishing equipment. Since 1992, NABARD has had a women's cell to focus on gender issues in credit and support services. Of 14,313 SHGs in the fisheries sector in 2000, 11,072 were formed by women. It is reported that the repayment rate of the loans taken by the women's SHGs have been very good (Samantray and Pathak, 2000).

It is certainly worth doing a detailed analysis of the experience with SHGs in fishing communities in terms of their socioeconomic impact, and to see how such groups can be expanded in meaningful ways.

Women's Self-help Groups (SHGs) in Tamil Nadu
(Government of Tamil Nadu, 2003)

Rearing lobsters
Kodimunai Village in Kanyakumari District
Women's SHGs here obtain juvenile lobsters and rear them until they attain full size. Fully grown lobsters fetch a price of anywhere between Rs 400 and Rs 700 per kg. With help from the local government bodies and technical inputs from the Fisheries College at Tuticorin, a farm with eight tanks was set up at a cost of Rs 1,04,000, to which the SHG contributed Rs 26,000. In the very first year, the SHG made profits in excess of Rs 25,000 per month.

Fish marketing
Seerkazhi Division, Nagapattinam District
Women fisherfolk in this division have started SHGs for fish marketing. Each SHG in the division was given a revolving fund of Rs 25,000 to enable it to buy fish for resale. Based on their performance, they were then given an additional loan of Rs 50,000, which included a subsidy. This loan is being repaid at the rate of Rs 1,000 per month. As a result of this intervention, the SHGs participate in a big way in the fish auctions. Grading of fish by the SHGs according to size and quality helps them get a better price. However, right now, they have only a shed from which to function. Even the ice-boxes they use have to be rented. Although the SHGs are doing very well, much is needed in the form of infrastructural support. Deep-freezing facilities, as well as proper facilities for salting and drying fish, are needed. At present, the salting and drying is done on sackcloths spread on the sand.

Net making
Francis Nagar, Mandapam Division, Ramanathapuram District
The SHG has obtained a loan of Rs 30,000,000, which includes a subsidy of Rs 1,25,000. This loan has gone towards setting up a unit where fishing nets are made by hand. Handmade nets are more durable and stronger than machine-made ones, and each net can be sold for as much

as Rs 18,000. The unit helps each of its members make profits in excess of Rs 2,000 every month. The SHG has a common fund of Rs 53,000, out of which loans are given to members to meet urgent requirements.

Crab rearing

Keezha Arasadi Village, Ottapidaram Division

A crab-rearing facility at a cost of Rs 500,000 and an auction centre at a cost of Rs 1,000,000 have been built by the district authorities. The 4,000-odd people of Keezha Arasadi are fisherfolk, and crabs, including juvenile crabs, form a major part of their catch. Juvenile crabs, known as "kazhi nandu" (waste crabs), do not fetch more than Rs 50 or 60 per kilogram, as against the fully grown crabs that fetch between Rs 350 and 400 per kg.

Five women's SHGs, with a total membership of 79 women, are functioning here and their main activity is acquiring the small crabs and rearing them in the facility until they are fully grown. This is done with inputs from the Suganthi Devanesan Ocean Research Centre of the Manonmaniam Sundaranar University. The SHGs gather food for the crabs from the seaside, thus saving the cost of feed.

(Source: From *Makalir Suya Udhavikkuzhakkalin Vetrikkadhaigal* (Success Stories of Women Self Help Groups), Department of Rural Development, Government of Tamil Nadu, 2003)

7.1.5.State-level Fisheries Policies

The Kerala Fisheries Development and Management Policy of 1993 is one of the few policy documents, at the Central or State level, that have had such a strong focus on issues of poverty and livelihood security. Notably, the policy highlighted the need for aquarian reform legislation in the territorial and inland waters to ensure that the rights of ownership of fishing assets rest only with those who fish. It also called for the right of first sale to be ensured to the fish harvester. The policy also stresses on other important aspects, such as the need to improve coordination among various governmental institutional set-ups, to improve credit availability, to raise the level of skills and productivity of fishworkers, to raise the socioeconomic status of those involved in fisheries-related activities, and to enhance the participation of fishworkers and women in the management of resources and in the fish economy (GOK, 1997).

