

India Marine Fisheries

Issues, Opportunities and Transitions for Sustainable Development

Agriculture and Rural Development Sector Unit South Asia Region



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THE WORLD BANK

CURRENCY EQUIVALENTS

Currency unit: Indian rupee (annual average)

2000: \$1 = Rs. 47.0 2002: \$1 = Rs. 49.3 2004: \$1 = Rs. 45.0 2006: \$1=Rs. 45.3 2008: = Rs. 43.8
2001: \$1 = Rs. 48.5 2003: \$1 = Rs. 46.7 2005: \$1= Rs. 43.0 2007: \$1=Rs. 44.7 2009: = Rs. 48.9

FISCAL YEAR (FY)

April 1–March 31

ACRONYMS

ANU	Australian National University	INCOIS	Indian National Centre for Ocean Information Services
AFMA	Australian Fisheries Management Authority	IUU	Illegal, Unreported and Unregulated Fishing
BPL	Below Poverty Line	ITQ	Individual Transferable Quota
CBO	Community-Based Organisations	LPG	Liquefied Petroleum Gas
CIFE	Central Institute of Fisheries Education	M&E	Monitoring and Evaluation
CIFNET	Central Institute of Fisheries and Nautical Engineering and Training	MEY	Maximum Economic Yield
CIFT	Central Institute of Fisheries Technology	MCS	Monitoring, Control and Surveillance
CMFP	Comprehensive Marine Fisheries Policy	MPEDA	Marine Products Export Development Authority
CMFRI	Central Marine Fisheries Research Institute	MSY	Maximum Sustainable Yield
CCRF	Code of Conduct for Responsible Fisheries	NABARD	National Bank for Agriculture and Rural Development
CP	Continuing Program	HACCP	Hazard Analysis and Critical Control Points
CRZ	Coastal Regulation Zone	NFDB	National Fisheries Development Board
CZM	Coastal Zone Management	NFF	National Fishworkers Forum
DAHDF	Department of Animal Husbandry, Dairying and Fisheries	NGO	Non Governmental organisation
DARE	Department of Agricultural Research and Education	NPF	Northern Prawn Fishery
DOF	Department of Fisheries	NREGS	National Rural Employment Guarantee Scheme
DFV	Development of Fishing Villages	NSS	National Sample Survey
DFID	Department for International Development	PFZ	Potential Fishing Zone
EEZ	Exclusive Economic Zone	PROFISH	Global Program on Fisheries
EU	European Union	RFMO	Regional Fisheries Management Organisations
FMP	Fishery Management Plan	SASDA	South Asia Agriculture and Rural Development
GDP	Gross Domestic Product	SASSD	South Asia Sustainable Development Department
GOI	Government of India	SEAI	Seafood Exporters Association of India
FAO	Food and Agricultural Organisation	SHG	Self-Help Group
FMC	Fisheries Management Companies	SIFFS	South Indian Federation of Fishermen Societies
FMU	Fishery Management Unit	SSF	Small-Scale Fisheries
FSI	Fishery Survey of India	TURF	Territorial Use Rights in Fishing
HSD	High Speed Diesel	UNDP	United Nations Development Program
ICAR	Indian Council of Agricultural Research	VMS	Vessel Monitoring System
IFQ	Individual Fishing Quota	WBFM	Wealth- Based Fisheries Management
		WTO	World Trade Organisation
		WWF	World Wildlife Fund

Unit Measurements

ha - hectare km - kilometre
nm - nautical mile mt - million tonnes

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The policy note was compiled by Grant Milne, under the general guidance of Adolfo Brizzi, South Asia Agriculture and Rural Development (SASDA), World Bank. Expert technical guidance was provided by Michael Arbuckle and Kieran Kelleher, Senior Fisheries Specialists in the Agriculture and Rural Development Anchor unit (ARD) of the Bank. The policy note draws on seminal literature from a range of Indian and global sources, as well as detailed background papers developed for Karnataka, Andhra Pradesh, Orissa, and Gujarat, and a draft overview paper. The report also builds on lessons from a scoping study of marine fisheries in Tamil Nadu in 2005 as part of tsunami recovery planning. The state background papers and draft overview paper were prepared by the team's lead consultants,

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EXECUTIVE SUMMARY

Background

This study represents a collaborative initiative by the World Bank and the Department of Animal Husbandry, Dairying and Fisheries – Ministry of Agriculture, Government of India, to review the marine fisheries sub-sector, within a broader sector that also includes aquaculture and inland fisheries. The policy note provides a major step forward in understanding current issues and future opportunities facing the marine fisheries sub-sector.

According to Government of India figures, the marine sub-sector accounts for approximately 39 percent of the total national fish production of 7.60 million tonnes. Inland fishing accounts for 61 percent of total fish production, largely through freshwater aquaculture from large inland agriculture water storage areas (tanks), smaller farm ponds, and reservoirs. India is the world's third largest fish producing nation and second in inland aquaculture¹.

The marine fishing sub-sector accounts for approximately one percent of national Gross Domestic Product (GDP), but forms an important component of the rural coastal economy, generating income, employment, livelihoods, and food security for an estimated 3.52 million people along the 8,118 km Indian coastline, who depend on fishing for their livelihoods. Close to 100 percent of

working people in these small coastal communities are engaged in marine fisheries-related livelihoods. Nearly half are involved full-time in marine fishing and related work such as processing and trade. Coastal fishing communities, while generally having good access to health, roads and electricity, are also characterised by low levels of education, high illiteracy, and poor access to piped water and sanitation. The majority of small-scale participants in the sub-sector are poor, with annual earnings below Rs 25,000 (US\$570) not uncommon. Debt levels are often very high, made worse by the lack of regular cash surpluses from fishing, problems in finding alternative income during lean fishing seasons, and being able to fish only during the usual nine-month season. These factors can lead to a perpetual cycle of debt for many smaller-scale fishers.

The marine sub-sector has experienced three recognised phases of development. Phase I was a pre-development stage (up to 1965) where fishing was still largely dominated by small indigenous craft and gear, and mechanisation was in the very early stages. Phase II (from 1965 to 1986) reflected a major expansion in the use of synthetic gear, focus on exports, increases in the number of larger mechanised vessels, government investment in new fishing harbors, introduction of purse seine harvesting, and the start of motorizing smaller, artisanal boats that could now extend their range further offshore. Phase III (1986-2000) was characterised by rapid growth in motorizing the artisanal fleet, further

¹ See Annex 1 for a glossary of terms.



extension of fishing offshore and extended voyage fishing, and introduction of seasonal closures of selected fisheries as concerns developed over depleting fish stocks. A fourth phase (post-2000 modernisation) is now emerging, characterised in inshore areas by declining fish catches, depleted fish stocks, increasing conflict over fish resources, and mounting investment needs. At the same time however, the country is trying to expand fishing activities in its 2.02 million km² offshore Exclusive Economic Zone (EEZ), where there may be scope for further growth.

India's economy has until recently, grown at a remarkable average annual rate of more than 8.0 percent from 2003/04. Although certain industry and service sectors of the Indian economy have become world leaders with innovative growth and development, much of the rural economy in India, including coastal areas dominated by marine fishing, is lagging behind. Sustained economic growth is critical for India to address poverty, and marine fisheries can play a part in this process. Globally, marine fisheries are recognised as valuable capital assets capable of generating significant and sustainable economic, social and environmental benefits under appropriate policy, institutional and management regimes. At the same time, global marine fisheries are an under-performing asset; recent estimates (World Bank 2008) suggest that the difference between potential and actual net economic benefits could be as high as US\$50 billion annually. At a global level, this situation warrants better governance, stronger policy legal frameworks and more effective management systems leading to increasing productivity, reducing overcapacity of fishing effort and enhancing the real value of landed fish.

India's marine fishery sub-sector has a high potential capital value, but also follows global trends with these values not being fully realised. The sub-sector can clearly generate greater net benefits and become a stronger engine for rural economic growth and social development in coastal India. However, to achieve this potential, a program of reforms, carefully implemented over an extended period of time at both national and state levels, must address core policy, legal, institutional and fisheries management issues, especially for inshore waters.

Objectives of the Report and Analytical Approach

The study represents an initial analytical review of the Indian marine sub-sector with special emphasis on inshore waters, which faces the greatest challenges for management and sustainable development. The main objectives of the study were to: a) appraise the general structure, conduct and performance of the marine fisheries sub-sector in India with particular focus on the role that marine fishery plays in rural livelihoods for coastal communities; b) identify the main constraints in the marine sub-sector that are impacting on biological sustainability and economically healthy fisheries; c) draw on national and international experience to recommend alternative policy approaches and strategies to address these issues; and d) inform the Government of India during subsequent consultations with key stakeholders about long-term transformations towards better sub-sector performance.

Based on discussions between the government of India, fisheries departments in several states, and the Bank team, the states of Andhra Pradesh, Karnataka, Gujarat and Orissa were selected for analytical work that contributed to this broader national sub-sector synthesis. A small core team spent approximately two weeks in each state to gather information and meet key stakeholders to discuss the predominant technical, policy and management issues. Other important information was gathered from secondary sources in cooperation with various government agencies and national fisheries research institutions. In particular, secondary data and various reports from Tamil Nadu and Kerala provided a rich source of information, and also helped confirm that the patterns emerging from the four focal states could reasonably represent a national picture of marine fishing. End-of-mission presentations were given to key government stakeholders in each of the four focal states and Delhi to gain valuable feedback on the data collected. This feedback was also important in shaping the team's conclusions about issues and opportunities for improving sub-sector performance. Further feedback was obtained through



structured consultations in each of the four focal states for small-scale fishers, processors, civil society and government officials, as well as a national meeting for senior representatives from government, fishworker organisations and NGOs.

Opportunities and Key Constraints

What are the Opportunities?

As in other regions, India's marine fishing sub-sector has the potential to develop a more valuable asset base (**building more productive fish stocks**); generate a higher level of sustainable net economic, social and environmental benefits in the future (**capturing the inherent value of more productive fish stocks**); and improving the distribution of these benefits (**providing for better equity among stakeholders**). The sub-sector can build on the strengths provided by an experienced labor force, a long history of fishing, good local examples of fisheries management, and expanding global and domestic demand for high quality marine fish products. Marine fisheries can become more highly integrated with India's growing rural economy and the wealth generated can help provide coastal dwellers with new opportunities to engage in this growing economy. Yet, independent research that evaluated international compliance with the United Nations Food and Agriculture Organisation's Code of Conduct for Responsible Fisheries Article 7 (fisheries management) suggests that India's marine fisheries, along with many other countries, could show a better performance.

What are the Key Constraints?

To achieve these opportunities, reforms are needed to guide improved economic performance of the sub-sector, in particular for inshore waters and work around the following five key constraints:

- 1. The current policy, legal and administrative systems can only serve as a partial foundation for reform towards more progressive fisheries management.**

*Central government policy on marine fisheries in India is informed by two key policy documents; the Five Year Plans developed by the Planning Commission (defining fiscal contributions to fisheries), and the 2004 Comprehensive Marine Fishing Policy (CMFP – Government of India 2004b) from the Ministry of Agriculture (defining various desired goals and identifying schemes on which the funds are spent). The historical performance of the sub-sector against key objectives set out in these policy documents could be improved, even when compared with more traditional management objectives based on increasing fish production. Fiscal processes that direct funds from the centre to coastal states tend to support subsidies and welfare schemes for fishers rather than reward good fisheries management performance. While improving the welfare of coastal fishers is an important social policy objective, some of the schemes such as fuel, boat and gear subsidies, may be encouraging participants to remain in a sub-sector that is already highly overcapitalised, particularly for inshore fishers. Some estimates suggest that the 242,000 fishing vessels currently registered within inshore Indian waters represent more than 2.5 times the optimal number of fishing vessels (and capacity) relative to available fish stocks. Yet as this report will suggest, limited alternatives currently exist for coastal fishers to move out of the sub-sector into other livelihood options. *Marine fishing policies at the state/union territory level* range from a lack of any guiding policy document, to new and relatively comprehensive policy statements (such as in Orissa).*

Five major legal instruments and several related pieces of legislation from the central government are used to administer marine fishing at the national level. The current legal framework needs further strengthening to provide a sufficiently sound basis for sub-sector development, both in terms of meeting the demands of the 2004 CMFP and the requirements of international law. State fisheries legislation is largely based on a model bill prepared by the central Government in 1979. While providing for some concordance of the law among states, it also exposed states to the same short-comings and limitations of the existing national legal framework,



as well as predating the United Nations Convention on the Law of the Sea. In all states studied, policy and legal implementation needs to be improved; few effective administrative systems are in place to support improved fisheries management performance. Coordination between national laws and authority (outside the 22 km territorial waters boundary) and state laws and authority (within the 22 km boundary) is another area where improvements could be made.

2. The biological and economic sustainability of marine fish stocks in India faces challenges.

Strong economic growth in India over the past several years and increasing global markets for fish products have contributed to an unprecedented expansion of fishing capacity and changes in the composition of fish being harvested. At the same time that fishing capacity has been increasing, however, marine catch levels in inshore waters are stagnating and fish stock health is showing some alarming signs of depletion. As an example, in case of the stocks assessed by the government of India, over 61 percent of marine capture fish stocks are already over-exploited, and most of the remaining stocks are fully exploited, leaving little or no scope for future expansion in inshore waters. Another factor contributing to declining fish stocks may be expanding coastal development activities, including land reclamation; construction of ports, bridges, roads, and buildings for industrial and residential purposes; oil and natural gas exploration; pollution from agricultural run-off containing chemicals, fertilisers and pesticides; and industrial effluents and urban sewage.

3. Small scale fishers are losing their livelihoods and opportunities for development, and there are presently few options for alternatives.

The current situation with marine fishing is affecting inshore fishers through declining catches, reduced incomes, and increasing conflicts. This is particularly true for smaller boat owners and crew who are unable to protect their resource access effectively, or shift to newer and more distant fishing areas in the Indian EEZ. The rapid growth of the mechanised trawler fleet, often with

the benefit of public subsidies, has increased competition for those fishing with smaller inshore vessels. Trawlers now account for an estimated 20 percent of the fishing labor force but 60 percent of the catch. These issues appear to trap the poor inshore fishers and processors into a cycle of perpetual low profits and debt. Rising world fuel prices (until recently) put even more pressure on the viability of motorised vessels and increased calls for further subsidies from the government. Small-scale fishers also have few points of entry into the broader state or national policy debate on marine fisheries, nor easy access to programs that could help them sustain their livelihood both from fishing and non-fishing sources. Education levels tend to be low, making it difficult for fishers to take advantage of alternative employment opportunities in the expanding national economy.

4. Fisheries management needs to be strengthened, especially for inshore waters.

For waters under the authority of the government of India, between 22 km (12 nautical miles) and the 370 km (200 nautical miles) Indian EEZ, more effective mechanisms are needed to set out conservation and management measures, and their enforcement. Like many other countries, marine fisheries management objectives in India are largely based on biological criteria. For waters within the 22 km limit, states generally provide only a basic regulatory and licensing regime for fisheries management, augmented by seasonal fishing bans, ordered by the Government of India and implemented by the maritime states and Union Territories regulating mesh size, and limited use of zoning. Most state fisheries departments lack working patrol vessels, making enforcement of even these basic kinds of regulations quite challenging. There is increasing conflict as smaller inshore vessels and larger offshore mechanised trawlers compete for fish within the 22 km boundary, as the shallow waters are traditionally more productive. This situation is even more difficult to analyse because fishing vessel designs are evolving outside of the current vessel classification system in India. Although there has been an attempt to limit fishing vessels in some states, entry into the sub-sector by new vessels has been difficult to restrict in practice.



5. Market channels, particularly for small-scale fishers, are inefficient and hinder delivery of high quality products at optimal prices.

Indian fish products exports (mainly shrimp) passing through European Union certified processing plants can usually meet high international health and safety standards; at the same time however, the cost of adjusting to these standards has been very challenging for smaller-scale Indian processors. In contrast, domestic marine fish market chains in India are generally characterised by unhygienic conditions, poor handling of fish and loss of quality (from the boat to the final market), and a subsequent reduction in profits. High levels of product losses through wastage (up to 15 percent of harvest) are common. While new developments in marketing channels such as mega-grocery stores are emerging in some larger cities, with modern fish handling practices and facilities, smaller-scale fishers are often unable to gain access to these marketing channels due to the poor quality of their product. Major contributors to this problem are the lack of easily accessible and low-cost credit, and the affordability of basic infrastructure such as ice, cold storage, and cold transport that would enable fishers to maintain better quality and obtain higher prices. While demand for fish products in India is forecast to rise significantly in the future, along with the expected increase in the population, the small-scale fishers and traders appear to lack adequate information about market requirements and emerging market opportunities. Globally, India can also face increasing market competition as well as risks if the rupee appreciates relative to the US dollar as it did from 2004 to 2006.

Recommended Reforms for Improved Sub-sector Performance

Direction of Reforms

Overcapacity contributes to fishing effort in excess of the effort required to harvest the biological Maximum Sustainable Yield (MSY), resulting in declining catches,

lower net benefits, and a growing poverty trap for the more marginalised stakeholders. Evidence from this study and other relevant research suggests that India may be heading in this direction with its marine fisheries sub-sector, particularly for inshore areas where the majority of vessels operate. It must be noted however, that India is not alone in confronting these types of challenges for marine fisheries. Within the region, Indonesia, Thailand, and Vietnam also face similar issues. Outside the region, many other countries share this situation.

The present status of marine fisheries in India – particularly within 22 km of shore, and future uncertainty – calls for a better implementation of appropriate reforms through consultative and analytical processes that could lead to improved awareness, more efficient legal and policy frameworks, stronger institutions and stakeholder participation, and more effective fisheries management systems. Any reform process must *gradually* shift the policy, institutional and management focus from what could be termed a more ‘conventional’ goal (harvesting

Box 1. Key features of fisheries management approaches that maximise fish production

- ◆ Policy and management focus is on fish production – a policy goal that can contribute to overexploitation.
- ◆ Fishing is typically viewed only in its biological dimension.
- ◆ Fishing benefits are often seen in terms of employment and livelihoods for the poor, which can lead to subsidies and other policies that may encourage overcapacity.
- ◆ Strategies often focus on improving technology (boats, gear, etc.) to enable fishers to increase harvests, even where stocks are at risk.
- ◆ Fishers have poorly defined and unenforced use-rights for fish, often contributing to an open access, common property situation that provides strong incentives for immediate exploitation.

Source: DFID 2005 and study team.



increasing volumes of fish through expanded capacity and changes in technology, where users operate in an open access system – see Box 1), to one based on improving the productivity of fish stocks, maximising net benefits, and improving equity with a management system that has well-defined fishing rights (see Box 2). This second approach has a goal of achieving the Maximum Economic Yield (MEY) from sustainable fish production, supported by more effective management systems including well-defined resource access rights for stakeholders. It also builds on progressive management prescriptions associated with Eco-System Based Fisheries Management, promoted by the Food and Agriculture Organisation (FAO).

Transitioning to a more progressive and holistic fisheries management approach with a stronger focus on economics and access rights may offer a long-term

pathway to improved sub-sector performance in India, especially for inshore areas where most of the problems are generated. This can be seen in a limited but growing number of global experiences where this approach is being used, for example in Chile, Mexico, New Zealand, South Africa, and Namibia. India's inshore waters clearly offer a significantly more complex and challenging operating environment than the other countries (larger population, long coastline, complicated stakeholder groups and institutions, huge artisanal and traditional fisheries, poor structures for monitoring and surveillance, etc). Yet, the underlying precepts are still applicable and broad lessons can be learned from these countries of how the reform processes worked towards a transition, problems encountered and successes achieved. An overarching lesson is that this kind of reform process can take decades to fully achieve the desired results.

While a number of interim measures can help improve fisheries management in India, a longer-term transition in fisheries management will be needed eventually, to address critical policy issues. These are, reducing the current overcapacity of fishing effort, allocating more secure fishing rights to stakeholders, and mitigating any negative impacts on stakeholders if fleet or capacity reductions should occur, largely for inshore fishing. Therefore, it is important that the costs of mitigation or compensation for stakeholders affected by these potential changes be considered early in any transition process. Appropriate programs need to be identified and implemented to support broader livelihood opportunities and ensure that safety nets are provided where required.

Phasing and Timing of Reforms

From global experience, considerable time and commitment will be required by major stakeholders – from the government of India and state governments, to inshore fishers and processors, and appropriate civil society organisations – to successfully engage in a reform process. Reforms need to be innovative, adaptive and responsive; they must build appropriate capacities and provide the necessary tools and information about

Box 2. Key features of fisheries management that maximise net benefits:

- ◆ The inherent wealth in fish resources is represented by the resource rent, or net benefits from harvesting fish. In the absence of effective management, fish stocks are usually overexploited and potential resource benefits dissipated,
- ◆ An effective management system can reduce investments in excess capacity, lower operating costs, and increase productivity and unit prices because of larger stocks and better quality fish – this leads to higher net benefits,
- ◆ The net benefits can be capitalised into the value of defined fishing-use rights, and/or captured by the public fisheries management agency to support new economic activities in coastal communities,
- ◆ Collective decisions are taken about how to generate net benefits, how to share these benefits, and how to use them,
- ◆ Developing a more effective fisheries management approach based on net benefits is a long-term and challenging goal with many intermediate steps required to lay the groundwork.

Source: DFID 2005 and study team.



best practices. It is important that early on, a process be established for extensive stakeholder participation, education and awareness-building, especially at the community level; this will help overcome vested interests and allow local solutions to be identified, which is critical in the Indian context. In addition, it is important that the planning and early implementation of programs aim to minimise any impacts of change on people in the sub-sector, particularly smaller operators, and to facilitate development of expanded livelihood opportunities. This will help shift the expectations and capacities of new generations in coastal fishing communities to more viable economic alternatives beyond fishing.

Recommended Actions

It is recommended that the following actions be implemented at the national and state levels in a phased approach over three to five years to *initiate* a gradual transition in fisheries management. This three to five year program would lay a strong foundation for longer-term actions that would ultimately improve net economic, social and environmental benefits from the sector:

a) National Actions

Phase 1 includes consultation and review, and should focus on providing additional and targeted strategic analysis of the marine fisheries sector in India and complement a wide body of work already completed. It should also evaluate international and domestic best practices for fisheries management and coastal livelihood development that could be replicated more widely in India as part of a broader effort to build stronger capacities and a knowledge base. This evidence-based approach would lay a robust foundation for more detailed policy analysis, and careful consideration of options for reform interventions and livelihood improvement that could be implemented, particularly at a national level.

Phase 2 includes policy development, and would build upon Phase 1 and set out possible policy options and fisheries development strategies for the future, including

the design of improved fisheries management systems. It should also identify targeted legal, policy, regulatory, and institutional reforms at both national and state levels; these will help drive improved marine sub-sector performance, and start building necessary capacities.

Phase 3 includes policy implementation planning, and would build upon the two earlier phases, and analyse and define a concrete, long-term fisheries sub-sector development program for India to improve social, economic and environment performance. A monitoring and evaluation system needs to be developed to track sub-sector performance, including livelihoods. Lessons learned from pilot work at the state level could play a major role in formulating longer-term programs that could be financed both through central schemes and possible multi-lateral support.

Each phase should consist of a series of linked components, with specific objectives and activities. However, at the same time, all phases need to be built upon specific, generic activities including information collection and analysis, human capacity-building, and the identification and evaluation of options. National level activities could be implemented through the National Fisheries Development Board (NFDB) in Hyderabad, under the guidance of the Department of Animal Husbandry, Dairying and Fisheries in the Ministry of Agriculture.

b) State Actions

It is recommended that state-level activities be planned and implemented in at least one state to pilot the reform process for the marine fisheries sub-sector in India, and provide valuable lessons for scaling up in other coastal states. The following actions are suggested:

Phase 1 includes review, analysis and preparation, and should provide additional and highly targeted analysis of the marine fisheries sub-sector at the state level. It should include a bio-economic assessment of selected priority fisheries, and development of improved baseline information around coastal fisheries and non-fisheries livelihoods.



Phase 2 includes implementation of management and livelihood reforms, and should put the proposed fisheries management reforms into practice, with the identification of a number of specific fisheries for the implementation of new fisheries management plans. A robust monitoring and evaluation system would need to be installed, building upon current systems as well as the FAO Ecosystems Approach and other reforms to improve net benefits. Phase 2 should also strengthen the socio-economic and livelihood status of the state fishers. Activities under this component could include capacity building, developing alternative livelihoods for coastal fishers, establishing fish marketing kiosks for retail fish marketing, provision of Information Technology (IT) kiosks, and improving post-harvest support for small-scale fishers through a network of mini-chill rooms, cold storage facilities, flake ice plants, etc.

c) Recommended Implementation Approach

It is recommended that a high level task force be constituted by the Department of Animal Husbandry,

Dairying and Fisheries, Ministry of Agriculture (chaired by the Joint Secretary), to provide broad oversight and strategic guidance to the proposed national and state-level activities. There is considerable operational merit in considering the Secretary to be the Chief Executive Officer of the National Fisheries Development Board (NFDB). Many of the reform activities could be implemented quite effectively through the NFDB. Other members of the task force could include one senior representative from the participating state(s), a member of a national civil society fisheries organisation, a member from the fishing industry, and representatives from key international partners. Consideration may also be given to establishing a linkage between the proposed task force and the Central Board of Fisheries, which is composed of state Ministers and chaired by the Union Minister of Agriculture. This would ensure that all coastal state Ministers responsible for marine fisheries are aware of the task force activities and where required, can assist participating states in overcoming implementation hurdles.





INTRODUCTION

Fisheries and the Marine Sub-sector in India

India is endowed with a wide diversity of water resources, which sustain a large fisheries sector in the country. India has a coastline of 8,118 km with an Exclusive Economic Zone (EEZ) stretching over 2.02 million km², and a continental shelf covering 0.53 million km². India also has inland water sources covering over 190,000 km and open water bodies with a water-spread area of about 740,000 hectares. Brackish water area that could be used for aquaculture is 1.24 million hectares, of which only 165,000 hectares have been developed. Total fish production from India's fisheries sector in 2009 was an estimated 7.60 million tonnes (Government of India 2010). The marine sub-sector contributed approximately 39 percent of total fish production, or 2.99 million tonnes. The balance, termed inland fisheries, was accounted for by freshwater aquaculture, inland capture, and coastal aquaculture. India contributes nearly five percent towards global fish production. The country ranks third in the world in total fish production and second in inland aquaculture. The fisheries sector has registered an average annual growth rate of around four percent during the last five years. The sector contributes around one per cent to Gross Domestic Product (GDP) and 4.7 percent to agriculture GDP (Central Statistics Organisation 2007 and Government of India 2010).

Marine fisheries in India remained in a pre-developed phase until 1965 when average annual production was less than 0.8 million tonnes. This was followed by a prolonged growth phase up to 1988, with annual production ranging from 0.82 to 1.8 million tonnes. Peak production followed during the 1990s when coastal areas were becoming fully exploited and yielded annual production between 1.8 and 2.8 million tonnes. Marine products exports are one of the fastest growth sectors of India, reaching US\$1.9 billion in 2008/09. Domestic per capita consumption of fish is estimated to increase by an average of 3.3 percent from 2000 to 2020 (Dastagiri and Mruthyunjaya 2003), double the estimated annual average global change in demand for fish as food from 1997 to 2020 of 1.5 percent (Delgado et al. 2003).

Marine fisheries in India are a shared responsibility between the national and state governments. In a legal and constitutional sense, state governments are responsible for waters inside the 12 nautical mile territorial limit (22 km) while the Government of India (GOI) is responsible for waters between 12 nautical miles and the country's 200 nautical mile (370 km) EEZ. Marine fisheries management faces a number of challenges such as open access fishery property rights systems; weaknesses in several aspects of state- and national-level legal and policy frameworks; low state government capacity for monitoring, control and surveillance (MCS); and knowledge gaps regarding the sustainability of key fish stocks. These kinds of issues are not unique to India.



Strong economic growth in India in the past several years (India Brand Equity Foundation 2008)² and increasing global markets for marine fish have contributed to an emerging post-modernisation phase, characterised by an unprecedented expansion of both inshore and offshore fishing capacity, greater emphasis on larger scale offshore commercial fishing in the EEZ, and changes in the composition of fish being harvested. While the EEZ offers growth potential of an estimated 3.9 million tonnes (2/3 off the west coast and in depths up to 50 meters), the reality is that the majority of coastal fishers will continue to operate in inshore waters where, according to the Food and Agriculture Organisation (FAO - 2008a), declines in catches, catch rate per unit of effort and real incomes are emerging as characteristic indicators. For fish stocks assessed by the GOI, 61 percent of capture fish stocks are overexploited and most of the other commercial stocks are fully exploited.

The present status of inshore marine fisheries in India and growing challenges, call for early implementation of appropriate policy measures to gradually shift the focus from harvesting increasing volumes of fish in a de facto open access resource situation, to a more holistic approach based on a long-term goal of maximising net economic, social and environment benefits from sustainable fish production. The status quo with current fisheries management is not working. Loss of the inherent value or 'wealth' of the resource is the first consequence of ineffective management of fisheries; excessive levels of fishing capacity may also lead to fishing effort beyond the biological MSY, contributing to declining catches and in extreme cases, stock collapse. The outcome of not reforming current management systems may be seen in continued resource depletion, poor net returns, reduced food security, and a growing poverty trap for the more marginalised stakeholders. Evidence is beginning to surface that suggests India's marine fisheries may be heading in this direction now, particularly for inshore waters.

Reform is both urgent and important because aside from generating valuable export earnings, marine fishing supports the livelihoods of an estimated 3.52 million

people³ in fishing communities spread along the 8,118 km Indian coastline and offshore islands. Most of these people are highly dependent on fishing for their employment, income and subsistence food. A majority of the fishers and processors are poor and have limited scope for diversification out of the sector without external assistance. They are not well-connected to India's rapidly growing economy and lack the formal education to take advantage of new jobs emerging from wider national economic growth.

A fisheries development model for inshore waters needs to be developed that is characterised by more productive fish stocks, more effective fisheries management, and improved equity. This will require strengthened policy, legal, regulatory and management systems around a more holistic approach, supported by appropriate economic and financial incentives, and above all, stronger access and use rights for resource users. This approach closely aligns with guidance by the Commission on Economic Growth (2008) which states that economic growth is critical to address poverty, and as part of this process, a market economy needs to be based on deep institutional underpinnings that define property rights, enforce contracts, convey prices, and bridge informational gaps between buyers and sellers. There is no reason why these general economic and institutional concepts cannot begin to be extended to marine fisheries in India.

India brings exceptional challenges in reforming its marine fisheries because of the large number of participants, boats and on-shore infrastructure, poor regulation and management, and a traditional focus on increasing fish catches as a central policy mechanism for pro-poor growth. Revitalising India's marine fisheries sub-sector will likely require major changes in policy and governance with respect to stronger access and use rights, which could limit and in some cases reduce access to selected inshore fisheries that have excess fishing effort relative to sustainable stocks. This may

² For example average growth of 8.8 percent from 2003/04 to 2006/07.

³ Other references, for example, Planning Commission (2006) estimates that 14 million people are involved in marine and inland fishing, aquaculture, marketing, and related services.



Box 3. What is fishing capacity?

In general, capacity can be defined with reference to fishing inputs (vessels, potential effort) or outputs (potential catch) over a period of time by a vessel (or fleet) if fully utilised. Variations include:

- ◆ Fisheries scientists often view capacity based on comparisons between fishing effort (number of days fished, number of nets used, etc), fishing mortality and MSY. When total mortality exceeds MSY, there is excess fishing capacity.
- ◆ Fisheries managers often see capacity in terms of the number of vessels (or total horsepower), average fishing days, and harvests relative to stock conservation goals.
- ◆ Economists will often measure capacity based on a level of potential fishing output and maximising net benefits.

Source: FAO 2008b.

ultimately lead to a reduction in overall fishing capacity (see Box 3 for definitions of capacity), yet without eventual rationalisation of fishing capacity relative to stock sustainability, further sub-sector development may be very limited for the majority of fishers operating in inshore waters.

According to a recent study from Sierra Leone (DFID, World Bank, FAO 2007) a long-term transition in fisheries policy and management around more sustainable social and economic net benefits may raise two main questions that should also be paramount for Indian policy-makers. First, will a stronger focus on potential net benefits and the economics of the fisheries overshadow other important issues such as the importance of fisheries for livelihoods and social welfare? Secondly, will the inherent wealth in fisheries be captured and used exclusively by the already rich and powerful in society, simply increasing social problems and perpetuating existing inequities with smaller scale operators? In responding to these concerns, four important issues need to be taken into account by policy makers:

- i) The success and impact of new approaches for fisheries management will depend, to some extent,

on design and implementation that accounts for national and local conditions, and putting in place appropriate mechanisms and instruments to help sub-sector participants to cope with these changing conditions;

- ii) The process of allocating stronger fishing rights must be decided early on through extensive stakeholder consultation. Fishing rights can be allocated in any way that policy-makers desire, including favoring disadvantaged fishers. Considerable time may be required to build capacity among stakeholders to even engage in this consultation process;
- iii) Care will be needed before a change in approach to fisheries management is pursued; the true costs of change versus no change must be made explicit and transparent to policy-makers and other stakeholders. Where fisheries may be providing a 'safety-net' for the poor, further mechanisms must be developed to invest in pro-poor fishing, alternative non-fishing employment, and indirectly in education or infrastructure;
- iv) The development of new and more progressive fisheries management approaches in any country will produce winners and losers. Difficult political choices are inevitable; impacts must be monitored, and compensation mechanisms put in place.

