Report of The Research Study on

Exploring Market Opportunities for Fisheries Sector in India

Submitted to
National Fisheries Development Board
Govt. of India

National Centre for Agricultural Economics and Policy Research
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Submitted to
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Hyderabad

National Centre for Agricultural Economics and Policy Research
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CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

1.1 BACKGROUND

Fisheries sector occupies a very important place in the socio-economic development of the country, as it contributes to economic growth and human welfare. It has been recognized as a powerful income and employment generator as it stimulates growth of a number of subsidiary industries and is a cheap source of nutritious food, besides being a foreign exchange earner in India (Ayyappan and Krishnan, 2004). This sector contributes to the livelihood of a large section of economically underprivileged population in our country. More than 200 million people worldwide are fish workers, which is just under 3 per cent of the global work agricultural labour force. Over 90 per cent live in developing countries, working in small-scale, household based or artisanal fishing enterprises (IDS, 2006). In India, about 14 million people are employed in this sector either directly or indirectly (Sugunan, 2008).

Fish and fishery products are increasingly finding place in the diets of Indian population as a result of their rising income, growing urbanization, unfolding globalization, changing consumption behavior and life style, increasing number of working women population etc. Fish is a healthy food with a few taboos associated with it, unlike meat and the health is associated with high protein, vitamin and mineral and low fat contents.

Fisheries sector, a sunrise sector in India, has recorded a faster growth than that of crop and livestock sectors (Kumar *et al*., 2006). In the last 25 years, total fish production has been growing at an annual growth rate of about 4.60%, in which marine sector was growing at a rate of 3.24 and inland sector was growing at a rate of 6.20% (Ganeshkumar, *et al*., 2008). For some years now, aquaculture has been seen as a possible savior for the overburdened capture fisheries sector and an important source of food fish for the poor (FAO, 1995; Williams, 1996). With diverse resources ranging from deep seas to lakes in the mountains and more than 10% of the global biodiversity in terms of fish and shellfish species, the country has shown continuous and sustained increments in fish production since independence.

However, there is a large untapped potential in fisheries and aquaculture, which can contribute considerably to improve the livelihoods as also to the empowerment of women. The future development of aquaculture depends on the adoption of new and innovative production technologies, management and utilization of underexploited water bodies and proper marketing strategies. Proper post harvest handling, reduction of losses and hygienic primary processing are important to realize full potentials of the sector. Simultaneous marketing arrangements are to be made to ensure adequate returns to the fishers and fish farmers as also make available good quality fish at affordable prices to the consumers.

Realizing the potentials of this sector, Government of India established the National Fisheries Development Board (NFDB) during 2006. It aims to work towards a blue revolution with a focus on increasing the fish production of the country to a level of about 10 million metric tonnes from the present level of 6.5 million metric tonnes, to achieve doubling of exports and an additional direct

employment to an extent of 3.5 million by extending assistance to various agencies for implementation of activities under inland, brackishwater and marine sectors. While doing so, it is also desired to have an efficient and well planned distribution network so that fish and fishery products move from the place of landing or production to the place of consumption at cheapest cost with quality-intact, ensuring the maximum price realization to the fishermen / fish producers. It is really challenging for the public agencies involved to meet the requirements of all the three major players, viz. fishermen / fish farmers, consumers and traders.

Fish is a highly perishable commodity and needs to be disposed off from the point of landing / production to the place of consumption as quickly as possible. The perishability of these products requires careful handling, special facilities (assembling yards, cold storage, and refrigerated transport), and rapid delivery to consumers to maintain quality and reduce physical and nutritional losses. Many a times, the long supply chain, poor access to roads and electricity, and inadequate infrastructure and services in physical markets add to the transaction costs and cause quality deterioration and high spoilage losses in this sector. In India, it is estimated that fruit and vegetable postharvest losses amount to about 40 percent of total annual production, equal to a year's consumption in the United Kingdom. The situation would be no different in this high-value sector.

Markets are good for improving efficiency of the any system, and much progress has been made in Indian fisheries marketing system, especially by private sector. But, further efficiency gains will require public sector support to deliver the necessary public goods, foster institutional innovation, and secure competitiveness. Because efficient markets do not always secure socially desirable outcomes, complementary policies are often needed to ensure fisherfolk participation. A large agenda remains in improving the performance of the fish marketing systems in our country. Public investments to expand access to rural infrastructure and services—such as rural roads and transport services, primary and secondary fish markets, telecommunications, and electricity—will be critical to reducing transaction costs and physical losses and to enhancing transparency and competitiveness in traditional fish markets.

The major chunk of marketing of fish in our country is in the hands of private. The role of public agencies in this aspect is limited, except in creating and maintaining certain infrastructure facilities required for marketing either their own products or those of fishermen or fish farmers or lease fish farmers of reservoirs. They don't have an end-to-end system in facilitating fish marketing as in the case of dairy by National Dairy Development Board.

Experiences in other related sectors highlight the respective roles of the government and the private sector to meet these challenges. A priority area for public action is to establish an enabling policy environment (competition policy, contract enforcement, setting grades and standards, food-safety legislation). It could develop credible public institutions to enforce regulations to guard against opportunistic and uncompetitive behaviour in the marketing system. The public sector can facilitate smallholder access to the big opportunities offered by market development. Greater access to assets for smallholders, level playing fields, and strong producer organizations to achieve scale and market power are necessary elements. The opportunities offered by major changes in markets will work for the poor only if these complementary policies are in place. The private sector can enable smallholders to

participate as partners in modern procurement systems and exports. It can setup innovative vertical coordination arrangements with farmers or producer groups. It can facilitate farmer access to credit, inputs, extension, and certification.

It is expected that the fish production, especially from inland and aquaculture sector would phenomenally increase in the coming years as a result of huge initiatives by several public agencies. In the scenario of ever increasing supply and demand for fish and fishery products, the country needs to have an efficient and manageable supply chain management with the involvement of all the stakeholders involved in this business. The NFDB has commissioned this study with the objective of bringing out mainly the demand – supply scenario of certain important fish species, the existing status of markets and price situations and future policy directions for developing the domestic market regime in the country. The intension of this study is to address the issues in a consistent economic framework that focuses on the dynamic and interacting decisions of fishermen / fish producers, consumers and traders all over the country by fish species and location to support useful conclusions on the likely future of Indian fisheries.

1.2 POLICY RESEARCH QUESTIONS

The study aims to address the following seven sets of key policy research questions.

How would demand pattern for fish and fish products change in the overall context of population growth, urbanization, globalization and growing income?

Rising incomes, urbanization, greater female participation in the workforce, wider media penetration—all are driving the demand for higher-value products such as fish and fishery products. They are also increasing consumer attention to food quality and safety. Diets are globalizing too, with local consumer preferences influenced by international tastes. Apart from this, there is also distinct demarcation as far as preferences of fish by species, size, source, season, festivals etc. by the people in different parts of our country. These trends open new markets for a wide range of fish and fishery products and lead to the evolution of the marketing system in some of the developed states in our country, with the entry and rapid growth of supermarket chains and upcoming of modern hygienic retail outlets. Hence, the demand for fish by species needs to be estimated so as to foresee the future potential of this dynamic sector.

How would supply be met for growing demand? What would be the sources of future supply sources?

In the initial years of our country's planning, marine sector used to contribute more to total fish production then inland sector. But from the beginning of this decade, the inland sector's share crossed 50% and continues to improve further. The main source of growth for this sub-sector is the wide-spread activities in aquaculture. The states such as Andhra Pradesh, Uttar Pradesh and Punjab are growing rapidly because of technological and market forces. Apart from this area expansion, it is expected that the under-utilized water bodies such as ponds, tanks, reservoirs, rivers, ox-bow lakes, beels, mountain lakes, estuaries, etc. are increasing being intervened with culture activities. These resources would supply for the future demand.

What would be the future of small fisher folks in the wake of commercialization, particularly their income and livelihood security?

There are apprehensions that in an era of commercialization these poor fisher folks would be marginalized and a bulk of benefits would be siphoned by the middlemen or the agri-business houses. Therefore, a system needs to be in place so that poor and underprivileged fisher folks take advantage of growing fisheries sector. In other sectors, especially in dairy, poultry and horticulture, there are innovative institutions are emerging (such as contract farming, farmers' associations, cooperatives), which are reducing transactions cost of the producers and ensuring procurements at remunerative prices.

How can the fishermen and fish farmers be connected to the niche markets?

The government and the private sector can help fisherfolk to meet the new requirements of urban consumers, supermarkets and other coordinated supply chains. The options include public investments to provide them connectivity to markets, policy changes to facilitate trade and market development, and public-private efforts to promote collective action and build the technical capacity of farmers to meet the new standards. The market demand, price prevailing at various places, species preferences etc. could be provided using the information and communication technology to the fishermen / fish farmers regularly so that they could establish regular contacts with the traders in the consuming market.

What is the possible model for fish collection and marketing through PPP mechanism?

Contract arrangement with supermarkets and processors for production and assured supply would be one of the options. The agent may supply the inputs, credit, and extension services in the process of production. By supplying inputs and providing assured markets and prices, contracting firms share production and marketing risks with farmers. Reducing these risks helps stabilize farmers' incomes, critical in the absence of insurance markets in fisheries. Cooperative arrangements could be another option, wherein the public agency may help them in getting the real benefits from the emergence of market. It may be in the form of securing better prices in the auction at the production or collection point. Various models are working well in different parts of the country that could be studied for their success and acceptance among the stakeholders for further promotion and expansion elsewhere.

How to share the benefits of rising demand for fish products with the smallholders by better infrastructure, markets and policies?

Fish marketing infrastructure and facilities in our country are limited and congested, increasing the difficulty of trading fish and fishery products. A related study found that wealthier and politically powerful traders tend to capture a disproportionate share of the facilities in congested fish markets, whether wholesale or retail. They also distort the prices in the market wilfully to eliminate the poorer farmer-traders. There should be proper regulatory mechanism to check this phenomena of marginalising the small farmers or traders.

How would fishery trade and prices be affected in the light of changing export basket? And, which of the countries would compete with Indian fish and fish products?

The export basket of Indian fish trade is changing over the years. The destinations are changing and so the species and level of processing. New competitors are emerging in some of our traditional exported items of fish such as Tiger prawns. In the changing scenario, we need to reorient our strategies to keep our pie in the world trade. The potential buyers of our fishery products need to be identified for better targeting and business. At the same time, the price transmission signals from some of the major international market need to be studied in order to study the insulation or integration of our market with the global market could be gauged in short term as well as in the long term.

1.3 OBJECTIVES OF THE STUDY

The study was planned with the following objectives:

1. Project demand for and supply of fish and fish products in India.

2. Diagnose existing marketing structures, and assess their performance in marine and inland sectors.

3. Undertake successful case studies on innovative marketing arrangements in fisheries sector to assess their feasibility and benefits to fisher folks.

4. Assess the feasibility and sustainability of adapting innovative marketing models from dairy and poultry sectors and conceptualize a model terminal market / cold chain for fisheries sector through PPP mechanism

5. Analyze export opportunities and its implications on prices of fish and fish products.

CHAPTER II

FISHERIES SECTOR: GROWTH, TREND AND COMPOSITION

Fisheries sector, a sunrise sector in India, has recorded a faster growth than that of crop and livestock sectors. The sector contributes to the livelihood of a large section of economically-underprivileged population of the country. It has been recognized as a powerful income and employment generator as it stimulates growth of a number of subsidiary industries and is a source of cheap and nutritious food besides being a foreign exchange earner.

With the changing composition pattern, emerging market forces and technological developments, it has assumed added importance in India. It is undergoing rapid transformation and the policy support, production strategies, public investment in infrastructure, and research and extension for fisheries have significantly contributed to the increased fish production. Particularly, after the mid-1980s, the development of carp polyculture technology has completely transformed the tradition backyard activity into a booming commercial enterprise.

2.1 FISH PRODUCTION IN WORLD AND INDIA

Approximately 50 million people worldwide depend on fishing for all or most of their family earnings, while another 150 million depend on fish processing and the fleet servicing industry. More than 10 million work on 2.5 million small-scale fishing vehicles and account for 50% of world's catch (FAO 2001).

Fish production in the world rose from 23.50 million tonnes in 1950-51 to 140.48 million tonnes in 2003-04. Correspondingly, the fish production in India has touched 6.40 million tonnes in 2003-04 from a mere 0.75 million tonnes in 1950-1951 (Table 2.1). The total fish production of our country stood at 6.87 million tonnes in 2006-07. The share of India in global fish production has grown gradually from about 2.66% during the 1960s and 1970s to 4.56% in 2003-04.

Table 2.1 Fish Production in World and India, 1950-51 to 2003-04

(million tonnes)

Year	World	% change	India	% change	India's share
1950-51	23.50	-	0.75	-	3.19
1960-61	43.60	85.53	1.16	54.67	2.66
1970-71	66.20	51.83	1.76	51.72	2.66
1980-81	72.30	9.21	2.44	38.64	3.37
1990-91	98.26	35.91	3.84	57.38	3.91
2000-01	129.00	32.35	5.66	47.40	4.39
2003-04	140.48	8.90	6.40	13.07	4.56
2006-07*	--	--	6.87	--	--

Source: 1. ICAR-ICLARM Project on 'Strategies and Options for Increasing and Sustaining Fisheries and Aquaculture Production to Benefit Poor Households in India, 2004 and Economic survey 2006-07, GOI

*2. *Annual Report 2006-07 Provisional Estimates*

It shows that growth in fish production in India has been at a faster rate than in world; mainly due to increasing contribution from inland fisheries. It can also be seen in Figure 2.1 that in the pre-WTO period of 1990-91, the share of India's fisheries was 3.90, which rose to 4.56 in the post-WTO period of 2003-04. Overall, the share of developing world in the total world fish production increased from 43% in 1973 to about 73% in 1997 (Figure 2.2), which has been mainly due to the increasing contribution from countries like China and India (Delgado *et al*, 2003).

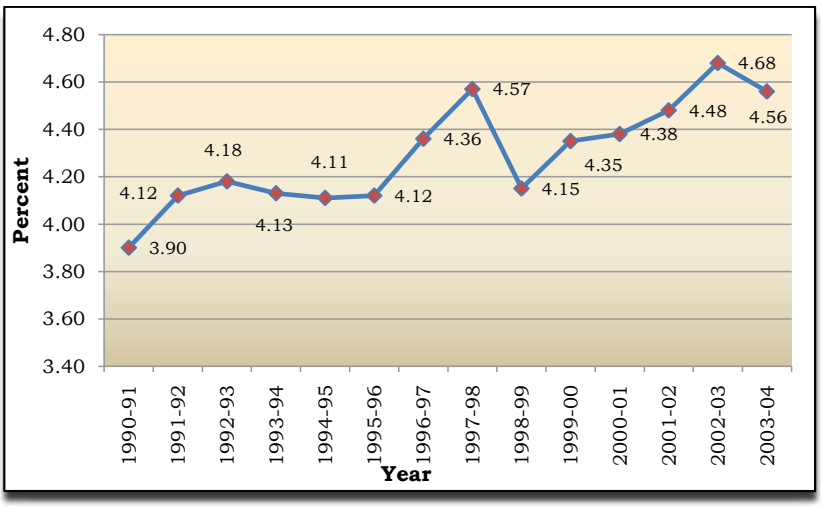


Figure 2.1 India's Share in World Fish Production

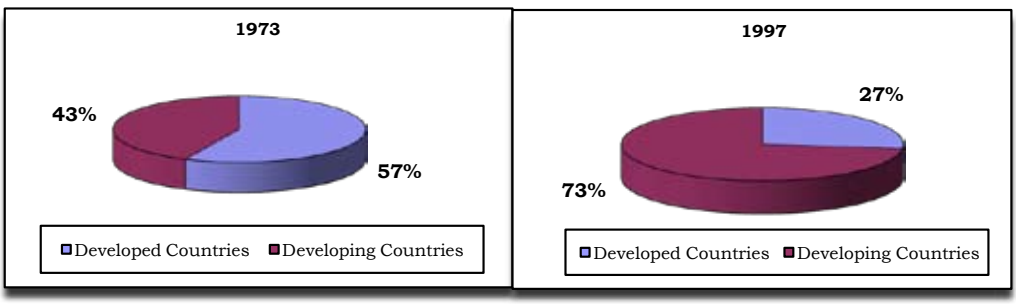


Figure 2.2 Changing Share of Developing Countries in the Production of Fish for Food, 1973 and 1997

2.2 CONTRIBUTION TO INDIAN ECONOMY AND PROSPECTS OF FISHERIES GROWTH

With fisheries sector comprising marine fisheries, freshwater and brackish water aquaculture and inland fisheries consisting of tanks and reservoir, the potentiality of this sector as a whole remains to be fully tapped and it remains a sector of much promise.

The fisheries sector in particular is more complex enterprise that functions under integrated network of natural resources, other enterprises with forward and backward linkages with fisheries and

other socio-political variables. The major functions of fisheries enterprises, viz. production, transportation, storage and processing involve value addition from labour, capital and management, which significantly influence the rapid economic development of the country.

In the last 25 years, unlike agriculture, the contribution of fisheries sector to Gross GDP continued to grow at a rapid pace because of expansion of culture fisheries enterprise. The share of agriculture and allied activities in the total GDP is constantly declining. It was 34.69% in 1980-81 and declined gradually to become 17.62% in 2004-05. In contrast, the contribution of fisheries sector to the total GDP has gone up from 0.75% in 1980-81 to 1.04 in 2004-05 (at current prices).

Similarly, the share of fisheries in agriculture GDP (AgGDP) has increased robustly from 2.17% in 1980-81 to 5.93% in 2004-05 (Figure 2.2). This sector is in fact pushing the agricultural growth upward for the past 5 and half decades.

Table 2.2 Comparison and Growth of Fisheries Sector

Period	Percent contribution of		
	Agriculture to Total GDP	Fish to Total GDP	Fish to Ag GDP
1980-81	34.69	0.75	2.17
1990-91	28.42	0.96	3.37
2000-01	22.26	1.18	5.32
2004-05	17.62	1.04	5.93

Source: National Account Statistics, CSO, GOI

2.3 FISH PRODUCTION: STRUCTURE AND COMPOSITION

The fish production in India witnessed a spectacular growth since independence. It rose from a mere 0.75 million tonnes in 1950-51 to over 6.57 million tonnes in 2005-06 (Table 2.3). In the initial years, marine sector used to contribute more to total fish production then inland sector. In the 1950-51, marine production contributed about 71.01%, which fell gradually to 42.77% in 2005-06, while inland sector started contributing from 28.99 in 1950-51 to about 57.23% in 2005-06. In fact, by the year 2000, its share crossed 50% and continues to improve its share further in the coming years (Figure 2.3).

Table 2.3 Fish Production by Source in India

(million tonnes)

Year	Marine	Inland	Total
1950-51	0.534	0.218	0.752
1960-61	0.880	0.280	1.160
1970-71	1.086	0.670	1.756
1980-81	1.555	0.887	2.442
1990-91	2.300	1.536	3.836
2000-01	2.811	2.845	5.656
2003-04	2.941	3.458	6.399
2004-05	2.779	3.526	6.305
2005-06	2.816	3.756	6.572

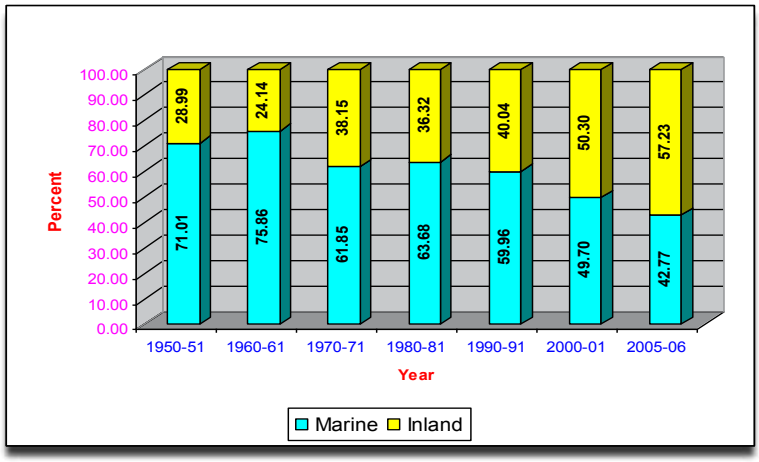


Figure 2.3 Fish Production by Source in India

Expansion of fleet capacity, technological innovation, and increases in investment all led to explosive growth in the exploitation of marine fisheries through the 1960s, 1970s and 1980s. But from the late 90s onwards, the marine fisheries production has reached a plateau and it seems that it can register only marginal increase in the near future. With most wild fisheries near maximum sustainable exploitation levels, capture fisheries will most likely to grow slowly.

On the other hand, inland fish production was on constant rise. The inland fisheries include both capture and culture fisheries. The capture fisheries have been the major sources of inland fish production till mid-1980s. But the fish production from natural waters like rivers, lakes, etc. followed a decling trend, primarily, due to proliferation of water control habitat degradation (Katiha and Bhatta, 2002). The depleting resources, energy crisis and resultant high cost of fishing etc. have led to increased realization of the potential and versatility of aquaculture on a sustainable and cost-effective alternative to capture fisheries.

2.4 TRENDS AND CURRENT PATTERNS OF FISH PRODUCTION

2.4.1 Fish production in India from I Plan to X Plan

The total fish production in our country was hovering around 1 million ton since the end of third five year plan. Until then, the policy of the country was focused on enhancing fish production only, with little attention on such issues as marketing, storage, transportation, etc. Later, emphasis was also laid on creating facilities for ice-cold storages, processing & canning. As a result of this, the fish production started increasing significantly from VI Five Year Plan onwards during which it attained the total increase of about 47.11 %. Its impressive growth continues all through subsequent plan periods also. Overall, plan wise fish production is witnessing an exponential growth path (Figure 2.4). The trend equation for plan wise fish production is as follows

$$Y = 443.4e^{0.294x}$$

This trend confirms the characteristic of this sun rise sector in Indian agriculture in days to come.

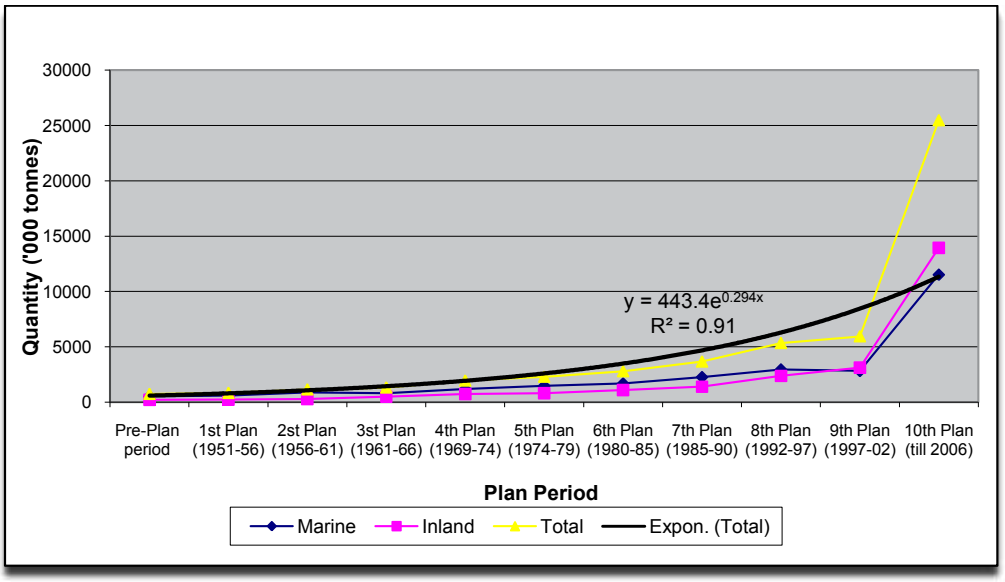


Figure 2.4 Trend in Fish Production (Plan-wise)

In fact, the X Plan proposed a fish production target of 8.19 Mt (Table 2.4), envisaging a growth rate of 5.44% per annum (marine 2.5% and inland 8.0%). During the X Pan, new initiatives for development of fisheries were planned to increase production and productivity from deep sea, inland capture fishery resources like rivers, canals, etc., culture sources like reservoirs, bee ls, ox-bow lakes, etc. and measures for replacement of fishery resources through mariculture, besides development of infrastructural facilities or a better post-harvest management, technology for sustainable aquaculture, setting up of cold storage and marketing network through viable fisheries co-operatives, etc. were to be taken up to ensure better livelihood for fishers and enhance export promotion for economic development of the country (X Five Year Plan, 2002-07 documents, Planning Commission).

Table 2.4 Targets & Achievements in Production & Growth Rate in X Plan

X Plan	Marine	Inland	Total
Production (Mt)			
Target	-	-	8.19
Achievement	-	-	6.57
Growth rate (%)			
Target	2.5	8.0	5.5
Achievement	-2.4	5.1	1.6

To assess the trend of fish production in the country, the last 25 years data (from 1980-81 to 2005-06) was used. Both linear and non-linear trend analysis was tried and the best equation fitted. The total fish production in India has been following a linear trend (Figure 2.5) and it is likely proceed further in the same direction. The trend pattern of marine and inland fish production revealed that while the marine sector's production was increasing at a decreasing rate, the inland sector's production was increasing

at an increasing rate, the possible reasons for which are that inland aquaculture activities are gaining much importance in some of the states like Uttar Pradesh, Andhra Pradesh, Punjab etc. in recent years. The trend equations for both marine and inland fish production, as well as total fish production are given below:

Marine: $Y = -2.7588X^2 + 143.4X + 1061.3$
Inland: $Y = 2.9078X^2 + 38.083X + 824.85$
Total: $Y = 185.5X + 1867.4$

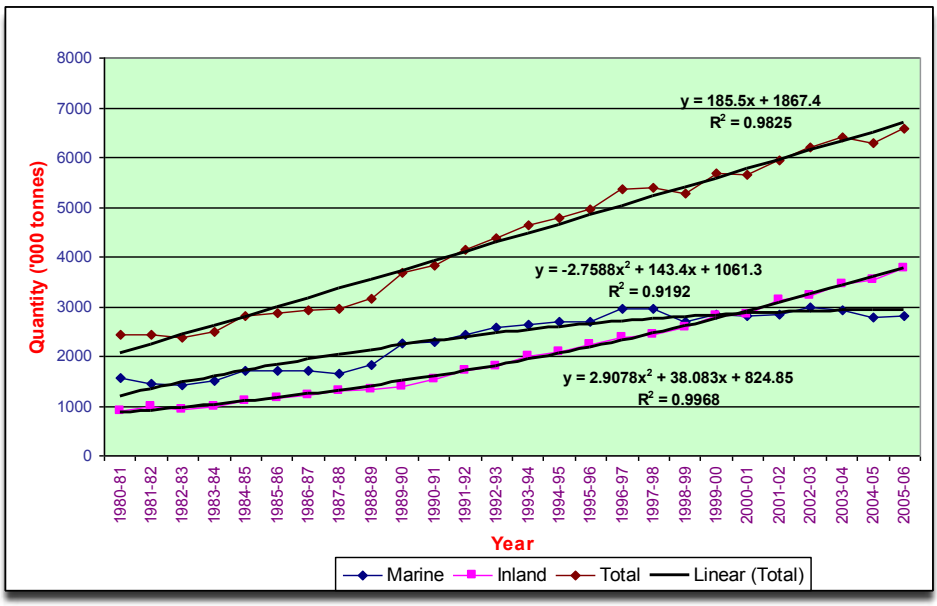


Figure 2.5 Trend in Fish Production, 1980-81 to 2005-06

Based on the trend observed in the last 25 years, assuming that the same scenario would prevail on both public and private investment pattern in the sector, the fish production of the country would reach 7.46, 8.42 and 9.38 million tonnes in 2010, 2015 and 2020 respectively (Table 2.5).

Table 2.5 Fish Production in 2020

(million tonnes)

Year	Marine	Inland	Total
2010	2.88 (38.61)	4.58 (61.37)	7.46
2015	2.70 (32.07)	5.72 (67.33)	8.42
2020	2.38 (25.37)	7.00 (74.63)	9.38

Note: Parentheses indicates percentage to total.

In the coming decades, aquaculture will likely be the greatest source of increased fish production, as fish farmers expand the water surface area under cultivation and increase yields per unit of area cultivated. But the sector must overcome several major challenges, if it has to sustain the rapid growth of the past 25 years.

- Aquaculture has to face competition from others users of land and water, as these resources would become more scarce in future (Rosegrant *et al*, 2002)
- Marine sector would face energy crisis as it would expand fossil fuels for further expansion.
- The aquaculture production would be restrained by diseases as the sector expands (Subasinghe, *et al*, 2001).
- The availability of fish meat and fish oil would caught feed inputs may also become a limiting factor.

Yield increases can come either from increased inputs or greater efficiency of inputs. It is likely that in the next several decades, aquaculture production will benefit from both these sources of yield growth. Greater use of compounded aquaculture feeds along with improvements in rearing technology and selective breeding has the potential to significantly increase the productivity of many farm of aquaculture.

In the last 25 years, total fish production has been growing at an annual growth rate of about 4.60%, in which marine sector was growing at a rate of 3.24 and inland sector was growing at a rate of 6.20%.

Table 2.6 Compound Growth Rate in Fish Production, 1980-81 to 2005-06

Year	Marine	Inland	Total
1980-81 to 1989-90	3.80	5.28	4.39
1990-91 to 1999-00	2.33	6.55	4.13
2000-01 to 2005-06	-0.21	5.37	2.75
1980-81 to 2005-06	3.24	6.20	4.60
1980-81 to 1980-91 (Pre-WTO)	4.35	5.43	4.78
1991-92 to 2005-06 (Post-WTO)	0.84	5.71	3.18

In all, inland sector fared better in all the periods, viz. 1980-81 to 1989-90, 1990-91 to 1999-00 and 2000-01 to 2005-06. There seem to be a slower pace in growth of this sector in the recent times. In contrast, marine sector is witnessing a negative growth rate in the period 2000-01 and 2005-06, which indicates the exhaustion of marine resources especially in the in shore and near shore water, where maximum harvest has happened. About 90% of the present production from the marine sector is within a depth range of up to 50-70 m and the remaining 10% from depth extending upto 200m. While 93% of the production is contributed by artisanals and motorized sectors, the remaining 7% is contributed by depth see fishing fleets confining their operation mainly to deep see fishing fleets confining their operation mainly to the shrimp grounds in the upper east coast. Hence, in order to enhance and sustain the contribution from this sector, we need to go deep sea for targeting its untapped potential that is supported by enhanced investment in mechanized vessels, capacity strengthening of artisanals and probably a proper institutional structure to share the benefits.

The growth rates in pre and post WTO periods were also estimated. It is noticed that the pre-WTO period witnessed an impressive growth rate of about 4.78 as compared to post WTO period (3.18). This trend was mainly due to the marine sector, which is understandable by the fact that the country's fish export basket was dominated by marine species and buoyance of marine export might

have propelled the growth of marine catch, and vice versa. The post-WTO period imposed many quality regulations in terms of SPS measures on developing countries like India, which couldn't create huge investment in the infrastructures required to produce export-quality marine fisheries products that are acceptable to our trading partners, especially EU, USA and Japan. In contrast to the marine sector, inland sector continued to grow better in the post-WTO period also, which is possibly because of enhanced public and private investment for inland fisheries sector especially though different development programmes and research by the Government of India since IV plan onwards that started delivering results continuously.

The Figure 2.6 clearly depicts the dominance of inland fisheries sector in the contribution to total fish of the country, particularly from 1990s.

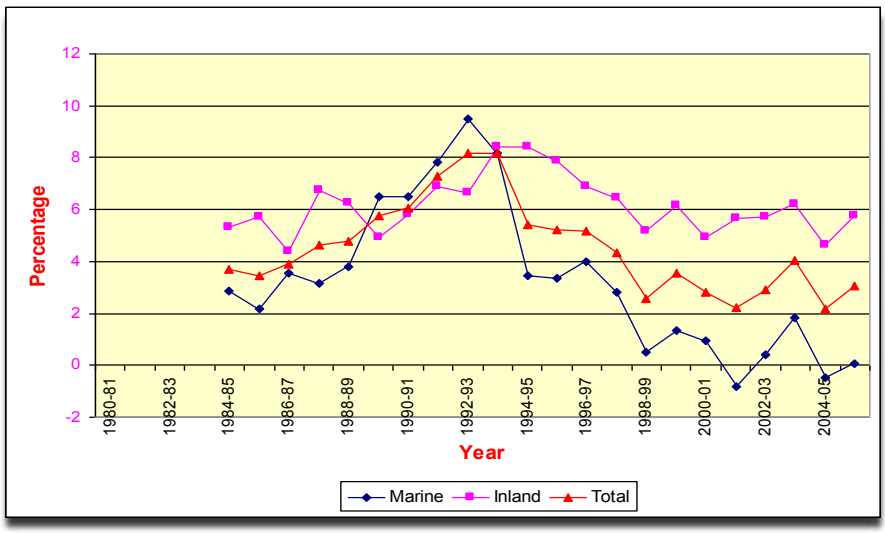


Figure 2.6 Annual Growth Rate (%) in Fish Production, 1980-81 to 2005-06

2.4.2 Growth of Fisheries Sector in Different States of India

The growth rate analysis for various states from 1990-81 to 2005-06 showed that fish production had a significant growth in all states and Union Territories except Goa, Karnataka and Tripura in case of states and Andaman & Nicobar Islands, Dadar & Nagar Haveli, Daman & Diu and Puducherry in case of Union Territories, respectively. In some of the states like Andhra Pradesh, Maharashtra, Orissa, Tamil Nadu and West Bengal the growth of inland fisheries was found to be higher than that of marine fisheries. But in Gujarat Nadu, marine fisheries growth was observed to be more than that of inland fisheries, though the latter is negative and non-significant (Table 2.7).

Table 2.7 Growth Rate of Fish Production by States, 1990-81 to 2005-06

(Per cent)

States	Inland	Marine	Total
Andhra Pradesh	13.01* (19.42)	4.92* (8.21)	10.03* (16.51)
Arunachal Pradesh	5.11* (14.73)	--	5.11* (14.73)
Assam	3.36* (4.35)	--	3.36* (4.35)
Bihar	4.88* (9.14)	--	4.88* (9.14)
Goa	13.01* (19.42)	1.19^{NS}	1.24^{NS}
Gujarat	-0.13^{NS}	1.16*** (2.11)	1.08*** (1.98)
Haryana	3.19* (27.96)	--	3.19* (27.96)
Himachal Pradesh	1.66* (4.30)	--	1.66* (4.30)
Jammu & Kashmir	2.64* (7.94)	--	2.64* (7.94)
Karnataka	3.52** (2.90)	-0.66^{NS}	0.71^{NS}
Kerala	5.92* (10.51)	1.04* (4.57)	1.48* (6.46)
Madhya Pradesh	10.73* (10.59)	--	10.73* (10.59)
Maharashtra	5.23* (7.36)	1.63** (2.98)	2.33* (4.86)
Manipur	4.73* (15.67)	--	4.73* (15.67)
Meghalaya	5.15* (3.97)	--	5.15** (3.97)
Mizoram	1.82** (2.32)	--	1.82** (2.32)
Nagaland	12.01* (8.03)	--	12.01* (8.03)
Orissa	5.22* (9.02)	1.58*** (1.98)	3.59* (6.14)
Punjab	14.02* (22.34)	--	14.02* (22.34)
Rajasthan	5.22* (4.43)	--	5.22* (4.43)
Sikkim	2.82* (3.79)	--	2.82* (3.79)
Tamil Nadu	2.66* (4.34)	0.90*** (2.06)	1.40* (5.31)
Tripura	0.08^{NS}	--	0.08^{NS}

Uttar Pradesh	7.35* (40.30)	--	7.35* (40.30)
West Bengal	4.42* (37.01)	1.96* (5.30)	4.01* (29.86)
A& N Islands	0.68^{NS}	0.67^{NS}	0.68^{NS}
Dadra & Nagar Haveli	1.15^{NS}	--	1.15^{NS}
Daman & Diu	--	2.17^{NS}	2.17^{NS}
Delhi	-6.41* (-3.07)	--	-6.41* (-3.07)
Lakshadweep	--	2.76** (2.42)	2.76** (2.42)
Puducherry	1.68^{NS}	-0.56^{NS}	-0.33^{NS}

* Significant at 1%, * *Significant at 5%, ***Significant at 10% and NS Non-significant
Figures in parentheses indicate 't' values

Note: 1. Madhya Pradesh, Uttar Pradesh, and Bihar include Chhattisgarh, Uttarakhand and Jharkhand, respectively.
2. Growth rates for A& N Islands and Dadra & Nagar Haveli calculated for the period 1991-92 to2005-06 and 1992-93 to 2005-06, respectively.

2.4.2.1Share of States in Marine Fish Production

The share of various states in the country's total marine production was analysed and its composition was presented for the year 1990-91 and 2005-06 to understand the changing share of various states in this crucial export oriented sector (Figure 2.7).

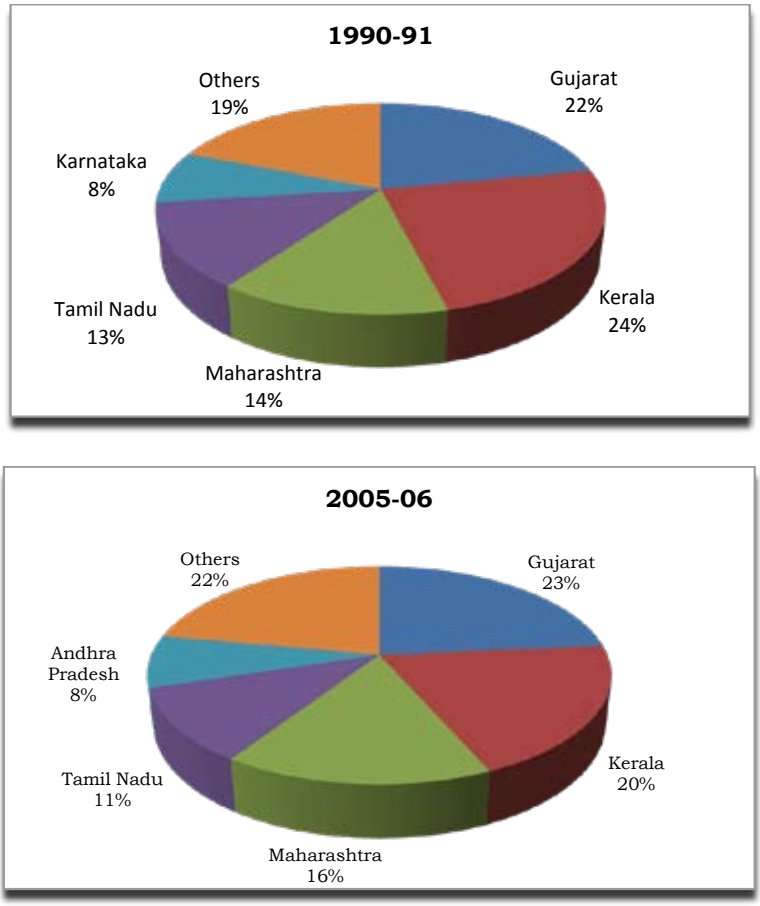


Figure 2.7 Changing Share of States in Marine Production, 1990-91 & 2005-06

In 1990-91, Kerala, Gujarat, Maharashtra, Tamilnadu and Karnataka together contributed about 81 % in the total marine production. In the last one and half decade, the share of Kerala and Tamil Nadu reduced, while that of Gujarat and Maharashtra increased. But, the one state that has been increasing at a rapid pace in marine production is Andhra Pradesh, which replaced Karnataka in its share to total production in the last 15 years. Among the others states, which are contributing significantly to total marine production, are West Bengal and Orissa and among UTs, the major contributors are Puducherry, and Andaman Nicobar islands, though their current production is stagnating in the recent years.

It is reasonably known that marine fisheries are probably near the ceiling of the potential. However, scientific opportunities may exist in area like mariculture of filter feeders. But, the development of this sector is beset with major management problems. It is facing the problem of influx of sewage water and other pollutants causing health hazards. Yet another problem faced relates to global warming. The marine fisheries also have to bear large-scale destruction of juvenile fishes. Hence, institutionalization of conservatory and regulatory / control measures are important.

2.4.2.2Share of States in Inland Fish Production

The share of various states in the country's total inland fish production was analyzed and its composition was presented for the year 1990-91 and 2005-06 to understand the dynamics of this sector in contributing to total fish production (Figure 2.8).

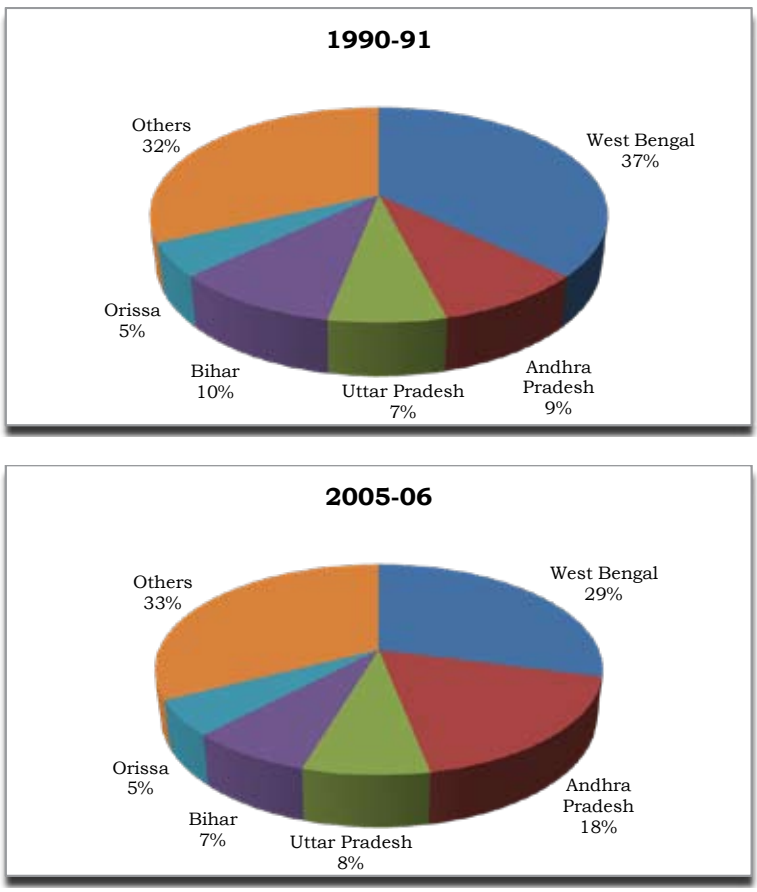
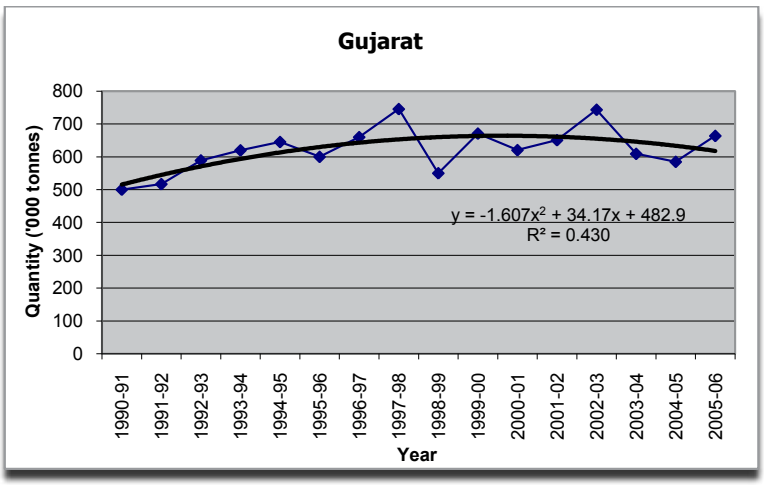


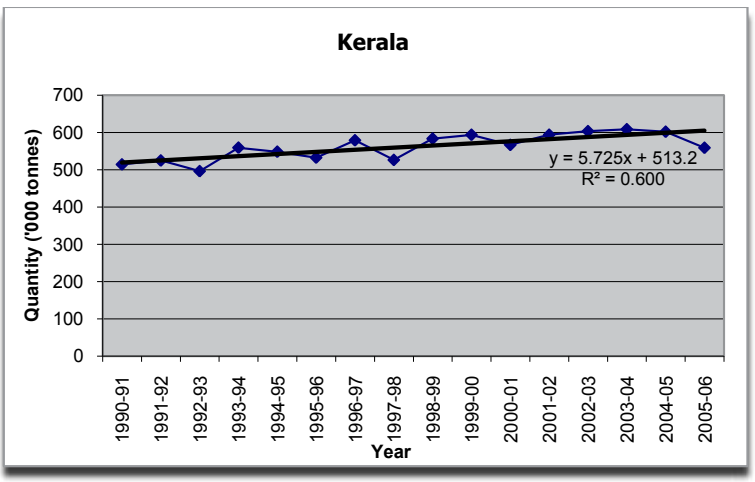
Figure 2.8 Changing Share of States in Inland Production, 1990-91 & 2005-06

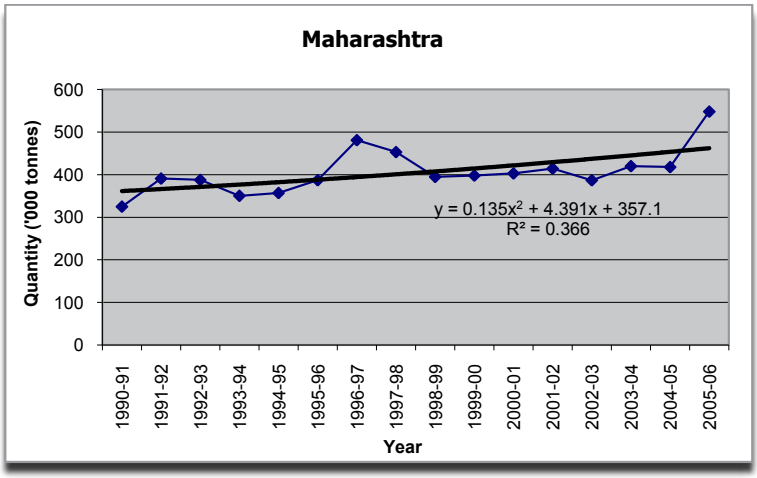
In the year 1990-91, the major producing states were West Bengal, Bihar, Andhra Pradesh, Uttar Pradesh and Orissa. They together contributed about 68% to total inland fish production. In the subsequent one and half decades, Andhra Pradesh and Uttar Pradesh had made tremendous progress in its share to total inland production compared to West Bengal, which is fast loosing its dominance in

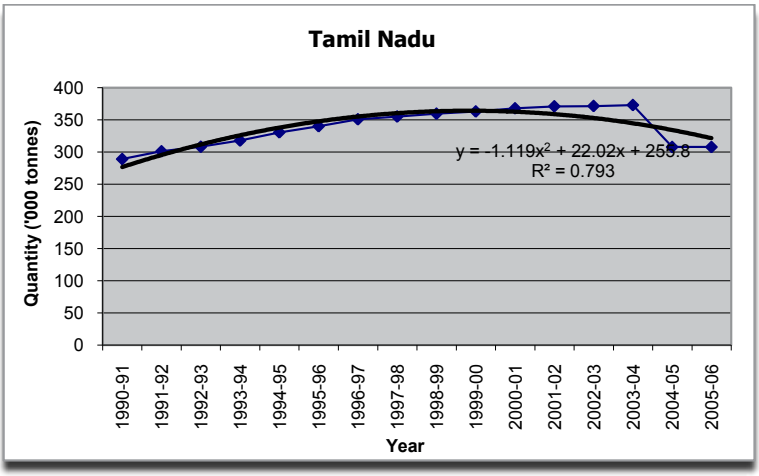
this sector to these emerging states. While the other major contributor like Bihar has decreased in its share, Orissa was maintaining it in total inland production. Another major state, whose contribution is improving rapidly, is Punjab. Apart from these, the states which are reaching a point of maximum output are Assam, Kerala, Maharashtra and Tamil Nadu. Some states were also experiencing negative growth in its production and they are Gujarat, Karnataka and Madhya Pradesh. Again the promising UT in inland production is Puducherry.