The Government of Kerala subsequently set up a Task Force on Livelihood Secure Fishing Communities in 1997. However, the recommendations of the Task Force, which translated this policy into concrete programmes of action, are, unfortunately, yet to be implemented meaningfully. According to the ADB (2003), in the Draft Proposal on Fisheries Policies, announced in February 2002 and the new draft policy titled "Fisheries Development and Management Policy" issued in September 2002, the "revolutionary programmes, viz., aquarian reforms, Matsya Bhavan, women empowerment, formation of district-level fisheries management committees, etc. envisaged in the fisheries policy of 1994 are totally missing in the present policy document." Despite this, however, Kerala remains the only coastal State with has put a strong policy emphasis on livelihood issues in the fisheries sector.

7.1.6. Fish Markets

The fish market in Margao in Goa, being run by the South Goa Planning and Development Authority, is known to be one of the best fish markets in the country today.

The market has facilities for water and sanitation and is hygienically maintained. Women's groups and fishworker organizations are demanding fish markets built along similar lines in their States as well. It is worth studying the possibility of developing such markets elsewhere, given their relevance to both conditions of work and hygiene.

7.1.7. Education

The State government of Kerala has taken up several interesting initiatives for education among fishing communities. Fisheries Technical High Schools were started in 1968 to enable fishermen with secondary education to learn about modern techniques of fishing, fish processing, fish trade, and building strong cooperative organizations. Apart from this, residential fisheries schools were started in several districts, where boys from *bona fide* fishermen families, who had completed their primary and upper primary education, were given admission. Each year, a maximum of 40 students are being admitted in Class 8 and taught until Class 10. These schools provide a public-school type of education, with a fisheries bias. Children are also given instructions in seamanship and navigation, and practical training in net fabrication. Additionally, in 1984-85, the State Government started vocational higher secondary courses in fisheries in selected Fisheries Technical High Schools and Government High Schools—a two-year course, with emphasis on aquaculture, fish processing, technology, fishing craft and gear technology, and marine engine operation and maintenance. Fishermen training centres were also started by the State to enable the traditional fishermen to get used to mechanized fishing operations.

Thomas (1989), in a study of educational standards in fishing communities in Kerala, observed that, though the various measures introduced by the government had not been fully successful, to a certain extent, the State has succeeded in its venture by developing an incentive among the fisherfolk to take up further learning. It would be useful to study the achievements and drawbacks of these initiatives, with a view to replicating them in other States.

7.2. Other Interventions: Unions and NGOs

The following pages will look at some of the initiatives being taken by NGOs and other organizations in the fisheries sector. It needs to be emphasized that the information here is by no means exhaustive. At the same time, very little information on NGOs working in the fisheries sector in States like Gujarat, Maharashtra, Karnataka and West Bengal is available. It is not clear whether this is because there are fewer NGOs working in the fisheries sector.

7.2.1 South Indian Federation of Fishermen Societies

The South Indian Federation of Fishermen Societies (SIFFS) is a non-governmental apex organization of village- and district-level fish marketing societies of small-scale artisanal fishworkers of south India. The organization has made important contributions in a wide range of areas, relevant from a socioeconomic perspective, including in marketing, credit and savings for small-scale fishermen, in the development of appropriate technology, in research on small-scale fisheries, and so on (see Box).

7.2.2 National Fishworkers' Forum

The National Fishworkers' Forum (NFF) was formed in 1979. It is a national federation of independent State-level fishworkers' unions. NFF was active in mobilizing traditional fishing communities against destructive bottom trawling, against the 1991 joint venture policy, and against coastal industrial shrimp aquaculture and other forms of coastal degradation like pollution and upstream dams. The NFF sees the enactment of Marine Fishing Regulation Acts by the coastal States, adoption of a uniform monsoon ban on bottom trawling, a ban on night trawling, and the cancellation of the 1991 joint venture policy as some of the positive outcomes of its campaigns.