Study Objectives and Methods

In November 2006, the Department of Animal Husbandry, Dairying and Fisheries in the Ministry of Agriculture (DAHDF) – GOI requested the World Bank to undertake an initial review of the marine sub-sector as a first step towards a potentially longer-term engagement in supporting the sustainable development of the Indian fisheries sector. The subsequent study aimed to: a) review the general structure, conduct and performance of the marine fisheries sub-sector in India with particular focus on inshore fishing and the role that the marine fishery plays in rural livelihoods for coastal communities;



b) identify the main constraints in the marine sub-sector that are impacting on biological sustainability and economically healthy fisheries; c) draw on national and international experience to recommend alternative policy approaches and strategies to address these issues; and d) provide material to assist the government of India in consultations with key stakeholders about long-term transformations towards better performance.

Structure of the Report

The report identifies options for improving the performance of the marine sub-sector through integrated reforms, focusing on inshore waters. The report highlights key trends and lessons from state-level analyses; it also includes examples of how similar issues are being resolved in other countries. The study is based largely on background papers developed from analyses of marine fisheries in Andhra Pradesh, Karnataka, Gujarat and Orissa. These states were identified by DAHDF in consultation with the state fisheries departments, ensuring that the study covered both east and west coasts, and could take advantage of available information. A small core study team carried out field assessments in each state, consisting of focus group discussions, key person interviews and household-level interviews, supplemented by a secondary literature collection. The field work was conducted in major coastal ports, rural landing centers and fishing villages. Stakeholders consulted included state and district level officials of the Department of Fisheries, boat owners, crew and drivers, fish vendors, auctioneers, traders, loading and unloading workers, ice makers and a range of ancillary workers such as net menders, mechanics, painters, and carpenters. Focus group discussions and household interviews were carried out to ascertain income, indebtedness, poverty

and vulnerability. The team spent approximately two weeks in each state to gather critical information and meet the key stakeholders. The bulk of data and other information were collected from secondary sources, with primary data collection through small samples of communities being undertaken, especially for social and institutional assessments at community levels.

Other inputs included a 2005 scoping study already completed for Tamil Nadu, reports from Orissa through an ongoing UK - DFID/United Nations Development Program (UNDP), and secondary material from Kerala.

Following the completion of a draft report, structured consultations were held in each of the four focal states as well as at the national level. State workshops focused on gathering feedback on key issues and proposed reforms from small-scale fishers, processors, civil society groups, and local fisheries department officials. A national-level consultation in Hyderabad was aimed at senior participants from all coastal states and Ministry officials from Delhi. These consultations provided valuable inputs for revising the draft report into a final version, particularly with proposed reforms over the short, intermediate and long-term.

The report is organised as follows. Chapter 2 provides benchmarks for efficient fisheries management based largely on wealth-based management approaches, and draws from global best practices. Chapter 3 examines the general structure, conduct and performance of the sub-sector as well as a brief historical review. Chapter 4 discusses the livelihood context of marine fisheries and key issues that must be acknowledged in any sub-sector transformation. Chapter 5 provides a brief analysis of the current Indian legal and policy setting in marine fisheries against the benchmarks in Chapter 2. Chapter 6 discusses options for moving a transitional reform process forward.





INTERNATIONAL BEST PRACTICE IN FISHERIES DEVELOPMENT

The Global Marine Fisheries – Where does India Fit?

The State of World Fish Resources and Aquaculture (FAO 2007a), estimates that 25 percent of the world's fish resources were categorised in 2005, as "overexploited, depleted and recovering", 50 percent as "fully exploited" and 25 percent as "underexploited and moderately exploited". The terms "exploited" and "overexploited" refer here to a biological MSY reference point. At a fiscal level, the defining characteristic of the fishing industry globally is one of subsidies and other government support that usually provide the wrong signals to fishers, encouraging excessive capacity and fishing effort. A study edited by Sumaila and Pauly (2006) estimates that world fisheries are currently subsidised between US\$30 billion and US\$34 billion per annum.

Based on results published by the Central Marine Fisheries Research Institute (CMFRI 2007), the overexploitation situation in India appears to be more serious than the global average. From the previous chapter, recent data in India suggest a general decline in catch returns and fisheries performance. Varkey et al. (2006) compared the current and optimal fleet sizes in India based on recent census results and analysis (Table 1). Using these numbers and excluding deep water vessels operating in distant offshore waters, India has more than 2.5 times the optimal number of fishing

vessels, suggesting that a significant reduction in capacity is needed to support more sustainable fishing, particularly for inshore areas⁴.

India is not alone in facing these types of policy challenges in fisheries, either within South Asia or worldwide. A recent global study (Pitcher et al. 2006)⁵ focusing on compliance with the United Nations Code of Conduct for Responsible Fisheries (CCRF) Article 7 (fisheries management) highlights the performance of national fisheries policy and fisheries management systems (Table 2). Some countries (for example New Zealand, South Africa, USA and Canada) were rated as performing reasonably well in terms of fisheries policy design and implementation, including fisheries management. Others including India, Indonesia, Thailand and Vietnam could perform better. There is clearly considerable scope for learning and experience sharing between countries with different types of fisheries and policy context.

- a) The countries included in the table by the authors of the current India study have been chosen to reflect the diversity of fisheries sectors and policy performance worldwide; a more in-depth comparative analysis is

⁴ It must be noted however, that in the four states where field work was undertaken, an increasing number of registered fishing vessels are no longer actively fishing due to stagnant or declining catches – this may make the issue of reducing overcapacity somewhat easier to address.

⁵ The study by Pitcher et al. (2006) is the most recent and most comprehensive global review of marine fisheries performance available in the literature.



Table 1: India – comparison of actual and estimated optimal marine fishing fleet size

Fishing vessel type	Actual numbers	Estimated optimal numbers	Potential overcapacity (%)
Traditional non-motorised craft	106,044	31,058	241
Small-scale motorised craft	76,057	20,928	311
Mechanised craft	59,619	15,998	273
Deepwater vessels	180	n/a	n/a
Total	241,720	67,984	255

Source: CMFRI (2006); Government of India (2007a), Varkey et al. (2006).

in preparation by Pitcher et al. at the University of British Columbia;

- b) Pitcher et al. (2006) includes 2 main sections in the CCRF evaluation (policy intention and implementation); within each section there were 3 sub-sections and 6-9 questions for each; the current table reflects the average score across all questions in each section (used to give an Overall Policy Performance rating for each country); Low = Low compliance to, High = high compliance;

open access situation generally have been ineffective. The main reason is a chronic failure by governments to first deal decisively with the free and open access nature of marine fisheries.

In addition, government policies tend to center on maximising biological harvests or employment through incentives that can actually encourage greater fishing capacity. Public subsidies are often a contributing factor to poor fisheries performance. An assessment by the World Wildlife Fund (2004) on global marine fisheries concluded that harmful subsidies are a significant part of the failure of governments to establish effective, science-based fishing management regimes. As a result, subsidies represent nearly 20 percent of fishing industry revenue, flowing to fishing fleets already operating at more than twice the optimal capacity. According to the same report, harmful subsidies are a fundamental driver of fishing overcapacity and encourage unsustainable levels of fishing effort. These can take the form of many of the subsidies currently available in India to the sub-sector, including social support, insurance, fuel, ice boxes, vessel construction, modernisation and conversion, and port and harbor expansion (Marine Products Export Development Authority – MPEDA- 2002). While welfare support can be viewed as a positive social policy action, subsidies for boats, gear, fuel, etc, can often act as an incentive for marginal fishers to remain in the sub-sector when it is not otherwise economic to do so. Also, these kinds of subsidies can encourage new participants to enter the sub-sector, for example people from inland rural areas who may see fishing as a means of

Alternative Approaches to Marine Fisheries Development

Conventional Approaches

It is widely accepted by most natural resource management experts and policy makers that unlimited and unrestricted (open) access to common property resources can lead to these resources being overexploited with all scarcity rents dissipated (Tietenberg 2000). Unmanaged marine fisheries face chronic economic overexploitation and overfishing largely because of open access characteristics⁶. Open access situations can destroy incentives for conservation and promote inefficient allocation of resources. In recognition of this problem, many countries have attempted to manage their marine fisheries, but management efforts within an

⁶ For more details about rents and open access fisheries, refer to Annex 2.



Table 2: Fisheries management and policy compliance – an international comparison

Country	Annual landings (tonnes)	World ranking for landings	Compliance with the CCRF Article 7 (fisheries management) (B)			Fisheries management performance score
			Policy design	Policy implementation	Overall policy performance	
Europe						
Norway	2,618,910	10	High	High	High	4/6
Iceland	1,735,887	12	High	High	High	6/6
Denmark	1,404,017	14	Medium	Low	Medium	4/6
UK	881,859	22	Medium	Low	Medium	4/6
France	586,041	27	Medium	Low	Medium	4/6
Poland	217,112	47	Low	Low	Low	n.a.
North America						
USA	4,690,860	5	High	Medium	Medium	4/6
Canada	977,257	21	High	High	High	5/6
Africa						
South Africa	587,744	26	High	High	High	3/6
Senegal	376,324	35	Low	Low	Low	n.a.
Namibia	297,651	41	High	High	High	3/6
Asia						
China	14,552,262	1	Medium	Low	Medium	4/6
Japan	5,101,361	3	High	Medium	Medium	5/6
Indonesia	3,621,498	7	Low	Low	Low	3/6
INDIA	2,776,067	8	Low	Low	Low	2/6
Thailand	2,656,129	9	Low	Low	Low	2/6
Vietnam	1,217,193	16	Low	Low	Low	1/6
Australasia						
New Zealand	591,763	25	High	High	High	6/6
Australia	236,644	46	High	High	High	n.a
South America						
Peru	8,390,557	2	Low	Low	Low	3/6
Brazil	518,470	29	Low	Low	Low	2/6

Note: The results shown in this table have been generated using information and data published in Pitcher et al. (2006) and available at the following website: <ftp://ftp.fisheries.ubc.ca/CodeConduct>.

survival during drought periods. In the absence of other livelihood options for farmers in this position or people who have lost low-skilled jobs in the formal sector, inshore fishing may appear to be the only means of providing food and possibly modest earnings to support a family.

Many government fisheries policies also seek to enhance post-harvest value-addition, which is a logical goal provided that an effective management system is in place. In the absence of effective management however, any increases in value-addition simply generates higher raw 'first-sale' fish prices that in



turn may encourage yet more entry into a sub-sector with excess capacity, and fuel higher subsequent exploitation.

More Holistic Fisheries Management Approaches

Fish resources are inherently valuable, in many cases extremely valuable. Well-managed fish resources can make significant contributions to social and economic welfare on a sustainable basis. The amount of these benefits, often termed "wealth" (measured by the estimated net economic benefits or resource rents) varies according to changes in fish stock abundance, fish prices and fishing costs. However, the indications are that these potential values are substantial, perhaps as high as US\$50 billion globally. Moreover, this return is available on a recurrent basis due to the renewable nature of fish resources. The generation and appropriate use of resource rents can also help support the achievement of a range of policy goals such as economic growth, poverty alleviation, and resource conservation. The experiences of those few marine fisheries around the world that are reasonably well-managed suggest that resource users are able to increase the value of these net benefits or rents, often substantially, once they operate under more effective management systems, including well-defined resource allocation and use rights.

Unfortunately, if access is left free and open, it will usually attract excess levels of fishing capacity, both in terms of the number of fishers and capital investment by those who are fishing. Loss of net benefits is the first consequence of ineffective management of fisheries, but if the potential amount of net benefits is great enough (measured by the ratio of fish prices to fishing costs) then excessive levels of capacity may also drive fishing effort beyond the MSY level, leading to declining catches. The fishery is then characterised by both overcapacity and overfishing. The implication of this conclusion is that reforms to marine fishing should strive to create and manage this inherent value of the resource, moving beyond traditional objectives such as biological sustainability (often represented by MSY).

More holistic approaches use resource rents or net benefits as the foundation of fisheries management systems⁷. Under these approaches, many elements in normal fisheries management need to be effectively operating, for example stock assessment, monitoring, control and surveillance (MCS), fishery management information systems, etc. These activities would be part of any modern and well-managed fishery, for example as suggested by the FAO for Ecosystem Based Fisheries Management. However, their focus and the relationship between the different elements will change as rents become a more prominent policy focus. Countries with an abundance of natural resources should be able to invest the rents from these resources to increase domestic economic growth and also generate finances that can be redistributed to address poverty. An important part of a more holistic approach focused on net benefits or rents will be to develop bio-economic modeling methods to estimate resource rents in different fishery management units (FMUs). The identification of appropriate economic rents, and the development and implementation of fishery management plans (FMPs) are key requirements.

Successful fisheries management, based on maximising net benefits will achieve biological sustainability, because resource users possessing well-defined use rights know they need a healthy resource base to generate, sustain and increase the value of the fishery. Identifying goals (maximising net benefits, rents or 'wealth') and constraints (sustainability) is therefore essential, as well as attacking them in the correct order. If management systems fail to deal with the value of the fishery as measured by net benefits, then continued overexploitation is guaranteed. There is no example of a well-managed marine fishery anywhere in the world that has not dealt first with the economic aspects. Box 4 summarizes key differences between more conventional and more holistic approaches to fisheries management that take greater account of net economic, social and environmental benefits.

⁷ For more details on this approach, refer to Annex 3 in the main report.



Box 4. Comparison of approaches to fisheries management

Conventional approaches to fisheries management Holistic fisheries management based on net benefits;

- ◆ Physical weight of fish caught (production maximisation and technology upgrades) is usually emphasised as the main policy goal;
- ◆ Fisheries management systems have biological targets (MSY), and a top-down approach with government fishery managers setting catch limits and input controls (fishing effort);
- ◆ Fishers participate in exploitation of the resource, usually with weak 'rights' (it can be argued that certain co-management approaches can help in the development of a rights-based framework, at least for inshore fishing);
- ◆ Success indicators are defined with reference to increasing production levels (landings, employment, exports, GDP; fiscal receipts, value-addition, food security);
- ◆ Key issue of resource rent is hardly ever addressed;
- ◆ Access to benefits depend on being a fisher (or one engaged in related trade);
- ◆ Incentives exist to increase participation in the sector (often perverse incentives leading to overexploitation where access restrictions do not exist);
- ◆ Objective is to unlock the inherent wealth (resource rent or net benefits) of fish stocks;
- ◆ Macro-economic contribution of the sector is the main focus; countries reinvest rents domestically to ensure pro-poor growth;
- ◆ Many of the usual fishery management techniques are used but in a different way;
- ◆ Relies on a fishery management planning approach, with a focus on generation and equitable distribution of resource rent within each specified fishery;
- ◆ As governance and stakeholder capacity increases, government plays the enabling (oversight) role for private sector expansion;
- ◆ The approach is about achieving goals, not setting new ones; it is consistent with existing goals: resource sustainability, economic growth and livelihoods enhancement;
- ◆ Not prescriptive; provides an approach that can be tailored to the specific conditions and objectives of different countries and fisheries;
- ◆ It is important to develop the right institutions and incentives for successful fisheries;

Source: Study background papers.

The International Development Record and Fisheries Policy

Where fisheries management systems are moving towards a more holistic approach (e.g. New Zealand, Namibia, Chile), these are proving to be more economically successful than more conventional biological approaches. A set of guiding principles is now beginning to emerge relating to success in fisheries management, which can form the basis of international best practices in the future, and which

in theory could be applied across different situations (large or small countries; simple or complex fisheries; single country or federal-state systems). These emerging best practices (albeit at an early stage in most of the countries) represent a good opportunity for India to review its marine fisheries sub-sector, make relevant and objective comparisons, and identify future options for more effective sub-sector development. While the underlying lessons from these countries are relevant for India, the country also has very different conditions and significant challenges that need to be overcome



during implementation. These include the sheer scale of the sub-sector, length of the coastline, complexity of management issues and processes for inshore waters, need to improve performance with basic fisheries management, high levels of poverty in coastal areas, low levels of education, poor access to credit by smaller fishers, and institutional gaps related to policy and law. A shift in approach for India will necessarily be slow (it could take decades to fully achieve), require careful planning, and carry with it potentially high social costs that must be identified early and addressed. *Lessons from other countries should not be adopted blindly, but rather should be reviewed with an open mind, taking into account the Indian context and modified to suit local conditions.* These country examples, when studied in more detail, preferably through on-site visits, may provide useful lessons on how successful processes engaged with stakeholders in a reform program; how to revise policy and legal frameworks using consultative processes; how to set up new fisheries management units to support inshore fishers in a co-management approach; data requirements and methods for bio-economic modeling and rent estimation; and how countries have dealt with overcapacity issues.

Factors of Success in Fisheries Management and Emerging Best Practices

According to Cunningham and Bostock (2005), there are several major factors which appear to be important for success in marine fisheries management. These can be illustrated by several emerging examples⁸ of best practice in countries that are at different stages along the process to achieving an effective wealth-based fisheries management approach⁹.

- i) **A clear and well-founded policy framework:** Australian Northern Prawn Fishery. Management of fishery resources must sit within an effective national policy framework. This consists of the declared objectives of the various government departments (fisheries, trade, environment, etc,) and the overall

⁸ Source: Study team and Hilborn et al. 2005.

⁹ See Annex 4 for more details for some of these cases.

Box 5. Analysis of the fisheries policy profile and policy process – 4 steps

Step 1: Identify the policy profile

- ◆ What is the general policy context?
- ◆ What are the objectives of the fisheries policy?
- ◆ Which organisations are responsible for policy design and implementation?
- ◆ What are the policy instruments?

Step 2: Assessment of policy performance

- ◆ Have the stated objectives of the policy been achieved?
- ◆ What information underlies the assessment?

Step 3: Evaluate policy performance?

- ◆ How can the level of policy performance be explained?
- ◆ How have policy approaches been shaped by particular narratives?

Step 4: Identify options for policy change

- ◆ What opportunities currently exist for policy change?
- ◆ What constraints does policy change face?
- ◆ How can these constraints be overcome?

Source: Study background papers

macroeconomic goals of national and state governments. Clear specification of the roles and responsibilities of the various levels of government and the private sector is required to ensure effective decision-making in fisheries. The characteristics of the framework (strength, flexibility and appropriateness) will impact on the achievement of management objectives. In Australia, the Northern Prawn Fishery (NPF) is a good example of how an effective policy framework was able to set the boundaries for the fisheries management system, and how this was supported by an appropriate legal framework.

- ii) **Appropriate institutional capacity: Mauritania.** Effective institutional arrangements are crucial to the performance of fisheries management systems and the contribution of fisheries to the economy.



The range of institutions can relate to management organisations, legislative frameworks, policy processes, research and information collection and so forth. To ensure that the tasks are performed adequately, an appropriate level of institutional capacity is also needed; this is a major factor affecting success in developing countries in particular. In Mauritania, an African coastal state with large fishery resources, the development and implementation of an appropriate institutional framework and building capacity helped ensure that a significant proportion of central government revenue came from the fishery sector through the collection of resource rent. Presently, 20 percent of central government expenditures are financed from fishing revenues. The expected annual rent generation is US\$100 million per year.

- iii) **Holistic fishery management and stakeholder participation:** *Shetland.* Fisheries managers cannot act in isolation from other stakeholders, and fisheries cannot be managed without reference to other inter-acting sectors and to the wider economic and eco-system context. In the case of two fisheries in Shetland, the management regimes were changed to take account of a range of external factors, and to draw upon the collaborative efforts of different stakeholders to find an appropriate response to the needs identified.

- iv) **Resource rent or net benefits as a central concept:** *New Zealand.* The ability to extract resource rent and allocate it within the economy is a critical contributor to success in fisheries management for three reasons. First, it probably means that the fishery is being managed properly from an economic perspective. Secondly, it also means that the fisheries is probably also being exploited on a biologically sustainable level. Thirdly, a fishery that is contributing to a wider economy (through collection and use of resource rent) is probably also fulfilling the social objectives of a fishery management regime. In the case of New Zealand, resource rent is at the center of management, and incentives are aligned to the goal. In 1986, an

Individual Transferable Quota (ITQ) system was introduced. The right to catch fish is allocated as a proportional interest in the amount of fish that can be sustainably taken each year, and as a fishing right in perpetuity. Therefore, fishers face the costs of good or poor fishing practices on an individual basis and there is clearly an incentive not to overfish, and to protect their business investments into the future. Since New Zealand adopted a resource rent-centred approach to management, the total asset value of its fisheries has increased to US\$3.0 billion.

- v) **Appropriate incentives: Pacific halibut fishery:** *Canada and USA.* A key challenge for fishery management is to address the perverse incentives which occur in unmanaged (or weakly managed) fisheries and which drive overexploitation. In the case of the Pacific Halibut fishery spanning both Canadian and American waters, the introduction of rights-based fishing in 1995 has had numerous positive effects. What once had been an annual fishery with a reasonably long season had been reduced to a classic 'derby' fishery with crews racing non-stop for 48 hours in vessels of ever-increasing size and motors to catch as much fish as fast as possible from the opening of the season, with impacts on crew safety and product quality. Recognising the problems with the 'race to fish', Canadian fishermen asked for Individual Fishing Quotas (IFQs) from their government, which was successful in reducing the annual race for fish. In 1995, IFQs were introduced in Alaska to replicate the Canadian success. Stock recovery has taken place, landings have increased, prices on markets have improved and stabilised, and the fishing season has been lengthened with improved sea-safety. Discards have also been reduced along with ghost fishing, since fishers can now fish more selectively and efficiently.

- vi) **Dealing with complexity and change and ability to learn and adapt:** *Namibia.* Fisheries do not operate in isolation, but are located within diverse and complex systems, which make up the natural, social and economic environments. To successfully manage such complexity requires flexibility, and the ability to learn and adapt. The case of Namibia



is interesting in this respect. At Independence in 1990, the country went through a period of turmoil, with complex political and economic changes. In the inshore fisheries, operators from South Africa had a large presence. Offshore, a large fleet of foreign fishing vessels operated under free and open access conditions. Despite the political complexities (both regionally and internationally), Namibia was able to define the boundaries of its EEZ, establish a quota system, and create a sense of ownership of its fisheries. Of particular note is the fact that the new state asserted jurisdiction over the rich off-shore fishing grounds. Today the new fisheries management systems have been successful in generating significant economic rents for Namibia and continue to represent a source of economic growth. GDP contribution increased from 4 percent in 1990 to over 10 percent in 1998. Fish exports are now worth US\$300 million annually. Resource rents now cover all fisheries management costs in addition to generating surpluses to government for general redistribution.

- vii) **Setting an effective legal framework for small-scale shellfish fisheries:** Chile. The Chilean inshore shellfish fishery covers more than 40 species along a 3,000 km stretch of coastline, involves 10,000 divers in 250 communities, and generates revenues of US\$170 million per year. Until the 1980s, the area along the coast was an open access fishery with the usual problems of overcapacity, conflict and growing concerns over sustainability. In 1996, a new Fisheries Act supported the development of Territorial Use Rights from Fishing (TURFs). Implementation started in 1996 with TURFs granted to officially recognised fisher organisations. Co-management takes place between the local fisher organisation and the Ministry of Fisheries. Before a TURF is granted, the local organisation must provide a detailed base-line survey of the shellfish grounds, habitat maps, stock assessments and two-year management plan. The local organisations often contract technical consultants to assist with these tasks. TURFs are underpinned by strong legislation and a regulatory framework that protects use rights that are allocated. These rights are exclusive, secure,

and durable. Resource stocks have stabilised, fishers are playing a central role in resource management, and marketing systems have improved through larger bulk sales from local organisations rather than from individual fishers.

Making the Transition to Better Fisheries Management – Key Issues

It is generally accepted that fisheries management performance in most countries is relatively weak. Attempts to develop and implement fisheries management systems based mainly on increasing production, have overlooked the wider range of issues which affect fisheries exploitation, especially the management of people and their economic activities, and environment considerations. The inertia of institutional change also means that many fisheries management authorities are still structured in a way that is consistent with the old paradigm of maximising production rather than maximising net benefits. Therefore, the key questions are:

1. How can institutional change be brought about?
2. What are the issues that need to be tackled to improve fisheries policy performance?
3. What new approaches can be used in fisheries management?

In attempting to address these questions and work towards a more holistic fisheries management approach to maximise net benefits, there are at least 10 important points to be considered as follows:

- i) **Policy and policy analysis (problem definition):** For any country, the national fisheries policy is the formal statement that sets out clearly and explicitly the objectives, and the associated course of action, for management of the fishery. It represents the reference point against which all that happens in the fishery sector is measured. Policy analysis, as a starting point for considering change, is needed to measure the performance of policy (the extent to which objectives are achieved) and then attempt to explain the level of performance (policy evaluation – see Box 5).



- ii) **Policy process and future vision (opportunities identified):** The policy process involves both the design and implementation of policy. Fisheries policy should reflect a consensus by society on what it wishes to achieve through the exploitation (or not) of its fish resources and how it is going to achieve those objectives. The 'visioning' of the future of the fishery is important to gain ownership by the stakeholders, and to initiate the overall process of change.
- iii) **Information to shape reform and shift perceptions:** Stakeholders and key decision-makers need to understand the nature and performance of the fisheries, and the potential benefits which can be realised under different management regimes. Information flows during the reform process are critical to build credibility, shape perceptions and maintain support for change.
- iv) **New approaches to fisheries management need to be designed, tested and made operational:** New approaches to fisheries management based on improved fishing rights and maximising net benefits may offer a viable alternative to the conventional approach of maximising production in an open access system. However, there is a need to adapt any new approach to country and fishery-specific conditions, to test management arrangements and tools, and develop management plans which can be made operational in the future through appropriate instruments. This could be organised as a set of program components including the pilot testing of different institutional arrangements (such as co-management for inshore fishing with small communities or alternatives based on individual or collective use rights separate from direct government involvement) across a number of locations.
- v) **New institutions and organisations should be developed and evaluated:** Institutional arrangements which can enable the effective performance of new fisheries management systems should be developed. For example, frameworks of rights and fiscal arrangements, which provide incentives to fisheries stakeholders to align behind the policy objectives and cooperate within the management systems. Appropriate organisations (public and private sector) will be needed to provide a range of services for the management system and sector.
- vi) **Importance of legal frameworks:** The legal framework exists to support the implementation of the policy and subsequent strategy. It is essential to establish efficient policies and strategic direction before developing or reforming legal instruments. Close attention should be paid to the nature of the legal instruments that are developed. The best generic approach seems to have a broad Fisheries Law that establishes general goals and directions for the fisheries sector based on Policy and Strategy documents, and then to develop a "cascading" structure of legal and regulatory instruments to implement the law. The precise instruments chosen will depend on the particular circumstances of the country concerned. In federal systems, national policy and legislation must guide state policy and legal frameworks to ensure harmonisation in critical areas.
- vii) **Launching, piloting and scaling-up of new fisheries management systems takes time:** The movement towards new management systems is a process that takes considerable time to implement. Successful implementation of this process starts by identifying a set of potential FMUs that will encompass a resource or set of resources and all of those who exploit these resources in a defined spatial and/or temporal area. Once such FMUs have been identified, the second step is to prioritise them. The third step is to develop fishery management plans for the priority FMUs, starting with one or two and then gradually scaling up in step with improved capacities and institutional development.
- viii) **Supporting the process and linking to other public policies:** As discussed in the section above, the move towards new management systems will require capacity that is usually not in great supply



in most countries. There is almost always a need therefore for a capacity-building exercise, involving human capacity (training and the recruitment of new skills) and institutional capacity (for example, the development of systems to manage fishing rights on a day-to-day basis). Another difficulty in many countries is that the fishing sector is poorly integrated into macroeconomic goals. An important role for the fisheries line Ministry is to educate the key central government agencies as to the possible contribution that fish resources might make at different levels, depending on the value of the resource.

- ix) **Political support and governance (importance of champions for change; nature of governance arrangements may affect extent of lead taken by government):** Global experience suggests that the movement towards more effective management systems such as a wealth-based approach is not simple, and will face countervailing pressure to maintain the status quo. There is a need to proceed gradually, exploring the implications of change for different groups and individuals, and build consensus around the new approach. The need for a gradual approach will be particularly great as the first fisheries are moved towards a new management system. Experience elsewhere strongly suggests that once the results become available are seen as successful, demands for change will emerge from other fisheries (or FMUs).
- x) **Dealing with transition – costs and benefits of change; mitigation and compensation; winners and losers; disinvestment of old institutions and systems:** Although more holistic fisheries management offers the prospect of a substantial increase in net social and economic welfare, there are two key issues. First, in the short term, investment will be required in both the fish stocks and the institutional arrangements for improved management. Secondly, once the pay-off does develop, attention will have to be paid to the distribution of the gains and the losses, both for reasons of equity and for reasons of sustainability.

It is critical to analyse who gains and who loses and to devise appropriate social policies.

Fisheries Management, Poverty Reduction and Livelihoods

The marine fisheries sub-sector can provide a range of direct and indirect benefits. Direct benefits include employment, income, and food security, all important to underpin livelihoods. Indirect benefits can arise when some of the wealth generated by the fisheries is reinvested in the economy, leading to income and employer multiplier effects (as the sub-sector expands) and/or through government fiscal policy (taxation and reinvestment of public revenues in other parts of the economy). One major way in which fisheries can address poverty reduction is through contributing to sustained economic growth. Also, by focusing on pro-poor growth and the ways in which poverty in fisheries (and other sectors) can be addressed from a macro-economic perspective, the empirical evidence shows that there is a greater chance of success in reducing poverty. In addition, programs can also be developed to provide alternative sources of livelihoods for fishers and their families; India has several leading examples of rural livelihood programs, linked to private investment and markets that could easily be adapted to coastal areas.

A major question often arising in the context of poverty and coastal fishers is whether more holistic fisheries management approaches based on net benefits, generally apply to all scales of fishing, for example large trawlers versus artisanal boats, or small-scale fisheries (SSF). Global experience shows that these more holistic approaches to fisheries management can apply across the board. As in the case of Chile, it can certainly be used to defend the interests of small-scale fishers or any other group felt to constitute a particularly deserving case, but not in the same way as the standard government approach of simply encouraging more fishers to the sector by subsidising new boats, nets, fuel, etc. Instead, particular target groups can be allocated an interest in the inherent resource wealth, for example through individual



catching rights or an interest in a collective set of rights, through community-based fisheries management. Various arrangements can be introduced to make certain these allocations and the wealth generated is retained

by the target group. Work to develop community-based fisheries in southern India by UNDP, FAO and the South Indian Federation of Fishing Societies (SIFFS) is beginning to show some promise (FAO 2008a).

Key Chapter Messages

1. Based on compliance with the United Nations/FAO International Code of Conduct for Responsible Fisheries Article 7 (fisheries management) India, along with many other countries could improve its performance in terms of national policy and management systems, particularly for inshore waters where we see the highest concentration of fishers, vessels and conflict.
2. Conventional fisheries policies and management, based on de facto open access systems and maximising biological yields, generally fail to optimise the value of net benefits or 'wealth' that is inherent in marine fish stocks.
3. Based on emerging global experiences, countries that are gradually shifting to a more holistic fisheries management approach, focusing on maximising net benefits and allocating more well-defined rights to the resource, tend to improve marine fishing performance.
4. Critical success factors and valuable experiences are emerging from a number of countries that can guide India in considering future reforms to its marine sub-sector. At the same time however, it is important that these lessons be evaluated carefully in the Indian context.





INDIA'S MARINE FISHERIES SUB-SECTOR

Fisheries Sector and the Marine Sub-sector

The Indian fisheries sector consists of several sub-sectors based on fish production (Figure 1). The marine sub-sector accounts for approximately 39 percent of the total fish harvest in India, with inland fishing making up 61 percent. This reflects a remarkable shift; in 1950-51, marine fishing accounted for 71 percent of total fish production. Inland fishing includes freshwater aquaculture – fish caught in 195,000 km of rivers and canals; 5.3 million ha (surface area) of reservoirs, farm ponds and tanks, 0.8 million beels and small lakes, and 1.24 million ha (surface area) of brackish water near the coasts. It also includes open water capture from beels and small lakes. Inland fishing also includes coastal aquaculture with cultivation of high value marine fish, shellfish such as prawns, oysters, crabs, etc, in enclosures established in seawater close to shore or just onshore. Both inland and marine sub-sectors provide rural and coastal communities with significant livelihood opportunities.