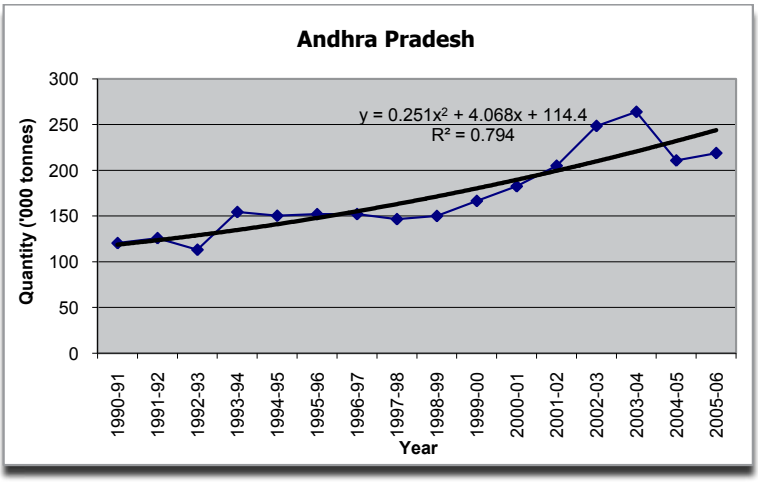
Trends in Top 10 Marine Fish Producing States

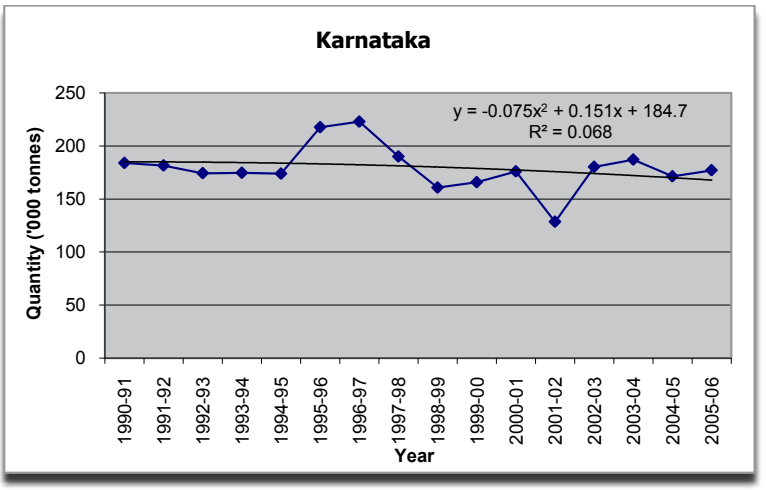


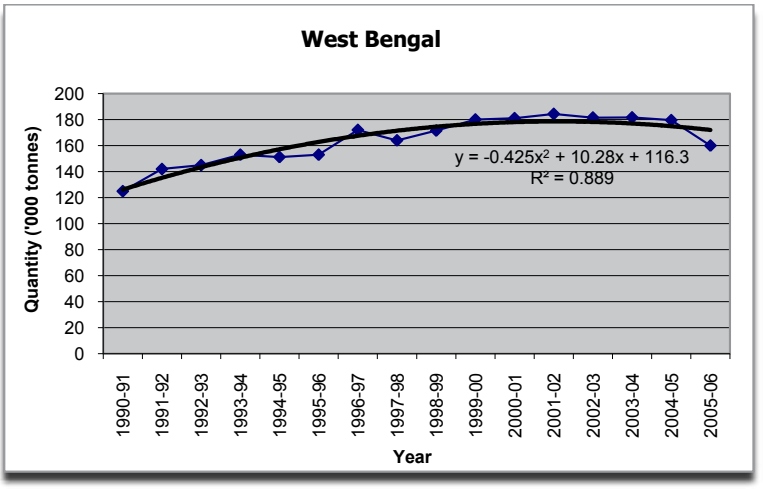


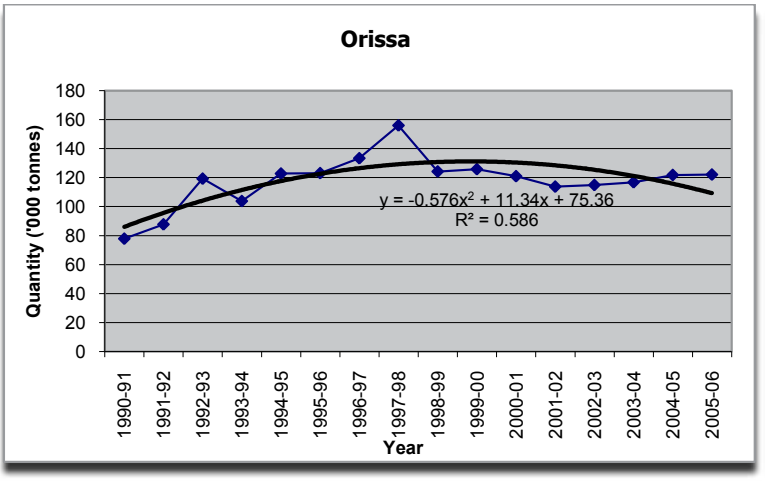

Maharashtra
Quantity ('000 tonnes)
600
500
400
300
200
100
0
y = 0.135x² + 4.391x + 357.1
R² = 0.366
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year

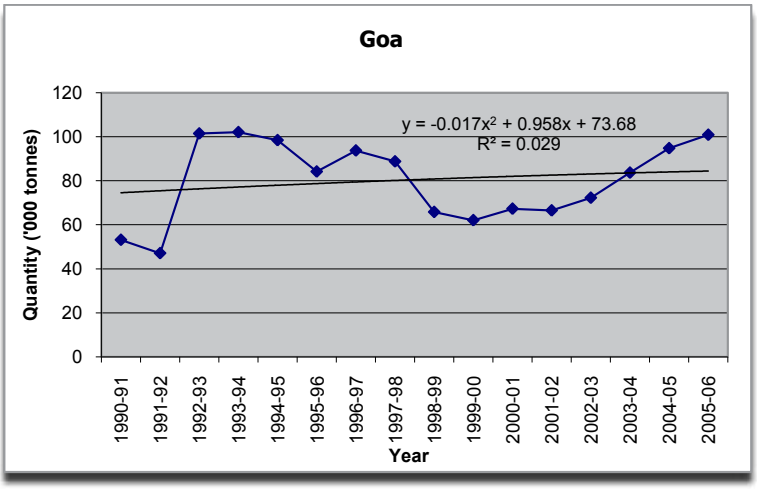

Tamil Nadu
Quantity ('000 tonnes)
400
350
300
250
200
150
100
50
0
y = -1.119x² + 22.02x + 255.8
R² = 0.793
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year

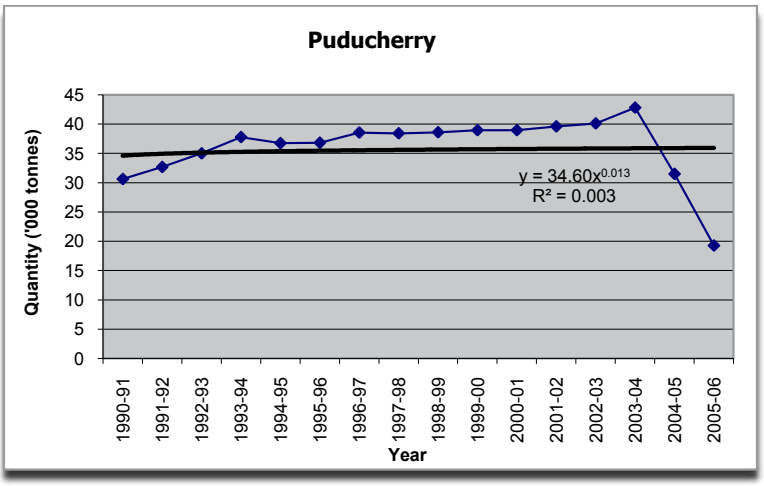

Andhra Pradesh
Quantity ('000 tonnes)
300
250
200
150
100
50
0
y = 0.251x² + 4.068x + 114.4
R² = 0.794
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year


Karnataka
y = -0.075x² + 0.151x + 184.7
R² = 0.068
Quantity ('000 tonnes)
250
200
150
100
50
0
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year

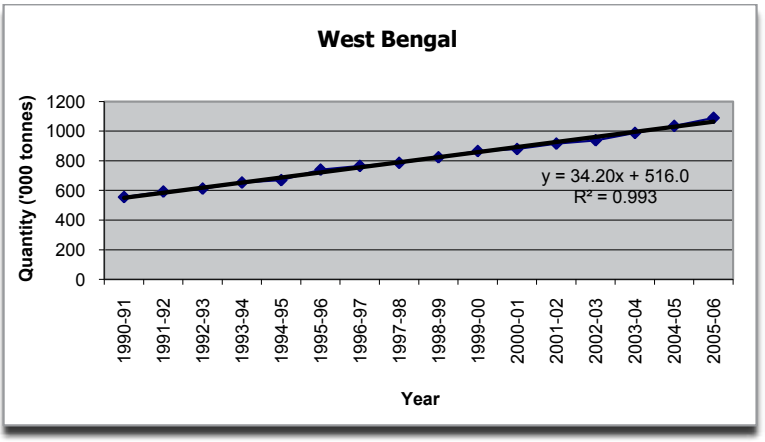

West Bengal
y = -0.425x² + 10.28x + 116.3
R² = 0.889
Quantity ('000 tonnes)
200
180
160
140
120
100
80
60
40
20
0
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year

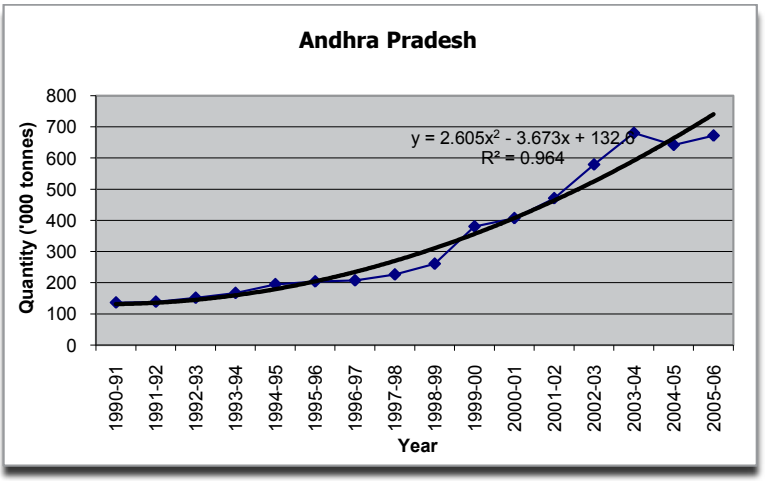

Orissa
y = -0.576x² + 11.34x + 75.36
R² = 0.586
Quantity ('000 tonnes)
180
160
140
120
100
80
60
40
20
0
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year

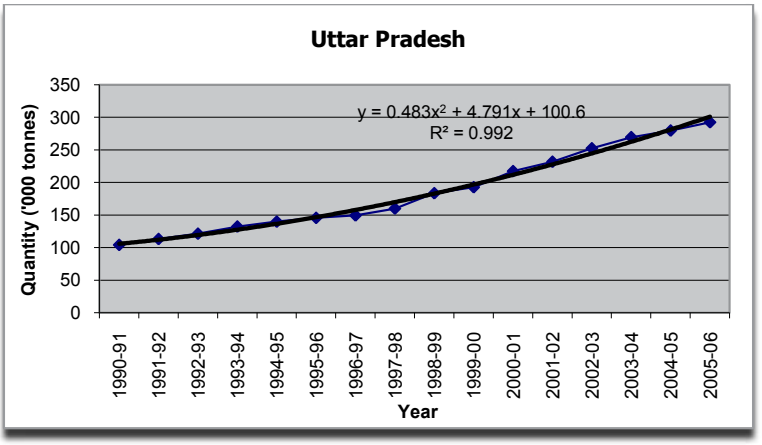

Goa
y = -0.017x² + 0.958x + 73.68
R² = 0.029
Quantity ('000 tonnes)
120
100
80
60
40
20
0
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year

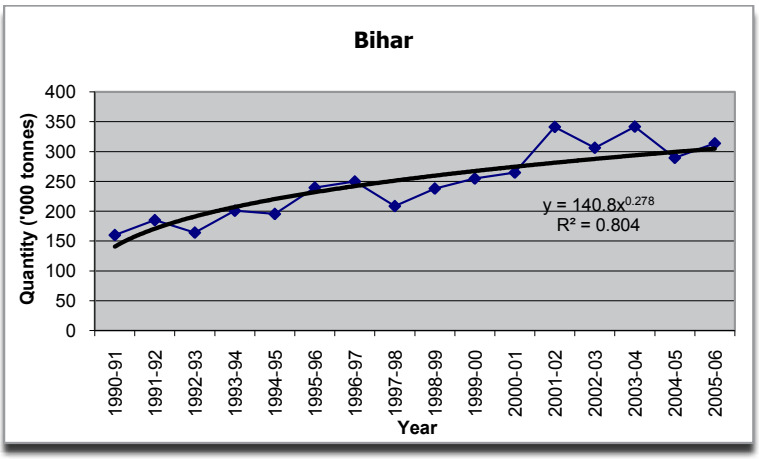

Puducherry
y = 34.60x^0.013
R² = 0.003
Quantity ('000 tonnes)
45
40
35
30
25
20
15
10
5
0
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year

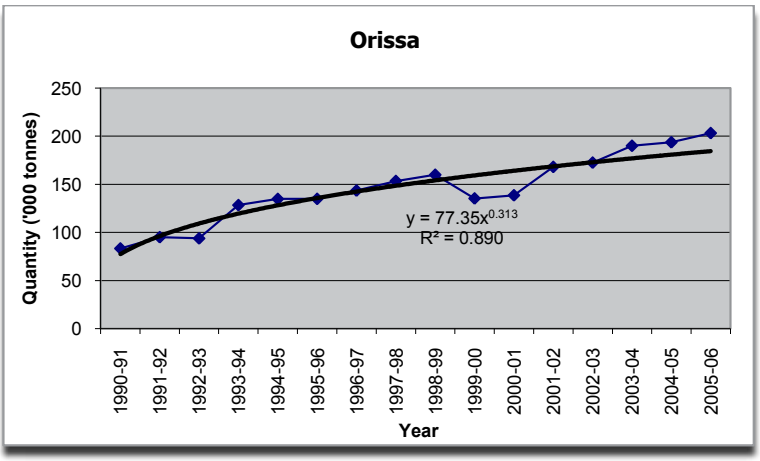
Trends in Top 10 Inland Fish Producing States

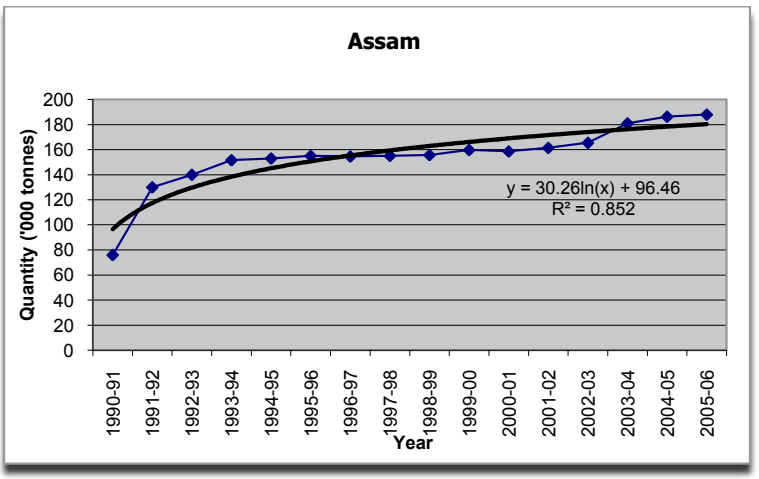


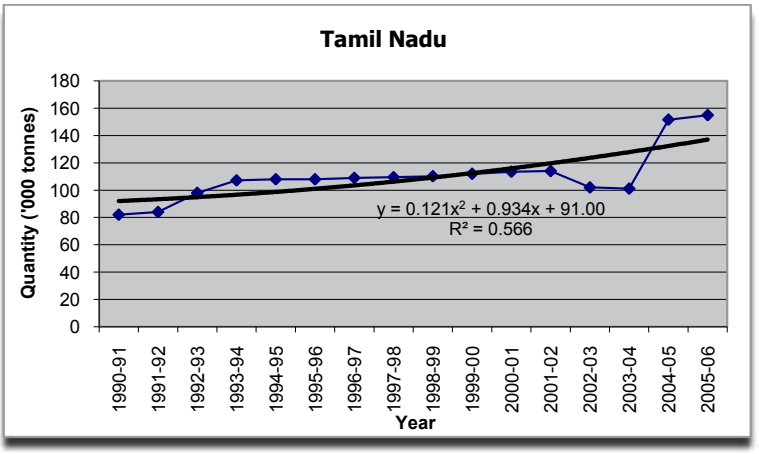


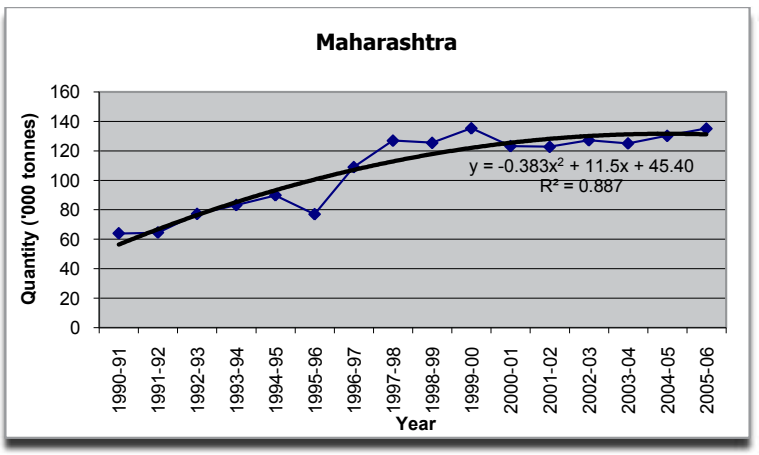


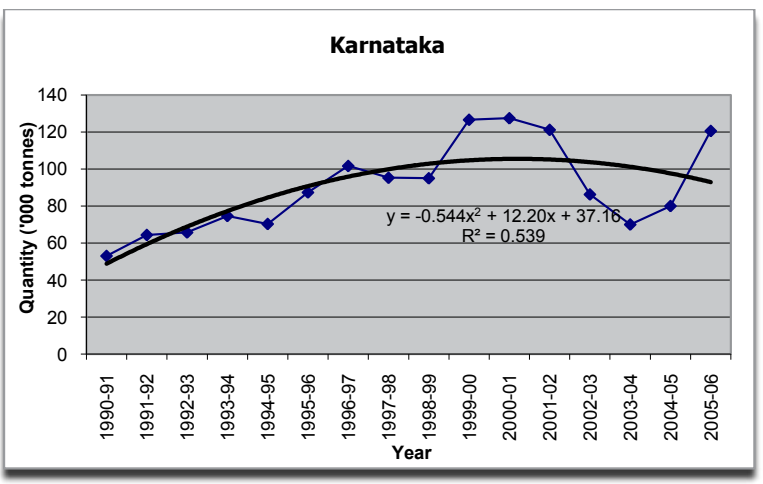

Bihar
Quantity ('000 tonnes)
400
350
300
250
200
150
100
50
0
y = 140.8x^0.278
R² = 0.804
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year

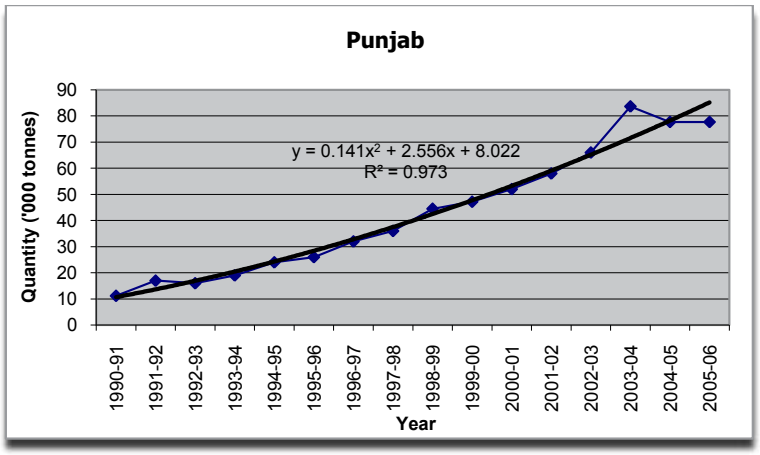

Orissa
Quantity ('000 tonnes)
250
200
150
100
50
0
y = 77.35x^0.313
R² = 0.890
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year


Assam
Quantity ('000 tonnes)
200
180
160
140
120
100
80
60
40
20
0
y = 30.26ln(x) + 96.46
R² = 0.852
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year


Tamil Nadu
Quantity ('000 tonnes)
180
160
140
120
100
80
60
40
20
0
y = 0.121x² + 0.934x + 91.00
R² = 0.566
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year


Maharashtra
Quantity ('000 tonnes)
160
140
120
100
80
60
40
20
0
y = -0.383x² + 11.5x + 45.40
R² = 0.887
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year


Karnataka
Quantity ('000 tonnes)
140
120
100
80
60
40
20
0
y = -0.544x² + 12.20x + 37.16
R² = 0.539
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
Year



Note: 1. Chhattisgarh was replaced with Karnataka among top ten inland fish producing states to observe the trend for the period 1990-91 to 2005-06, since the former had data for seven years only.
2. Madhya Pradesh, Uttar Pradesh, and Bihar include Chhattisgarh, Uttarakhand and Jharkhand, respectively.

2.5 INVESTMENT IN FISHERIES SECTOR

2.5.1 Fisheries Development

Allocation of funds to a particular sector is as indication of a push given for development of the sector. The outlay for fisheries sector was about 5.13 in the I Five Year Plan and it went to 2060.54 crore in the X plan (Table 2.8 and Figure 2.10).

Table 2.8 Investment on Fisheries Development

(Rs. crores)

Plan	Total	Agriculture	Fisheries
I	1960	294	5.13
II	4600	529	12.26
III	7500	1068	28.27
IV	15902	2728	82.68
V	39322	4302	151.24
VI	97500	6609	371.14
VII	218730	12793	546.54
VIII	434100	22467	1232.82
IX	859200	42462	2070.00
X	1525639	58933	2060.54

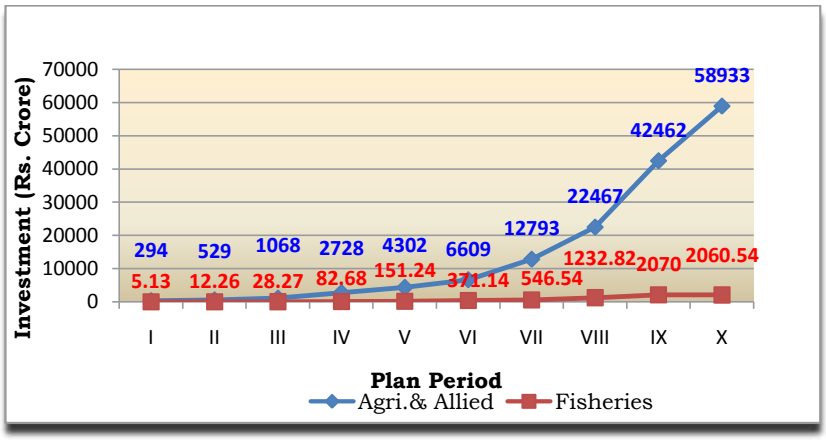


Figure 2.9 Fisheries Development vis-à-vis Agriculture

Its share in the total plan outlay was hovering from 0.26% in I Plan to 0.52% in IV Plan and decreasing thereafter continuously and it received only 0.14% of total outlays in X Plan (Figure 2.11), in spite of that the sector has been growing at an annual growth rate of about 5% in the last 21/2 decades. Similarly, its share in agricultural outlay has increased from 1.74% in I Plan to 5.62% in VI Plan and it is slowly declining sine then and is about 3.50% in X plan (Figure 2.12).

Figure 2.10 Percent Allocation to Fisheries in Total Outlay

Figure 2.11 Percent Allocation to Fisheries in Agricultural Outlay

However, the status of fisheries sub-sector is better, when compared to that of agricultural sector as a whole. Because, the percent allocation to agricultural sector in the total plan outlay started decling from IV Five Year Plan onwards and is continuously decreasing further, which is a great concern for the sector's overall growth. It's share in I Plan was about 15.00% and it went upto 17.16% in IV plan and is now only 3.86% in X Plan (Figure 2.13). Considering the general importance given to agricultural sector, the preference received by the fisheries sub-sector in the plan outlays is still reasonable.

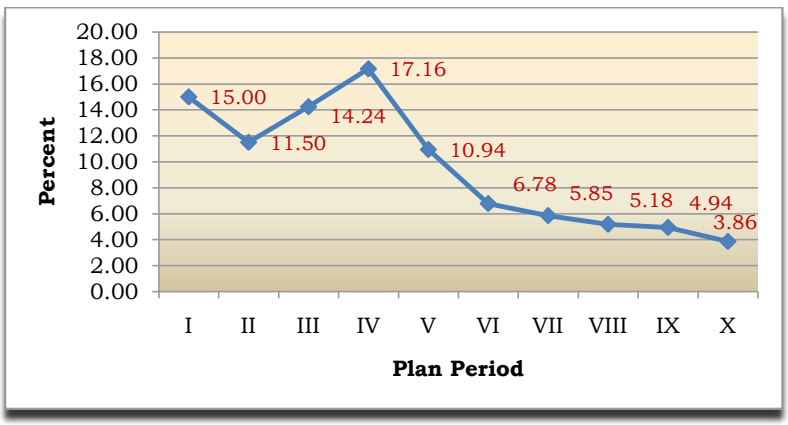


Figure 2.12 Percent Allocation to Agriculture in Total Outlay

2.5.2 Fisheries Research

Fisheries sector witnessed a spectacular growth of over 800% in last 5 and half decades of planning & development for which technologies are the main drivers of growth. At present, fisheries research is carried out by a huge network of institutes under different organizations, viz. ICAR, SAUs, CSIR, DOD, DST, DBT, UGC, IITs, IIMs, Ministry of Agriculture, Ministry of Commerce, Ministry of Food Processing Industries, several voluntary agencies / private industries etc. Most of the productivity enhancing technologies have largely come from the research investment made by ICAR/ DARE, which is the main agency responsible for developing & disseminating the technically feasible, economically viable & environmentally sustainable technologies for the development of agricultural & allied sectors, including fisheries in our country.

The outlay for fisheries research in total agricultural research has grown from 2.7% in IV Five Year Plan to 6 % in IX Five year Plan, though it again dropped to 3.1% in X Plan (Table 2.9). Overall, this showed the increasing importance accorded to this sector to exploit the still under-exploited areas.

Table 2.9 Investment on Fisheries Research by ICAR

(Rs. crores)

Plan	ICAR / DARE	Fisheries	% to Total
IV	85	2.25	2.6
V	153.56	9.6	6.3
VI	340	15.75	4.6
VII	448	18.25	4.0
VIII	1300	65	5.0
IX	2070	125	6.0
X	5050	157.14	3.1

Source: Planning Commission GoI 2001 & ICAR Report 2005-06

2.5.3 Investment in Fisheries Development vis-a-vis Research

The allocation for fisheries development rose from Rs. 82.68 crores in IV Plan to Rs. 2060.54 crores in X Plan, while that for fisheries research increased from Rs. 2.25 crores to Rs. 157.14 crores during the same period (Figure 2.14). Among the two major sub-sector of fisheries sector, it was found that the importance accorded to research is more than that of development over different plan periods. It is evidenced from Figure 2.15 that the share of research allocation rose from 3% in IV Plan to about 7% in X Plan. It shows the increasing importance accorded to research over development programmes by the Government, as the planners are convinced that the technologies are driving the growth in this sector, which needs to be nurtured to achieve the desired 4% growth in agriculture in the XI Plan.

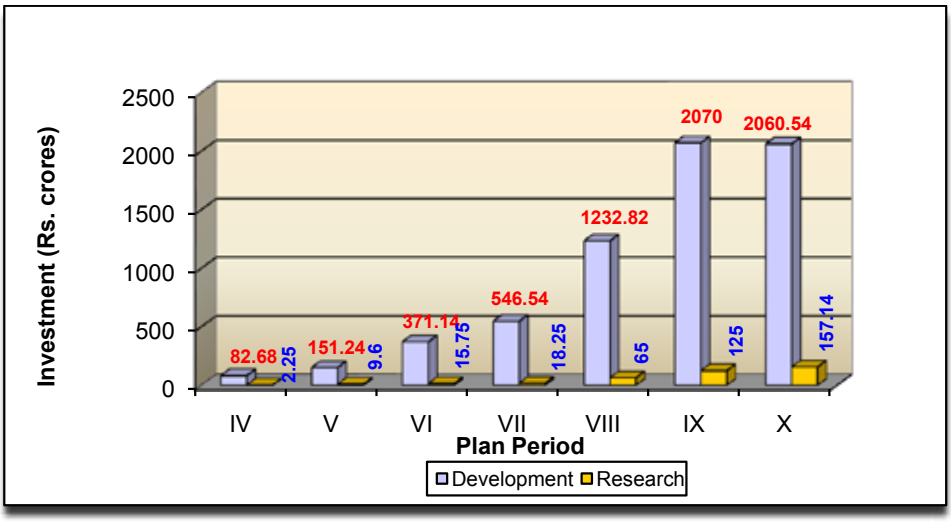


Figure 2.13 Investment in Fisheries Development vis-a-vis Research

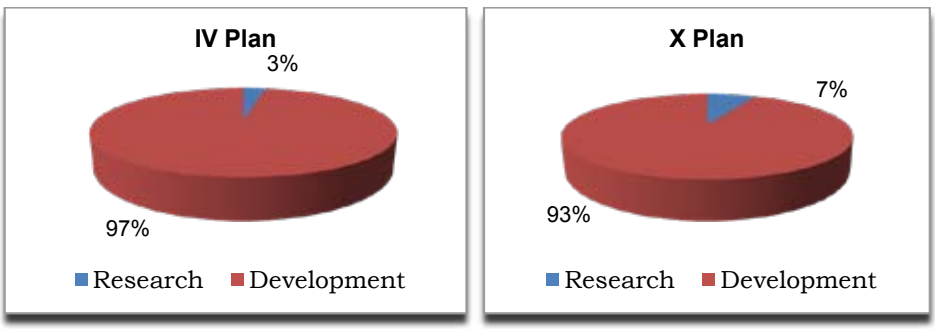


Figure 2.14 Composition of Allocation on Fisheries Development and Research

2.5.4 Returns from Investment in Fisheries Research and Development

It was found that the investment on both fisheries research and development would be financially feasible and beneficial to the society. It was evidenced by an earlier study conducted by ICAR and World Fish Centre (Table 2.10) that the net present value (NPV) was estimated to be Rs. 82 to 176 billion under various TFP scenarios. The internal rate of return (IRR) from investment would be in the range of 42 to 55 percent. The benefit-cost ratio would vary between 2.1 and 3.4.

Table 2.10 Returns to Investment on Fisheries Technology in India

Parameters	Baseline Scenario (Existing TFP growth)	Deceleration by 2015 (25%)	Deceleration by 2015 (50%)	Deceleration by 2015 (75%)
IRR (%)	55	52	48	42

NPV (Rs. billion)	176	149	119	82
B:C Ratio	3.4	3.0	2.6	2.1

Source: ICAR-ICLARM Project Report, 2004

Existing TFP growth: Marine sector: 2.0; Aquaculture: 4.0)

2.6 DRIVERS FOR FUTURE GROWTH

To sustain this growth of the sector in general, technology, infrastructure and market would play a major role apart from enhanced investment in research and development. Technology had been the main factors responsible for the phenomenal growth of the aquaculture, particularly after the advent of carp polyculture and composite fish culture in the late 70s. Similarly, major investments on infrastructure such as construction of mini harbours, jetties, landing centres, introduction of trawlers and mechanized vessels, supply of nets, etc. led to increased catch and contribution from capture fisheries sector. However, market has not been able to play a major driver for the growth of the sector so far. To untap the potential of the sector, this would take the lead in furthering the growth, especially in the emergence of aquaculture sector. Some of the illustrative aspects under each major driving force are given below for future attention.

2.6.1 Technology

i. Quality seed production
ii. Selective breeding of carps
iii. Formulation of low cost feed materials using locally available ingredients
iv. Fabrication of nets for targeted fishing

2.6.2 Infrastructure

i. Construction of landing centres in second tier potential costal towns
ii. Creation of cold storage near landing centres
iii. Upgradation of manually operated boats into outboard motorized ones
iv. Supply of ice box

2.6.3 Market

i. Creation of domestic markets
ii. Creation of institutional structures like marketing societies with fishermen / fish farmers as members
iii. Creation of cold storage facilities
iv. Transportation of fish and fishery products by refrigerated containers from point of landing / production to consumption centres
v. Documentation of innovative market models already existing in the sector and replicating in similar areas with support from both Govt. and non-governmental agencies
vi. Grading, Standardization and Branding of fish an fishery products
vii. Creation of Market Information System with the application of ICT tools.

CHAPTER III

SUPPLY, DEMAND AND TRADE OF FISH IN INDIA

Fish is a major accessible source of animal protein for the poor living in coastal region. Fisheries sector in India is undergoing a transformation and contributes to the livelihood for a large section of economically underprivileged population of the country. Marine resources were dominating fisheries production and are already being nearly fully exploited and register stagnant growth. Policy support, production strategies, public investment in infrastructure, research and extension for fisheries had significantly contributed to aquaculture and increased fish availability. Rapid growth has occurred in aquaculture production under freshwater and coastal brackish water ponds and mariculture. The fish production has increased rapidly, nearly tripling from 2.44 million tonnes in 1980 to about 6.4 million tonnes in 2005. It has policy implications on the livelihood of a large section of economically-underprivileged fisher folk and small farmers.

Domestic demand for fish in India is growing rapidly. Fish availability, higher economic growth, rising population, shift in dietary pattern, tastes and preferences are the driving forces for rapid growth in domestic fish demand and trade. The expansion of demand to match supply has to be a priority concern in the light of resource degradation, weak public support and investment, and potential worsening inequities in the global trade. Key questions emerged such as: Will past trends in supply, demand, and exports of fish be sustained in the future? Can the additional demand from rising population and per capita income be met by fish supplies? Which types of fish offer the most promising opportunities for growth in production, consumption, and trade?

The present study attempted the analysis of fish supply, demand and international trade of fresh fish by species group and projected by the year 2020. The disaggregate analysis, attempted in this study, will provide information that would be useful for policy prospective.

3.1 FISH MODEL

On the demand side, consumer preferences in the developing countries vary widely across fish types. On the supply side, fish is produced through various production environments i.e. is capture and culture. Analysis of the disaggregated fish types would clearly be more useful for many applications such as allocation of resources for investment and research; comparison of policy options based on likely impacts; and projecting the marketing potentials within the fish sector over the medium and long term. Due to limited available projections of demand, supply and trade for the fish sector, a multi-market, multi-species fish sector model has been constructed.

The Asia Fish Model which consists of producer, consumer, and trade cores was employed for the disaggregated analysis of the fish sector. The time series data on fish production and farm survey data on fish farming at regional level was used to estimate producer core following the dual approach (Quadratic

profit function). The multi-stage budgeting framework with AIDS model was used for fish demand analysis based on consumer survey data. Armington approach was used for the trade core . The model is closed with a set of equilibrium conditions between supply, demand and trade. The model was run under various scenarios of total factor productivity. Projections of supply, domestic demand, and export by species group were obtained.

3.2 CONSTRUCTION OF DATA SET

The model required data on demand, supply, trade and prices for each fish type. These also needed extraneous information for variables like income, prices of non-fish food types, etc. In order to ensure a consistent data set, it was necessary to organize the information for each fish type in a balance sheet. Each balance sheet assumed that the total supply of each fish type (S) was equal to imports (M) and the sum of outputs from capture fisheries (Q_{CF}) and aquaculture (Q_A), that is,

$$S = M + Q_{CF} + Q_A.$$

On the other, total demand (D) was the sum of exports (X), intermediate demand (ID), rural household demand (HD_R), and urban household demand (HD_U). In other words,

$$D = X + ID + HD_R + HD_U.$$

Finally,

$$S = D \text{ or } M + Q_{CF} + Q_A = X + ID + HD_R + HD_U$$

The outcome of the exercise was a series of balance sheets for different fish types. Besides balance sheet, the model also required parameters for its behavioural equations, namely producer, consumer and trade cores. Initially, we had estimated the demand and supply parameters and elasticity matrix using multi-species model for each source, and borrowed the elasticity for import and export trade. The demand and supply elasticities applied in the model have been presented in the subsequent section. The estimated parameters of consumer, producer and trade cores were transformed to suit the specification of the equations in the AsianFish model. The intercept terms of all the relevant equations were then calibrated to ensure that the model replicated the baseline values. Using the values of exogenous variables, along with the assumed elasticities and the actual base year initial values of the endogenous variables, the model was solved using the Minos option of the Generalized Algebraic Modeling System (GAMS) software. The model was run assuming total factor productivity growth (TFPG) in the projected period 2% for aquaculture and 1% for capture production environments.

3.3 FISH SPECIES

There are a large number of species of inland and marine fish. These species are grouped into eight broad groups namely Indian major carps (IMC), other freshwater fish (OFWF), shrimp (marine and

fresh water), pelagic high value (PHV), pelagic low value (PLV), Demersal high value (DHV), Demersal low value (DLV), and molluscs and others (molluscs). The species group scheme is followed as:

3.3.1 Classification of Inland Fish Species

Indian Major Carps:	Catla, Rohu, Mrigal, Calbasu
Other freshwater fish:	Silver carp, Grass carp, Common carp, Murrels, Hilsa (inland), and other unspecified inland fish.
Prawn/Shrimp:	Penaeid shrimp production

3.3.2 Classification of Marine Fish Species

Pelagic fish:	High Value (PHV): Seerfish, Oceanic tunas (yellowfin tuna, skipjack tuna), Large carangids (*Caranx* sp.), Pomfrets, Pelagic sharks, Mullets
Pelagic fish:	Low Value (PLV): Sardines, Mackerel, Anchovies, Bombayduck, Coastal tunas, Scads, Horse mackerel, Barracudas
Demersal fish:	High Value (DHV): Rock cods, Snappers, Lethrinids, Big-jawed jumper (*Lactarius*), Threadfins (Polynemids)
Demersal fish:	Low Value (DLV): Rays, Silverbellies, Lizard fish, Catfish, Goat fish, Nemipterids, Soles
Crustaceans:	High Value (Shrimp): Shrimps, Lobsters
Molluscs and others:	Cephalopods (squids, cuttlefish and octopus), Mussels, oysters, Non penaeid prawns, etc.

3.4 DEMAND ELASTICITY

The multi-stage budgeting framework with AIDS model was used for fish demand analysis based on consumer survey data. Income elasticities of different fish food groups across income groups are given in Table 3.1. The income elasticities vary substantially across fish species by income group. But at the aggregate level for all the households, income elasticities range with narrow difference 1.61 for Shrimp/Prawn to 1.66 for Molluscs. Income elasticities for all the fish groups consistently fall with an increase in per capita expenditure (income) level of the household above the poverty line (Quartile II to Quartile IV). None of the groups under study became an inferior good at the highest income quartile. This suggests that even a very rapid increase in aggregate per capita income in the projected period, fish consumption is not likely to turn an inferior good in India. The results revealed that when total income increases, people tend to spend more on fish, and relatively less on other types of meat.

Table 3.1 Income Elasticity of Demand for different groups of Fish in India

Fish group	Expenditure Quartile				
	I	II	III	IV	All
Indian Major Carps	1.63	1.79	1.54	1.36	1.62
Other Freshwater Fish	1.64	1.80	1.54	1.36	1.62
Prawn/Shrimp	1.14	1.72	1.54	1.39	1.61
Pelagic High Value	0.72	1.76	1.54	1.37	1.62
Pelagic Low Value	1.66	1.81	1.54	1.34	1.62
Demersal High Value	1.56	1.79	1.54	1.36	1.62
Demersal Low Value	1.64	1.80	1.54	1.36	1.62
Molluscs	3.75	2.01	1.55	1.12	1.66

The uncompensated and compensated own-price elasticities of various groups of fish species, evaluated at the expenditure quartile-specific mean, are given in Table 3.2. Uncompensated elasticities of demand represent changes in quantity demand as a result of changes in prices, which capture both price effect and income effect. Compensated elasticities of demand refer to the portion of change in quantity demanded which capture only price effect. The own-price elasticities vary in the range of -0.88 for DLV and -1.00 for Molluscs. The own price elasticities does not vary across income group except Demersal groups. Compensated own-price elasticities were almost half in absolute terms as compared to un-compensated elasticities for IMC, reflecting its large share in total fish food expenditure. The compensated own price elasticity was estimated -0.97 for molluscs, followed by PLV (-0.95), DHV (-0.92), Shrimp (-0.88), OFWF (-0.97), PHV (-0.86), DLV (-0.86) and minimum for IMC (-0.52). Fish demand is sensitive to price changes except IMC.