7.2.3. Alliance for the Release of Innocent Fishermen (ARIF)

This is a loose network of trade unions, NGOs, and fishermen's associations that are committed to the release of *bona fide* fishermen from India and Sri Lanka. The network evolved in the context of the increasing number of cases of arrest and detention of innocent fishermen in Sri Lanka and India. ARIF plays a vital role in facilitating the release of such fishermen and their vessels.

7.2.4. Swadhyaya Parivar (SP)

The Swadhyaya, a social reform movement drawing its inspiration from the Vedas, with a following of many thousands in Gujarat and Maharashtra, has also been working with the fishing communities in these States, through an innovative institutional experiment called Matsyagandha. Thirty-two boats, called floating temples, have been developed specifically for the fishermen communities. The catch of the boat is seen as belonging to God, and the act of fishing is seen as worship. Followers of SP, numbering about 64,000 fishermen, work in rotation on these boats—small, mechanized trawl boats fishing in inshore areas. The income earned from the fish caught goes to support poor and needy fishing families. It is also reported that, under the influence of the SP, many fishermen have left alcohol (Khakhar, 1995).

South Indian Federation of Fishermen Societies (SIFFS)
www.siffs.org

SIFFS (South Indian Federation of Fishermen Societies) is a non-governmental apex organization of village- and district-level fish marketing societies of small-scale artisanal fishworkers of south India, said to be the largest network of small-scale fishermen organizations in the world. With over 8,000 fishermen members spread over a 1,200-km coastline in South India, SIFFS has been making crucial contributions to strengthening the small-scale artisanal fisheries sector. SIFFS is an organization run by fishworkers' representatives identified through democratic processes, and assisted by professional managers. SIFFS makes available a range of services to its members as well as to non-member fishermen.

The fish marketing societies run by SIFFS are founded on a member-based, marketing-oriented model, with membership open only to active fishermen. The three core activities of the model are marketing of fish caught by members, providing credit for renewal of fishing equipment and promoting savings.

Marketing of the members' fish catch forms the most important activity of the society. A salesman appointed by the society, who is also responsible for collecting and remitting dues from the

buyers, carries out the auction. For the member fishermen-who had to do all this himself earlier-it is just a matter of presenting the sales bill at the society office and collecting his earnings.

An extremely important service the society provides is that of credit. Bank credit is tapped by societies and routed to members, and the repayment is made through deductions in the range of 5-15 per cent of the member's daily sales value. Further, societies also implement savings schemes, wherein 2 per cent of the daily sales value is deposited in the member's name with the society. The accumulated amount could be withdrawn at a later date under stipulated rules. The credit programmes under the SIFFS network (SIFFS, district federations and primary societies) cover the following requirements: purchase and renewal of fishing equipment, repair and maintenance of fishing equipment, post-harvest activities (fish vending, fish processing), food credit, employment diversification, and other consumption credit. The credit programme is tightly coupled with fish marketing and savings. Loan repayment is generally based on a percentage (5-15 per, cent depending on the quantum of loan) of fish catches, and not on a fixed installment. This system is 'natural' for fisheries, but it suffers from the same uncertainties as the incomes of fishermen.

SIFFS also engages in various developmental and commercial activities. Commercial activities include boatbuilding; import and distribution of outboard motors and spares; a network of outboard motor workshop and service centres; fisheries credit programme; a network of Ice plants; growing albyzzia timber for kattumarams (the traditional fishing craft) and manufacture and distribution of ice-boxes.

An important contribution of SIFFS is the census of the artisanal fishing fleet in Kerala, done twice, in 1991 and 1998. This provided, for the first time in Kerala, villagewise disaggregated information on craft, gear and outboard engines. A more refined classification system was used with 14 craft categories and 15 gear categories, that took into account both type of craft/ gear as well as the size of the equipment.