Historical Overview of Marine Fisheries

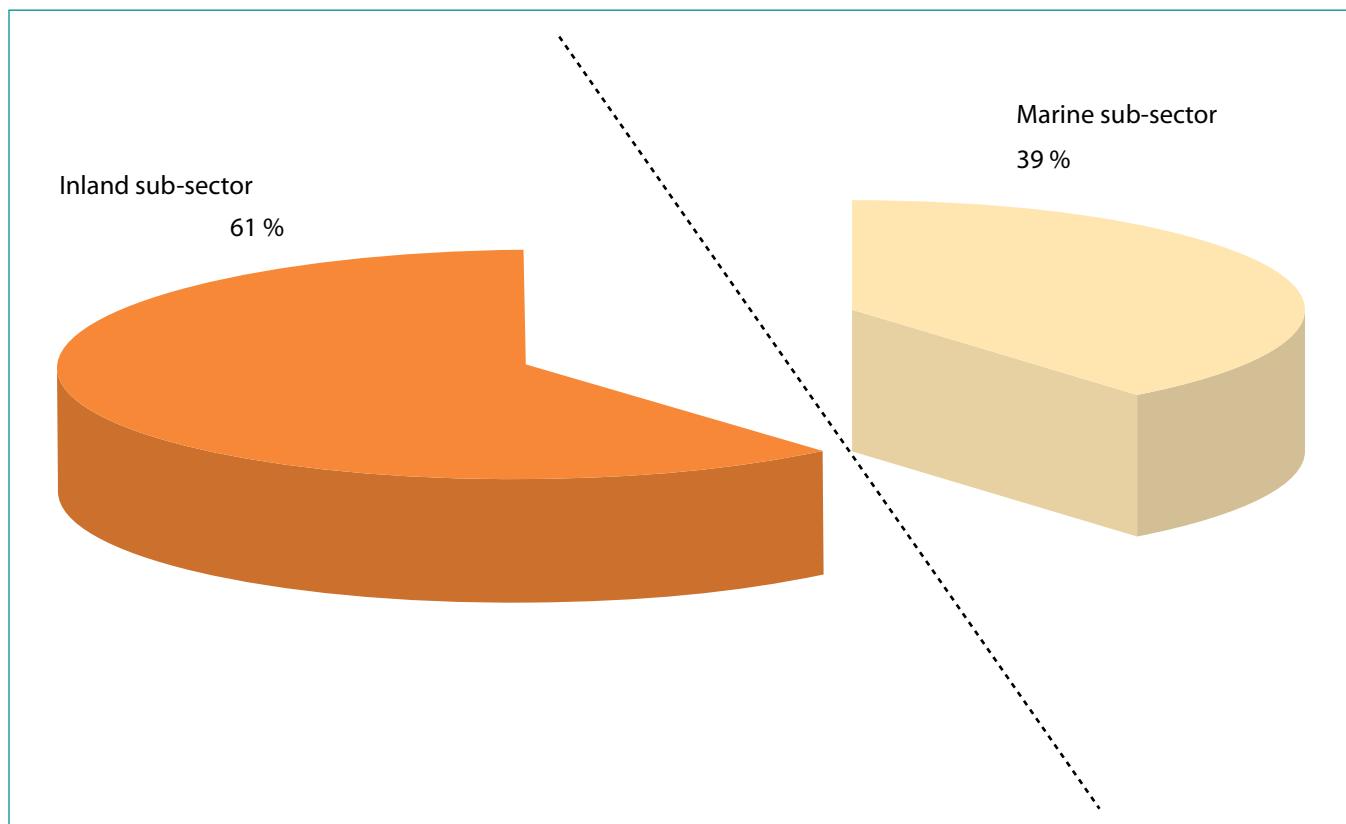
The Central Marine Fisheries Research Institute (CMFRI 2003) identifies three phases of development in marine fisheries in the country (Figure 2). Phase I corresponds

to the pre-development stage (up to 1965) where fishing was predominantly by indigenous craft and gear and the process of mechanisation was in the initial stages. Phase II (from 1965 to 1986) is characterised by a substantial increase in the use of synthetic gear materials, export trade expansion, increased use of larger mechanised vessels such as trawlers, establishment of larger fishing harbors, introduction of purse seine harvesting and initiation of motorisation of smaller artisanal boats. Phase III (1986-2000) witnessed substantial growth in motorisation of the artisanal fleet, increased use of ring seines, extension of fishing grounds further offshore, increases in extended voyage fishing, and introduction of seasonal closure of fisheries.

A fourth phase (post-2000 modernisation) is now emerging that could describe the recent stagnation with inshore fish catches, reduced investment, and increasing conflicts at sea over access to fish. This is a result of the "open access" nature of the inshore marine fisheries, as well as policies, and management systems that failed to control the expansion of total fishing effort to a level commensurate with the productivity of the resources. This period also coincided with (and was influenced by) major changes in the macro-economic environment from economic liberalisation and structural adjustment programs at the national level, to the establishment of new global trade regimes under the aegis of the World Trade Organisation (WTO). The collective impact of such changes can be summarized as diminishing access for different stakeholders in fisheries to resources,



Figure 1. Fisheries sector production India, 2008–09



Source: GOI 2009

technology, investments, and markets. It also reflects a recent expansion of long-range fishing effort into the more distant areas of the Indian EEZ.

Economic Context of Marine Fisheries

Contribution to National GDP

With respect to marine fishing, the country has a coastline of 8,118 km with an EEZ stretching over 2.02 million km², and a continental shelf covering 0.53 million km². Marine fisheries remain an important source of employment, income and food security. At the global level, it is ranked third¹⁰ in overall fish production and second in aquaculture. The economic importance of

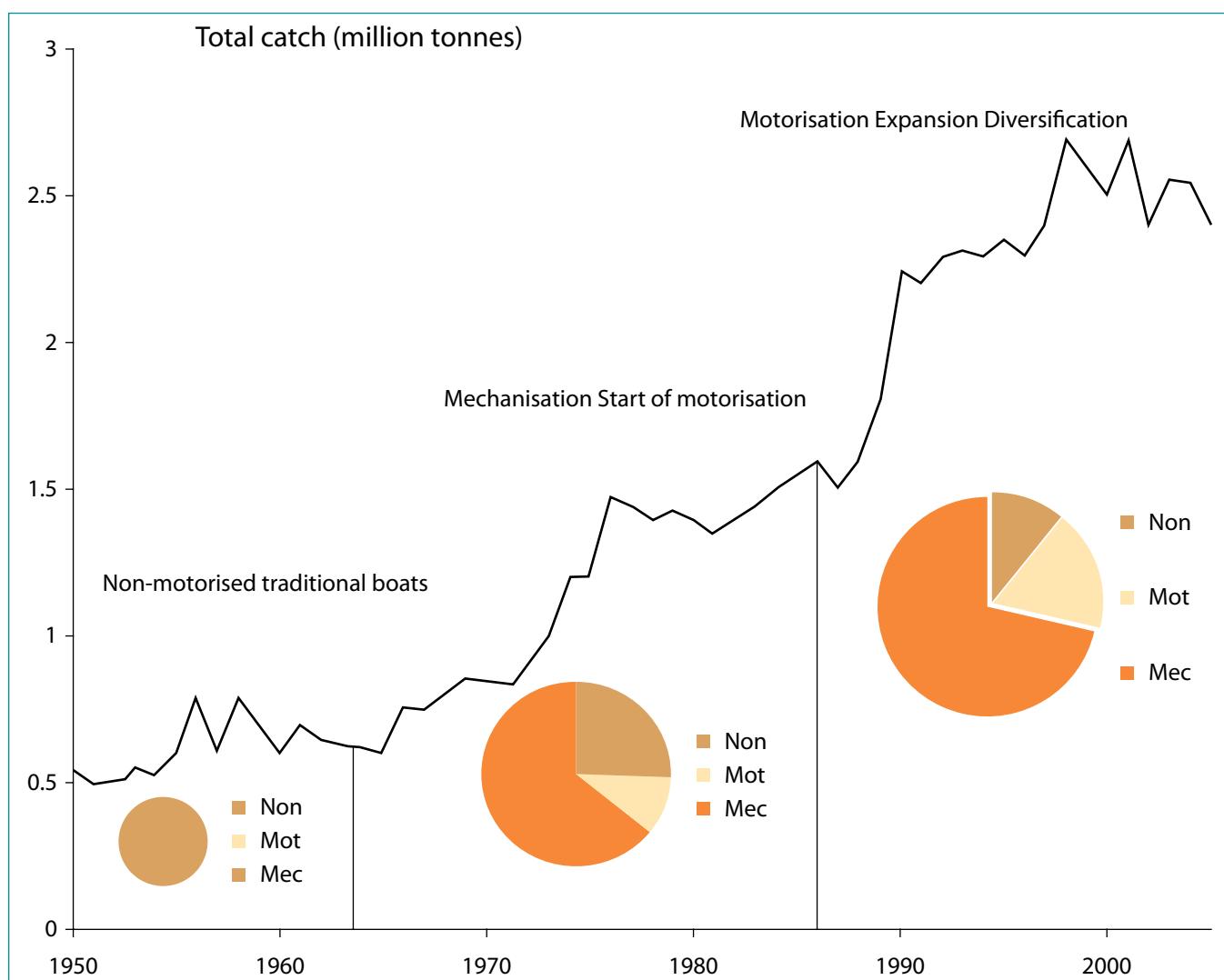
the fisheries sector for the country can be described by contributions to national GDP, foreign exchange earnings, domestic food security, and employment generation. The GDP contribution from fisheries is about 1/20th that of agriculture. The percentage contribution of fisheries to GDP has increased from 0.46 percent in 1950-51 to a peak of 1.24 percent in 1997-98, and then has declined to just over one percent in 2007-08. Marine fishing accounts for about half this GDP value.

Contribution to Exports

Since the beginning of modernisation in the 1950s, the fisheries sector, especially the marine and the coastal aquaculture sub-sectors, have had a growing focus on export markets (MPEDA 2006), particularly for shrimp, which now makes up 54 percent of total exports by value. Frozen fish, cuttlefish and squid account for another 32

¹⁰ According to FAO data, India ranks 8th in fisheries production. This report will use the Indian data on this point.

Figure 2. The three phases of development of Indian fisheries



Source: CMFRI 2003. Note: Non=non-motorised; Mot=motorised; Mec=mechanised.

percent of total export value. The remainder is comprised of dried fish products, as well as live and chilled exports. About 20 percent of India's total marine fish production is exported.

According to the Planning Commission (2006), India's share in the global fish products trade increased from 6.1 percent in 1992 to 6.5 percent in 2003. India is now estimated to account for five percent of the global fish products trade. There has been a steady increase in exports by volume, value, and unit value realisation

since the 1960s. From 2002 to 2008, export volumes and value showed modest gains (Figure 3). Japan, the USA, the European Union (EU) and Southeast Asia (including China) are the main export markets. The EU remains the largest export market, now accounting for 35 percent of total value (The Hindu 2008). A worrying trend from April 2007 to January 2008 however, was the 18 percent drop in the volume of seafood exports and a corresponding decline in value of 13 percent. The decline is attributed largely to the appreciating India rupee relative to the US\$ during this period.



Figure 3. Exports from India by volume and value



Source: (Planning Commission, 2006; MPEDA 2009).

Employment Generation in Marine Fisheries

The 17th Livestock Census of 2003 (Government of India 2004a) gives the total number of fishers in the country (inland and marine) as 14.5 million, of whom 4.6 million are men (32 percent), 4.0 million are women (28 percent), and 5.8 million are children (40 percent). According to the 2005 Marine Fisheries Census (CMFRI 2006), the total population of marine fishers in the country is 3.52 million, living in 756,212 households in 3,202 fishing villages along the coast¹¹, or nearly 25 percent of the total number of fishers in India. Of this total, over 900,000 are recorded as active fishers, 1.0 million as part time fishers while 1.4 million fell into the category of 'others'.

¹¹ For the remainder of the report, the 3.52 million figure will be used.

Structure of Marine Fisheries

Fishing Vessels

According to CFMRI (2006), there were more than 240,000 fishing vessels¹² in the sector, of which nearly 60,000 were large mechanised vessels (about 25 percent), 76,000 were smaller motorised (about 31 percent) and the rest smaller non-motorised (about 44 percent). This means 75 percent of the vessels are fishing largely in inshore waters. The non-motorised craft are still the dominant fishing boats in the Indian waters although their contribution to overall landings is much less (Table 3). The largest number of mechanised boats is in Gujarat and Maharashtra (over 13,000 each), while Tamil Nadu tops the list of

¹² More recent data (Yadava 2008) suggest a figure of 280,000 vessels.



Table 3: Fishing crafts, coastal states and union territories

State/Union Territory	Mechanised Vessels	Motorised Traditional Boats	Non-Motorised Traditional Boats	Total Marine Fishing Vessels
Andhra Pradesh	2,541	14,112	24,386	41,039
Goa	1,087	932	532	2,551
Gujarat	13,047	7,376	3,729	24,152
Karnataka	4,373	3,705	7,577	15,655
Kerala	5,504	14,151	9,522	29,177
Maharashtra	13,053	3,382	7,073	23,508
Orissa	3,577	4,719	15,444	23,740
Tamil Nadu	7,711	22,478	24,231	54,420
West Bengal	6,829	1,776	10,041	18,646
A&N Islands	230	160	1,180	1,570
Daman and Diu	562	654	211	1,427
Lakshadweep	478	306	594	1,378
Puducherry	627	2,306	1,524	4,457
Total	59,619	76,057	106,044	241,720

Source: CMFRI (2006); Government of India 2007a.

motorised boats with over 24,000 boats. The largest number of non-motorised boats is in Andhra Pradesh and Tamil Nadu (over 24,000 each). Of the total fishing vessels in the sector, the 2005 Census found 185,438 boats (about 78 percent) to be owned by fishers. Within vessel categories, the ownership of the mechanised, motorised and non-mechanised boats by the fishers was 60 percent, 70 percent and 92 percent respectively, indicating that nearly a quarter of the boats are owned by people not involved in fishing themselves.¹³ From Chapter 2, Varkey et al. (2006) estimated that India has more than 2.5 times the optimal number of fishing vessels, suggesting a significant reduction in capacity is needed to support more sustainable fishing, especially for inshore waters.

These three broad categories of vessel classification mask a number of underlying issues (Vivekanandan 2007). First, they do not reflect perfectly homogeneous categories from a management perspective; as an example the mechanised category includes all boats

that have an inboard diesel engine, whether they use small 15 hp motors or larger 150 hp engines. Though the predominant mechanised vessel is the large trawler, it also includes a limited number of gill-nets and long liners, some of which are already involved in offshore tuna fishing in the outer reaches of the EEZ. There is also a fourth category generally not reflected in the Indian data; the 180 or so deep sea vessels, of which only about 30 are still operating. Second, the mechanised vessels, especially trawlers, operate from a limited number of harbors and hence are more amenable for certain management controls. In contrast, the smaller motorised boats land anywhere they wish along the coast and cannot be managed without self-control or peer pressure (such as a community-based management system). The ring seine boats of Kerala are another example; they are large (70'-90') vessels with an investment of US\$50,000 and above. Despite their size however, they are actually beach landing boats of traditional design, labor intensive (with 40-60 persons per unit), owned by groups (for livelihood rather than investment). They follow local traditions and are

¹³ It is possible that the ownership of motorised and non-mechanised boats among the fishers is higher than reported.



Table 4: Coastal fisheries infrastructure 2005

Boat-building yards	Ice factories	Cold storage	Freezing plants	Canning plants	Curing yards	Peeling sheds	Fishmeal plants	Major harbor & ports	Minor harbors & landing centers
224	905	108	113	13	992	293	46	4	203

Source: CMFRI (2006).

under village community control. By some measures these boats are large mechanised vessels, yet by other definitions these could be classified as artisanal. Thirdly, the structure of the fishery also includes different interest groups that transcend the government's vessel categories used. For example, there is a large interest group that calls itself "traditional" or "artisanal" yet this category comprises an assortment of craft and gear types.

Fisheries Infrastructure

The Marine Census 2005 provides a summary of coastal fisheries-related infrastructure (Table 4)¹⁴. Each state has a number of major fishing ports as well as numerous small landings sites, often on exposed beaches or in semi-sheltered estuaries and bays. The port facilities and markets also vary markedly across the country but most are overcrowded with old wholesale market places in need of upgrading. Some upgrading is occurring as international retail chains are expanding in major cities and taking an increasing volume of fish. Most of the states have inadequate facilities for drying fish and storing dried products.

Much of the boat-building activity in the country involves artisanal, small-scale, operations and is not formalised, either legally or even physically (the construction activities can shift from place to place depending on convenience). This makes it difficult to keep track of the numbers or activities of the boat-building yards and, from a management and sea safety perspective, to monitor the numbers and quality of the boats they produce.

Fish factories, canneries and fish meal plants exist in all states with most of the modern European Union certified plants being located in Gujarat. Ice plants and freezing plants occur around the coast but ice availability and price are constraining factors, and the handling and sanitary quality of ice is commonly unsatisfactory. A notable feature of the seafood industry is the declining number of sizeable export processing enterprises in the states and concentration around cities such as Kochi and Mumbai where fish is imported from other states for processing and shipping.

Fish Production Trends

As a result of modernisation, the Indian fisheries sector witnessed a steady growth from the 1st Five Year Plan launched in 1951. The total annual fish production from all sources was over 7.6 million tonnes during 2008-09, which was a significant improvement over the 0.75 million tonnes in 1950-51 (Figure 4). The west coast currently contributes approximately 70 percent to the total marine landings, while the east coast accounts for more than half the freshwater fish production and nearly 95 percent of the cultivated shrimp production. Marine fish production increased from 0.53 million tonnes in 1950-51 to a peak of just under 2.9 million tonnes in 2000-01, and then a leveling-off in subsequent years. A similar trend is shown using data from SIFFS (2007). Despite this apparent leveling off in marine fish harvests, the Working Group on fisheries for the 11th Five Year Plan (2007-2012) estimated that additional annual yields were possible for tuna and billfish from offshore waters (217,800 tonnes), sharks

¹⁴ The Fisheries Survey of India (2009) indicates an estimated 1,914 fish landing centers in coastal India.



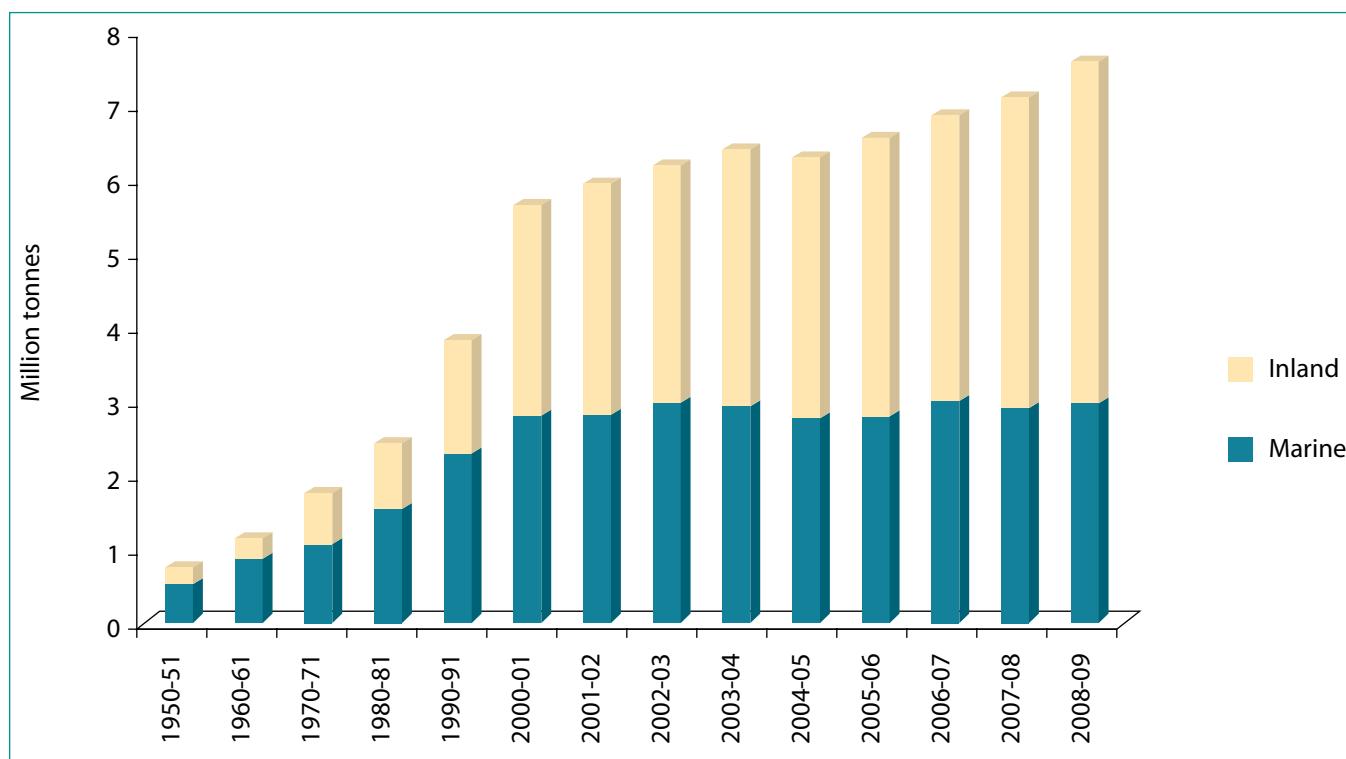
(26,200 tonnes) and others including coastal pelagic, oceanic squids and deep-sea lobsters (29,000 tonnes). Whether these additional production targets can be met is unclear.

The contribution of the inland sector to the overall production has increased at a higher rate than that of the marine sector, from 0.218 million tonnes during 1950-51 to 4.61 million tonnes in 2008-09 (Figure 4). The relative stability of inland aquaculture (compared to marine capture fisheries) together with a shift in inland fishing from traditional subsistence activities to more commercial enterprises has increased its importance at the national level. It is expected that the inland sector's importance will continue to grow in the coming years.

As outlined in Chapter 2, a recent assessment of the status of 61 fish stocks from around India (CMFRI, 2007),

indicated that nearly two-thirds were overexploited (exploitation rate greater than 65 percent); 28 percent were fully exploited (exploitation rates between 50 percent and 65 percent); and only 11 percent were under-exploited (exploitation rates less than 50 percent). This is in sharp contrast to global figures published by FAO (2007a) indicating that in 2005, around 25 percent of the world's fish resources were categorised as overexploited, depleted and recovering, 50 percent as fully exploited, and 25 percent as underexploited and moderately exploited. Estimated illegal, unreported and unregulated (IUU) fishing in EEZs in both the Western and Eastern Indian Ocean represents an average of 18 percent and 32 percent, respectively of regional catches (Pitcher and Ganapathiraju 2008). Information from Kerala (SIFFS 2007) illustrates the pressure on most marine fisheries (Box 6).

Figure 4. Total fish production since 1950-51



Source: (Planning Commission, 2006, GOI 2010).



Box 6. Fish production trends, Kerala

Kerala is a leading maritime state. Marine fish production increased from 325,000 tonnes from the mid-1980s to 600,000 tonnes in the early 1990s. Since then, fish production has stagnated despite enormous increases in fishing capacity. For certain species, catch levels have declined. Mackerel production has dropped from 128,000 tonnes in 1996 to just 20,000 tonnes in 2001. Annual landings of shrimp declined from an average of 51,000 tonnes between 1985 to 1994, to an average of 46,000 tonnes during 1995 to 2004. The production of sharks, rays, ribbon fish, catfish, anchovies, goat fish, croakers, carangids and pomfret show clear declining trends. Conversely, sardines, squid, and seer fish show increasing trends.

Source: SIFFS (2007)

Institutional Framework

Background

Article 246 of the Constitution of India makes fisheries a subject for the State List. This means that all laws and regulations related to fishing, fish marketing, fishers' welfare, etc, have to be framed by the state legislatures. As FAO (2000) notes, the involvement of the Union Government on issues related to fisheries management is high. Also, fish production from the EEZ, major fishing harbors, fishing vessel industry, seafood export trade, and marine and inland research and training are on the Union List in the Seventh Schedule of the Constitution (Mathew, 2003). Under existing law, the maritime states of India control the seas up to 22 kilometers (12 nautical miles) from the shore, while the GOI has control over the EEZ from 22 km to the 370 km (200 nautical mile) limit. Within states, a range of zones and boundaries may exist but mainly on paper. The GOI sees the entire area beyond 22 km as an under-exploited zone. For administration purposes, it is generally assumed by authorities that all boats registered (or unregistered) in the states (especially smaller vessels) do not fish beyond 22 km. Yet, there is considerable fishing beyond 22 km by

smaller motorised vessels supposedly operating within state jurisdiction. At the same time, larger mechanised trawlers that should be fishing outside the 22 km zone often cross into the zone closer to the shore to fish in competition with smaller boats.

Agencies Dealing with the Marine Fisheries Sector

Mathew (2003) provides a description of the main government departments and Ministries dealing with various aspects of fisheries (Table 5). Additional details on selected institutions are provided below.

Key Central Government Organisations

At the central government level, marine fishing falls under the purview of the **Department of Animal Husbandry, Dairying and Fisheries (DAHDF)** which is part of the Ministry of Agriculture, Government of India. The fisheries division within the DAHDF implements and monitors the central sector schemes and centrally sponsored schemes¹⁵ delivered through the state governments. The division is the focal point for fisheries policy, strategy, management and development (Yadava 2008). On paper, the DAHDF is responsible for fisheries management in the Indian EEZ outside of the 22 km territorial boundary. In the past, this has focused mainly on foreign fishing vessels and is covered by a number of Acts and regulations.

National Fisheries Development Board (NFDB) is an autonomous body under the administrative control of the DAHDF and inaugurated in September 2006. The board's objectives include the following three particularly challenging ones of a) coordinating activities pertaining to fisheries undertaken by different Ministries/Departments in central and state/union governments; b) improving production, processing, storage, transport and marketing; and c) achieving sustainable management and conservation of natural aquatic resources including the fish stocks.

¹⁵ The latter have a component of contribution by the state governments.



Table 5: Public institutional matrix – Indian marine fisheries

Ministry/Department	Responsibilities
At the national-(Union) level	
Ministry of Agriculture (Department of Animal Husbandry, Dairying and Fisheries), along with national fisheries research institutions	<p>Fisheries in the EEZ, infrastructure, survey and assessment of fishery resources, research, training and extension; distribute subsidies:</p> <ul style="list-style-type: none"> ● Motorisation of traditional craft and purchasing fishing gear ● Reimbursement of Excise Duty on High Speed Diesel (HSD) oil ● Fishing harbor facilities at major and minor ports ● Renovation/construction of fish farms ● Establishment of shrimp seed hatchery of 2-5 million capacity ● Development of Fishing Villages (DFV) program provides basic civic amenities such as housing, drinking water and community halls ● Relief programs to fishers during the lean period ● Accident insurance for fishers
Ministry of Shipping	Fishing vessel industry and fishing harbors (Union List); minor fishing ports (Concurrent List)
Coast Guard (under the Ministry of Defense)	Regulation of fishing by foreign vessels, prevention of marine pollution from ships and protection of endangered marine species
Ministry of Food Processing Industries	Fish processing
Marine Products Export Development Authority, MPEDA (Ministry of Commerce and Industry)	Increasing exports, specifying standards, processing, marketing, extension and training in various aspects of the industry MPEDA (2001)
Ministry of Environment and Forests	Protection of wild animals and forests and marine biodiversity (Concurrent List); Coastal habitat protection issues
Ministry of External Affairs	Law of the Sea matters
Department of Ocean Development, Ministry of Earth Sciences	Implementation of 1982 UN Convention on the Law of the Sea
Ministry of Earth Sciences	Monitoring ocean pollution, identifying potential fishing zones
Ministry of Water Resources	Erosion-related issues
Ministry of Tourism	Tourism (activities that have an impact on fisheries)
At the state-level	
Department of Fisheries	All fisheries and mariculture activities in the state
Department of Forests	Protection of wild animals and forests and marine biodiversity (Concurrent List)
Department of Ports	Minor fishing harbors (Concurrent List)

Source: Mathew (2003), Yadava (2008).

Key State Government Organisations

The State **Departments of Fisheries (DOF)** are the nodal agencies responsible for formulation of policy, development and management programs and their

implementation. The DOF is tasked with providing direct support for increasing supply from both capture and culture fisheries. It has a mandate to monitor and promote improved management of the resources, and subject to resource constraints, actively promotes the



involvement of small-scale and poorer participants in the sector.

The state-level fisheries departments largely function along the same lines as at the beginning of the modernisation period about 40 years ago. They face many constraints to effectively cope with the emerging management trends and issues such as open access, overcapacity and stagnant or declining catches, increasing conflict, coastal pollution, etc. Typically, department staff implement social welfare schemes for the fishing community (insurance, diesel subsidies, etc); maintain records of fishing operations; implement various fishing regulations (governing where vessels of certain categories can fish, enforcing periodic fishing bans, monitoring gear use, etc); oversee construction of fishing harbors and set up marketing and processing infrastructure (encouraging even higher production); provide technical support, training and extension where possible; support fishing cooperatives; and compile fisheries statistics (Department of Fisheries-Andhra Pradesh, 1998). Most states do not have working patrol boats, vehicles, or other equipment required to support effective fisheries regulation, including monitoring, enforcement and control. As summarised by Sathyapalan, Srinivasan, and Scholtens (2008), department officials must simultaneously act as welfare providers, registration officers and policemen.

Research Organisations

Fisheries research is undertaken by both the central government and the individual state governments. The central government research institutions generally fall under the control of the **Indian Council of Agricultural Research (ICAR)**, which is affiliated with the **Department of Agricultural Research and Education (DARE)**. Fisheries research in the states is done by agricultural universities and their colleges of fisheries. ICAR coordinates the activities of six major research centers, covering inland fishing, aquaculture, education and technology. The **Central Marine Fisheries Research Institute (CMFRI)** in Kochi, Kerala is directly supporting marine fishing in India. Another fisheries research organisation, the **Central Institute of Fisheries**

Education (CIFE) in Mumbai, undertakes education and research in fisheries. The **Central Institute of Fisheries Technology (CIFT)**, also in Kochi, carries out research in fishing technology, craft and gear, processing and preservation; it also helps in quality control certification for export of seafood. The **Fishery Survey of India (FSI)**, headquartered in Mumbai has a mandate for national fish-stock assessments. A significant level of research is carried out and practical information is provided both to the state and central policy makers, and private stakeholders ranging from small scale fishers to large trawler operators. Notification to fishermen on Potential Fishing Zones (PFZ) in collaboration with the Indian **National Centre for Ocean Information Services (INCOIS)**, Hyderabad, under the National Remote Sensing Agency, is based on remote sensing data from satellite imagery. Training is provided by the **Central Institute of Fisheries, Nautical Engineering and Training (CIFNET)**.

Financial Institutions

The **National Bank for Agriculture and Rural Development (NABARD)** has a special component for preferential lending to the fisheries sector at subsidised rates of interest. NABARD's support to fishing sector included refinancing mechanised and other boats and aquaculture. In the Tenth 5-Year Plan period, NABARD had plans to refinance loans worth over 6 thousand crores or US\$1.5 billion.

Trade Associations

The **Seafood Exporters Association of India (SEAI)** is the representative body of seafood exporters. It takes an active part, in conjunction with the MPEDA, in conducting the International Seafood Fairs in India, besides participating in various international fairs and exhibitions. It also brings out the Seafood Exporters Journal.

Training Institutions

The main bodies involved in training and capacity building at the field level are the state Departments of Fisheries,

which frequently offer courses in new technologies or ancillary activities for supporting fishing effort (such as gear and engine repairing), and post-harvest issues such as processing, quality control and fish handling. Besides the DOFs, the state agriculture universities in several states also have their own colleges of fisheries which undertake more systematic and regular training in fisheries at graduate, post-graduate and doctoral levels. The CMFRI undertakes extension and training programs, generally of a one-off kind. MPEDA has a strong training role especially in the processing sector, but also undertakes regular extension programs on fishing and related activities.

Community Institutions

The most important community institutions are the traditional governance systems (caste/kinship-based, with geographical origin also being important in case of migrant/settler communities). Some of traditional management systems are still in place to provide fisheries governance at the local level, although these are being eroded by changes in society and the macro-economic policies of governments. Apart from these community-based institutions, there are three other kinds of institutions in the fishing communities of India:

1. **State-supported cooperatives** function as channels for aid but have often become so entrenched that their more important role of bringing about social change is often ignored.
2. **Community-based organisations (CBOs)** led by NGOs, tend to be more specific in their orientation in terms of target groups (by gender, for instance) or issues. Women's self-help groups (SHGs) are the most visible manifestation of the modern community institutions in the village (Box 7).
3. **Fishworkers' organisations**, which seek to network with other fishers' bodies and bring their issues and concerns to the notice of the policymakers in a proactive manner. The National Fishworkers' Forum (NFF) is the biggest fishers' body in the country and has its affiliates in several coastal states of the country.

Box 7. South Indian Federation of Fishermen Societies

The South Indian Federation of Fishermen Societies (SIFFS) is a Non-Governmental Organisation (NGO) supporting the small scale marine fisheries sector. SIFFS is the apex body of organisations of small-scale artisanal fish workers. It has a three-tier organisational structure. With over 6,000 member fishermen, organised through 100 primary societies in eight districts of southern peninsular India, SIFFS over the last two decades has kept its focus on strengthening the artisanal fisheries. SIFFS was originally established to help small scale operators market their fish and receive a fair price. SIFFS now provides a wide range of services to member and non-member fish workers, including access to credit. Today, over 50,000 fish workers including non-members are using these services. In 2003-04, the network of SIFFS reported an annual fish sales turnover of Rs.36.85 crores.

Source: SIFFS (2008)

Major Institutional Issues

The marine sub-sector has no separate central ministry of its own; the Fisheries Division remains as a small group within a small department in the large Ministry of Agriculture. The lack of a separate centralised body to coordinate fisheries at the national level means that different aspects of fisheries are handled by several ministries and departments. Finding common ground around different priorities and coordination in a mutually reinforcing manner is difficult in the absence of any effective inter-ministerial bodies. There is also considerable industry and government uncertainty about how the NFDB will interact with other organisations such as state Department of Fisheries, MPEDA and the research and training centers, especially in the area of vocational training. At the other end of the spectrum, the traditional community governance systems may prove to be highly effective and efficient at the grassroots level, but their potential contribution to the existing policy-making processes or to the implementation issues is rarely utilised.



