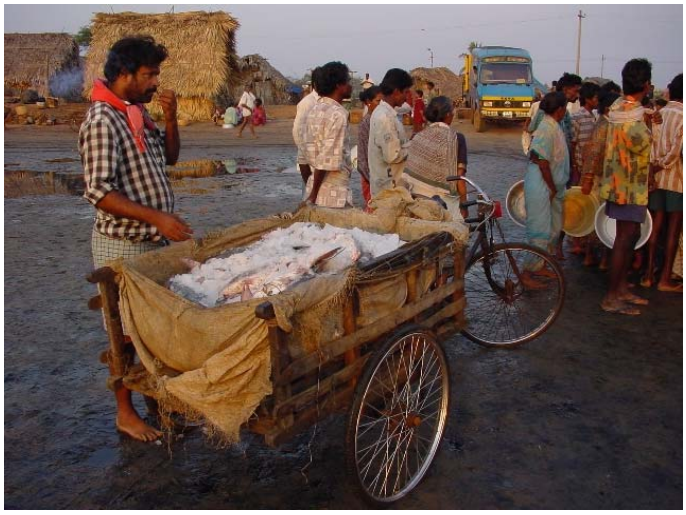
DFID Department for International Development

IMM LTD

ICM
Integrated Coastal Management

PHFRP
POST HARVEST FISHERIES RESEARCH PROGRAMME



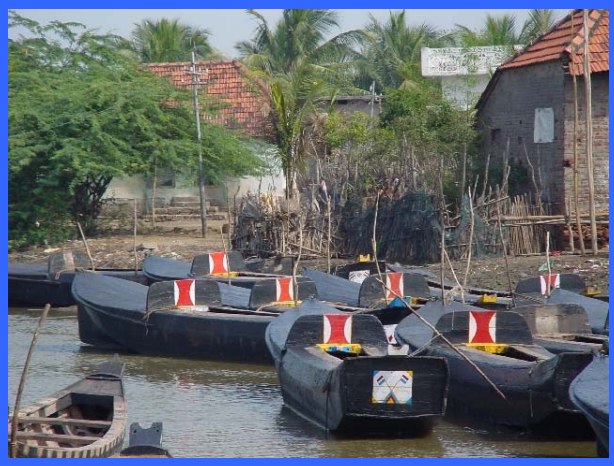
Major Trends in the Utilisation of Fish in India: Poverty-Policy Considerations

December 2003

Project R7799:

Changing Fish Utilisation and Its Impact on Poverty in India

A Project Funded under DFID's Post-Harvest Fisheries Research Programme



OUTLINE OF THE PROJECT

The "Changing Fish Utilisation and Its Impact on Poverty in India" project is funded by the UK Government's Department for International Development's (**DFID**) Post-Harvest Fisheries Research Programme. The project aims to develop options for consideration in the policy process concerning post-harvest utilisation of fish in India that would increase the positive impact on the lives of poor processors, traders and consumers in India. Throughout this report the project is referred to as the IFU project.

The research focussed mainly on five states in India: Andhra Pradesh, Orissa, Tamil Nadu, Kerala and Karnataka (with some work also in Maharashtra). The work involved carrying out post-harvest overviews of the key changes that were occurring in each state followed by more detailed field research to identify the effects and impacts of those changes on particular poor stakeholder groups. This report is a synthesis of the findings of that work highlighting areas for consideration in the future development and implementation of pro-poor policies.

The research was managed by IMM Ltd of the UK. Jock Campbell was the Project Manager and Policy Specialist, and Philip Townsley was the Social Development Research Coordinator. Ansen Ward and Emma Whittingham of IMM provided editing advice and technical guidance on the final documents.

The lead partner in India was ICM of Kakinada, Andhra Pradesh, whose staff participated in all the field research. Mr Venkatesh Salagrama leads ICM and played a major role in the field research for the project.

Dr. Ramachandra Bhatta of the College of Fisheries, University of Agricultural Sciences, Mangalore, Karnataka, played an important role in the inception of the project and was involved in some of the field work.

Specific state-level overview studies were implemented by the following people:

- Venkatesh Salagrama from ICM - Orissa and Andhra Pradesh studies
- Dr. Ramachandra Bhatta (College of Fisheries, University of Agricultural Sciences, Mangalore, Karnataka) – Karnataka study
- Karthikeyan (South Indian Federation of Fishermen Societies, Trivandrum, Kerala) – Kerala study
- Dr.S.Basu (Central Institute of Fisheries Education, Mumbai, Maharashtra) – Maharastra study
- K Karunaharan (Tamil Nadu) –Tamil Nadu study

The ICM field staff included: Venkatesh Salagrama (ICM Research Director), G. Durga Prasad (Researcher), M. Srirama Murthy (Researcher), S. Balaji (Researcher), M Vishnu Srinivasa Rao (Research Assistant), and Satyananda Mallik (Database Programming).

The Department of Fisheries, Government of Andhra Pradesh, has been an official partner in the research, and has extended all cooperation. Our special thanks to Sri D S Murty, IAS, the previous Commissioner of Fisheries, Government of Andhra Pradesh. The Departments of Fisheries in Tamil Nadu, Karnataka, Orissa and Kerala helped during the field research, and more importantly, with much secondary data.

Whilst many have contributed to the evolution of this report IMM takes responsibility for any mistakes and omissions in it.

FURTHER INFORMATION

For further information on the IFU project contact the Project Manager on J.Campbell-IMM@ex.ac.uk or visit the project website at: http://www.ex.ac.uk/imm/ . Contacts for the SCL project collaborators are as follows:

IMM Ltd
The Innovation Centre
Rennes Drive
University of Exeter Campus
Exeter EX4 4RN, Devon
UK

Integrated Coastal Management
64-16-3A, Pratap Nagar
Kakinada,
Andhra Pradesh
INDIA 533 004

Further information on the **Post Harvest Fisheries Research Programme** can be obtained from:

NR International
Park House
Bradbourne Lane
Aylesford
Kent
ME20 6SN

Telephone: **+44 (0)1732 878 686/7**

Fax: **+44 (0)1732 220 498**

Email: **info@nrint.co.uk**

This document is an output from a project funded by the UK Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID.

CONTENTS

ABBREVIATIONS & ACRONYMS

CCRF	Code of Conduct for Responsible Fisheries
CICFRI	Central Inland Capture Fishery Research Institute
CIFA	Central Institute of Freshwater Aquaculture
CIFE	Central Institute of Fisheries Education
CIFT	Central Institute of Fisheries Technology
CMFRI	Central Marine Fisheries Research Institute
DFID	Department for International Development (UK Government)
FAO	Food and Agriculture Organisation of the United Nations
FLC	Fish Landing Centres
FSI	Fishery Survey of India
GDP	Gross Domestic Product
ICAR	Indian Council of Agricultural Research
IFU	India Fish Utilisation (the abbreviation used for this project)
MPEDA	Marine Products Export Development Agency
Mt	Million tonnes
PHOT	Post-Harvest Overview Tool
UK	United Kingdom

PREFACE

The Fisheries Sector in India is undergoing many changes. These changes have affected the supply of fish, its quality, the species diversity, where it is landed and who benefits from it. While change is an inevitable, often irreversible, process, the small-scale fishers' ability to cope with it is limited. The response of government and civil society organisations to the effects of these changes on the poor has been constrained, mainly by a lack of knowledge about the extent of these changes, their causes and their consequences for the poor. This lack of comprehensive and up-to-date knowledge, and guidance for effectively tackling the problems revealed by that knowledge, has handicapped the development of effective policy responses that could ensure an efficient use of scarce development resources targeting the poor. In the absence of such policy responses, poorer fish processors and traders have often found themselves further marginalised from the development processes.

In response to this constraint to policy, the UK Government's Department for International Development (DFID) funded a research project to address this knowledge gap and to suggest what might be done about the problems facing the poor in the post-harvest sector.

The following report is based on the findings from research in five coastal states in India (Orissa, Andhra Pradesh, Tamil Nadu, Kerala and Karnataka) which was carried out over the period 2000-2003.

This report outlines the findings of that research and indicates some options that might be considered in the policy process for moving forwards in support of pro-poor economic growth.