Another important contribution has been the 1991 study assessing the techno-economic viability of the motorized sector and the remnants of the non-motorized artisanal fishing units along the lower southwest coast of India. This was a follow-up to the earlier pioneering study, "Economics of Artisanal and Mechanized Fisheries in Kerala", conducted jointly by the Programme for Community Organization, Trivandrum, the FAO/ UNDP and the FAO/ Bay of Bengal Programme.

The work of other NGOs and organizations, important from a socioeconomic perspective, will be briefly discussed below.

7.2.5. Social Security in Fisheries

It is worth mentioning some of the `non-governmental' systems of social security in fisheries that have evolved. The Bhai Bhandarkar Trust in Maharashtra, for example, provides financial assistance, in accordance with the main objectives of the Trust, which include: to give financial help to the families of fishermen who have lost their lives while fishing in the sea due to cyclones, storms, accidents or any other natural calamity; to give financial assistance to the fishermen who have become physically handicapped due to the above reasons; to give financial assistance for education and medicines to the family members dependent on the fishermen who have lost their lives in the circumstances mentioned above; to give financial assistance to the fishermen suffering from permanent disabilities caused during fishing operations; and to impart training to fishermen to guard against the dangers to their lives, by supplying them with modern safety equipments, whenever possible. The Trust gives a one-time financial assistance of Rs 5,000 to the

family of the deceased fisherman. It also gives financial assistance for educational purposes to children of the deceased fishermen, at rates fixed by the Trust. This assistance is given right up to the Bachelor of Arts level. Financial help is also provided for post-graduate education

The member federations of SIFFS have also initiated their own social security schemes. The Kanyakumari federation, for example, has initiated a pension scheme for its members, according to which a member, on retirement, is given a lump sum amount of Rs 15,000. The Trivandrum federation has started a system of insuring craft and gear that is lost or damaged. According to this system, members raise a total of 50 per cent of the costs of the lost or damaged craft or gear through collections among themselves, while the balance 50 per cent is paid by the federation. These are important interventions in a fisheries context, particularly as the cost of craft and gear can be very high.

7.2.6. Community Management Initiatives

Community management initiatives have been limited and have taken the form of mangrove protection or construction of artificial reefs, to act as fish aggregating devices, to increase fish catches and to act as barriers to the operation of bottom-trawl nets. Some communities in Kerala, with the help of an NGO, constructed about 21 people's artificial reefs (PARs) at depths of 12 to 15 metres between 1984 and 1989 (Kurien (2003). Kurien also notes that communities evolved several norms to restrict the fishing effort by individuals, with priority access given to older fishermen and to young boys learning to fish.

In Andhra Pradesh, the Action for Food Production (AFPRO) has assisted fishing communities to install artificial reefs made of cement moulds, sunk off the coast in clusters of four to five. It is reported that launching artificial reefs off the Nellore coast in Andhra Pradesh has shown positive results, as traditional fishers from five villages in the area report better catches as a result of the reefs. While these represent interesting initiatives by communities, scientific research is needed to better understand the impact of creating such man-made artificial reefs on the productivity of fish stocks.

Organizations like the M.S. Swaminathan Research Foundation (MSSRF) are engaged in developing the capacity of local communities to manage mangrove resources in several parts of the east coast.

7.2.7. Community Mobilization and Organization

Several NGOs are helping communities to organize to gain access to resources, and around issues that are negatively affecting their livelihoods, such as, for example, unregulated shrimp farming, and declining access to, and increasing pollution of, fishing grounds. This includes NGOs like Neythal and SNEHA based in the southern part of Tamil Nadu, PREPARE, also in Tamil Nadu, Masses Association for Self-sufficiency and Economic Security (MASSES) and the Society for National Integration through Rural Development (SNIRD) in Andhra Pradesh, and the Programme for Community Organization (PCO) in Kerala. Several networks such as the Campaign against Shrimp Industries (CASI) and Coastal Action Network (CAN) have also evolved with the same

purpose. These NGOs and networks, to a greater or lesser extent, have been able to draw attention to the issues facing coastal fishing communities.