Fiscal Analysis

The Central government fiscal support to development at both the national and state level comes through the budget allocation process as part of Five Year National Plans. Within each of these Five Year Plans, funds are allocated to the fisheries sector through both Non-Plan (mainly for staff salaries) and Plan (targeted to specific schemes, which are implemented by the central and state governments, either separately or in many cases jointly (Yadava 2008). The overall public expenditure during the Xth Plan (2002 to 2007) on fisheries was Rs. 2,497 crore (US\$ 640.5 million) including both central and state contributions. This was comprised central government contribution of Rs. 1,176.5 crore (US\$ 301.7 million) and state governments contribution of Rs. 1,320.5 (US\$ 338.6 million). For the central fisheries-Plan-related budget in the Xth Plan, about 57 percent of the total was allocated to support the marine fisheries sector, down from 80 percent in the Vth Plan (Yadava 2008). The allocations for marine fishing includes the large costs for infrastructure (ports and landing sites), marine product exports development, research (especially fishery surveys), and marine fisheries welfare. Taking into account both the DAHDF and the Department of Agricultural Research and Extension (DARE) budgets, the largest allocations go to the Fisheries Institutes (33 percent), followed by marine product export development (17 percent), infrastructure (11.5 percent), welfare (11.5 percent), marine fisheries development (10.6 percent), aquaculture (10.2 percent), information and databases (3.8 percent), inland fisheries development (1.3 percent), and central administration (1.3 percent).

For the coastal states, and taking Andhra Pradesh as a representative example, state fisheries budgets are largely directed to supporting staff salaries and maintenance (77.4 percent of the total state fisheries budget allocation). Within the operational programs sphere (excluding staff costs), marine fisheries activities account for only 12.3 percent of the total operational allocation. Central schemes provide approximately 50 percent of the funds to operational programs within the state fisheries sector. The largest single budget item

for both state and particularly central allocations with operational programs is welfare schemes, including support to cooperatives, housing schemes, a special Prime Minister's program for poorer communities, fuel subsidies, insurance, and various relief programs. These account for nearly half of all state fisheries budgets and nearly three-quarters of all central contributions to operational programs. A further 20.7 percent of the total central allocation for operational programs is towards constructing berthing facilities.

The sub-sector generates very little in public revenues through various taxes and fees. Perhaps the largest source of funds is a 0.3 percent tax on the shipped value of fish product exports, which amounts to around US\$4 million and is used to support the MPEDA (Yadava 2008). Only mechanised vessels are formally registered and license fees are fairly low. Fees from the use of government landing and berthing sites are low, and often not collected due to inadequate mechanisms to penalise defaulters. The low levels of rent capture (revenue) by the government reflect a range of factors, including politics and vested interests, labor market imperfections, poverty of small-scale fishers and an inability to pay. More broadly the situation also reflects the low level of net benefits (or rents) being generated due to poor productivity of fish stocks and overcapacity in the inshore marine fishery sector.

A general conclusion is that while significant funds are available from both central schemes and state allocations for the fisheries sector, the linkage to marine fisheries management is not well defined. As an example, funding allocation to monitoring, control and surveillance in the IXth Plan was only Rs. 20 million, or approximately US\$ 450,000 for the entire country. The focus of current budget allocations appears to be on maintaining staff at the state level, delivering social welfare schemes and various fishing subsidies, and supporting further expansion of harbors and landing sites. Some of the programs could legitimately be viewed as genuine welfare enhancing programs, for example housing improvement, free accident insurance, and savings schemes. On the other hand, other programs associated

with the marine sub-sector such as fuel, boat and gear subsidies may provide incentives for many participants (especially in inshore waters) to continue fishing at the same time that the sub-sector already has serious overcapacity. In any transition to more effective fisheries management, it will be important to consider reducing the subsidies that are encouraging overcapacity while providing more assistance to coastal fishers to improve their fishing and also develop non-fishing livelihoods.

Market Supply Chains

Domestic Fish Consumption

Fish consumption in India tends to be low, although this trend varies from state to state. According to National Sample Surveys (NSS) by the Government of India (2007b), some 34.2 percent of the rural population and 27.8 percent of the urban population are reported to consume fish as part of their regular diet. Several recent studies indicate a growing trend in per capita consumption from 3.1 kg in 1973 to 4.7 kg in 1997 and conclude that domestic fish consumption is likely to grow to 5.8 kg by 2020. This is also evidenced by the fact that the domestic urban markets for fish grew faster than any other market supply chain in the country since the 1990s.

Market Chains

There are five major markets and supply chains for the diverse harvest from India's marine fisheries (Table 6). The market used by the fishers depends on the fishing gear, total volume, species, size and the quality of the fish landed. The best quality fish and prawns typically go to the more lucrative export or distant urban markets. The less prized species/size, lower quality or damaged individuals are sold locally. Leftover or poor quality fish are commonly dried while the lowest grade ends up as livestock/fish feed or fertiliser. Thus a typical landing site has fish products going to several alternative market chains. While data pertaining to the tonnage of fish delivered through each of these specific market channels

in India are not available, the DAHDF publishes data on the "Disposal of catch by states" (Table 7). The results indicate that the majority of fish is marketed as fresh, largely for domestic markets, and that over the period 1980 to 2005, this percentage has increased significantly, supporting previous data showing increased domestic consumption of fish products.

Key Aspects of the Export Market Chain

From earlier in this chapter, it is clear that until recently India has enjoyed steady growth in fish products exports by volume, value, and unit value realisation over the past four decades. Indian fish products exports have been dominated by marine and brackish water production, with shrimp being the *prima donna*. Frozen shrimp dominated the exports right from the 1960s and, although its contribution declined from 52 percent in 1989-90 to 28 percent in 2005-06 in terms of volume, it still accounts for nearly 59 percent of the total fish products export earnings. Fresh/frozen fish, largely consisting of marine species, are growing in export volume, from 19 percent in 1989-90 to 35.6 percent in 2005-06, although their gross value remains low at 14 percent of the total export earnings. Other important export items include cuttlefish, squids and dried fish. However, the recent drop in value of exports (again largely prawns) underpins the crisis that the Indian marine export sector is undergoing due to (i) the abundance of low-cost white shrimp from Thailand, Vietnam, Indonesia and other nations, (ii) appreciation of the rupee relative to other major currencies, (iii) the anti-dumping tax imposed by the United States; and iv) the hike of more than 80 percent in fuel prices (which continues to increase). The export value of the fisheries industry has plunged 50 percent in US dollar terms and fallen by 20 percent in rupee terms. The crisis has potential impacts on more than 2 million aquaculture workers and capture fishers as well as 50,000 employees in the seafood processing market. Quality remains an issue; the study team confirms the findings of the Working Group on Fisheries for the XIth Five Year Plan (Planning Commission 2006), that poor post-harvest handling has led to high losses (up to 15 percent).



Table 6: Main characteristics of the major markets

Market Characteristics	Fresh local	Traditional dry fish	Distant-urban	Export	Livestock or fish feed
The supply	Cheaper species; lower quality	Cheaper species; lower quality	Higher priced species and outlets; better quality	Narrow range of higher priced & higher quality species	Cheap, low quality fish. Often discards
Customer & consumer focus	Know local customers	Varies; some processing with left-over fish.	Weak; focus on maximising sales volume	Insufficient production and volume focus	Usually good local knowledge
Logistics & distribution	Transport; sanitation & cold chain poor	Transport & sanitation poor	Cold chain & sanitation with fishers at landings a weak link	Cold chain & sanitation at landings needs improving	Transport & sanitation poor, but improving.
Information & communication	Informal and adequate	Informal but adequate with local consumers, inadequate with distant consumers	Insufficient information flow; Consumers' knowledge could be widened	Insufficient information flow; Promotion needs more brand focus, and industry participation	Informal for local market; but more formal for fish meal processing
Chain relationships	Credit/loans difficulties weaken this supply chain	Credit/loans difficulties weaken this supply chain	Trade is not transparent, fishers tied into loans. Relations weak	Trade with fishers not transparent; need stronger relations with customers	Credit/loans difficulties weaken this supply chain

Source: Study background papers.

The export market differs from the domestic market in that there can be formal and high barriers to entry. Fish exports usually need to meet standards set by importing countries to satisfy health concerns of the consumer, particularly in EU and US markets where standards may be very stringent. In both regions, it is mandatory for all imported fish products to have been processed in facilities with health and safety standards equivalent to the EU and US, including the implementation of Hazard Analysis and Critical Control Points (HACCP)¹⁶. While the US requires the importing company/distributor to ensure that imports meet regulatory requirements, in the EU this assurance is the responsibility of a "Competent Authority" in the exporting country, in this case, India. With the EU

system, this means the exporting country governments must have satisfactory regulations and procedures to certify compliance to EU regulations. According to Henson et al. (2004), the Indian government introduced reforms to its regulatory systems around fish processing facilities to respond to the challenges of the domestic industry in meeting external market export requirements, particularly for the EU market. Significant investments have been made in inspection and laboratory testing capacities.

For processing companies in India wanting to export fish products to the EU (and US), the costs of plant upgrading can be quite high. For example, the Henson et al. study (2004) estimated that the range in costs of compliance was between US\$ 51,400 and US\$ 514,300, with a weighted average cost of US\$ 265,492. This represented 7.6 percent of annual average turnover.

¹⁶ A systematic and preventative approach to food and pharmaceutical safety that requires exporters to address potential physical, chemical and biological hazards during processing.

Table 7: Disposal of the fish catch - India 1980 to 2005

Year	Marketed fresh	Frozen	Cured	Canned	Reduced	Offal for reduction	Misc.
Percentage of total harvest volume							
1980	65.17	5.92	21.00	0.21	5.14	0.57	1.98
1990	65.18	7.46	15.63	0.76	8.41	0.91	1.65
2000	76.38	4.93	6.05	0.89	5.66	0.02	6.06
2005	82.79	5.98	5.26	0.36	4.44	0.03	1.15

Source: Government of India 2007d, Salagrama (2004).

A range of national and state subsidies in both the fishing and post-harvest areas has been provided to help Indian exporters meet market health and safety standards, but smaller processors still find the costs very high. However, while many large processors have raised the sanitation standards in most factories to meet the EU requirements, the industry approach has been largely reactive to evolving market standards and requirements, rather than being more proactive and trying to become market leaders in meeting and surpassing export requirements. Further, Indian fish products still carry a stigma that their eating quality, packaging and traceability are below world standards.

Key Aspects of the Domestic Market Chain

While the export market captures government attention because of its high value and the employment it provides in processing and packing prawns and cephalopods, the domestic (both fresh and dried fish) markets are very important for marine fish (as well as inland fish). In the fresh fish trade, female fisher-folk buy pelagic and other inexpensive fish from fishers at beach landings or ports, either directly or via an auction. They sell these door to door on foot (head loaders), on the roadside, or at markets in nearby villages. The fish is sometimes bartered for agricultural goods and credit may be extended to the consumer. This trade only provides a marginal living because of the borrowing costs and the vagaries of supply.

The dry fish market chain also engages many thousands of women and men. Small pelagic species such as oil sardines and mackerel, and small demersal fish (silver bellies, croakers, etc.) are bought along the beaches and port landings by processors or a processor-trader. After drying, this fish may be sold directly to consumers at a local market, or door to door in nearby villages. Alternatively, it may be handled by one or more market intermediaries, a commission agent, or wholesale trader, before it is retailed, sometimes at a weekly dried fish market.

The distant urban market demand from Indian cities has been growing strongly in recent years, particularly for the limited volumes of "prime" finned marine species. There is some evidence that this is India's fastest growing and most vibrant market chain, and it is likely to continue experiencing strong growth. This growth, of course is conditional on improvements in fish quality. Yet, domestic marketing systems are highly disorganised, unhygienic, and have very poor fish storage and handling facilities, including inadequate transport systems (poor roads and not enough refrigerated vehicles). There is also a considerable time delay during transport of fish from the landing centers to the markets, which can drastically affect quality and price. In general, market promotion is insufficient, especially by processing companies who need new, creative strategies that address prospective customers' uncertainty about product availability and quality. A lack of a standardised product quality specifications for major items (squid, cuttlefish and prawns), and



quality guarantees tailored to attract new customers is a major constraint to further growth in fish marketing. If smaller scale fishers and processors are to be increasingly engaged in selling high quality products to the growing domestic market for fish products in India, these issues regarding quality improvement and market information need to be addressed. One approach that should be developed further in coastal communities is the establishment of new marketing institutions that could be supported by NGOs or through a local fishing cooperative. There is already some valuable experience through SIFFs in southern India (described earlier in this chapter), and through World Bank livelihood projects in several Indian states, that help communities access more efficient market channels for a range of products. These institutions need to be operated as a commercial business to access markets, facilitate credit, and provide a mechanism for training programs.

Fisheries Management

Traditional Systems

Before Independence from Britain in 1947, fishing was an entirely artisanal occupation with little intervention from the outside world. Fishers had to sell or barter their catch to procure other food items. Fishing technology during this early period was influenced by the availability and changes in the raw materials needed to make boats and nets and the markets for fish and fish products. The strong social cohesion in the fishery communities prior to "modernisation" formed the basis for good governance and there are many examples of strong and viable traditional systems of management in various parts of the country, with heads of villages, governing traditional fishing. These include exclusive rights to certain fishing areas (demarcated as zones running at right angles to the coast), sharing of the benefits of the harvest and conflict resolution. In many communities these systems still exist but have been eroded with more modern ideas of fishery management.

Existing Management Systems

The nature of the actors involved in each sub-sector of the fishery is a crucial aspect of the fishery and has great significance for management. Artisanal fishing in general is characterised by the participation of fishermen whose caste is traditionally involved in marine fishing. This was strongly represented in Gujarat for example. This characteristic gives local people some kind of historical right to fish. Where these traditional systems are still in place in certain coastal fishery communities they can limit access into inshore nearby coastal waters. Mechanised fishing (which includes all non-artisanal vessels) reflects more of an open-entry category with the owner being more of an investor (even if he/she is from the fishing community/caste) and crew coming from anywhere. Trawlers (originally shrimp trawlers) have been allowed to increase in numbers over the past several years, but in some areas as much as half the fleet is berthed due to poor economic returns. All maritime states have various fishery regulations to guide fisheries management. However, the study in four focal states revealed that inshore management is mainly confined to technical measures like regulating a minimum mesh size for specific fisheries, closed area/seasons for between 6 and 8 weeks, prohibitions on catching certain species, and listing species that cannot be exported below a minimum size.

While these types of regulations should be part of any fisheries management system, most are not effectively implemented in India (Mathew, 2003), reflecting points made earlier in the report about capacity and equipment constraints in state fisheries departments. Moreover, these measures are inconsistent among states, making the reasons for the different interventions difficult to understand and even more difficult to implement by DOF field officers. One example of implementation failure is bottom trawling that is prevalent in parts of western India, mainly along the Kerala coast (Box 8), which raises growing concerns over environment damage, high losses from unutilised by-catch, and more importantly, the use of fishing nets below regulation size. The ring seine is another case; the Kerala state government had



Box 8. Bottom trawling along the Kerala coast

More than 90 percent of the mechanised boats operating along the Kerala coast are bottom trawlers. These vessels use non-selective fishing gear that can be quite destructive to the sea floor environment in addition to harvesting high levels of by-catch. A study of 375 bottom trawlers operating from six major harbors in 2002 found that:

- ◆ 240,000 tonnes of low-value fish are thrown back into the sea due to lack of on-board storage, markets, etc.
- ◆ 94% of bottom trawlers were using mesh sizes below regulations.
- ◆ 232 non-targeted species were being harvested as by-catch.
- ◆ Destruction of eggs and juveniles was alarming.

Source: Chandrapal 2005.

to pass legislation to protect the ring seine vessels from a Supreme Court judgment that included all boats with more than 10 hp motors in the monsoon fishery ban on the west coast of India. More complex arrangements exist with zoning (Box 9) where states have created varying regulations but in practice have little means of enforcement. The marine fishery sector and the coastal zone in general need consistent and agreed fisheries management systems.

Impact of Coastal Development and Pollution on Marine Fisheries

India's coastal zone supports nearly 30 percent of the country's population and a significant share of industry. Five major potential stressors on marine eco-systems, include coastal pollution, climate change, eco-system fragmentation and habitat loss, invasive species, and overfishing (Nellemann et al. 2008). With the dramatic growth in India's economy over the past decade, concerns have been raised about impacts on coastal zones and indirectly on the marine fishery. To protect coastal areas from unregulated development for

industry, tourism, and urban development, the Coastal Regulation Zone (CRZ) Notification 1991, was issued under the provisions of the Environment (Protection) Act 1986. A positive feature of the 1991 Notification is the recognition of traditional and customary rights of fishing communities. At this time however, a revised Notification is being considered by the government of India, led by the Ministry of Environment and Forests. A number of concerns have been raised by NGOs representing fishing communities including:

- ◆ Inadequate public consultation with fishers and processors; lack of explicit language specifying that violations committed under the 1991 Notification must be settled and penalised;
- ◆ A proposed zoning scheme that may divert coastal lands used by fishing communities for settlement and landing sites, to large development projects;

Box 9. Zoning as a tool for fisheries management

- ◆ *Maharashtra.* Operation of trawl by mechanised fishing vessels is prohibited in some specified depths (5 fathoms and 10 fathoms), trawl ban during monsoon, trawl gear operation is not allowed between 6 pm and 6 am etc.
- ◆ *Goa.* The area up to 5 km from the coast line is specified area and mechanised fishing vessels are prohibited from fishing in the area; restriction on mesh size of nets i.e.: 20 mm for prawns and 24 mm for fish.
- ◆ *Karnataka.* The area up to 6 km from the shore or up to 4 fathoms is reserved for traditional craft, deep sea vessels are requested to operate beyond 20 km.
- ◆ *Kerala.* The area from the shore up to 30 meters deep in the sea along the coast from Kollengode in the south to Paravoor – a length of 70 km is called the First zone. The area up to 20 km line in the sea along the coastline from Paravoor in the south to Manjeswar in the north (length of 512 km) is the Second zone. Mechanised fishing, except fishing by motorised country craft, is prohibited in the First and Second zones. Only fishing with country craft is allowed in these zones.

Source: Madhusoodanakurup (2008).



- ◆ No explicit recognition of traditional and customary rights of fishing communities in the coastal zone; and
- ◆ The proposed expansion of the coastal zone to include territorial waters, the area from the shore to 12 nautical miles, which could have major implications for livelihoods of fishing communities (Sharma 2006).

While the government has clearly identified coastal zone development as a cause for environment concern it is clear that the ongoing policy, legal and regulatory changes may help the coastal fishing communities and their abilities to earn livelihoods from fishing. This, in turn will add to the concern as any development activity will be at the cost of the environment. Concerned stakeholders feel strongly that the revised CZM Notification must explicitly recognise rights of fishing communities in the coastal zone with respect to the right to maintain housing in coastal areas/existing fishing villages, settlements or fishing hamlets, with or without legal title deeds; a right to use coastal lands for fishing-based livelihoods; and a right to access marine resources under sustainable management.

According to the National Institute of Oceanography (2008), coastal pollution in India stems from population

growth, urbanization, agriculture, aquaculture and industrialization, all of which release a wide range of pollutants into the ocean each year (Table 8). Is coastal pollution a major cause of reductions in fish stocks and catches? The evidence is scattered and mixed. From the same 2008 NIO study, the authors concluded that for water and sediment quality, open shore waters (2 km away) are clean except for near coastal cities; inshore regions have been degraded to a varying degree depending on pollution rates and flushing characteristics; increases in petroleum hydrocarbons in water and sediments occurs, especially in ports; bacterial counts have increased in several locations; though marine sediments are generally free from gross contamination from heavy metals. With respect to contaminants in organisms, except in a few cases, commercial fish and shell fish are generally free from heavy metal contamination. The issue of marine pollution and potential impacts on fishing appears to be focused in specific points along the coast, rather than a more ambient condition, a view supported by Zingde (1999). The impact is probably greatest on traditional fishers in inshore areas near heavily industrialized areas in states such as Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu (Sharma 2006).

Table 8: Annual pollutant discharge in the Indian coastal environment

Input/Pollutant	Annual Discharge
Sediments	1.6 billion tones
Industrial effluents	$50 \times 10^6 \text{ m}^3$
Sewage – largely untreated	$1.41 \times 10^9 \text{ m}^3$
Garbage and other solids	$34 \times 10^9 \text{ tonnes}$
Agriculture fertiliser residue	$5 \times 10^6 \text{ tonnes}$
Synthetic detergents – residue	130,000 tonnes
Agriculture pesticides – residue	65,000 tonnes
Petroleum hydrocarbons (tar ball residue)	3,500 tonnes
Mining rejects, dredged spoils, sand extraction	$0.2 \times 10^6 \text{ tonnes}$

Source: National Institute of Oceanography (2008).



Key Chapter Messages

1. India's marine fisheries sector makes significant contributions to local and national economic development, trade, livelihoods and environment. There is a strong foundation to build on through an experienced labor force, long history of marine fishing and strong demand for fish products.
2. Yet, the sustainability of fish stocks in Indian waters, particularly for inshore waters, appears uncertain. Over 61 percent of India's capture fisheries are over-exploited, and most of the remainder are fully exploited with very little prospect for future expansion.
3. Sustaining economic benefits in inshore waters may be difficult. Catch rates and fish exports are declining, the marine fishery is overcapitalised by a factor of more than two; the large number of boats not actively fishing clearly point to overcapacity and poor economic returns. While the government of India is encouraging a shift to more distant deep water fishing in the outer reaches of the EEZ, the majority of fishers operating in inshore waters will continue to face constraints.
4. Fiscal flows from the centre to states for marine fishing are not directly linked to fisheries management but instead mainly support welfare schemes and infrastructure; these subsidies address important socio-economic policy goals, but at the same time, some of the non-welfare subsidies (for boats, gear, nets, fuel, etc) may be providing the wrong economic signals to inshore producers and can continue to encourage fishing overcapacity.
5. The roles and responsibilities of government agencies directly involved in the marine sub-sector and primary resource users suffer from implementation failure. Ineffective administrative systems, as well as capacity and equipment constraints make it difficult for state fisheries departments to support improved fisheries management performance, especially for inshore waters. The lack of a single, strong central Ministry for fisheries weakens the position of the marine sub-sector within the overall government machinery.
6. Product quality remains an issue for both marine and inland fish, leading to losses of up to 15 percent of harvest plus lower prices for poorer quality fish that are sold. Smaller-scale fishers are often unable to gain access to more efficient marketing systems and supporting infrastructure (ice, cold storage, etc.) that would lead to better quality and prices.
7. There is inadequate information about market requirements both in India and globally, poor access to market information (especially for small-scale fishers), and insufficient understanding of market chains and emerging opportunities by policy makers and processors.





LIVELIHOOD CONTEXT AND KEY ISSUES

Background

Referring again to data from the 2005 Marine Fisheries Census and CSO (2006)¹⁷, marine fisheries form the livelihood basis for 3.52 million people in over 3,000 villages along the coast. Nearly half of this population is actively involved in fishing and related work such as processing and trade and the majority operate in inshore waters. The main categories of stakeholders in the sub-sector are:

1. Producers – those involved in fishing and other production-related activities, including the shore-based owners of production-related tools;
2. Processors – those involved in traditional fish processing activities (such as drying and salting) as well as those in export processing (peeling, freezing, packing);
3. Traders – those involved in trading of fish, ranging from small-scale fish vendors selling fresh or dried fish (including some whose transactions are only partly monetized), to large-scale operators catering to urban and export markets. This group also includes a vast array of market intermediaries;
4. Ancillary workers – those involved in various support activities directly related to fishing (boat builders, mechanics, ice plant operators and sellers, transporters, net makers and menders, basket makers and sellers, etc.);
5. Supplementary workers – those involved in support activities not directly related to fishing, but are essential components of the fishing economy (For example, sellers of supplies, clothes, and suppliers of consumption credit.).

From the previous chapter, producers tend to fall into three broad categories; large mechanised trawlers, smaller motorised boats, and small non-motorised (or artisanal) fishers. There is often some overlap within the three categories, and particularly between the mechanised and motorised vessels in terms of where fish are harvested, species caught, and what happens to the fish once it reaches shore.

Poverty and Livelihoods in Marine Fisheries

Structural Features Relating to Poverty and Livelihoods

An analysis of the coastal fishing communities in the four focal states¹⁸, augmented by secondary data, for example (GOI 2007c) presents a set of structural features that are important in determining the people's access to different resources and, consequently to the extent of their poverty:

¹⁷ As indicated in the previous chapter, data from different official sources on coastal populations and fishers are not in agreement.

¹⁸ Refer to Annex 5 in the main report for more information.



- ◆ Of the more than 3,000 coastal fishing villages in India, 85 percent are electrified, 80 percent connected by road, 65 percent have a hospital, and 42 percent have a bank;
- ◆ Nearly 57 percent of the population is educated, which is below the national average of 65 percent. Only 6 percent of the fishers have education above secondary level;
- ◆ Fishing communities are characterised by high levels of illiteracy, and poor access to piped water and efficient sanitation services;
- ◆ Close to 100 percent of working people in these communities are engaged in fisheries-related livelihoods, for about half of them it is full-time work;
- ◆ Fishing is a largely caste-based occupation and caste plays a determining role for entry into, or exit from, fishing;
- ◆ There is a clear gender-based division of labor, as males largely do the sea fishing; fish once landed, are often handled by women for processing and marketing. The fact that the men are at sea most of the time requires the women to act as de facto heads of the households, giving them a prominent role in the family;
- ◆ Because fishing (as well as processing and trade) are labor intensive, age becomes an important criterion for inclusion or exclusion from the activity. Factors such as hard working conditions, poor living conditions, early marriages and child birth, alienation, lack of insurance and healthcare, can force the fishers out of productive work at a relatively early age (about 50 years); the lack of old age insurance and pension worsens their conditions. On the other hand, poverty and the open access nature of the resource force children to take to fishing at a very early age, reducing their opportunities for education and/or diversification.

In general, all laborers without assets, working in motorised and non-motorised sectors (constituting about 60 percent of the producers as fishing crew)

Box 10. Credit and debt issues in Tamil Nadu

A major study in Tamil Nadu found that 62 percent of loans held by small scale fishers and traders was from traders, money lenders, merchants and other informal sources for credit due to ease of access relative to more formal structures such as banks and government-sponsored programs. Micro-finance institutes accounted for another 18 percent of total loans. Effective interest rates varied considerably, from as much as 190 percent with informal money lenders to 12 to 14 percent from commercial banks. Micro-finance institutions offered funds at between 16 and 18 percent. The average cumulative debt load per person in one survey was approximately Rs. 81,000, covering funds for capital purchases (boats, gear, ice boxes), working capital, investment funds to start new businesses, and other requirements. The top financial needs for fishers were working capital, health insurance, medical and other emergencies, and asset replacement.

Source: (FAO 2007b)

are poor. The boat owners, by virtue of their assets are relatively better off but face more risk than their workers. The crew can always move on to another activity (where these exist) or a different boat, which the boat owners cannot do so easily. There is a heavy dependence on the informal money market for almost all stakeholders in the fisheries sector, except the large boat owners and traders who often double as money lenders to other stakeholders further down the supply chain. Smaller fishers rely on informal money markets to meet almost all of their consumption and life cycle needs. This dependence on the 'informal' and 'internal' money market is largely on account of cumbersome procedures of taking loans from the formal money market (Box 10).

High costs of credit that reduce the profit earned by various small stakeholders also has several serious implications for their poor and vulnerable livelihoods. First, the lack of surplus over livelihood costs keeps them in debt, and since borrowing is necessary to help



households tide over the lean season, high costs imply a perpetuation of cyclical household debt. Secondly, it stops households saving for the lean season, better health care or education for their children. Thirdly, it denies economic protection from market or natural resource-based shocks.

Income Patterns

A majority of activities in fishing are in the informal sector and with no record of investments, catches and returns over time, it is difficult to arrive at any consistent quantitative estimates of earnings in the sector. While the actual incomes from fishing are hard to quantify, it is however possible to draw certain broad conclusions from the data collected in this study:

- ◆ Annual incomes for large trawler owners can range from Rs. 75,000 to Rs. 150,000 or more; the majority of traditional boat owners earn annual incomes ranging from less than Rs. 25,000 to Rs. 100,000; the majority of crew members earn annual incomes from less than Rs. 35,000 to Rs. 75,000; traders can earn from less than Rs. 25,000 to Rs. 100,000 per annum.
- ◆ The higher average annual fishing incomes are generally in Karnataka; lower annual incomes are found in Andhra Pradesh, Orissa and Gujarat. In these latter three states, annual income from marine fishing of less than Rs. 25,000 are quite common.
- ◆ Incomes from fishing are usually confined to a maximum of nine months a year.
- ◆ The earnings from fishing are not confined to monetary payments; they frequently include non-monetized income like fish or other consumables, or utilities like firewood. Similarly, the cost of operations is not always monetized; a number of activities like launching and hauling of boats, repairing nets, women gutting fish for drying, involve drawing upon the 'social capital' without which the economic viability of at least some of the activities can suffer.
- ◆ While some of the trades (local fish trade) depend on daily turnovers for consumption and business purposes, others (like dried fish trade) have a longer turnover cycle, i.e., about a week or two depending

on the size of operations, and others (distant urban trade and export trade) may have even longer turnover cycles extending up to a month.

Livelihoods and the Evolving Marine Sub-sector

The phenomenal growth in the fishing economy in the modernisation phase was accompanied by the entry of new fishing methods, players, and trading systems that have had long-lasting impacts on the life and livelihoods of the fishers, particularly for small-scale fishers. Mechanised trawlers now account for 20 percent of the labor force in primary fishing, yet they corner 60 percent of the catch. Smaller scale vessels (motorised and non-motorised) account for 80 percent of the labor and account for 40 percent of the catch. These changes have affected the terms of access for the poor to resources, the focus and organisation of production, new systems of preservation, new market intermediaries, altered terms of trade, and access to markets.

Within a state's territorial waters, the consequences of an open-access system with declining fish stocks overall, and general over-capitalization of fishing capacity are felt in many ways: a) reduced productivity within the fishery (returns per unit of labor or capital); b) further reductions in resource stocks and negative changes in household livelihoods; and c) human health and gender workloads (as women have to bear the brunt of lower incomes with which to provide food for the whole household, bring up children and tackle health problems, and consequently, either find supplementary agricultural work or increase their fishing-related activities). An FAO study in Tamil Nadu (Neiland et al. 2006) indicated that of 212 small scale fishers surveyed, 59 percent indicated that the viability of their principal livelihood had declined from the previous year. Of these individuals, 85 percent said that it was a matter of concern because of a greater risk of starving. Major reasons for the downturn in livelihoods were decreased fish catches and scarcity of fish during poor fishing seasons; low fish prices, especially during



supply gluts; increased input costs; and poor access to more distant and lucrative markets.

Transitions to More Holistic Fisheries Management and Livelihood Diversification

What are the Options?

Previous chapters have suggested that a policy shift is needed from the current fisheries management approach towards a system where the productivity of fish stocks is improved to generate higher wealth, underpinned by economic incentives and stronger access rights for fish resources. Further, this transformation may require a reduction in fishing capacity. As suggested in Chapters 1 and 2, a transition to more holistic fisheries management based on maximising net benefits may raise important livelihood and equity issues that are both real and important for a country like India. It is beyond the scope of this study to pre-determine the allocation of fishing rights between larger mechanised fishing vessels, smaller motorised boats, and traditional non-motorised boats. This can only be determined by stakeholders through a comprehensive and inclusive process of change management, leading to policy and legislative reform. However, it is critical to examine how well coastal communities and fishers could adapt to this changing policy environment should it be reflected by reductions in capacity. With larger trawlers, there may be better scope for capacity reductions (Box 11) but the situation for smaller operators is less clear. What options are available to coastal dwellers to diversify into other livelihood alternatives as fishing capacity is reduced?

Field results suggest that the options chosen by men who are under pressure from poor catches, weather patterns, etc, frequently derive from fisheries itself, either by shifting to another location or by shifting from fishing to shore-based trade activities related to fishing. On the other hand, choices by women appear to range across a wider array of activities in different sectors (Box 12).

Box 11. Fleet reduction in Tamil Nadu

A feasibility study was completed in Palk Bay, Tamil Nadu on the potential of introducing fleet reduction as one means of helping address the overcapacity problem. It was found that 23 percent of trawler owners would be willing to participate in a boat buy-back program. Although this is a positive response and one that correlates with the declining economic performance that comes with overcapacity, such a program could only work if it were supported by tighter controls on new boats entering the sector.

Source: SIFFS (2007)

The Orissa example in Box 12 illustrates the potential to broaden livelihoods, especially for women, through well-organised programs involving Self-Help Groups, access to credit, training in relevant income generating activities, and assistance with developing marketing channels.

Unlike inland villages, there are limited opportunities for coastal people to shift to farming due to a lack of available productive land, poor soils in many areas, and limited ground water. Although some coastal areas support paddy cultivation, these sites are always under risk of sea inundation and salinization. Forestry has potential in many coastal areas and this option has been developed in some states such as Andhra Pradesh and Tamil Nadu as part of *Tsunami* rehabilitation. This implies potential opportunities for community forestry programs, particularly where active pulpwood markets exist for fast growing coastal species such as *Casuarina*. At the same time however, field results indicate that coastal fishers have a strong affinity for the sub-sector as a way of life and might not be amenable to change.