AUDIENCE OF THE REPORT

This report is aimed at those people in Government, regional agencies, NGOs, academic institutions and donor communities who are concerned with developing and implementing policies and plans targeting the poor in coastal India.

The aim of the report is to inform those people about key changes that are affecting the coastal poor in the fisheries sector and to highlight key areas where emphasis may be placed to assist particularly disadvantaged groups. The underlying priority of the report is to address the needs of the most vulnerable and disadvantaged in the fishery. This reflects India's current policy focus on poverty reduction. The report also relates the key points emerging from the work to the wider international policy framework reflected in the Code of Conduct for Responsible Fisheries, of which India is a committed supporter.

INTRODUCTION

The following report very briefly outlines the background to the fisheries sector in India and highlights some of the major changes that the sector is facing. In particular it looks at the major trends in the fish supply, processing, marketing and consumption. It particularly looks at these trends from the perspective of the poor and tries to understand some of the impacts of these changes on them.

Emerging from this analysis are some implications for policy makers. These are discussed in relation to the internationally supported Code of Conduct for Responsible Fisheries (CCRF), the uptake of which is being supported by FAO. This discussion is not prescriptive but rather tries to place the concerns identified in the research within the wider context of the CCRF in order to benefit from the guidance which the Code provides.

BACKGROUND

The Contribution of Fisheries to the Indian National Economy

Fisheries in India are a major part of the livelihoods of many coastal and inland people. FAO (2000)[1] has estimated that in 1997 there were approximately 6 million people involved in catching fish and many more involved in processing storage and trade. The sector also contributed over US$1107 million in foreign exchange, amounting to about 3.4% of total export earnings. The contribution of the sector to the economy is about 1.3% of GDP. One of the most important contributions is to food security in the country. India is estimated to produce some 6.2 million tonnes of fish (live weight equivalent) of which 4.7 million tonnes is for direct domestic human consumption. The sector also contributes very significantly to poverty reduction in the country by providing work and food for some of the poorest and most marginalised people.

Support for the Sector

Recognising the importance of the sector, the Government of India and the State Governments have invested significantly in the sector in recent years. According to FAO (2000) plans have been approved for 6 major and 45 minor fishery harbours and 158 modern Fish Landing Centres (FLCs), of which the 6 major harbours have been completed, together with 30 minor fishing harbours and 130 FLCs. In order to improve the marketing of fresh fish internally, a number of cold storage, ice plants and cold chains have also been established.

In recent years there has also been considerable government investment in fleet modernisation and the development of fishing gear. Aquaculture in both coastal waters and inland fisheries has received considerable support from the government and from both domestic and foreign sources.

The social needs of the sector are also considered important through welfare schemes that have provided financial support for the development of model fishing villages, accident insurance schemes for active fishermen, and savings-cum-relief schemes for

[1] FAO (2000). Fishery Country Profile: The Republic of India: FAO, Rome Italy.

marine fishermen. Training in the use of new technologies is also provided to fishermen and women.

The Marine Products Export Development Agency (MPEDA) has promoted Indian seafood products in overseas markets.

There is also considerable institutional support provided to the sector from the Indian Council of Agricultural Research (ICAR) in the form of research into fish stocks and their exploitation by the Central Marine Fisheries Research Institute (CMFRI) and the National Research Centre on Coldwater Fisheries and Central Inland Capture Fishery Research Institute (CICFRI). Research into fish processing and trade is supported by the Central Institute of Fisheries Technology (CIFT), while education for the sector is provided by the Central Institute of Fisheries Education (CIFE). Research and development in aquaculture is carried out by the Central Institute of Freshwater Aquaculture (CIFA) and Central Institute of Brackish-water Aquaculture. The Ministry of Agriculture also provides support to the sector through such agencies as the Fishery Survey of India (FSI), the Integrated Fisheries Project, and the Central Institute of Fisheries, Nautical and Engineering Training. In the past the FAO-implemented Bay of Bengal Programme, with its DFID-funded post-harvest component, has supported the development of the sector.

Major Changes in the Sector

Development within the sector has been influenced by global forces, particularly the opening up of markets and the increasing global demand for seafood. This has been complemented by improved communications that have facilitated linkages between suppliers and consumers. Fish is now a widely traded commodity and trade linkages reach even the most remote fishing villages in order to access fish supplies.

As with much of the rest of the world, fisheries in India are in a state of transition with many changes in technology, skills, markets, infrastructure and industry that impact upon the lives of those people who depend upon the sector for their livelihoods. These changes are influenced by trends such as: the rising demand and static or possibly declining supply of fish; motorisation and mechanisation of the fishing fleet; increasing degradation of the aquatic environment from land-based sources; increasing availability and distribution of ice; and changes in the aquaculture sector. The rapid shift in the macro-economic policies of the government in the 1990s, such as economic liberalisation and globalisation, have also contributed significantly to these changes as have broader trends such as urbanisation and population growth.

Broadly the analysis of trends affecting changes in the sector can be discussed under the following headings:

- Trends in supply;
- Trends in processing;
- Trends in marketing;
- Trends in consumption.

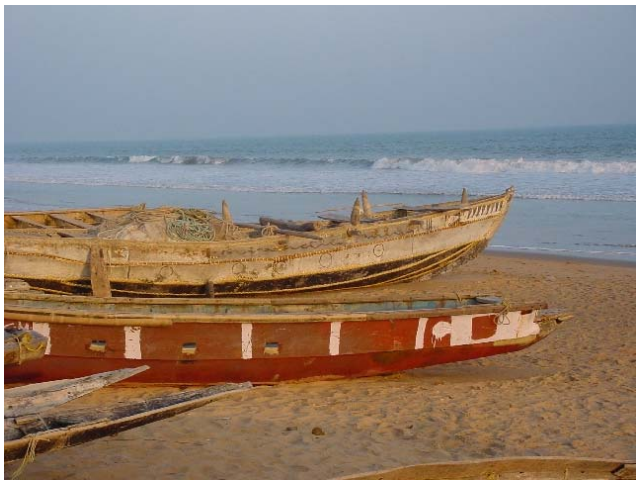
TRENDS IN SUPPLY

Trends in supply affect the whole of the post-harvest sector as they affect the quantities and composition of the raw materials feeding into the sector. Any changes

in supply are therefore of crucial importance and their effects can generally be seen throughout the fish utilisation chain.

Changes in marine landings

Figure 1: Traditional fishing craft in northern Andhra Pradesh



In most locations the official published figures indicate that landings for the marine sector have increased, although other official research suggests that these data might not always accurately reflect reality. While the data suggests that overall marine catches have increased in recent decades, there are also clear indications that, for many stocks, the point of maximum sustainable yield has already been passed. Among fishers themselves there is a widespread perception that the catch rates, and the sizes of fish caught have declined significantly and that catches have often become more unpredictable.

There has also been a shift in the species composition in many areas. In Karnataka for instance there has been a significant fall in the recorded landings of mackerel and oil sardine, and local fishermen perceive that the species mix is changing significantly. In Kerala there has been an increase in focus on the harvesting of wild shrimp stocks but in Andhra Pradesh and Karnataka wild shrimp landings are reported to be declining. The reasons for these changes are not fully known. Some may well be linked to changes in fishing patterns and technology (see below) that are becoming more species specific. There is also a growing perception of increased uncertainty of catches which, given the increased investment in many parts of the country, suggests a greater degree of risk in the harvesting sector. In Andhra Pradesh, for instance, fishermen note that the number of days per year when good catches are made has decreased substantially. Changes in the seasonal availability of fish are also a common observation. In the Karnataka study it was noted that there was now less variability between seasons and the major monsoon gluts in fish landings have diminished.

Changes in other sources of supply

These changes in marine catches do not mean that the supply of fish in any one location is decreasing or that fish supply overall is static. Certainly the growth of freshwater fish harvesting and aquaculture has added substantially to national supplies and interstate movements of fish now mean that in at least some locations, fish supply is actually increasing. For example, freshwater fish production in Karnataka and Orissa has more than doubled between 1989 and 1998. In Orissa, the area used for brackish water aquaculture increased from only a few hundred hectares in the early 1980s to over 12,000 hectares in 1997. The demand for wild shrimp seed also grew substantially and this provided a source of work for many people in the coast (at least until the types of gear used were made formally illegal). The growth in production is also tempered by increasing flows of fish to foreign markets that have reduced the

access that some stakeholders have to fish but, at the same time, has brought new participants into the sector.