Table 3.2 Own-Price Elasticity of Demand for different groups of Fish in India

Fish group	Expenditure Quartile				
	I	II	III	IV	All
Uncompensated Own-Price Elasticity					
Indian Major Carps	-0.99	-0.99	-0.99	-0.99	-0.99
Other Freshwater Fish	-0.99	-0.99	-0.99	-0.99	-0.99
Prawn/Shrimp	-0.96	-0.99	-0.99	-1.00	-0.99
Pelagic High Value	-0.78	-0.98	-0.99	-0.99	-0.99
Pelagic Low Value	-1.04	-1.06	-1.04	-1.05	-1.05
Demersal High Value	-0.46	-0.92	-0.96	-0.95	-0.95
Demersal Low Value	-0.88	-0.93	-0.85	-0.82	-0.88
Molluscs	-1.01	-1.00	-1.00	-0.99	-1.00

Compensated Own-Price Elasticity					
Indian Major Carps	-0.36	-0.45	-0.50	-0.60	-0.52
Other Freshwater Fish	-0.83	-0.84	-0.89	-0.89	-0.87
Prawn/Shrimp	-0.95	-0.93	-0.90	-0.83	-0.88
Pelagic High Value	-0.78	-0.91	-0.87	-0.81	-0.86
Pelagic Low Value	-0.90	-0.97	-0.93	-0.96	-0.95
Demersal High Value	-0.46	-0.90	-0.93	-0.92	-0.92
Demersal Low Value	-0.86	-0.90	-0.84	-0.81	-0.86
Molluscs	-0.99	-0.96	-0.96	-0.97	-0.97

Table 3.3 presents the compensated price elasticity matrices for the fish eating households. The positive sign of compensated cross-price elasticities indicates that the substitution relationship among the pair of goods, the negative sign indicates the complementary relationship among goods. All the own price elasticities are negative and cross price elasticities are positive for all the species groups except molluscs. The substitution is strong towards IMC. This substitution was strong for poor as compared to rich households

Table 3.3 Compensated Price Elasticities of Demand for different groups of Fish in India

Fish group	Expenditure Quartile I							
	I	II	III	IV	V	VI	VII	VIII
I: Indian Major Carps	-0.36	0.64	0.64	0.64	0.64	0.64	0.64	0.64
II: Other Freshwater Fish	0.16	-0.83	0.17	0.16	0.15	0.17	0.16	0.16
III: Prawn/Shrimp	0.21	0.08	-0.95	-0.01	0.03	0.00	0.02	0.02
IV: Pelagic High Value	0.29	0.04	-0.08	-0.78	-0.08	-0.01	0.03	0.01
V: Pelagic Low Value	0.13	0.12	0.13	0.13	-0.90	0.15	0.14	0.14
VI: Demersal High Value	0.30	0.11	-0.13	-0.03	0.48	-0.46	0.22	0.00
VII: Demersal Low Value	0.03	0.02	0.02	0.02	0.00	0.04	-0.86	0.02
VIII: Molluscs	-1.26	-0.04	0.04	0.11	0.68	-0.37	-0.32	-0.99
	Expenditure Quartile IV							
I: Indian Major Carps	-0.60	0.39	0.39	0.39	0.39	0.39	0.39	0.39
II: Other Freshwater Fish	0.09	-0.89	0.10	0.10	0.08	0.10	0.10	0.10
III: Prawn/Shrimp	0.17	0.17	-0.83	0.17	0.17	0.17	0.17	0.17
IV: Pelagic High Value	0.18	0.18	0.18	-0.81	0.18	0.18	0.18	0.18
V: Pelagic Low Value	0.10	0.07	0.08	0.08	-0.96	0.10	0.08	0.09
VI: Demersal High Value	0.05	0.03	0.01	0.02	0.07	-0.92	0.04	0.02
VII: Demersal Low Value	0.02	0.01	0.01	0.02	-0.02	0.05	-0.81	0.01
VIII: Molluscs	-0.03	0.09	0.07	0.09	0.28	-0.08	-0.06	-0.97

3.5 SUPPLY ELASTICITY

3.5.1 Aquaculture Fish Supply

Three output and three variable inputs over the time span of the study were considered. These were output of IMC, OFWF, Shrimp and inputs including: feed measure as crude protein, fertilizer measure as nitrogen, and labour measure as man days. During the analysis all possible input/output prices were used as the numeraire. OFWF turnout to be best numeraire and the parameter estimates on the price variables for supply and input demand equations agree with a priori expectations (Table 3.4).

The fish supply and input demand models maintained the homogeneity and symmetry hypotheses. Analysis of the estimates showed that own-price parameters were statistically significant and positive for all supply output model. The cross-price parameters were negative, in general, and significant. Both the own-price and crops-price of fish were important determinants of fish supply decision. Price of inputs had negative influence on fish supply but it was not significant for IMC and Prawn/Shrimp. The significance could not be tested for OFWF being the numeraire equation. The own input price parameters in the factor demand equation were significantly negative. The rise in wage and other input prices will cut down the employment and use of input levels in aquaculture.

The shifter, area under aquaculture, as expected will induce fish supply and fish inputs. The supply of IMC will increase significantly with time. The results revealed that the input demand and fish supply are sensitive to their own prices. This suggests that Indian fish producer respond to price changes in an effective manner. Price instruments along with technological policy are likely to be quite effective in fish supply. The changes in relative fish species prices will change the supply mix consisting to various species. Significant cross-price effects for fish supply and insignificant crop-price effects for input demand was observed. Fish supply is interrelated through prices, policy makers should ensure that the effects of one policy do not conflict with the policy decisions for other fish types. It is suggested that the comprehensive approach to fish price policy be taken rather than the product-by-product approach.

Table 3.4 Aquaculture Fish Supply and Input Demand Model

Particulars	Fish Supply					Input Demand					
	Indian Major Carps		Prawn		Other Freshwater Fish	Labour		Feed		Fertilizer	
	Coeff	't'	Coeff	't'	Coeff	Coeff	't'	Coeff	't'	Coeff	't'
Intercept	-12991.90	-2.55	1843.47	1.23		-125.63	-0.10	615.08	0.25	67.07	0.12
Price (Rs./kg)											
Indian Major Carps	40.14	2.05	-16.58	-3.56	5.98	1.19	0.30	1.25	0.15	-0.03	-0.03
Prawn	-16.58	-3.56	2.99	1.64	-2.48	0.87	0.82	1.71	0.72	0.46	1.19
Labour	-1.19	-0.30	-0.87	-0.82	-3.12	-5.10	-2.02	1.86	0.53	0.73	0.45
Feed	-1.25	-0.15	-1.71	-0.72	-20.11	1.86	0.53	-34.45	-4.12	-0.37	-0.25
Fertilizer	0.03	0.03	-0.46	-1.19	-2.14	0.73	0.45	-0.37	-0.25	-4.19	-2.19
Other Freshwater Fish	5.98		-2.48		51.75	3.12		20.11		2.14	

Shifters											
Area (ha)	0.00	8.55	0.00	6.88		0.00	12.19	0.00	12.16	0.00	8.14
Year	6.52	2.55	-0.91	-1.21		0.07	0.11	-0.30	-0.24	-0.03	-0.11
IMR	-35.51	-2.17	-10.35	-3.77							

The elasticity calculated at mean data values are given in Table 3.5. The own-price elasticity estimates had the expected sign; they were greater than unity for IMC, and OFWF and less than unity for prawn/shrimp. The prawn cultivation is capital intensive as compared to other species. The short run price effect on supply will be sharpener and quick for IMC and OFWF as compared to Shrimps. IMC price will affect the prawn supply negatively. The cross price elasticity of IMC and prawn was negative and highly elastic (-4.03). The input price has the mild effect on IMC supply whereas supply of prawn and other freshwater species will be affected sharply. The acreage effect on fish supply is quite high (0. 7) for all the species groups, it can be used as an instrument for increasing fish supply to meet the domestic demand and export till new technological breakthrough in fish comes about. The Inland fish supply is not sensitive to input prices as the cross input price and fish supply elasticities are highly inelastic except feed price in case of Prawn and OFWF. The higher fish price will not attract higher use of inputs. The input demand elasticities with respect to own prices was estimated -0.75 for labour, -0.87 for feed and -1.54 for fertilizer demand. The one way complementarity between labour and material inputs was observed. In India, fish culture is largely practiced in village ponds, tanks and cages with low level of input use, the, lack of good quality fish seed, lack of access of poor farmers to fish nurseries and unorganized system of fish marketing. Fish productivity is quite low. The majority of fish producer belong to socio-economically backwards community. Any improvement in fish production practices through institutional efforts will increase the demand for quality inputs and supply of fish. This will reduce the cost per unit of production and increase the income level and quality of life of these poor households.

Table 3.5 Aquaculture Fish Supply and Input Demand Elasticities

Particulars	Fish Supply			Input Demand		
	Indian Major Carps	Other Freshwater Fish	Prawn	Labour	Feed	Fertilizer
Fish Price (Rs./kg)						
Indian Major Carps	1.560	0.294	-4.032	0.174	0.032	-0.013
Other fresh water fish	0.157	1.716	-0.224	0.254	0.818	0.637
Prawn	-0.645	-0.221	0.727	0.127	0.043	0.171
Input Price (Rs./kg)						
Wage	-0.046	-0.185	-0.210	-0.746	0.047	0.270
Feed price	-0.048	-0.415	-0.417	0.272	-0.872	-0.138
Fertilizer price	0.001	-0.088	-0.113	0.107	-0.009	-1.544
Area in ha	0.731	0.737	0.73	0.717	0.794	0.626

3.5.2 Marine Fish Supply

Six output and two variable inputs over the time span of the study were considered. These were output of PHV, PLV, DHV, DLV, Shrimp, and Molluscs and inputs namely fuel and labour. While estimating the normalized quadratic profit function labour is used as the numeraire. The supply system is estimated using the cross section time series data described above. Estimates of the model were obtained using Zellner's generalized least squares with correction for serial correlation and heteroscedasticity in the disturbance term. Following the application of the Prais-Winsten estimator, the GLS SUR estimator is applied to the transformed variables from the last iteration of the Prais-Western estimator to generate the final parameter estimates for the system of equations in the supply system. The parameter estimates on the price variables for supply and input demand equations did not agree with a priori expectations. All the sign of own price elasticities for fish supply and input demand were turn out to be of the opposite sign and did not agree with a theoretical priori expectations. By changing the numeraire and introducing the state dummies, the expected sign of the parameters could not be obtained. Since, majority of cross price parameters were insignificant. The supply model was estimated by dropping the cross price variables.

The final results of marine fish supply and input demand model are presented in Table 3.6. The model maintained the homogeneity and symmetry hypotheses. The majority of the estimated parameters were statistically significant at the 1 % level. Only two fuel price parameter in PHV and DHV supply equation and one fish price parameter in fuel input demand were not statistically significant. This is reasonable for supply systems models of this size. R^2 statistic was used as a measure of goodness of fit. The values of this statistic were about 0.97 for all the equations indicating high degree of explanatory power. Labour is used as the numeraire variable, the parameter of wage in supply equations, fuel demand equation and the parameters of labour demand are derived from the estimated model. The coaster length and time trend had positive and significant influence on fish supply and input demand statistically significant. The own-price was statistically significant determinants of fish supply. It was true for all the fish species groups. Diesel price and wage influence fish supply and factor demand negatively.

The elasticities calculated at mean data values are given in the last column of Table 3.6. The own price elasticity of fish supply was highest for Shrimp (0.0.49), followed by DHV (0.45), PLV (0.32), Molluscs (0.28), PHV (0.28) and minimum for DLV (0.20). The effect of diesel price on Shrimp supply was more negatively pronounced than that on the supply of other species groups. The effect of wage on fish supply was highly inelastic. It is because, the labour input is almost fixed for marine fishing for a given technology. The Diesel price elasticity of fuel demand was highly elastic (-4.6). The fuel price inflation will hinder the process of modernization from traditional non-mechanized boats to modernized boats. There is the need to extent diesel subsidy to help the fishermen to adopt the modern technologies. The operating costs accounted for a maximum proportion of (92%) of the total cost in traditional fishing units followed by ring seine (89%), gill net (84%), trawler (78%) and purse seine unit (74%). The high operating cost most of the fishing unit was due to high cost on fuel. Keeping lower fuel price will improve working conditions and socio-economic status of the crewmen by adopting mechanization. Until the fishers get an opportunity to work with improved technologies, they continued to be exposed to poverty.

Table 3.6 Marine Fish Supply and Input Demand Model

Fish Group	Variable	Coefficient	't'	Elasticity
Pelagic High Value	Intercept	0.06094	0.66	
	Fish price (Rs/kg)	3.73563**	9.83	0.276
	Fuel price (Rs/lit)	-2.01506	-1.06	-0.059
	Wage (Rs/day)	-0.06488		-0.004
	Coast length (km)	0.02050**	14.03	0.445
	Year	0.05947**	5.41	0.318
	R^2	0.98680		
Pelagic Low Value	Intercept	0.01715	0.17	
	Fish price (Rs/kg)	21.42804**	9.17	0.326
	Fuel price (Rs/lit)	-20.75153**	-4.22	-0.242
	Wage (Rs/day)	-0.12068		-0.004
	Coast length (km)	0.03550**	6.83	0.309
	Year	0.28045**	9.58	0.602
	R^2	0.99030		
Demersal High Value	Intercept	-0.00638	-0.05	
	Fish price (Rs/kg)	8.96698**	7.18	0.454
	Fuel price (Rs/lit)	-4.78844	-1.76	-0.142
	Wage (Rs/day)	-0.25935		-0.010
	Coast length (km)	0.01697**	6.23	0.375
	Year	0.00607	0.33	0.033
	R^2	0.98720		
Demersal Low Value	Intercept	0.23642	0.92	
	Fish price (Rs/kg)	3.13951**	2.86	0.203
	Fuel price (Rs/lit)	-7.31787**	-6.78	-0.368
	Wage (Rs/day)	0.05607		0.002
	Coast length (km)	0.01405**	12.64	0.527
	Year	0.06231**	7.65	0.576
	R^2	0.98150		
Shrimp	Intercept	0.00193	0.02	
	Fish price (Rs/kg)	2.32544**	12.13	0.494
	Fuel price (Rs/lit)	-22.65492	-10.04	-0.964
	Wage (Rs/day)	0.04831		0.005
	Coast length (km)	0.01157**	5.63	0.367
	Year	0.14097**	11.73	1.101
	R^2	0.98780		
Molluscs	Intercept	-0.00442	-0.07	
	Fish price (Rs/kg)	9.03093**	14.08	0.278
	Fuel price (Rs/lit)	-12.25718**	-3.31	-0.274
	Wage (Rs/day)	-0.00265		-0.000

	Coast length (km)	0.04281**	14.78	0.714
	Year	0.06918**	3.41	0.284
	R^2	0.97440		
Input Demand				
Fuel (Diesel)	Intercept	1.25900**	4.07	
	Fish price (Rs/kg)	0.20940	0.82	0.095
	Fuel price (Rs/lit)	-4.63110**	-10.30	-1.099
	Wage (Rs/day)	-0.09033		-0.002
	Coast length (km)	0.00610**	13.42	1.080
	Year	0.03763**	15.43	1.639
	R^2	0.97670		
Labour	Price of fish (Rs/kg)			
	Pelagic high value	0.02565		0.001
	Pelagic low value	0.02557		0.001
	Demersal high value	0.02557		0.001
	Demersal low value	0.02453		0.001
	Shrimp	0.02528		0.003
	Molluscs	0.02568		0.001
	Fuel price (Rs/lit)	-0.02556		-0.001
	Wage (Rs/day)	-0.13390		-0.016
	Coast length (km)	0.00610		
	Year	0.03763		

3.6 TRADE CORE

Data on foreign trade are typically available only at the country level. Data for fish types, over an extended time series, may simply not exist for most developing countries. The formulation of the trade core must therefore recognize these data constraints, while modeling trade elasticities in a flexible manner. One such formulation is the Armington approach, commonly adopted in applied market modeling with trade. In the Armington approach, the foreign and domestic versions of a good are first combined into a foreign-domestic aggregate, which is the object of consumption or production. The foreign and domestic versions are deemed imperfect substitutes. Flexibility is gained by specifying the aggregating equation as a constant elasticity of substitution (CES) function for the demand side, and as constant elasticity of transformation (CET) function for the supply side. Given foreign and domestic prices, imports (exports) can be determined conditional on the total quantity demanded (supplied). In the present fish modelling 0.50 and 1.0 is assumed the values of CES and CET respectively for all the exportable species groups (Shrimp, PHV, DHV and Molluscs).

3.7 DEMAND PROJECTIONS

The increase in supply will make the fish available to the consumers at a cheaper price, which will increase the fish consumption in their food basket. The demand projection of fish by species group is presented in Table 3.7. Domestic demand for fish under the baseline scenario is likely to grow at an annual rate of 2.5 % between 2000 and 2020. Highest growth in demand is projected for IMC (3.98 %), followed by OFWF (3.96), PLV and DLV (2.0 % each). Declining consumer prices are the major drivers of demand growth. However, domestic demand for various species meant for international market is likely to decline due to increase in their prices. Between 2000 and 2020 consumer demand for shrimp would declined at an annual rate of -1.97 %, followed by DHV (-1.43 %) and Molluscs (-1.14 %).

The domestic demand of fish would be 6.72 million tonnes at the end of 11th Plan It is likely to grow to 8.46 million tonnes in 2020. Out of this, in-home consumption as the fresh fish is estimated to be about 66 percent, and the remaining would be consumed away from home and enter industrial processing. The annual per capita consumption at national level is projected to be 5.6 kg in 2011 and 6.3 kg in 2020 (Table 3.8).About 35 percent of Indian population eats fish. Thus, annual per capita consumption of fish eating population is projected about 16.8 kg in 2010, and would rose to 18.5 kg by 2020 (Table 3.9). Under the baseline scenario, the additional fish demand from the year 2000 to 2020 would be about 3.21 million tonnes (Table 3.10). Out of this, 52 % would be met from IMC followed by OFWF (38 %), PLV (14 %) and DLV (3.3 %). The additional consumption of Shrimp, DHV and Molluscs species would decline by 9 %. The aquaculture has been found to hold the key for meeting the future demand challenges.

Table 3.7 Domestic Demand of Fish

('000 tonnes)

Year	Popula-tion	IMC	OFWF	Shrimp all	PHV	PLV	DHV	DLV	Molluscs	Total
Base line										
2000	1010.5	1418.3	1047.3	532.4	414.4	931.4	259.1	216.2	425.3	5244.3
Projected										
2001	1028.6	1473.4	1087.3	528.6	419.1	949.6	257.2	220.5	422.7	5358.5
2002	1045.5	1530.9	1129.1	523.7	423.8	968.2	255.0	224.9	419.9	5475.7
2003	1062.4	1590.9	1172.8	518.0	428.3	987.3	252.7	229.4	416.8	5596.2
2004	1079.1	1653.4	1218.3	511.6	432.8	1006.7	250.2	234.0	413.6	5720.5
2005	1095.7	1718.5	1265.8	504.5	437.1	1026.6	247.5	238.7	410.1	5848.8
2006	1112.2	1786.4	1315.3	496.9	441.3	1046.9	244.8	243.4	406.4	5981.3
2007	1128.5	1857.1	1366.9	488.8	445.4	1067.6	241.8	248.3	402.6	6118.5
2008	1144.7	1930.7	1420.7	480.4	449.3	1088.8	238.8	253.3	398.6	6260.6
2009	1160.8	2007.4	1476.7	471.7	453.1	1110.4	235.7	258.3	394.5	6407.8
2010	1176.7	2087.2	1535.0	462.8	456.8	1132.5	232.5	263.5	390.2	6560.6
2011	1192.5	2170.3	1595.7	453.8	460.3	1155.0	229.3	268.8	385.9	6719.1
2012	1208.1	2256.8	1659.0	444.6	463.7	1178.0	226.0	274.2	381.5	6883.8
2013	1223.6	2346.8	1724.8	435.4	466.9	1201.5	222.6	279.7	377.0	7054.8
2014	1238.9	2440.5	1793.3	426.2	470.0	1225.4	219.2	285.3	372.5	7232.5

2015	1254.0	2538.0	1864.7	417.0	473.0	1249.9	215.8	291.0	367.9	7417.3
2016	1269.0	2639.4	1938.9	407.9	475.8	1274.9	212.4	296.9	363.2	7609.3
2017	1283.6	2744.9	2016.1	398.8	478.5	1300.3	208.9	302.8	358.5	7809.0
2018	1298.0	2854.7	2096.5	389.8	481.0	1326.3	205.5	308.9	353.8	8016.6
2019	1312.2	2968.9	2180.1	380.9	483.5	1352.8	202.1	315.1	349.1	8232.5
2020	1339.7	3087.7	2267.1	372.2	485.7	1379.9	198.6	321.4	344.4	8457.0
CGR (%)	1.42	3.98	3.96	**-1.97**	0.72	1.99	**-1.43**	2.00	**-1.14**	2.47

Note: CGR – Annual Compound Growth Rate

Table 3.8 Per Capita Consumption of Fish in India: Projections till 2020

(kg)

Year	Popula-tion	IMC	OFWF	Shrimp all	PHV	PLV	DLV	DLV	Molluscs	Total
Base line										
2000	1010.5	1.4	1.0	0.5	0.4	0.9	0.3	0.2	0.4	5.2
Projected										
2001	1028.6	1.4	1.1	0.5	0.4	0.9	0.3	0.2	0.4	5.2
2002	1045.5	1.5	1.1	0.5	0.4	0.9	0.2	0.2	0.4	5.2
2003	1062.4	1.5	1.1	0.5	0.4	0.9	0.2	0.2	0.4	5.3
2004	1079.1	1.5	1.1	0.5	0.4	0.9	0.2	0.2	0.4	5.3
2005	1095.7	1.6	1.2	0.5	0.4	0.9	0.2	0.2	0.4	5.3
2006	1112.2	1.6	1.2	0.4	0.4	0.9	0.2	0.2	0.4	5.4
2007	1128.5	1.6	1.2	0.4	0.4	0.9	0.2	0.2	0.4	5.4
2008	1144.7	1.7	1.2	0.4	0.4	1.0	0.2	0.2	0.3	5.5
2009	1160.8	1.7	1.3	0.4	0.4	1.0	0.2	0.2	0.3	5.5
2010	1176.7	1.8	1.3	0.4	0.4	1.0	0.2	0.2	0.3	5.6
2011	1192.5	1.8	1.3	0.4	0.4	1.0	0.2	0.2	0.3	5.6
2012	1208.1	1.9	1.4	0.4	0.4	1.0	0.2	0.2	0.3	5.7
2013	1223.6	1.9	1.4	0.4	0.4	1.0	0.2	0.2	0.3	5.8
2014	1238.9	2.0	1.4	0.3	0.4	1.0	0.2	0.2	0.3	5.8
2015	1254.0	2.0	1.5	0.3	0.4	1.0	0.2	0.2	0.3	5.9
2016	1269.0	2.1	1.5	0.3	0.4	1.0	0.2	0.2	0.3	6.0
2017	1283.6	2.1	1.6	0.3	0.4	1.0	0.2	0.2	0.3	6.1
2018	1298.0	2.2	1.6	0.3	0.4	1.0	0.2	0.2	0.3	6.2
2019	1312.2	2.3	1.7	0.3	0.4	1.0	0.2	0.2	0.3	6.3
2020	1339.7	2.3	1.7	0.3	0.4	1.0	0.1	0.2	0.3	6.3
GGR (%)	1.42	3.98	3.96	**-1.97**	0.72	1.99	**-1.43**	2.00	**-1.14**	2.47

Note: CGR – Annual Compound Growth Rate

Table 3.9 Per Capita Demand of Fish Eating Population in India: Projections till 2020

(kg)

Year	Fish eating population	IMC	OFWF	Shrimp all	PHV	PLV	DHV	DLV	Molluscs	Total
Base line										
2000	339.8	4.17	3.08	1.57	1.22	2.74	0.76	0.64	1.25	15.43
Projected										
2001	344.9	4.27	3.15	1.53	1.22	2.75	0.75	0.64	1.23	15.54
2002	350.1	4.37	3.23	1.50	1.21	2.77	0.73	0.64	1.20	15.64
2003	355.3	4.48	3.30	1.46	1.21	2.78	0.71	0.65	1.17	15.75
2004	360.7	4.58	3.38	1.42	1.20	2.79	0.69	0.65	1.15	15.86
2005	366.1	4.69	3.46	1.38	1.19	2.80	0.68	0.65	1.12	15.98
2006	371.6	4.81	3.54	1.34	1.19	2.82	0.66	0.66	1.09	16.10
2007	377.2	4.92	3.62	1.30	1.18	2.83	0.64	0.66	1.07	16.22
2008	382.8	5.04	3.71	1.25	1.17	2.84	0.62	0.66	1.04	16.35
2009	388.6	5.17	3.80	1.21	1.17	2.86	0.61	0.66	1.02	16.49
2010	394.4	5.29	3.89	1.17	1.16	2.87	0.59	0.67	0.99	16.64
2011	400.3	5.42	3.99	1.13	1.15	2.89	0.57	0.67	0.96	16.79
2012	406.3	5.55	4.08	1.09	1.14	2.90	0.56	0.67	0.94	16.94
2013	412.4	5.69	4.18	1.06	1.13	2.91	0.54	0.68	0.91	17.11
2014	418.6	5.83	4.28	1.02	1.12	2.93	0.52	0.68	0.89	17.28
2015	424.9	5.97	4.39	0.98	1.11	2.94	0.51	0.68	0.87	17.46
2016	431.2	6.12	4.50	0.95	1.10	2.96	0.49	0.69	0.84	17.65
2017	437.7	6.27	4.61	0.91	1.09	2.97	0.48	0.69	0.82	17.84
2018	444.3	6.43	4.72	0.88	1.08	2.99	0.46	0.70	0.80	18.04
2019	450.9	6.58	4.83	0.84	1.07	3.00	0.45	0.70	0.77	18.26
2020	457.7	6.75	4.95	0.81	1.06	3.01	0.43	0.70	0.75	18.48
GGR (%)	1.50	2.4	2.4	-3.4	-0.8	0.5	-2.9	0.5	-2.6	0.9

Note: CGR – Annual Compound Growth Rate

Table 3.10 Changes in Consumption of Fish by Species Groups by 2020

Species Group	Consumption		Change in production		% Share in total fish	
	2000	2020	('000 tonnes)	Per cent	2000	2020
IMC	1418.3	3087.7	1669.5	52.0	27.0	36.5
OFWF	1047.3	2267.1	1219.8	38.0	20.0	26.8
Shrimp all	532.4	372.2	-160.2	-5.0	10.2	4.4
PHV	414.4	485.7	71.4	2.2	7.9	5.7
PLV	931.4	1379.9	448.4	14.0	17.8	16.3
DHV	259.1	198.6	-60.5	-1.9	4.9	2.3

DLV	216.2	321.4	105.2	3.3	4.1	3.8
Molluscs	425.3	344.4	-80.**9**	-2.5	8.1	4.1
Total	5244.3	8457.0	3212.7	100.0	100.0	100.0

3.8 SUPPLY PROJECTIONS

Fish production by production environment is projected for two decade using year 2000 as the base year and presented in Table 3.11. Total fresh fish output growth is projected slightly above 3%. The aquaculture output is expected to expend with higher growth about 4% per annum as compared to capture output which is likely to grow at slower rates about 2% per annum. Thus, aquaculture would expand faster than the capture.

Table 3.11 Supply of Fish by Source in India

('000 tonnes)

Year	Fresh Fish Production			Share of Aquaculture in Total (%)
	Aquaculture	Capture	Total	
Base Line Supply				
2000	2849.5	2632.1	5481.6	52.0
Projected Supply				
2001	2961.3	2686.3	5647.6	52.4
2002	3077.8	2741.7	5819.5	52.9
2003	3199.1	2798.5	5997.6	53.3
2004	3325.5	2856.5	6182.0	53.8
2005	3457.2	2915.8	6373.0	54.2
2006	3594.2	2976.5	6570.8	54.7
2007	3736.9	3038.6	6775.6	55.2
2008	3885.5	3102.1	6987.6	55.6
2009	4040.1	3167.0	7207.1	56.1
2010	4201.0	3233.3	7434.3	56.5
2011	4368.5	3301.1	7669.5	57.0
2012	4542.7	3370.4	7913.1	57.4
2013	4724.0	3441.2	8165.2	57.9
2014	4912.6	3513.6	8426.2	58.3
2015	5108.9	3587.6	8696.5	58.7
2016	5313.1	3663.2	8976.3	59.2
2017	5525.4	3740.5	9265.9	59.6

2018	5746.4	3819.4	9565.8	60.1
2019	5976.2	3900.1	9876.3	60.5
2020	6215.2	3982.6	10197.8	60.9
CGR (%)	**3.99**	**2.10**	**3.18**	

Note: CGR – Annual Compound Growth Rate

The higher share of aquaculture in total output of fresh fish bas been projected and would raise from 52% in the year 2000 to 61% in the year 2020. The total fresh fish production is projected 7.7 million tonnes by the end of 11th Plan and would raise to 10.2 million tonnes by the year 2020 comprising 6.2 million tonnes aquaculture and 4.0 million tonnes capture Total fish output annual growth is projected to be 3.2% which would likely to be doubled as compared to crop sector.

The supply projections by species group for the year 2001-2020 have been depicted in Table 3.12.

Table 3.12 Supply Projections by Species in India

('000 tonnes)

Year	IMC	OFWF	Shrimp all	PHV	PLV	DHV	DLV	Molluscs	Total
Base Line Supply									
2000	1418.3	1047.3	639.7	374.1	931.4	367.7	216.2	486.9	5481.6
Projected Supply									
2001	1473.4	1087.3	664.0	381.4	949.6	374.7	220.5	496.5	5647.6
2002	1530.9	1129.1	689.1	388.9	968.2	381.9	224.9	506.3	5819.5
2003	1590.9	1172.8	715.0	396.6	987.3	389.3	229.4	516.4	5997.6
2004	1653.4	1218.3	741.8	404.4	1006.7	396.8	234.0	526.6	6182.0
2005	1718.5	1265.8	769.5	412.3	1026.6	404.5	238.7	537.1	6373.0
2006	1786.4	1315.3	798.1	420.5	1046.9	412.4	243.4	547.8	6570.8
2007	1857.1	1366.9	827.7	428.8	1067.6	420.5	248.3	558.7	6775.6
2008	1930.7	1420.7	858.4	437.3	1088.8	428.7	253.3	569.8	6987.6
2009	2007.4	1476.7	890.1	445.9	1110.4	437.1	258.3	581.2	7207.1
2010	2087.2	1535.0	922.9	454.8	1132.5	445.6	263.5	592.8	7434.3
2011	2170.3	1595.7	956.9	463.8	1155.0	454.4	268.8	604.6	7669.5
2012	2256.8	1659.0	992.1	473.0	1178.0	463.3	274.2	616.7	7913.1
2013	2346.8	1724.8	1028.6	482.4	1201.5	472.4	279.7	629.0	8165.2
2014	2440.5	1793.3	1066.4	492.0	1225.4	481.8	285.3	641.5	8426.3
2015	2538.0	1864.7	1105.5	501.8	1249.9	491.3	291.0	654.4	8696.5
2016	2639.4	1938.9	1146.1	511.8	1274.9	501.0	296.9	667.4	8976.3
2017	2744.9	2016.1	1188.1	522.0	1300.3	510.9	302.8	680.8	9265.9
2018	2854.7	2096.5	1231.7	532.4	1326.3	521.0	308.9	694.4	9565.8
2019	2968.9	2180.1	1276.8	543.0	1352.8	531.3	315.1	708.3	9876.3
2020	3087.7	2267.1	1323.7	553.8	1379.9	541.8	321.4	722.5	10197.8
Annual Compound Growth Rate (%)									
Supply	3.98	3.96	3.69	1.99	1.99	1.97	2.00	2.00	3.18
Price	-2.68	-2.59	3.29	0.56	-0.50	2.43	-1.12	2.38	-0.73

The results revealed that the fish production would grow at the growth rate of 3.2% corresponding to the baseline scenario. It would be highest for IMC, OFWF and Shrimp at about 4% and lower for PHV, PLV, DHV, DLV and mollusks at about 2% per annum. The rise in supply growth and shift in supply curve towards the right has not declined the price for all the species. A mixed effect was observed on the real prices. For the species which are not entering in the export market, the prices will decline with the increase in supply. These species are IMC, OFWF from inland sources where prices of these species will decline in the projected period at the rate of about 2.6% per annum. Among the marine species which are of low value, fish price will decline by less than -0.50% per annum for PLV and 1.12% for DLV. The price of export oriented fish species would continue to rise with the increase of their supply.

The higher growth in fish supply for the species used in the domestic market would benefit the common man as this fish species will be available at cheaper price in future. In the fish species which are export oriented, the rise in supply will not cut down the price in the domestic market substantially, and the price will keep rising and would benefit the producer. The price of shrimp, which is the most important exportable fish, will rise 3.35% annually. Other exportable fish species are PHV, DHV and Molluscs for which also the price will rise annually about 2.4% for DHV and Molluscs and 0.5% for PLV.

The changes in the share of different production environment and different species group in total production during the period 2000-2020 are presented in Table 3.13 and Table 3.14.

Table 3.13 Changes in Fish Supply by Production Environment by 2020

Production environment	Production ('000 tonnes)		Change in Production		% Share in Total	
	2000	2020	Quantity ('000 tonnes)	Per cent	2000	2020
Aquaculture	2849.5	6215.2	3365.8	71.4	52.0	60.9
Capture	2632.1	3982.6	1350.5	28.6	48.0	39.1
Total	5481.6	10197.8	4716.3	100.0	100.0	100.0

Table 3.14 Changes in Fish Supply by Species Groups by 2020

Species Group	Production ('000 tonnes)		Change in Production		% Share in Total	
	2000	2020	Quantity ('000 tonnes)	Percent	2000	2020
IMC	1418.3	3087.7	1669.5	35.4	25.9	30.3
OFWF	1047.3	2267.1	1219.8	25.9	19.1	22.2
Shrimp all	639.7	1323.7	684.0	14.5	11.7	13.0
PHV	374.1	553.8	179.7	3.8	6.8	5.4
PLV	931.4	1379.9	448.4	9.5	17.0	13.5

DHV	367.7	541.8	174.1	3.7	6.7	5.3
DLV	216.2	321.4	105.2	2.2	3.9	3.2
Molluscs	486.9	722.5	235.6	5.0	8.9	7.1
Total	5481.6	10197.8	4716.3	100.0	100.0	100.0

The share of IMC in total fish production will increase to 30% in 2020 from 26 % in 2000 and of OFWF to 22 % from 19 %. The share of shrimp would increased by 1.3%. While the share of pelagic, demersal, and molluscs would decline from 23.8 to 18.9%, 10.6 to 8.5 % and 8.9 to 7.1 % respectively during this period. By the year 2020, the incremental production is projected to be 4.7 million tonnes. Out of this additional production the aquaculture contribution is projected more than 60%. Among species, IMC would contribute maximum (35.4%) followed by OFWF (25.9%), shrimp (14.5%), Pelagic (13.3%), Demersal (5.9%) and Molluscs (5.0%). Aquaculture would emerged important opportunity for additional fish supply. Among aquaculture species IMC, OFWF and shrimp would emerge great opportunities for future fish supply scenario. Among capture PLV would be the major contributor in additional marine fisheries.

3.9 EXPORT PROJECTIONS

Shrimp, PHV, DHV and Molluscs are the major species of fish, which are being exported from India. The export of this species would grow at a rate of 3.82 % per annum (Table 3.15).

Table 3.15 Export of Fish in India: Projections till 2020

('000 tonnes)

Year	Shrimp All	PHV	DHV	Molluscs	Total
2000	107.4	25.1	108.6	66.8	307.9
2001	115.3	26.3	113.4	69.6	324.7
2002	123.4	27.7	118.3	72.4	341.7
2003	131.5	29.1	123.1	75.2	358.9
2004	139.7	30.5	128.1	78.0	376.3
2005	148.0	31.9	133.0	80.9	393.9
2006	156.5	33.5	137.9	83.7	411.6
2007	165.0	35.0	142.9	86.6	429.5
2008	173.7	36.6	147.9	89.5	447.6
2009	182.4	38.3	152.9	92.4	466.0
2010	191.4	39.9	157.9	95.3	484.5
2011	200.5	41.7	162.9	98.2	503.3
2012	209.8	43.4	168.0	101.1	522.3
2013	219.2	45.2	173.0	104.1	541.6

2014	228.9	47.1	178.1	107.1	561.2
2015	238.8	48.9	183.2	110.1	581.1
2016	249.0	50.8	188.3	113.1	601.3
2017	259.4	52.8	193.5	116.2	621.9
2018	270.1	54.8	198.7	119.3	642.8
2019	281.1	56.8	203.9	122.4	664.2
2020	292.4	58.8	209.2	125.5	686.0
Annual Compound Growth Rate (%)					
Export	4.73	4.20	3.12	3.02	3.82
Price	10.3	4.18	7.16	6.72	8.17

The highest growth of export is projected for shrimp (4.73%), followed by PHV (4.2%), DHV (3.1%) and Molluscs (3.02 %). The price of exported fish would also increased at the annual growth rate of 4.2 – 10.3 % per annum at constant price. The higher export price will benefit the fish producer substantially. The export would stabilized the domestic price of these species at higher level safeguarding the interest of producer. The technological development of fish sector with export orientation would induce higher fish production, demand and export, and would stabilize the domestic market. The benefit of the technological development in the fish sector will be transmitted substantially to both producer and the consumer.

The fish export was 0.31 million tonnes in the year 2000 (base year). Under the baseline scenario, the export of fish would likely to grow at an annual rate of 3.82 % between 2000 and 2020 and the exports would increased to 0.48 million tonnes in 2010 and 0.69 million tonnes in of 2020. The export price is likely to increase at an annual rate of 6.1 % during this period. Under the baseline scenario shrimp exports price would likely to witness the highest annual growth (10.3 %), followed by PHV (4.2 %), DHV (7.2%) and Molluscs (6.7%). The export price of each species is predicted to keep on increasing. A steep rise is predicted in the shrimp price. Exports of shrimp would also increase at a much faster rate, compared to other species. The DHV share has been projected 30.5% in the year 2020, followed by Molluscs (18 3%) and PHV (8 6%). India is likely to increase its fish exports by 0.42 million tonnes i.e. nearly 123 % by 2020. Out of this, shrimp contribution is projected to be nearly half and dominating in the export market (Table 3.16).

Table 3.16 Changes in Fisheries Export by Species Groups by 2020

Species Group	Export ('000 tonnes)		Change in production		% Share in Total	
	2000	2020	('000 tonnes)	Percent	2000	2020
Shrimp all	107.4	292.4	185.0	48.9	34.9	42.6
PHV	25.1	58.8	33.8	8.9	8.1	8.6
DHV	108.6	209.2	100.7	26.6	35.3	30.5

Molluscs	66.8	125.5	58.7	15.5	21.7	18.3
Total	307.9	686.0	378.1	100.0	100.0	100.0

3.10 POLICY IMPLICATIONS AND OPPORTUNITIES

The technological diffusion, resource management, subsistence and commercial orientation, and macro policies are the key factors that influence the supply response.

The supply response to own-price has been recorded higher for aquaculture than capture which is consistent with the sharp increase observed in aquaculture in recent decades and predicted for future. Aquaculture freshwater species would account for the bulk of output, and would maintain its dominance in the growth of fisheries supply in the foreseeable future. These are mostly low price fish and would occupy a significant place in the diets as a primary source of protein. Higher productivity growth would tend to increase supply and demand and would control fish prices. More fish at lower real prices would be available to the consumers.

Considerable impacts of technology are expected on social welfare. Within freshwater fisheries, IMC is expected to become prominent. Capture fisheries is likely to register stagnant growth. Brackishwater aquaculture (Shrimp) and capture shrimp would have dominance in the export basket. Sustainable management of fisheries resources and compliance of HACCP standards would be the challenges needing attention in the wake of widespread poverty among fisher's folks and availing opportunities for fish trade. Government policies are needed to design machines and provide training to minimize the cost of compliance of international standards.

The new yield-raising technologies, species management of resources and development of infrastructure can serve the useful purpose of sustainable growth of fish supply. Scope for increasing productivity through increased extension activities is limited. By contrast, systematic breeding strategies would improve the stock permanently, as the genetic gain is cumulative and sustainable. The micro-level analysis has shown that the genetically improved strain of Rohu (Jayanti Rohu) is economically viable and socially acceptable at various stages (viz. hatchery, seed-rearing farm and fish grow-out farm).

The mixed trend on complementarity and substitute-response has been investigated in the study, suggesting the need for more caution in developing and implementing the fisheries policy for improving sustainability of various production environments. Thus, national strategies need to be prioritized towards sustainability issues by improving stock and dissemination of latest technologies to the poor farmers and fisher folks. The success of research for Jayanti Rohu in India has induced catalytic effects on policymakers to build strategies and institutions for the dissemination of improved strain on a large scale to benefit the resource poor farmers in India. Rohu is among the most preferred fish of the producers as well as consumers. Dissemination and seed policy for genetically improved strain of carp and shrimp can be seen as an important opportunity for fisheries growth in India to match the domestic demand and export.

CHAPTER IV

MARKETING SYSTEM OF FISH AND FISHERY PRODUCTS

4.1 INTRODUCTION

This is defined as physical and institutional set up to perform all activities involved in the flow of products and services from the point of initial fish production until they are in the hands of ultimate consumers. This includes assembling, handling, storage, transport, processing, wholesaling, retailing and export of fish and fishery products as well as accompanying supporting services such as market information, establishment of grades and standards, commodity trade, financing and price risk management and the institutions involved in performing the above functions (Planning Commission, 2007).

There are three important dimensions of fish marketing system. These are market structure, conduct and performance. Market structure determines the market conduct and performance. The structural characteristics govern the behavior of marketing firms. The market structure has never remained static but kept on changing with the changing environment. An important characteristic of fish marketing in India has been that private trade dominates the market. With the large quantities required to be handled by the private trade the size and structure of markets over time have considerably expanded.

The experience of agricultural development in India has shown that the existing systems of delivery of agricultural inputs and marketing of agricultural output have not been efficient in reaching the benefits of technology to all sections of farmers. This is especially true of the fisheries sector where input delivery has been relatively efficient but the system of marketing of output is far from efficient whereby the fishermen community as a whole still remains one of the weakest sections of the society. Certain aspects of market performance like absolute share of the producer in terms of remunerability, fluctuations in prices across time and space and lack of proper markets are getting increasingly crucial.

There are structural weaknesses of markets like unorganized suppliers as against organized buyers, weak holding capacity of the producers and the perishable nature of the produce in the absence of any storage infrastructure. In the presence of these characteristics of the market, the rural producers cannot simply be left to fend for themselves so far as marketing of their produce is concerned. In such circumstances the producers will only be losers in the process of globalization and liberalization (Planning Commission, 2007).

4.2 MARKETING CHANNELS

Fish and fishery products, both fresh and frozen, move in the marketing chain through different channels, domestic or export, as the case may be. The marketing channels are distinguished from each other on the basis of market functionaries involved in carrying the produce from the farmers to the ultimate consumers. The length of the marketing channel depends on the size of the market, nature of the commodity and the pattern of demand at the consumer level.

Fish marketing systems in India involve several marketing channels, each with a number of intermediaries between producer and consumer of fish. The common domestic fish marketing channel for marine and brackishwater fish in India is one that has the auctioneer, commission agent, wholesaler and the retailer as intermediaries (Figure 4.1).

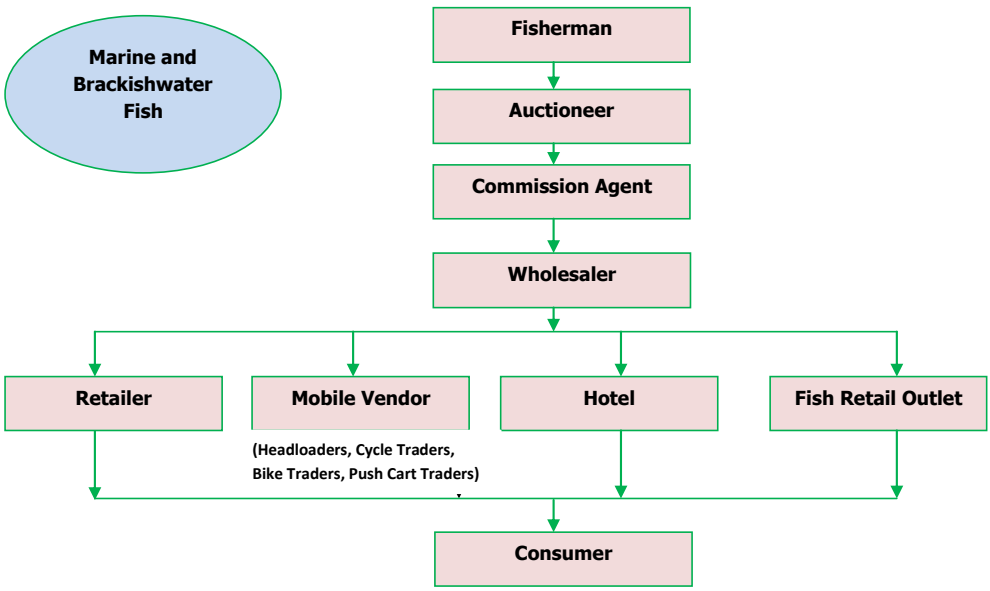


Figure 4.1 Common Domestic Marketing Channel for Marine and Brackishwater Fishes

The fisherman sells his catch through the auctioneer, usually at the landing centre, without any value addition. Generally each fisherman has a pre-fixed auctioneer through whom he sells his catch. The auctioneer conducts the auction and sells the fish to the local dealers / fish collectors, who then takes it to the wholesale market and auctions it off to the wholesaler. The auctioneer and fish collector carry out some value addition in terms of cleaning, icing of fish, etc. The commission agent operates at the market place. Fish is supplied to the agent who facilitates the disposal of fish to wholesalers and retailers for a fixed commission. The commission agent rarely carries out any value addition. The wholesaler in turn sells his fish to the retailer after re-icing, salting, cleaning, size grading, etc. Vendors and hoteliers also might buy their supply of fish from the wholesaler directly. Retailers carry out further value addition by re-icing, size grading, dressing and filleting the fish and sell the same to the consumers.