One conclusion that can be drawn about many of the alternative activities that fishers have moved into is that they sometimes may be no more sustainable than the ones they have left behind. This is because the availability of alternative/supplementary options, as well as improving access to credit requires concerted



efforts by the government, private sector links, and long-term strategic thinking to assure the viability of options promoted (Salagrama and Koriya 2008). Current efforts by the government (or the NGOs) to address this issue often suffer from lack of clear focus, insufficient resources, coherence, and appropriate support systems for developing strong backward and forward market linkages.

For India, one possible strategy is to consider coastal dwellers within the wider economy and seek to improve fisheries and non-fisheries-based livelihoods. Salagrama and Koriya (2008) suggest that programs need to address vertical diversification (move the producer higher up the fisheries value chain) and horizontal diversification (invest in livelihood alternatives outside fishing). These options are not mutually exclusive and can complement local and regional economic growth and diversification. World Bank experience over the past 20 years in India (Hayward and Brizzi, 2007) suggests that there are at least five key areas where appropriate investment can be made to help the overall process; 1) developing institutions for the poor; 2) human capital development; 3) networks; 4) systems of capital development and linkages with markets; and 5) the private sector. The new livelihood opportunities could of course be created either within the sector (e.g. new fish processing and value-added product development) or outside the sector (e.g. fishers developing new skills and trades in small business development, coastal forestry, agriculture, or handicrafts), or some combination of the two. There is a wealth of experience from the World Bank rural livelihoods programs in South Asia that demonstrate how poor and landless people can become part of a vibrant and growing rural economy (Box 13). These programs build up the organisational capacity and skills of communities, often provide links to better education, and help people (or small groups) to start small businesses and access credit, and federate to a scale that better equips people to negotiate for improved service delivery from government programs, tap into external investments, manage demand for their products and services, and provide a more attractive market for the private sector.

Box 12. Occupational diversification strategies in Ganjam district

The fisherwomen in several villages of Ganjam district in Orissa faced a major need to diversify out of fishing in late-1990s, as the men found it increasingly difficult to go fishing because of encroachment of trawling boats into their traditional fishing grounds. Working in seasonal agriculture in the neighboring villages had always been a seasonal activity for the women, but now the number of women moving in for work increased greatly. This led to traveling farther out and working as far away as 40 km from home. Women also started working in the Gopalpur Port, outside the agriculture season, loading and unloading goods. Some women started working in the government's social forestry programs, while others found work as maids in the hotels in Gopalpur. Other sources of income included construction labor, opening petty shops, making sweetmeats for door-to-door sale, collecting flowers used in making fragrances, etc.

Source: Study background papers.

There is a small number of similar and very successful government-financed programs in India, helping fishing communities broaden their livelihood base, particularly around *tsunami* rehabilitation. In Tamil Nadu for example, the *Tsunami* Emergency Assistance Project is assisting 3,387 self-help groups to establish small business enterprises, following skill training and creation of revolving funds for internal loans. Examples of successful businesses include compressed mud block production for commercial construction, manufacturing sanitary napkins, salt production, aquaculture (mud crabs, sea weed), bakeries, bamboo crafts, palm leaf crafts, mushroom cultivation, garment production, incense stick production, livestock, welding shops, and commercial fish drying.

Another opportunity is through the "National Rural Employment Guarantee Scheme" (NREGS) which in 2007, operated in 330 districts, providing 30 million families with an average of 43 days' work at a set minimum wage (The Economist 2008). Assuming a person works the full 100 days at an average wage of Rs. 60 per day,



Box 13. Successful Bank-supported livelihood programs, South Asia

Afghanistan – National Solidarity Project: Establishing more than 21,000 voluntary Community Development Councils, creating community development plans, providing block grants for local development including drinking water, sanitation, small-scale irrigation, roads, schools, electricity, etc.

Bangladesh – Social Investment Program Project: Helping 2 million people in 1,000 villages by building strong community capacities and institutions, helping them create village development plans, and funding support for implementation as well as maintenance of local assets.

India – Rural Poverty Projects (Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan, Tamil Nadu, Chattisgarh, and most recently in Orissa): Building bankable community organisations of poor and marginal groups (especially women), revolving funds for credit and internal loans to start small business, federating the groups to improve market access and access commercial credit. These projects are improving the rural livelihoods of over 16 million families.

India – Natural Resource Livelihood Projects (Andhra Pradesh, Karnataka, Himachal Pradesh, Uttarakhand, Uttar Pradesh): Improving more than 600,000 ha of natural resources including soil, water, and forests to generate higher incomes for more than 600,000 families, and creating new groups for marginal farmers, the landless and women to help them establish small businesses, access credit, etc.

Nepal and Pakistan – Poverty Alleviation Funds: Helping poorer groups in over 5,500 communities to improve access to income-generating projects and social services, and create new community infrastructure through social mobilisation, capacity-building and access to credit.

Sri Lanka – Gemi Diriya Project: Building local capacities and institutions in over 1,000 communities (encompassing 1 million people), helping communities mobilize local resources, establish small businesses and facilitate linkages with the public and private sector.

total earnings would be Rs. 6,000, augmenting livelihood activities outside of fishing.

Climate Change, Disaster Management, and Alternative Livelihoods

In any debate about improving livelihoods of coastal fishers, the potential impact of climate change must be acknowledged. One impact would be on the fishery, particularly inshore fisheries where increase in sea temperature leads to coral bleaching and declines in fish stocks (Sridhar 2002). Further, increased sea temperatures in shallow coastal areas could result in certain fish species migrating to cooler locations; as an example SIFFS (2007) raise the possibility of sardine populations in southern Indian waters moving northwards from states such as Kerala. A second impact would be loss of coastal areas if sea levels rise. A study

by The Energy and Resources Institute (1996) suggested that without mitigation measures, a one meter rise in sea level due to climate change could affect an area of 5,763 km² and put 7.1 million people at risk, largely because of land loss in coastal areas and higher risk of cyclone damage. The main point here is that programs designed to provide alternative sources of livelihoods for coastal fishers must look ahead to identify potential risks from climate change with respect to ongoing fishing, new land-based activities (agriculture, forestry, animal husbandry), and locating new small businesses. In a similar light, experience with the 2004 *Tsunami* has shown how vulnerable coastal people are to natural disasters; livelihood programs need to be coupled with broader coastal protection initiatives such as shelter belts and protected landing centers to reduce the risk of life and livelihood losses from future disasters of this nature.



Key Chapter Messages

1. Marine fisheries provide a source of livelihood for more than 3.5 million people in over 3,000 villages along the coast. Close to 100 percent of working people in these small coastal communities are engaged in fisheries-related livelihoods. The majority of coastal fishers are small-scale operators, fishing in inshore waters.
2. Coastal fishing communities are characterised by low levels of education, high levels of illiteracy, and poor access to piped water.
3. The majority of small-scale participants in the sub-sector are poor. Annual earnings below Rs. 25,000 are not unusual. Debt levels are high; the lack of regular surpluses, lean season catches, and a 9-month fishing season lead to a perpetual cycle of debt for many fishers.
4. The current situation with marine fishing in India's coastal states is affecting fishers through declining catches, reduced incomes, and increasing conflicts, particularly for smaller boat owners and crew operating in inshore waters.
5. A policy shift to fisheries management, based more on maximising net benefits, will require alternative and enhanced livelihood opportunities to be developed for fishers and implemented as soon as possible. Potential longer-term impacts from climate change need to be factored into alternative livelihood program planning and implementation.





ANALYSIS OF LEGAL AND POLICY FRAMEWORK

Introduction

This chapter provides a preliminary analysis of the fisheries legal and policy framework currently in effect in India. Such an analysis seeks to draw lessons from past policy performance to better inform future policy development. This is a particularly relevant, although complex, piece of analysis for India, given the large number of agencies and stakeholders involved and the policy changes signaled in the Comprehensive Marine Fisheries Policy Statement (CMFP) 2004.

The chapter utilises information summarised in previous chapters of this policy note and lays out a brief, formal policy analysis to guide further dialogue. Current fisheries policy in India is then compared to some of the key international best practice benchmarks summarised in Chapter 2. The analysis relies heavily on information presented in various studies that accompany this report and in particular draws on the consultant's report on Assessment of National Fisheries Policies and Laws¹⁹. The analysis focuses more on the policy framework since it must be designed to subsequently guide supporting legislation. It is critical to get the right policy framework established; then focus on developing appropriate legislation and regulations for implementation.

Legal and Policy Context

India has three levels of government. The central government, or the Union, operates as a parliamentary democracy with a bicameral legislature. Below the Union there are 28 states and seven Union Territory governments (for example Puducherry). Members of Parliament are directly elected to the lower house of the Union Government and to the state /union territory legislatures. Members of the upper house, known as the Council of States, are elected through state electoral colleges. In addition there are 3,682 municipal entities and nearly 250,000 local bodies. Policy-making across Union and state / territorial governments is consequently a complex, demanding and often extended process.

Provisions within the Indian Constitution help guide the policy-making process between the states, union territories and the Union by defining the functions of the various arms of the government. Schedule VII of the Constitution contains lists setting out these mandates and areas where concurrent powers exist. While the function of administering fishing and fisheries beyond territorial waters is listed as a Union responsibility (which means that the central government is competent to legislate on this item) fisheries generally is listed as a State responsibility (which means that the state governments have the exclusive power to make laws with respect to fisheries within their jurisdiction). Thus, while the state has a jurisdiction over fisheries in territorial waters

¹⁹ Judith Swan and Sanjay Upadhyay, Legal Specialists.



within 22 km (12 nautical miles), the central government regulates fishing and fisheries beyond 22 km²⁰.

The Constitution also requires the Indian President to carry out a financial review at Union and state level every 5 years. This requirement has led to the establishment of the Planning Commission and the development of a series of Five Year Plans. The Five Year Plans are the GOI's key economic planning instrument and were first initiated in 1951. India has since implemented a total of Ten Five Year Plans, interspersed with four transitional annual plans. These plans have important policy implications at both the Union and state levels as they define the amount of funds allocated from central taxation to fund fisheries schemes encompassing many of the operational activities of the Union and state government agencies.

The Legal Framework

Five major legal instruments of the central Government directly govern marine fisheries activities:

1. The Indian Fisheries Act, 1897.
2. Marine Products Export Development Authority Act 1972 (No. 13 of 1972).
3. The Maritime Zones of India (Regulation of fishing by foreign vessels) Act, 1981 (No. 42 of 1981).
4. The Maritime Zones of India (Regulation of fishing by foreign vessels) Rules, 1982.
5. The Operation of Deep Sea Fishing Vessels, 20m OAL²¹ and above, Notifications dated 14 December 2006.

In addition, there are several related laws dealing with the environment, biodiversity, trade, and shipping impact on fisheries and coastal communities, namely:

1. Indian Ports Act, 1908.
2. Indian Forest Act, 1927.
3. Merchant Shipping Act, 1958.

4. Wildlife Protection Act, 1972, amended 1983, 1986, 1991.
5. Water Prevention and Control of Pollution Act, 1974.
6. The Coast Guard Act, 1978.
7. Forest Conservation Act, 1980.
8. Environment Protection Act, 1986.
9. Coastal Regulation Zone Notification, 1991.
10. Foreign Trade Act, 1992.
11. Biological Diversity Act, 2002.
12. Coastal Aquaculture Authority Act, 2005.

This legal framework is far from comprehensive; it contains a number of gaps, is outdated in many areas, not fully consistent with India's international obligations²², and focused on foreign access²³ and development, with less emphasis on fisheries management. At the same time however, the plethora of Acts makes it difficult for a coordinated approach towards improved fisheries management. In particular, the Wildlife Conservation Act is used by the implementing agency (Ministry of Environment and Forests) to enforce bans on fishing for certain species including sharks, sea cucumbers, etc. This authority can extend to a total ban on all fishing in certain areas during breeding seasons for rare or endangered species (see Box 14), leading to potential interdepartmental conflicts. The Coastal Regulation Zone Notification of 1991 entered into force under the Environment Protection Act, 1986, and was designed to protect coastal areas from unregulated development for industry, tourism, and urban development. The Notification recognised the customary rights of traditional coastal fishing communities by restricting development for up to 200 meters from the high-tide level. A more recent development has been the requirement of all states to prepare coastal zone management plans. However, these are being developed as a new Notification and could weaken the earlier protections given to coastal fishers from other forms of development.

The inadequacy of the current legal framework is readily acknowledged in the 2004 national Comprehensive

²⁰ However, the protection of certain fish species lies in the concurrent jurisdiction of both the centre and the state.

²¹ Overall average length.

²² See Annex 6.

²³ See Annex 7.



Marine Fishing Policy (CMFP – discussed in the next section) and some points for legislative reform are now being proposed, including the need for an enabling legal framework around the operation of Indian flag vessels in the EEZ, introduction of new fishing units, ensuring resource conservation, limited access fishery, harbor management, and harmonizing domestic and international fisheries law. But, few details are available about how to reform new legislation – and more broadly how to apply legal reforms to help reduce fishing overcapacity and provide stronger resource rights.

State fisheries legislation is based on a model Act prepared by the central government in 1979. This allowed for some important conformity of the law among states, but also exposed them all to the same short-comings and limitations of the existing

Union law. Most significantly, the model Act predated the United Nations Convention on the Law of the Sea. Thus, concepts and requirements in the UN Law (and subsequent international instruments ratified by India) are not fully addressed, such as the eco-system and precautionary approaches to fisheries management. The state Acts are all divided into four Chapters: 1) Preliminary; 2) Regulation of Fishing; 3) Penalties; and 4) Miscellaneous. A major concern is that insufficient attention has been paid to fisheries management or the sustainability of the resource. State laws (with some notable exceptions such as Gujarat) are primarily concerned with fisher welfare, especially for small-scale traditional fishers, and on the promotion of exports, trade, and labor in the more industrial sub-sector. Coordination on fisheries matters with the states is sometimes difficult, as there can be weak political will in states to coordinate with neighbors on sensitive matters such as closed seasons. In many other jurisdictions, the focal points and processes for institutional cooperation are written into the law and policy. Existing communications and occasional meetings appear to be keeping some momentum moving forward, but the issue of better cooperation in fisheries enforcement has not been tackled to the extent needed.

In summary, the current legal framework for fisheries at both Union and state/union territory level is extremely complex, involves a range of government institutions, and may need strengthening to provide a sound enough basis for fisheries management and development, either in terms of meeting the demands of the 2004 CMFP or the requirements of evolving international law. The GOI is presently developing new national fisheries legislation (Maritime Zones of India Act), to address some of these concerns. The draft Maritime Zones of India Act was sent to 26 agencies for comment, reflecting the scope of challenges with legal reform in India. It should be noted that most fishing countries face similar challenges in structuring and implementing the legal and policy framework for fisheries management. The complexities require as much clarity as possible in terms of the overall

Box 14. Turtle protection and conflict with fishing

In Orissa, inshore fishers suffer from loss of access to fishing grounds in traditional coastal Mangrove areas due to the restrictions related to conserving the Olive Ridley turtle. Although the non-motorised sector has been granted certain exemptions, the smaller motorised boats have not. The ban affects 120 km of the state's 480 km coast for 7 months each year, from November to May. The restricted fishing area covers about 2,800 km² or 14 percent of the harvestable area up to 100 meters depth, with a potential loss of 20,000 tonnes of fish harvest. According to the Orissa Department of Fisheries (DOF), around 17,546 families, comprising some 100,000 people are subjected to loss of livelihood because of the ban. In Kendrapara district alone, over 85 fishing villages, comprising about 40,000 fishers, are affected. The NGOs, Orissa Traditional Fish Workers Union and Samudram, put the number of families affected at 27,825. While few dispute the need to protect the turtles during egg laying and hatching periods, the affected fishers have not been compensated for the loss of fishing access and income.

Source: Study team



objectives, empowerment of lead agencies and coordination and communication with supporting agencies.

The Fisheries Policy Profile

The Central government policy on fisheries in India is informed by two key policy documents; the Five Year Plans developed by the Planning Commission and the CMFP 2004 developed by the Ministry of Agriculture. As noted above, the former defines the fiscal contributions that the Union Government makes to fisheries each year. The Five Year Plan is not however silent on policy as it also sets out strategies and objectives and defines various schemes on which these funds are to be spent. In addition to this, the CMFP 2004 was developed as a guiding document to inform the Union and state governments more generally on policy development for the "conservation, management and sustainable utilisation" of India's fisheries resources. The Fisheries policy at the state / union territory level ranges from an absence of any guiding policy, in the case of Gujarat, to the development of a relatively comprehensive policy in the state of Orissa which was developed in partnership with the Union Government and the support of international aid agencies.

From the outset in 1951, the Five Year Plans have included specific reference to fisheries which is a reflection of their perceived economic and social importance to India. Until the advent of the 2004 CFMP, the Five Year Plans were the only policy framework for fisheries in India. All ten of the Five Year Plans established so far have focused fisheries policy on increasing fish production through technological and infrastructure development (mechanisation, building new port and landing facilities, etc), aquaculture development, and through the expansion of fishing into relatively under-utilised offshore fisheries.

The Tenth Five Year Plan began in 2002 and expired in 2007. This Plan did recognise that the marine fisheries in India were facing increasing sustainability problems

and emphasised the need for a greater focus on sustainability measures, particularly in stressed inshore fisheries. The schemes funded through the Tenth Plan nonetheless still targeted fisheries development with the aim of increasing fish production from an estimated 6.12 million tonnes (in 2000-01) to a target of 8.19 million tonnes by 2007. Most of this increase was expected to come from inland fisheries and aquaculture production but some increased marine harvests were also envisaged through exploitation of ostensibly "un-fished" offshore resources. The Tenth Plan continued to focus government expenditure in fisheries on technological and infrastructure development.

The Eleventh Five Year Plan is currently midway through implementation. The aspects of this Plan that relate to fisheries are being informed by a specially appointed Working Group of 52 members, largely consisting of officials from the states, Union and international fisheries agencies. The Working Group report proposes seven objectives for fisheries over the next five years (Table 8) and identifies these objectives as current government policy.

To implement these objectives, the Working Group has recommended that various schemes detailed in the last Five Year Plan are continued. They have also recommended several new schemes targeted largely at fisheries development; principally aquaculture development, deep-sea vessel construction, mariculture and value addition activities. A central government budget of Rs. 4,013 crores (US\$ 1.0 billion) is proposed, which is a significant increase over the previous Five Year Plan budget for fisheries of Rs. 2,497 crores (US\$ 640.5 million). A large part of this increased expenditure has accompanied the operations of the newly established National Fisheries Development Board (Rs. 2,069 crores). As in the past years, some of these centrally sponsored schemes are designed specifically to support the state activities and are expected to be co-financed by the states. Consequently *the operational activities of the Centre and states/union territories fisheries agencies are heavily*



Table 9: Comparison of fisheries objectives in key policy documents in India

Tenth Five Year Plan	Eleventh Five Year Plan	CMFP 2004	Policy elements
To enhance fish production from aquaculture and marine fisheries and in particular to utilise the full potential of the deep sea fisheries to enhance fish consumption Management of coastal fisheries Increase fish seed production Equity of participation	<i>Enhancing the production of fish from Indian waters, both marine and inland, on an environmentally sustainable and socially equitable basis;</i> Address the hitherto unexplored potentials of the Indian fisheries such as island fisheries and non-food fisheries;	To augment India's marine fish production up to the sustainable level in a responsible manner so as to boost export of seafood from the country and also increase per capita fish protein intake of the masses	Fish production outcomes: Increased production Increased consumption Increased exports
Train fisherwomen Optimal exploitation of the fishery wealth Increased investment for infrastructure	Promoting fish as health food and meeting the changing requirements of both domestic and export markets to make the sector globally competitive; Increasing profitability of fishers and aqua-farmers through an integrated approach from production to consumption; Strengthening of infrastructure in harvest, post harvest, value addition and marketing and upliftment of fisher and aqua-farmer communities with gainful employment opportunities and capacity strengthening	<i>To ensure socio-economic security of the artisanal fishermen whose livelihood solely depends on this vocation</i> <i>To ensure sustainable development of marine fisheries with due concern for ecological integration and biodiversity</i>	Socio-economic outcomes Social equity Socio-economic security Increased profitability/optimal use of fishery resources Infrastructure development
	Enhancing the production of fish from Indian waters, both marine and inland, on an <i>environmentally sustainable and socially equitable basis</i> ; Conservation of aquatic resources and genetic diversity, as also preservation of the health of eco-systems;	To ensure sustainable development of marine fisheries with due concern for ecological integration and biodiversity	Environmental outcomes Protection/preservation of the environment Environmental sustainability



influenced by the policies set by the Union government (central government) and resourced through the Five Year Plan process.

Comprehensive Marine Fisheries Policy 2004

The 2004 CMFP is the current national fisheries policy framework for India. The policy document establishes three key objectives:

- i) Augment marine fish production of India up to the sustainable level in a responsible manner so as to boost export of seafood from the country and also increase per capita fish protein intake of the masses;
- ii) Ensure socio-economic security of the artisanal fishermen whose livelihood solely depends on this vocation;
- iii) Ensure sustainable development of marine fisheries with due concern for ecological integrity and biodiversity.

The 2004 CMFP consists of ten components which include establishing a "stringent fisheries management system" encompassing an improved regulatory and Monitoring, Control, Surveillance (MCS) systems. The CMFP also proposes a new legal framework to enable various components of the new policy to be implemented. What makes the CMFP significant is that it also identifies a need to reform the legal framework. An Inter-Ministerial Empowered Committee on Marine Fisheries has been established to steward the implementation of the Policy under the Chairmanship of the Secretary in the DAHDF. Outside this framework, regional consultations have apparently been held to discuss how best to make this policy operational.

Fisheries Management Systems

On the whole, there is *no comprehensive mechanism for management of fisheries outside the territorial sea other than the granting of licenses*, and even those provisions are largely procedural and not related to mechanisms or procedures to decide conservation and management measures or their enforcement. As described in the

previous chapter, the state legislation provides a *rudimentary regulatory and licensing regime for fisheries management within territorial waters*, but management objectives and roles and responsibilities are often not well-defined, and legal powers are weak. Enforcement of even this minimal level of regulatory and licensing regime is very low due to budget, capacity and technology constraints in the state fisheries departments.

Policy Performance

The Five Year Annual Plans issued by the Union Government seemingly offer the best prospects for anchoring a performance assessment given that they have a large impact on the way fisheries management activities are funded and directed in both state and Union jurisdictions. They are consequently the primary policy documents that provide a historical link between the objectives set by the government and the activities undertaken in the administration and use of fisheries. Two such five year plans have particular relevance for assessing recent fisheries policy performance; the Tenth Five Year Plan, which expired in 2007; and the Eleventh Five Year Plan, which is now in operation.

The Working Group Report on the Eleventh Five Year Plan provides an assessment of the delivery performance with respect to the schemes funded during the Tenth Five Year Plan (operated between 2002 and 2007). They estimated that actual expenditure on the schemes identified in the Tenth Plan averaged 80 percent of the original budgets allocated and identified this as the key financial achievement. This expenditure is also translated into physical outputs delivered, namely 10,910 motorised traditional craft, 18 intermediate craft, 11 deep-sea vessels fitted with Vessel Monitoring Systems (VMS) and other resources, 500 fishermen provided with safety equipment and 73,000 fishermen provided with development rebates (mainly rebates for installing diesel motors).

The Working Group Report also provides a summary of the status, potential and issues surrounding India's fisheries, but unfortunately does not explicitly link this



analysis to the schemes funded or to the outcomes originally sought in the Tenth Five Year Plan. A limited analysis can however be carried out using information provided in the Tenth Five Year Plan, the Working Group Report and supplemented by the information provided in this report.

One specific target set in the Tenth Plan was that fish production should reach 8.19 million tonnes by the end of the planning period in 2007. The Eleventh Plan Working Group estimated that annual fish production in the four years from 2002 to 2005 increased from 5.96 to 6.3 million tonnes. This represented an average increase of less than 2 percent per annum, which is well below the target of 5.44 percent annually which would be needed to reach an annual harvest of 8.19 million tonnes. Fish production from the marine sector in fact has changed very little over this period.

A range of other intended outcomes for fisheries are identified at various places in the Tenth Five Year Plan that warrant mention. For marine fisheries, these outcomes include; i) increased production from the deepwater fisheries (linked to the overall fish production target); ii) increased fish consumption per capita in India; iii) management of coastal fisheries; iv) equity in participation; and v) optimal exploitation²⁴. A few specific measures of performance against these outcome statements are available, but some general comments are provided below, based on information sources noted above and earlier chapters of this report:

- i) Increased production in deepwater fisheries is evolving but has not yet fully materialised;
- ii) Information on actual fish consumption change in India is limited, but various studies cited earlier in the report suggest that demand is expected to increase significantly;
- iii) Various fishery performance indicators (such as change to catch per unit of effort, change in fishery trophic status, change in numbers and capability of vessels, change in user conflict) show that current

management of coastal fisheries is less than optimal and leading to the overexploitation of inshore fisheries (both in terms of fishing and capacity);

- iv) Growing levels of conflict between users, between states, and between states and neighboring countries such as Pakistan, as vessel numbers and capacity increase, and fish stocks decline, suggest *equity in participation in management or in access to the fisheries resource is poor*;
- v) There is evidence that *coastal fisheries are overexploited and deepwater/island fisheries are underexploited*.

Overall, a simple comparison of fisheries policy outcomes measured against the key outcomes in the Tenth Five Year Annual Plan suggests that performance can be significantly improved. This assessment mirrors the global findings in Chapter 2 which provided a comparative assessment of fisheries policy in India and the performance of other countries, benchmarked against the FAO International Code of Conduct for Responsible Fisheries.

It is also relevant to consider the objectives proposed within the 2004 CMFP and the links between this policy and the Eleventh Five Year Plan fisheries objectives. Put in direct terms, we are not only interested in examining whether past production-based objectives were met, but also in determining whether past fisheries performance and problems encountered are being adequately addressed in objectives and policies established for the future. In this respect it is not entirely clear how well the CMFP has been translated into the objectives in the Eleventh Five Year Plan, but many synergies are apparent.

What is evident is that many of the outcomes being pursued around the use and management of fisheries in India are carried through, in one form or another, in all three policy documents. There is a consistent focus on fish production as a core outcome along with equity (with a particular focus on people involved in the artisanal fishing sector). There is also a continued focus on infrastructure development. What distinguished the

²⁴ There is also a range of other activity-based targets specifically identified in the Tenth Five Year Plan that are not considered here, such as numbers of fish seeded and fisherwomen trained.



policy objectives set for the future from those in the past is the increased attention being given to environment sustainability. However, this must be broadened to encompass economic growth, trade, and livelihoods (Salagrama and Koriya 2006).

Causes of Poor Policy Performance

Problems of Open Access

What is now evident is that marine fisheries in India have largely reached a plateau in terms of production, especially for inshore waters. Efforts to stimulate expansion of fishing in unexploited deepwater fisheries may materialise but will not address the issues surrounding inshore fishing. Clearly, the problems classically found in fisheries worldwide when *the open access incentives of fishing are not adequately managed* are emerging in India. A basic tenet of the FAO International Code of Conduct is that:

States should prevent overfishing and excess fishing capacity and should implement management measures to ensure that fishing effort is commensurate with the productive capacity of the fishery resources and their sustainable utilisation;

It is very difficult to increase these natural limits, and although some suggest that interventions such as artificial reefs, restocking, and marine ranching can increase productivity, result have been far from spectacular (FAO 2004). Such measures can theoretically speed up recovery of degraded natural resources back to natural limits, but the costs often do not justify the results, except where overall labor costs are low. Further, stock enhancement strategies must be linked to policies and regulations that limit new entry of fishers; otherwise increased stocks could induce still further fishing capacity. Allowing fish stocks to recover naturally will ultimately give greater yields with reduced risks of stock collapse. Reducing the fishing effort can increase the value of the catch by reversing the "fishing down the food chain"

phenomenon that has occurred in all the maritime states in India²⁵, thus restoring eco-system health and resilience, increased catches of prime species etc.

Policy Complexity

Fisheries policy in India has become increasingly complex and seeks to achieve a wide range of objectives aimed at industrial and artisanal fisheries, fish production and use, the generation of economic returns, providing social benefits and ensuring conservation of fish stocks and the environment. Many of these objectives are conflicting and have accumulated during the development of successive planning documents. Even with a high level of funding and capacity, it would still be difficult to achieve these objectives across the range of fisheries jurisdictions in India in the short-term. The reforms proposed in this report will take many years of stakeholder commitment, support and investment.

Policy Implementation Failure

Where fisheries management rules are applied, their implementation is often fragmented and the capacity to implement is weak. The management and use of fisheries information is one such example. Both the Fishery Survey of India (FSI) and CMFRI are mandated to provide information on the status of the resource. The fishery potential of the Indian EEZ is periodically assessed by an expert committee consisting of the scientists of the CMFRI, FSI and other fisheries institutes of the country. The last such assessment was done in 2000. These findings are approved by the Ministry of Agriculture and are considered for planning and development activities. However, there is an urgent need for more formal and frequent reporting structures and a framework on which the decision-making in response to the findings can be applied, so as to make fisheries research in India more application-oriented. This will also help to bridge the gaps among the

²⁵ "Fishing down the food chain" refers to the alteration of the eco-system through sequentially fishing down longer-lived, larger fish that are higher in the food chain (e.g. sharks) until the only fish left to catch are the short-lived, small fish that feed on plants and detritus (e.g. squid and cuttlefish).



fisheries research community, fisheries policy, and day-to-day fisheries management, with scope for better public scrutiny and review of scientific advice.

The fisheries laws themselves generally provide a weak environment for officials to enforce. Penalties are very low in relation to international standards. For example, the Maritime Zones of India (Regulation of fishing by foreign vessels) Act, 1981 lists the powers of search and seizure by authorised officers, but only in the context of boarding vessels. There is no authority to exercise enforcement powers on land – for example, to conduct searches for fish that may have been landed or are being transported after landing, to inspect documentation or to carry out other activities to investigate compliance. Offences under the Rules are punishable by a maximum Rs50,000 (US\$1,282) fine. Compared to other global jurisdictions, this is exceedingly low and would have little or no deterrent effect for larger operators. Higher fines for “serious offences”, such as those described in Article 21 of the 1995 UN Fish Stocks Agreement, are not distinguished. However, in the 1980s, there were more stringent penalties when the offending foreign fishing vessels were detained, crew arrested and put in jail, and vessels were confiscated and auctioned.

Other reasons for poor implementation of fisheries rules include (i) inadequate human resources and capacity, especially to police long stretches of coast scattered with landing sites²⁶, (ii) a lack of focus in the DOF on the role of officers to enforce (it often conflicts with the role of providing welfare support, especially to poor fishers), (iii) low awareness of the rules and regulations by many stakeholders, and, more importantly, (iv) an absence of effective co-management arrangements where self-regulation could be fostered and encouraged, building on local experience, for example the traditional Padu system for managing common property inshore fisheries in southern India and Sri Lanka (Bavinck 2001).

²⁶ It was not uncommon in the states examined that fisheries department field staff lacked working patrol boats and vehicles. In one case, officers used public transport and bikes to visit coastal communities.

Policy Coherence

The most recent fisheries policy reflects, to some extent, the overarching goals of development for India, as encapsulated in the Five Year National Plan. In the 10th plan, explicit recognition is made of the fact that development which merely expands the production of goods and services and consequent growth in per-capita income needs to be balanced by development aimed at enhancing of human well-being. This recognises that social indicators on health, longevity, literacy and environmental sustainability are just as important as per-capita GDP. Policy implementation in India is scheme-driven as noted earlier in this report. Past practice has been to build on existing schemes rather than realign these to the changing policy environment. This has been complicated by the fact that production-based activities are becoming less relevant and in fact are contributing to current fisheries problems. The result is that there is insufficient coherence between current policy and practice in fisheries management and use in India.

Fisheries Management Systems

Given the complex policy framework, coherency problems and current low capacity for implementation, there is a strong case for developing a more focused policy framework for fisheries management and use in India. One key element of successful fisheries policy that has attracted little attention in the past is the fisheries management system. The development of a more effective fisheries management system at the Union- and state-levels offers one means of focusing current policy. The key question to be asked in developing such a system is what should be the objectives of fisheries management and what type of system is best suited to meet these objectives. The reforms proposed in this report offer some possible solutions.



Key Chapter Messages

1. A review of economic, social and environmental performance suggests that fisheries management in India is meeting only a few policy outcomes against stated planning goals established by the government. Thus, the overall performance could be significantly improved.
2. The continued policy focus on increasing fish production, underpinned by capacity and infrastructure improvement in the face of increasing resource scarcity is not a viable option for the future. The current approach to fisheries management is not addressing overexploitation, nor contributing to more positive economic and social outcomes, particularly for inshore fishing.
3. A new policy focus must embrace economic growth, trade, livelihoods and the environment. At its core, marine fisheries policy needs to move away from production and capacity development and towards the generation of sustainable net economic benefits. With a more appropriate policy direction, over the longer-term marine fisheries can contribute to a broader economic growth and poverty alleviation, while also providing stronger incentives for resource conservation.
4. Any recasting of sub-sector policy objectives must be supported by the building of necessary institutions and capacity to put this new framework into effect. First and foremost, the current legal framework governing marine fishing needs targeted reform. There are good examples to build on, such as recent attempts by Gujarat and Orissa to update their laws, and with Tamil Nadu now beginning to engage in a comprehensive policy/strategy revision process.
5. Current organisational capacity and functions are too misaligned to support more holistic approaches for fisheries management that can maximise economic, social and environmental benefits. Fisheries departments need strengthening, a point raised earlier in the report.
6. Although India has some positive local experiences to build on, in general the country would benefit from a more comprehensive and effective fisheries management system on which to gradually develop this new future. Interim measures can be undertaken to improve basic fisheries management, provided these are consistent with long-term reforms.
7. The impact of future policy change will need to be evaluated and managed with care in terms of the economic value that might be generated, and with impartiality in how this value could be best allocated to ensure the sustainability of coastal communities.