The increase in the contribution of freshwater fish and harvests from coastal aquaculture to total supply has meant that the species composition of fish supplies entering the market has changed significantly. In the case of shrimp, there have been major fluctuations in supply as problems within the aquaculture sector, such as the incidence of disease, have manifested themselves. Interstate movements of fish have dramatically changed the species mix and quantities of fish available in different states. In Orissa for example imports from other states rose from less than 10,000mt in 1992 to over 30,000mt in 1996.

Changes in the wider marine ecosystem

Closely linked to the supply of fish is the changing condition of the coastal environment, which is influenced by factors such as:

- Increasing population pressure;
- Expansion of industrial development;
- Growth of tourism ;
- Increased agricultural intensity;
- Growth in aquaculture;
- Changing fishing practices.

The coast has undergone massive change in recent years with increased population, industrial development, port and harbour development and tourism. In addition, the impacts of land-based activities in the coastal zone, such as aquaculture and agriculture, have changed as these activities have spread or become more intensive. There is considerable concern throughout India that these phenomena are affecting the quality of the marine environment, the carrying capacity of the sea and thus potential fish harvests. In addition, fishing practices that use small-mesh nets, explosives, and bottom trawls in ways that are unsustainable also threaten the resource, while increased motorisation of fishing craft is contributing to aquatic pollution.

In ecosystems at or near the coast the effects of environmental degradation are most obvious. For instance Chilka Lake in Orissa is one example, where human interaction with the natural environment has led to a localised decline in the fish stocks, fish landings and biodiversity, and, consequently, resulted in a decline in the livelihoods of those who depend upon those resources. Adverse changes to the reef ecosystem in the Gulf of Mannar as a result of multiple influences, is another example where environmental degradation is clearly reducing the fish catches that the local people can obtain from the reefs.

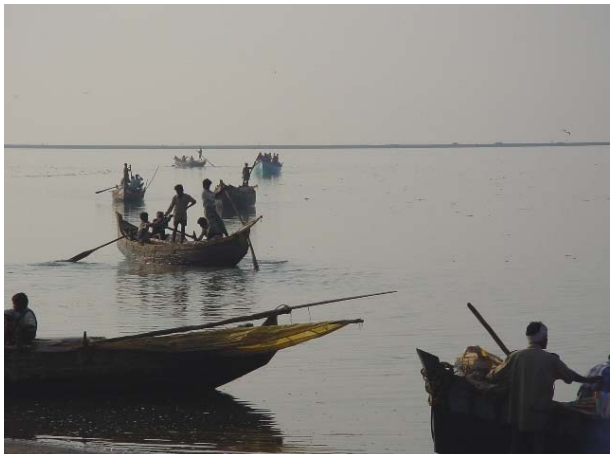
In many places the relationship between environmental damage and falling catch rates or changing catch composition cannot yet be supported by clear evidence, but there is a strong perception by many of the stakeholders concerned that these are related. The extent to which coastal pollution is affecting fish quality is also not widely documented, but people who live beside polluted waters complain of its health implications.

Changes in harvesting practices

Many changes in harvesting practices have direct effects on, or are affected by, the changes discussed above, such as:

- Changes in technology, and in technology ownership and use patterns;
- Changes in fishing practices;
- Increased conflict;
- Concentration of landings;
- Changes in employment patterns.

Figure 2: Traditional fishing craft such as these *nava* are becoming less important in terms of overall production.



In general there has been a gradual increase in the technological complexity of harvesting capacity and a greater level of capitalisation of the industry. Although, paradoxically, in some locations the number of traditional craft is actually increasing as fishers return to lower cost fishing technologies, generally there is an increasing focus on motorisation and mechanisation. In Kerala, for instance, the percentage of total landings coming from the traditional sector declined from 24% to 5% between 1985 and 1996 in favour of motorised and mechanised craft. In Orissa, the contribution of non-motorised traditional craft to the total marine catch declined from 50% in 1989 to 35% in 1995. In Karnataka all types of fishing vessel have increased in number, but the greatest increase has been in the mechanised sector, whilst among non-mechanised boats more and more have become motorised. In Orissa, traditional non-motorised craft have declined since 1992 but motorised and mechanised craft have increased in numbers. In most places, all sub-sectors of the fleet have tended to increase their catching potential through increased engine power and, at least in the larger vessels, the greater use of electronic equipment. In some states, such as Tamil Nadu, it is reported that fishermen are increasing the number of different specialised gears they carry.

These changes require higher levels of capital investment in fishing operations that, in turn, require longer fishing trips to offset these higher costs and there is a growing shift from single-day fishing to multi-day trips. This in turn requires changes in on-board handling and storage of catches and has been accompanied by, and made possible because of, a greater use of ice, thus increasing operating costs. The increased capitalisation, and some would say over-capitalisation, of the fishery has meant that different patterns of fleet investment are taking place. For many the risks have been too great to make the change, for others they have tried and failed, and for some the change has been a success. The fortunate people, who have survived the transition, now own more of the capital but there is an increasing trend for this ownership to be from financial sources outside of the traditional fishing communities, either through direct investment by “entrepreneurs” who then hire fishers to work on “their” fishing boats, or through loans by financiers to boat owners. This means that

the relationship of fishers to the fishing enterprises they are engaged in has often changed. In Tamil Nadu it was reported that many fishermen have moved from fishing for themselves to being crew on larger craft. In other cases, major lenders to the boat owner now have considerable influence over the operation of the craft.

For some vessels there has been a more targeted approach to fishing, focusing on particular high value species, such as seer fish or shrimp. This in turn may have contributed to the perception that there has been a fall in biodiversity. On the other hand, as catch rates have declined for the shrimp trawler fleet, a greater diversity of the species being caught is now being landed and discards have declined.

Competition for resources is increasing in the coastal areas of most parts of India. This has resulted in increasing conflict between fishermen, especially between those using different levels of technology. The interactions between the fishermen of motorised and mechanised craft off the Kerala coast are well documented but there are more localised conflicts throughout the country. In Andhra Pradesh there has been a growing level of conflict in creek-based fisheries where there are increasing disputes over use-rights. A past strategy of many fishermen in response to falling catch rates, particularly seasonal declines, has been to migrate to locations where more fish are available. In Orissa there is reported to be a greater number of migrants from Andhra Pradesh fishing in the waters off Orissa, and fishers from Tamil Nadu are increasingly found fishing in Andhra Pradesh and Kerala. But increasing competition for resources now means that resident fishers are less tolerant of migrants into their areas.

Higher investment in vessels, gear and engines, combined with larger landings from individual craft engaging in multi-day trips, has encouraged vessels to concentrate on larger landing sites, especially in Andhra Pradesh, Karnataka and Kerala. At these sites there is good shelter, more developed and reliable support services and a more regular attendance of fish buyers with greater access to funds. Such facilities have also contributed to wider changes in fishing behaviour. For instance in Kerala it was noted that better harbour facilities have allowed increased fishing during the monsoon period. On the east coast where cyclones are not uncommon, being based at large protected harbours becomes a necessity to protect large-scale investment. The cyclone in 1999 that hit the coast of Orissa did major damage to the fishing fleet, particularly the traditional fleet in unprotected areas of the coast.

In many cases the fish from larger craft are destined for distant national or international markets and landing in close proximity to good communications is becoming more important. Likewise access to steady supplies of ice and fuel are important. In the larger sites the number of fish buyers tends to be higher than in the smaller locations, they attend the sites more regularly and they tend to have greater purchasing power. This works to the advantage of the fishermen as competition for their fish is increased and they have a better chance of obtaining the best possible price for their catches.

There is a perception amongst many of the coastal people contacted in the research that coastal populations are increasing and many new unskilled people are trying to join the fishery. This has resulted in crew sizes increasing and, for at least some locations, competition for work in the sector has increased. For at least some of the fishermen this means that there is underemployment in the sector. In the past beach seines provided employment for large numbers of unskilled poor people, particularly women and the old. The reduction of this fishing method, in for instance Andhra Pradesh and Tamil Nadu, has led to a decline in work opportunities for many of the

poor. But in other locations rising demand for fish coupled with static supplies have meant that incomes for fishers have gone up as the fish they produce has increasingly become a valuable commodity.