The common marketing channel for freshwater fish involves the traders and fishermen co-operatives (Figure 4.2). The traders collect fish from the landing centres (either through auctions or at fixed prices) and supply the fish to the markets for a commission. The fishermen co-operatives carry out the same function as the trader. Both the traders as well as the co-operatives sell their fish to the wholesaler.

The wholesaler sells off his fish to the retailer or mobile trader or bulk consumers like hoteliers. The retailers sell the fish to the consumer after some value addition.

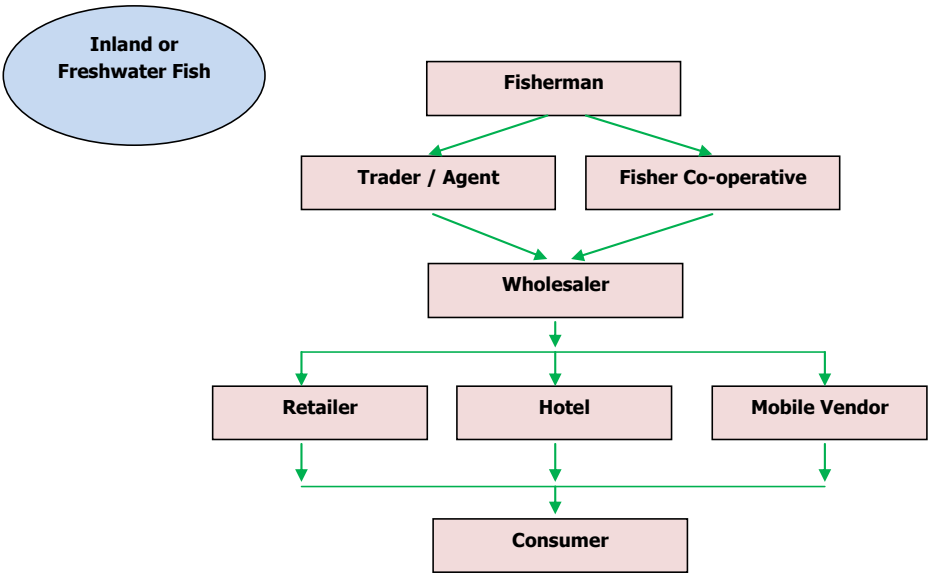


Figure 4.2 Common Domestic Marketing Channel for Freshwater Fishes in India

The common marketing channel for fish export involves the trader or agent and the fish processing unit (Figure 4.3). Fish is purchased from the producer by traders or agents of the export processing unit. The traders sell their fish to the processing unit. After processing the fish are sent to the respective destinations by the exporter.

Figure 4.3 Marketing Channel for export of fishes from India

4.2.1 Kolkata

4.2.1.1 Howrah Fish Market

Primary data was collected from different market intermediaries related to the Howrah wholesale fish market in West Bengal. The most prevalent fish marketing channels are:

Domestic Marketing Channels	
Channel I	Fisher – Local Auctioneer – Fish Collector / Local Dealer – Auctioneer – Wholesaler – Retailer – Consumer
Channel II	Fisher – Fish Collector / Local Dealer – Auctioneer – Retailer – Consumer
Channel III	Fisher - Wholesaler – Retailer – Consumer
Channel IV	Fisher – Dealer – Auctioneer – Vendor – Consumer
Channel V	Fisher – Dealer – Auctioneer – Hotel Supplier / Restaurant – Consumer

Export Marketing Channels	
Channel I	Shrimp Farmers – Exporter
Channel II	Fisher – Trader – Auctioneer – Exporter
Channel III	Fisher – Trader – Exporter

Market Intermediaries

The functioning and costs and returns of market intermediaries associated with marketing of fish at Howrah fish market are summarized in following paragraphs. Indian Major Carps (IMC) were used as the study species.

Auctioneer

The auctioneers are commonly known as *aratdars.* They are vital in wholesale fish marketing as they play the role of auctioneer and credit provider. The *aratdar* extends loans (at low interest) to the fishermen/contractor/supplier with the condition that they supply the catch to him. The sale of fish after auction is also generally on credit basis. The purchaser is called *paikar* who makes payment to the *aratdar* after fish is purchased by him. So, the *aratdar* has to buy and sell the fish on loan. This is a major problem in fish marketing and might be due to the high competition in the market.

The main function performed by auctioneer is to conduct bidding or auction of fish. The auctioneers deal with all available species of fish. The average quantity bid vary from 12- 50 kg. About 85% buyers are wholesalers/suppliers of fish to other markets, while retailers are 8% and remaining are the bulk consumers like hotels, restaurant, etc. The number of vendors is very less. On an average, each auctioneer handle about 3 tonnes fish daily with a maximum of 10 tonnes and minimum of 0.35 tonnes per day. The auctioneers take 5% as the commission charges on the value of auctioned fish. The rate of commission is fixed by the auctioneer's association.

Aratdar engages both daily labourers and permanent employees. The number of employees varies according to the size of the *aratdar's* business. Permanent employees are mainly the accountants or *hisabrakhaks.* There is no fixed salary for them. Their salary depends on the experience and volume of work. Apart from accounting all the necessary services such as unloading, grading, weighing, cleaning, icing, etc. are done by the labourers. The labour charge is fixed at Rs 25 / basket, each holding 40 kg fish.

The auctioneer incurs both fixed and variable costs. Fixed costs include costs of furniture, weighing scale, ice cutters, salaries of permanent employees, rent for the shop, etc. The variable costs consist of expenses on ice, transportation charges, storage/preservation baskets, etc. The income of *aratdar* is from the commission on auctioned fish. The cost incurred by the auctioneer for handling one kg of fish is estimated at Rs 0.98. The details of the auctioneer's costs are given in Table 4.1.

Table 4.1 Marketing Costs of Auctioneer, Howrah Fish Market

Item	Cost (Rs/kg)
Labour	0.63
Salary	0.18
Ice	0.08
Telephone	0.05
Electricity	0.04
Total	**0.98**

Source: Primary Survey, 2008

The *aratdar* incurs about 64% expenses on labour followed by 19% on salaries of permanent employees and 8% on ice (Figure 4.4). Telephone, electricity, rent etc. together account for 9% of the total cost.

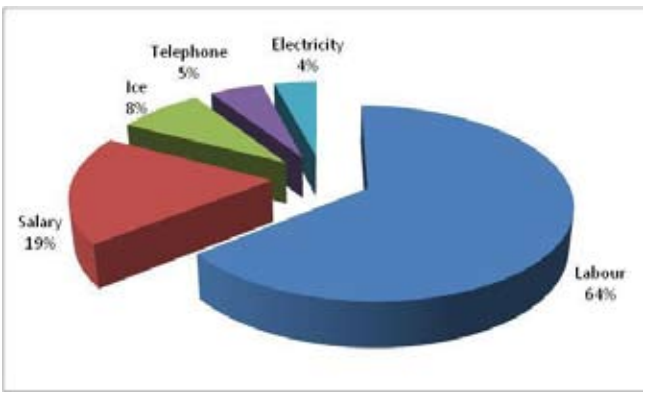


Figure 4.4 Distribution of Marketing Cost of Auctioneer, Howrah Fish Market

Wholesaler

Wholesalers from Kolkata and surrounding districts in West Bengal as well as nearby states operate at Howrah market. They purchase fish in bulk by auction and sell it to retailers and consumers at their respective places. They buy fish from Howrah market mostly on credit and dispose the same to retailers at one day credit. Average daily quantity handled by the wholesalers was estimated at 300kg. The margin kept by the wholesaler depended on demand, supply, fish species, and source of fish.

Wholesalers employ labour for packing of fish with ice (if required, when the place is distant from Howrah Fish market) and transportation to their destination. These labourers also do loading and unloading and necessary cleaning of the market place. In case of quality fish of large size, the wholesalers auction it to retailers; otherwise they sell it directly to the retailers. Bargaining is found very common between wholesalers and retailers.

The cost components of wholesalers are shown in Table 4.2. The total marketing cost is estimated at Rs 8.89 / kg. For wholesaler packing, icing and transportation / carrying cost are the major items, besides the labour charges. Maximum expenses are on icing (30%) followed by labour (26%), transportation (22%) and packing (14%). Other cost items have very low share in cost (Figure 4.5).

Table 4.2 Marketing Costs of Wholesaler, Howrah Fish Market

Item	Cost (Rs/ kg)
Ice	2.63
Other Labour	2.35
Transportation	1.95
Packing	1.25
Loading/Unloading	0.45
Telephone	0.23
Electricity	0.02
Rent for Shop	0.02
Total	**8.89**

Source: Primary Survey, 2008

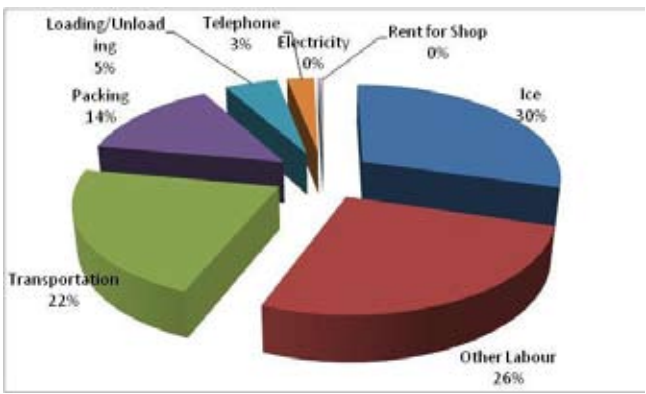


Figure 4.5 Distribution of Marketing Cost of Wholesaler, Howrah Fish Market

Retailer

Retailers buy fish mostly from wholesalers, with some buying fish directly from Howrah wholesale market. They handle all fish species available in the market or in demand in their area of sale. The fishes

in demand are Indian Major Carps, hilsa, *pabda*, *chital* and *tengra*. On an average daily fish handled by retailers is 53 kg with a maximum of 100 kg and minimum of 20 kg.

After purchase of fish, retailers pack and load it for transportation to their shops, where it is unloaded, segregated and arranged for display. On an average, they engage one or two family members / labourers for assistance. Though family labour is very common among retailers in larger businesses, labourers are hired on daily wage basis. The engaged persons clean and dress the fishes also. The dressed fishes fetch significantly higher price than full fish. Customers generally pay in cash. Credit payment is allowed in some cases with personal relationship and risk. At the beginning of the day, the retailers use to have better bargaining. But towards the end of the day, the bargaining power shifts towards the consumers, as the retailers want to dispose their fish on the same day. Their bargaining power also depends on their capacity to preserve the unsold fish.

The costs incurred by the retailers consist of costs of labour (both hired and family), ice, packing and transportation. The details of the costs are given in Table 4.3. The other cost items are charges for loading / unloading, rent, etc. The total marketing cost is estimated at Rs 6.61/kg.

Table 4.3 Marketing Costs of Retailers, Howrah Fish Market

Item	Cost (Rs/kg)
Labour	2.15
Ice	1.88
Packing	1.06
Transportation	0.97
Loading/Unloading	0.44
Electricity	0.07
Rent for shop	0.05
Total	**6.61**

Source: Primary Survey, 2008

Among different components of cost, percentage share of labour is the highest (32%), followed by ice (28%), packing (16%) and transportation (15%) (Figure 4.6).

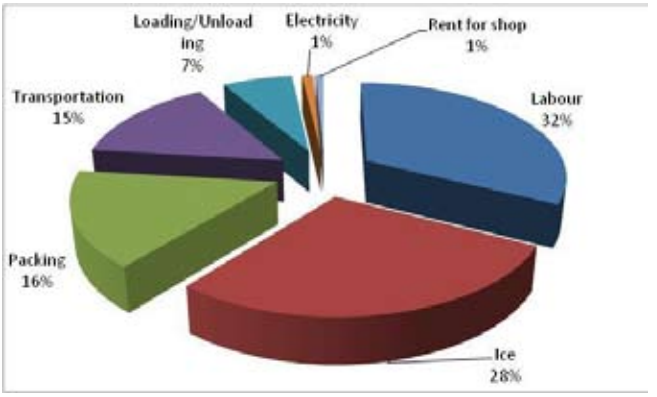


Figure 4.6 Distribution of Marketing Cost of Retailer, Howrah Fish Market

Fish Collector / Local Dealer

Fish collectors / local dealers are the market intermediaries who purchase fish from the landing centre, usually situated at the bank of the river/ reservoir site/ at the sea shore, either through auction or at pre-fixed price. After the purchase, fish is packed with ice and sent to Howrah wholesale market either by road or by train. Their costs vary significantly according to marketing functions such as mode of transportation, grading, cleaning, packing, icing, loading, unloading, etc. Quantity purchased by the collector/local dealer per day depend on the volume of the fish catch, quality of the catch, geographical location, and price of particular fish prevailing in market. The daily quantity of fish sent by fish collector/local dealer to Howrah wholesale market from both inland and marine fish landing centers vary from 100 kg to 10 t. The transactions with the fishers and Howrah market auctioneers are made both on credit and in cash. Usually they get advance from the auctioneer, to whom they are bound to send the catch. The costs incurred by the fish collectors/local dealers are depicted in Table 4.4.

Table 4.4 Marketing Costs of Fish Collector/Local Dealer, Howrah Fish Market

Item	Cost (Rs/kg)
Auctioneer's commission	2.79
Packing	2.50
Transportation	1.00
Other items	0.50
Labour	0.39
Telephone	0.11
Rent for shop	0.01
Electricity	0.004
Total Cost	**7.31**

Source: Primary Survey, 2008

The total marketing cost of fish collector is estimated at Rs 7.31/kg with major cost constituents being auctioneer's commission (38%) followed by packing (34%) and transportation (14%) (Figure 4.7). Packing cost includes expenses on ice and packing materials. The other costs include "*britt*" (2% challan), "*dan*" (Rs 0.60 / basket) and accounting (Rs 0.60 / challan). These costs are calculated and collected by the auctioneer at Howrah wholesale market.

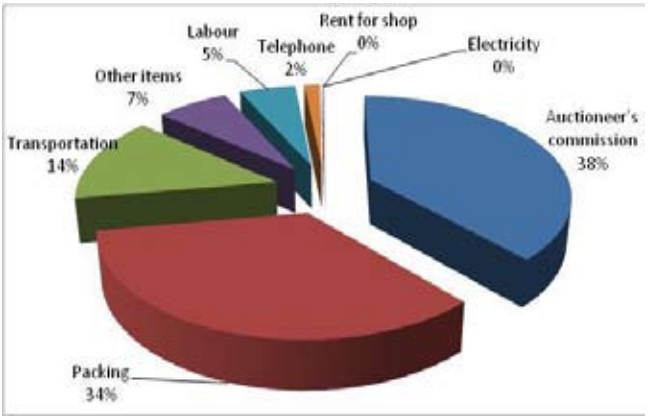


Figure 4.7 Distribution of Marketing Cost of Fish Collector/Local Dealer, Howrah Fish Market

Contractor / Fishermen Co-operative

There is a fish marketing channel, which starts with the fishers / aquaculturists / fishermen co-operatives. Here, fishers rarely sell their catch to the fish collector. They mostly dispose catch through co-operatives/contractor. Only in case of shrimp production, exporters purchase shrimps directly from the farmers. Whenever the fishing right of a water body is with a private/public body, i.e. contractor/co-operative, fishers are paid for fishing and their remuneration depends on the bargaining power of the fisher/contractor. Table 4.5 contains the marketing costs of contractor / fishermen co-operatives.

Table 4.5 Marketing Costs of Contractor/Fishermen Co-operatives in West Bengal

Item	Cost (Rs/kg)
Auctioneer's Commission	2.10
Labour	0.50
Other items	0.50
Fisher's wage	0.40
Depreciation cost of net	0.01
Depreciation cost of the craft	0.01
Total Cost	**3.51**

Source: Primary Survey, 2008

The total marketing cost for the contractor/ co-operatives is estimated at Rs 3.51/kg. The highest share of the cost is for the commission paid to the auctioneer (60%) followed by labour and other costs (14%) (Figure 4.8).

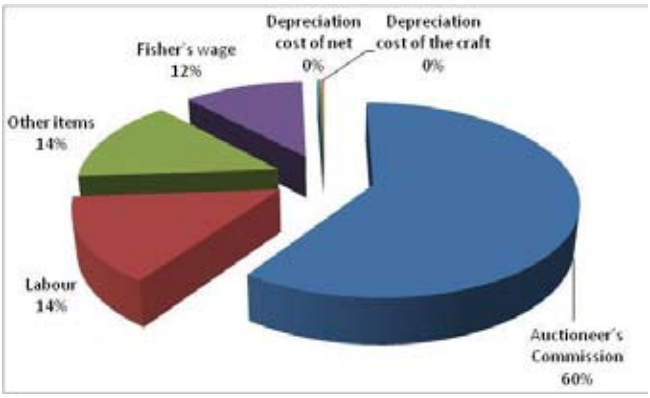


Figure 4.8 Distribution of Marketing Cost of Fishermen Co-operatives in West Bengal

Price Spread for IMC, Hilsa and Magur

Linking the producer to market is the main objective of any public body and is a major task of them. While trying to achieving this, it is imperative to know the exact mechanism by which the goods and commodities change hands from the point of production to point of consumption and its efficiency. Price spread is one such major indicator to understand how efficient the supply chain is. In India, fish travels relatively long distance when compared to other perishables, since they are captured or cultured at various places or systems, far away from the consumption markets, mostly distant states. In this study, attempt has been made to document and analyze different market channels and associated price spread and efficiency for selected species at various locations / states.

The price spread analysis was done for IMC, hilsa and magur, since they are the most common fishes at the Howrah market. The fish marketing channels prevalent at Howrah fish market are mentioned below. The three most important marketing channels are analyzed to study price spread and marketing efficiency. The channels investigated are:

Channel I	Fisher – Local Auctioneer- Fish Collector/ Local Dealer - Auctioneer – Wholesaler - Retailer – Consumer
Channel II	Fisher – Fish Collector/ Local Dealer - Auctioneer – Retailer– Consumer
Channel III	Fisher - Wholesaler – Retailer – Consumer

The price spread for IMC, hilsa and magur in these three channels are given in Tables 4.6, 4.7 and 4.8, respectively. The estimates of marketing efficiency for these fish species are summarized in Table 4.9, 4.10 and 4.11 respectively.

Table 4.6 Price Spread for IMC at Howrah Fish Market

(Rs/kg)

Particulars	Channel I	Channel II	Channel III
Prices received by Fisherman	23.80 (31.47)	40.45 (53.48)	45.59 (60.27)
Cost incurred by the local auctioneer	0.05 (0.07)	-	-
Margin	2.93 (3.87)	-	-
Price paid by the Fish Collector / Local Dealer	26.78 (35.40)	-	-
Cost incurred	6.71 (8.87)	7.71 (10.19)	-
Margin	10.84 (14.34)	12.44 (16.44)	-
Price paid by auctioneer	44.33 (58.61)	60.60 (80.12)	-
Cost incurred	0.98 (1.30)	0.98 (1.30)	-
Margin	1.94 (2.56)	1.94 (2.56)	-
Auctioned price	47.25 (62.47)	63.52 (83.98)	-
Cost incurred by the wholesaler	8.89 (11.75)	-	8.89 (11.75)
Margin	7.38 (9.75)	-	9.04 (11.95)
Wholesaler's price	63.52 (83.98)	-	63.52 (83.98)
Cost incurred by the retailer	6.61 (8.74)	6.61 (8.74)	6.61 (8.74)
Margin	5.51 (7.28)	5.51 (7.28)	5.51 (7.28)
Retailer's price/ Price paid by consumer	**75.64 (100.00)**	**75.64 (100.00)**	**75.64 (100.00)**

Figures in parentheses indicate percentages to consumer price

Table 4.7 Price Spread for Hilsa at Howrah Fish Market

(Rs/kg)

Particulars	Channel I	Channel II	Channel III
Prices received by Fisherman	136.29 (65.80)	159.32 (76.92)	165.46 (79.88)
Cost incurred by the local auctioneer	0.80 (0.39)	10.50 (5.07)	-
Margin	3.88 (1.87)	13.37 (6.45)	-
Price paid by the Fish Collector / Local Dealer	140.97 (68.06)	-	-
Cost incurred	9.90 (4.78)	-	-
Margin	13.37 (6.45)	-	-
Price paid by auctioneer	164.24 (79.29)	183.19 (88.44)	-
Cost incurred	0.99 (0.48)	0.99 (0.48)	-
Margin	2.42 (1.17)	2.42 (1.17)	-
Auctioned price	167.65 (80.94)	186.60 (90.09)	-
Cost incurred by the wholesaler	9.02 (4.35)	-	9.02 (4.35)
Margin	9.93 (4.80)	-	12.13 (5.85)
Wholesaler's price	186.60 (90.09)	-	186.60 (90.09)
Cost incurred by the retailer	8.19 (3.95)	8.19 (3.95)	8.19 (3.95)
Margin	12.33 (5.95)	12.33 (5.95)	12.33 (5.95)
Retailer's price/ Price paid by consumer	**207.12 (100.00)**	**207.12 (100.00)**	**207.12 (100.00)**

Figures in parentheses indicate percentages to consumer price

Table 4.8 Price Spread for Magur at Howrah Fish Market

(Rs/kg)

Particulars	Channel I	Channel II	Channel III
Prices received by Fisherman	97.75 (55.98)	123.24 (70.58)	126.73 (72.57)
Cost incurred by the local auctioneer	0.9 (0.52)	12.55 (7.19)	-
Margin	3.00 (1.72)	9.05 (5.18)	-
Price paid by the Fish Collector / Local Dealer	101.65 (58.21)	-	-
Cost incurred	11.50 (6.59)	-	-
Margin	9.99 (5.72)	-	-
Price paid by auctioneer	123.14 (70.52)	144.84 (82.95)	-
Cost incurred	0.99 (0.57)	0.99 (0.57)	-
Margin	5.40 (3.09)	5.45 (3.12)	-
Auctioned price	129.53 (74.18)	151.28 (86.63)	-
Cost incurred by the wholesaler	12.55 (7.19)	-	13.05 (7.47)
Margin	9.20 (5.27)	-	11.50 (6.59)
Wholesaler's price	151.28 (86.63)	-	151.28 (86.63)
Cost incurred by the retailer	9.50 (5.44)	9.50 (5.44)	9.50 (5.44)
Margin	13.84 (7.93)	13.84 (7.93)	13.84 (7.93)
Retailer's price/ Price paid by consumer	**174.62 (100.00)**	**174.62 (100.00)**	**174.62 (100.00)**

Figures in parentheses indicate percentages to consumer price

Table 4.9 Marketing Efficiency for IMC at Howrah Fish Market

Item	Channel I	Channel II	Channel III
Consumer's price (Rs/kg)	75.64	75.64	75.64
Fisherman's price (Rs/kg)	23.80	40.45	45.59
Marketing cost + margin (Rs/kg)	51.84	35.19	30.05
Marketing expenditure as % of consumer's price	68.54	46.52	39.73
Marketing efficiency	**0.31**	**0.53**	**0.60**

Table 4.10 Marketing Efficiency for Hilsa at Howrah Fish Market

Item	Channel I	Channel II	Channel III
Consumer's price (Rs/kg)	207.12	207.12	207.12
Fisherman's price (Rs/kg)	136.29	159.32	165.46
Marketing cost + margin (Rs/kg)	70.83	47.80	41.66
Marketing expenditure as % of consumer's price	34.20	23.08	20.11
Marketing efficiency	**0.66**	**0.77**	**0.80**

Table 4.11 Marketing Efficiency for Magur at Howrah Fish Market

Item	Channel I	Channel II	Channel III
Consumer's price (Rs/kg)	174.62	174.62	174.62
Fisherman's price (Rs/kg)	97.75	123.24	126.73
Marketing cost + margin (Rs/kg)	76.87	51.38	47.89
Marketing expenditure as % of consumer's price	44.02	29.42	27.43
Marketing efficiency	**0.56**	**0.71**	**0.73**

It was observed that prices increased with size across all species selected for the study. The marketing costs of intermediaries remained almost similar across type of fish, size and channel, as the cost of handling fish was the same for all species. The highest price spread was observed for the longest marketing channel. Fisherman's share in consumer's rupee increased in magnitude with fish size but as percentage share, it reduced with increasing size. Share of other market intermediaries in consumer's rupee increased with fish size. This indicates a higher price spread for larger sized fish and lowest price spread for small sized fish. Marketing efficiency was lowest for the longest channel due to higher marketing costs of intermediaries and lower share of fishermen in consumer's rupee.

4.2.2 Chennai

Chennai, the capital of the state of Tamil Nadu is a major fish consuming centre in the state and has several fish markets. Four major fish markets of the city were surveyed and the results are discussed below.

4.2.2.1 Chindadiripet Fish Market

Chindadiripet is one of the oldest fish markets of Chennai city and functions both as a wholesale and retail market. The market handles more than 25 tonnes of fish valued above Rs 25 lakh. The market is patronized by wholesalers, retailers, vendors, (moped and cycle vendors and head loaders). The major force in this market is the wholesaler /commission agent. The major fish marketing channels observed at the market are depicted below.

Marketing channels for Marine fishes	
Channel I	Fisherman – Wholesaler – Retailer – Consumer
Channel II	Fisherman – Wholesaler – Retailer – Vendor – Consumer
Channel III	Fisherman – Wholesaler – Assembler – Export Unit
Marketing channels for Freshwater fishes	
Channel IV	Fish Farmer – Wholesaler – Retailer – Consumer
Channel V	Fish Farmer – Intermediary – Wholesaler – Retailer – Consumer
Channel VI	Fish Farmer – Wholesaler – Export Unit

Market Intermediaries

Wholesaler / Commission Agent

The wholesalers / commission agents estimate the demand for next day based on previous day's experience and confirmed orders. They arrange the supply of fish by train or truck in thermocol boxes upon a commission of 6-10%. Most of the fish loads are either accompanied or followed by a representative from the production centre. After the auction, the representative takes the money and pays the commissions. They pay in cash to their sellers and give credit of at least one week to the retailers. Most of these wholesalers are traditionally from the 19 families which established this market. New players cannot enter and operate in this market. Most of the traders own storage areas popularly called "sheds" in which whole fish are stored overnight for sale the next day at a lower price. The wholesaler has regular bulk customers like hotels, hostels and canteens to which fresh fish is sold at relatively cheaper price. Each wholesaler normally employs 2 permanent labourers for office work and 5-7 casual laborers for loading, unloading and other related works. The marketing expenses of wholesalers include monthly rent of Rs 3000 and labour charges of Rs 10,000- 15,000 per month. The expenses on ice for local fish supply is

borne by them, but the same expenses for fish coming from longer distances is paid by the agents for producers / assemblers.

Table 4.12 Marketing Costs of Wholesalers/Commission Agents at Chindadiripet Fish Market

Item	Cost (Rs/kg)
Labour	0.15
Ice	0.12
Salary	0.10
Transportation	0.06
Rent	0.05
Telephone	0.03
Electricity	0.01
Total	**0.52**

Source: Primary Survey, 2008

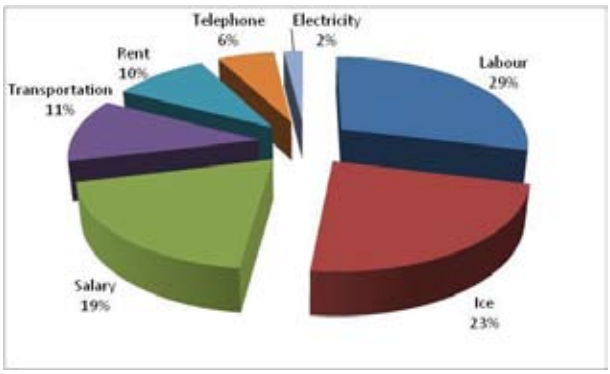


Figure 4.9 Distribution of Marketing Cost of Wholesalers/Commission Agents at Chindadiripet Fish Market

Retailer

Retailers purchase fish through auction. Retailing of fish starts at 10 am in a day, which is dominated by women (About 80% are women). They also sell fish obtained from nearby landing centers along with fish supply arranged by wholesaler from far off places. Each retailer sells about 30-50 kg fish daily.

Table 4.13 Marketing Costs of Retailers at Chindadiripet Fish Market

Item	Cost (Rs/kg)
Ice	1.00
Rent	0.67
Transportation	0.67
Miscellaneous	0.67
Total	**3.01**

Source: Primary Survey, 2008

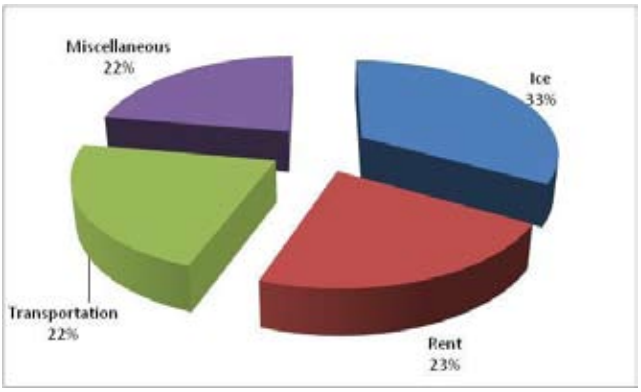


Figure 4.10 Distribution of Marketing Cost of Retailers at Chindadiripet Fish Market

Vendor

Vendors are the people who sell fish at roadside stalls and who use cycle/moped for selling fish. They sell in lots at places where people assemble for purchase of groceries/vegetables. Vendors purchase 30-35 kg fish at wholesale rates. They stick on to their selling prices till they make a profit of Rs 100-150, after which they sell the fish at throwaway price for bulk consumers/ hotels.

Table 4.14 Marketing Costs of Vendors at Chindadiripet Fish Market

Item	Cost (Rs/kg)
Transportation	1.00
Ice	0.67
Miscellaneous	1.00
Total	**2.67**

Source: Primary Survey, 2008

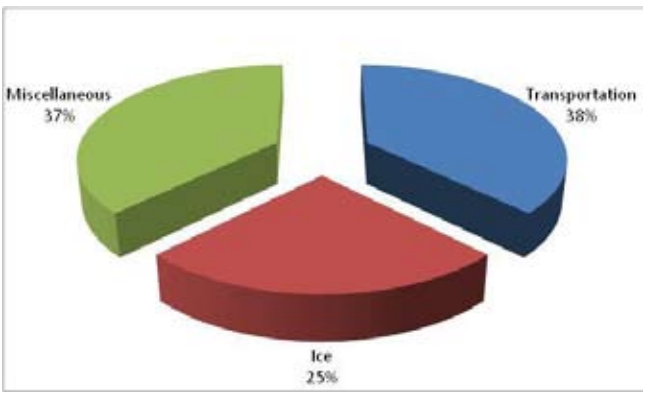


Figure 4.11 Distribution of Marketing Cost of Vendors at Chindadiripet Fish Market

4.2.2.2 Saidapet Fish Market

Saidapet fish market was established in 1900 and acts as both wholesale and retail market. Several marketing channels are observed in the market and the most common channels are depicted below.

Marketing channels for Marine fishes	
Channel I	Fisherman – Wholesaler – Retailer – Consumer
Channel II	Fisherman – Wholesaler – Assembler – Export Unit
Marketing channels for Freshwater fishes	
Channel III	Fish Farmer – Wholesaler – Retailer – Consumer
Channel IV	Fish Farmer – Intermediary – Wholesaler – Retailer – Consumer
Channel V	Fish Farmer – Wholesaler – Export Unit

Market Intermediaries

Wholesaler / Commission Agent

Traditionally Saidapet fish market is controlled by wholesalers / commission agents. The wholesalers/commission agents bear the risk of marketing the fish thereby safeguard both the producer and the assembler. They also invest considerable money in marketing operations and in some cases they advance money to the producer/assembler at the production centre. The transport of fish from the production centre to Saidapet market is often by train, particularly from distant supply centres like Howrah market. Large demands are met by supply of fish in trucks from Andhra Pradesh. The wholesalers place confirmed supply orders to production centre. They also store unsold fish with proper icing for sales in subsequent days. An agent / representative accompanies fish coming from distant supply areas. This agent collects sale proceeds and pays the commission to wholesaler. The empty thermocol boxes are taken back to the production centre. The cost of damaged thermocol boxes are shared by sender and receiver at a pre-fixed ratio.

Bulk consumers like hotels and canteens of multinational companies demand high quality fish which are supplied by wholesalers. The wholesalers on receipt of fish lot sort the fish according to the grades demanded by the bulk consumers. The demand of bulk consumers is met first before selling the fish to other consumers. Bulk consumers being regular purchasers pay the wholesalers regularly and have a long standing relation with the sellers. Sometimes, sellers sell quality fish even at slightly lower price than market price to the regular bulk consumers.

The wholesalers also advance fish on credit to the regular vendors, the money being returned before the next purchase. The wholesalers are forced to pay their dues to producers within a week. The wholesalers use electronic weighing machines, mobile phones and even faxes in certain cases. They

employ permanent labourers for maintaining accounts, collecting money due and for office management on monthly wages and the daily labourers for sorting, grading, loading, unloading and cleaning etc.

Table 4.15 Marketing Costs of Wholesalers/Commission Agents at Saidapet Fish Market

Item	Cost (Rs/kg)
Ice	0.13
Labour	0.11
Salary	0.11
Transportation	0.06
Telephone	0.02
Rent	0.01
Electricity	0.01
Others	0.03
Total	**0.48**

Source: Primary Survey, 2008

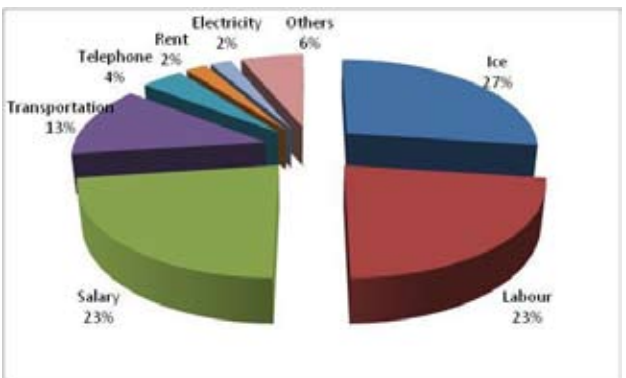


Figure 4.12 Distribution of Marketing Cost of Wholesalers/Commission Agents at Saidapet Fish Market

Retailer

About 100 retailers operate in the Saidapet fish market. Most of the retailers are women (about 70%). However, they sell only low value fishes in lots catering to the common consumers. The choice variety of fish like seer fish is sold in retail by employees of wholesalers/commission agents. Retailers sell around 25-50 kg fish daily and gain Rs 150-200.

Table 4.16 Marketing Costs of Retailers at Saidapet Fish Market

Item	Cost (Rs/kg)
Transportation	1.00
Ice	0.50

Rent	0.30
Miscellaneous	1.50
Total	**3.30**

Source: Primary Survey, 2008

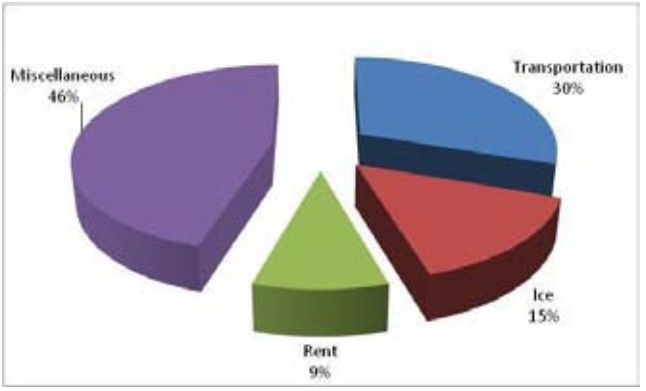


Figure 4.13 Distribution of Marketing Cost of Retailers at Saidapet Fish Market

Vendor

Vendors such as headloaders and cycle/moped vendors source their fish from Saidapet fish market. Their trade is based on credit advanced by wholesalers on personal understanding. They start their business at 8 am and end by 12 noon. They operate in specific neighborhoods where they have a regular customer base. Their average net income per day is Rs 100-150. They do not hold any fish and when the demand is slack they sell the fish at lower rates to the consumers and hotels, though in the early morning hours they are reluctant at reduce the price.

Table 4.17 Marketing Costs of Vendors at Saidapet Fish Market

Item	Cost (Rs/kg)
Transportation	1.60
Ice	1.00
Miscellaneous	1.60
Total	**4.20**

Source: Primary Survey, 2008

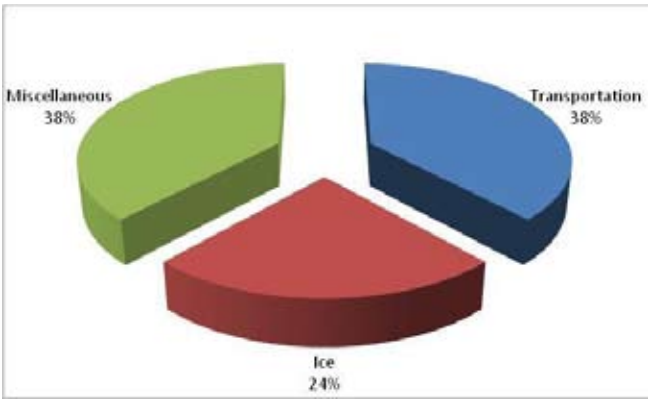


Figure 4.14 Distribution of Marketing Cost of Vendors at Saidapet Fish Market

Women Headloader

Women headloaders are the last link in the market channels for fish. They invest Rs 500-1000 per day for purchase of fish. The marketing expenses of women headloaders (including food) amounts to Rs 50 per day. They are mostly middle aged women and belong to fishermen community. They sell dry fish during lean fish seasons.

4.2.2.3 Kasimedu Fish Landing Centre

Kasimedu is a major fish landing centre of Tamil Nadu where organized fish auctioning began in 1970. The major marketing channels observed at Kasimedu are shown below.

Marketing channels for Marine fishes	
Channel I	Fisherman– Auctioneer – Retailer – Consumer
Channel II	Fisherman – Wholesaler – Retailer – Consumer
Channel III	Fisherman – Assembler – Retailer – Consumer
Channel IV	Fisherman – Auctioneer – Vendor – Consumer
Channel V	Fisherman – Wholesaler – Assembler – Export
Channel VI	Fisherman – Intermediary – Wholesaler – Export Unit
Marketing channels for Freshwater fishes	
Channel VII	Fish Farmer– Wholesaler – Retailer – Consumer
Channel VIII	Fish Farmer – Intermediary – Wholesaler – Retailer – Consumer
Channel IX	Fish Farmer – Wholesaler – Export Unit

Market Intermediaries

Wholesaler

Most of the wholesalers reside near the landing centre. They finance the fishermen for fishing on the agreement that fish catch will be sold through them. When the fish harvest is large, then the wholesalers arrange for sales in neighbouring states also. They incur the cost of labour charges for loading, unloading and sorting fish, shop rental charges, transportation charges, ice, telephone and electricity charges.

Table 4.18 Marketing Costs of Wholesalers at Kasimedu Fish Landing Centre

Item	Cost (Rs/kg)
Ice	0.50
Labour	0.33
Salary	0.33
Transportation	0.50
Rent	0.10
Telephone	0.05
Electricity	0.02
Others	0.33
Total	**2.16**

Source: Primary Survey, 2008

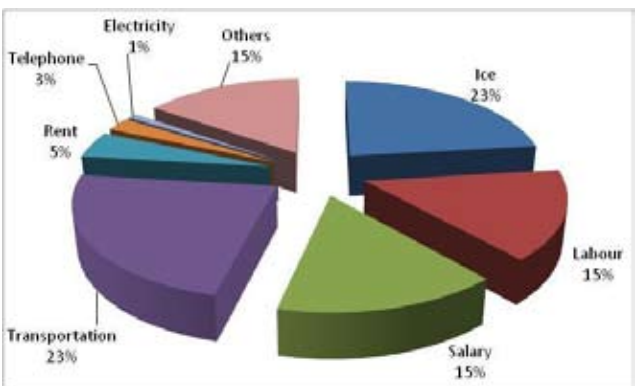


Figure 4.15 Distribution of Marketing Cost of Wholesalers at Kasimedu Fish Landing Centre

Retailer

The number of retailers operating at Kasimedu varies seasonally. Normally 50 retailers operate here and another 50 retailers do business during the peak fishing seasons. Retail business is dominated by fisherwomen. They participate in the auction competing with men traders and take fish for sale to nearby

areas and sell the fish in lots. Their business starts at 6.30 am and goes to up to 9 pm. Each retailer normally sells about 20-30 kg per day and they do not use weighing machines. They sell cheaper varieties of fish such as *Sankara*, *Nethili*, Sardine and Mackerel. Price flexibility is seen during afternoon and evening hours. Their problem is mainly the auctioneers who allow fish purchases of only 10 kg and above, making it difficult for small time vendors to participate in auction directly. Hence, 2-3 retailers join together to participate in the auction and share the fish among themselves.

Table 4.19 Marketing Costs of Retailers at Kasimedu Fish Landing Centre

Item	Cost (Rs/kg)
Transportation	0.95
Ice	0.57
Rent	0.28
Miscellaneous	0.48
Total	**2.28**

Source: Primary Survey, 2008

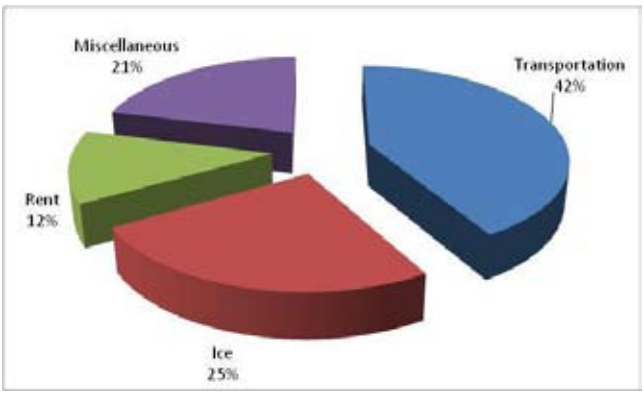


Figure 4.16 Distribution of Marketing Cost of Retailers at Kasimedu Fish Landing Centre

Vendor

About 2000 headloaders and moped/cycle vendors operate from Kasimedu market. They sell cheaper variety fish demanded by low income consumers. The head loaders are mostly women. Cycle and moped vendors are men. They have approximate estimation about consumer demand and its weekly and annual variations. They sell at least 10 kg on any business day which may go up to 25 kg during peak demand seasons. They incur cost on ice and transportation. Unlike retailers, the vendors' livelihood depends upon the daily sale and hence they go for business everyday except on days of family compulsions.

Cycle Vendors - Cycle vendors prefer Kasimedu market due to availability of large number of fish varieties at reasonable prices. Mostly 2 to 3 vendors join together to take part in auction and share the fish among themselves. By this way, they ensure availability of 4-5 varieties of fish for sale. The major fish varieties dealt are *Sankara*, Sardine, Mackerel, *Nethili*, Lady fish (*Kelanga*). High value species like Seer fish and Pomfrets are sold during festive seasons in bulk.

Moped Vendors - Moped vendors have a strong base of regular customers. Except on Tuesday and Saturday, their sale is brisk and its quantum varies between 40 kg and 50 kg. They normally incur expenses on petrol, ice and food items. TVS XL and Bajaj M-80 are the most preferred brands of two wheelers used by them. The fish variety dealt by moped vendors includes *Sankara*, Sardine, Mackerel, *Nethili*, Lady fish (*Kelanga*).