7.2.8. Micro-credit, Alternative Employment and Entrepreneurship Development
Many NGOs are now reported to be playing a role in helping fishing communities increase their access to credit, through micro-credit programmes, and to support alternative income-generating activities.

This includes organizations like SNIRD and MASSES in Andhra Pradesh, and Santhidan and Anawim in Tamil Nadu. Anawim, for example, is working to promote self-help groups for women in the coastal communities of Tuticorin in Tamil Nadu through activities such as vermiculture, permaculture and preparation of spirulina capsules.

The Self-employed Women's Association (SEWA), functioning in both Trivandrum and Ernakulam in Kerala, is an interesting initiative providing alternative income-generating activities for women. The membership base of SEWA in Ernakulam is about 3,000 women, mainly women of fishing communities. In Trivandrum, of the membership base of 900, approximately 400 are from fishing communities. Through the organization, women are trained in alternative sources of employment in the services sector. The organization also helps women members find work as nurses, daycare workers, caterers, etc. This represents an important initiative as it helps women to get dignified employment at decent wages.

7.2.9 Safety at Sea and Disaster Preparedness and Mitigation Programmes
Several NGOs in Orissa and Andhra Pradesh are involved in various aspects of developing cyclone preparedness, including in training communities to prepare for such disasters, in order to minimize losses in terms of capital and lives. These include the Association for Rural Development and Action Research (ARDAR), SNIRD and AFPRO in Andhra Pradesh, and PREPARE in Tamil Nadu.

Regarding safety at sea, following the damage inflicted during the cyclone in 1996 in Andhra Pradesh, an FAO-assisted project was initiated, which included provisions for a VHF (very high frequency) shore-to-vessel communication system, supply of life floats to mechanized vessels, and a comprehensive programme of community-based disaster preparedness.

7.2.10. Housing, Education and Health
NGOs have also been working to improve conditions of housing, sanitation, health and education in fishing communities. Such organizations would include SNIRD and Grama Siri in Andhra Pradesh, and Santhidan and Anawim in Tamil Nadu.

7.3.Recent Interventions

7.3.1. The Bay of Bengal Programme Inter-Governmental Organization (BOBP-IGO)
The BOBP-IGO has evolved from the erstwhile Bay of Bengal Programme of the Food and Agriculture Organization of the United Nations (FAO). The establishment of the BOBP-IGO was conceived during the early stages of the Third Phase of the BOBP (1994 –

2000) and finally endorsed through a resolution at the 24th Meeting of the Advisory Committee of the erstwhile BOBP, held at Phuket, Thailand in October 1999. The BOBP-IGO Agreement was formally signed by the Governments of Bangladesh, India and Sri Lanka at Chennai on 26 April 2003 and by the Government of Maldives at Chennai on 21 May 2003

Based on the needs identified by the member countries, the BOBP-IGO proposes to take up the following fisheries management programmes:

- Regional Programme on Safety at Sea for Artisanal and Small-scale Fishermen
- Regional Program for Fish Stocks Assessment in the Bay of Bengal
- Capacity Building and Information Services for Fisheries Development and Management in the Bay of Bengal Region
- Taking the Code of Conduct for Responsible Fisheries to the Grassroots Level
- Setting Up of Regional Information Network

7.3.2. Bay of Bengal Large Marine Ecosystem Programme (BOBLME)

The BOBLME is a Global Environment Facility (GEF) project co-financed through the World Bank (WB), the Swedish International Development Cooperation Agency (SIDA), FAO and the US National Oceanic and Atmospheric Administration (NOAA). It is the first GEF International Waters programme in the Bay of Bengal. The BOBLME programme has been set up at the request of the littoral countries to provide them a forum to address these issues that transcend political boundaries. This GEF initiative aims to mobilize national and regional efforts to protect the health of the Bay and to improve the food and livelihood security of the region's coastal population. Recognizing that the threats to the Bay extend beyond the mandates of the national fisheries Departments and Ministries, the GEF project will draw in all stakeholders concerned, especially the communities whose livelihoods depend on the Bay's resources. National partners include fisheries, agriculture, environment, planning and finance institutions, and non-governmental and community-based organizations. The project has initiated national-level studies and consultations to identify main issues. Implementation of programmes is slotted for the next phase.