CREATING CONDITIONS FOR REFORMING THE MARINE FISHING SUB-SECTOR IN INDIA

What are the Opportunities?

Fish resources are inherently valuable, measured by the potential contribution that well-managed fisheries can make to social and economic welfare. Marine fisheries can provide a range of direct benefits including employment, income, and food security, which are all important to underpin livelihoods. Indirect benefits can be generated when income from fisheries is reinvested in the economy, leading to income and employer multiplier effects (as the sub-sector expands) and/or through government fiscal policy actions (taxation and reinvestment of public revenues in other parts of the economy). Globally, the economic rent (often termed net benefits or wealth) value from marine fisheries is thought to exceed US\$ 50 billion. Fisheries management based on building this value can also address poverty reduction by focusing on pro-poor growth, and exploiting the ways in which poverty in fisheries can be addressed from a broader macro-economic perspective.

India's marine fishing sub-sector has the potential to develop a more valuable resource base, improve the productivity of fish stocks, generate a higher level of sustainable benefits, and provide better equity. The marine sub-sector can certainly build on a number of existing strengths such as an experienced labor force, a long history of fishing, local examples of improved fisheries management, and rapidly growing global and domestic demand for fish products. Like agriculture-based regions

in rural India, marine fisheries stakeholders can become more integrated with India's expanding rural economy. Coastal dwellers can be presented with more robust livelihood opportunities, both from within fisheries (as its performance improves) and non-fisheries sectors. But to achieve these opportunities, there is a rising awareness and general agreement among key stakeholders in India that reforms are needed to guide the improved economic performance of the sub-sector.

What are the Key Constraints?

While marine fisheries in India and many other countries have strong performance potentials, there are a number of difficult challenges to overcome. Empirical evidence from many parts of the world shows that where policy goals emphasise greater participation in the sector by fishers and subsequent production increases (by expanding vessel numbers, size, etc.), the long-term outcome tends to drift towards fisheries overexploitation and either limited or no reduction in poverty levels. In general, countries that have tried to manage fisheries where fishing capacity is expanding beyond sustainable levels, have largely failed to improve sub-sector performance. Overcapacity can usually lead to overfishing and subsequently to sub-sector stagnation and declining incomes. In many parts of India, there appears to be very little possibility of increasing the numbers of fishers in inshore waters while providing



them with sustainable fishing livelihoods and increasing incomes. Any shift to apparently more plentiful offshore, deepwater resources is unlikely to benefit the majority of inshore fishers. For India to build a more valuable and sustainable marine fisheries asset base that can generate a range of economic, social and environmental benefits, there are five main constraints that must be addressed, as follows:

1. The current policy, legal and administrative systems can only serve as a partial foundation for reform towards more progressive fisheries management.

The historical performance against the major objectives in the 2004 CMFP and the current Five Year Plan across all indicators identified is not as strong as desired. In the three broad fields of economic, social, and environmental performance, marine fisheries in India is not fully meeting government expectations, even in terms of more traditional policy objectives based on increasing fish production. While the 2004 CMFP recognises the need to depart from an open access system, the aspect of assigning more clearly-defined fishing rights as part of a transition to more sustainable fisheries management approach is not addressed. Instead, the policy statement simply refers to the need to establish fishing areas or zones for small non-motorised boats, small motorised and larger mechanised boats, and deep sea vessels. While setting aside fishing zones is often part of effective fisheries management, it must be complemented by a system of well-defined property rights to different stakeholders. Fisheries policy at the state/union territory level ranges from an absence of any significant guiding policy document (in the case of Gujarat) to a relatively comprehensive policy (in Orissa). However, even though the Orissa policy emerged from a partnership with the Union Government and support of international aid agencies (primarily DFID), actual policy implementation remains fairly weak.

Five major legal instruments and several related pieces of legislation of the central government directly govern marine fisheries activities. This legal framework

contains a number of gaps, is outdated in many areas, remains inconsistent with some of India's international obligations, and is focused more on foreign access to offshore fishing and fisheries development rather than domestic fisheries management, especially for inshore waters. The current national legal framework does not appear to provide a sufficiently robust foundation for improved fisheries management either in terms of meeting the demands of the 2004 CMFP statement, or the evolving requirements of international fisheries law. At the same time, state fisheries legislation is based on a model document prepared by the central Government in 1979. This allowed for some conformity of the law among states, but also exposed them to many of the same limitations of the current national legal framework. Most significantly, the 1979 document predated the United Nations Convention on the Law of the Sea and has not been amended accordingly.

The government agencies directly involved in the marine sub-sector and primary resource users have many positive qualities, but suffer from the implementation failure and weak institutional capacity with respect to fisheries management. There are few effective, let alone optimal, administrative systems operating to support improved fisheries management performance. Fiscal processes, especially with funds flowing from the centre to coastal states for marine fishing, are not directly linked to fisheries management performance, but instead tend to support welfare schemes, operational programs and infrastructure for fishers. While there is general agreement that welfare support is important, central schemes for boats, gear, fuel, etc., usually provide the wrong economic signals to producers. Instead of helping limit entry, these kinds of incentives may encourage more participants to enter a sub-sector already overcapitalised by more than 200 percent, and to catch fish from stocks that are already largely overexploited. This is particularly acute for inshore waters.

2. The biological and economic sustainability of marine fish stocks in India faces challenges.

A number of indicators point to a declining contribution of India's marine fisheries to sustainable development.



For example, government data suggest that for marine stocks assessed, over 61 percent of India's capture fisheries are already over-exploited, and most of the remaining stocks are fully exploited, with very little prospect for future expansion. While fishing capacity has increased, catch rates for key species from inshore waters are stagnant. There has been evidence of increased use of destructive fishing gear, such as ring seines, in some regions. Bottom trawling is another destructive approach for fishing in inshore waters, particularly in the western Indian Ocean. The harvest of juvenile fish/shrimp is also increasing. The large number of vessels docked and no longer fishing clearly points to overcapacity and poor economic returns. Smaller boats are making increasingly longer fishing trips to more distant areas, impacting on safety at sea. Conflicts between small-scale/artisanal boats and larger vessels operating within or just beyond the 22 km state/territorial fishing grounds are becoming more common. There is also growing concern over the impact of coastal development and pollution on inshore fish stocks – a direct negative externality from India's booming economy.

3. Small scale fishers are losing their livelihoods and opportunities for development, and there are few options for alternatives.

Marine fisheries provide a source of livelihood for more than three million people in over 3,000 villages along the coasts of India. Nearly half of this population is directly and actively involved in fishing and related work such as processing and trade; for these people, fishing accounts for most of their livelihoods. Yet the current open-access system and the related decline in fish harvests is helping trap poor people into a downward spiral of low profits, few assets, marginalisation, increased poverty, declining health, and perpetual debt cycles. Limited availability of low-cost credit hampers the adoption of better technologies, particularly for improving fish quality from boat to market. A further issue is that the growth in the trawler fleet has created competition with smaller, inshore vessels in many fishing areas. These trawlers now account for 60 percent of the fish harvest, but only 20 percent of the total labor force. Many participants

in the sub-sector rely on central subsidies to continue fishing. A high number of participants in the small-scale sector earn less than Rs. 25,000 per year, over a nine-month fishing season. The support systems at the government, NGO and civil society levels are inadequate to help people fully cope with the changing operating environment and gain access to other, possibly more viable livelihood alternatives.

4. Fisheries management needs to be strengthened, especially for inshore waters.

Waters between the 22 km state territorial limit and the 370 km Indian EEZ (managed by GOI) are generally identified with larger mechanised vessels; more distant areas of the EEZ are thought to contain significant underutilised fisheries resources. The primary mechanism for the management of offshore fisheries at this time is the granting of licenses. Additional mechanisms are required regarding conservation and management, and their enforcement. Waters within the 22 km limit are generally identified with smaller motorised and non-motorised (artisanal) boats. Here, state legislation only provides a rudimentary regulatory and licensing regime for fisheries management, but management objectives are based on biological criteria and maximising harvests rather than maximising resource rents or net benefits in a more holistic management approach. Fisheries management practices are fairly basic and generally include seasonal fishing bans for selected stocks, regulating mesh size, trying to create fishing zones, etc. Yet, while these basic management approaches have some merit, enforcement is weak – most state fisheries departments lack working patrol boats and other monitoring equipment. Governance roles and responsibilities between the centre and state, and among a range of agencies within states are often not clear and can be exacerbated by large mechanised and smaller motorised vessels that cross over the 22 km boundary to fish in both directions. There are few real barriers for entry into the sub-sector, especially with larger-scale vessels. Major stakeholders such as fishers and traders are not well-organised and lack sufficient access to policy processes relating to fisheries management and



broader sub-sector development. Finally, despite the efforts of several NGOs who are trying to demonstrate co-management systems for inshore fishing on a small scale, formally Recognising the approach and scaling it up would be one logical interim step towards a more effective management.

5. Market channels, particularly for small-scale fishers, are inefficient and hinder delivery of high quality products at optimal prices.

Aside from exports (mainly shrimp) through EU certified processing plants, marine fish market chains in India suffer from unhygienic conditions, poor handling of the fish and large wastage in terms of both lost product and profits. Quantity losses due to poor quality of up to 15 percent of the harvest are common. Smaller-scale fishers are often unable to gain access to more efficient marketing systems and supporting infrastructure (ice, cold storage, etc.) that would lead to better quality and prices. While demand for fish products in India is forecast to rise significantly in the future, there is inadequate information about domestic market trends and specific quality requirements (especially for small-scale fishers), and insufficient understanding about evolving market chains and opportunities. In addition, smaller producers lack access to more efficient collective marketing institutions – starting from a village level – that could represent their interests as a commercial business, providing better linkages with the private sector and access to credit. Globally, India faces increasing market competition from other developing countries in the region.

Moving Forward with Critical Marine Fisheries Reforms

As this report has indicated, India's marine fisheries can generally be characterised as a free and open-access system, underpinned by fairly conventional policy goals of maximising production based on increased fish landings through technology inputs and expanded fishing effort. This model is fairly consistent

with many other countries, yet global experience shows that this approach usually results in low levels of success in generating sustained economic benefits; in some cases it leads to stock collapse from overcapacity and overfishing. Marine fishing under open-access conditions usually fails to support sustained livelihood development of fishers, particularly smaller-scale operators, as economic rents are dissipated and incomes decline.

It is an appropriate time for India to step back and learn from a small but growing body of emerging national and international best practices in fisheries management that can help guide marine fisheries into becoming a better-managed and more sustainable sector for economic and social development. This is especially critical for inshore fishing, as opposed to deep sea fishing in more distant areas in the EEZ. While India's marine fishing sub-sector has many positive features to build on, a new approach is needed with an increased focus on maximising economic, social and environment benefits, improving productivity, and providing better equity. This needs to be supported by appropriate policy, legal, and institutional frameworks, and a more effective fisheries management system for both inshore and offshore stocks. Such a holistic approach will eventually require the allocation of fishing rights; for India, this will mean some challenging political and economic decisions on how to allocate limited stocks among different groups currently operating in the sub-sector, particularly between larger mechanised fleets (mainly trawlers) and smaller motorised and non-motorised boats operating in inshore coastal waters. Further, this transition process, to be successful will require measures to restrict additional entry. These decisions must be highly sensitive to the political and economic environment in India, particularly with equity considerations and pro-poor growth.²⁷ Clearly, while actions are needed to address structural issues such as overcapacity in fishing effort, the costs of mitigation or compensation for people affected by possible structural changes must be accounted for in any long-

²⁷ Refer to Annex 8 for more details.



term transition process. More specifically, broader livelihood opportunities must be developed for coastal fishers to help them take advantage of growing local and regional economies.

Improving the performance of marine fisheries, creating a more sustainable flow of social and economic benefits, and ensuring a healthy marine environment requires a number of reforms and actions to be implemented at both national and state levels. In brief, a comprehensive transitional reform process is needed to:

- a) Build awareness of the potential opportunities and policy options, and gain broad support for change (from civil society at the community level to senior policy makers);
- b) Develop a new policy framework (including objectives and roles and responsibilities);
- c) Establish the supporting institutional framework (legal framework, management systems and processes, accountabilities, organisational design);
- d) Strengthen the required human capacity to implement more effective fisheries management;
- e) Put the framework and capacity into practice through pilot programs in selected states; and
- f) Monitor progress and use an adaptive process to continually improve sub-sector performance.

The selection of recommended activities in a reform process must account for the following considerations:

- ◆ *Activities specified:* selected activities must lead to the achievement of the program goal (fisheries reform) and include: awareness-building, policy development, institutional development, capacity-building, practical implementation, and monitoring and evaluation;
- ◆ *Sectoral context:* the fisheries sector in India presents a range of development opportunities (e.g. high demand for fish products) and constraints (e.g. weak fisheries management) which must be addressed;
- ◆ *Institutional context:* the underpinning institutional framework (laws, policies, institutions and processes) needs to be upgraded and realigned to meet development objectives;

- ◆ *International lesson-learning:* the experience gained from development interventions in fisheries over the past thirty years reveals the importance of a broad-based approach; major investments (e.g. harbor construction and fishing fleet) must be accompanied by less tangible but critically important interventions (e.g. policies, institutions and processes for fisheries management); the latter often involves reform and change over a long period of time;
- ◆ *Time, sequencing and funding:* sufficient time is needed to accomplish specific objectives in a realistic manner; this is usually predicated on the right inputs in the right sequence (usually in sequential phases); and supported by sufficient funding;
- ◆ *Participation and consensus:* the success of any marine fisheries reform process will depend on the achievement of a consensus about key decisions by key stakeholders;
- ◆ *Adaptive process:* over the course of implementing reforms, new opportunities to further develop and strengthen India's marine fisheries may arise; the reform program needs to be flexible to capitalise on these.

Recommended National Activities

National activities should aim to initiate a national reform process to support improved performance in the marine fisheries sub-sector, characterised by more sustainable flows of net social and economic benefits, and a healthy marine environment. A reform program is recommended with three phases – (1) Consultation and Review; (2) Policy Development; and (3) Policy Implementation Planning – and several components, operating over 3 to 5 years.

Phase 1: Consultation and Review

Component 1.1. (Strategic Assessment) should produce a comprehensive assessment of the marine fisheries sector in India and the development of a preliminary marine fisheries strategy upto the year 2030. This would be undertaken through a combination of activities including stakeholder consultations, visioning exercises,



scenario building and international comparisons, and awareness-building through exposure visits in India and globally.

Component 1.2. (National and International Best Practices in Fisheries) should identify and highlight best practices in fisheries development and management relevant to India. Information and lesson-learning should be gathered and analysed from both national and international sources, using field studies, field visits, study tours and the international literature.

Component 1.3. (Building a Knowledge Base) should establish an improved and comprehensive knowledge base of India's marine fisheries, including published reports and a web-based knowledge system. The knowledge base would draw on a wide variety of information sources including formal publications, informal reports, and a purposeful review of current programs and data. There would be a need for an early stock-taking and definition of likely future information needs, tools and media for different users – policy-makers, fishery managers, private sector traders and local level fishers.

Component 1.4. (Capacity-building and institutional strengthening) should create an appropriate level of capacity (technical, policy decision-making) for fisheries development and fisheries management in key government institutions, and relevant private and civil society organisations. A capacity needs- assessment in the sector would be followed by a series of relevant and on-going capacity-building courses.

Component 1.5. (Livelihoods Support and Best Practice Interventions) should establish a monitoring and evaluation system, and gather a baseline of information of fisheries and other related livelihoods in India and the impact of policy and other changes. Both published data and a series of new surveys as appropriate would need to be employed. This would also include the identification of suitable indicators to monitor the future impact of policy implementation and general livelihood improvement. A full range of stakeholders would need to be engaged in this process. Interaction with programs and experts in

marine fisheries and other sectors would help identify actual rural livelihood projects/program models that could be scaled-up in all coastal areas to improve both fishers' and non-fishers' livelihoods.

Phase 2: Policy Development

Component 2.1. (Fisheries Policy Development) should produce a draft National Fisheries Policy and State Guidelines. Following a retrospective analysis of fisheries policy in India (1970-2008), a full range of alternative policy options would be identified and evaluated. Tools such as bio-economic modeling could be used to assess the impact of alternative management strategies on different fisheries types throughout India. The theoretical and empirical information would be used to draft a new fisheries policy following widespread stakeholder consultation.

Component 2.2. (Institutional and Legal Framework) should establish the basis for a revised National Fisheries Act and State Guidelines, leading to the development of a draft Bill (for eventual approval by the government of India in the medium or longer term). Based on a detailed review of institutional and legal arrangements, targeted policy and legal reforms to support more holistic fisheries management would be identified including: formalising and codifying fishing rights around co-management; leasing of open seas; application of FAO Fisheries Code of Conduct or development of comparable national codes, ICZ policy reform and Marine Environment Policy. National guidelines for state-level policy and legal reform would also need to be developed. Improved processes for inter-ministerial consultation and coordination, greater coherence between union and state roles and responsibilities would also need to be identified and agreed on²⁸.

Component 2.3. (Fisheries Management Systems) should identify and evaluate design options for improved fisheries management systems in India. A wide range of multi-disciplinary information will have to be used along with appropriate consultation of fisheries stakeholders.

²⁸ Refer to Annex 9 for more suggestions on legal reform

The identification and creation of an inventory of fisheries management units throughout India and for different types of fisheries should be undertaken, followed by definition of the structure and operation of fisheries management systems. A set of fisheries to be considered for "pilot scale" development activities in the future (Phase 3 below) would need to be identified as an important part of this activity.

Component 2.4. (Long-term capacity-building) should establish the human and institutional capacity to build upon and take forward the reform of national fisheries policy and the suggested new approaches to fisheries management. A series of dedicated training courses and expert mentoring programs could be designed and operated. National, regional and international experts in fisheries management will need to contribute to the on-going process. The component should also include periodic exposure visits within India and abroad to countries already following a reform process, in order to continue sharing ideas and experiences, and building professional networks.

Phase 3: Policy Implementation Planning

Component 3.1. (Fisheries Development Strategies) should identify and elaborate how fisheries policy at the national level can be implemented through a series of inter-related strategies and actions at national, state and local level. Building upon the results of reviews and analysis in earlier phases, a set of strategic interventions in key areas relevant to fisheries development and fisheries management priorities, both at the national level and in each state, would need to be identified, elaborated and relevant costs calculated. This could include holistic approaches to resource management, technology adoption, marketing strategies, capacity rationalisation, human resource development, research and development, etc. A range of possible options should be identified, evaluated and compared. The core component of resource management would need to be built upon current systems as well as the FAO Ecosystems Approach and other reforms to improve net benefits. The use of a set of "pilot scale" operations in

certain fisheries (identified in phase 2) would also need to be considered. Successful pilot scale operations could then be used to test and demonstrate new approaches for fisheries development and management in India at the state level. Awareness raising and capacity-building around proposed strategies would be required too.

Component 3.2. (Implementation Planning and Preparation) should identify and elaborate a Program of Fisheries Development for India to 2030, based upon a review of proposed fisheries development and management strategies (earlier phases mentioned above) and consultation and engagement with key stakeholders. Building on lessons learned from pilot work at the state level, the requirements for establishing an appropriate process of fisheries development and management would be identified and outlined. An action plan should be developed for national- and state-level reform activities, resource mobilisation plans and training and capacity-building. In addition, ongoing monitoring and evaluation operations would be needed, including support from the establishment of a National Resource Centre for national fisheries data and statistics, the establishment of guidelines for focused evaluation studies, and publication of output data from project activities.

Recommended State Activities

It is recommended that state activities be undertaken in 1-2 states to put *into practice* the reform process for the marine fisheries sub-sector in India developed through the national level activities. The recommended state activities should consist of two phases – (1) Review, analysis and preparation; and (2) Implementation of management reforms, and several components, operating over 4 to 5 years as a starting point.

Phase 1: Review, Analysis and Preparation

Component 1.1. (Policy Review and Analysis) should review new state fisheries policy and strategy in line with new approaches to fisheries management and identify any gaps and appropriate policy responses. The opportunities for reform and necessary actions should be a key focus.



Component 1.2. (Fisheries Assessment) should produce an updated status report on marine fisheries in the state, including an inventory of all fisheries and their major characteristics (fish stocks, productivity, wealth potential, catching/onshore sector, status of exploitation, etc.). On the basis of this assessment, a number of *pilot fisheries* for reform implementation could then be selected. The pilot fisheries would be a core component of the reform program, and the successes and lessons learned from key interventions in these fisheries would form the basis for future scaling-up throughout the selected state's marine fisheries sub-sector.

Component 1.3. (Capacity-building) should establish necessary human and institutional capacity to manage and implement the fisheries reform process into the future. Capacity-building in fisheries policy, and analysis through a variety of dedicated courses and mentoring arrangements, along with a parallel set of awareness-raising and information dissemination activities need to be carried out throughout the period of the program, including training for both fisher-folks (e.g. understanding and using fishing rights) and fishers' personnel (e.g. FAO Code of Conduct protocol).

Component 1.4. (Fisheries Livelihoods Monitoring and Evaluation (M&E) baseline) should create a baseline understanding of fisheries' and non-fisheries' livelihoods, and establish a monitoring and evaluation system to gauge the impact of future fisheries reform. It is intended that this component will draw upon other livelihoods programs in the state and link with the proposed national M&E system.

Phase 2: Implementing Management Reforms and Livelihood Support

Component 1. (Implementation of Management Reforms) should be based on four separate activities: The first activity would identify and define up to three fisheries management units in the participating state(s). This would include the designation on a legal basis (under state and local laws) and the principles of allocation of use rights to specific stakeholders. The second activity would produce

a fisheries management plan (FMP) for each of the selected fisheries management units. The components of the plan (fish harvesting possibilities, catch control, capacity control, technical management measures, precautionary management measures, structure of use rights and fiscal arrangements) would need to be worked out and agreed between all stakeholders involved (using a combination of different types of information – bio-economic models, local knowledge etc.). The third activity would focus on implementing the FMP, leading to the establishment of sustainable fisheries that would eventually generate increased net economic, social and environmental benefits. Appropriate success indicators would need to be developed for each FMP and its implementation plan. Suggestions for indicators include: the value of rents generated by the fishery, capitalised value of such rents, value of rents captured by public authorities, capacity of the fishing fleet in comparison to the resource availability, sustainability of the targeted fish stocks, and the level of income and employment generated on the basis of fishing. Finally, M&E systems would be needed to review and assess on-going activities, capacity-building related to specific fisheries management reforms and reporting.

Component 2. (Socio-economic and Livelihood Support) should encompass several activities. The first activity could support local capacity-building through learning, exposure visits, training and participation. The second activity would use an appropriate rural livelihood program to benefit fishers suffering from low catches and income by providing options for coastal inhabitants to broaden their livelihood base to non-fisheries alternatives. This could occur through group formation, social mobilisation, institutional strengthening, and a revolving fund to finance the establishment of small-scale enterprises, mainly in non-fisheries livelihoods. The third activity could establish Potential Fishing Zone (PFZ) display boards to help reduce input costs in diesel and labor in the offshore areas for active inshore fishers. The fourth activity would improve the inadequate market infrastructure in key coastal areas through fish marketing sheds, platforms for hygienic display and sale of fish, refrigeration facilities for storing the fish in a hygienic condition, freshwater supply, sanitation, etc. It



should also help establish modern wholesale and retail fish markets as per EU or HACCP standards. The fifth activity would improve sea safety by providing training on appropriate safety measures.

Recommended Implementation Approach

The proposed reform activities are complex and span both national and state jurisdictions and several agencies. Effective coordination and communication are essential for successful implementation. Based on input from stakeholder workshops, it is recommended that a high level task force, chaired by the Joint Secretary, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, provide necessary broad oversight and strategic guidance to the proposed national and state-level activities. Given the prominent role of the National Fisheries Development Board (NFDB) in marine fisheries development, there is considerable operational merit in considering the Secretary of the task force to be the Chief Executive Officer of the NFDB. Other members of the task force could include one senior representative from the participating state(s) in a reform program, a member of a reputable national civil society fisheries organisation, members from the fishing industry, and representatives from key international partners. Implementation of many activities could be through the NFDB, which has greater autonomy and flexibility than government Ministries. Consideration may also be given to establishing a linkage between the proposed task force and the Central Board of Fisheries, which is composed of state Ministers and chaired by the Union Minister of Agriculture. This would ensure that all coastal state Ministers responsible for marine fisheries are aware of the task force activities and where required, can assist participating states in overcoming implementation hurdles.

Implementing these proposed initial national- and state-level reform activities will take at least 3-5 years; a strong commitment by the government of India and participating state governments; participation by appropriate donors; and continued consultation with

key stakeholders. The marine fisheries sub-sector is important both to the national and state economies, as it concerns the livelihoods of more than 3.5 million, mostly poor coastal inhabitants. Appropriate action needs to be taken urgently to improve the performance of the sub-sector and the lives of the participants.

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ANNEX 1. GLOSSARY

Aquaculture	The cultivation of aquatic organisms. Aquaculture implies the cultivation of aquatic biota under controlled conditions. It includes algaculture (the production of kelp/seaweed and other algae); fish farming; shrimp farming, shellfish farming, and the growing of cultured pearls.
Beel	A term for a pond (wetland) with standing water (as opposed to moving water in rivers and canals. Generally found in the Ganga-Brahmaputra flood plains of the eastern Indian states of West Bengal and Assam, and Bangladesh.
Bottom trawling	An industrial fishing method where larger, mechanised vessels drag large, heavy nets across the seafloor.
Community	A group of habitations or hamlets, managing its affairs in accordance with customs and traditions.
Crore	Ten million Indian rupees (about US\$250,000).
Demersal fish	A fish that feeds on or near the bottom of the ocean or a deep lake in the demersal zone. Demersal fish are also known as bottom feeders or groundfish. Examples include some species of catfish, such as the members of the genus <i>Corydoras</i> , cod, haddock, whiting, halibut, perch, snapper, eel, grouper, bream, bass, flounder, plaice, sole, and demersal shark.
District	India is divided into states and states are divided into districts. Many government development programs operate at the district level under the District Collector, who is the top civil servant at the district level.
EEZ	Under the law of the sea, an Exclusive Economic Zone (EEZ) is a sea zone over which a state has special rights for exploration and use of its marine resources. Generally a state's EEZ extends to a distance of 200 nautical miles (370 km) out from its coast.
Economic Rent (Resource Rents)	Economic rent is generally defined as the difference between the income in the current use of the factor and the absolute minimum required to draw a factor into a particular use (from no use at all, or from the next best use). Resource rent is abnormal or supernormal profit which derives from the exploitation of natural resources. There are two main reasons of the existence of resource rent: The scarcity of the natural resource and the possible impact exploitation will have on natural growth of the resource in future. If the scarcity is reflected in a market price as in a perfect market, resource rent may be obtained.



Fisheries Management Unit	The FMU usually can be characterised and constituted by identified fishing vessel categories, which target resources consisting of one or, more probably, of a species assemblage. Given this, the identification of an FMU involves the prior identification of key fisheries, which at the initial disaggregated level may be locally structured according to the resource, the local fishing grounds and related ports from where the fishing vessels operate and where the economics of production originate (e.g. access to local/regional markets, trading, processing, vessel-related activities and costs, etc.).
Gram Panchayat	Village-level elected body.
Gram Sabha	Gathering of all villagers within the jurisdiction of a gram panchayat.
Lakh	One hundred thousand units.
Mariculture	The culture of fish or other aquatic organisms in the marine environment, either for food or profit (specifically aquaculture or fish farming in the sea); in its simplest form, juvenile fish are captured and allowed to grow for several months, with regular feeding, in a simple floating net cage until they reach harvest size. More complex systems can employ a range of technologies to produce young fish (fingerlings) using artificial breeding techniques, with grow-on stages involving formulated feeds and various designs of aquaculture structures (ponds, cages and raceways).
Maximum Economic Yield (MEY)	In fisheries economics, MEY is, theoretically, the largest economic yield that can be taken from a fishery over an indefinite period of time. It represents in basic terms the difference between gross economic earnings and costs relating to fishery activity. MEY occurs at a lower level of fishing effort than MSY, and as a consequence fisheries with high and expanding levels of fishing effort, often under open access conditions, tend to yield low economic returns, and are economically inefficient.
Maximum Sustainable Yield (MSY)	In fisheries ecology, MSY is, theoretically, the largest yield or catch that can be taken from a species' stock over an indefinite period. MSY is extensively used for fisheries management. MSY in most modern fisheries models occurs at around 30% of the unexploited population size. Unfortunately errors in estimating the population dynamics of a species can lead to setting the maximum sustainable yield too high (or too low), leading to stock depletion.
Monitoring, Control, Surveillance (MCS)	Part of the overall composition of a fisheries management system, MCS focuses on the collection of appropriate data, licensing and enforcing systems, and provision of management information systems relative to fisheries management objectives and legal frameworks. MCS is essential to counter illegal, unreported and unregulated (IUU) activities within a fishery. Approaches and tools range from logbook data collection on boats, to inspection and regulation by fishery patrols, and more recently the design and operation of Vessel Monitoring Systems (VMS) using modern electronic and satellite technology.
Panchayat	A local unit of government covering a small number of contiguous villages.
Pelagic fish	Fish that swim near the surface, compared with demersal fish, which live closer to the sea bottom. Pelagic fish are mostly of the oily type such as herring, mackerel, and pilchard, containing up to 20% oil.
Scheduled caste (SC)	Low caste people of Indian origin, also called Dalits, formerly treated untouchables, or Harijans, who traditionally have been at the bottom of the social hierarchy in India. "Scheduled caste" is the official and most socially acceptable term used for these groups of people. "Scheduled" refers to the schedule in the Constitution of India where these castes are listed. The Constitution of India guarantees a government policy that grants these groups certain affirmative action rights through reservation in education, employment and elections to the Parliament, state legislatures and other local bodies.



Scheduled tribe (ST)	Indigenous ethnic groups, similar to the SC, outside of the mainstream of society are often referred to as "scheduled tribes." This refers to the schedule in the Constitution where these tribes are listed. The Constitution of India guarantees a government policy that grants them certain affirmative action rights through reservation in education, employment and elections to the Parliament, state legislatures and other local bodies.
Purse-seining / Seining	In commercial tuna fisheries operated on the high seas, modern fishing vessels use large seine nets (a long curtain of nylon net that hangs from floats at the surface and is weighted below) to encircle schools of surface-living tuna such as skipjack or yellow-fin. The end of the net is often fed out using a supporting launch, and then circled back to the fishing boat. The net is drawn back to form a huge bag, which can be reduced in size and lifted by mechanical crane on larger vessels. While seine netting for tuna is highly effective, it has the disadvantage of also taking other organisms including dolphins which accompany and prey on the tuna. Various tactics are used to scare away or even release the dolphins, but it remains a problem.
Shellfish	Soft bodied aquatic invertebrates having exoskeletons as shells such as mollusks, crustaceans, and echinoderms, used as food. Both saltwater and freshwater invertebrates as mentioned above are considered shellfish. The term finfish is sometimes used to distinguish ordinary (vertebrate) fish / true fish from shellfish.
Trawl	A tapering bag-like fish net towed at the stern of the fishing vessel.





ANNEX 2. THE TRAGEDY OF THE COMMONS AND DISSIPATION OF RENT

A fisher entering an open access fishery for the first time would carry out a very simple cost benefit exercise:

As a result, if the sustainable economic rent is positive, potential fishers will see a net benefit (**Benefit - Cost**) from engaging in fishing. In the open access fishery, this causes effort to increase towards an economic break-even point, where rent is zero.

The tragedy of the commons: For fisheries therefore is that the open access, unregulated fishery will eventually be reduced to a biological state at which it generates zero or possibly even negative rent. All participants will lose everything ("ruin for all"), despite the existence of an option for managing the resource on an economically optimal basis (i.e. by keeping effort at the correct level). If one tries to avoid the tragedy of the commons by limiting only the number of fishers, the result will still be unsuccessful. This is because the existing participants will increase their fishing capacity by upgrading their vessels

(more powerful motors, better navigational equipment, better echo-sounders etc.). The end result will be that the fishery will be forced towards the economic break-even point as before.

Another option open to managers is to limit both the number of fishers and the total catch that may be landed each year. If the limit on the total catch can be effectively enforced, then this will probably prevent the detrimental biological consequences of the tragedy of the commons scenario. However, participants in the fishery will still compete against each other for the largest share of the annual allowable harvest. Individuals will therefore still follow a simple "cost to the group versus benefit to self" calculation in decisions to increase effort. Since everybody will follow the same logic, effort will increase. However, since the total catch is limited, the same amount of fish will be landed at much greater cost. Therefore, although theoretically there is no biological risk to the resource, the economic rents will decline as harvesting costs increase,

Cost: The negative impact (cost) of an additional fisher in the fishery is that effort will increase, and the sustainable economic rent (any surplus between revenues and fixed plus variable costs) must therefore decrease. The loss in sustainable economic rent must however be borne by all fishers, and so this loss is a shared loss. The loss that will be experienced by individual fishers is therefore relatively small.