These changes have implications for the people who purchase the fish from fishermen and these will be discussed further below.

TRENDS IN PROCESSING

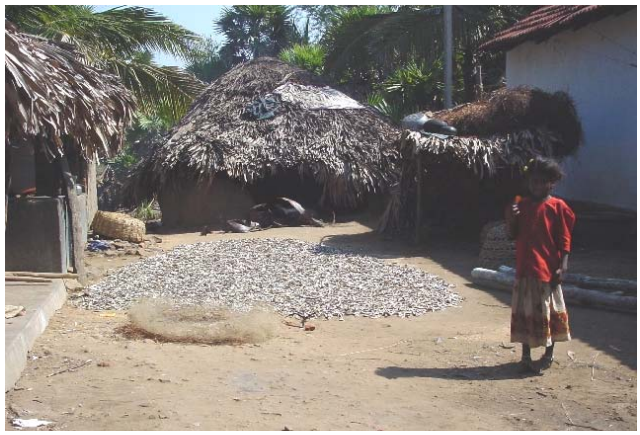
The processing side of the sector is also changing in a variety of ways such as:

- Changes in access to supplies of fish;
- Changes in gender aspects of processing;
- Changes in technology and practices;
- Increased competition for space.

Changes in access to supplies of fish

The changes in harvesting practices discussed above have had major effects on the supply of fish into the fishing villages where many traditional processors live. In the main, more fish is being landed at larger landing sites in most states. This means that the supply of fish being landed directly at village landing sites has reduced and access to fish for these village-based processors has become more difficult. Even when fish is immediately available in these communities, competition for that fish has increased along with demand for fresh fish.

Figure 3: Traditional drying of fish is being replaced by rack drying and the demand for products is declining as ice use increases



Even for those processors who are able to travel to the larger landing sites, access to fish for processing is not necessarily ensured. The increased demand for iced fish means that much of the fish finds a market with fresh fish buyers. Where there is a concentration of larger buyers who are feeding supplies into distant markets, their ability to purchase large quantities is often considered by the fishermen to be beneficial and selling to the larger buyers is more attractive than selling small quantities to many small-scale operators (processors or traders). As a consequence processors lose access to the fish.

Increases in access are also occurring in some situations. Increased localised access to freshwater fish and farmed marine species has improved opportunities for some. In some cases, the increased landings of by-catch from trawlers has meant that processors have been able to shift their focus from traditionally processed fish species to new, lower value species that are less sought after by the fresh fish trade. This has provided an opportunity for those processors that have the capacity to travel to the larger landing sites where trawler catches are landed.

Competition for fish is thus increasing for the smaller buyer in many locations, although this is sometimes offset by increased supplies from other sources. In spite of this, there has been an increase in processors in some locations. In some villages in Andhra Pradesh, for instance, greater uncertainty in the harvesting sector has meant that the wives of some fishermen have had to process fish for longer periods of the year to help to maintain household incomes.

Other opportunities have been created by a small growth in the higher quality dried products market. For instance, in Orissa processors in Paradeep are now targeting markets in north-eastern India and Bangladesh where demand for high quality dried fish exist.

Changes in gender aspects of processing

Traditionally, the processing of fish has been predominantly a role of women, who combine the activity with working in the home and looking after children. Throughout the research women involved in fish processing were ranked as poorer that their male equivalents. They also have options for responding to change. In the main men find it easier to travel to new locations outside of their home village to access fish and can thus take advantage of the concentration of landings in larger landing sites. However, this is not always the case; some groups of women are also showing increased mobility. In the shrimp and high quality fish industry in Orissa many women are employed to sort, grade, pack and, in the case of shrimp, to peel. Initially these were women from Kerala, who had the skills to do this kind of work, but now more local women are becoming involved.

Changes in technology and practices

There are also changes in post-harvest technology for producing high-value products. At the larger centres there has been a growth in freezing capacity to allow products to move into the export markets. There has also been growth in fishmeal production in some locations such as Karnataka, which has seen a growth from 40mt/day capacity in the 1970s to 184mt/day in 1998.

Likewise in the villages, improved roads, increased ice production and use of improved storage containers and insulated trucks have enabled an increase in the use of ice for fish storage in many villages. The use of ice and refrigeration has been further facilitated by widespread electrification, which has reached most rural locations in the country.

Figure 4: Fish processors on the beach in Andhra Pradesh

The shift to ice in these better connected locations has been further enhanced by the growing shift in consumer

preferences away from traditionally processed fish towards fresh fish. This is reflected in changes in packaging of fish, an increase in the availability of fish fillets and greater fish sales through supermarkets.

These changes are not only affecting the fish processors, traditional fish basket makers are also seeing their livelihoods threatened through the introduction of plastic boxes and ice boxes.

Generally there is a trend towards less fish being available at the landing sites that traditional processors have relied on in the past. However, there are still a number of remote and poorly served communities where ice has not reached and traditional processing continues at the same rate as before. In addition, there are still specialised products, such as *mas min* (processed tuna) produced in Lakshadweep Islands, that find a ready market.

Competition for space

In many locations where coastal populations have increased there is also an increase in the competition for space for processing. The development of coastal aquaculture has also increased demand for coastal land. This has directly affected the traditional processors in many locations where fish drying is practiced, particularly in southern Tamil Nadu where large areas of coastal land were used for fish drying. This is worsened where coastal erosion has removed large areas of the shoreline, the area often used for fish drying. The widespread cutting of forest in coastal areas for building materials and for fuelwood has further complicated the lives of fish processors in some locations.

TRENDS IN MARKETING

Major changes which have taken place in the marketing of fish include:

- Increased demand;
- Changes in availability of fish;
- Increased competition in trade;
- Gender changes;
- Changes in financing transactions;
- Reduced fish loss;
- Group formation.

Increased demand

The value of fish exported from India increased nearly five times from 1990/91 to 1998/99. This has significantly affected domestic fish supplies for trade and processing. It has also stimulated greater movement of fish domestically to make use of facilities with export certification. For example, fish is sent from Karnataka to Kerala to benefit from the export industry there.

Changes in availability of fish

Many of the trends mentioned above for processors also affect local fish traders; landings are focused at larger sites, local supplies are more erratic, and competition

has increased. In areas where coastal communications have improved, outside buyers can locate good fish landings quicker than before and can access those landing sites with larger vehicles carrying ice. Likewise, improved feeder roads to coastal communities means that fish that previously only entered those villages by foot or by cycle rickshaw can now often be transported by motorized vehicles.

In the larger landing sites there is a more steady supply of fish that has meant that livelihoods of the traders based there have become more secure. In general, increased demand for fish has meant that traders are now more likely to find sales for their fish.

Increased competition in trade

In many villages the competition to buy fish has increased, not only because more traders are coming into the villages from outside, but also because more people from within villages are entering the fish trade. Some of these are displaced fishers, others are processors who have moved into fresh fish trading, and some are people who have been displaced from land-based activities.

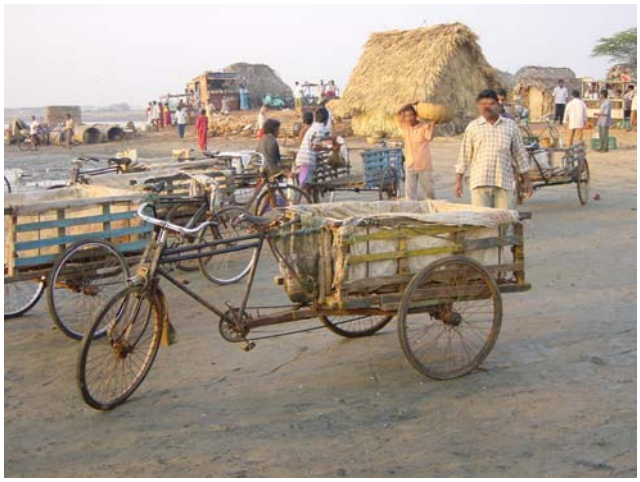
The increased dependence on ice, both ashore and onboard, means that the suppliers of fish and the suppliers of ice are more closely linked. In more remote locations it means that the ice suppliers often have preferential access to fish landings and this can displace small-scale local buyers.