In conclusion, it is evident that there have been several of interventions in the fisheries sector, relevant from the perspective of poverty and livelihoods. There is much to learn by way of lessons from these interventions, and to develop them further. These should include interventions in the area of welfare provision, development of cooperatives and self-help groups etc, where States have played a major role.

Interventions that relate to improving availability and type of education in fishing communities, in India and elsewhere, are also essential to study and develop, especially in the context of fostering viable livelihoods for those from the community, either within or outside the fisheries sector. Also important to study and disseminate are experiences related to management of resources, particularly through community institutions.

8. CONCLUSIONS

Available evidence suggests that fishing communities, in general, have lower levels of literacy, a lower sex ratio, and poorer conditions of housing, as compared to State and national averages, indicative of a lower level of well-being in fishing communities. Even though there appears to have been an overall improvement in socioeconomic conditions, as compared to past decades, evidence also suggests that communities are faced with a deteriorating quality of life as a result of pollution, sea erosion, increased pressure on coastal lands, degradation of the coastal environment and displacement—aspects that are not captured in current measures of human development.

Most of the available evidence on the socioeconomic situation of fishing communities is from Kerala and Tamil Nadu—States that are, in fact, higher on indicators of human development. The situation of fishing communities in States that are lower on the human development scale is certainly worth exploring.

The situation *vis a vis* marine fisheries in India is complex and dynamic. On the capture side, there is enough indication of a growing trend towards greater expansion of capacity, even among the small-scale. The greater capital requirements and higher operating cost could be leading to situations of higher indebtedness and greater concentration of ownership.

It is evident that the small-scale sector, impacted by changes in technologies and markets, has itself changed. While there are those that have been able to benefit from the changes, others are struggling to cope. A greater stratification within the sector can be observed, with a significant proportion comprising those who have not been able to join the technological race, and who find their livelihoods increasingly vulnerable.

This segment would certainly include owners and crew of non-mechanized craft, by far the majority of the active artisanal fisher population. It would also include fishers, collectors and gleaners, fishing in inshore waters, often for subsistence purposes. It could also include crew on motorized and mechanized craft, who often work under difficult working conditions and poor employment security. It may well also include those small-scale fishers who have gone in for changed technologies, often through loans, but find themselves deep in debt, given the limited profits possible from an overfished resource base.

There is also evidence to indicate that this growth in capacity, in the absence of effective management, is leading to higher pressure on the resource base. The need for effective management, particularly the regulation of non-selective gear groups, is urgent. Current fisheries management measures are inadequate and poorly implemented.

The fisheries sector is increasingly being affected by pollution and the impact of other land- and sea-based activities on coastal resources and their productivity. Impacts are most acutely felt by those traditionally fishing in coastal and inshore waters, particularly

those engaged in gleaning and collection activities. This is an issue that needs to be addressed through appropriate integrated coastal management initiative.

Despite the high participation of women in fisheries-related work, they have not received much policy attention. This neglect has had its impact in terms of the socioeconomic well-being of women and their families.

In the post-harvest sector, given that production and demand for fish has increased, it is likely that employment opportunities in fish marketing and processing have gone up. However those with little access to credit and capital have been found it difficult to take advantage of these changes.

In the export-oriented processing sector, while new employment opportunities have opened up in fish processing plants, conditions of work and payment, particularly for women, are often reported to be unsatisfactory.

Vulnerable groups on the post-harvest side would thus include small-scale fish vendors and headloaders, small traders, workers in processing plants and peeling sheds, particularly migrant women, processors engaged in salting and drying fish, etc. Many of these workers are women.