Benefit: The benefit to new fishers is that each now gets a percentage of the rent, that percentage depending on the total number of fishers. This portion of the rent will always be larger than the portion of lost sustainable economic rent borne by each fisherman.

Source: Ocean and Land Resource Consultants, 2008



until an economic break-even situation is reached. In fisheries managed in this way, the tendency is for the fishing season to become very (sometimes ridiculously) short. The end result is a biologically intact resource (optimistically), but nevertheless an economically valueless fishery as before.

The essential ingredient missing from the last option is to limit the catch that each participant in the fishery may

take by the allocation of individual quotas. This is the situation in a number of countries, for example, South Africa and New Zealand. In theory, this removes the "race to catch" incentive. This is sometimes used to explain why South African fisheries are technologically inexpensive and unsophisticated compared to their counterparts elsewhere. If this is true, it would certainly be desirable not to jeopardise this state of affairs by introducing new competitive forces which lead to long term rent losses.



ANNEX 3. DEVELOPMENT APPROACH TO FISHERIES POLICY

Fisheries management, based on net benefits, begins with the recognition that fish resources are inherently very valuable, and that this value, or wealth, exists in the form of potential resource rents. These rents exist even in the absence of fishery management or policy (and serve to drive the fishery to its overexploited state). And they will influence policy outcomes whether or not they are explicitly recognised in policy.

The new approach does not simply take such value or wealth explicitly into consideration but uses it as the foundation stone of fisheries management systems.

Under this approach, many elements in fishery management systems will remain similar (e.g. stock assessment, MCS, fishery information systems and so on), but their focus and the relationship among different elements will change. Bringing resource rents to centre stage will itself generally be a major change. And change will also be required in institutional arrangements, including the structure of the line Ministry, the nature of management mechanisms and instruments, the nature of research support, the organisation of communication principles and processes, the Administration, Research and the Profession, the design of fish information systems and so on.

The identification of appropriate fishery management units, and the development and implementation of fishery management plans (FMPs) are key requirements.

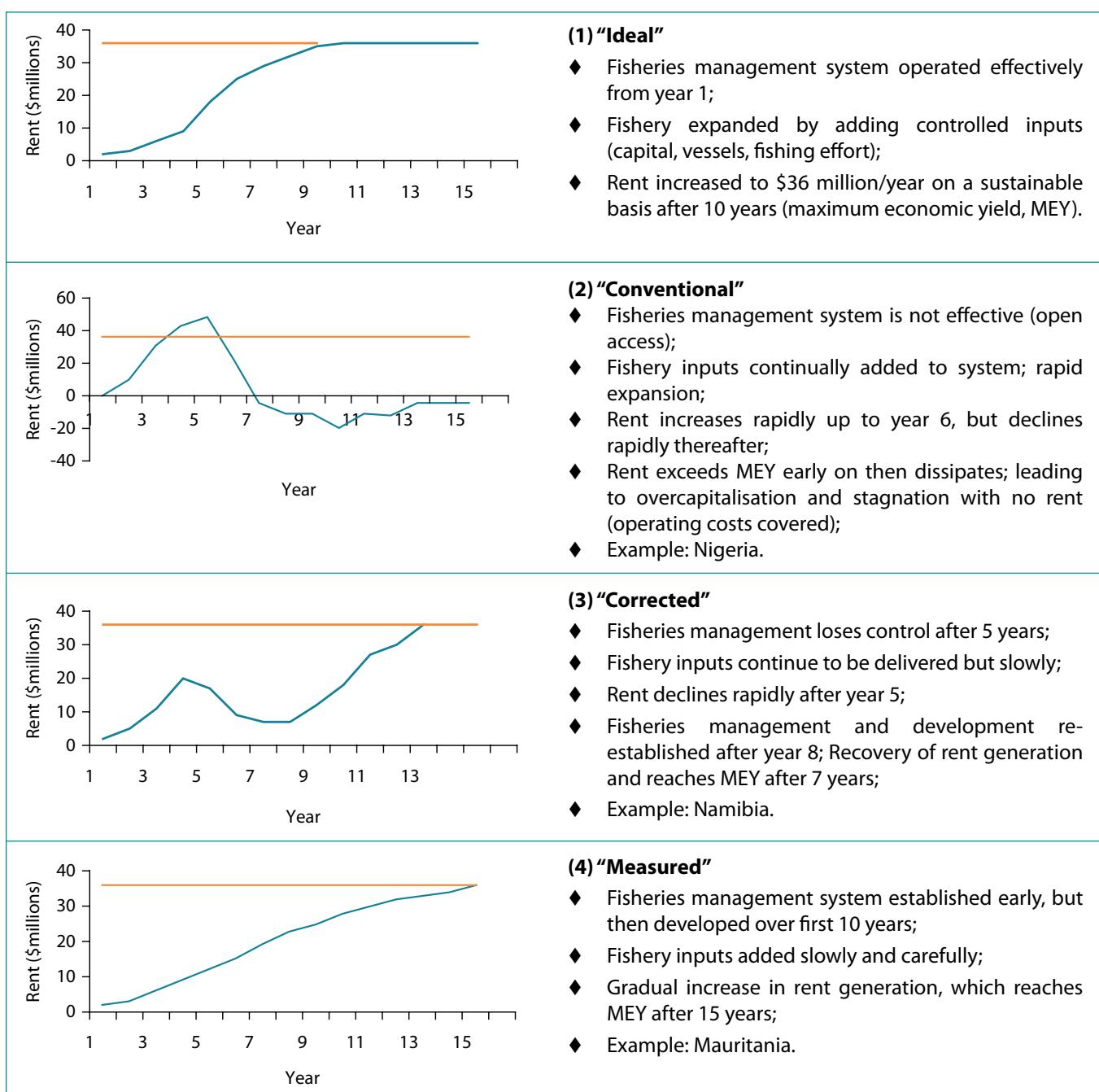
FMPs are a key element. Such plans provide a means to structure the activities of the various parties involved in the fisheries exploitation and management process. The design and implementation of FMPs tends to be a lengthy process, especially in its initial stages. A successful FMP process will have a number of general features, in particular it must be participatory, transparent, holistic, and use the best available information. Successful FMP processes are consultative and participatory, and there is hence a need to assist fishers to organise and function within the planning process. The FMP approach has the great advantage of being able to federate stakeholders around a common object.

FMPs can only be designed if appropriate management units can be identified. These units are essential for successful management. It is not possible to calculate resource rents if FMUs are not defined, because then it is not possible to assign fishing costs in a meaningful way. For successful management, FMUs are an essential element in preventing fishing effort from switching uncontrollably from one target species to another depending, for instance, on fish prices and fish stock availability.

This approach is based on biological advice on the catch possibilities for each FMU. In a management context, such advice needs to be forward-looking and timely. There is a need to develop systems that can deliver such advice. These systems need to take into account other



Box A-1: Alternative fisheries development scenarios and assumed rent generation over time



Source: (DFID, World Bank, FAO 2007).

Note: Charts are derived using a hypothetical fishery model with a potential sustainable rent of \$36 million/year under appropriate management conditions, values are non-discounted. Upper horizontal plot line = maximum economic yield (MEY). Lower curved line = rate of growth of economic rent over time.



dimensions, such as eco-system constraints, as necessary. Although this function is similar to current practice, there are some important differences. First, the rent or wealth-maximising level of effort is less than the production-maximising one, which means that fisheries generally should be operating within the resource constraint. Advice on catch possibilities should therefore be easier to formulate and less contentious. Secondly, fisheries managers will pose questions to their research institutes in a rather different manner than currently (where, de facto, researchers often end up setting the exploitation level rather than advising on possibilities).

An important part of a more holistic approach based on maximising net benefits will be to estimate resource rents under different management arrangements. There will be a need to develop bio-economic modeling methods to estimate resource rents in different FMUs. It should however be noted that, despite their need and usefulness, bio-economic models (in common with other rent estimation techniques) may tend to under-estimate true rents. This is because once rational management is put into place, fishers have an incentive to increase rents and this is reflected in the fact that the value of fishing rights generally increases over time. This incentive may be as important as the rent itself and needs to be kept in mind in the design of management systems. It is certainly a strong argument for Governments not attempting to tax away all resource rent, but rather taking a fiscal stance that represents appropriate sharing between resource users and the Government (as representative of the resource owners).

Countries possessing a comparative advantage in fish harvesting (usually because of the valuable fish resources in their EEZs) often assume that they must also have a similar advantage in fish processing. However, few countries seem to have based their policy on detailed analyses of their true comparative advantage.

A final advantage of an FMP approach is that it will enable the identification of necessary infrastructure

investments. Government is always faced with a vast range of possible infrastructure projects – the problem is to choose between them. A more holistic approach based on maximising net benefits provides some means to do so.

Summary

As indicated above, fisheries development can take several forms with alternative objectives such as conserving fish stocks, economic efficiency, or social stability (DFID, World Bank, FAO 2007). Box A-1 lays out four alternative fisheries development scenarios based on a small, hypothetical fishery. The ideal approach (1) assumes a case where the fisheries management system works effectively from day one and then is gradually expanded to a point where the maximum economic yield is reached. The second case is with weak or no active management (typically what is seen in most countries) under an open access system, characterised initially by high rents as fishing effort increases rapidly and harvests expand, but then declining rents as the system suffers from overcapacity, overfishing, and reduced harvests. The third scenario represents a system with an initial loss of fisheries management that is slowly corrected. The final case (4) is a more measured approach with a focus on maximising net benefits and where new fishing inputs added slowly and carefully. One can see parallels with this case and the “ideal” system in scenario 1.

Based on these hypothetical examples, it is fairly clear that when using economic criteria such as wealth creation (represented by economic rent) as a fundamental basis for fisheries policy and development, it is possible to achieve the ideal situation (case 1) of MEY over a given period of time, either if fisheries development follows a measured approach from the beginning (case 4) or if mid-stream corrections are made to a sub-optimal system (case 3). The only case (2) where optimal rents are not achieved is with conventional management in pursuit of production-based targets.





ANNEX 4. FISHERIES MANAGEMENT: BEST PRACTICE CONSIDERATIONS FROM OTHER COUNTRIES

Australian Northern Prawn Fishery

Management of fisheries resources must sit within an effective national policy framework. This consists of the declared objectives of the various government departments (fisheries, trade, environment, etc.) and the overall macro-economic goals of national and state governments. Clear specification of the roles and responsibilities of various levels of the government and the private sector is required to ensure effective decision-making in fisheries. The characteristics of the framework (strength, flexibility and appropriateness) will impact on the achievement of management objectives. In Australia, the Northern Prawn Fishery (NPF) is a good example of how an effective policy framework was able to set the boundaries for the fisheries management system, and how this was supported by an appropriate legal framework. The NPF is a limited entry, input-controlled trawl fishery, which has been successfully managed (to a greater degree) since 1995. Net economic returns are high and the capitalised value of licenses is over US\$ 350 million. Since 1995, the Australian Fisheries Management Authority (AFMA) has managed the NPF under a statutory authority framework, at arms length from the political process. AFMA is required to make management decisions based on a clear set of legislative objectives: ecological sustainable development, the precautionary principle, and economic efficiency, guided by a 'road-map' with agreed strategies and performance targets. Since 1995,

the existing fishing rights in the NPF became statutory fishing rights, providing operators with long-term access rights to the fishery, and an incentive to collaborate with government and other stakeholders in the management process.

Mauritania

Effective institutional arrangements are crucial to the performance of fisheries management systems and the contribution of fisheries to the economy. The range of institutions which can be involved in the sector can be large, relating to, for example, management organisations, legislative frameworks, policy processes, research and information collection and so forth. To ensure that the tasks are performed adequately, an appropriate level of institutional capacity is also needed, and this is a major factor affecting success in developing countries in particular. In Mauritania, an African coastal state with large fisheries resources, the development and implementation of an appropriate institutional framework was able to ensure that a significant proportion of the central government revenue came from the fisheries sector through the collection of resource rent. A state monopsony (a market situation in which there is only one buyer) was established to channel fish prior to export. Differential tax rates were used as a means to extract resource rents to the government to finance other public policy goals and implement fisheries policy. For example, taxes were higher on products that were frozen at sea as



to encourage development of processing in Mauritania, and were higher on cephalopods (squid, octopus) than other fish to discourage excessive targeting of the former. The system was successful in a number of ways; 20 percent of total government revenue was collected from marine fisheries in the mid-1980s (although subsequently a less successful licensing system has replaced it and government has become dependent on fishing agreements. The development of the artisanal fishery was favored mainly because it provided a ready market for artisanal produce. The monopsony worked with artisanal fishers to ensure that their product quality met the export market standards and also provided countervailing power to the large buyers.

Shetland

Fisheries managers cannot act in isolation from other stakeholders and fisheries cannot be managed without reference to other inter-acting sectors and to the wider economic and ecosystem context. In the case of two fisheries in Shetland, the management regimes were changed to take account of a range of external factors, and to draw upon the collaborative efforts of different stakeholders to find an appropriate response to the needs identified. In the first case, a small industrial fishery for sand eels was closed in 1991 after a rapid decline in catches. Commercial fishers came into conflict with environmental groups over the apparent link between seabird mortality and fish catches. After extensive talks between the commercial fishers and environmental groups, the fishery was reopened in 1995 with reduced quotas, vessel limits, and closed seasons to protect the birds. Management of the fishery is now the responsibility of the local fishing industry. In the second case, the management of demersal and pelagic fisheries²⁹ has been altered to allow the Shetlands to manage the haddock quota on behalf of the island community. This proved to be a successful experiment, and as a result there was a rapid move towards adopting sectoral quotas throughout the fishing industry at large in the UK.

²⁹ Demersal fish live on or near the bottom of the sea and include species such as cod, haddock, whiting and halibut. Pelagic fish live near the surface and include species such as herring, mackerel, sardines and pilchards.

Canada and USA

A key challenge for fishery management is to address the perverse incentives which occur in unmanaged (or weakly managed) fisheries, and which drive overexploitation. Effective fisheries management systems will remove these perverse incentives while at the same time encourage rational exploitation. One important approach is to develop strong use rights systems. There are many types of use rights, and care must be taken to develop a system suitable to a specific fishery and its country context. If successful, then a use rights system will give fishers a direct stake in the future of the resource, which can help promote effective fisheries development, exploitation patterns, and compliance (for removing the usual 'race for fish' as one example). For use rights to contribute to success they have to be both equitable in their allocation and be seen to be a fair means of controlling effort by the wider group of stakeholders to simply enter the marine sub-sector. In the case of the Pacific Halibut Fishery, spanning both Canadian and American waters, the introduction of rights-based fishing in 1995 has had numerous positive effects. What once had been an annual fishery with a reasonably long season had been reduced to a classic 'derby' fishery with crews racing non-stop for 48 hours in vessels of ever-increasing size and motors to catch as much fish as fast as possible from the opening of the season, with little regard for crew safety or product quality. Recognising the problems with the "race to fish", Canadian fishermen asked for Individual Fishing Quotas (IFQs) from their government, which was successful in reducing the annual race for fish. In 1995, IFQs were introduced in Alaska to replicate the Canadian success. So what were the positive effects? Stock recovery has taken place, landings have increased, prices on markets have improved and stabilised, and the fishing season has been lengthened with improved sea-safety. Discards have also been reduced along with ghost fishing, since fishers can now fish more selectively and efficiently.

Namibia

The fisheries do not operate in isolation, but are located within diverse and complex systems, which make up the



natural, social and economic environments. Depending on the country and the point in time, different combinations of factors (components of the environments) will influence and impact on the fisheries. There is a need to identify and understand these factors by adopting a multi-disciplinary approach to fisheries analysis and policy formulation. While complexity is often cited as a cause of failure for fisheries management systems, it can also be viewed as providing opportunities for developing new approaches and systems. To successfully manage such complexity requires flexibility, and the ability to learn and adapt. The case of Namibia is interesting in this respect. At Independence in 1990, the country went through a period of turmoil, with complex political and economic changes. In the inshore fisheries, operators from South Africa had a large presence. Offshore a large fleet of foreign fishing vessels operated under free and open access conditions. Despite the political complexities (both regionally and internationally), Namibia was able to define the boundaries of its EEZ, establish a quota system, and create a sense of ownership of its fisheries. Of particular note is the fact that the new state asserted jurisdiction over the rich off-

shore fishing grounds. Today the fisheries management systems so established have been successful in generating significant economic rents for Namibia and continue to represent a source of economic growth.

New Zealand

New Zealand is one of only a small group of countries where fisheries management has been transformed from an open access regime, heading down a familiar path of overcapacity, overfishing, increasing conflicts, etc, to one centered on maximising net benefits. While New Zealand and India represent very different contexts, the value in reviewing the country as a case study is to see how change processes were established and implemented and the resulting improvement in sub-sector performance.

Performance of the New Zealand Fishery Sector

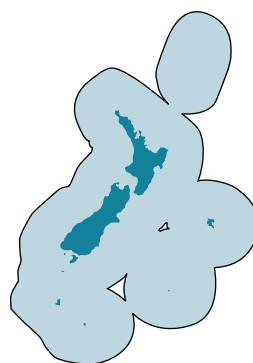
The performance of the fishery sector in New Zealand, and underlying policy, is guided by a clear goal, which is to “maximise the value New Zealanders obtain through

Box A-2. Comparative areas of fishery EEZs

New Zealand :	4.3 million km ²
India :	2.02 million km ²



3,781,000 sq km



4,363,000 sq km



7,956,000 sq km

Source: Arbuckle, M. (2008) Towards effective fisheries management the example of New Zealand, China, UK sustainable Development in Fisheries Seminar Shenzhen April 2008. World Bank.

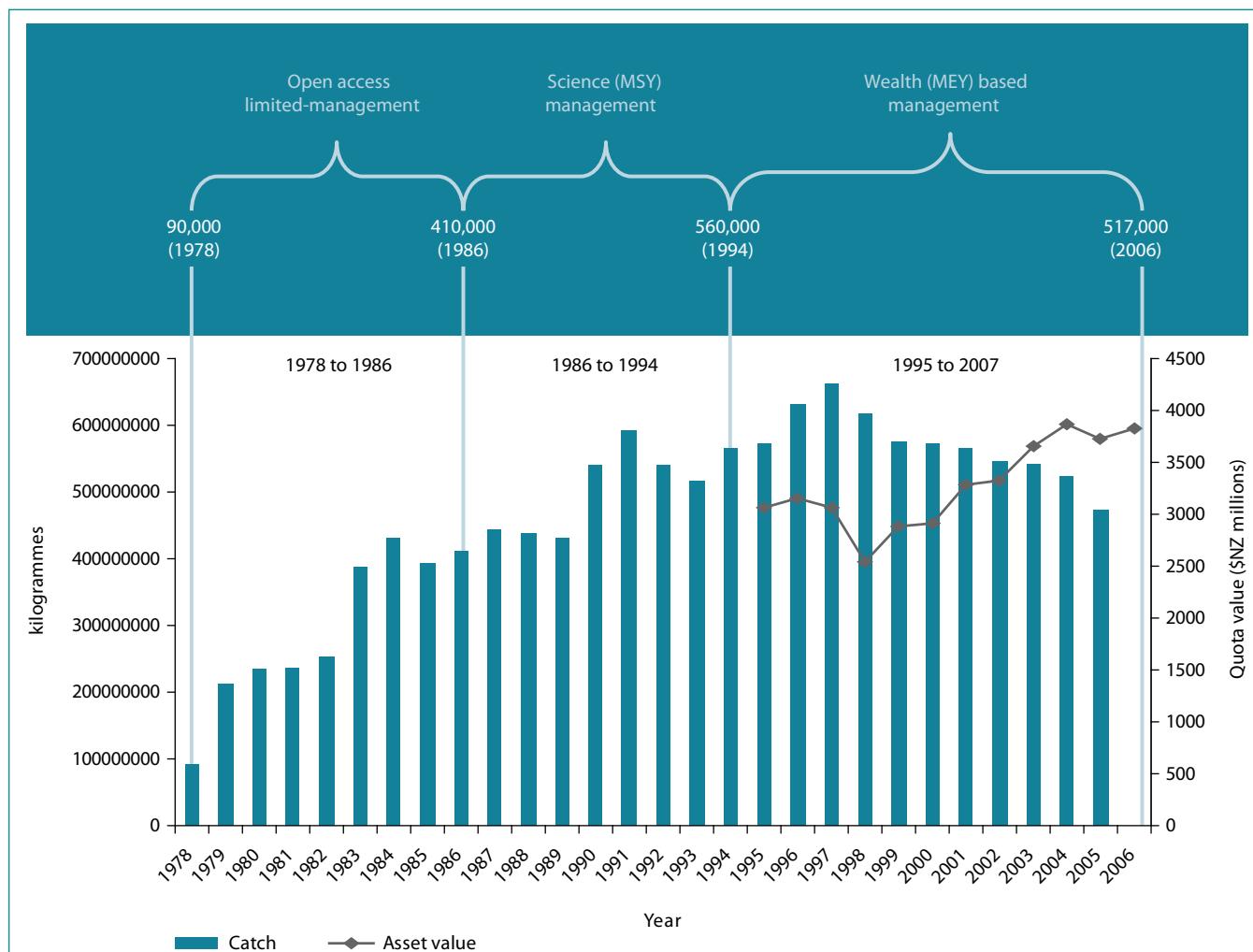


the sustainable use of fisheries resources and the protection of the aquatic environment."

The fishery in New Zealand covers an EEZ zone of 4.3 million km² (Box A-2). This is about twice the size of India's EEZ but is far less productive in output. The current New Zealand total wild fish catch is approximately 482,000 tonnes. This is based on 130 species taken commercially of which 92 species (592 stocks) are under quota management. Fisheries management is viewed as sustainable; stock status information is now available on 60-70% of all stocks (by weight and value). Approximately

82% of these stocks are at or near the target level, and clear rebuilding strategies are in place for the remainder. With respect to utilization, the total export value in 2006 (FOB) was NZ\$1 billion (US\$ 780 million). The industry receives no direct subsidies from government. The total asset value of the fish stocks in 2006 was an estimated NZ\$ 3.8 billion (US\$ 3 billion). New Zealand's fisheries are sustainable and are being managed in a way that creates wealth. These achievements have not come overnight; in fact the current sector structure and performance reflects almost 30 years of evolution (Box A-3).

Box A-3. Evolution of fisheries management and catch levels, New Zealand.



Source: Arbuckle, M. (2008) Towards effective fisheries management the example of New Zealand, China, UK sustainable Development in Fisheries Seminar Shengen April 2008. World Bank.



Role of Government and Industry

The role of the New Zealand government in the fisheries sector is reflected in the Fisheries Act. The purpose of the Act is to provide for the utilization of fisheries resources while ensuring their sustainability. Utilisation is to enable people to provide for their economic, social and cultural well-being. The law and its implementation in and of itself does not meet the fisheries goal but provides an enabling framework to achieve the goal. It is recognised that the fisheries goal can only be realised with the assistance of the fishing industry and other stakeholders.

Resource rent is at the center of management and incentives are aligned to the goal. The right to catch fish is allocated as a proportional interest in the amount of fish that can be sustainably taken each year so the fishers individually face the costs of good or poor fishing practices and have an incentive not to overfish. The right to catch is allocated in perpetuity so fishers have an incentive to invest over the long term (i.e. they can be sure of future access) and an incentive to conserve stocks to ensure there is fish to take to maintain their business investments into the future.

The fishers pay the full costs of management and expect to get a good service for their money. Their investment and fishing activities are not distorted by subsidies. The right to fish can be traded, subdivided and its title is guaranteed by the Government (i.e. it can be registered and mortgaged) – resource rent is at the centre of management – it has a realisable capital value and can be used for investment in fishing and processing or other more profitable economic activities. A visual summary of the old model and the preferred model for roles and responsibilities for marine fishing is shown in Box A-4.

Evolving Institutional Capacity

Given that the industry has a major role in sector management and development, what is a typical institutional structure to implement the responsibilities? There are now more than 20 fishers and/or industry-run fisheries management companies (FMC) operating for deepwater, mid-depth, inshore

finfish and shellfish. They are supported by a parent body, called the Seafood Industry Council (SeaFIC) which is a company wholly owned by the industry. Shareholdings are held by FMCs. SeaFIC has an 8 member Board and oversees delivery of services to FMCs, for example maintaining catch registries, providing research advice to fishers and the FMCs, and collecting and distributing funds for FMC activities

FMC Example – the Hoki Fishery Management Company

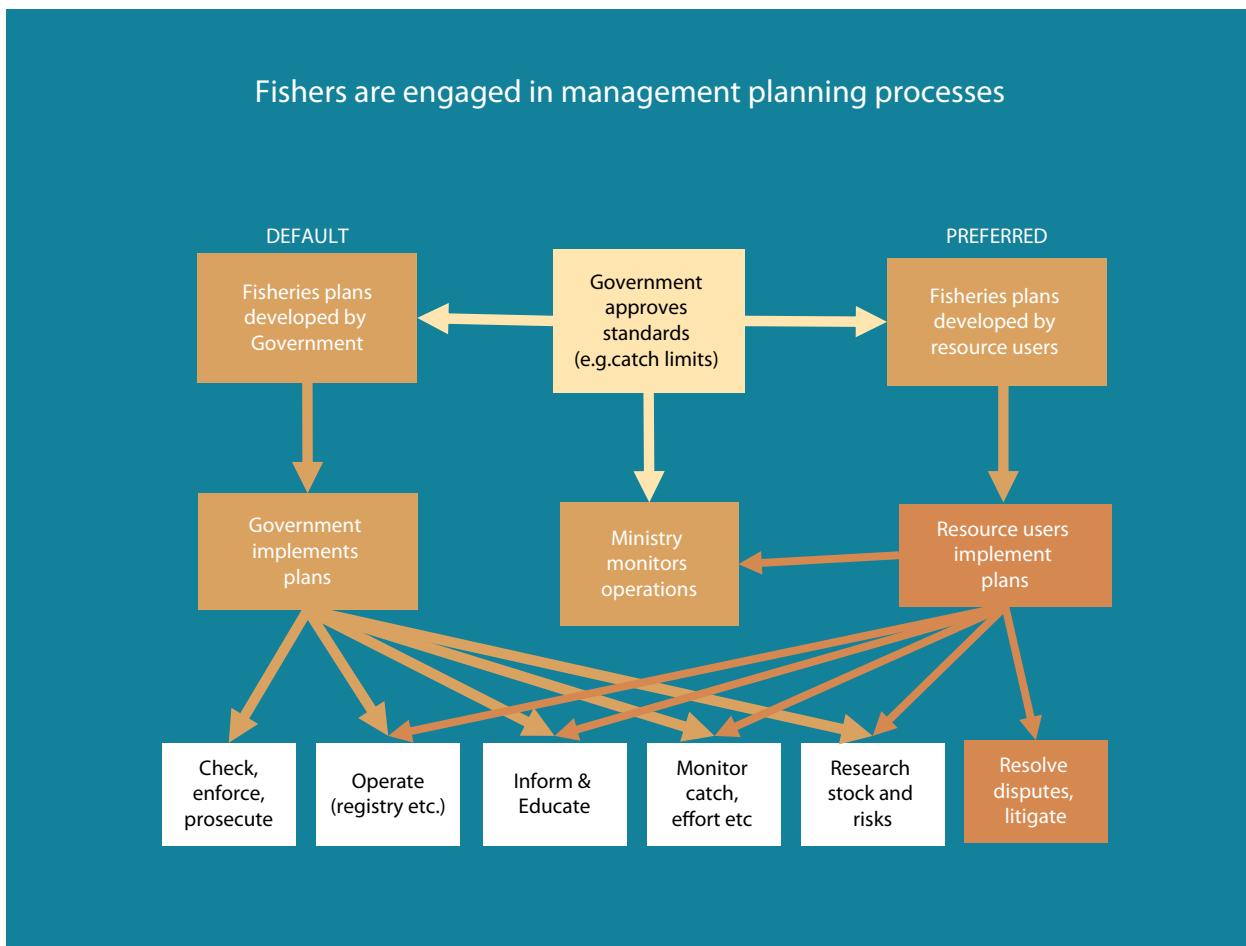
Hoki is a mid-depth fish species (generally living around 200 meters). It is caught by midwater or bottom trawl methods. The annual sustainable catch levels vary between 150-250,000 tonnes per year. The fishery is managed by allocation of shares in the Total Allowable Catch to fishers. The value of fishing rights is currently US\$ 600 million. In terms of the FMC structure, shareholdings are proportional to the quota share ownership. Quotas encompass Hoki, Hake, Ling and Southern Blue Whiting (all major mid-depth species). Voting on the management of particular fish stocks by the fishing industry is proportional to the shares held within particular stocks. Operation of the FMC is financed through a levy, which is set by majority vote of shareholders at the Annual General Meeting. The FMC has dedicated staff and is supported by the Seafood Industry Council experts. Through industry management, the Hoki fishery achieved the Marine Stewardship Council certification in the year 2000, after addressing 10 corrective actions.

There is an active management plan being followed and a code of practice underpinned by civil contract with agreed damages applied when a breach occurs. The main points of the Hoki Code of Practice are:

- a) Objective is to improve yield (maximising productivity of optimal sized fish);
- b) Binds all fishers who are authorised to take Hoki.
- c) Provides for monitoring of catch size;
- d) Provides for vessels to spread fishing effort among different biological stocks;



Box A-4: Preferred roles and responsibilities for government and industry in marine fishing



- e) May limit catch to below the Government set catch limits;
- f) Sets areas closed to fishing (i.e. to protect juvenile areas) and rules about when to cease fishing (e.g. when more than 10% small Hoki are found in tows);
- g) Provides for use of mitigation devices to minimise sea-bird mortalities caused when the birds hit trawl warp.



ANNEX 5. LIVELIHOODS OF COASTAL FISHERS

Andhra Pradesh

Demographics: The 975 kilometre-long coastline of Andhra Pradesh is home to 498 marine fishing villages and 271 marine fish landing centers and four fishing harbors (CMFRI, 2005). Just over half a million marine fisher-folk in 130,000 families inhabit these areas, with an average family size of four persons. Nearly all of them (99 percent) are Hindus, though low-caste, belonging to the other backward classes (ie other than SC & ST people) Only around 27 percent of the fishing populations are active fishers, with another 30 percent being engaged in fishing-associated activities (*ibid.*). There is a strong gender divide in fishing-related occupations with fish harvesting, boat repairs and maintenance being done by men and women being predominantly engaged in fish marketing (79 percent of those engaged in marketing are women) and in curing operations (87 percent). About 5 percent of fisher-folk families have only women as the sole bread-winner from fishing-allied occupations (*ibid.*).

Education status: Two-thirds of fisher-folk in rural coastal villages are illiterate, and most of the literate (67 percent) have only primary-schooling, with 5 percent having had secondary school education, reflecting the fact that 83 percent of the 627 educational institutions situated in marine fishing villages are primary level schools (CMFRI, 2007). Discussions in the field showed that a majority of students drop out after class 10 as they

cannot afford to pay fees (education is free till class 10). The main reasons cited for not going to school at all are poor financial status, social stigma against the girl child receiving education, and the lack of parental awareness about the importance of education. Field interviews also revealed that the main reason for boys not continuing education was to join the family in the fishing operation; for the girls it was to help in household work. Further, there is a general air of discouragement because parents see the educated youth in the fishing villages seldom getting white collar jobs in the government. At the same time, educated youth are often unwilling to go the sea for fishing, which is a physically demanding and dangerous occupation.

Status of water facilities: Most households (93 percent of the 73 surveyed) use nearby sources like hand pumps, tap stands or wells for domestic water supply. Only one percent of households had piped water. Discussions with the community revealed that poor water quality was a major issue. Overall, the general water and sanitation situation in these households is very poor and hygiene practices require immediate attention from local NGOs and the government.

Age composition and life expectancy: Among the fishing households surveyed it was found that 40 percent of the total respondents were in the age group of 18 to 35 years. Discussions revealed that this fishing community expects males to live up to 55 years and women a little longer.



Occupational status: In Andhra Pradesh 36 percent of the fisher-folk engaged in fishing-related occupations are reported to be laborers (CMFRI, 2005). Of the 146 respondents surveyed for this study, 34 percent stated that they are involved full time in catching fish as boat owners and 21 percent are crew members (Table A-1). A small proportion (only 9 percent) of the total respondents is involved in other trades such as grocery shops, pujaris (temple priests), phone kiosks, etc. Around 17 percent of the total respondents (mainly women) are involved in agriculture. Many fishermen

have been trained as boat drivers but not many jobs are available for them.

Involvement in other fishing activities: Although men and women share the labor in fishing, there is a clear demarcation in their activities. Only the men go to sea for fishing and women do not play any role in fish harvesting; instead, women are involved in fish trading and salting. After the catch comes in each day and the marketable fish is sold, women collect and clean the small fish for salting, which is done

Table A-1. Occupational profile in villages surveyed, Andhra Pradesh

Occupation	Number in full time employment	%	Number in part-time employment	%	Total
Fishing	50	34	0	0	50
Crew member	30	21	1	8	31
Trading	25	17	2	17	27
Boat driver	1	1	0	0	1
Ice-making	2	1	0	0	2
Agricultural labor	25	17	2	17	27
Others (including grocery shop, pujari)	13	9	7	58	20
Total	146		12		158

Source: Study background papers.