Increased competition is also a reflection of the increased access to inland markets, inter-state and overseas trade. Within the domestic market the increased preference for fresh fish over processed fish, its increased availability in distant markets and increased awareness of the health benefits of fish has increased the price of fish and thus attracted more people to become involved in trade either as a worker or investor.

Gender changes

The roles of men and women are also changing in the trade of fish. Men displaced from fishing are looking more towards trade as a livelihood option. In Orissa, for example, in the north most of the fish trade was traditionally done by men, often on bicycles, but in the south it was carried out by women head loaders. In the south more men are now entering the fish trade and competing with the women.

Figure 5: Cycle traders



Changes in financing transactions

The operating costs of many small-scale traders who now access fish from landing sites away from where they live are also likely to be increased as the fish needs to be transported back to the fishing communities where they live in order to access their local markets. Accompanying these changes has been an increase in the trade of fish based on cash transactions rather than loans or long-standing relationships of trust and

inter-dependence. This has meant that reciprocal arrangements between wholesalers, processors, retailers and fishermen have declined and transactions have become more opportunistic. While this may have increased the "transparency" in many fish marketing transactions, it has also increased the level of uncertainty for many small-scale poor fish traders, who often depended on their long-term relationships with wholesalers and other middlemen to help them deal with lean periods or crises.

Reduced fish loss

The expansion of the iced fish trade, and the increased investment associated with it, has meant that in many locations the level of fish loss along fish marketing chains has decreased and more fish is reaching the consumer in better condition. The greater landings of by-catch from the trawlers and the increased demand for this fish for human consumption have also reduced fish loss. In addition, these changes have also prompted a greater degree of grading of such fish to address different segments of the market, which has provided increased work opportunities in fish handling and grading in those areas.

Group formation

Whilst the expansion of demand for fresh fish has generally been beneficial for the petty traders, the increased quality consciousness of the consumers has meant that there is greater pressure for improved use of ice which increases costs. Combined with the need to move the focus of purchasing to larger sites, or to compete with larger fresh fish buyers at the village level, this has prompted many petty traders to form groups. This enables them to reduce competition between themselves and to buy larger quantities of fish, and thus more effectively compete with larger buyers coming from outside.

TRENDS IN CONSUMPTION

Due to the lack of information available at the time of the research and the limited resources available for primary data collection, the state-level studies did not focus greatly on the consumption side of the post-harvest sector. However, some broad trends appear to be emerging.

Export demand

The export demand for fish is globally increasing making locally produced fish less available for local markets. This increase is likely to continue and its effects are likely to be more noticeable as the domestic population increases.

Domestic purchasing power

Likewise, the different preferences for different types of fish at different times of the year, in different locations, and the increased willingness to pay for fish, combined with improved transport and storage of fish means that there is greater interstate movement of fish throughout the country.

Overall the purchasing power of the average domestic consumer seems to have increased at a faster rate than the increase in the price of fish. But this is not the case for all groups and poorer consumers now find it more difficult to access the types of fish they prefer at affordable prices. For some this has meant changing their diets to incorporate cheaper fish species. For many people in Orissa, for example, the price of freshwater fish has risen to such

a point that there has been an increase in the consumption of less preferred marine fish and overall fish consumption appears to have increased.

Changes in preferences

Associated with the increased demand for iced fish has been a general decline in consumption of traditionally processed fish. In Karnataka, for instance, the main purchasers of dried fish are now poor consumers from inland who cannot afford, or access, fresh fish. In Orissa, on the other hand, there is still a large amount of traditionally processed product available.

This shift in consumption has affected different consumers in different ways. For the poorer consumers, in some locations, the increased price of fish has meant that they have to seek a greater proportion of their animal protein from other sources. This has resulted in a change of image of fish in some locations from being food for all, to becoming a more middle class food.

IMPACTS OF CHANGES

General Impacts

For the majority of the different groups of people operating in coastal fisheries the impacts of the recent changes in fish utilisation have been positive. The increased demand for fish combined with better technology and communications has increased competition for fish at the landing site and the prices paid at the beach have reportedly improved. The increased value of fish has provided increased opportunities for more people to become involved in the transportation and marketing of fish and thus provided increased employment.

For processors who can access larger landing sites, supplies have tended to increase and fish is reportedly available for longer periods of the year. The expansion of icing, freezing and export-quality facilities have increased access to foreign markets and have increased foreign exchange earnings, and created a complete new set of jobs for people. The associated industrialization of some of the processing facilities has provided new opportunities for people such as shrimp peelers, packers etc. Likewise, the greater focus on a wider diversity of fish, especially from the trawl fishery, has provided increased jobs for graders. For the richer consumers the quality of fish has improved, and fish can now enter markets further away, faster and in better condition.

However, for some of the poorer groups the positive impacts of changes have been less apparent and, in some cases, changes have clearly threatened certain groups, who depend on access to fish for their livelihoods. For these groups, the process of transition from a more traditional industry to a more modern one presents problems. These are discussed below.

Impacts on the Poor

Poor in the harvesting sector

A key aspect of the fisheries in most of the states is that the coastal populations have increased and more people are now dependent on fisheries for a livelihood. The open access nature of much of the fishery has provided opportunities for those who wish to make an income, but the returns from working in the sector are becoming more polarised and uncertain.

There are several consequences of these changes for the poor in the harvesting sector, but there is less uniformity of those changes than perhaps in other parts of the sector. There seems to be localised underemployment in the sector due to an increase in the number of participants. This has placed a greater burden on the women in the household and this is not helped by increased alcohol consumption amongst the men reported in some locations. Those more established in the industry are likely to have increased their incomes because of the increasing demand for fish and the higher prices paid. However, the risks and costs of operating in the sector are increasing, and the higher costs often involved if fishers are to compete effectively are leading to increased indebtedness in some areas. As much of the credit flowing into the harvesting sector continues to come from informal sources, the high interest rates charged threaten commercial sustainability. Many people now talk of greater wealth polarisation within coastal villages with more capital being concentrated in fewer hands. How sustainable the benefits flows will be, considering the increasing competition in the harvesting sector and given the increasing pressure on the resources, is unknown.

For some of the fishers, conflict in the sector, more competition for resources and the need for ever increasing levels of investment has meant that they have left fishing and moved into fish trade or migrated in search of fish harvesting work elsewhere. Fishers from Andhra Pradesh have traditionally seasonally migrated to Orissa, but this is happening now on a semi-permanent basis and some fishers are also migrating to work on trawlers in Gujarat. The impacts upon the families left behind are not well documented but there are reports that the wives of fishers with families are having to take over more of the responsibilities for the household during the long absences of their men. The traditional patterns of caste involvement in fishing are also changing with more people from non-fishing castes entering the fishery, especially at the more mechanised end of the sector and in fish handling and trading.

In some communities fish carriers or transporters, who carry fish from the boats to the auction centres, make up a large number of the poorer workers. Where fish continue to be regularly landed in villages their work has continued. Where greater quantities of fish are now landed at larger sites the village carriers are finding that work is more intermittent and only those who are more mobile and are able to follow work opportunities to the larger landing centres are able to continue with this work. By contrast, at those larger centres, new jobs for carriers have been created benefiting the local poor.

The poor processors

For traditional processors in remote locations, where connections with the outside world are limited and access to markets more difficult, the situation remains largely unchanged. They continue to produce for the local markets and competition has not dramatically increased. However, these unaffected locations are becoming fewer. For the majority of traditional processors, access to the fish they need to continue their trade has reduced, and demand has changed amongst middle class consumers towards iced/fresh fish. Demand for traditional products amongst poorer consumers probably remains high but with increasing fish prices demand is not being met. In general, fish processors are the main stakeholder group that seems to have lost out most dramatically as a result of almost all the changes that have taken place in fish utilisation.