Table 4.20 Marketing Costs of Vendors at Kasimedu Fish Landing Centre

Item	Cost (Rs/kg)
Ice	1.00
Fuel and vehicle maintenance	0.33
Miscellaneous	0.55
Total	**1.88**

Source: Primary Survey, 2008

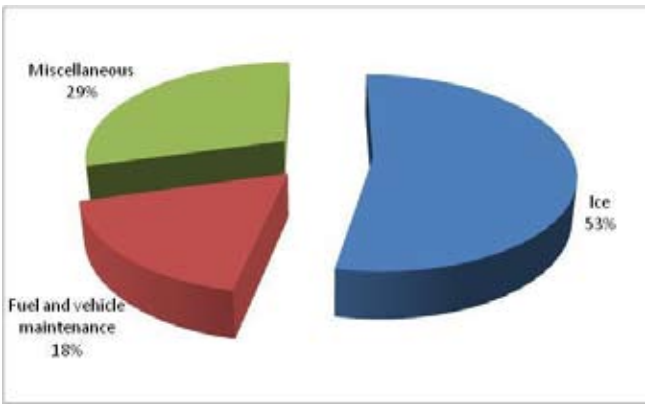


Figure 4.17 Distribution of Marketing Cost of Vendors at Kasimedu Fish Landing Centre

4.2.2.4 Moolakothalam Dry Fish Market

This dry fish market was established in 1920 and was very active till the nearby bus stand was shifted to a new location. Since then the trade has been declining at this market. The major marketing channels observed at this market are shown below.

Channel I	Producer – Wholesaler – Retailer – Consumer
Channel II	Producer – Wholesaler – Retailer – Vendor – Consumer

Market Intermediaries

Wholesaler /Commission Agent

The wholesalers get material from dry fish production centres across the country by train or trucks. Each dry fish lot is a minimum of 10 tonnes of identical fish varieties. The wholesalers split arrivals amongst themselves in convenient quantities. They sell the fish with in a week. The wholesaler sends money to the dry fish producer by demand draft or Electronic fund transfer (EFT). The forward sales by wholesalers to retailers/vendors are mostly on credit basis. A common complaint by the wholesalers was about non-repayment of credit advanced to retailers/vendors. The wholesalers mainly belonged to the Muslim community with business establishments (shops) being passed on through generations.

Table 4.21 Marketing Costs of Wholesalers at Moolakothalam Dry Fish Market

Item	Cost (Rs/kg)
Salary	0.10
Rent	0.10
Labour	0.07
Telephone	0.05
Electricity	0.01
Others	0.05
Total	**0.38**

Source: Primary Survey, 2008

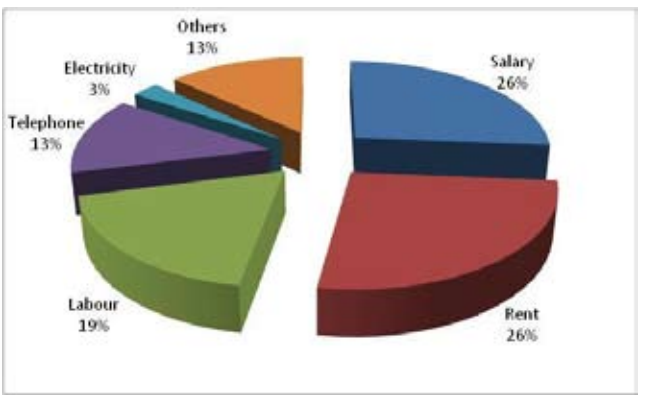


Figure 4.18 Distribution of Marketing Cost of Wholesalers at Moolakothalam Dry Fish Market

Retailer

Retailers get the materials from wholesalers on credit basis. The payment is done in a cyclical manner, i.e. payment for first lot is paid on purchase of second lot. They also do sorting and grading using one or two laborers. They normally sell about 40 -100 kg per day.

Table 4.22 Marketing Costs of Retailers at Moolakothalam Dry Fish Market

Item	Cost (Rs/kg)
Rent	1.67
Labour	1.67
Electricity	0.14
Telephone	0.28
Miscellaneous	0.28
Total	**4.04**

Source: Primary Survey, 2008

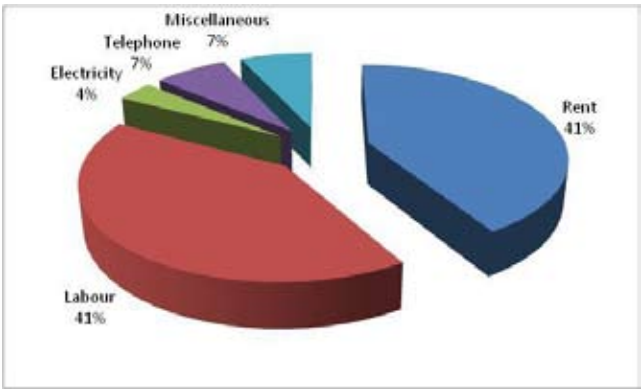


Figure 4.19 Distribution of Marketing Cost of Retailers at Moolakothalam Dry Fish Market

Vendor

Vendors are the terminal level functionaries having linkages with wholesalers and retailers and forward linkages with consumers. Most of the vendors are middle aged and older persons. They buy dry fish by weight and mostly sell in lots. They sell in residential areas, public places like bus stand, market etc. They use aluminum vessels for transporting dry fish and display the fish lots on a bed sheet or polythene sheet. They also do cutting of dry fish suitable for cooking on consumer's insistence.

Table 4.23 Marketing Costs of Vendors at Moolakothalam Dry Fish Market

Item	Cost (Rs/kg)
Transportation	4.40
Others	5.90
Total	**10.30**

Source: Primary Survey, 2008

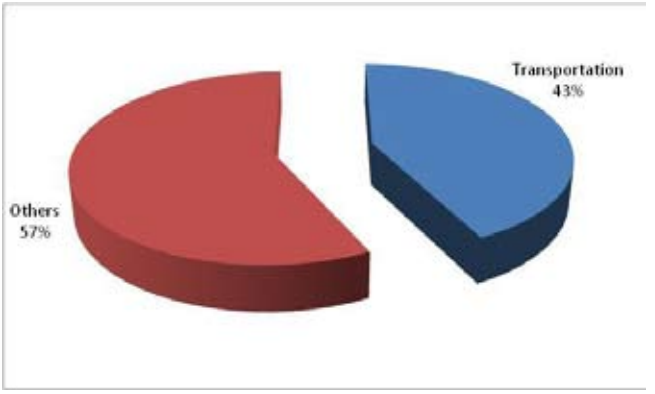


Figure 4.20 Distribution of Marketing Cost of vendors at Moolakothalam Dry Fish Market

Price spread

Price spread for major fish varieties namely, seer fish, mackerel and IMC was estimated for Chennai fish markets. The results are depicted in Tables 4.24, 4.25 and 4.26 respectively. From the price spread analysis it is evident that the length of the marketing channel has no effect on final consumer's price in the case of low and medium value fish (Mackerel and IMC). In these cases, the fisherman receives lesser share of the consumer's rupee, the percentage varying according to length of channel. In the case of high value species like Seer fish, the length of the channel affects the final price. This reflects the fact that consumers are willing to pay higher price for high value species. The consumer has a price ceiling for low and medium value species. Fisherman's share of consumer's rupee is higher for high value species.

Table 4.24 Price Spread for Seer fish at Chennai Fish Markets

(Rs/kg)

Particulars	Channel I	Channel II	Channel III
Price received by fisherman	260.00 (89.66)	255.00 (79.68)	250.00 (89.92)
Costs incurred	3.00 (1.04)	10.00 (3.13)	-
Wholesaler's purchase price	263.00 (90.70)	265.00 (82.81)	-
Costs incurred	2.00 (0.69)	2.00 (0.62)	-
Margin	15.00 (5.17)	18.00 (5.63)	-
Auctioneer's purchase price	-	285.00 (89.06)	-

Costs incurred	-	1.00 (0.31)	-
Margin	-	10.00 (3.13)	-
Collector/Assembler's purchase price	-	296.00 (92.50)	250.00 (89.92)
Costs incurred	-	3.00 (0.94)	3.00 (1.08)
Margin	-	10.00 (3.13)	12.00 (4.32)
Retailer's purchase price	280.00 (96.56)	309.00 (96.57)	-
Costs incurred	1.00 (0.34)	1.00 (0.30)	-
Margin	9.00 (3.10)	10.00 (3.13)	-
Agent's purchase price	-	-	265.00 (95.32)
Costs incurred	-	-	1.00 (0.36)
Margin	-	-	12.00 (4.32)
Price paid by consumer	**290.00 (100.00)**	**320.00 (100.00)**	**278.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

Table 4.25 Price Spread for Mackerel at Chennai Fish Markets

(Rs/kg)

Particulars	Channel I	Channel II	Channel III
Price received by fisherman	42.00 (70.00)	38.00 (61.29)	36.00 (58.06)
Costs incurred	2.00 (3.33)	1.00 (1.61)	2.00 (3.23)
Wholesaler's purchase price	44.00 (73.33)	39.00 (62.90)	-
Costs incurred	1.00 (1.67)	1.00 (1.61)	-
Margin	5.00 (8.33)	2.00 (3.23)	-
Auctioneer's purchase price	-	42.00 (67.74)	-
Costs incurred	-	1.00 (1.61)	-

Margin	-	2.00 (3.23)	-
Collector/Assembler's purchase price	-	45.00 (72.58)	38.00 (61.29)
Costs incurred	-	3.00 (4.84)	3.00 (4.84)
Margin	-	5.00 (8.06)	10.00 (16.13)
Retailer's purchase price	50.00 (83.33)	53.00 (85.48)	-
Costs incurred	2.00 (3.33)	2.00 (3.23)	-
Margin	8.00 (13.34)	7.00 (11.29)	-
Agent's purchase price	-	-	51.00 (82.26)
Costs incurred	-	-	1.00 (1.61)
Margin	-	-	10.00 (16.13)
Price paid by consumer	**60.00 (100.00)**	**62.00 (100.00)**	**62.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

Table 4.26 Price Spread for IMC at Chennai Fish Markets

(Rs/kg)

Particulars	Channel I	Channel II	Channel III
Price received by fish farmer	42.00 (70.00)	40.00 (66.67)	45.00 (75.00)
Costs incurred	2.00 (3.23)	2.00 (3.33)	3.00 (5.00)
Wholesaler's purchase price	-	42.00 (70.00)	-
Costs incurred	-	5.00 (8.33)	-
Margin	-	5.00 (8.33)	-
Collector/Assembler's purchase price	44.00 (73.23)	-	-
Costs incurred	3.00 (5.00)	-	-
Margin	10.00 (16.67)	-	
Retailer's purchase price	-	52.00	48.00

		(86.66)	(80.00)
Costs incurred	-	1.00 (1.66)	1.00 (1.67)
Margin	-	7.00 (11.68)	11.00 (18.33)
Agent's purchase price	57.00 (94.90)	-	-
Costs incurred	1.00 (1.67)	-	-
Margin	2.00 (3.33)	-	-
Price paid by consumer	**60.00 (100.00)**	**60.00 (100.00)**	**60.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

A retailer selling his fish at Saidapet Fish Market, Chennai

Women retailers selling fish in pavements at Saidapet Fish Market, Chennai

A three wheeler used for transporting fish from the marine landing centre to Saidapet Fish Market, Chennai

Fish catch is transported from a Trawler to the shore in *Catamaram* for auction in Kasimedu Fish Market, Chennai

Office of a commission agent operating at Chindadripet Fish Market, Chennai

A view of the Moolakothalam Dry Fish Market on the road side at Chennai

Fish catch is offloaded in bamboo baskets to take it to shore in Kasimedu Landing Centre at Chennai

Since the wharf is severely damaged, fish catch is landed in a very unhygienic shore in Kasimedu at Chennai

Variety of fish ready for auction in Kasimedu at Chennai

A retailer packing his purchased fish for transportation to sell at a market 100 km away from landing centre in Chennai

Fish are sun dried on the side of a bridge in an unhygienic manner, as there is no drying yard at Chennai

A trawler is loaded with ice, net and fuel for a 7-8 days trip into sea at Kasimedu in Chennai

A group of mobile women vendors on board a mini-tempo to go to their respective areas for door-to-door sale at Chennai

Mobile women vendors on an auto for travel to short distances from wholesale market at Chennaiale market in

4.2.3 Mumbai

Survey of different Mumbai fish markets was done in the study to understand the functions of various market intermediaries and marketing channels prevailing.

4.2.3.1 Chatrapati Shivaji Marine Fish Market

The Shivaji market is the predominant marine fish market at Mumbai. The prevalent fish marketing channels at the market can be depicted as follows:

Channel I	Fisher/Boat Owner – Local Auctioneer – Collection Agent/Trader – Wholesaler/Commission Agent – Secondary Wholesaler
Channel II	Fisher/Boat Owner – Local Auctioneer – Collection Agent/Trader – Wholesaler/Commission Agent – Retailer/Vendor
Channel III	Fisher/Boat Owner – Local Auctioneer – Collection Agent/Trader – Wholesaler/Commission Agent – Processing Plants
Channel IV	Fisher/Boat Owner – Local Auctioneer – Collection Agent/Trader – Wholesaler/Commission Agent – Hoteliers

Market Intermediaries

The main marketing intermediaries involved in the market are the wholesalers, secondary wholesalers, retailers and vendors.

Wholesaler / Commission Agent

The fisherman catches the fish and sends it through local agents to the wholesalers present in the market. These agents give the materials to the wholesalers or the commission agents who mainly deals with the wholesale trading of the materials. The commission agents charge a commission of 3-4% over the materials. Wholesalers are the important intermediary and hold the major position in the market. They receive the materials brought by the collection agents/trader to the market and sell them to the retailer on the basis of wholesale trading. The weighing of the fishes is done on weight (kg) basis by using physical balance. The commission agents decide the rates of the materials and sell the fishes to retailers. The transactions between the wholesalers and the retailers as well as the collection agents are based on cash as well as credit.

Table 4.27 Marketing Costs of Wholesalers at Chatrapati Shivaji Fish Market

Item	Cost (Rs/kg)
Ice	2.00
Packing	1.25
Transportation	1.00

Loading/Unloading	0.60
Weighing	0.50
Total	**5.35**

Source: Primary Survey, 2008

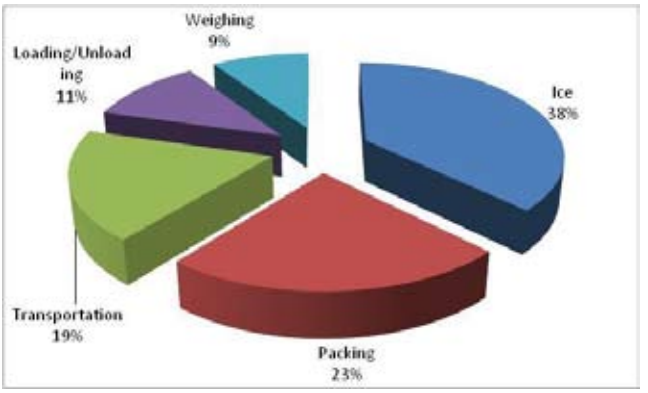


Figure 4.21 Distribution of Marketing Cost of Wholesalers at Chatrapati Shivaji Fish Market

Retailer

The fishes are then passed to the retailers after weighing the materials. Retailers are the persons who are in direct contact with the customers and after getting the fishes from the wholesalers, they sell the materials to the customer.

Table 4.28 Marketing Costs of Retailers at Chatrapati Shivaji Fish Market

Item	Cost (Rs/kg)
Ice	2.00
Packing	1.00
Loading/Unloading	1.00
Storage	0.50
Weighing	0.05
Rent for shop	0.02
Total	**4.57**

Source: Primary Survey, 2008

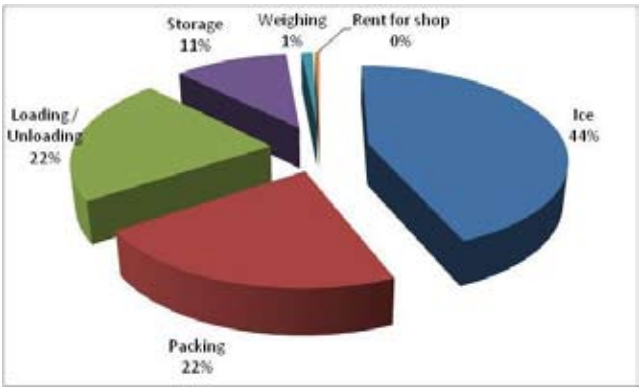


Figure 4.22 Distribution of Marketing Cost of Retailers at Chatrapati Shivaji Fish Market

Vendor

Along with these intermediaries, there is the involvement of various vendors who are getting the materials from the suppliers or retailers and they sell the materials on door to door basis. These persons are not allowed to do trade in the market.

Collection Agent

Collection agents are the intermediaries who collect the materials from the landing centers and bring them to the market in order to sell them to the wholesalers in the market. They used to earn their income on commission basis over the materials brought from the wholesalers. They bring the materials via road through trucks or tempos. Transportation cost as well other cost for the wholesale and retail trading for the materials are given by the intermediaries themselves.

Price spread

The price spread for three marine fish species is shown in Table 4.29. For the same marketing channel fisherman's share of consumer's rupee is highest for high value species. Contrary to this, the wholesaler and retailer's margins are higher for the low valued species.

Table 4.29 Price spread for Marine Fishes at Chatrapati Shivaji Fish Market

(Rs/kg)

Particulars	Fish Species		
	Pomfrets	Seer fish	Bombay duck
Prices received by fishermen	280.00 (70.00)	130.00 (65.00)	40.00 (44.44)

Costs incurred and margin of the auctioneer and collector	70.00 (17.50)	30.00 (15.00)	10.00 (11.11)
Wholesaler/ supplier's purchase price	350.00 (87.50)	160.00 (80.00)	50.00 (55.56)
Cost incurred	5.35 (1.34)	5.35 (2.67)	5.35 (5.94)
Margin	14.65 (3.66)	14.65 (7.33)	14.65 (16.28)
Retailer's purchase price	370.00 (92.50)	180.00 (90.00)	70.00 (77.78)
Cost incurred	6.21 (1.55)	6.21 (3.11)	6.21 (6.90)
Margin	23.79 (5.95)	13.79 (6.89)	13.79 15.32)
Price paid by consumer	**400.00** **(100.00)**	**200.00** **(100.00)**	**90.00** **(100.00)**

Figures in parentheses indicate percentages to consumer price

Office of the wholesalers at Chatrapati Shivaji Market, Mumbai

A wholesaler selling fish to a retailer at Chatrapati Shivaji Market, Mumbai

Licensed labourers at work at Chatrapati Shivaji Market, Mumbai

Women retailers selling fish to consumers and mobile vendors at the ground floor of Chatrapati Shivaji Market, Mumbai

4.2.3.2 Sassoon Dock Fish Landing Centre

Sassoon Dock is the largest fish landing centre of Maharashtra. The most prevalent fish marketing channels at Sassoon Dock are depicted below:

Channel I	Fisherman – Auctioneer – Supplier – Wholesaler – Retailer - Consumer
Channel II	Fisherman – Auctioneer – Supplier – Wholesaler – Vendor - Consumer
Channel III	Fisherman – Auctioneer – Supplier – Processing Factories – Export Destination

Market Intermediaries

Fisherman

The marketing channel starts with the fishermen who own fishing boats and fish at sea. Most of them belong to the fishermen community of Maharashtra. Generally, there are 7-8 crew members along with one captain; the number of crew members depending on the size of the boat, type of fishing, etc. The crew members are paid by the boat owner either on monthly basis or according to the percentage of the profit of the boat owner. The crew members in Mumbai ports are mainly from nearby regions and also from Gujarat, Goa and Karnataka. The crew members segregate the catch onboard itself on the basis of species as well as on the importance of its market value, i.e. whether the materials will be going for export purpose or for domestic selling. During peak season, catch of the trawlers ranges within 3-4 tonnes per trip while during slack season the catch ranges 1-3 tonnes per trip. The boat owner sells his catch through the auctioneers to the suppliers. In certain cases the boat owner may take loan from the auctioneer for procurement of fishery requisites, on which the auctioneer charge interest on fixed rate.

Auctioneer

The fishermen sell the fish to the auctioneer (agent); who is the prime price deciding factor at Sassoon Dock. Each fishing boat possesses own auctioneer. The auctioneer is the first intermediary in the marine fish marketing channel. Auctioneer conducts the auction or bidding of the bulk fish catch landed on the dock and sells the fishes to the suppliers/wholesalers and retailers. The auctioneers are locally known as *Lilavwala*. They are vital in wholesale fish marketing as they play the role of auctioneer and credit provider. The main purpose of auctioning is to clear off the huge arrival of the materials to various other intermediaries in a systematic manner as there are a large number of fishermen when compared to the few buyers. Auctioneers mobilize the materials from the boat with their own labourers and carryout auctioning at the dock itself. The auctioneer charges 7-8% commission in case if the fisherman has taken loan from him otherwise they charge a commission of 2-3%. The auctioneer deals with all species of available fish. The marketing costs of auctioneer's mainly include the charges of the labourers who load and unload fish. The auctioneers transact with the fishermen and the suppliers in both cash as well as credit basis. The auctioneer sells the fish either to the supplier or to the wholesaler. The supplier supplies the fish to the processing factories.

Table 4.30 Marketing Costs of Auctioneers at Sassoon Dock Fish Landing Centre

Item	Cost (Rs/kg)
Labour	0.80
Salary	0.20
Total	**1.00**

Source: Primary Survey, 2008

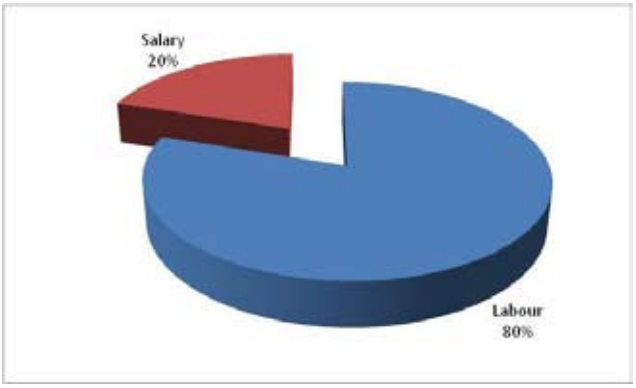


Figure 4.23 Distribution of Marketing Cost of Auctioneers at Sassoon Dock Fish Landing Centre

Supplier

A supplier takes the materials from the auctioneers after bidding at some fixed price and sells them to the processing plants. The suppliers have their own pre-processing plants in which the primary processing activities like peeling, grading etc. are performed as per the requirement of the processing plants. Some of the suppliers who are also act as wholesalers sell the materials to the retailers and vendors from whom the fish material reaches the final consumers. The suppliers supply materials to the processing plants based on a certain percentage of profit (Rs 3-5/kg of materials) over total amount of materials supplied to the plants. They are having their own association which looks after various issues of the market like price of the materials, supply of ice etc. The suppliers hire labourers for packing the fish in boxes with ice and after packing transport them. There is specialization existing within the suppliers based on the fish species handled by them. The transactions between the suppliers and the auctioneers as well as with the processing plants or retailers are via cash or credit basis. The wholesaler procures fish from the auctioneer in bulk quantity and supplies either to processing factory or to retailers.

Some suppliers supply only shrimp to the processing factories. In this case, a group of women purchase shrimp in bulk quantity from the auctioneer or the fishermen directly. The women are paid depending on the quantity of the shrimps peeled. For 1 kg of peeled shrimps, they get Rs 15. Grading of the shrimps is done based on quality and size (counting) of the shrimps. The headless and PU shrimps are given to the supplier.

Table 4.31 Marketing Costs of Suppliers at Sassoon Dock Fish Landing Centre

Item	Cost (Rs/kg)
Transportation	2.50
Ice	2.00
Packing	1.50
Loading/Unloading	0.50
Rent for shop	0.50
Total	**7.00**

Source: Primary Survey, 2008

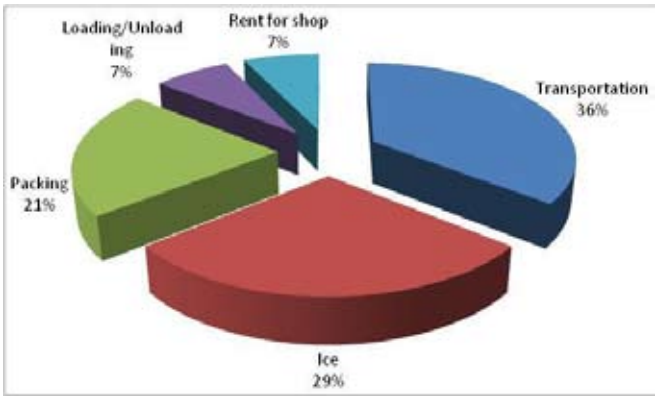


Figure 4.24 Distribution of Marketing Cost of Suppliers at Sassoon Dock Fish Landing Centre

Retailer

The retailers sell the fish directly to the final consumers.

Price spread

The price spread analysis of marine species at Sassoon Dock follows the same pattern as that of Chatrapati Shivaji market. The fisherman's share is highest for high value species. The marketing margins of wholesalers and retailers are highest for low and medium value species.

Table 4.32 Price spread for Marine Fishes at Sassoon Dock Fish Landing Centre

(Rs/kg)

Particulars	Fish Species			
	Pomfrets	Seer fish	Bombay duck	Pink perch
Prices received by fishermen	280.00 (82.35)	130.00 (72.22)	40.00 (50.00)	30.00 (50.00)
Costs incurred by the auctioneer	1.00	0.80	0.60	-

	(0.29)	(0.44)	(0.75)	
Margin	9.00 (2.65)	9.20 (5.11)	4.00 (5.00)	--
Wholesaler/ Supplier's purchase price	290.00 (85.29)	140.00 (77.78)	50.00 (62.50)	32.00 (53.33)
Costs incurred	2.00 (0.58)	6.50 (3.61)	3.00 (3.75)	5.00 (8.33)
Margin	10.00 (2.94)	13.50 (7.50)	7.00 (8.75)	4.00 (6.67)
Retailer's purchase price	302.00 (88.82)	160.00 (88.89)	60.00 (75.00)	41.00 (68.33)
Cost incurred	3.00 (0.88)	3.00 (1.67)	2.00 (2.50)	1.82 (3.03)
Margin	35.00 (10.29)	17.00 (9.44)	18.00 (22.50)	15.00 (25.00)
Price paid by consumer	**340.00** **(100.00)**	**180.00** **(100.00)**	**80.00** **(100.00)**	**60.00** **(100.00)**

Figures in parentheses indicate percentages to consumer price

4.2.3.3 New Ferry Wharf Fish Landing Centre

New Ferry Wharf is the second largest landing centre after Sassoon Dock. The following marketing channels were observed at the landing centre:

Channel I	Fisherman – Commission Agent – Auctioneer – Retailer – Consumer
Channel II	Fisherman – Commission Agent – Auctioneer – Supplier – Processing Company – Export
Channel III	Fisherman – Commission Agent – Auctioneer – Supplier – Hotel – Consumer

Market Intermediaries

There are five intermediaries, viz. commission agents, auctioneers, suppliers, retailers and hoteliers in the fish marketing channel at New Ferry Wharf. The peak season of the market is during September, October, November and the fishing continues up to May of the next year. From June to August, there exists a fishing ban during which the fishing season stops totally.

Fisherman

The fishermen after harvesting the materials bring it to the landing centre where they sort the materials by species in the boat itself. Each and every boat has a owner under whom there are other

fishermen going for fishing. The cost for boat maintenance and construction is paid by the boat owners only. An approximate amount of Rs 1 lakh is spent on a single boat including the diesel cost, construction cost etc. These fishermen receive salary on a monthly basis from the boat owner. An average of Rs 2000-5000 is received by the fishermen based on there experience. There are an approximate 1400 number of fishermen present at the Center.

Commission Agent

The Commission agents get the materials from the fisherman and after weighing them brings for the auctioning. The commission agents receive a commission of 3% per boat. The price of the materials is decided based on the demand and supply of the material. If the material is more in quantity then the price will be less whereas if the materials are less the price will be more.

Auctioneer

The auctioneers auctions the materials and during bidding if he gets any persons giving good prices for the materials than he asked the materials are been sold to them. The suppliers and the retailers buy the materials during auctioning.

Supplier

The suppliers transport the materials to the particular exporters they are having contact and receive a commission of 1.5-2 % from the companies to whom they are sending the fish. The suppliers also send the fishes to the hoteliers. Sometimes the suppliers take money from the exporters or processors and pay as an advance (without interest) to the fishermen who in turn sell these materials to those suppliers. Such management is known as 'Tying of boats' and the remainder fishes are sold to the retailer after auctioning.

Retailer

The retailers sell the fishes to household consumers directly. In the landing center, there are also women who used to do the peeling process of the small prawns known as *Goinar*. They used to take the materials during auctioning and receive Rs 100 /day for peeling.

There are approximately 60 commission agents, 70 suppliers and about 50 auctioneers present in the market. During peak landing of the season, the catch is sold to wholesalers and payment is made later based on prevailing market prior to that day. The transactions are carried out through cash and credit basis.

The landing center has many good aspects like good marketing strategies, good interaction between all the intermediaries involved in marketing, variety of high quality of fish etc. But there are also few aspects which are to be improved like provision of a good storage house, presence of a price regulating body as all the prices are being decided based on the availability of materials and seasons by the agents which forces the fishermen to sell their materials at a price which may be more or less than his production cost.

4.2.3.4 Versova Fish Landing Centre

Versova landing centre is the third most important fish landing centre in Mumbai though it is not a typical landing centre but a landing centre cum fishing village. The landing center is an important center in terms of total landing and also is an important drying center. The market is maintained by Versova Machimar Society Pvt. Ltd. The following fish marketing channels were observed at Versova:

Channel I	Fishermen – Auctioneers – Retailers - Consumers
Channel II	Fishermen – Auctioneers – Suppliers – Processing companies - Export
Channel III	Fishermen – Auctioneers – Suppliers – Hotels - Consumers

Market Intermediaries

There were four main intermediaries, viz. auctioneers, retailers, suppliers and hoteliers at Versova.

Fisherman

After harvesting, the materials are washed on board with water and some preliminary icing is done in the boat itself. The boats are owned by a particular fisherman and there are crew members working under him for fishing. The salary of the crew members is decided based on their experience in fishing, profits etc. It may range from Rs 2000 – 8000. In a single boat there may be a total of 8-10 fishermen going for the trip.

Auctioneer

The materials are taken by the auctioneers for auctioning purposes. The auctioneers bid the materials in different rates depending on the amount of the materials arrived in the landing center. The materials are taken by the persons who agree to pay the highest price for an individual material.

Supplier

The suppliers are the fish sellers and are especially ladies at Versova. From suppliers the materials are sold to the retailers. From suppliers the materials are also sold to the exporter who processes the materials and exports as per demand.

Retailer

The retailers go to small retail markets for selling the materials to the household consumers.

The materials which do not fetch a high commercial value such as Bombay Duck, small prawns etc. are dried on the dock itself by the fishermen's family. For drying, there are bamboo scaffoldings present in the center over which the fishes are dried under the sun. The fishes for drying generally arrive during the morning hours when it will be helpful for sun drying. They are washed and are hung for drying.

A view of Versova fish landing centre-cum-fishing village in Mumbai

Fish catch being transferred from a fishing vessel to landing centre market at Versova, Mumbai

Women conducting the auction of fish catch obtained from their husbands at Versova landing centre, Mumbai

Women retailers selling the high value marine fish at the landing centre market, Versova, Mumbai

4.2.3.5 Dadar Fish Market

Dadar fish market is primarily a freshwater fish market. Although it deals with marine as well as brackish water fishes, it is specialized in dealing with freshwater fishes. The predominant fish marketing channels observed at Dadar fish market are as follows:

Channel I	Fish Farmer – Wholesaler/Commission Agent – Consumer
Channel II	Fish Farmer – Wholesaler/Commission Agent – Retailer – Consumer
Channel III	Fish Farmer – Wholesaler/Commission Agent – Hotelier – Consumer
Channel IV	Fish Farmer – Wholesaler/Commission Agent – Processing Company - Export

Market Intermediaries

The marketing strategy at Dadar market is generally simpler than other fish markets as the market mainly deals with freshwater fishes. The fishermen bring the harvested fishes to the market where the wholesalers buy the materials from them.

Wholesaler / Commission Agent

The wholesalers are the commission agents by themselves. These wholesalers sell the materials to the retailers, hoteliers**,** processing plants, export companies and also to general household consumer after weighing on the kilo basis. The transactions made in the market are done through cash and cheque.

Table 4.33 Marketing Costs of Wholesalers at Dadar Fish Market

Item	Cost (Rs/kg)
Transportation	5.00
Loading/Unloading	1.50
Packing	1.40
Ice	1.00
Rent	0.08
Total	**8.98**

Source: Primary Survey, 2008

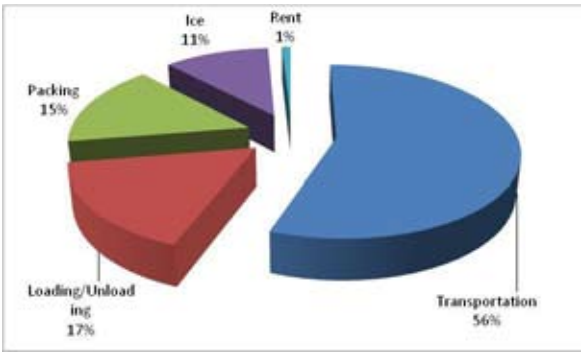


Figure 4.25 Distribution of Marketing Cost of Wholesalers at Dadar Fish Market

Retailer

Retailers sell fish to consumers directly through their retail outlets. The marketing costs of retailers are shown in Table 4.34.

Table 4.34 Marketing Costs of Retailers at Dadar Fish Market

Item	Cost (Rs/kg)
Ice	2.00
Packing	1.00
Loading/Unloading	1.00
Transportation	1.00
Storage	0.50
Rent for shop	0.08
Weighing	0.05
Total	**5.63**

Source: Primary Survey, 2008

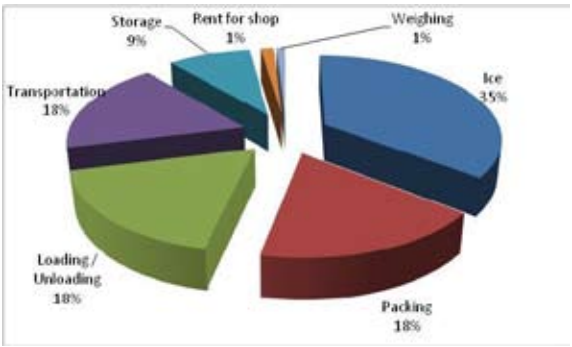


Figure 4.26 Distribution of Marketing Cost of Retailers at Dadar Fish Market

Price spread

The price spread for various fish species at Dadar fish market are depicted in Table 4.35 below. The price spread analysis follows the same trend as seen earlier in Shivaji market and Sassoon Dock.

Table 4.35 Price Spread for Freshwater Fishes at Dadar Fish Market

(Rs/kg)

Particulars	IMC	Scampi	Magur
Prices received by fishermen	40.00 (53.33)	240.00 (63.15)	25.00 (41.66)
Costs incurred by the local agent	5.00 (6.66)	80.00 (21.05)	5.00 (8.33)
Wholesaler/ Commission agent's purchase price	45.00 (60.00)	320.00 (84.21)	30.00 (50.00)
Costs incurred	7.90 (10.53)	7.90 (2.07)	7.90 (13.16)
Margin	7.10 (9.46)	22.10 (5.81)	7.10 (11.83)
Retailer's purchase price	60.00 (80.00)	350.00 (92.10)	45.00 (75.00)
Costs incurred	5.63 (7.50)	5.63 (1.48)	5.63 (9.38)
Margin	9.37 (12.49)	14.3 (3.76)	9.37 (15.61)
Price paid by consumer	**75.00 (100.00)**	**380.00 (100.00)**	**60.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

4.2.3.6 Marol Dry Fish Market

The Marol dry fish market is one of the oldest markets in the Mumbai region and is the largest dry fish market in Maharashtra. The market is fully dedicated to the wholesale trading of dry edible fishes. The main fish marketing channels at Marol market are as follows:

Channel I	Fisherman – Family Members – Wholesaler – Retailer – Consumer
Channel II	Fisherman – Family Members – Wholesaler – Commission Agent – Retailer – Consumer
Channel III	Fisherman – Dry Fish Processor – Wholesaler – Retailer – Consumer
Channel IV	Fisherman – Dry Fish Processor – Wholesaler – Commission Agent – Retailer – Consumer

Market Intermediaries

The market functionaries include producer (family members of the fishermen or a processor who purchases raw material from the fishermen) and buyer (wholesalers or secondary wholesalers from distant places of Maharashtra and also from other states).

Producer (Fisherman / Family members of fisherman / Dry fish processor)

In the dry fish marketing channel, fishermen is at the base. Fish items such as *Acetes*, Bombay duck, non-penaeid shrimps, smaller sized edible fishes as well as large sized fishes are generally used for drying. Family members of the fishermen are engaged in drying and marketing of the dry fishes. In some cases, dry fish processors buy raw material either from a supplier or from fishermen itself. After drying the processor alone or a group of dry fish processors hire a vehicle to reach the dry fish market. Profit margin from processors to buyers (wholesalers) is 10%.

Buyer / Wholesaler / Retailer

At Marol market, there is no auctioning system. Both the dry fish sellers and the buyers come together and decide the price. The buyers are mainly the wholesalers from distant places of Maharashtra such as Aurangabad, Nanded, Beed, Yewla, Nashik, Satara, Sangli etc. and also from other states like Andhra Pradesh. These wholesalers act as suppliers to the retailers or regional wholesalers from their concerned places. Profit margin from wholesalers to buyers (secondary wholesalers/retailers) is 10%. The weighing of the dry fish is generally done through a weighing balance costing Rs 5 per *Dali* (a bag weighing 7 kg in case of Bombay duck).

4.2.4 Delhi

Delhi is a fish consuming centre only. There is no production of fish at Delhi. Instead, Delhi markets receive fish from all over India. The most prevalent fish marketing channel in Delhi is shown below. Delhi being a consuming centre, the marketing channel starts with the auctioneers, who receive fish from other areas. The auctioneer in turn auctions the fish to retailers who transport the fish to respective retail outlets. Door-to-door sales of fish are not seen in Delhi.

Channel I	Auctioneers – Retailers – Consumers

4.2.4.1INA Fish Market

The marketing cost of retailers in INA fish market is given in Table 4.36 and Figure 4.27. The price spread for different fish species in the INA market is shown in Table 4.37. On an average, 88% of the sale price is accounted by the purchase price, 9% by the retailer's marketing margin and 3% by cost of ice and storage.

Table 4.36 Marketing Costs of Retailers in INA Fish Market, Delhi

Item	Cost (Rs/kg)
Loading / Unloading, Weighing, Cleaning	0.88
Grading, Filleting / Dressing, Packing	1.32
Ice & Storage	2.61
Transportation	0.73
Total	**5.54**

Source: Primary Survey, 2008

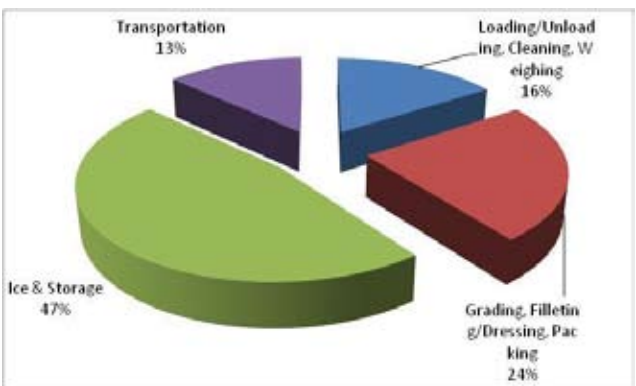


Figure 4.27 Price Spread for Fish in INA Fish Market, Delhi

Table 4.37 Price Spread of Major Fishes traded in INA Fish Market, Delhi

(Rs/kg)

Items	Pomfrets	Seer fish	Tuna	Shrimp / Prawn	IMC	Other Freshwater fishes
Retailer's purchase price	261.00 (88.18)	253.30 (90.46)	86.00 (75.90)	225.20 (84.59)	79.10 (80.71)	287.50 (90.55)
Loading / Unloading, Weighing, Cleaning	1.68 (0.57)	1.68 (0.6)	1.68 (1.48)	1.68 (0.63)	1.68 (1.71)	1.68 (0.53)
Grading, Filleting / Dressing, Packing	2.52 (0.85)	2.52 (0.9)	2.52 (2.22)	2.52 (0.95)	2.52 (2.57)	2.52 (0.79)
Ice & Storage	5.00 (1.69)	5.00 (1.79)	5.00 (4.41)	5.00 (1.88)	5.00 (5.10)	5.00 (1.57)
Transportation	1.40 (0.47)	1.40 (0.50)	1.40 (1.24)	1.40 (0.53)	1.40 (1.43)	1.40 (0.44)
Margin	24.40 (8.24)	16.30 (5.82)	17.00 (15.00)	30.20 (11.34)	8.42 (8.59)	18.50 (5.83)
Price paid by Consumer	**296.00 (100.00)**	**280.00 (100.00)**	**113.30 (100.00)**	**266.20 (100.00)**	**98.00 (100.00)**	**317.50 (100.00)**

Figures in parentheses indicate percentages to consumer price

A retail shop with fish being displayed at INA Market, Delhi

Tiger shrimp kept for sale with ice at INA Market, Delhi

4.2.5 Hyderabad

Hyderabad, the capital of Andhra Pradesh is a major fish consuming centre. The focal point of fish marketing in Hyderabad is the Musheerabad wholesale fish market. Majority of fish retailers and vendors in the city purchase fish from wholesalers at Musheerabad wholesale fish market. The common fish marketing channels in the city are:

Channel I	Wholesalers – Retailers – Consumers
Channel II	Wholesalers – Vendors – Consumers
Channel III	Wholesalers – Retailers – Vendors – Consumers
Channel IV	Producers – Vendors – Consumers

Market Intermediaries

Retailer

There are three types of retailers in Hyderabad namely, roadside retailers, small retailers and modern retailers. The roadside retailers purchase fish mainly from wholesalers. The small retailers obtain approximately 20% of their fish from local ponds/tanks. Modern retailers purchase approximately 42% of their fish from other districts (mainly coastal districts for marine fish and prawns). The marketing costs and margins of the three types of retailers are given in Table 4.38.

Table 4.38 Marketing Costs of Roadside Fish Retailers in Hyderabad

Item	Cost (Rs/kg)
Labour	5.00
Transportation	4.00
Ice	1.00
Loss (spoilage of fish)	1.00
Total	**11.00**

Source: Primary Survey, 2008

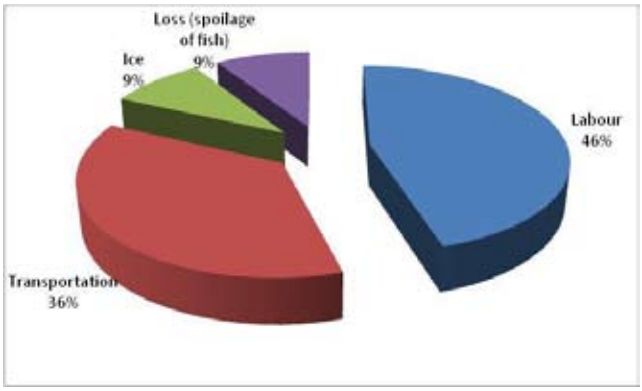


Figure 4.28 Distribution of Marketing Cost of Roadside Fish Retailers in Hyderabad

Table 4.39 Marketing Costs of Small Fish Retailers in Hyderabad

Item	Cost (Rs/kg)
Labour	5.00
Transportation	4.00
Ice	1.00
Other items	0.50
Total	**10.50**

Source: Primary Survey, 2008

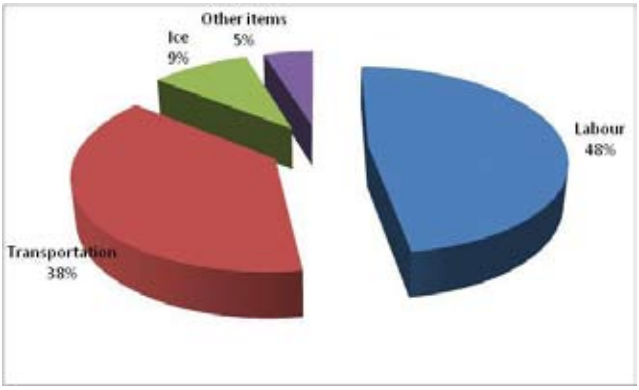


Figure 4.29 Distribution of Marketing Cost of Small Fish Retailers in Hyderabad

Table 4.40 Marketing Costs of Modern Fish Retailers in Hyderabad

Item	Cost (Rs/kg)
Labour	5.00
Transportation	4.00
Ice	1.00
Rent	1.00
Electricity	0.50
Total	**11.50**

Source: Primary Survey, 2008

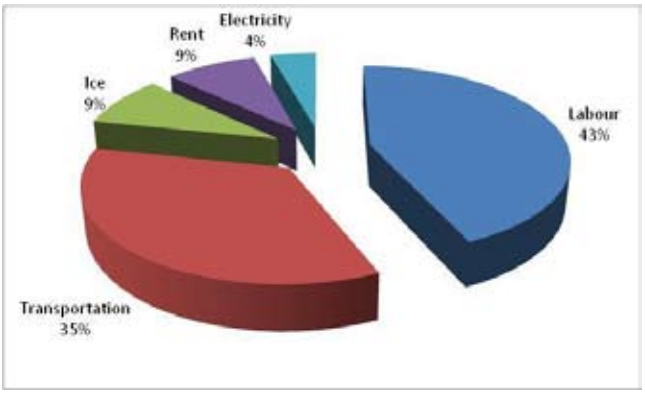


Figure 4.30 Distribution of Marketing Cost of Small Fish Retailers in Hyderabad

Table 4.41 Marketing Margins of different Fish Retailers in Hyderabad

(Rs/kg)

Item	Roadside retailer	Small retailer	Modern retailer
Freshwater fish	8-12	10-15	15-20
Marine fish	10-20	15-20	20-40
Murrels	-	20-30	30-40
Prawns	20-30	20-30	30-40
Crabs	-	30-50	40-50

Source: Primary Survey, 2008

Vendor

There are more than 300 fish vendors in Hyderabad. Majority (94%) of the vendors purchase fish from wholesale fish markets and the rest buy from retailers or producers. They sell about 15-30 kg of fish daily earning a daily income of up to Rs 250 on weekdays and up to Rs 400 on weekends. Sixty-seven percent of the vendors surveyed were women. The marketing costs of vendors are given in Table 4.42. They charge a margin of Rs 10-15 per kg for freshwater fish and Rs 15-20 per kg for marine fish. They sell fish mainly to household consumers (98%) and the rest (mainly left over fish) to hoteliers/snack vendors.