Any initiative that aims to address poverty issues in coastal fishing communities must have a clear focus on such vulnerable groups, given particularly their high dependence on the fisheries resource base. Notably, such groups also tend to have lower levels of education, financial resources and skills to take up alternate livelihoods.

There is a wide range of experience available among policy makers, State agencies, NGOs and other organizations, on interventions in the fisheries sector. It would be relevant to draw from these experiences while designing interventions addressing poverty issues in coastal fisheries.

9. RECOMMENDATIONS

Addressing poverty issues in fishing communities would require a wide and comprehensive range of coordinated interventions. The close link between poverty and natural resource degradation, with a degraded natural resource base contributing to greater poverty, and poverty contributing further to natural resource degradation, is vital to keep in mind. This is certainly true in the case of the marine fisheries sector in India today.

It is not possible to address issues of poverty in fishery-dependent communities in isolation from issues of fisheries management, all the more because vulnerable groups in the fisheries sector are highly dependent on coastal fisheries resources for survival, as they tend to have, in general, lower levels of education and skills to take up viable alternative employment options. The emphasis, therefore, has to be on issues of equity and sustainability in management of coastal and marine fisheries resources, while ensuring better value addition and returns to primary producers and small-scale fish processors and traders.

Selected interventions, important from the perspective of poverty and coastal fisheries, are identified below.

Promoting Fisheries Management

Effective management measures focusing on equity and sustainability are urgently required within the framework of the FAO Code of Conduct for Responsible Fisheries. The following measures should be considered:

- Recognizing traditional ecological knowledge and arrangements that contribute to greater sustainability and equity in coastal fisheries;
- Initiating participatory, community-based resource management in selected regions, and, in this context, developing the capacity of State, Panchayat and local government bodies and community groups to undertake resource management;
- Promoting the use of small-scale, labour intensive, selective gear, including through appropriate incentives; and identifying environmentally friendly propulsion techniques and promoting their usage;
- Organizing a consultation on poverty and fisheries and promoting dialogue with State agencies and other stakeholders on the importance of fisheries management measures. These could include the following: preferential access to persons working on board non-mechanized vessels using selective gear and techniques; regulating the use of non-selective and destructive gear, with a view to eventually phasing out these gear; and regulating inter-State migration of mechanized vessels.

Promoting coastal area management

The impact of activities from other sectors on fisheries is increasing, leading to pollution and degradation of coastal habitats, and declining productivity of coastal waters. It is also

leading to displacement of communities. With a view to regulating such impacts, the following measures should be considered:

- Promoting integrated coastal area management initiatives, with better coordination of departments working in coastal areas and with stakeholder participation;
- Increasing awareness about the need for comprehensive social and environmental impact assessments (EIAs) for activities initiated in coastal and marine areas.

Supporting workers in the post-harvest sector

Several reports have indicated that small-scale vendors and processors continue to face constraints that limit their ability to benefit from higher fish production and possibilities of higher incomes from value added products. A detailed study of such constraints, as well as of interventions that have already been taken up by NGOs and other organizations are required. The following measures could be considered:

- Improving availability of credit to fish vendors and processors, through cooperatives or self-help groups;
- Improving availability of transport, including transport that could be owned and operated jointly by the group, and of ice, ice boxes and appropriate storage infrastructure;
- Creating and improving facilities for cleaning and processing fish under hygienic conditions at landing centres and harbours, and developing clean fish markets with availability of water and sanitation facilities, learning from the example of existing markets, such as the one in Margao, Goa;
- Upgrading traditional fish processing technologies and identifying other value added products that can be produced by small-scale processors, while identifying markets for these products;
- Studying various aspects of employment in fish processing plants, and identifying regulatory mechanisms needed to ensure dignified working conditions, keeping in mind the recommendations of the Task Force appointed by the Ministry of Labour for improving the living and working conditions of women workers in the fish processing industry.
- Studying and estimating the local employment and incomes generated through the handling of low-value species such as ribbon fish, which are now entering the export market, with a view to highlighting the implications of export trade in these species on local employment, income and food security.