Traditional women processors are particularly affected as they have to deal both with changes in access to fish supplies and the problems associated with their position as women, particularly their greater poverty relative to men. The shift of fish landings to fewer, larger landing sites has demanded greater mobility and it is often more difficult for women, especially older women, to move out of their immediate community in order to access fish. This also affects older people more generally, particularly those who may have been involved in fish processing because it involved little travel. As fish processing has traditionally involved more women than men the potential impacts of these changes at the household level are significant. For those who have made the move to purchasing from larger landing centres, their costs have reportedly increased but their incomes have not necessarily increased to the same degree. The organisation of women processors into groups, often with the support of government or NGOs, has sometimes helped to offset some of these negative impacts and has enabled women to operate in this more competitive environment. But such support is still limited compared to the need.

For those wishing to abandon fish processing as a livelihood activity, the alternative income earning opportunities are few and where they exist the poor often lack the skills to take these opportunities up. The availability of alternatives is also changing, for example in Karnataka women processors and traders were also often involved in agricultural labour, but in some locations the development of coastal shrimp farming and the mechanisation of agriculture have lessened the availability of such options. In areas where coastal aquaculture has developed, the collection of wild shrimp seed for the aquaculture industry did provide an important income-generating activity for the poor, but this has greatly reduced both because of:

- Problems in the aquaculture industry itself (such as the legal aspects of coastal development and shrimp disease);
- The growth of hatchery produced shrimp fry;
- Legislative changes that have made many of the gears used to catch wild shrimp fry illegal.

Other alternatives that may traditionally have supplemented fish processing for women in fishing communities have also declined – for example, opportunities for the manufacture and repair of fishing nets and for making basket have decreased with the introduction of synthetic materials.

Overall the position of many women processors seems to have got worse and many are reported to have left the sector but what they are currently doing is unknown.

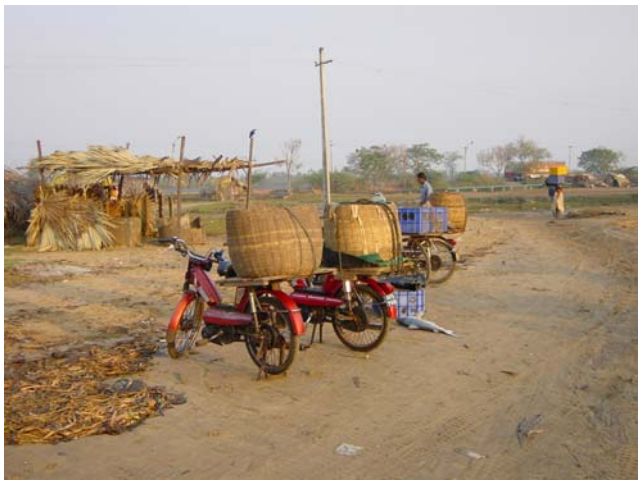
Poor traders

The iced fish trade has grown and, while this has created many new employment opportunities in fish trading, the benefits for poorer fish traders involved in the sector have been dependent on their capacity to adapt to changing conditions and deal with increased levels of competition. In particular, as is the case with fish processing, it is the poorest and most vulnerable, whose fish trading activities may have been on an extremely small-scale but were often relatively far more important as part of their livelihood strategies, who have faced the greatest difficulties. The elderly, the infirm, or the socially emarginated, such as female-headed households or widows, are often those who have had the greatest difficulties in making the necessary adaptations.

The increased demand for fresh fish has attracted inward investment in trading, and increased the number of traders, commission agents, head loaders and transporters involved in the sector. Generally, this increase in the number of people involved in handling the fish has been compensated for by the increased prices paid. However, these changes have also increased competition amongst the participants and not all have benefited equally.

At the same time, in Southern Orissa, Andhra Pradesh and Karnataka, there has been a shift from women traders to men traders in many of the local markets. This has reportedly led to a decline in the power of women in the household. Whilst some of the jobs traditionally done by women are being taken over by men, the export processing activities, especially for shrimp, have provided new opportunities for women, e.g. in shrimp peeling. For those that have managed to penetrate the larger landing sites and formed purchasing groups the situation, at least in the medium term, looks good. This has also been helped by greater landings of by-catch from the trawler fleet.

Figure 6: Old baskets combined with new bikes – stages in the evolution of the fish trade.



These impacts have not just affected men and women differently; they have also affected different groups differently. For example there has also been a weakening of the traditional barriers to entering fish trade in Karnataka, where the fish trade was traditionally run by Hindu women but where more Muslim women are now entering the trade.

The reduced dependence on transactions based on delayed payment and reciprocal arrangements in fish trade has increased uncertainty in the sector, particularly for the poorer participants, and made the fish trade more opportunistic. The impacts of this are likely to be most seen when processors and petty traders fall on to hard times and they need to fall back on such traditional mechanisms.

Poor Ancillary workers

For porters, graders and general labourers in the sector the impacts have been mixed. For those able to move to new locations the opportunities offered by the larger landings sites have generally been beneficial. For those restricted to local landings sites where catches have become less regular, work has declined. Some intermediaries, such ice sellers and fish transporters, have also benefited from the increased levels of activity at landing sites that the rising demand for fresh fish has created. There are more fish traders to be catered for, work opportunities have increased and the increasing availability of ice and demand for its use have created an entire range of activities linked to the supply of ice that simply did not exist in the past.

Poor consumers

It is likely that for poor consumers the situation has got worse in terms of the availability of fish at prices that are affordable. To an extent this has been offset by increased availability of cheaper protein from other sources, but little is known regarding the relative levels of availability of fish for poor consumers. Given the widespread effects of improved communications and transport on the movements of fish from rural landings to urban centres, it seems likely that fish supply for the urban poor may have improved while access to cheap fish for the rural poor may have declined. This certainly seems to be the case in many rural coastal communities where poorer people often depended on access to low-value fish from local catches and "discards" for their consumption. Often these fish could be obtained through barter arrangements or informal exchange of labour or other services. However, increasingly, there is demand for these "discards" in distant markets where higher values can be realised such that these fish are no longer readily available for local rural consumption. Landings, in any case, are more likely to be in distant landing sites where these poor rural groups have reduced access. Overall availability of fish for poor consumers, at prices that they can afford, therefore seems to be declining.

POLICY IMPLICATIONS

The above changes have implications for those people involved in formulating policy, planning interventions or providing support to rural people involved in the post-harvest sector.

The changes that are affecting the post-harvest sector in India are moving it from a traditional and local activity into one which has a more modern and global perspective. There is a degree of inevitability concerning such changes as similar changes are occurring throughout the fishing industry globally. However, these changes are also affected by the actions of government and the private sector and these have an important role in reducing the negative impacts that such changes have on poorer sections of the fisheries sector.

As with all policies there is a need to periodically reassess progress and to fine tune the way forwards. In particular, and in line with wider poverty reduction policies in the country, there is a need to consider the impacts of policies instituted in support of the post-harvest fisheries sector on the poorest groups involved, as these are the groups that may be least able to benefit from changes that are generally seen as positive.

The following section outlines what those implications might be and aims to:

- Identify areas from the research that are particularly important for consideration during the policy process; and
- Seek guidance from the Code of Conduct for Responsible Fisheries on what might be done to address those areas.

In terms of poverty reduction these policy implications can suggest the relative priority of policy options and suggest ways that issues might be addressed. In addition, policy is always a process of trade-offs and the Code of Conduct for Responsible Fisheries offers some guidance on these issues.

Ensuring Sustainable Supplies

The research has looked at the supply-side of the post-harvest sector only in terms of what happens after capture and with a focus on the sustainability and variability of supply of fish to the post-harvest sector. The complexities of fisheries management or the policies concerning fleet development have not been touched upon. FAO's assessment of the resource position in India suggests that marine production has reached a plateau and only marginal increases in production are predicted, which are likely to come from the deep-sea. However, inland production and aquaculture do have the potential for increasing overall supplies.

This situation will have implications for the post-harvest sector in terms of both the location of supplies and the species that make up those supplies. The increased capitalisation of the fleet to harvest deeper water resources is likely to further concentrate landings into fewer landing sites. Increased mechanisation of vessels is also likely to reduce onboard employment opportunities in the long-term. The progressive shift towards deeper water fishing, inland fishing and aquaculture will also change the species mix available to processors, traders and consumers. These issues will have important implications for future policies.