Table 4.42 Marketing Costs of Fish Vendors in Hyderabad

Item	Cost (Rs/kg)
Transportation	4.00
Ice	1.00
Total	**5.00**

Source: Primary Survey, 2008

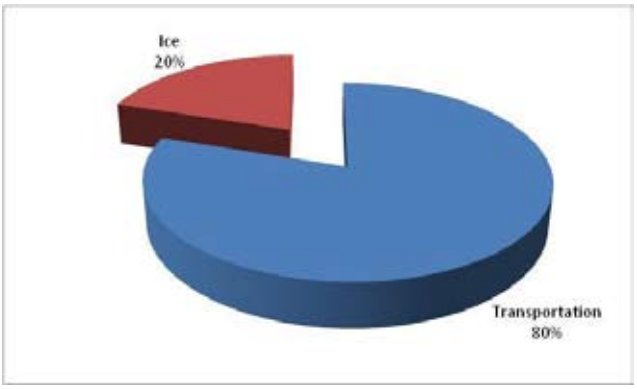


Figure 4.31 Distribution of Marketing Cost of Fish Vendors in Hyderabad

Fish trading in progress in an open market place in muddy floors at Musheerabad market, Zamistanpur, Hyderabad

A fish mobile vendor leaving the wholesale market at Zamistanpur, Hyderabad

Women members of the wholesalers dressing the fish for consumers at Musheerabad market, Hyderabad

A heap of black tiger shrimp kept for sale at Musheerabad market, Zamistanpur, Hyderabad

Personnels of a wholesaler sorting the shrimp before sale at Musheerabad market, Hyderabad

A commission agent-cum-wholesaler at Musheerabad market, Hyderabad

Live Murrels kept in iron tin with perforated lid arriving from a nearby farm to Musheerabad market, Hyderabad

Ice bars ready for crushing in a fish depot located near Musheerabad market, Hyderabad

An agent of a wholesaler at Musheerabad market, Hyderabad tracking the prices and arrivals at other fish markets

Permanent labourers of wholesalers making fish fillets for hotels at Musheerabad market, Hyderabad

4.2.6 Cochin

Kerala is a major fish consuming state, where majority of the population consume fish and are ready to pay high prices for fish. Hence fish from neighbouring states also finds its way into the fish markets of Kerala. Cochin in central Kerala is a major landing centre and market for fish in the state.

Fish landed at the harbours and landing centres is auctioned off by the auctioneer. Fish is bought by wholesalers, retailers, and vendors. Retailers market the fish in local markets or markets up to 100 km distance. Vendors target local household consumers and restaurants. Wholesalers send fish to distant markets that are more than 250 km away or over to neighbouring states like Tamil Nadu. Fish from other states is supplied to the wholesale markets where they are sold by the commission agent. He either auctions the fish or sells it at a pre-fixed price based on market demand.

The predominant fish marketing channels prevalent in the state are:

Channel I	Fisherman – Auctioneer – Retailer – Consumer
Channel II	Fisherman – Auctioneer – Vendor – Consumer
Channel III	Fisherman – Auctioneer – Commission agent – Retailer – Consumer
Channel IV	Fisherman – Auctioneer – Commission agent – Vendor – Consumer
Channel V	Fisherman – Auctioneer – Wholesaler – Commission agent (other states)
Channel VI	Fisherman – Auctioneer – Commission agent – Other states
Channel VII	Fisherman – Auctioneer – Wholesaler (Other states) - Commission agent – Retailer
Channel VIII	Fisherman – Auctioneer – Wholesaler (Other states) – Commission agent – Vendor
Channel IX	Fisherman – Auctioneer – Wholesaler (Other states) – Commission agent – Auctioneer – Retailer
Channel X	Fisherman – Auctioneer – Wholesaler (Other states) - Commission agent – Auctioneer - Vendor
Channel XI	Fisherman – Auctioneer – Commission Agent - Export Unit

Fish marketing within the state or those sent to other states followed Channels I to VI. Fish imported from other states (including freshwater fish) followed Channels VII to X. Fish destined for export followed Channel XI.

Market Intermediaries

Auctioneer

Also known as *Tharakans* in Kerala, the auctioneer is the first step in the marketing chain after the producer. The auctioneer advances money to boat owners for maintenance and repair of crafts and for fishing expenses. The boat owner gives the auctioneer the rights to auction his fish and pays the money back with a share of the fish sales. The auctioneer charges a commission of 5 to 10% from the fisherman for the service of auctioning the fish. The commission rates vary according to value, quantity and species. For example, in case of high value species like Seer fish the commission rate might increase to 15% and similarly, when the fisherman lands very little quantities, the auctioneer reduces his commission rates. It was noticed that traders paid 10% less than the auctioned amount. An auctioneer employs an accountant as well as a person to collect money from the buyers. The auctioneer spends Rs 0.22/kg towards labour charges. Other than labour, he does not incur any marketing costs.

The Kerala State Co-operative Federation for Fisheries Development Ltd., (Matsyafed) regulates the auctioning in the marine non-mechanized sector. Here those fishermen who are members of a co-operative society auction their catch only through an auctioneer employed by the society. Thus they are ensured a fair deal and get immediate cash payment from the co-operative society. Auctioneers employed by co-operative societies are paid monthly salary in addition to their commission charges. Apart from co-operative societies, several NGOs also employ auctioneers, who are also paid monthly salary in addition to their commission charges. These auctioneers employed by co-operative societies and NGOs charge 1% commission whereas private auction agents charge 5-10% as commission.

Table 4.43 Marketing Costs of Auctioneers at Cochin Fish Landing Centres

Item	Cost (Rs/kg)
Labour	0.22
Total	**0.22**

Source: Primary Survey, 2008

Wholesaler

Wholesalers play multiple roles in domestic fish marketing in Kerala. These wholesalers buy fish for sale in markets of Kerala. There are also wholesalers who buy fish for sending to neighbouring states. Other smaller wholesalers buy fish for selling to retailers at local markets. They buy fish from auctioneers. The fish is then weighed, packed with crushed ice in boxes, loaded into vehicles and transported to various markets. Depending on the quantity of fish purchased, a wholesaler employs up to 12 labourers for loading fish into baskets, weighing the basket, transferring fish to boxes, crushing ice, putting ice into boxes and for loading boxes into the vehicles. The labourers are paid daily wages. Drivers are also paid a percentage of total fish sales depending on distance and quantity of fish transported. Generally most wholesalers supply fish at several markets on the way to their final destination. At each market he has an agent who buys the fish and pays money deducting 10% as his commission. Most wholesalers are informed of the catch by the fishermen as well as of market demand by his agents. Hence, he has good idea about production as well

as demand. The marketing costs of wholesalers who send fish to Tamil Nadu are given in Table 4.44. The marketing costs of wholesalers who send fish to distant markets in Kerala are given in Table 4.45.

Table 4.44 Marketing Costs of Wholesaler sending fish to Tamil Nadu from Cochin

Item	Cost (Rs/kg)
Transportation	4.39
Ice	1.00
Labour	0.75
Fee	0.02
Total	**6.16**

Source: Primary Survey, 2008

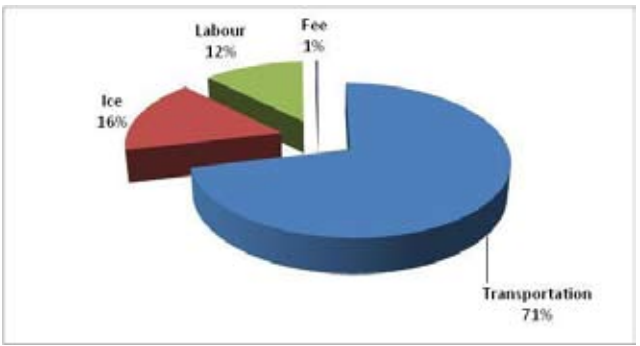


Figure 4.32 Distribution of Marketing Cost of Wholesaler sending fish to Tamil Nadu from Cochin

Table 4.45 Marketing Costs of Wholesaler sending fish from Cochin to Distant Markets within Kerala

Item	Cost (Rs/kg)
Transportation	3.70
Ice	1.00
Labour	0.75
Fee	0.03
Total	**5.48**

Source: Primary Survey, 2008

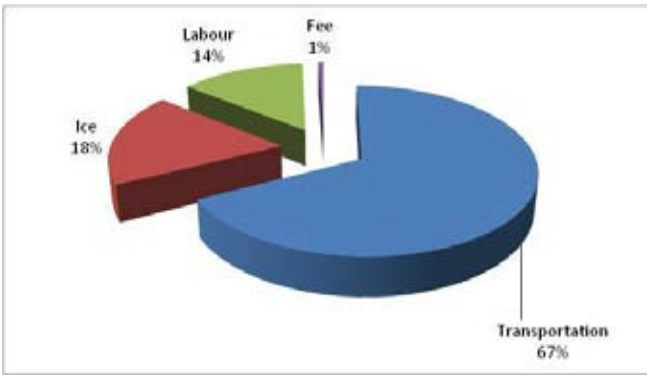


Figure 4.33 Distribution of Marketing Cost of Wholesaler sending fish from Cochin to Distant Markets within Kerala

Retailer

Retailers purchase fish from either auctioneers or commission agents. Retailers based in areas close to harbours and fish landing centres buy fish from auctioneers directly. Retailers, who are based at markets farther away from landing centres and harbours, buy fish from commission agents. They pay a commission of 10% to the agent for procuring fish based on the retailer's demand.

Retailers with shops/outlets buy around 500 kg fish every day covering 10-35 fish species. The fish is weighed, iced, packed and loaded on to small trucks by laborers who are paid daily wages. All charges for ice, labour and transportation are paid by the retailer. The marketing costs of a retailer are shown in Table 4.46. They keep a margin of 20-30% which varies according to quantity, species and value. For larger and high value species, margin is less whereas for low value and small species like Sardines the margin is higher.

Table 4.46 Marketing Costs of Retailers at Cochin Fish Markets

Item	Cost (Rs/kg)
Ice	3.00
Labour	1.12
Transportation	0.30
Fee	0.03
Total	**4.45**

Source: Primary Survey, 2008

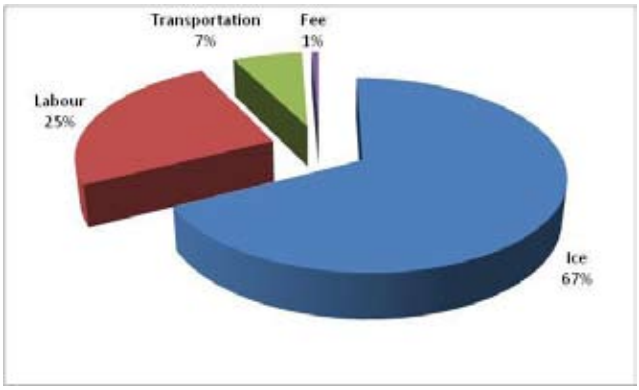


Figure 4.34 Marketing Costs of Retailers at Cochin Fish Markets

Fish crates received from Tamil Nadu at early morning hours for sale at Champakkara fish market, Cochin

Fish trading at Champakkara fish market, Cochin

Vendor

Vendors purchase their fish from auctioneers or commission agents. 40% of the fish vendors in Cochin are women. They are provided with aluminum vessels for carrying fish. Women vendors sell between 10 and 25 kg of fish in a day. Women vendors mainly travel by public transport or walk short distances for selling fish. Men vendors use cycles, mopeds and motor cycles for selling fish. Vendors pay for ice and transportation and generally keep a margin of 20-25%. Most prefer Sardine, Mackerel, Anchovies, Pink perch, Shrimps and other small fishes. The marketing costs of a women vendor are shown in Table 4.47 and those of a male vendor with motor cycle are given in Table 4.48.

Table 4.47 Marketing Costs of Women Vendors in Cochin Fish Markets

Item	Cost (Rs/kg)
Ice	1.20
Transportation	0.50
Total	**1.70**

Source: Primary Survey, 2008

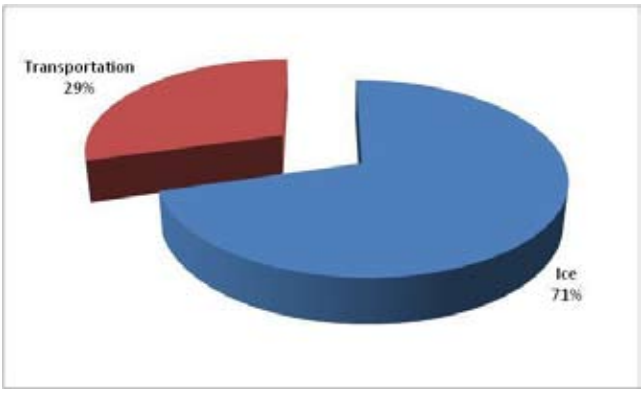


Figure 4.35 Distribution of Marketing Cost of Women Vendors in Cochin Fish Markets

Table 4.48 Marketing Costs of Mobile Male Vendors in Cochin Fish Markets

Item	Cost (Rs/kg)
Transportation	1.50
Ice	1.00
Labour	0.50
Fee	0.125
Total	**3.125**

Source: Primary Survey, 2008

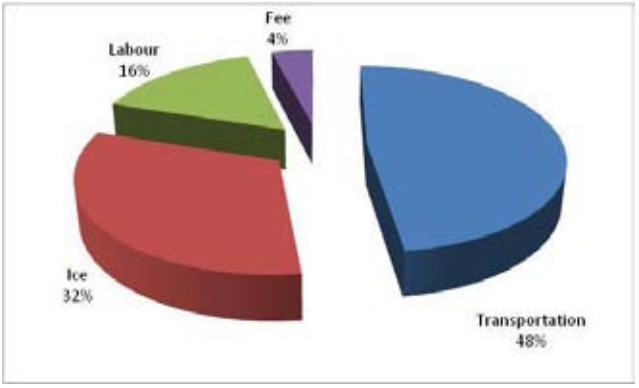


Figure 4.36 Distribution of Marketing Cost of Mobile Male Vendors in Cochin Fish Markets

Commission Agent

The commission agent purchases fish for his clients from the auctioneer. The clients are generally retailers from distant markets who cannot attend the early morning auctioning at harbors and landing centres. The agent buys fish based on the demand of the retailers. The agent charges 10% commission from the retailers for his services. Additionally there are commission agents who work for traders operating outside the state. They purchase fish and get it weighed, iced, packed and loaded on to trucks for transport to distant markets. He charges a commission for these activities and his services. Other agents work exclusively for exporting companies. Here too they purchase fish/shrimp; get it weighed, iced, packed and loaded on to trucks that take the fish/shrimp to the processing plant. The agent charges a commission for his services.

Price Spread for Major Fish species

The price spread was worked out for some of their fish species for different marketing channels. The details for different species for the same marketing channel involving fishermen, auctioneers and retailers are given in Table 4.49.

Table 4.49 Price Spread for different Marine Species at Cochin Fish Markets

(Rs/kg)

Particulars	Sardine	Mackerel	Seer fish	Pomfrets	Tuna	Shrimp
Prices received by fishermen	13.50 (54.00)	18.00 (60.00)	123.75 (68.75)	188.00 (72.31)	36.00 (60.00)	315.00 (78.75)
Auctioneer's commission	1.50 (6.00)	2.00 (6.67)	13.75 (7.64)	12.00 (4.62)	4.00 (6.67)	35.00 (8.75)

Retailer's purchase price	15.00 (60.00)	20.00 (66.67)	137.50 (76.39)	200.00 (76.92)	40.00 (66.67)	350.00 (87.50)
Costs incurred	4.45 (17.80)	4.45 (14.83)	4.45 (2.47)	4.45 (1.71)	4.45 (7.42)	4.45 (1.11)
Margin	5.55 (22.20)	5.55 (18.5)	38.05 (21.14)	55.55 (21.88)	15.55 (25.92)	45.55 (11.39)
Price paid by consumer	**25.00 (100.00)**	**30.00 (100.00)**	**180.00 (100.00)**	**260.00 (100.00)**	**60.00 (100.00)**	**400.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

It is seen that fishermen's share of consumer rupee is higher for high value species. The magnitude of margins charged by retailers is also higher for high value species than for low value species like sardine. Contrarily, retailer's marketing margins as a share of consumer's rupee is highest for low value species like sardine. Auctioneer's commission also formed a major portion of consumer's rupee for high value species.

4.2.7 Mangalore

Karnataka has the shortest coastline among the major coastal states in the country, but is the fifth largest producer of fish in India. Despite this relatively small area, it supports significant pelagic fish resources and was known traditionally as the 'mackerel coast'. Several wholesale and retail markets were surveyed in the state for studying both marine and freshwater fish marketing.

The prevalent marketing channels observed in the state were:

Marketing Channels for Marine Fishes	
Channel I	Producer – Auctioneer – Wholesaler – Retailer (Fisherwomen) – Consumer
Channel II	Producer – Auctioneer – Retailer (Fisherwomen) – Consumer
Channel III	Producer – Auctioneer – Commission Agent (Freezer) – Processor (Woman) – Export Unit
Channel IV	Producer – Auctioneer – Commission Agent (Freezer) – Retailer – Consumer
Channel V	Producer – Auctioneer – Commission Agent (Domestic market) – Wholesaler – Retailer (Woman) – Consumer
Marketing Channels for Freshwater Fishes	
Channel VI	Producer – Wholesaler – Secondary Wholesaler – Retailer – Village Merchant – Consumer
Channel VII	Producer – Wholesaler – Secondary Wholesaler – Retailer – Hotel – Consumer
Channel VIII	Producer – Wholesaler – Secondary Wholesaler – Retailer – Vendor – Consumer
Channel IX	Producer – Wholesaler – Secondary Wholesaler – Other state

Market Intermediaries

The market intermediaries involved in fish trade at Mangalore marine fisheries harbour are described below.

Commission Agent

Commission agent advances loan to boat owners for maintenance and repair of boats and to pay the crewmen. Trawler owners borrow up to Rs 6 lakh/annum and agree to sell fish throughout the year. The loan amount is adjusted from the sale proceeds in the next fishing season and no interest is charged. The commission agent arranges for unloading, auctioning, weighing, packing and storing of fish and the agent charges 6% commission for his services. The commission is charged to the fisherman. An agent maintains 5-10 people as staff and they are paid daily wages of Rs 150-250 per day or fixed rate per box of fish. The sources of income and expenditure of commission agent are given in Table 4.50.

Table 4.50 Sources of Income and Expenditure of Commission Agents in Mangalore Fishing Harbour

Sources of income	Sources of expenditure
Commission charges @ 6%	Labor charges and salaries
Commission charges for sending fish to other states	Ice
Miscellaneous	Transportation
	Charges for harbor services
	Office rent
	Cost of storage equipments

Normally high value fishes and export oriented fishes are sold by weight whereas small pelagic fishes and purse-seine catch are sold in bulk quantity through auction. In the case of bulk sale through auction, 10% of the auction value is deducted towards negotiations and bargaining process. This 10% deduction from the auction value was introduced recently.

As soon as the fish is sold in the auction market, based on the slip received from the auctioneer the commission agent prepares two bills, one for the trader and another for fishermen, often deducting the 6% commission charges. It is important to note that unlike in the case of agriculture commodities, where the entire commission charges are paid by the merchants as per the APMC Act, 1966, in the case of fish market, the entire commission charges are paid by the fishermen, although the services of commission agent is available to merchants.

Auctioneer

The main function of the auctioneer is to arrange for auctioning of fish, sale, payment to trading parties, etc. On an average, each auctioneer auctions 8 times a day. The purse seine catch is normally sold by auction method and the auction price varies depending on the channel of distribution. The auctioneer deducts 6-10 % of the sale value of fish towards the commission charges and makes payment to the boat owner.

Wholesaler

Wholesalers buy fish in bulk for export companies or for sending to other states. The commission charges of wholesalers vary based on value of fish and demand of exporting companies. Some commission charges are given in Table 4.51. The commission charges are fixed every month by the association of wholesalers.

Table 4.51 Commission Charges of Wholesalers for Various Exportable Species in Mangalore Fishing Harbour

Species	Commission Rate
Squids	15 - 20 %
Tiger prawn	20 - 25 %
Pink perch	Rs 1.50 - 2.00/ton

The wholesalers also advance money to fishermen and recover the money through the sale of fish. The marketing costs of wholesalers are given in Table 4.52.

Table 4.52 Marketing Costs of Wholesaler at Mangalore Fishing Harbour

Item	Cost (Rs/kg)
Transportation	2.10
Ice	0.50
Labour	0.33
Total	**2.93**

Source: Primary Survey, 2008

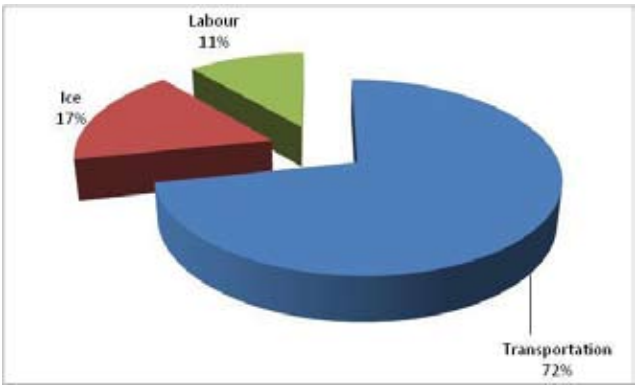


Figure 4.37 Distribution of Marketing Cost of Wholesaler at Mangalore Fishing Harbour

In the case of inland fish, wholesalers directly purchase fish from local landing centres and other states. The wholesaler incurs cost on ice (Rs 2/kg) and transportation (Rs 10/kg).

Retailer

The retailing of fish is mostly monopolized by women belonging to fishing communities in coastal Karnataka, although men belonging to other communities are slowly increasing their share in the door-to-door delivery business. This was further facilitated by the state subsidized schemes for the distribution of two-wheelers and tempos. However, the fish markets are still the monopoly of fisherwomen retailers.

Women retailers provide a variety of marketing services right from the local sales at the landing centre, major markets within and outside city and door-to-door sales. They follow each and every stage of marketing namely pricing, altering product attributes, timing and place of sale, value addition, product promotion and provision of credit services. The marketing costs of women vendors are given in Table 4.53.

The attributes of products are enhanced through various means such as icing, spreading salt with ice (to avoid discolouring of fish) and mixing sea-shore sand with ice (for better appearance and freshness). The sand particles especially create an impression that the fish is just harvested (although it might have been kept in cold storage). The retail women maintain refrigerators to keep unsold fresh fish. They normally buy such refrigerators from scrap sellers. The women retailers observe that the consumers are willing to pay 5-10 % higher price for a better quality fish and expenditure on value addition always provides for increase in sales and profit margin improves whenever they spend on quality management.

Table 4.53 Marketing costs of Women Fish Vendors in Mangalore Fish Market

Item	Cost (Rs/kg)
Transporting	2.00

Icing	1.50
Packing	1.00
Total	**4.50**

Source: Primary Survey, 2008

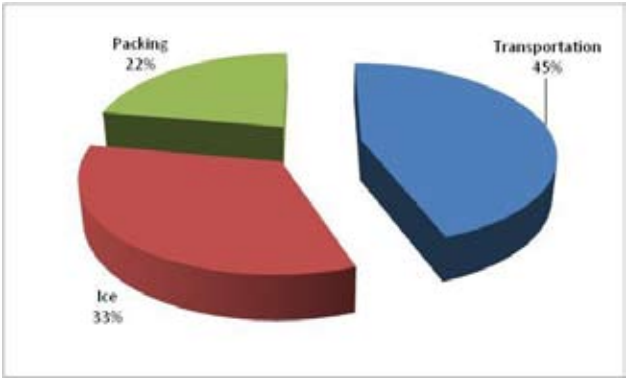


Figure 4.38 Distribution of Marketing Cost of women fish vendors in Mangalore Fish Market

The consumer could be classified into household consumers and hotels and restaurants. The hotels and restaurants normally prefer Seer fish, Pomfrets, Mackerels, Sardines, Soles and Silver bellies. The women supplying fish to hotels and restaurants also provide value addition services such as washing, observing, evisceration, cutting (both steaks and filleting) skin removal, etc. All these services are provided without extra charges, though these services are done by highly skilled women in harsh working conditions.

Commission Agency

The main type of fish in demand by the exporters is high value fishes like Squids, Cuttle fish, Ribbon fish, along with mackerel. They depend on middlemen to get a regular supply of fish from the producers. The middlemen do not carry out any of the value addition activity. They spend only on yard cleaning. They spend Rs 4,500 per month. It is half an hour job. To ensure quality of the fish they sell, they ice the fish as soon as the catch reaches the harbour. In one hour 100 boxes of fish can be iced. One box contains around 30 kg of fish and 20 kg of ice. Apart from this, supply of insulated vehicle for transportation of fish to the exporters and packing in insulated boxes to maintain low temperature to reduce spoilage are the measures they take in order to ensure better quality of their products. There is no bargaining about the price since the price already fixed. If the quality of the consignment is poor, the buyers (exporters) reject the entire consignment.

Fishermen Co-operatives

The marketing cooperatives for each type of craft-gear combinations such as trawlers, purse seiners, gillnet and traditional fishing units, etc. have emerged during the last 15 years. These cooperatives basically supply fishing requisites mainly subsidized diesel, oil, nets, ice, etc. and function as commission agents for the marketing of fish. Each cooperative extends credit limits to the trader on their trade- deposits. The credit limits are sanctioned by the committee.

4.2.8 Tuticorin (Thoothukudi)

Primary data was collected from Tuticorin fish landing centre and market. The common fish marketing channels prevalent at Tuticorin are:

Channel I	Fisher – Auctioneer – Retailer – Consumer
Channel II	Fisher – Auctioneer – Vendor – Consumer
Channel III	Fisher – Auctioneer – Wholesaler – Consumer

The flow of Lethrinids, Barracuda, Seer fishes, Sardines and miscellaneous fishes through retail market is mainly through Channel I and II. Channel I and III are the channels through which Seer fishes arrive in retail market, while the Carangids is observed to flow through Channel I. In the present study, it is found that the major portion of the selected marine fishes is traded in Thoothukudi through Channel I and II.

Market Intermediaries

Auctioneer, Wholesaler, Retailer, Vendor

Normally, auction is carried out in the auction hall by the auctioneers. Fin fishes are sorted out and kept on floor in heaps. Then open bidding is performed and the auctioneer will invite bidding. The exportable varieties such as shrimps, lobsters, squids and cuttle fishes are sold through marketing society on weight basis. Bidding is done verbally declaring the bids of all the prospective buyers for a particular fish lot. As a rule, the fish lots are awarded to the highest bidder. Wholesalers, commission agents, retailers, vendors and some times consumers participate in the bidding.

Most of the marine fishes are sold through the auctioneers. They provide working capital to the fishermen. An agreement exists between the auctioneer and the fishermen that the fish catches have to be sold through the auctioneer only. They charge an auction fee at the rate of 6-10% of the total value of the auctioned fish from the fishermen. They also take the responsibility of collecting the money from the wholesalers and giving it to the fishermen.

The costs and returns are found to be the highest for the auctioneer at Rs 3.63 lakhs and Rs 99,425 respectively. The total cost for the wholesaler ranges between Rs 37,800 and Rs 53,800 while annual income ranges between Rs 78,750 and Rs 59,660. The annual income is the lowest for the vendor ranging between Rs 27,700 and Rs 19,700.

Price spread for Marine Fishes

The price spread of selected marine fishes (sardines and seer fishes) in Thoothukudi is calculated and given in Tables 4.54 and 4.55. The fishermen's share in consumer rupee per kg of Sardines is worked out for the two channels for three fish landing centres. It is observed that the fishermen's share and auction fee are found to be almost the same irrespective of channels and fish landing centres in Thoothukudi. The presence of other intermediaries such as wholesaler, retailer and vendor and their marketing costs and margins made impact on consumer price. In the case of Sardines, the fishermen's share in Channel I is more (63.89%) in Therespuram, followed by Fishing Harbour (57.14%) and Inigo Nagar (53.12%) landing centres and the corresponding values in Channel II are 57.50%, 54.05% and 48.57%, respectively. High marketing margin charged by vendor escalates the consumer price in Channel II. Fishermen's share is above 50% in Channel I where retailers operate. In the case of Channel II since the vendors charge high margin (Rs14.50 in Inigo Nagar, Rs12.50 in Therespuram and Rs 12.30 in Fishing Harbour) the consumer price goes up by Rs 2-4 in all the landing centres. The marketing cost for retailers and vendors is almost the same, which ranged from Rs 2.50 for vendor in Inigo Nagar to Rs 4.80 for retailers in Fishing Harbour. The auction fee ranged from 2.86% to 4.17% in the landing centres in Thoothukudi.

Table 4.54 Price Spread for Sardines at Tuticorin Fish Market

(Rs/kg)

Particulars	Fishing Harbour		Therespuram		Inigo Nagar	
	Channel I	Channel II	Channel I	Channel II	Channel I	Channel II
Prices received by Fisherman	20.00 (57.14)	20.00 (54.05)	23.00 (63.89)	23.00 (57.50)	17.00 (53.12)	17.00 (48.57)
Auctioneer's fee	1.20 (3.43)	1.20 (3.24)	1.50 (4.17)	1.50 (3.75)	1.00 (3.12)	1.00 (2.86)
Retailer's purchase price	21.20 (60.57)	—	24.50 (68.05)	—	18.00 (56.25)	—
Costs incurred	4.80 (13.71)	—	4.50 (12.50)	—	4.00 (12.50)	—
Margin	9.00 (25.71)	—	7.00 (19.44)	—	10.00 (31.25)	—
Vendor's purchase price	—	21.20 (57.30)	—	24.50 (61.25)	—	18.00 (51.43)

Costs incurred	—	3.50 (9.46)	—	3.00 (7.50)	—	2.50 (7.14)
Margin	—	12.30 (33.24)	—	12.50 (31.25)	—	14.50 (41.43)
Price paid by Consumer	**35.00 (100.00)**	**37.00 (100.00)**	**36.00 (100.00)**	**40.00 (100.00)**	**32.00 (100.00)**	**35.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

In Thoothukudi, sardines are sold for higher price (Rs40 per kg) at Therespuram landing centre in Channel II. The marketing cost is found low whereas the marketing margin is comparatively high in both the channels when retailers and vendors participated resulting in increased price to the consumers and reduced fisherman's share in consumer's rupee.

The fisherman's share in consumer's rupee per kg of seer fish is worked out for two different channels in Fishing Harbour and Therespuram landing centres and is presented in Table 4.50. It is observed that the fisherman's share in consumer rupee was found to be highest in Therespuram than in Fishing Harbour and among the channels, it was observed that the Channel III (Producer → Wholesaler → Consumer) gives higher returns to producers than Channel I (Producer → Retailer → Consumer). Overall, it is found highest (86.40%) in Channel III at Therespuram landing centre and is lowest (76.92%) in Channel I at Fishing Harbour. The consumer price was Rs 260 per kg of in Channel I in both the landing centres and Rs 250 per kg in Channel III. The auction fee ranges from Rs 12.00 per kg in Fishing Harbour to Rs 12.50 per kg in Therespuram. The marketing costs are higher for wholesaler in Channel III (3.40% and 5.00%) than for retailers in Channel I (2.69% and 3.27%) at Fishing Harbour and Therespuram respectively. The marketing margin is highest (15.19%) in Channel I at Fishing Harbour and lowest (5.20%) in Channel III at Therespuram. The marketing margin of retailers in Channel I is higher than those for wholesalers in Channel III in both landing centres, mainly because of the increased volume handled by wholesalers than retailers. Overall, there is not much difference in the consumer price between landing centres or between channels which is reflected again on the fisherman's share in the consumer's rupee in Thoothukudi.

Table 4.55 Price Spread for Seer fish at Tuticorin Fish Market

(Rs/kg)

Particulars	Fishing Harbour		Therespuram	
	Channel I	Channel III	Channel I	Channel III
Prices received by Fisherman	200.00 (76.92)	200.00 (80.00)	216.00 (83.08)	216.00 (86.40)
Auctioneer's fee	12.00 (4.61)	12.00 (4.80)	12.50 (4.80)	12.50 (5.00)
Wholesaler's purchase price	—	212.00 (84.80)	—	228.50 (91.40)

Costs incurred	—	12.50 (5.00)	—	8.50 (3.40)
Margin	—	25.50 (10.20)	—	13.00 (5.20)
Retailer's purchase price	212.00 (81.54)	—	228.50 (87.88)	—
Costs incurred	8.50 (3.27)	—	7.00 (2.69)	—
Margin	39.50 (15.19)	—	24.50 (9.42)	—
Price paid by Consumer	**260.00** **(100.00)**	**250.00** **(100.00)**	**260.00** **(100.00)**	**250.00** **(100.00)**

Figures in parentheses indicate percentages to consumer price

Fish landings by trawlers in the early hours at marine fishing harbour at Tuticorin, Tamil Nadu

Full-fledged auctioning of fish catch in process at Tuticorin fishing harbour

Labourers icing, packing, weighing and loading the fish catch in the early hours at Tuticorin fishing harbor

An auctioneer conducting auction of the fish caught by fishermen at Tuticorin fish landing centre

4.2.9 Thanjavur

Thanjavur district along the east coast of Tamil Nadu has the distinction of having the largest number of owned, dug-out ponds in the state. Hence the district is also a big market for farmed carps which are sold live, fresh and iced. Farmed carps reach markets at Thanjavur through the following marketing channels:

Channel I	Fisher – Consumer
Channel II	Fisher – Wholesaler-cum-Commission Agent – Consumer
Channel III	Fisher - Retailer – Consumer
Channel IV	Fisher - Vendor – Consumer
Channel V	Fisher – Wholesaler-cum-Commission Agent – Retailer – Consumer
Channel VI	Fisher – Wholesaler-cum-Commission Agent – Vendor – Consumer
Channel VII	Producer-cum-Retailer – Consumer

The highest flow of farmed carps (35 %) is through Channel I. The physical flow of farmed carps through the Channel II, III, IV, V, VI and VII are found to be 2%, 10%, 3%, 15%, 25% and 10%, respectively.

In the present study, it is found that 73.33% of the farmers market their produce directly to the consumers. Around 43% of the farmers market their produce through retailers and around 28% of the farm produced carps are marketed through retailers. Selling through wholesaler-cum-commission agents is preferred by 23.33% of the farmers and 10.16% of the farm produced carps are marketed through the Wholesaler-cum-commission agent. About 30% of the carp farmers sell 13.67% of their farm produced carps through vendors.

The important factors that influenced the choice of marketing channels are fish price, demand for fish, and distance between the farms and market, occupational status of the farmer, timing and quantity of harvest, socio-economic status of the local population and cost incurred in the channel.

Market Intermediaries

Wholesaler, Retailer, Vendor

In Thanjavur and Kumbakonam fish markets, live farmed carps are brought by the farmers to the wholesaler-cum-commission agents who transact the fish lot to the retailers, vendors or directly to the

consumers. For transacting, the wholesalers-cum-commission agent charges 10% commission from the farmers. The quantity transacted annually and annual earnings by the wholesaler-cum-commission agent, retailers and vendors are presented in Table 4.56.

Wholesaler-cum-commission agents traded an average quantity of 1460 tonnes per annum of farmed carps which ranged from 1095 tonnes to 1825 tonnes. The quantity transacted by the retailers range from 14.6 tonnes to 36.5 tonnes with an average of 21.9 tonnes per annum. Vendors traded 8.76 tonnes to 10.95 tonnes per annum with an average of 9.855 tonnes per annum. The average annual income of wholesalers-cum-commission agents, retailers and vendors recorded were Rs 73,00,000, Rs 1,75,200, and Rs 78,840, respectively.

Table 4.56 Quantity Traded and Income of Intermediaries at Thanjavur Fish Market

Intermediaries	Quantity (t/year)			Income (Rs/year)		
	Min	Max	Average	Min	Max	Average
Wholesalers-cum-commission agents	1095	1825	1460	54,75,000	91,25,000	73,00,000
Retailers	14.6	36.5	21.9	87,600	3,28,500	1,75,200
Vendors	8.76	10.95	9.855	61,320	98,550	78,840

The costs and returns of different intermediaries are given in Table 4.57. The wholesaler-cum-commission agent had the highest cost and returns in the trade of farmed carp.

Table 4.57 Cost and Returns of the Intermediaries at Thanjavur Fish Market

(Rs/year)

Intermediaries	Capital cost	Variable cost	Fixed cost	Total cost	Total return	Net return
Wholesaler-cum-Commission agent	7000	2,61,500	1,02,525	3,71,025	41,56,944	37,85,911
Retailer	3000	60,750	2125	65,875	2,15,090	1,49,215
Vendor	4000	39,420	400	42,820	82,130	38,310

Price spread for Farmed Carps

The price spread for farmed carps is analyzed for the seven marketing channels mentioned above. The producer's share in consumer's rupee per kg of farmed carps is worked-out for all the marketing channels (Table 4.58). The producer's share is found highest in the Channel I (95.24 %) and simultaneously the consumer's price was lowest (Rs 63/kg) compared to all other marketing channels. The next highest producer's share in consumer's rupee was found in Channel VII (93.75 %) and also the

consumer's price was found to be second lowest (Rs 64/kg). For both these channels, the producer's shares in the consumer's rupees are higher because there was no involvement of any intermediaries. In Channel II though the consumer's price was low (Rs 65/kg) due to involvement of wholesaler-cum-commission agents the producer's share was reduced to 76.92%. The wholesaler made a margin of 15.38 % in this channel. High marketing margin charged by the retailers and vendors escalate the consumer's price in the Channel IV, V and VI and hence, the producer's shares were low (69.33%, 61.72% and 60.98 % respectively) in all these channels. The margin charged by wholesaler is less than those of retailers and vendors in that order, as a result of more quantity handled by the former than the latter; thereby scale economy is realized by the wholesalers. Among the intermediaries, vendors realized the highest share in the consumer's rupee. Vendor's shares (as margin) were 21.33% and 15.85% in Channel IV and Channel VI, respectively.

Table 4.58 Price Spread for Farmed Carps at Thanjavur Fish Market

(Rs/kg)

Particulars	Marketing Channels						
	I	II	III	IV	V	VI	VII
Prices received by Producer / Producer-cum-retailer	60.00 (95.24)	50.00 (76.92)	55.00 (74.32)	52.00 (69.33)	50.00 (61.72)	50.00 (60.98)	60.00 (93.75)
Costs incurred	3.00 (4.76)	3.00 (4.62)	3.00 (4.05)	3.00 (4.00)	3.00 (3.70)	3.00 (3.66)	4.00 (6.25)
Wholesaler- cum – commission agent's purchase price	-	53.00 (81.54)	-	-	53.00 (65.43)	53.00 (64.63)	-
Costs incurred		2.00 (3.08)			3.00 (3.70)	3.00 (3.66)	
Margin		10.00 (15.38)			10.00 (12.35)	10.00 (12.20)	
Retailer's purchase price	-	-	58.00 (78.38)		66.00 (81.48)	-	-
Costs incurred	-	-	4.00 (5.41)	-	4.00 (4.94)	-	-
Margin			12.00 (16.22)		11.00 (13.58)		

Vendor's purchase price	-	-	-	55.00 (73.33)	-	56.00 (68.29)	-
Costs incurred				4.00 (5.33)		3.00 (3.66)	
Margin				16.00 (21.33)		13.00 (15.85)	
Price paid by Consumer	**63.00 (100.00)**	**65.00 (100.00)**	**74.00 (100.00)**	**75.00 (100.00)**	**81.00 (100.00)**	**82.00 (100.00)**	**64.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

4.2.10 Kanyakumari

Kanyakumari is located at the southern tip of the country with only one fishing harbor at Chinnamuttom. About 220 species are landed in this district, both from inland and marine waters of which more than 140 species are from marine sector. The main marine fishes landed in Kanyakumari are Sardines, Seer fish, *Lethrinus* sp, Tuna, Pomfrets, Carangids and Anchovies etc. In addition, other commercially important shell fishes like Shrimps, Cuttle fishes, Squids, Lobsters and Crabs are landed.

The following channels were identified in the marketing of marine fishes landed in Kanyakumari:

Channel I	Fisherman – Auctioneer – Wholesaler – Retailer – Consumer
Channel II	Fisherman – Auctioneer – Retailer – Consumer
Channel III	Fisherman – Auctioneer – Vendor – Consumer
Channel IV	Fisherman – Auctioneer – Commission agent – Export Unit

Of the four Channels identified, Channel I is the popular one for marketing of marine fishes in Kanyakumari. This channel caters to the needs of the local market, markets within the state and Kerala markets which are mainly for the high value fishes like Seer fish, Barracudas, Lethrinids, Carangids, etc. Channel II and III are used for the marketing of low value fishes, mostly Sardines, in the local markets of Kanyakumari and directly to the consumer. Channel IV is the preferred channel for marketing of exportable varieties of bigger sized fishes, Shrimps, Squids, Cuttlefishes, Crabs and Lobsters to the export processing units within the state and in Kerala.

Price spread

Sardine

In this species, two distinct channels of distribution are observed. They are:

Channel I	Fisherman – Auctioneer – Retailer – Consumer
Channel II	Fisherman – Auctioneer – Vendor – Consumer

The price spread worked out for Sardines in Kanyakumari is given in Table 4.59. Among the two channels, the producer's share in consumer price was higher (61.40%) in Channel I compared to 58.33% in Channel II. In both the channels, the auction fee is Rs 2.50 per kg. The marketing cost is comparatively less for vendors than for retailers whereas the marketing margin is higher (Rs 9.00 per kg) for vendors than for retailer (Rs 6.00 per kg). The consumer's price is Rs 30 per kg in Channel II whereas it is Rs 28.50 per kg in Channel I. Hence, it is found that the Channel I is more advantageous to both producers and consumers in Kanyakumari than Channel II.

Table 4.59 Price Spread for Sardines in Kanyakumari Fish Market

(Rs/kg)

Particulars	Channel I	Channel II
Price received by Fisherman	17.50 (61.40)	17.50 (58.33)
Auctioneer's fee	2.50 (8.77)	2.50 (8.33)
Retailer's purchase price	20.00 (70.17)	—
Costs incurred	2.50 (8.77)	—
Margin	6.00 (21.05)	—
Vendor's purchase price	—	20.00 (66.67)
Costs incurred	—	1.00 (3.30)
Margin	—	9.00 (30.00)
Price paid by Consumer	**28.50 (100.00)**	**30.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

Seer fish

In this species, two distinct channels of distribution are observed. They are:

Channel I	Fisherman – Auctioneer – Wholesaler – Retailer – Consumer
Channel II	Fisherman – Auctioneer – Retailer – Consumer

The fisherman's share in consumer's rupee was estimated in the marketing of Seer fish in Kanyakumari and is given in Table 4.60. Of the two channels observed, the analysis showed the efficiency of Channel I is more than Channel II, since both producer and consumer realize better price in the former channel as compared to latter one. The consumer price fish is found to be Rs 250 per kg in Channel I and Rs 260 per kg in Channel II whereas in both the cases, the producers realize Rs 173 per kg. The auction fee is also the same (Rs 14 per kg) for both the channels, whereas the marketing costs and marketing margins put together worked out higher (Rs 73 per kg) for retailers whereas it is only Rs 63 per kg in the case of wholesalers.

In Seer fish marketing, the marketing costs are higher (Rs 21 per kg) for wholesalers compared to Rs 18.50 per kg for retailers whereas the marketing margins fixed by the retailers are higher (Rs 54.50 per kg) compared to that of wholesalers (Rs 42 per kg) again due to the higher volume handled by wholesalers in Kanyakumari.