Table A-2. Household income status, Andhra Pradesh

Occupation	Number of Respondents	Range of annual income			
		up to Rs. 25,000	%	Rs. 25,000 – 75,000	%
Boat-owning fishermen	50	48	96	2	4
Crew member	31	27	87	3	10
Trading	27	26	96	1	4
Trawler driver	1	1	100	0	0
Ice making	2	0	0	2	100
Agriculture labor	27	27	100	0	0
Others*	20	20	100	0	0
Total	158	150	95	8	5

Source: Study background papers.

*Including grocery shop owner, temple priest, net repairer, etc.



overnight after which they dry it the next day. Out of the 73 households surveyed only 4 households were involved in ancillary activities. An estimated 33 percent of the households surveyed reported that they are involved in local fresh-fish trade and 23 percent in processed fish trade. Among this community only 1 percent was reported to be involved in distant fresh fish trade. Under the processing activities, 25 percent of the households are involved in dry-fish processing activity.

Sources of household income: The main source of household income in the villages surveyed is from fishing and fishing-related business. Most respondents (95 percent) stated that their annual household income was less than Rs. 25,000 per annum or Rs. 2,000 per month (Table A-2). Only a small minority (5 percent) of households reported annual incomes higher than Rs. 25,000.

Karnataka

Demographics: The 300-kilometre coastline of Karnataka stretches from Karwar in the north to Mangalore in the south, covering the three coastal districts of Uttar Kannada, Udupi and Dakshina Kannada, bordered by the high Western Ghats in the east and the Arabian Sea to the west. According to the National Fisheries Census of 2005 ,this coastal belt is home to 156 marine fishing villages and nearly one million marine fisher-folk in around 170,914 families, most of whom are in Uttara Kannada (CMFRI, 2005). The National Census data shows that the average family size is 5.66, the average population per village is 1,096 with 968 females for 1000 males. It also reveals that a majority (90 percent) of the fisher-folk are Hindus, followed by Muslims (9 percent) and Christians (1 percent). Also, about 6.5 percent of the fisher-folk families belonged to either scheduled caste or scheduled tribe. There is a strong gender divide in fishing-related occupations with fish harvesting and boat repairs and maintenance being done by men, and women being predominant in fish marketing.

Education status: Approximately 31 percent of the fishermen possessed primary level of education, 29 percent had secondary level and 10 percent possessed above secondary level of education. About one third of the fishermen population had no formal education (CMFRI, 2005). A large majority of the marine fisher-folk in Udupi (80 percent), Dakshin Kannada (69 percent) and Uttar Kannada (62 percent), had some level of formal education (*ibid.*). The household survey among fishermen showed that nearly 80 percent had some degree of formal education (at least till primary school), while 26 percent had primary education, 26 percent had secondary education (i.e., higher primary) and 28 percent had more than secondary level of education (i.e., high school). Only 19 percent are illiterate. A majority of the illiterate are the fresh and dry fish vendors and crew members, although there were a few traders and boat owners also. About 15 respondents, largely purse-seiner and trawler owners and traders (9 out of 15), had crossed pre-degree and some had gone on to complete their graduation and ITI diploma, indicating more awareness and capacity among this class than the traditional boat owners or crew members. This is even more evident in the case of the 485 household members of the fishermen where 83 percent are literate, 17 percent had studied beyond high school, and mostly the children of boat owners and traders had professional degrees in engineering, medicine and management.

Age composition and life expectancy: Approximately 42 percent of the fishermen surveyed were adults between 18 and 35 years of age, followed by adults between 35 and 60 years (27 percent) and those below 18 years (26 percent). Discussions in the field revealed that this fishing community expects males to live up to 55 years and women a little longer.

Occupational status: In Karnataka the majority (71 percent) of the fisher-folk own traditional boats and 19 percent have mechanised boats (CMFRI, 2005). Of the 100 respondents surveyed for this study, 50 (or 50 percent) were involved in full time fishing activity with their own boats and 18 percent were working as crew members, while a small proportion (6 percent) were traders (Table A-3). Around 14 percent of the total



Table A-3. Occupational profile of respondents in villages surveyed, Karnataka

Occupation	Number fully employed	%
Trawler owners	15	15
Purse-seine boat owners	14	14
Traditional boat owners	18	18
Crew members	18	18
Traders	6	6
Dry fish vendors	14	14
Fresh fish vendors	9	9
Ancillary workers	6	6
Total	100	100

Source: Study background papers.

Table A-4. Annual household income by occupation, Karnataka

Occupation	Number of Respondents	Range of annual income (Rs.)				
		up to 35,000	35,000 - 75,000	75,000 - 100,000	100,000 - 150,000	> 150,000
Trawler owners	15	-	2	5	3	5
Purse-seiners	14	-	-	5	3	6
Traditional boat owners	18	5	8	4	1	-
Crew member	18	2	11	5	-	-
Traders	6	-	2	2	2	-
Dry fish vendors	14	4	8	1	1	-
Fresh fish vendors	9	-	8	-	1	-
Ancillary workers	6	2	4	-	-	-
Total	100	13	43	22	11	11

Source: Study background papers.

respondents (mainly women) are involved in dry fish vending followed by 9 percent fresh fish vendors. Only 6 percent are involved as ancillary workers, largely because of low and uncertain wages.

Involvement in other fishing activities: Only men go to sea for fishing and women focus on fish vending (both fresh and dry) and salting. After the catch comes in and the marketable fish is sold, women collect and clean the small fish for salting, which is done overnight then dried either on coir mats or on plastic sheets in the beach for two days. Out of 100 households surveyed, 19 percent reported that they were involved in the local dry fish trade and 9 percent in fresh fish trade.

Amount and sources of household income: The main source of household income in the villages surveyed is fishing and fishing related activities. More than half of the respondents (56 percent) stated that their annual household income was less than Rs. 75,000 despite having two to three active members in fishing (Table A-4).

Further, traders, purse-seine boat owners and trawler owners report higher incomes of up to Rs. 150,000 per year, while the bulk of dry fish vendors, fresh fish vendors, ancillary workers, crew members and traditional boat owners report earning less than Rs. 35,000 per year (or Rs. 3,000 per month or Rs. 100 per day).



A more detailed breakup of income shows that 50 percent of purse-seine boat owners, nearly 50 percent of trawler owners surveyed) and 66 percent of traders earn more than Rs. 70,000 per year, while 50 percent of ancillary workers, 55 percent of crew members, 93 percent of dry fish vendors, 66 percent of fresh fish vendors and 55 percent of traditional boat owners (10 out of 18) earn less than Rs. 30,000 per year or Rs. 2,500 per month – which is around Rs. 80 per day. It needs to be borne in mind that these are averages of income that are uncertain and fluctuating. Also there is no income during the lean season for most of them, which drives them into consumption-driven debt. This makes marine fishers, especially small scale participants, an especially vulnerable section.

Orissa

Demographics: The 480 kilometre-long coastline of Orissa is home to 641 marine fishing villages that are located in Balasore, Jagatsinghpur, Kendrapara, Bhadrak, Puri and Ganjam districts respectively (CMFRI, 2005). Just below half a million (450,391) marine fisher-folk in around 86,352 households inhabit these areas, with an average family size of a little more than 5. Nearly all (98 percent) are Hindus, though more than half (55 percent) belong to either scheduled castes or scheduled tribes. Only around 27 percent of this population (or 120,000) are the active fishermen, and, of this number, an estimated 62 percent are full-time fishermen, 28 percent are part-time fishers and another 10 percent are occasional (*ibid.*). Around 34 percent of fisher-folks earned their livelihood from allied activities like marketing, repairing/making of nets, curing, peeling, labor and other fishery related activities. Most of the males were engaged in occupations such as repairing and making of nets (33 percent), labor (27 percent), and marketing (21 percent) while more women were occupied in curing (33 percent), marketing (20 percent), labor (19 percent) and repairing and making of nets (13 percent).

Education: In Orissa about 51 percent of the fishermen population has no formal education. Only 32 percent

of the fishermen possessed primary level of education, 13 percent secondary level and 4 percent possessed above secondary level of education (CMFRI 2005). Out of the total 82 households surveyed a total of 161 individuals responded to the question about their educational status. Among the surveyed households, it was found that over 100 children (63 percent) study in classes I to V. Only one student is studying in class XII which is almost negligible among the total respondents. None of the household surveyed had any member attending a college for a degree.

Drinking water facilities: Most households (96 percent) use nearby sources outside their houses, like hand pumps, tap stands or wells for domestic water supply. Only two percent of homes surveyed had piped water. As in the other states, poor water quality was a major issue.

Age composition and life expectancy: An estimated 68 percent of the heads of fishing households surveyed were below 35 years old, with only 2 percent being above 60 years old.

Sources of household income: The main source of income among the fishing communities surveyed was from fishing and fishing-related business. But the level of annual income reported was very low. As much as 95 percent of the respondents reported that their annual household income was below Rs. 25,000 per annum (Table A-5). Only men go to sea for fishing and only women are the auctioneers at the landing centers.

Involvement in other fishing activities: An estimated 57 percent of households surveyed were involved in ancillary activities, 27 percent in trading and 24 percent in processing activities. The majority of those in ancillary activities were in net-making and repairing 15 percent were involved in local fresh fish trade and none of the respondents was involved in processed fish trade. Among this community 13 percent were reported to be involved in distant fresh-fish trade. Under the processing activities, 14 percent of the households were involved in dry fish processing activity.



Table A-5: Annual household income status

Occupation	Respondents	Household income range per annum (%)		
		up to Rs. 25,000	Rs. 25,000– 75,000	Rs. 75,000-100,000
Fishing	62	82	0	18
Crew member	9	67	33	0
Trading	8	88	12	0
Kerosene trader	1	100	0	0
Boat mechanic	3	0	100	0
Others	6	100	0	0
Total	89	80	5	15

Source: Study background papers.

Gujarat

Demographics: According to the Marine Fisheries Census 2005 there are 263 marine villages in Gujarat housing 59,889 fisher-folk families. Just over 330,000 marine fisher-folk inhabit these areas, with an average family size of five. Nearly 78 percent are Hindus, and only 6.5 percent of the fishing families belong to either scheduled caste or scheduled tribe. Only around 26 percent of this population is active fishermen, with another 23 percent being engaged in fishing-associated activities (*ibid.*).

Education status: Largely the youth are educated up to VIIth or maximum up to Xth Standard. Some of them from the richer fishing communities are sending their children to colleges for higher studies. In Jaffrabad (a large and wealthy fishing community), crew members can earn Rs. 7,000 per month at the age of 17 or 18 years on larger mechanised vessels. Parents prefer to educate the youth only up to the level Xth standard and then encourage them to become Khalasis (dock laborers or crew). Some students are pursuing studies in the Fisheries College in Veraval however, and want to pursue an MBA to start a new processing plant in Jaffrabad. On the other side of the coin, discussions with non-motorised boat owners in Subhash Nagar, Porbandar, revealed there was only one government school up to standard IV. Although the school has

received permission to start standards V to VII, due to lack of teachers they are not able to begin. Out of 808 respondents, 272 claimed to have attended schools in their life. Among the 272, the majority of children (147) were attending classes from VI to X. More than half the respondents (66 percent) were illiterate.

Status of water facilities: A large number of households (34 percent) use piped water for domestic water supply. Another 30 percent buy water at different rates from various sources. Only one household reported about obtaining water from the panchayat Swajaldhara scheme.

Age composition and life expectancy: Among the fishing households surveyed it was found that 34 percent of the total respondents were in the age group of 18 to 35 years. Of those interviewed 33 percent fell in the category of 6 years to 18 years of age.

Occupational status: In Gujarat, 26 percent of the fisher-folk are engaged in active fishing and of these people, 83 percent are involved in full-time fishing (CMFRI, 2005). Of the 108 respondents surveyed, 67 percent stated they were involved full-time in fish-catching as boat owners and 9 percent were working as crew members (Table A-6). A small proportion (only 6 percent) of the total respondents was involved in other trades such as grocery shops, pujaris (temple priests), STD booths etc.



Table A-6. Occupational profile in villages surveyed, Gujarat

Occupation	Number in full time employment	%
Fishing	72	67
Crew member	10	9
Trading	16	15
Boat mechanic	3	3
Kerosene trader	1	1
Others	6	6
Total	108	100

Sources of household income: The main source of income among the fishing community is from fishing and fishing-related business. But the level of annual income reported in this fishing community, is very low, as much as 33 percent (36 out of 108) of the respondents reported that their annual household income was below Rs. 25,000 per annum (Table A-7).

Involvement in other fishing activities: As in the other states, only men go to sea for fishing and women are involved in fish trading and salting. Out of the 101

households surveyed a total of 28 households were involved in ancillary activities. An estimated 23 percent of the households surveyed reported that they were involved in local fresh fish trade and a majority of the respondent population (40 percent) was involved in distant fresh fish trade. One percent of the population was involved in the processed and export fish trade. Among this community 10 percent is reported to be involved in fresh fish cutting when it comes to processing activities. Dried fish and fish meal activity is undertaken by 3 percent of the respondents.

Table A-7. Household income status, Gujarat

Occupation	Number of Respondents	Range of annual income					
		up to Rs. 25,000	%	Rs. 25,000 – 75,000	%	Rs. 75,000 – 100,000	%
Boat-owning fishermen	72	15	21	34	47	12	17
Crew member	10	7	70	3	30		
Trading	16	7	44	1	7		
Kerosene vendor	1	1	100	0			
Boat mechanic	3	0		3	100		
Others*	6	6	100	0			
Total	108	36	33	47	43	12	11

Source: Study background papers.

*Including grocery shop owner, temple priest, net repairer, etc.





ANNEX 6. INTERNATIONAL OBLIGATIONS

Article 253 of the Indian Constitution expressly mandates that the Parliament has the power to make any law for the whole or any part of the territory of India for implementing any treaty, agreement or convention with any other country or countries, or any decision made at any international conference, association or other body. Thus, it is not only a moral duty but a clear provision in the Indian Constitution to formulate legislation for giving effect to international agreements.

India has committed to a range of international fisheries obligations by becoming party to treaties or agreements, and membership in regional fishery bodies (RFBs). Prominent among these are the 1982 United Nations Convention on the Law of the Sea and the 1995 UN Fish Stocks Agreement which relates to fishing for straddling and highly migratory fish stocks in areas beyond national jurisdiction³⁰, the Indian Ocean Tuna Commission (IOTC) and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). India is obliged by international law to implement "hard law", or binding instruments, including international conservation and management measures adopted by the regional fisheries management organisations (RFMOs) to which it is party.

India has a moral duty to implement "soft law" instruments such as resolutions or declarations. For example, the 2001 FAO International Plan of Action on IUU fishing recommended, *inter alia*, that IUU fishing be clearly addressed by the development of a National Plan of Action and strengthening an MCS System on an incremental basis including a VMS, an observer program and other cost-effective means such as reporting, information systems and port control measures. Robust legislation would need to underpin these measures, which are not specifically identified in either the 2004 Marine Fishing Policy component on Legislative Support or in any current legislation.

A major problem is that much of the current legislation (both central and state), and to some degree the 2004 Marine Fishing Policy, pre-dates the entry into force of many of these instruments. For example, India ratified the 1982 UN Convention in 1995 and the UN Fish Stocks Agreement in 2003. Both contain general principles that form a basis for fisheries management and obligations for India as a flag State, coastal State and port State. Many countries have now implemented these in their national legislation but India has not yet done so.

As an example, the UN Fish Stocks Agreement requires parties to issue authorisations to all vessels fishing beyond areas of national jurisdiction. In contrast, the 2004 Marine Fishing Policy aims to provide "special incentives for wholly Indian-owned vessels for venturing

³⁰ "Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (New York 1995)".



into international waters and for concluding fishing arrangements with other nations under license etc". There is currently no requirement for Indian vessels to be authorised to fish in areas beyond national jurisdiction. Another example is India's inability to fulfill its obligations as a member of CCAMLR and the IOTC because there is no legal authority to do so. Legislation is required to implement their conservation and management measures, including catch documentation schemes, transshipment requirements, IUU and authorised vessel

lists, vessel monitoring systems, boarding and inspection and port State measures.

Implementation of these measures by law not only would fulfill India's international obligations, but would also provide for adequate fines and penalties, harmonised at a level with other RFMO Members, to deter the vessels from engaging in IUU fishing and compensate India for resources that were taken illegally.





ANNEX 7. FOREIGN ACCESS

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 deal with the granting of licenses and permits to foreign vessels, prohibition of Indian citizens using foreign vessels and the responsibilities of permit and license holders. Fishing in the EEZ under the Letters of Permission by vessels operating under a joint venture, has been authorised by Public Notices, dated 17 May, 2006 and 14 December, 2006, relating to the Operation of Deep Sea Fishing Vessels, 20m OAL and above, in the Indian EEZ. With foreign equity collaboration, an Indian company has to produce evidence of at least 51% Indian equity.³¹

The legal regime governing these operations is out-dated and weak. The 1981 Maritime Zones of India (Regulation of Fishing by Foreign Fishing Vessels) Act defines an Indian vessel as one owned by a "company in which no less than sixty per cent of the share capital is held by citizens of India", and all other vessels are foreign vessels. Therefore, joint venture vessels where Indian equity amounts to only fifty one per cent, as required by the Public Notice, are considered foreign vessels even though they are flying

³¹ The company also has to produce evidence of owned/hired shore-based processing facility. The entire catch has to be landed at an Indian port and processed. No mid-sea transfer of catch or export of unprocessed catch would be permitted in case of joint venture project vessels.

an Indian flag under current arrangements. The 1981 law is therefore disregarded as it is inconsistent with current government practice and policy.

Further, the Act does not incorporate the flag state responsibilities of foreign fishing vessels under the international instruments. Transshipment remains an issue especially including those measures that India is required to implement as a member of the IOTC. The forms appended to the Rules are also outdated.

Finally, under the law, there is no requirement for the government to maintain a register of licenses or permits, or implement the rules of a regional fisheries management organisation (RFMO). There is a requirement for the vessel to display the license or permit on board the vessel.

An Inter-Ministerial Empowered Committee on Marine Fisheries was established in 2004 following the adoption of the Indian Marine Fishing Policy to oversee the development of deep sea fishing under the Public Notices. However, it only meets once or twice a year, and with no coherent national databases there is often insufficient information for decision-making. The Committee itself addresses operational problems, including the need for further inter-agency cooperation and information sharing, the failure by most vessels to report information on landings to the MPEDA.





ANNEX 8. ALLOCATING FISHING RIGHTS IN INDIA

Limited Access and Rights-Based Fisheries

It has been the combination of “modernisation” with open access that has led to the existing poor state of India’s marine fisheries. A change from an open access system to one based on optimising rents supported by rights allocation, will be necessary, if the health of both the fish resources and the fishers are to improve. Current fishing capacity in India is estimated at more than twice of what is required to catch current harvest levels. Overcapacity is especially acute for the mechanised sub-sector. Reductions in the order of at least 50 percent will be necessary to reap the benefits of restored fish stocks and associated increased social and economic benefits.

Limiting access implies allocating fishing rights in some ways among current stakeholders and eliminating excess capacity through fleet reductions. Allocating fishing rights is contentious because it means making some hard, explicit social, political, legal and economic decisions. The three most common forms of rights are (i) Territorial use rights in fishing (TURFs) – the right to fish in a particular location (ii) Input (effort) rights – the right to take part in a fishery often through restricting licenses (limited entry) and (iii) Output (harvest) rights – the right that allows a certain level of resource usage.

The basic characteristics of fishing rights are well-known and agreed. Fishing rights need to be durable (long lasting), divisible, transferable, exclusive and secure.

The mode of access is also important, for example, individual quotas, collective ‘group’ quotas, etc. The use of rights-based management systems is increasing across the world and the processes by which these are developed, designed, and implemented being increasingly driven from the ground up, thereby eliminating some of the political hazards that have previously hindered their uptake. This, in turn, is providing signals to politicians that controversies surrounding fishing rights are surmountable and worthy of their attention.

Because the mechanised trawlers are more organised and smaller in number than small-scale fishers, it would be logical to start with this group. In some states, because of the very depressed state of the sector, natural attrition is already happening with boats becoming idle and removed from the fishery. Governments could facilitate this process by providing viable incentives to leave the sector (not providing subsidies and incentives to remain in the sector).

There is still considerable resistance to allocating rights in Indian fisheries. With small-scale fisheries, moving from a common-pool resource (with access to all) into private ownership (with access limited to some) is often seen as a violation of their rights as long-term users of the resources. In the larger-scale fisheries, powerful lobby groups can block any allocation processes. However, at a recent meeting involving the Palk Bay fishers in southern India, 23 percent of boat owners indicated their willingness to remove their boats from the fishery, provided they were compensated.





ANNEX 9. RECOMMENDATIONS FOR LEGAL REFORM IN MARINE FISHERIES, INDIA

Concept Note for an Integrated Fisheries Law

Following is the basis for an indicative framework for a modern, integrated fisheries law that would implement India's international obligations and address most of the areas suggested in the 2004, CMFP for development of new legal instruments.

Preliminary: The general foundation for the proposed integrated Fisheries law includes the objective and application of the Act, and definitions of the terms used. The Act would apply to all fishing activities from the territorial sea to the outer limit of the EEZ, and, to implement the UN Fish Stocks Agreement, to Indian vessels and nationals beyond the limits of national jurisdiction. Key terms in current legislation (fish, fishing vessel, fishing, among others) are not well defined or are undefined, making enforcement very difficult. These should be strengthened and modernised.

Institutional Arrangements: The responsibilities and, as appropriate, appointment of personnel, power and authority of the Minister for purposes of transparency and accountability need to be highlighted. Institutional mechanisms, such as advisory committees, or decision-making bodies could be established. A coordinating Committee among relevant agencies could be considered, as a mechanism for stakeholder inputs. In particular, a mechanism for integrating responsibilities with the

agency responsible for coastal zone management, and with the states, could be considered for inclusion. Other areas could include rules for national policy development (lead responsibility, review and implementation) confidential information, ownership of information, a public information program and annual administrative report to promote accountability.

Conservation, Management and Development: The management procedures, objectives, mechanisms and principles would be set out in clear terms. They would implement India's international obligations and form the basis for other authorities and responsibilities under the Act. Provisions could include the responsibility for determining conservation and management measures, formulation and adoption of Fishery Management Plans, prohibitions of specific fishing and related activities, and procedure for declaring prohibitions, declaration of Fisheries Management Areas, Fisheries Reserves and endangered species. A provision requiring the furnishing of data, information, records returns, etc. would support management and development functions.

Requirements for Fishing and other Activities: This Part would set out basic requirement standards in fisheries legislation, for all activities under the scope of the Act, including fishing by Indian flag vessels, foreign fishing vessels and deep sea vessels. It would be designed to promote maximum compliance with the law, and cover fishing and related activities by foreign fishing vessels and Indian fishing vessels. It would



include requirements for Indian flagged vessels in areas beyond national jurisdiction, and for foreign fishing vessels in respect of fishing, landing and transshipment. An access agreement or joint venture must be in place for foreign fishing, and basic conditions of an agreement are required to facilitate increased benefits for India. The Minister should have authority to enter into Fisheries Management Agreements, which provide for cooperation on matters of fisheries management. The Minister may also be authorised to participate on behalf of India in regional fishery management organisations or arrangements, such as the Indian Ocean Tuna Commission.

Licensing/access Limitation: This would describe mechanisms for limiting access including licensing authority and procedures, and take into account current practices and proposed reforms. It would set out, in consolidated form, the licenses or other forms of access limitation that are required under the Act, and provide for conditions, suspension, revocation, cancellation and appeals of decisions. It would promote transparent procedures and spell out the authorities and responsibilities to ensure consistent and coordinated management. Conditions for revocation and cancellation of licenses or other forms of access permissions would be set, and an appeals procedure could be provided.

Monitoring, Control and Surveillance: Identification of authorised officers (e.g. coast guard personnel) and, as appropriate, their appointment. Authority of authorised officers would be described, including search, seizure and arrest. They would apply to areas beyond India's national jurisdiction in certain situations that implement India's international obligations, including boarding and inspection of RFMO measures, and in situations of hot pursuit as described in international law.

The powers of authorised officers would apply, as appropriate, to vessels, vehicles, premises, and other places where activities under the scope of the Act are carried out. A range of inspection and enforcement authorities would be given, and the other personnel such as observers, port samplers, inspectors and auditors for

the purposes of fish quality control may be appointed. Duties of authorised persons would be set out so they may safely carry out their responsibilities under the Act.

Monitoring requirements, such as VMS and reporting would be included.

Dispute Resolution: Approaches to the resolution of disputes could be considered, such as a panel or other mechanism, together with rules and procedures and enforcement provisions.

Jurisdiction, Procedure, Fines, Liabilities, Seizures, Etc: Because the competence of the courts in most countries does not generally extend to the exclusive economic zone or beyond the areas of national jurisdiction, the competence of specified courts would be extended to all activities under the Act. Provisions relating to the initiation and elements of proceedings are included. Procedures for the seizure and release of vessels, vehicles, etc. would be set out. Fines and penalties would be included after a review to ensure they were commensurate with the offence committed and had a deterrent effect.

Evidence: This Part would include presumptions, burden of proof, and interference with evidence. The concept of certificate evidence could be introduced, allowing prosecutions to be carried out in a cost-effective, timely, just and fair manner as per the legal requirements. A Part on the evidence is needed in fisheries laws due to the fact that at-sea offences are different in nature than terrestrial offences, and the laws of evidence are often inadequate to cover such situations, leaving loopholes in the enforcement of the law.

General: This Part could set out miscellaneous provisions not covered elsewhere in legislation, such as notification, import/export and contaminated fish, as well as standard provisions allowing regulations to be made.

List of Recommendations

Following is a list of recommendations made from the consultant's report:



1. Constitutional, International, Policy and Planning Framework

1.1 Basic National Instruments: Constitution, Maritime Zones Act

It is recommended that the Section 7(5) of the Maritime Zones of India Act be repealed or amended in order that the Government may require licenses for all fishing, scientific research and other activities in the EEZ, and therefore promote sustainably managed fisheries.

1.2 Fisheries-related International Instruments

1.2.1 Membership in Regional Fishery Bodies (RFBs)

It is suggested that India's policies, plans and laws would benefit from substantial reform with a view to broader incorporation and implementation of international obligations, at the same time ensuring sustainability of the resource and economic benefits to Indian people. At the same time, institutional mechanisms for coordination in implementation and administration should be identified or strengthened.

1.3 The 2002 Tenth Five Year Plan and the 2004 India - Comprehensive Marine Fishing Policy

1.3.1 Review of India - Comprehensive Marine Fishing Policy by Regional Organisations

1.3.1.1 APFIC

It is recommended that IUU fishing be clearly addressed in the implementation of the Policy and by the development of an NPOA-IUU that includes developing and strengthening an MCS System on an incremental basis including a VMS, an observer program and other cost-effective means such as reporting, information systems and port control measures. Robust legislation would need to underpin these measures, which are not specifically identified in the Policy component on Legislative Support.

It is recommended that a policy be developed in relation to institutional arrangements and human capacity development to facilitate implementation of sustainable fisheries management.

1.3.1.2 FAO/Bay of Bengal Large Marine Ecosystem Program

It is recommended that a policy guideline be considered that provides for involving fishers in the processes concerning management, development and conservation of coastal areas, and that a clear policy be adopted by the Central Government that will guide the policy initiatives to be implemented by the coastal States.

1.3.2 Marine Fisheries Resources – Resource Management

It is recommended that consideration be given to emphasising resource management, including harmonisation through mechanisms such as fishery management plans, as the foundation of a fisheries policy and sustainable long-term use of the resource as its goal. Such an approach, taken in an integrated manner and using internationally accepted management principles, is consistent with the best practices of approaches to fisheries law and policy.

1.3.3 Harvesting of Marine Fish Resources

It is recommended that the identified measures be considered as resource management issues for purposes of implementation of the Policy and that international obligations and guidelines be taken into account and implemented as appropriate.

1.3.4 Post-Harvest Operations

It is recommended that post-harvest operations include arrangements to ensure traceability of the fish to ensure it was caught legally and according to sustainable practices, and is not a product of IUU fishing.

1.3.5 Fishermen's Welfare

It is recommended that measures for fisher's welfare, as appropriate, should be reviewed from a financial/economic/social/institutional point of view, and that the Conventions, guidelines and proceedings of the International Maritime Organisation, regarding safety at sea, be implemented on a priority basis.



1.3.6 Environment Aspects

It is recommended that implementing actions by the fisheries agencies in cooperation with those responsible for the environment would include positive approaches for improved marine environmental quality as an objective, prohibiting the discharge of hazardous wastes, priority-setting, ensuring fishing interests are taken into account by other agencies, communication strategies and harmonisation at state/national level as appropriate.

1.3.7 Legislative Support

It is recommended that, as appropriate, this study serve as a basis for a review of the existing legislation in relation to fishing operations as well as fisheries in general.

It is recommended that a robust and comprehensive fisheries act would best serve the recommendations of introducing separate laws in relation to the operation of Indian flag vessels in the EEZ, the management of introduction of new fishing units, ensuring conservation of resources and providing for limited access fisheries.

It is recommended that the policy supporting reciprocal unlicensed fishing rights in neighboring waters be discarded at the earliest possible opportunity, as being impractical and contrary to India's international obligations.

It is recommended that the Policy or its implementation be strengthened with respect to the interface between international and regional obligations and national law as follows:

- ◆ National law must implement international obligations (this important step was overlooked) and the conservation and management measures adopted by RFMOs in which India is a member – national law must not simply “harmonise” with international laws and “consider participation in (undefined) RFMOs”;
- ◆ Because there is a wide range of international obligations not yet implemented, these should be prioritised so that action can be taken at an

incremental level commensurate with institutional, human and financial resource availability;

- ◆ Laws should be harmonised at regional level with those of other countries through active participation in relevant RFMOs.

It is recommended that, as appropriate, the areas identified for further development should be considered under a separate heading of institutional arrangements and their legal implications taken into account.

2. Legal and Institutional Framework for Fisheries Management And Related Activities

2.1 Laws that directly regulate fishing activities

2.1.1 Introduction

It is recommended that legislation be enacted which provides for the conservation and management of living marine resources in the Indian EEZ. Such legislation should refer to a decision-making process, fishery management plans including their framework and process, management measures (e.g. licensing, prohibitions, regulation of areas, gear, mesh, seasons, quotas, fishing capacity), cooperative mechanism with other countries, Indian states and appropriate Ministries, and clear fines and penalties for non-compliance. Monitoring, control and surveillance measures should be linked to these provisions as the information obtained would be fed into fisheries management.

In preparing such legislation, the existing legislation should be reviewed, taking into account the analysis in this Study, and consolidated as appropriate in order to allow for a clear integrated approach to fisheries management through robust legislation.

2.2 Advantages and potential elements of a modern, integrated fisheries law

Because the content of the draft MZI Act is not yet known, it is recommended that the advantages of developing a modern, integrated fisheries law, consistent with best practices, be considered. These would include:

- ◆ Fulfilling India's international and regional obligations.



- ◆ Clarifying the application and scope of the Act.
- ◆ Clarifying and updating institutional and procedural responsibilities.
- ◆ Allowing integrated fisheries management, according to internationally accepted principles including the development of fisheries management plans.
- ◆ Facilitating integrated monitoring, control and surveillance (MCS).
- ◆ Updating provisions on jurisdiction, evidence, information, presumptions for consistency with regional measures and cooperation.
- ◆ Clarifying the linkages with institutional arrangements and legislation of other government agencies.
- ◆ Providing an incentive for the Indian maritime states to update, expand and harmonise their legislation to complement national laws..

It is recommended that, in developing the legislation, consideration also be given to key elements of an integrated fisheries law, based on the internationally best practices and India's international obligations outlined in Annex 6.

2.3 Fisheries-related laws

2.3.1 National Environment Policy 2006

It is recommended that development of laws and policies in relation to the environment be followed closely by fisheries authorities, and the appropriate undertakings be sought to ensure the integrity of the fisheries resource and the fishers and the environmental requirements of each.

2.3.2 Laws related to trade

2.3.2.1 The Marine Products Export Development Authority Act 1972 (No.13 of 1972)

It is recommended that the draft legislation in relation to India's EEZ should state the agency responsible for fisheries management and identify its functions, and as appropriate amend the relevant MPEDA functions. A clear policy should be considered specifying the roles of agencies in relation to fisheries and to each other.

2.3.3 Laws related to shipping

2.3.3.1 The Merchant Shipping Act, 1958

It is recommended that the definition of "fishing vessel" be reviewed, that the term be defined in the draft MZI legislation in accordance with the best practices, and that the definition under the Merchant Shipping Act be consequently aligned.

2.3.3.2 The Coast Guard Act, 1978

It is recommended that the clear authorities of enforcement officers and their duties, consistent with best practices, be included in the draft MZI Act, as well as authorities for high seas boarding and inspection in accordance with the UN Fish Stocks Agreement. A senior fishery officer from any national institute who is familiar with sea fishing and various species of fish caught should be included in the Coast Guard team for the high sea-boarding and inspection of a fishing vessel.

It is further recommended that a clear policy and priorities for fisheries MCS be developed and reflected in laws as appropriate.

2.3.3.3 The Indian Ports Act, 1908

The Major Port Trusts Act, 1963

It is recommended that the fisheries authorities monitor the development of the binding agreement on port state measures, effect appropriate liaison with port authorities and as appropriate implement the provisions of the agreement into law.





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