Perhaps the most important aspect of the fishery, as far as the post-harvest sector is concerned, is the ***sustainability of existing supplies from the marine sector***. Concern for the existing supply situation globally, and its implications for the livelihoods of those who depend upon the sector, has prompted the international community to formulate and promote the Code of Conduct for Responsible Fisheries (CCRF). The CCRF lays down clear policy guidance on the ***management of fisheries to ensure sustainability, quality and diversity of resources in sufficient quantities for present and future generations*** (Art. 6.2). If this is not achieved the livelihoods of many of the people in the sector are likely to become more and more vulnerable.

Such policy guidance is particularly relevant to the Indian context where concerns for resource sustainability are based on the recognition that even the livelihoods of those who are currently benefiting from the changes in the fishery ***are vulnerable to future adverse changes in the state of the stocks***. In formulating solutions to the problems facing the fisheries sector, the CCRF suggests, that those involved in the sector should be ***consulted and their participation facilitated in the processes of decision making with respect of laws and polices related to fisheries management, development and international lending and aid*** (Art. 6.13)**.** This is particularly important where, as in the Indian coastal fisheries context, there are many different stakeholder groups with different, and sometimes conflicting, livelihood needs and aspirations.

Likewise regulations to ensure the conservation of resources and the preferential access by local communities to those resources are of little benefit unless they are enforced. The CCRF suggests that ***states should establish, within their respective competences and capabilities, effective mechanisms for fisheries monitoring surveillance, control and enforcement to ensure compliance with their conservation and management measures*** (Art. 7.1.7).

Where aquaculture development is seen as an important way forwards to ensure future supplies of fish, its impact on the livelihoods of the coastal communities, and particularly those involved in the processing of fish on the shore, needs to be considered. The CCRF suggests that States should ***promote responsible aquaculture practices in support of rural communities*** (Art. 9.4.1). It also promotes the ***active***

participation of fish farmers and their communities in the development of responsible aquaculture management practices (Art. 9.4.2). It needs to be recognised that while aquaculture production may, in the long-term, provide an alternative source of fish supplies, access to that supply may not be easy for those who currently depend on capture fisheries from marine resources. Therefore the opportunities from aquaculture will not necessarily compensate those who may lose out from the decline of capture fisheries resources. In some cases, as mentioned, it may even result in the decline of important alternative opportunities, as aquaculture replaces agriculture on which poor women processors depend. The CCRF suggest ***that states should ensure that the livelihoods of local communities, and their access to fishing grounds, are not negatively affected by aquaculture development*** (Art.9.1.4).

Given the dependence of the small-scale fishers on access to local resources in the Indian coast, the need to ensure that access is maintained, at least in the medium term, is an important consideration. The CCRF also recognises the important contributions of artisanal and small-scale fisheries and encourages states to protect the rights of fishers and fish workers to a secure, just livelihood as well as ***preferential access, where appropriate, to traditional fishing grounds and resources*** (Art. 6.18). In addition the CCRF states that ***due recognition should be given… to traditional practices, needs and interests of indigenous people and local fishing communities which are highly dependent on fishery resources for their livelihoods*** (7.6.6).

Such access, needs and interests are likely to be more important in the coastal areas where the traditional fleet is still well established such as Andhra Pradesh, Tamil Nadu and Kerala.

The changes that have taken place in patterns of fish utilisation highlight the importance of fisheries production for a complex web of stakeholders, many of whom are poor and some of whom are only able to avoid poverty because of their access to fish, either for capture, sale, handling or processing. If the supply of fish that supports the flow of benefits through this web fails, the livelihoods of many of these actors will also fail and there is a high risk of increased poverty, particularly in the coastal communities most directly concerned. Therefore, effective efforts to sustain fisheries resources are of critical importance in supporting the livelihoods of the poor involved in fish utilisation activities.

Key Knowledge Gap: A detailed understanding of the state of the resources is needed, including the changes that they are facing, the causes of those changes and the consequences of those changes especially for the poor.

Taking a Holistic Approach to Fisheries

Fisheries resource depletion, where it occurs in the world, is rarely caused by over-fishing alone. In most cases the carrying capacity of the environment is also being reduced by land-based activities and urban development. Therefore efforts to support and sustain the livelihoods of those dependent on fisheries and fish utilisation cannot be considered in isolation from these other spheres of activity that may be impacting on the fisheries environment.

At the same time land-based activities, whether they be agricultural or industrial, provide important opportunities and benefits, both for society as a whole and for those

people who are displaced from the fishery. These opportunities are becoming more important as people displaced from traditional fisheries activities seek alternative livelihoods in other sectors.

Likewise, coastal fisheries do not operate in isolation from the wider coastal community. The income generated from fisheries-related activity may often be of crucial importance in supporting a far wider range of commercial, service and agricultural activities in the coastal belt, so that the failure of the fisheries may have far wider impacts throughout coastal communities. Particularly in rural areas, fisheries related activities can often constitute important sources of cash income in rural economies which may be chronically cash-starved. The importance of sustaining the fisheries therefore also needs to be considered in the light of its multiplier effects in the local economy.

Developing interventions to support the poor in the post-harvest sector requires that the sector be approached in a holistic fashion. Single interventions to support single groups of stakeholders or address individual problems are unlikely to be effective if the problems facing the sector as a whole are not adequately taken into account. Likewise, it needs to be recognised that many of the "solutions" to the problems facing the poor, who are currently involved in fish utilisation in one way or another, are likely to lie outside the fisheries sector. The holistic approach to addressing the problems of the sector therefore has to include an overall understanding of the livelihoods of the actors involved and the range of options open to them both in fisheries-related activities and in other areas of activity. This in turn ***will require partnerships to be formed between line agencies concerned with fisheries and agencies in other sectors.***

Fisheries also constitute a contribution to food security both in coastal communities and in rural and urban areas as a whole. Changes in patterns of fish utilisation are therefore liable to have wide-reaching impacts on food security for groups far outside of the coastal area. This should encourage policy makers to ensure the sustainability of the fisheries sector not just for the sake of those primary producers directly involved in fisheries and fish utilisation but in order to ensure sustainable supplies of high quality animal protein for society as a whole. The CCRF recognises the importance of food security and highlights it as an objective of the code to ***promote the contribution to food security and food quality, giving priority to the nutritional needs of local communities*** (Art 2.f)

The CCRF acknowledges the importance of linkages between fisheries and other sectors and encourages ***fisheries interests to be integrated into coastal area management, planning and development*** (Art. 6.9). In the Indian context this needs to extend beyond the conservation of coastal resources to accommodate a wider form of social and economic integration in the coast.

Focussing on the Most Vulnerable

Whilst many are benefiting from the current changes in the sector, there are also many whose livelihoods have worsened and they have already become poorer or more vulnerable. Many of the traditional processors have seen the markets for their products change as increases in international and national demand decrease the availability of the supplies that they can access at affordable prices. These are mainly women who tend to be poorer, more vulnerable and less able to respond to change than men.

The CCRF has foreseen how the poor are liable to be affected by many of the changes underway in world fisheries but, at the same time, recognises ***their rights to a secure and just livelihood*** (Art. 6.18) and to ***participate in the development of laws and policies related to the development and management of the sector*** (Art. 6.13). This requires greater knowledge of the livelihoods of the poor involved in the post-harvest sector than currently exists and the development of mechanisms to allow and support their participation in decision-making processes that affect their livelihoods.

Key Knowledge Gap: Understanding of the complexities of the lives of people involved in the post-harvest sector is not well understood and more research needs to be done on this and on the effects and impacts of change.

In particular the research has identified ***the need to mainstream concerns for the old, those in ill health, those who have recently suffered major shocks and women (especially female household heads) in the processes of change, and to ensure that policies are specifically targeted at such groups.***

A key first step in this is the recognition that the poor have a different capacity to react and adapt to changes compared to those who are better-resourced. As changes occur a key element will be ensuring that ***basic safety nets are in place*** to assist the poor to adapt to these changes. The ***welfare schemes of the past provide a mechanism that could be more focussed preferentially towards these specific vulnerable groups***.