Table 4.60 Price Spread for Seer fish in Kanyakumari Fish Market

(Rs/kg)

Particulars	Channel I	Channel II
Price received by Fisherman	173.00 (69.20)	173.00 (66.55)
Auctioneer's fee	14.00 (5.60)	14.00 (5.38)
Wholesaler's purchase price	187.00 (74.80)	—
Costs incurred	21.00 (8.40)	—
Margin	42.00 (16.80)	—
Retailer's purchase price	—	187.0 (71.92)
Costs incurred	—	18.50 (7.11)
Margin	—	54.50 (20.96)
Price paid by Consumer	**250.00 (100.00)**	**260.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

4.2.11 Coimbatore

In Coimbatore district, freshwater fishes from the reservoirs are the major source for consumption for a long time. The reservoir fishes are marketed through the Tamil Nadu Fish Development Corporation (TNFDC) outlets at the reservoirs and the stalls in nearby towns directly to the consumers at the price fixed by the corporation based on grading as per species and sizes. The freshwater fishes from the irrigation tanks are marketed either directly or through retailers/vendors locally or through wholesalers in Coimbatore Wholesale market. The demand for freshwater fishes in the district is increasing whereas the supply from the reservoirs and irrigation tanks is not enough to meet the increasing demand, mostly for carps. Hence, there is supply of carps from other districts of the state and even from Andhra Pradesh into the Coimbatore and Tirupur markets. The fishes from the wholesale markets reach the consumers through the retail fish stalls, retailers in markets and vendors. In Coimbatore, there are four modern fish retail outlets which supply freshwater carps along with other marine fishes to the consumers.

The major fish marketing channels observed at Coimbatore were:

Channel I	Producer (TNFDC/Fishermen) – Consumer
Channel II	Producer (TNFDC/Fishermen) – Wholesaler – Retailer/Vendor – Consumer
Channel III	Producer (Fishermen's Cooperative Society) – Retailer/Vendor – Consumer
Channel IV	Producer (Other districts/states) – Primary wholesaler – Secondary wholesaler – Retailer/Vendor – Consumer

In Channel I, the freshwater fishes capture either from the reservoirs by TNFDC/share fishermen or from the irrigation tanks by the fishermen co-operative societies are sold directly to the consumers at the landing centres or through retail stalls.

In Channel II, the excess fish over and above direct sales to the consumers are marketed through the wholesalers to the retailers/vendors and ultimately to the consumers.

In Channel III, the fishes harvested from the irrigation tanks are purchased by the retailers/vendors for marketing to the consumers.

In Channel IV, freshwater fishes from other districts within the State or from Andhra Pradesh reach the primary wholesalers who sell them to secondary wholesalers from whom, the retailers/vendors purchase and sell to the consumeRs

Price spread for Freshwater Fishes

The price spread analysis for freshwater fishes marketed through different channels is given in Table 4.61. It revealed that the producers share in consumer's price was more in channel I and II in which the Tamil Nadu Fisheries Development Corporation (TNFDC) has taken steps to market the reservoir fishes directly to consumers at reservoir sites and through their stalls (Channel I). Similarly in channel III, the producers, i.e. members of inland fishermen co-operative societies receive 85.84% of consumer's price

when marketed through the retailers In Channel IV, the producers in Andhra Pradesh receive only Rs 40/ kg of fish compared to the consumer price of Rs65/kg leaving the rest to the marketing costs and marketing margins of the intermediaries. The consumer price was higher (Rs70 / kg) for reservoir fishes marketed by corporation due to their bigger size than for smaller sized and iced fishes marketed by other intermediaries.

Table 4.61 Price Spread for Freshwater Fishes at Coimbatore Fish Market

(Rs/kg)

Particulars	Channel I	Channel II	Channel III	Channel IV
Prices received by producer	63.50 (90.71)	52.00 (74.23)	51.50 (85.84)	40.00 (61.54)
Costs incurred by Wholesaler (TNFDC)	6.50 (9.20)	2.00 (2.86)	-	-
Margin	-	4.00 (5.71)	-	-
Costs incurred by Primary wholesaler	-	-	-	8.00 (12.31)
Margin	-	-	-	2.00 (3.08)
Secondary wholesaler's purchase price	-	-	-	50.00 (76.92)
Costs incurred	-	-	-	2.00 (3.08)
Margin	-	-	-	3.00 (4.62)
Retailer's purchase price	-	58.00 (82.86)	-	55.00 (84.62)
Costs incurred	-	5.00 (7.14)	3.50 (5.83)	3.50 (5.39)
Margin	-	7.00 (10.00)	5.00 (8.33)	6.50 (10.00)
Price paid by consumer	**70.00 (100.00)**	**70.00 (100.00)**	**60.00 (100.00)**	**65.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

4.2.12 Bhubaneshwar

Several fish marketing systems are prevalent in Orissa because of uniqueness of the fish production systems of the state and import of fishes to the state. The most common preference of the state's population is freshwater fishes. Therefore, large amounts of freshwater fishes (about 50,000 t) are

imported from other states, particularly Andhra Pradesh. On the other hand, large amount of the marine and brackishwater fishes of the state are sent to either other states (about 70,000 t of marine/brackishwater) or exported.

The fish marketing systems of Orissa can be grouped into 8 categories:

1. Marketing system of small artisanal
2. Marketing system of freshwater fishes
3. Export of the freshwater fishes
4. Marketing system of brackishwater capture fisheries
5. Marketing system of marine capture fisheries
6. Marketing system of reservoir fish
7. Marketing system of Andhra fish

Marketing System of Small Artisanal

The pond aquaculture system in Orissa is characterized by highly fragmented and small holdings. The fishes from ponds are harvested in small quantities and sold at the local markets. The very small reservoirs of size less than 40 ha also disposed their harvest by the same system. The farmers sell the standing crop of the fishes directly to the traders who take the responsibility of harvesting and transporting at a predetermined price paid to the farmers. In few cases, the farmers themselves harvest the fish with the help of specialized fishing groups on payment of 2-3% of the value of the fish harvested. But in case of small fishes, the share paid to the harvesting groups go up to 40%. When the catch is very high the fishes are taken to wholesale markets. But, the practice of direct sale to the traders/retailers is the predominant marketing practice in this system.

Marketing System of Freshwater Fishes

The fish farmers, entrepreneurs, marketing agents with possession of large amounts of fish are resorted to organized form of the fish marketing. Large quantities, in this case, refer to amounts sufficient enough to engage transport vehicle, use ice and packing and transportation to the wholesale city markets located in the far-off places. Such fishes are sourced from the large aquaculture farms or reservoirs located in the Nayagarh, Kausalyaganga, Balugaon and Brahmapur areas. The major production environments are medium reservoirs, pond and tank aquaculture. The market agents or traders or businessmen in and around Nayagarh area have developed a system of the share culture in which inputs and feed and harvesting is done by the traders or outsiders where as the local farmers or entrepreneurs pay the lease-rent, labour, watch and ward and management expenses. The harvest is shared equally between them. The traders also take responsibility of selling the fish in the market. The fishes are brought in and auctioned by the commission agents (Gaddiwala) in the wholesale market of Bhubaneswar. The fishes are brought to the wholesale markets in small vans (carrying 2-3 tones of fishes and 2-3 tones of ice) and auctioned through the commission agents.

Export of the Freshwater Fishes

There are few freshwater species which are not cultured but captured from the small water bodies like rivers, ponds, tanks and other water bodies. The large catfishes like Balia (*Wallago attu*), Sal (large), Murrels, Chittal (*Notopterus chitala*) have high demand in west Bengal and outside the country. The bigger sizes of the fishes more than 1-2 kg are sent to the Howrah market and consequently to the export destinations like Singapore and east Asian market. The price of the fishes paid to the fishers or fish farmers are Rs 60-80 per kg for Balia (2kg size), Rs 70-100 for Sal (2kg size) and Rs 50-60 for Seul (medium sized murrels 1 kg size). These fishes are sorted, iced and packed in thermocol packets and sent using public transportation systems to the Kolkata.

Marketing System of Brackishwater Capture Fisheries

Chilka fisheries is the largest brackishwater lagoon in the country with area of 971 sq. kilometers with reported production of 0.14 lakh tones per year with estimated fish value of more than 60 crore rupees. A total of 1.5 lakhs fishers are dependent on it. The Chilka fisheries are catering to the local markets (Berhampur and Bhubaneswar region), regional market (Howrah) and internal markets. The local fish markets are primarily served by the traditional marketing systems where as the modern marketing systems involve supplying fishes to other states and outside country markets. The traditional marketing system is operated primarily by the women traders, who collect the fishes from the fishers or landing centers and distributed the fish in the villages and nearby towns within the periphery of 10-20 kilometers. Presently, these traders are also supplying the fishes even in cities located even at distances of 100 kilometers. These traders either sell directly to the consumers or supply to the retailers located in the city retail markets. The majority of the Chilka fishes are sold in the city markets of Bhubaneswar, Brahmapur, Cuttack, Puri using these networks. The modern system of marketing involve traders, market agents, processing plant and export houses for sending fish to the export markets. The wholesalers are also operating the Baluagaon for collecting, icing and transportation of the fishes to the Howrah market.

The traditional marketing channels are largely informal, subsistence based transactions, dominated by women of the fishing communities for historic reasons. The technologies are fairy simple, low cost and local. The traditional fish marketing is highly prevalent in the southern Orissa in and around Chilka lake. The marketing system is primarily women based with fisher-women collecting fishes either from the husband, or other fishers or purchasing from markets. They carry the fish in headload either to the retail market or to the village for door to door selling of the fish. The women sell fish within the radius of 5-10 kilometer through walking, buses, auto-rickshaw, cycle rickshaw and other forms of mass transportations. The women operators deal about 30-40 kg of fish in a cycle with investment between 500 to 2000 rupees per cycle. Bicycles are second most important means of the fish transportation and trading in the state. They cover around 30-50 kilometer per day in transaction of the fishes. The bicycle fish vendors deal around 40-50 kg of fish with investment of 1000 to 3000 rupees per cycle.

Marketing System of Marine Capture Fisheries

The landing centers are located in the sea coast of Gopal pur, Puri, Balasore, Astaranga, Parikuda and Paradip. Most of the marine capture fisheries are sent to Howrah or export markets. Most of the fishes are taken away by the large traders to Howrah and consequently to the export market. The in-expensive fishes are traded locally and enter in to the local market either by women (headload operator) or man (cycle/moped operator).

Marketing System of Reservoir Fishes

Most of the large and medium reservoirs with organised fish marketing are located in Nayagarh, Sambalpur, Rayagada and Bhanjanagar areas. The reservoirs are managed either by the fisheries cooperative society or private individuals as lease holders. The fishers catch the fish with stipulated rate of the management (cooperative or individual). Every management engage one 'fish merchant' on annual rate contract basis. The fish merchant connects the fish to the local wholesalers or retailers. Wholesalers are taking up the job of sorting, icing and transportation of the fishes and connecting to the wholesale city markets through the *Gaddiwala*. A portion of the fishes are also sent to the Howrah market using similar marketing channel as used by the Andhra traders.

Marketing System of Andhra Fishes

The Andhra fishes are brought in from Vijayawada area in truck to the whole sale markets of Bhubaneswar, Berhampur, Sambalpur, Rourkela and other major cities of the state. An entry tax of 4% is levied on Andhra Fish at the entry point as entry tax. The truckload of the fishes is kept in the Bhubaneswar wholesale market for auctioning. Auctioning is done by the Gaddiwala (commission agents) for 2% of the value of the fish. The wholesalers or the retailers are taking the fish on tray basis for retailing or selling to the retailers. The average price at the auctioneers are Rs 60-70 for 2.5-3 kg fish, 50-60 for 1-2 kg and 40-45 for less than 1 kg size. The retailers sell the fishes with the margin of 15-20 rupees per kg to the retailers.

There are seven major marketing channels in Bhubaneshwar fish markets and they are as follows:

Channel I	Fisher – Consumer
Channel II	Fisher – Retailer – Consumer
Channel III	Fisher – Wholesaler – Retailer – Consumer
Channel IV	Fisher – Trader – Retailer – Consumer

Channel V	Fisher – *Barapas* – Wholesaler – Retailer – Consumer
Channel VI	Fisher – Trader – *Gaddiwala* – Retailer – Consumer
Channel VII	Fisher – Trader – *Gaddiwala* – Retailer – Consumer

These market channels do not include export channels and that of fish sent to other states. These seven market channels are indicative of the major mode of domestic fish marketing in the state of Orissa.

Market Intermediaries

Fisher / Producer

The producers include the aquaculturists, reservoir managers (or the merchants engaged by them), fishers or boat operators landing the fishes in the landing centers or any other entrepreneur who are the primary suppliers of the fish to the market channels. There are diverse players and various institutional arrangements in this level to link the fishers or fish farmers to the market channels. The reservoir managers (fisher cooperatives, groups, individuals) engage the merchants for the whole year at prefixed rates to harvest all the reservoir production and hence, they can be treated as the primary supplier of fishes. Similarly, a group of fishers in the marine and brackishwater fisheries (Chilka) are working as fishing labourers under the boat and net owners, and therefore, these owners can also be treated as the primary fish suppliers. The aquaculturists are directly supplying the fishes to the markets. A large number of the fishers operating in the freshwater capture fisheries resources such as rivers, wetlands and reservoirs are also directly connected to the markets and are treated as the producers in the marketing channels.

Commission Agent

Popularly known as '*Gaddiwala*' they are located in the wholesale markets of Orissa. They are the largest players in the fish marketing channels with sizable investment for holding the product and act as security to the producers, advance credit to the producers as well the traders. Their main activities are unloading the fish from truck or van for auctioning. They also function as wholesalers by purchasing the standing crop from the aquaculturists and from reservoirs. The marine fishes are brought to them either through the '*Barapas*' (commission agents) located at the sea shore or around Chilka lake or through direct purchase of the fishes from independent boat operators. Few traders are directly supplying the fishes to *Gaddiwala*. The agents pay the suppliers in cash but extend advance credit to the retailers for one or two days. Bulk of the fish marketing was channelized through the agents. Primarily they take a commission of 6-10% (6.5% in case of Bhubaneswar) for their functions from the producers. Those agents, who functioned as wholesalers, fix the price of fish depending on the market situation.

Wholesaler / Large Retailer

The commission agents act as wholesalers in the market by holding the fish for providing it to the retailers. They either acquire the standing fish stock by providing advance for culture or buy in bulk at the end of culture phase. The wholesalers also bring the marine and brackishwater (Chilka) fishes from agents located there to the market. In each retail market, there are 1-2 large retailers who function as wholesalers. These retailers purchase the left over fish from smaller retailers for storing and reselling the next day. At the same time, they also supply fish to the small retailers in the market.

Table 4.62 Marketing Costs of Wholesalers in Bhubaneswar Fish Market

Item	Cost (Rs/kg)
Ice	1.50
Loading/Unloading	1.00
Weighing	0.50
Cleaning	0.50
Packing	0.50
Storage	0.10
Other items	0.40
Total	**4.50**

Source: Primary Survey, 2008

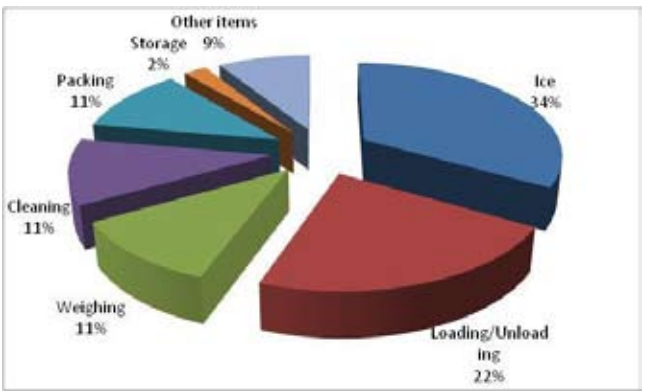


Figure 4.39 Distribution of Marketing Cost of Wholesalers in Bhubaneshwar Fish Market

Andhra Trader

The Andhra traders are the link between the farmers of the Kolleru lake area and wholesalers through commission agents. They primarily sort, pack and transport the fishes to the wholesale markets across the country. They charge margin of Rs 4-7 per kg. They generally operate on cash basis in multiple wholesale markets.

The price fixation of the Andhra fish is determined in a most competitive and efficient way as the farmers use to contact 4-5 traders for the price. The traders offering better price are given the right to the fish. The harvesting, weighing and assembling are the responsibility of the farmers whereas the traders do sorting, grading, packing and transportation to the respective destinations.

Table 4.63 Average Cost and Wholesale Price of Andhra Fish

(Rs/kg)

Destination	Cost	Wholesale Price
Bhubaneswar	6.00	40.00
Howrah	8.00	47.00
Siliguri	11.00	51.00
Guwahati	14.00	55.00
Agartala	17.00	65.00

Source: Primary Survey, 2008

Table 4.64 Marketing Costs of Andhra Fish Traders at Bhubaneswar Fish Market

Item	Cost (Rs/kg)
Ice	2.50
Transportation	2.00
Loading/Unloading	0.25
Weighing	0.25
Sorting	0.25
Packing	0.25
Storage	0.10
Other	0.40
Total	**6.00**

Source: Primary Survey, 2008

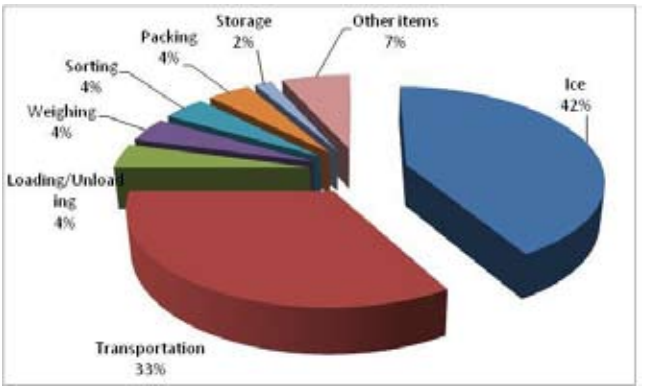


Figure 4.40 Distribution of Marketing Cost of Andhra Fish Traders at Bhubaneshwar Fish Market

Retailer

The retailers are the most important functionaries in the fish marketing channels in Orissa. They have the functions of acquiring, transporting, preserving, cleaning and selling the fish to the consumers. The retailers are located in the fish markets across the urban centers. The vendors are predominant in the rural markets. The retailers/vendors have multiple sources of the fish, viz. direct purchase of the fish stock from farmers/fishers, purchase on auction from *Gaddiwala* and purchase from the wholesalers. Generally the retailers sell the fish with a margin of Rs 15-25 per kg in case of large fishes and Rs 10-15 in case of smaller fishes. The marketing costs of the retailers include cost of transportation (Moped, auto-rickshaw), polythene pack and ice. In the transactions, the retailers lose around 5-10% of the fish weight due to cleaning, mal practices in weighing and drying. The retailers are also paying a license fee of Rs 580 per year.

Table 4.65 Marketing Costs of Retailers/Vendors at Bhubaneswar Fish Market

Item	Cost (Rs/kg)
Transportation	3.90
Dressing	1.40
Ice & Storage	1.00
Cleaning	0.90
Weighing	0.50
Grading	0.30
Loading/Unloading	0.10
Packing	0.10
Other	1.70
Total	**10.00**

Source: Primary Survey, 2008

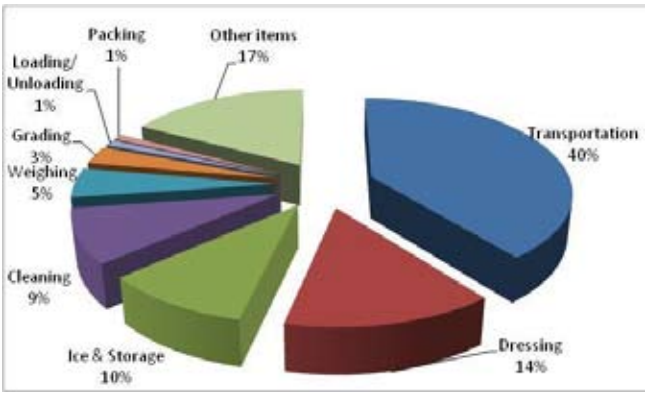


Figure 4.41 Distribution of Marketing Cost of Retailers/Vendors at Bhubaneswar Fish Market

Fish Harvester

There are various systems of fish harvesting in Orissa. The aquaculture ponds, culturing IMC, are harvested by a specific group of fishers who charge 2-3 rupees per kg of the fish. In cases, when retailers purchase the whole standing stock, the price of harvesting is paid by the buyers. Otherwise, the farmers pay the price for harvesting. But, for the catching of the small fishes the share for catch was 30-40 per cent of the catch. Sometimes the fishers catch and sell the fishes directly from the capture fisheries resources like rivers and natural water bodies.

Table 4.66 Marketing Costs of Fish Harvesters in Orissa

Item	Cost (Rs/ kg)
Depreciation cost of net	0.38
Transportation	0.19
Food	0.15
Repair of net	0.13
Total cost	**0.84**

Source: Primary Survey, 2008

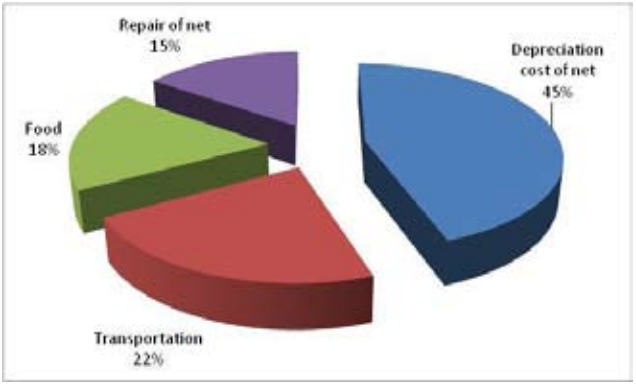


Figure 4.42 Distribution of Marketing Cost of Fish Harvesters in Orissa

Fish Assembler / Collector

The assembling or collecting functions are taken up as specialized activities only in case of larger quantities of the fish. It requires organized packing and transportations to the wholesale market. The fish of at least 1 tonne and above is being handled by specialized assembler/collector. In case of the smaller catch, these are handled directly by the retailers as they take the fish directly to the retail market bypassing the wholesale market. The major functions of the assembler are icing, packing and transportation to the wholesale market.

Table 4.67 Marketing Costs of Fish Assembler /Collector in Orissa

Item	Cost (Rs/kg)
Ice	0.38
Packing material	0.08
Transportation	0.75
Total	**1.20**
Price	3
Margin	1.8

Source: Primary Survey, 2008

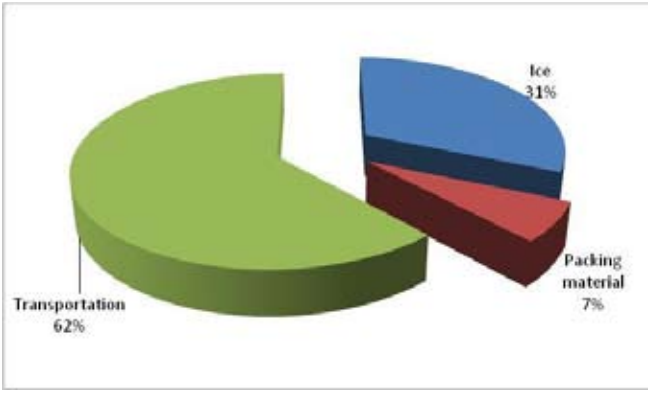


Figure 4.43 Distribution of Marketing Cost of Fish Assemblers /Collectors in Orissa

Price Spread for IMC

The four important channels for IMC were studied to analyze the price spread across the channels.

Channel I (IMC from Orissa)	Producer – Collector – Wholesaler – Retailer – Consumer
Channel II (IMC from Orissa)	Producer – Wholesaler – Retailer – Consumer
Channel III (Live IMC)	Fisher – Wholesaler – Retailer – Consumer
Channel IV IMC from Andhra)	Producer – Trader - Commission Agent – Retailer – Consumer

The details of the price spread and producer's share in consumer rupee in case of IMC cultured in Orissa (Channel I, II and III) and those cultured and transported from Andhra Pradesh (Channel IV) are presented in Table 4.68 and 4.69 respectively.

Table 4.68 Price Spread for IMC cultured in Orissa

(Rs/kg)

Particulars	Channel I	Channel II	Channel III
Prices received by fish farmers	44.80 (68.40)	45.80 (69.9)	52.84 (74.20)
Costs incurred by harvester	0.84 (1.30)	0.84 (1.30)	1.08 (1.50)

Margin	1.16 (1.80)	1.16 (1.80)	2.28 (3.20)
Collector's purchase price	46.80 (71.50)	-	-
Costs incurred	1.20 (1.80)	-	-
Margin	1.80 (2.70)	-	-
Wholesaler's purchase price	49.80 (76.00)	47.80 (73.00)	**-**
Costs incurred	4.50 (6.90)	5.50 (8.40)	-
Margin	1.70 (2.60)	2.70 (4.10)	-
Retailer's purchase price	56.00 (85.50)	56.00 (85.50)	56.20 (78.90)
Costs incurred	5.00 (7.60)	5.00 (7.60)	6.50 (9.10)
Margin	4.50 (6.90)	4.50 (6.90)	8.50 (11.90)
Price paid by consumer	**65.50** **(100.00)**	**65.50** **(100.00)**	**71.20** **(100.00)**

Figures in parentheses indicate percentages to consumer price

Table 4.69 Price Spread for IMC cultured and transported from Andhra Pradesh

(Rs/kg)

Particulars	Channel IV
Price received by fish farmers	33.80 (64.40)
Costs incurred by harvester	0.84 (1.60)
Margin	1.16 (2.20)
Trader's purchase price	35.80 (68.20)
Costs incurred	1.20 (2.30)
Margin	1.80 (3.40)

Commission agent's purchase price	38.80 (73.90)
Costs incurred	6.00 (11.40)
Margin	2.70 (5.10)
Retailer's purchase price	47.50 (90.50)
Costs incurred	1.50 (2.90)
Margin	3.50 (6.70)
Price paid by consumer	**52.50 (100.00)**

Figures in parentheses indicate percentages to consumer price

It is seen that the price offered by the Andhra fish is the lowest followed by local fish and live fish. The price for the live fishes is the highest as the consumers prefer to purchase them so as to take home the fish of assured freshness.

Marketing efficiency

The marketing efficiency across the channels is estimated. The live fish trading is considered to be the most efficient. The price received and share of the producers in consumer rupee are highest for the live fishes. The live fish trade is also the shortest and quickest channel in the disposal of the fish. The price received by the Andhra fish farmers is the lowest but the system of marketing is efficient as the price offered to the consumers is found lower even through the product travels longer distances through complex process and lengthy marketing channels. Scale economy is very much established in production and trade of fishes in Andhra Pradesh.

Table 4.70 Marketing Efficiency in the selected market channels for IMC at Bhubaneswar Fish Market

Item	Channel I	Channel II	Channel III	Channel IV
Consumer's price (Rs/kg)	65.50	65.50	71.20	52.50
Fisherman's price (Rs/kg)	44.80	45.80	52.80	33.80
Marketing cost + margin (Rs/kg)	20.70	19.70	18.40	18.70
Marketing expenditure as % of consumer's price	31.60	30.10	25.80	35.60
Marketing efficiency	**68.40**	**69.90**	**74.20**	**64.40**

4.2.13 Chilka Lake

Fish Marketing System of Chilka Lake

There are two distinct types of the marketing system in Chilka, i.e traditional and modern marketing system. The traditional marketing systems are primarily developed and existed in the historical period of time, whereas the modern marketing systems are developed to cater to the emerging and relatively recent changes in the production and marketing scenario of the lake. The traditional marketing systems cater to the need of the rural people, whereas the modern system is attending to the need of the export and urban markets.

Traditional fish marketing system

The traditional marketing system emerged out of the attempt by the fisherwomen to sell a part of the fish caught by their family members in the neighbouring villages by carrying head loads through walk as a means of support to the fishing activities. The whole Telugu fishing community in Orissa (also called as '*Nolia*') are particularly adapted to these practices, where the women exchange their fish for rice, tamarind, vegetables, eggs or any other commodity. Over the period of time, these communities are professional involved in the fish marketing of Chilka since time immemorial.

The traditional marketing system is informal in nature using of the low cost traditional materials with women being the primary stakeholders in the system. The marketing channels are short, simple catering to the local and rural needs. The system primarily deals with the low cost fresh fish to the local people.

Modern Fish marketing system

The modern marketing channels are newly developed system in response to the change in the fisheries and market practices. The increase in the fish catch and increase in the demand from the regional markets, urban centers as well as export markets are provided environment to develop modern fish marketing system in place of traditional marketing system. There are many factors responsible for the development of the modern fish marketing system over the traditional fish marketing of fish from Chilka, viz. use of motorized boats and large synthetic nets, demand of the fish in the regional and national markets, development of the transportation and communication facilities, increase in the demand of the fish in the export markets. Over the period of time, the number of the intermediaries increases with the entry of the markets agencies like exporters, processors. They require an assured and regular supply of fish leading to change in the relations between market agents and fishers. Therefore, the modern fish marketing system is based on the urban centric and large players in the market place with involvement of the better technologies.

The modern marketing channels are of the following six types as indicated below. The fishers, commission agents, traders, wholesalers, retailers were the major players in the modern marketing

channels. The market channels typical for the export and urban marketing are presented in Figures 4.40 and 4.41 respectively.

Channel I	Producer – Commission Agent – Trader – Wholesaler – Retailer – Consumer
Channel II	Producer – Auctioneer – Wholesaler – Retailer – Consumer
Channel III	Producer – Auctioneer – Trader – Retailer – Consumer
Channel IV	Producer – Commission Agent – Wholesaler – Trader – Retailer – Consumer
Channel V	Producer – Commission Agent – Wholesaler – Middleman – Retailer – Consumer
Channel VI	Producer – Commission Agent – Retailer – Consumer

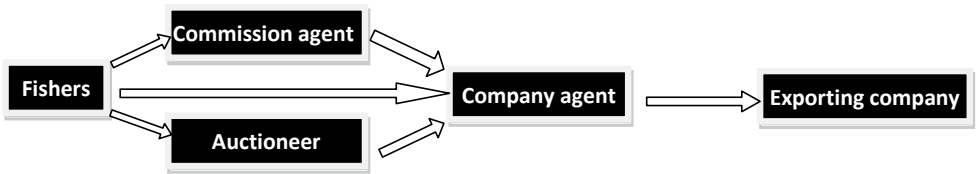


Figure 4.44 Export Channel of Fish in Chilka

Figure 4.45 Urban Market Channel in Chilka Lake

Market intermediaries

The fishes of Chilka (about 100 commercial varieties) cater to the need of the rural, urban, regional and export markets. Therefore, in the modern fish marketing channels a large number of the fish marketing agents are involved that includes commission agents, traders, carriers and transporters, truck and bullock cart operators, peelers and shrimp head-removers and processors, exporters and processing plant operators, ice makers, sellers and crushers, crate and basket makers, insulated systems manufacturers and sellers found at important fish landing centres. The fishes from Chilka can be categorized as fish, prawn and crab and the agencies deal exclusively with any one of the product. The best quality of them are exported by export houses; the middle category goes to the large regional markets like Kolkata, Chennai; the next best quality to Bhubaneswar and Brahmapur markets; and the most inferior qualities to rural markets of Orissa. Therefore, multiple operators are involved in the modern marketing channels of Chilka

fisheries. Three categories of buyers of fish, prawn and crab are predominant in the marketing system, viz, Commission agents, Independent traders and Company agents.

Commission Agent / Trader

The commission agents act on behalf of any particular company to purchase fish, prawn and crab from individual fishers or small traders. They extend credit or inputs to the fishermen in return for their catches. The advantage to the company in using an intermediary like the commission agent is that it does not need to employ permanent labourers and pay salary for the purpose. For the fishers, the advantage with the commission agent is that they take their product immediately after landing, thereby relieving them of all responsibility of carrying it to a distant market.

The independent agents act as independent entities without being tagged to any company with greater flexibility in operations. They too extend interest-free loans to the fishermen in return for their produce from the fishers. The company agents differed from commission agents in that they are salaried employees of the company. The companies keep a regular employee to procure fish from important landing centres to ensure consistency, good quality, low cost of procurement and promptness.

The commission agents, independent traders or company agents operate under either permanent or temporary sheds near landing centers of Chilka. These centers are used for collecting, auctioning, sorting and packing of the fishes. The traders have four options - selling to the retailers, selling to consumers, packing and sending to regional market and sending to the exporting company. In most of the cases, the fishermen are paid in cash immediately. In some cases, they are paid in a week's time. In case of sale to direct consumers as well as retailers (both male and women operators), the traders keep Rs 5 per kg as commission and the realized price are given to the fishers. In case of disposal to export houses, the commission agents keep at least 10% of the price of the fishes. In most cases, they procure at the negotiated price with fishers and send them to the regional markets through packing and transportations.

Table 4.71 Marketing Costs of Commission Agents at Chilka Lake

Item	Cost (Rs/kg)
Transportation	5.00
Packing	4.20
Ice	1.50
Loading/Unloading	0.02
Other items	0.50
Total	**11.22**

Source: Primary Survey, 2008

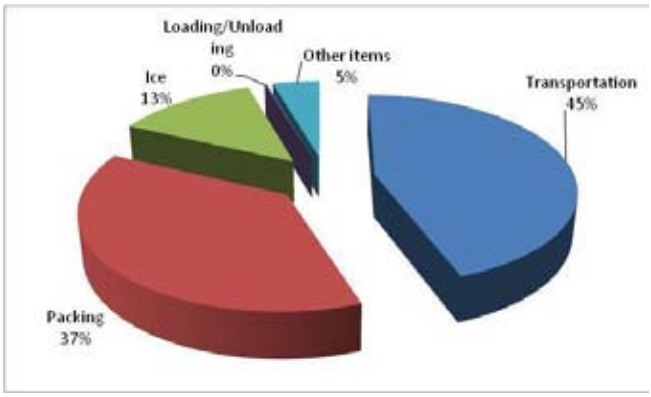


Figure 4.46 Distribution of Marketing Cost of Commission Agents at Chilka Lake

Fisherman

Most of the motorized boat owners receive 'advances' ranging from Rs 30,000 to Rs 100,000 from the commission agents (who in turn receive advances from the processing plants or wholesalers in the regional markets). Only a tiny fraction of the owners tend to remain independent. The artisanal / motorized boat operators also have access to advances ranging from Rs 25,000 to Rs 50,000. The money that a boat owner receives as advance from the trader is used to provide advances to the crew and also for repair/maintenance/replacement of engine, boat and nets. Working capital needs include cost of fuel and ice for each trip and are estimated to be about Rs 500-750 per trip by a motorized boat. The returns from a trip is shared equally among the boat owner, motor owner and the crew members, after deducting the costs incurred in the trip.

Table 4.72 Cost of Fishing per Trip in Chilka Lake

Item	Cost (Rs)
Diesel (7 litres)	245
Food (6 people)	180
Ice (35 kg)	50
Net repair	30
Boat repair	50
Other cost	20
Total cost	**575**

Source: Primary Survey, 2008

Table 4.73 Returns from a Trip in Chilka Lake

Item	Amount (Rs)
Average fish quantity in kg	35

Price per kg	45
Total cost	575
Gross return	1575
Net return	1000
Share of boat and motor owner	250
Share of individual crew members	125

Source: Primary Survey, 2008

Auctioneer

Auctioneers are important functionaries as immediate link between the fishers and market. They are located in the major landing centres of the Chilka as fishers (primarily independent fishers without any credit obligations) deliver the catch to the auctioneers to auction them to the retailers or consumers. The auctioneers do the function of the sorting and grading with support of fishers before auctioning them to the retailers. A small amount of the good quality fishes are purchased directly by the consumers. The traders involved in long distance transportation of fishes also take the fish directly from auctioneers. The auctioneers charge Rs 1 per kg of fish auctioned as their commission.

Table 4.74 Marketing Costs of Auctioneers at Chilka Lake

Item	Cost (Rs/kg)
Loading/unloading	0.10
Labour	0.10
Other items	0.05
Total	**0.25**

Source: Primary Survey, 2008

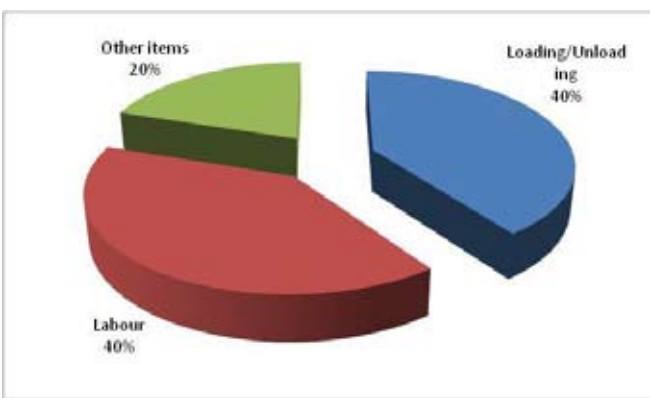


Figure 4.47 Distribution of Marketing Cost of Auctioneers at Chilka Lake

Wholesaler

Wholesalers are located mostly in the large urban centres of Bhubaneswar, Cuttack, Brahmapur, Rourkela and Sambalpur. They purchase fish either from commission agents or traders located in the landing centres of Chilka. Few of the wholesalers are also located in the urban centres located in Chilka Lake like Balugaon, Rambha and Kalupadaghat. The wholesalers located in the Chilka areas are mostly specialized in fish, prawn or crab. The wholesalers dealing with the prawn store the prawns in ice-packed thermocol packet. The crab traders use specialized bamboo baskets to store the crabs. These wholesalers also act as large retailers as they sell the fishes to consumers directly in few cases.

Table 4.75 Marketing Costs of Wholesalers at Chilka Lake

Item	Cost (Rs/kg)
Ice	1.50
Loading/Unloading	1.00
Weighing	0.50
Cleaning	0.50
Packing	0.50
Storage	0.10
Other items	0.40
Total	**4.50**

Source: Primary Survey, 2008

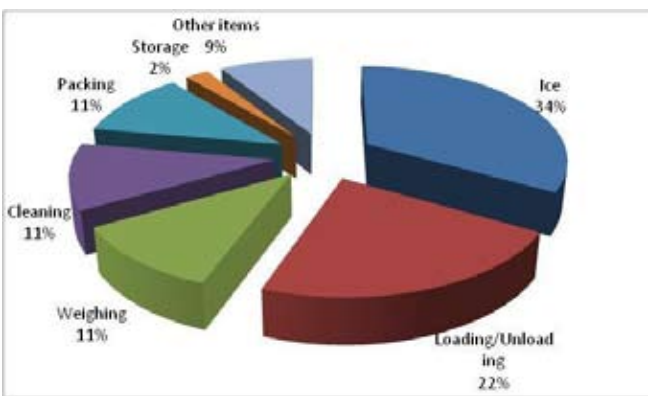


Figure 4.48 Distribution of Marketing Cost of Wholesalers at Chilka Lake

Retailer

Retailers are located in the rural as well as urban centres. Both male and female operators are involved in fish retailing activities equally. Many retailers connect directly to the consumers by carrying the fish by train and bus from landing centres to sell them directly in the retail markets. They operate with about 30-40 kg of fish per day. Some of the male retailers are also operating in the wholesale markets.

Table 4.76 Marketing Costs of Retailers at Chilka Lake

Item	Cost (Rs/kg)
Ice	2.50
Transportation	2.50
Personal expenses	2.00
Loading/Unloading	0.03
Other items	1.00
Total	**8.03**

Source: Primary Survey, 2008

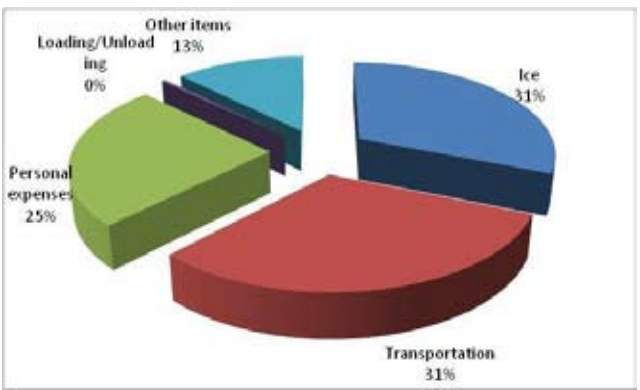


Figure 4.49 Distribution of Marketing Cost of Retailers at Chilka Lake

Price spread of High Value Fishes

There are two main marketing channels in Chilka lake fish market, one each for medium value prawn for urban markets of the state (Channel I) and high value fishes to Kolkata Channel II). In order to analyze the market performance, price spread analysis was done for these two channels as representatives of the diverse products of Chilka Lake fish marketing system. Fishermen receive higher share of consumer's rupee in Channel I due to shorter length of the channel even though the channel is for

medium value prawns as compared to Channel II for high value fish. The analysis also shows that prawns cost the wholesalers and retailers a higher percentage in terms of marketing costs when compared to fish.

Table 4.77 Price spread for Prawn and High Value Fish at Chilka Lake Fish Market

(Rs/kg)

Particulars	Channel I	Channel II
Prices received by Fisherman	102.78 (73.40)	153.78 (69.90)
Costs incurred by Commission agent	1.50 (1.10)	1.50 (0.70)
Margin	5.50 (3.90)	7.50 (3.40)
Trader's purchase price	109.78 (78.40)	162.78 (74.00)
Costs incurred	11.22 (8.00)	16.22 (7.40)
Margin	4.50 (3.20)	6.50 (3.00)
Agent's purchase price	-	185.50 (84.30)
Costs incurred	-	6.50 (3.00)
Margin	-	8.00 (3.60)
Wholesaler's purchase price	125.50 (89.60)	200.00 (90.90)
Costs incurred	4.50 (3.20)	1.50 (0.70)
Margin	2.50 (1.80)	7.50 (3.40)
Retailer's purchase price	132.50 (94.60)	209.00 (95.00)
Costs incurred	4.00 (2.90)	2.50 (1.10)
Margin	3.50 (2.50)	8.50 (3.90)
Price paid by consumer	**140.00** **(100.00)**	**220.00** **(100.00)**

Figures in parentheses indicate percentages to consumer price

Marketing Efficiency

It is found that the price of the fishes vary from Rs 50 to Rs 220 or even higher depending upon species, size and quality of the fishes. The traditional channels are most efficient as they are short, simple and quick without much involvement of any processing or other functions. On the other hand, the modern fish marketing system can also be considered as efficient as the products are sent quickly to the destinations without much loss in the quality and value, as these marketing channels consume only 25-30% of the consumer rupee. Here, scale economy is achieved as a result of which, there used to be small margin and large volume of trade. Moreover, the increase in demand at urban markets, presence of multiple players and stiff competition among the traders are also making the system efficient. But in the process, the players in the traditional channels are losing out as they are unable to compete with the modern traders. Traditional market functionaries are specialized themselves in the low value fresh fish which were of little demand in the urban centers.

Table 4.78 Marketing Efficiency at Chilka Lake Fish Market

Item	Channel I	Channel II
Consumer's price (Rs/kg)	140.00	220.00
Fisherman's price (Rs/kg)	102.80	153.80
Marketing cost + margin (Rs/kg)	37.20	66.20
Marketing expenditure as % of consumer's price	26.60	30.10
Marketing efficiency	**73.40**	**69.90**

4.2.14 Kolleru Lake

Kolleru Lake is synonymous with the culture of Indian Major Carps and this area is also known as the 'Carp Pocket of India'. One of the major secrets behind the identity is due to the creation of proper channel of marketing without which every effort of fishers, farmers and scientists to enhance productivity would have gone in vain. It is observed that the existence of proper marketing channels has brought handsome income to the producers which helped in the establishment and expansion of Kolleru Carp Culture area.

Almost 100% of fish that is produced in Andhra Pradesh in general and Kolleru area in particular is transported to West Bengal (Howrah), Bihar, Assam and other North Eastern states of India. Fish farmers over the years have brought down 'Composite Fish Culture' from six species combination to two species combination of catla and rohu only for profitable marketing. In India, Rohu and Catla are commonly preferred by consumers. Among the Indian Major Carps, Rohu is the most expensive, while Mrigal is the cheapest in the markets. Mrigal has demand only in Assam.

The marketing channels of fish at Kolleru Lake were studied and are depicted below:

Marketing Channels within the state (5% of fish)	
Channel I	Producers – Consumers (negligible quantities)
Channel II	Producers – Wholesalers – Retailers – Consumers (2%)
Channel III	Producers – Wholesalers – Vendors – Consumers (2%)
Channel IV	Producers – Retailers – Consumers (< 1%)
Marketing Channels for fish transported to other states (95% of fish)	
Channel V	Producers – Local traders – Other states (Tamil Nadu, Kerala, Karnataka, Maharashtra)
Channel VI	Producers – Brokers – Traders (Packers) – Other states (West Bengal, Bihar, Assam, Tripura and Nepal)
Channel VII	Producers – Local traders – Traders (Packers) – Other states (West Bengal, Bihar, Assam, Tripura and Nepal)
Channel VIII	Producers – Brokers – Traders (Packers) – Local traders – Other states (Tamil Nadu, Kerala, Karnataka, Maharashtra)

It is observed that only 5% of fish from Kolleru Lake region was marketed within the state of Andhra Pradesh, majority of the fish (95%) is marketed outside the state.