Addressing socioeconomic issues in fisheries

Several interventions are needed to improve the socioeconomic status of fishermen, fisherwomen and their communities. These would include the following:

- Increasing access to credit facilities and tailoring the credit delivery and repayment mechanism to the requirements of fishing communities. The experience of organizations such as SIFFS should be taken into account in this context;

- Support the development of self-help groups and cooperatives, drawing lessons (positive and negative) from the past experiences;
- Promoting the use of Information and Communication Technologies (ICT), particularly for enabling fishworker cooperatives and groups to get a better price for their products and for increasing safety at sea;
- Improving availability and content of education to fisherfolk and to children of fishing communities, to enable them enhance their option for earning a better livelihood from fisheries and non-fisheries activities;
- Where employment opportunities within the sector have declined, to consider developing short-, medium- and long-term alternative avenues for employment, through appropriate training and credit, drawing from the experiences of self-help groups, NGOs and other organizations;
- Identifying the landless in fishing communities and facilitating ownership of land for minimum housing needs;
- Mapping vulnerable communities, lacking some or all of basic services, and working out strategies to ensure their provision;
- Bringing fishing communities into the purview of urban planning by undertaking studies that identify the problems they face in urban areas.

Monitoring the impact of shrimp aquaculture on fisheries

- Monitoring closely, through appropriate studies, the implications of coastal shrimp aquaculture for small-scale fishers and their communities, including the impact of aquaculture production on prices for shrimp caught in the wild; the employment generated for coastal communities through shrimp farming; and the environmental impact of aquaculture on coastal biodiversity, and thereby on livelihoods of fishing communities.

Enhancing social security

- Analyzing and evaluating the performance and impact of welfare schemes undertaken by States, in particular by Tamil Nadu and Kerala, with a view to ensuring the dissemination of positive schemes to other States.
- Enlarging social security coverage, particularly to groups identified as vulnerable.

Identifying data gaps and undertaking research

- To draw meaningful conclusions and policy directions on human development aspects in fishing communities, village-level disaggregated data specific to fishing communities would be required. A fisherfolk census, along the lines of the Fisherfolk census in Tamil Nadu, with additional parameters as considered necessary, should be considered for all coastal States, particularly Andhra Pradesh and Orissa;
- There is need to develop methodologies that capture various dimensions of poverty in the sector, including the dimension of ecological poverty, that increases the

vulnerability of many fishing communities to resource degradation, pollution, sea erosion and alienation from the lands they inhabit;

- Detailed studies on aspects such as the techno-economic viability of motorized and non-mechanized fleets, craft gear combinations, changing pattern of ownership of craft and gear, sharing systems in fisheries, cost and investment studies, migration patterns of crew and vessels, sources of credit and their relative importance, patterns and extent of indebtedness, etc. need to be actively considered;
- Studies to understand the various institutions existing at the community level and their engagement with aspects such as regulating resource use, providing social insurance and resolving conflicts, would be useful, especially in the context of initiating community based resource management;
- Studies on the way Information and Communication Technologies (ICTs) have been used for the economic benefit of producer groups, in fisheries and other sectors, should be considered;
- A detailed study on fisheries cooperatives in India, analyzing both positive and negative experiences, as well as constraints facing the cooperative sector, should also be considered.

The themes identified above can be considered important from a poverty and coastal fisheries perspective. A more comprehensive analysis would be needed to identify the thematic focus that would be needed in different geographical areas. However, themes such as fisheries management, improving post-harvest handling of fish, social security, education, capacity building and institutional strengthening can be considered as cross-cutting. Geographically, Andhra Pradesh and Orissa on the East Coast, with higher number of non-mechanized and motorized vessels, and comparatively higher levels of poverty, would need a greater focus.

Annex I

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