However, it must also be recognized that the small-scale fish traders and fish processors that have suffered the most from changes in their working environment are likely to have to continue to deal with change, at least in the short to medium-term. An essential part of supporting these poor fish users will therefore involve the provision of support that helps them to deal with, rather than protect them against, these changes. The research has shown ***the importance of self-help groups as a mechanism that can help the poor, especially women, to achieve better access to support from government, private sector and NGOs***. Such mechanisms can also help to empower the poor and help them to adapt to change in the future. In the short-term self-help groups can facilitate access to credit for poorer groups that is so important for helping them to participate in the change process. This is of particular relevance in the post-harvest fisheries sector as many of the stakeholders involved are among the poorest groups in coastal communities.

A key survival strategy that many of the coastal poor are involved in is increased mobility and migration. ***Mainstreaming and formalising the migration and mobility aspects of the livelihoods of the poor in the policy process will help to cater for the needs of these people***. One particular aspect of this is the movement of women to work in factories and fish landing sites away from their homes. This aspect of mobility needs to be given particular attention again through such mechanisms as self-help and representative groups catering for the specific needs of such stakeholders.

Key Knowledge Gap: The importance of mobility and migration on the fishery, and in particular on the post-harvest sector, is poorly understood. In particular we know little about the implications of changes in migration at the household level.

Creating Alternatives

In the longer term, there will inevitably be some people who will not be able to adapt to the changes in the sector, either because the sector simply cannot support the numbers of people seeking to create a livelihood from it, or because those people cannot acquire the skills they need to continue to operate under the new prevailing conditions. One of the features of poverty is that it often leads to the exclusion of the poor in the face of competition, and increased competitiveness is a key change that the post-harvest sector is experiencing almost everywhere. Many people have already left the post-harvest sector in India but little is known about their new livelihood strategies.

Key Knowledge Gap: Some of these poor people have left the fisheries sector and have moved into other activities. We have little information about these changes in livelihood strategy, what enabled them to move and how successful they have been.

For people wishing to leave, there is a need to develop and apply methods of identifying appropriate, viable and sustainable alternative livelihoods and supporting them in adopting those alternatives and building their capacity to adapt to change, especially through enhancing their skills to access new opportunities. All too often, where efforts have been made to help the poor in taking up alternatives, they have been based on limited knowledge of the livelihood history and context of the people that they are designed for and many have failed. The poor can ill-afford such failures and a ***more systematic approach to the identification of livelihood alternatives needs to be developed***.

Key Knowledge Gap: More information is needed about what alternative livelihoods can be promoted and supported so that the poor can move out of fisheries into viable and sustainable livelihoods.

For many, enhancing existing livelihoods will still be important such as for those processors who now have access to increased quantities of bycatch that is landed. This emphasises the continued importance of research in post-harvest fisheries that pays particular attention to ways of adding value to these low-value species. The Code suggests that ***States and relevant organizations should sponsor research in fish technology and quality assurance and support projects to improve post-harvest handling of fish, taking into account the economic, social, environmental and nutritional impact of such projects*** (Art. 11.1.6)**.**

It is also important to assist the poor to help themselves in the process of change and ***to facilitate their empowerment, their involvement in decision-making bodies, and their ability to form and work in groups***. A key element in this is the provision of ***appropriate credit sources*** to enable change to occur.

Understanding Consumption

The changes that are occurring in and around the post-harvest sector are affecting the needs of the consumer in terms of the availability of different species of fish, the quality and quantity of fish, where it is available and its price. How these changes are affecting different groups of consumers, particularly poor consumers is not well known at present.

> **Key Knowledge Gap:** There is clearly a need for much more research into the food security issues of these poorer groups so that appropriate policies and strategies can be developed.

One of the key objectives of the CCRF is to ***promote the contribution of fisheries to food security and food quality, giving priority to the nutritional needs of local communities*** (Art. 2f) and, as a key principle, it encourages the management and the development of the fisheries sector in ways that ***promote the maintenance of the quality, diversity and availability of fishery resources…in the context of food security, poverty alleviation and sustainable development*** (Art. 6.2)**.**

A major aspect of the post-harvest fisheries sector in India has been the growth in exports. This is bound to have had implications for the availability of fish on the domestic market and the CCRF makes reference to such changes in that States should ensure that ***their policies and practices related to the promotion of international fish trade and export production do not…adversely impact the nutritional rights and needs of people for whom fish is critical to their health and well-being and for whom comparable sources of food are not readily available or affordable*** (Art. 11.2.15).

CONCLUSIONS

The fishing industry in India has seen major changes over the last ten years and these changes are having impacts across the fishery from harvesting to consumption. For many of the people involved in the sector these changes have been beneficial, for others, especially the poor, the situation has become more uncertain or has worsened.

For those involved in supplying the sector with fish the changes have generally been positive but their livelihoods are becoming more vulnerable, largely because the sustainability of the stocks of fish in inshore waters is threatened by over-exploitation and environmental degradation. Coastal resources currently represent a major source of supply to the post-harvest sector and changes in that supply are already impacting upon the livelihoods of those who depend upon them. The potential threat to the marine capture fishery is partly offset by an increase in supply from inland fisheries and aquaculture but these compensatory effects will not necessarily be of benefit to those who depend on supplies from marine capture fisheries.

Future decline of resources ultimately threatens all fish users from those harvesting right through to consumers both poor and wealthy.

Changes in the capitalisation of the fishery and increased competition for resources has meant that, overall, more fish is now being landed in fewer and larger landing sites. This capitalisation has led to changes in the ownership and working practices of

poorer fishers that have had effects at the household level; for many incomes are reduced and the security of employment in the household has changed. There are also changes in the trading of fish at the landing sites with more fish going to bigger traders.

Perhaps one of the most dramatic changes in the post-harvest sector of the fishery has been the widespread uptake and use of ice. Associated with this has been a growing demand for fresh fish. This has had serious implications for poor fish processors, many of whom are women. In many cases their livelihoods are being marginalised and few viable alternatives are currently available for them. At the same time, the expansion of the fresh fish trade has created new jobs but also increased competition. The rising fish prices have helped to offset some of these adverse effects but the benefits from the price increases have not always gone to the poor. The changes are thus having a mixed impact on the livelihoods of people who depend on the fishery. This research has helped to understand those changes and to explain in a little more detail who is affected and how. The current document has tried to place those changes in the context of the CCRF, to identify knowledge gaps and to suggest some broad policy options that the research suggests are important for the future livelihoods of the poor people involved in the fisheries post-harvest sector.

Policy options include:

1. Better understanding the state of the fisheries resources and ensuring sustainable supplies of fish through their sound management and effective enforcement;
2. Recognising the needs of traditional and resource dependent communities in those management measures, and providing local communities with preferential access to traditional fishing grounds and resources where appropriate;
3. Involving the fishers in the decision making about the management and development of the fisheries, especially concerning aquaculture development;
4. Balancing the needs for fish export with promoting the contribution of the fisheries sector to domestic food security, and giving priority to the nutritional needs of local communities;
5. Recognising the holistic nature of the livelihoods of the poor, better understanding those livelihoods, integrating fisheries into wider coastal area management, planning and development, and working in cross-sectoral, multi-agency, partnerships to achieve this;
6. Focussing on the most vulnerable people in the post-harvest sector, especially women, those in ill health, old people, and groups such as small-scale processors and traders; recognising their rights to a secure and just livelihood, and mainstreaming concerns for them in policy support;
7. Recognising the importance of safety nets for the poor but also the need to help them to deal with change in the future, and recognising the value of appropriate credit/finance sources and self-help groups as mechanisms to allow the poor to better access service delivery and to become empowered;
8. Recognising that change within the sector, whilst driven by similar forces across the country, is having different effects and impacts on different stakeholder groups in different locations; and understanding the consequences of change on the livelihoods of these different groups and responding accordingly;
9. Understanding the importance of increased migration and mobility to the livelihoods of the poor in the post-harvest sector and mainstreaming these issues in the policy process;
10. Understanding existing coping strategies of the poor to the changes they face in the sector, identifying viable and sustainable alternative livelihoods for those wishing to leave the sector, and supporting the uptake of those options;
11. Sponsoring and supporting innovative research into new opportunities that exist for the poor such as for improved use of small, low-value species;
12. Better understanding consumption patterns of the poor and promoting their food security.