Market Intermediaries

Producer/ Fish Farmer

A pond owner with fish grown to optimum size for marketing will be enquiring for the prevailing market prices. The farmer uses the services of a 'broker' for negotiating the price between him and a trader. The producer demands the price based on the cost of production (Feed, Lease, Harvesting, Chemicals, etc.) with at least Rs 2 -5 per kg as profit. The cost of production for Catla and Rohu amounts to Rs 38 (Table 4.79) and for Cat fish it amounts to Rs 30. The price demanded by farmer is based on price of fish prevailing at Howrah market on the day of negotiation.

Table 4.79 Cost of Production of IMC in Kolleru Lake area

(Rs/kg)

Item	Cost (Rs/kg)
Pond Lease	7.50
Feed	21.00
Harvest	0.20
Gear	0.16

Seed	2.00
Feed Bags & Poles	0.50
Watch & Ward	0.16
Electricity	0.20
Chemicals & Fertilizers	1.50
Sanitizers	1.00
Agent's Commission	0.10
Total cost	**34.32**

Source: Primary Survey, 2008

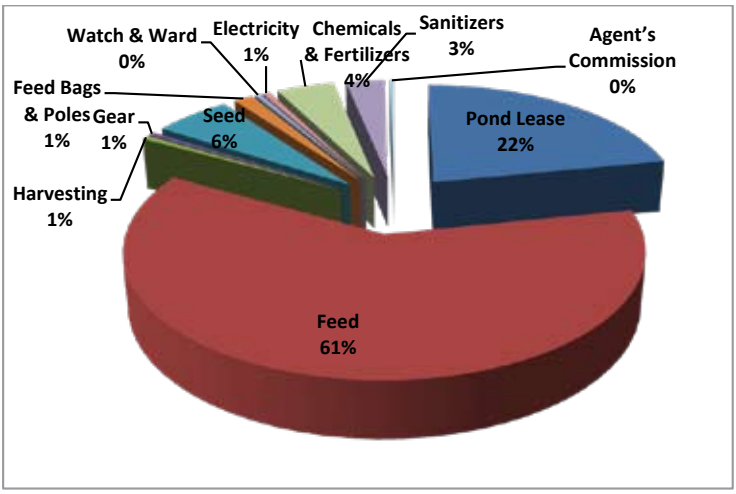


Figure 4.50 Percent Contribution of Factors in IMC Culture in Kolleru Lake area

Once the price for fish is agreed upon, and the harvest date is fixed, the farmer is asked to follow a protocol for proper conditioning of fish during transport that includes the following:

(i) Feeding is to be stopped one or two days before;
(ii) Pond (bottom) water level has to be reduced to facilitate netting operation;
(iii) Fish stock is to be moved by drag netting from one end of the pond to the other.

After this protocol, usually the Trader's representative and the Broker (farmer's representative) jointly examine a fish sample from the pond and dissect one or two fishes to ensure that they have empty guts. If they show any feed or plankton inside the digestive tract, the entire process of harvesting procedure will be discontinued and postponed for a few days. Therefore, 'condition of fish is given the utmost importance with a view to supply good quality fish to the consumer. Generally, the preferred size of Catla is more than 2 kg and Rohu more than 1 kg for receiving good price at the destination markets.

The farmer is responsible for harvesting fish from the ponds and landing fish on to the shore. The number of persons to be engaged for harvest is decided on the size and width (shape) of the pond. A 5-6 ha size pond requires nearly 30 labourers. For the sake of netting to determine the 'condition factor', the same pond requires only half the number of labourers. For seining fish population in the pond, one or more 'net pieces' (40-50 m width a piece) are knitted together just before the harvest. For each piece of net, Rs 80 is paid per day as rent. Each person engaged for harvest is paid Rs 80-100 per day. All these expenses are to be borne by the farmer (Producer).

If the farmer by himself wants to export the fish to any market (for example, Howrah market), in addition to cost of harvesting he has to bear the additional costs of lorry hire, plastic crates, crushed ice and packers' charges. Here, he can save the profit margins accruing to broker and trader.

Broker/Middleman

The broker is the liaison between the producers and the traders/transporters/exporters and negotiates the price between them. A broker extends services to a cluster of villages. In Kolleru area, about 85-90% of the fish farmers sell the fish at the farm gate / pond site to the trader/exporter through brokers. The broker is answerable to both trader for the expected quality of fish and to the farmer for the total cash payment for the quantity of fish sold. For this service, the Broker receives a commission of Rs 500 per truck load of fish from the trader and Rs 100 per ton of fish from the farmer. A trader can entertain at a time any number of brokers for arranging fishes according to the size of his business. In the same fashion, a broker can also do business with more than one trader.

There are nearly 120 brokers in the Kolleru Lake area. They stand as a guarantee for the money to the farmer. The money they earn is used for transport (petrol), telephone, etc. He brings the vehicle, containers, ice, etc. from the trader along with the representatives of the trader to the farm site.

Trader/Transporter

Traders buy fish from farmers through the services of brokers. The Trader arranges at his cost crushed ice packed in plastic crates, fish weighing machine, etc. loaded into lorry so as to reach the harvest pond well in advance, so that the fish is packed in ice without any time lag immediately after harvest. The farmer gives 5% of the catch as rebate to trader. The trader in turn transfers this rebate to wholesaler at destination market (mainly Howrah).

While pond seining is in progress, arrangements are made on the pond site itself to receive the fish for grading species-wise and size-wise. If there is no road access for the truck to reach the pond site, tractor or boats are engaged to carry fish from pond to the nearby place where truck is parked.

The trader employs semi-skilled labourers known as 'Packers'. A person who maintains the group of Packers is the 'Head Packer' and he is paid Rs 500 per truck, in addition to the packing charge and other labor charges. Head Packer is also involved in deciding the 'fish condition' before actual harvest begins.

The trader repacks the material as per size and species at the processing plant/packing shed. He fixes the price based on the expenditure incurred on the transport vehicle for visiting the farmer's pond site, cost of ice, brokerage charges and labour for grading and packing. The marketing costs of the traders to send fish to the destination markets (Howrah and Assam, respectively) are given in Tables 4.80 and 4.81.

Table 4.80 Cost of Transportation of Fish from Kolleru Lake Area to Howrah Market

Item	Cost (Rs/kg)
Broker's Commission	0.50
Thermocol Box	1.91
Market Cess	0.21
Ice	2.00
Packing & Grading	0.30
Transportation	5.35
Insulation Materials & Implements	0.40
Incidental Charges	0.12
Howrah Agent's Commission	0.12
Miscellaneous	0.10
Total cost	**10.99**
Price received by trader	**60-65**

Source: Primary Survey, 2008

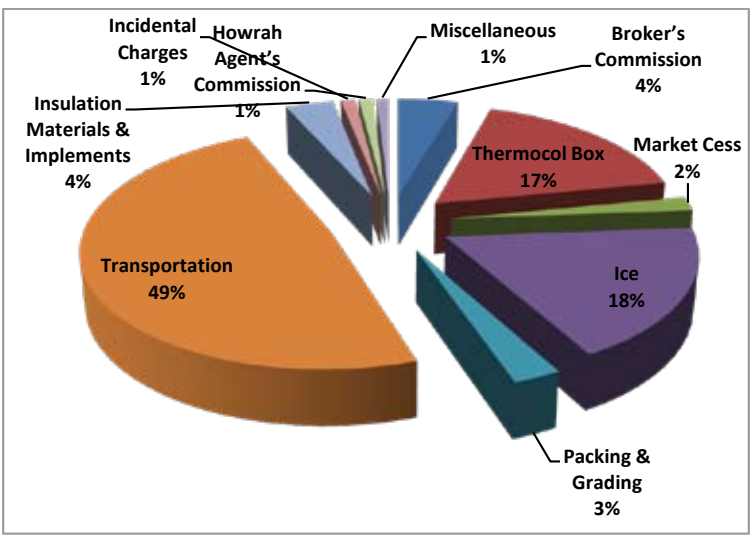


Figure 4.51 Percent Contribution of Various Components of Cost in Transportation of Fish from Kolleru Lake to Howrah Market

Table 4.81 Cost of Transportation of Fish from Kolleru Lake Area to Assam Market

Item	Cost (Rs/kg)
Broker's Commission	0.50
Thermocol Box	2.63
Market Cess	0.21
Ice	2.00
Packing & Grading	0.30
Transportation	7.35
Insulation Materials & Implements	0.40
Incidental Charges	0.22
Assam Entry Tax	0.20
Miscellaneous	0.10
Total cost	**13.91**
Price received by trader	**60-65**

Source: Primary Survey, 2008

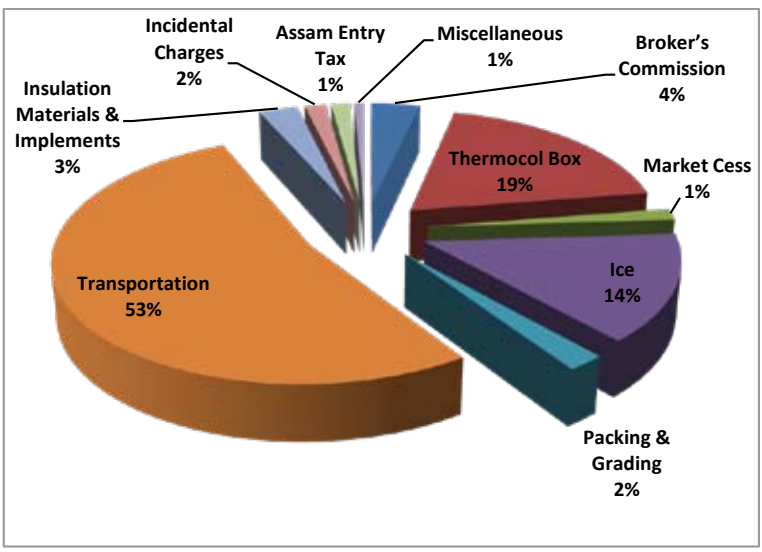


Figure 4.52 Percent Contribution of Various Components of Cost in Transportation of Fish from Kolleru Lake to Assam Market

Indian Major Carps after harvest on a pond site weighed, iced, packed and loaded to trucks in Kolleru lake area

A progressive aqua farmer showing his catch at his pond site in Kolleru lake area at Bhimavaram

Representatives of both the farmer and trader at the pond site during fish loading onto trucks in Kolleru lake area

Fish being harvested and brought to the pond bund for sale to the trader/transporter at Kolleru lake carp culture area

A truck is receiving the fish immediately after harvest and icing at a pond site in Kolleru lake area

Sufficient crushed ice is brought to pond sites during harvest for initial icing of fish in Kolleru lake carp culture region

Panoramic view of a shrimp farm at Krishna district, Andhra Pradesh

Project Team members showing the Pangasius fish cultured as an alternative to shrimp in East Godhavari and Krishna districts

Price Spread

The price spread for Catla, Rohu and Murrels in pond culture is given in Table 4.82. For the same marketing channel fishermen's share of consumer's rupee is higher for Catla than Rohu. This is despite the fact that the marketing costs and final price for both species are the same. Subsequently, the margins charged by retailers are lesser for Catla than for Rohu. Fisherman's share of consumer's rupee is highest for high value species (live Murrels).

Table 4.82 Price Spread for Catla, Rohu and Murrels in Kolleru Lake Area

(Rs/kg)

Particulars	Catla	Rohu	Live Murrels
Prices received by Fish farmer	42.00 (60.00)	40.00 (57.14)	80.00 (48.48)
Costs incurred by Financier	2.00 (2.86)	2.00 (2.86)	10.00 (6.06)
Margin	3.00 (4.29)	3.00 (4.29)	33.00 (20.00)
Wholesaler's purchase price	47.00 (67.14)	45.00 (64.29)	123.00 (74.55)
Costs incurred	2.00 (2.86)	2.00 (2.86)	3.00 (1.82)
Margin	3.00 (4.29)	3.00 (4.29)	9.00 (5.45)
Retailer's purchase price	52.00 (74.29)	50.00 (71.43)	135.00 (81.82)
Costs incurred	8.00 (11.43)	8.00 (11.43)	10.00 (6.06)
Margin	10.00 (14.29)	12.00 (17.14)	20.00 (12.12)
Price paid by Consumer	**70.00** **(100.00)**	**70.00** **(100.00)**	**165.00** **(100.00)**

Figures in parentheses indicate percentages to consumer price

The price spread analysis for tiger shrimps and freshwater prawn is given in Table 4.83.

Table 4.83 Price Spread for Tiger Shrimp and Freshwater Prawn in Andhra Pradesh

(Rs/kg)

Particulars	Tiger Shrimp	Freshwater Prawn
Prices received by Fish farmer	95.00 (55.88)	85.00 (53.13)

Costs incurred by Financier	10.00 (5.88)	10.00 (6.25)
Margin	20.00 (11.76)	15.00 (9.38)
Wholesaler's purchase price	125.00 (73.53)	110.00 (68.75)
Costs incurred	5.00 (2.94)	5.00 (3.13)
Margin	10.00 (5.88)	10.00 (6.25)
Retailer's purchase price	140.00 (82.35)	125.00 (78.13)
Costs incurred	10.00 (5.88)	10.00 (6.25)
Margin	20.00 (11.76)	25.00 (15.63)
Price paid by Consumer	**170.00** **(100.00)**	**160.00** **(100.00)**

Figures in parentheses indicate percentages to consumer price

4.2.15 Narsapur

The marketing of marine fish landed at Narsapur (West Godavari district) was studied. The marketing channels of fish captured at this landing centre are given below.

Marketing channels for Marine fishes landed at Narsapur	
Channel I	Producers – Auctioneers – Wholesalers – Retailers – Consumers (7%)
Channel II	Producers – Auctioneers – Retailers – Consumers (14%)
Channel III	Producers – Auctioneers – Vendors – Consumers (18%)
Channel IV	Producers – Auctioneers – Commission agents – Retailers – Consumers (14%)
Channel V	Producers – Auctioneers – Commission agents – Vendors – Consumers (14%)
Channel VI	Producers – Auctioneers – Commission agents – Export units (18%)
Channel VII	Producers – Auctioneers – Export units (15%)

Note: Percentages in parentheses denote percentage of total fish entering each channel

Price spread

The price spread analysis for marine fish landed at Narsapur in West Godavari district is given in Table 4.84. The marketing costs for producers are highest for high value species. Subsequently the margins charged by producers are highest for low value species. This results in the same pattern of higher share of consumer's rupee for high value species in the case of producers.

Table 4.84 Price Spread for Selected Marine Fish Species at Narsapur Fish Landing Centre

(Rs/kg)

Particulars	Sardine	Mackerel	Seer fish	White Pomfret	Tuna
Prices received by Fish farmer	15.00 (33.33)	35.00 (43.75)	110.00 (61.11)	125.00 (63.13)	35.00 (46.05)
Costs incurred by Financier	4.00 (8.89)	8.00 (10.00)	10.00 (5.56)	10.00 (5.05)	4.00 (5.26)
Margin	3.00 (6.67)	8.00 (10.00)	15.00 (8.33)	15.00 (7.58)	4.00 (5.26)
Wholesaler's purchase price	22.00 (48.89)	51.00 (63.75)	135.00 (75.00)	150.00 (75.76)	43.00 (56.58)
Costs incurred	2.00 (4.44)	2.00 (2.50)	3.00 (1.67)	10.00 (5.05)	3.00 (3.95)
Margin	2.00 (4.44)	3.00 (3.75)	12.00 (6.67)	10.00 (5.05)	4.00 (5.26)
Retailer's purchase price	26.00 (57.78)	56.00 (70.00)	150.00 (83.33)	170.00 (85.86)	50.00 (56.58)
Costs incurred	8.00 (17.78)	8.00 (10.00)	8.00 (4.44)	8.00 (4.04)	8.00 (10.53)
Margin	11.00 (24.44)	16.00 (20.00)	22.00 (12.22)	20.00 (10.10)	18.00 (23.68)
Price paid by Consumer	**45.00 (100.00)**	**80.00 (100.00)**	**180.00 (100.00)**	**198.00 (100.00)**	**76.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

4.2.16 Telengana

The marketing of fish captured from tanks in Telengana district was studied. The marketing channels of fish in this region are given below.

Marketing channels for Freshwater Fish captured from tanks in Telengana	
Channel I	Producers (Fishermen Co-operative Societies) – Consumers
Channel II	Producers – Wholesalers-cum-Commission agents – Consumers (< 1%)
Channel III	Producers – Retailers – Consumers (5%)
Channel IV	Producers – Vendors – Consumers (8%)
Channel V	Producers – Wholesalers-cum-Commission agents – Retailers – Consumers (5%)

Channel VI	Producers – Wholesalers-cum-Commission agents – Vendors – Consumers (2%)
Channel VII	Producers – Middlemen/Financiers – Wholesalers-cum-Commission agents – Retailers – Consumers (42%)
Channel VIII	Producers – Middlemen/Financiers – Wholesalers-cum-Commission agents – Vendors – Consumers (37%)

Note: Percentages in parentheses denote percentage of total fish entering each channel

Price spread

The price spread for catla and rohu in reservoir (tank capture) fisheries is given in Table 4.85. The share of each intermediary in consumer's price is the same irrespective of species.

Table 4.85 Price Spread for Catla and Rohu from Tank Capture Fisheries in Telengana

(Rs/kg)

Particulars	Catla	Rohu
Prices received by Fish farmer	18.00 (27.69)	18.00 (27.69)
Costs incurred by Financier	8.00 (12.31)	8.00 (12.31)
Margin	10.00 (15.38)	10.00 (15.38)
Wholesaler's purchase price	36.00 (55.38)	36.00 (55.38)
Costs incurred	2.00 (3.08)	2.00 (3.08)
Margin	2.00 (3.08)	2.00 (3.08)
Retailer's purchase price	40.00 (61.54)	40.00 (61.54)
Costs incurred	8.00 (12.31)	8.00 (12.31)
Margin	17.00 (26.15)	17.00 (26.15)
Price paid by Consumer	**65.00 (100.00)**	**65.00 (100.00)**

Figures in parentheses indicate percentages to consumer price

It was evident from the all the price spread analysis that fishermen's share in consumer's rupee was highest for high value species and for marketing channels with least number of intermediaries. The length of marketing channel had more pronounced effects on consumer price and thereby, fishermen's share in the case of high value species as compared to low and medium value species. This probably reflects the practice that consumers are willing to pay more for high value species. The same consumer will not buy low and medium value fish at very high prices.

It was observed that prices increased with size across all species selected for the study. The marketing costs of intermediaries remained almost similar across type of fish, size and channel, as the cost of handling fish was the same for all species. The highest price spread was observed for the longest marketing channel.

The margins charged by retailers and vendors varied according to value of species. Higher margins were charged for high value species as compared to low and medium value species. Margins as percentage of consumer's rupee showed the reverse trend. In percentage terms, higher margins were charged for low value species than for high value species. The terminal intermediary had the most flexibility in charging margins, since he/she could gauge the consumer's demand and change the margin accordingly.

4.3 PRICE ANALYSIS

4.3.1 Introduction

The domestic marketing system of fishery products in the country has long been neglected due to various reasons. It deserves its due share primarily as, around 85 per cent of the total production is consumed within the country. It is therefore, important to develop a strong network of efficient marketing system within the country so that a substantial chunk of country's fish production is efficiently managed and delivered to the consuming masses, while not negating the due share of the fishermen.

Essentially, an efficient marketing system is one where there is a perfect market integration and full price transmission, with price adjustment instantaneous to changes from within or outside the system. Such a system would enable the producers, middlemen and consumers in the marketing chain to derive maximum gains. It would also help in elimination of unprofitable arbitrage and isolation of spatially differentiated markets and would ensure that efficient allocation of resources across space and time is achieved.

In the fish marketing system, price movements in different markets depend to a large extent on the cross market movement of available catch, which in turn, is governed by the demand and supply factors. The extent of price transmission from one market to the other and its direction are the important aspects to be looked into, as these would provide valuable information on the degree of integration, and in turn, the efficiency of these markets.

4.3.2 Data and Methodology

For the study, monthly price data for a ten-year period from January, 1998 to December, 2007 were collected on important marine fish species viz. mackerel, sardine, pomfret and shrimp from the major coastal states of India. The states covered were Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu and West Bengal. The retail markets around major landing centres in each of these states were selected for this purpose. The data were collected through regular and systematic primary surveys conducted by the Central Marine Fisheries Research Institute (CMFRI), Cochin.

The degree of integration between various markets can be understood from the values of elasticity of price transmission between these markets. The elasticity estimates measure the extent of transmission of price changes from one market to the other during a given period of time. If the value of elasticity is closer to unity, it suggests a high permeability of price fluctuations between the markets, obviously an indicator of high levels of integration. The long term elasticities of price transmission between the markets were obtained using a regression approach. A co-integration framework was applied in case of non-stationary price series.

4.3.3 Market Integration for Major Fish Species

The degree of price integration and transmission between major markets across the coastal states of India for important marine fish species were determined and have been presented in this section. The results have been discussed separately species-wise, as the market dynamics are different for each of them.

4.3.3.1Mackerel

Mackerel is a pelagic scombroid shoaling fish, the bulk of which comes from the west coast of India, between Cape Comorine and Ratnagiri. The contribution from the east coast of India (Tamil Nadu, Andhra Pradesh and Orissa) is relatively less. The past catch data shows that the annual mackerel catch in the total marine landings in India was of the order of 8 per cent. A major share of this catch is consumed domestically, barring limited exports to the Middle East countries. As in any other fish species, mackerel catch is also seasonal, the fishing season, starts in August and lasts till February and sometime extending till March in the northern zone (Mangalore to Ratnagiri). Due the seasonal nature, the mackerel prices vary considerably across seasons and markets.

Table 4.86 Elasticity of Price Transmission between Various Domestic Markets for Mackerel

Markets	WB	GJ	TN	AP	OR	MH	KL
KA	$0.19_{\rightarrow}$	$0.28_{\rightarrow}$	$0.51_{\rightarrow}$	NI	NI	NI	$0.43_{\leftarrow}$
WB		$0.44_{\rightarrow}$	$0.81_{\rightarrow}$	NI	NI	NI	$0.79_{\leftarrow}$

GJ	NI	NI	NI	NI	$0.42_{\leftarrow}$
TN		$0.92_{\rightarrow}$	NI	NI	$0.95_{\leftarrow}$
AP			$0.87_{\leftarrow}$	$0.66_{\leftarrow}$	NI
OR				$0.58_{\leftarrow}$	NI
MH					NI

Notes: NI denotes lack of price integration
The arrows in the subscripts indicate the dominant direction of price transmission between markets.
KA: Karnataka; WB: West Bengal; GJ: Gujarat; TN: Tamil Nadu; AP: Andhra Pradesh; OR: Orissa; MH: Maharashtra.

The result of the market integration analysis for mackerel is presented in Table 4.86. Among all, 13 pairs were found to be integrated with a certain degree of price transmission from one to the other, while no integration was observed for others. The highest elasticity of price transmission was observed in Kerala-Tamil Nadu market pair with 95 per cent of the price changes in Kerala market getting transmitted to Tamil Nadu market. Such a response could be due to movement of a large bulk of mackerel lots between these two markets. The direction of price transmission was from Kerala to Tamil Nadu, as indicated by the arrow corresponding to the pair, implying that Kerala prices dictated the Tamil Nadu market prices.

A high degree of price transmission was also observed between Orissa-Andhra Pradesh (0.87) and West Bengal-Tamil Nadu (0.81). The direction of price transmission from Orissa to Andhra Pradesh was contrary to the expectation as Andhra Pradesh is the larger market of mackerel. It is probably due to the monopsonistic ability of the Orissa market by virtue of its large market share. A price transmission of 79 per cent was observed between Kerala and West Bengal, which is also quite high.

The lack of integration between many markets suggests that the prices in these pairs are moving independent of each other for a consistently long period with limited permeability from one to other. This can be either due to negligible movement of goods between them leading to isolation from one another or due to imperfect flow of price information between these markets eventually resulting in unrelated price movements. It is an irony that even some of the closer markets are not integrated due to various reasons and is a major cause of loss of efficiency in the entire marketing system.

4.3.3.2Sardine

Sardine is also a shoaling fish species which occurs both in the east and west coasts of India, with highest catches obtained from Kerala, Karnataka, Maharashtra and Goa coasts. The commercial fishing of sardine extends from July to March, with maximum intensity during October to January. In India, a major bulk of the catch is disposed off in the fresh condition mainly in the domestic market. The price varied from Rs 20/kg to 40/kg in the year 2007. A small share of it is cured and dried to be exported to countries like Sri Lanka. It is also used to extract oil for the paint industry and for making fish meals.

The price integration between various markets of sardine was determined by analyzing the respective monthly price series from the year 1998 to 2007.

Table 4.87 Elasticity of Price Transmission between Various Domestic Markets for Sardine

Markets	GJ	TN	AP	OR	MH	KL
KA	$0.96_{\rightarrow}$	$0.94_{\rightarrow}$	$0.58_{\rightarrow}$	$0.31_{\rightarrow}$	NI	NI
GJ		NI	$0.83_{\leftarrow}$	$0.73_{\rightarrow}$	NI	NI
TN			$0.88_{\leftarrow}$	NI	NI	$0.90_{\leftarrow}$
AP				$0.57_{\leftarrow}$	NI	$0.61_{\leftarrow}$
OR					NI	NI
MH						NI

Notes: NI denotes lack of price integration
The arrows in the subscripts indicate the dominant direction of price transmission between markets.
KA: Karnataka; WB: West Bengal; GJ: Gujarat; TN: Tamil Nadu; AP: Andhra Pradesh; OR: Orissa; MH: Maharashtra.

The market pairs, viz. Karnataka-Gujarat, Karnataka-Tamil Nadu, Andhra Pradesh-Gujarat, Andhra Pradesh-Tamil Nadu and Gujarat-Orissa were the major market pairs observed to be in long run equilibrium in terms of price movements of sardine among others. Their respective long-run price transmission elasticities and direction of causation are presented in Table 4.87.

An almost complete pass through of price changes from the Karnataka market to Gujarat market, as indicated by the elasticity of 0.96 suggested that the law of one price holds true in this scenario. A determining reason for such a high price integration between the markets can possibly be the existence of big dry fish markets in both the states, for which sardine is a major raw material. These markets cater to the demand of the whole country for fish meal production and to the north-eastern states for consumption. The field studies have also pointed towards definite flow of consignments and price information about this important raw material fish species between these states. A High level of transmission was also observed between Karnataka and Tamil Nadu and Andhra Pradesh and Gujarat markets. Similar to that of mackerel, Orissa market dictated the sardine prices in the Andhra Pradesh market, in spite of the latter being a bigger market.

The Kerala and Tamil Nadu prices were found to be integrated with a high long-run elasticity of 0.90 while Kerala and Andhra Pradesh markets were also fairly integrated. The strong relationship between these markets could be due to the high preference of lower-income group in these states for sardine which resulted in large-scale exchange of consignments. Except the market pairs described above, all other market pairs were found to be not integrated and the prices in these markets moved independent of each other.

4.3.3.3Pomfret

Pomfret is one of the main groups of table fish in India. Though it occurs all along the coast of India, the main areas of its abundance are Bombay on the west coast and Orissa and West Bengal on the east coast. Pomfret is a premium priced commodity due to its high demand from the high-end consumers in Indian market. The price wedge between various domestic markets was pronounced here also with the retail prices varying between Rs 250/kg to Rs 300/kg in the Gujarat market while in West Bengal, the prices were in a lower range of Rs 140/kg and Rs 180/kg in the year 2007.

Table 4.88 Elasticity of Price Transmission between Various Domestic Markets for Pomfret

Markets	WB	GJ	TN	AP	OR	MH	KL
KA	0.27←	NI	NI	NI	0.23→	NI	NI
WB		NI	NI	NI	0.82→	NI	NI
GJ			1.10→	NI	NI	NI	0.34→
TN				NI	NI	NI	1.48←
AP					NI	NI	NI
OR						NI	NI
MH							NI

Notes: NI denotes lack of price integration
The arrows in the subscripts indicate the dominant direction of price transmission between markets.
KA: Karnataka; WB: West Bengal; GJ: Gujarat; TN: Tamil Nadu; AP: Andhra Pradesh; OR: Orissa; MH: Maharashtra.

Only a few markets were integrated in terms of price transmission in case of pomfret. The retail prices of pomfret prevailing in West Bengal and Karnataka markets were found to be in the long-run equilibrium with a price transmission elasticity of 0.27. Similarly, long-run equilibria were found prevailing among Karnataka-Orissa and West Bengal-Orissa market pairs. In both these cases, the price signals moved towards Orissa.

Between Gujarat and Tamil Nadu markets, a high price transmission elasticity of 1.10 was observed implying that, one percentage change in Gujarat will result in a greater than proportional change of 110 per cent in Tamil Nadu. Clearly there is an overreaction of the latter market prices to the changes in the former. A similar integration was obvious in Kerala-Tamil Nadu pair also with an even higher elasticity of 1.48. Such a high response is assumed to be because of the premium price status of pomfret which often leads to over reaction in price movements. The field survey showed that there was no physical flow of Pomfret between Gujarat and Tamil Nadu, while there existed an exchange between Kerala and Tamil Nadu. However, there were evidences that the price information was exchanged between these markets

earlier also. The Gujarat and Kerala markets were also integrated, but with a lesser elasticity of price transmission (0.34).

4.3.3.4Shrimp

The shrimp production in India constitutes around 15 per cent of the total world production with a substantial share belonging to *Penaeid* shrimp from the Maharashtra and Kerala coasts. *Penaeus monodon* commonly known as 'Jumbo tiger shrimp', is a highly demanded and priced commodity, a substantial share of which is exported to Japan and the European Union. However, with a recent stagnation in India's shrimp exports to the biggest market Japan, its demand in the domestic market is expected to rise.

The existence of wide price differentials between various domestic markets within the country reveals better prospects for up-scaling the intra-national trade of this commodity. In the year 2007, while a kilogram of shrimp in the Maharashtra market fetched as high as Rs 500, the average prices in Andhra Pradesh market were only Rs 200/kg and in Orissa, Rs 310/kg. In this background, information on the extent of price integration among these markets would prove quite handy in taking decisions on the domestic marketing strategies.

Table 4.89 Elasticity of Price Transmission between Various Domestic Markets for Shrimp

Markets	WB	GJ	TN	AP	OR	MH	KL
KA	NI	NI	$0.90^{*}_{\leftarrow}$	NI	NI	NI	NI
WB		$0.58^{*}_{\leftarrow}$	NI	NI	$0.81^{*}_{\rightarrow}$	NI	NI
GJ			NI	NI	$0.33^{*}_{\rightarrow}$	NI	NI
TN				NI	NI	NI	NI
AP					NI	NI	NI
OR						NI	NI
MH							NI

Notes: NI denotes lack of price integration
The arrows in the subscripts indicate the dominant direction of price transmission between markets.
KA: Karnataka; WB: West Bengal; GJ: Gujarat; TN: Tamil Nadu; AP: Andhra Pradesh; OR: Orissa; MH: Maharashtra.

The integration analysis has shown that a long-run equilibrium existed between the Orissa and West Bengal prices, with a price transmission elasticity of 0.81. This is assumed to be the result of large-scale movement of shrimp lots between these markets on account of their proximity. The fast exchange of price information also must have contributed to their integration. The direction of movement of price signals

was from West Bengal to Orissa market, the former being a much bigger market than the latter. Gujarat and West Bengal markets were also found integrated with around 58 per cent of the price changes in Gujarat getting transmitted to West Bengal. A comparison of the catch statistics in both the markets corroborated the direction of price movement. While Gujarat and Orissa markets were in long-term equilibrium with an elasticity of 0.33, Tamil Nadu and Karnataka markets were observed to be highly integrated with a near full pass over of price changes of the tune of 90 per cent.

Though being large landing centres, the Kerala and Maharashtra markets were not integrated with any other domestic markets. This could be perhaps due to their larger share in export than domestic markets. The Andhra Pradesh market, which produces mostly cultured shrimp, was also found to be not integrated with rest of the markets, as it transports most of its catch to Tamil Nadu for further dispatch to export markets. In nutshell, various domestic markets of shrimp in the country were found to be very poorly integrated.

Conclusions

The degree of integration and rate of price transmission have been found to differ according to species. Relatively higher integration has been observed in mackerel and sardine perhaps because of their affordability to all income classes, resulting in a wide consumer base. The price changes in mackerel market in Kerala have been found to be transmitted almost in entirety to Tamil Nadu, in spite of having short-term divergences. Prices in the Orissa and Andhra Pradesh markets have been found moving synchronously with high rate of price permeability, but with direction of price transmission contrary to the expected lines. The monopsonistic ability of Orissa market has been assumed to be the causative factor.

Similar to that of mackerel, a high level of price integration between the Kerala and Tamil Nadu markets has been observed in sardine also. The sardine prices of Karnataka and Gujarat markets have also been found to be moving together closely, as this species is the major raw material for their dry fish industry. The dictating power of Orissa market over the Andhra Pradesh market has been confirmed in sardine also, but with a lesser degree of price transmission.

An overreaction of price changes has been depicted between the Kerala-Tamil Nadu and Gujarat-Tamil Nadu market pairs in the case of Pomfret, supposedly due to its preferential and premium priced status.

Shrimp markets in West Bengal and Orissa have been found to be integrated with the existence of long-run price equilibrium. In the same token, Tamil Nadu and Karnataka prices have been found also moving in tandem. In spite of being large producers, the Kerala, Maharashtra and Andhra Pradesh shrimp markets have not been found integrated with any other domestic market, possibly because of their larger market share outside the country.

The study has unveiled the complicated price transmission mechanism between different fish markets in the country and has conveyed an important message of the necessity of price integration between the markets as a remedy to address the supply-side constraints existing in these markets. It has highlighted the lack of integration between important markets of major marine fish species and has suggested devising strategies to bring about greater integration between these markets, so that both the fishermen and the fish consuming community in the country are benefitted.

4.4 MARKETING SYSTEM IN MARGINAL AREAS / TRIBAL AREAS

4.4.1 Orissa

Marketing System of Small Artisanal

The pond aquaculture system in Orissa is characterized by highly fragmented and small holdings. The fishes from ponds are harvested in small quantities and sold at the local markets. The very small reservoirs of size less than 40 ha also disposed their harvest by the same system. The farmers sell the standing crop of the fishes directly to the traders who take the responsibility of harvesting and transporting at a predetermined price paid to the farmers. In few cases, the farmers themselves harvest the fish with the help of specialized fishing groups on payment of 2-3% of the value of the fish harvested. But in case of small fishes, the share paid to the harvesting groups go up to 40%. When the catch is very high the fishes are taken to wholesale markets. But, the practice of direct sale to the traders/retailers is the predominant marketing practice in this system.

Traditional Fish Marketing System (Chilka Lake)

The traditional marketing system emerged out of the attempt by the fisherwomen to sell a part of the fish caught by their family members in the neighbouring villages by carrying headloads through walk as a means of support to the fishing activities. The whole Telugu fishing community in Orissa (also called as '*Nolia*') are particularly adopted to these practices, where the women exchange their fish for rice, tamarind, vegetables, eggs or any other commodity. Over the period of time, these communities are professional involved in the fish marketing of Chilka since time immemorial.

The traditional marketing system is informal in nature using of the low cost traditional materials with women being the primary stakeholders in the system. The marketing channels are short, simple catering to the local and rural needs. The system primarily deals with the low cost fresh fish to the local people.

Marketing Channels

The traditional marketing channels are primarily based on the fish marketing by women and male vendors within the vicinity of 60 km of the lake. In recent times, the periphery of such operations has increased to include the cities like Brahmapur and Bhubaneswar which are located 100-120 kilometers

from most of the landing centres of Chilka due to improvement in the transportation. The primary and most rudimentary marketing channel are women vendors selling directly to consumers in the village or market, the fish caught by their male family members. The second important channel is Fishers-Commission Agent-Vendors-Consumers. In this channel, the commission agents receive the fish at a predetermined rate from their respective fishers and the vendors purchase their fish with or without auction at the village markets. The third channel is Fishers-Auctioneers-Vendors-Consumers, which is used mostly by the fishers who are not attached to any commission agents. The fishers take the fish to any auctioneers who auctioned the fish to the vendors.

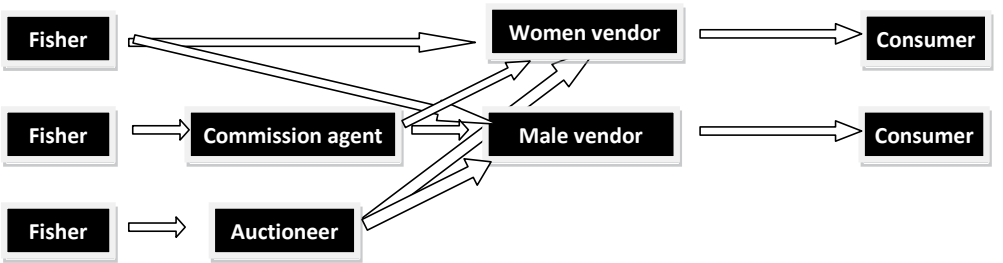


Figure 4.53 Traditional Marketing Channels for Fishes of Chilka Lake

Market Intermediaries

The two predominant functionaries of the traditional marketing channels are women traders and male cycle/moped vendors. On an average at any fish landing centre, women from fishing communities constitute about 50-60 percent of the total local fresh fish sellers and the cycle/moped fish vendors constitute about 30- 40 percent, while women from non-fishing communities comprised the rest. Fish for local fresh fish trade are mostly obtained in open auctions. The prevalent auctioning method was 'Dutch Auction', i.e. the auctioneer begins asking for a high price and begins a countdown until one of the bidders stops him at a particular price. The auctioneers auction the fish at landing centers when caught in large quantities.

Women Trader

These are women from the fishing as well as non fishing communities. The women sell their fish within a radius of approximately 5-10 km from the landing centre. Access to mass transport (buses, auto-rickshaws and trekkers) has enabled them to take fish up to 20-25 km from their villages. The sale is done from a central market or by going door-to-door. Generally, each fish seller service a particular area regularly and has a set of customers who purchase fish daily from her. On average, a local fish seller (woman) purchases about 30-40 kg of fish because there is a limit to the quantity that she can carry on her head to the markets. A woman trader invests between Rs 400 and Rs 1200 per cycle of operations and expected to earn a profit of between Rs 40 and Rs 100. During good fishing months, the petty fish traders

hope to earn about Rs 1,500 to Rs 2,500 per month, but with rising transport costs, use of ice and other expenses, their margins are falling. The women use bamboo baskets from local markets. The bamboo basket is versatile, low-cost, locally made and is well adapted to carrying fish. It provides air passages and helps drainage of water from the fish. If the catches land late in the evening, the women try to keep their fish in ice, where available until the next day's market, but fish are rarely carried to the markets in ice.

Table 4.90 Marketing Costs of Women Traders in Chilka Lake

Item	Cost (Rs/kg)
Ice	1.50
Transportation	1.50
Other items	1.00
Total	**4.00**

Source: Primary Survey, 2008

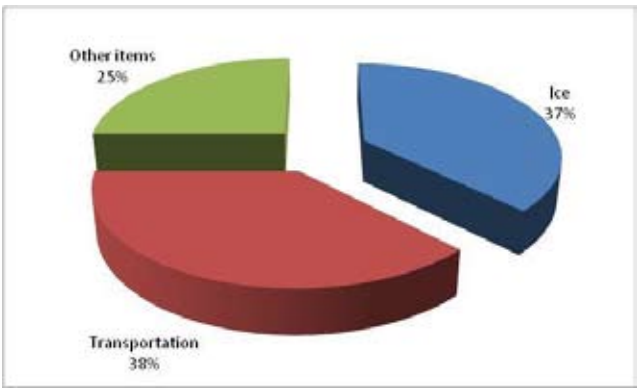


Figure 4.54 Distribution of Marketing Cost of Women Traders in Chilka Lake

Male Vendor

They are primarily from non fishing communities with limited number of fishers involved in marketing. Bicycle and moped are used by these fish vendors to carry fish up to 20-40 km inland and some went as far as 50-60 km. They use plastic tray with ice or bamboo basket covered with rubber sheet and packed in ice. Bicycle fish vendors buy about 40-50 kg of fish at an investment of Rs 1000-1200 in one cycle, while the moped fish vendors invest up to Rs 1500 to Rs 2500 to buy about 50-60 kg of fish. The returns could be in the range of 10-30%, but the net earnings decrease due to a number of expenses such as spoilage of a portion of fish, fuel costs (for the mopeds), ice etc.

Table 4.91 Marketing Costs of Male Vendors in Chilka Lake

Item	Cost (Rs/kg)
Ice	2.50
Fuel	3.50
Other items	1.50
Total	**7.50**

Source: Primary Survey, 2008

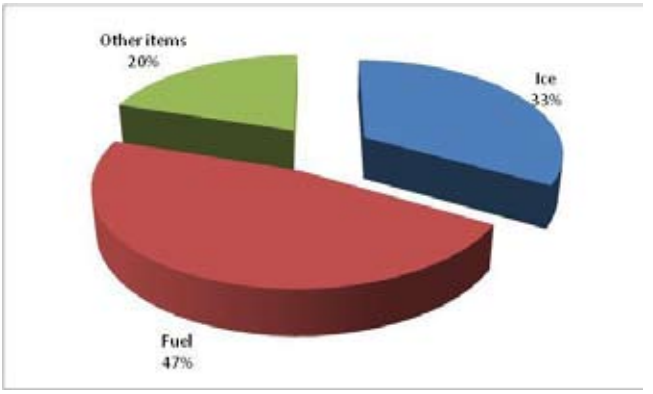


Figure 4.55 Distribution of Marketing Cost of Male Vendors in Chilka Lake

Table 4.92 Summary of Business for Male and Female Vendors in Chilka Lake

(Rs)

Particulars	Male Vendor	Female Trader
Average price of fish handled per kg	78.40	41.40
Total marketing cost	6.40	4.00
Selling price	84.80	48.90
Profit	5.50	3.50
Total quantity sold per day (kg)	35.00	20.00
Total cost incurred per day	224.00	80.00
Total income earned per day	192.50	70.00

Price spread

The typical channels involving women trader dealing with low value fish (Channel I), the channels involving male vendor dealing with medium value fish in the local areas (Channel II) were used for the price spread analysis.

Table 4.93 Price Spread in Traditional Fish Marketing Channels at Chilka Lake

(Rs/kg)

Particulars	Channel I (Low Value Fish)	Channel II (Medium Value Fish)
Price received by fisherman	40.40 (82.60)	71.90 (84.80)
Auctioneer's cost	0.25 (0.50)	0.25 (0.30)
Auctioneer's margin	0.75 (1.50)	0.75 (0.90)
Retailer's purchase price	41.40 (84.70)	72.90 (86.00)
Retailer's cost	4.00 (8.20)	6.40 (7.50)
Retailer's margin	3.50 (7.20)	5.50 (6.50)
Price paid by consumer	**48.90 (100.00)**	**84.80 (100.00)**

Figures in parentheses indicate percentages to consumer price

Marketing Efficiency

It is found that the price of the fishes varied from Rs 50 to Rs 220 or even higher depending upon species, size and quality of the fishes. The traditional channels are most efficient as they are short, simple and quick without much involvement of any processing or other functions.

Table 4.94 Marketing Efficiency in Selected Marketing Channels of Chilka Lake

Items	Channel I	Channel II
Consumer's price (Rs/kg)	48.90	84.80
Fisherman's price (Rs/kg)	40.40	71.90
Marketing cost + margin (Rs/kg)	8.50	12.90
Marketing expenditure as % of consumer's price	17.40	15.20
Marketing efficiency	**82.60**	**84.80**

4.4.2 Assam

The state of Assam has various types of fish markets based on location as described below.

Remote Fish Markets

The remote markets are located far away from major urban market centres and are not connected with proper roads for easy and quick transmission of fish. These markets are primarily based on fishes supplied from local sources. These markets are not integrated with the large marketing network; hence, the demand-supply equilibrium is primarily location specific. Around 14000 people in the neighborhood visit such markets in Assam.

Rural Fish Markets

The rural markets are typical village markets with occasional connection with the urban centres. The fishes are generally assembled from the local sources but interacted with the larger fish networks when demand or supply was higher. On an average 16000 people are accessing these markets in Assam.

Semi-urban Fish Markets

These markets are located in the semi-urban areas and small towns with average of 45000 people accessing the market. They are well connected with the large market networks and have intricate interactions with the large wholesale markets of the state.

Urban Fish Markets

Urban markets are the large city markets with average of 4.5 lakh people accessing them. The large wholesale markets with transactions of major supplies of fish are operating in these markets.

Additionally, the fish markets are operating in four modes in terms of operating hours, i.e. operating only in morning hours, only in evening hours, both morning and evening hours and whole day. In the whole day markets, fish are available throughout the day. The evening hour marketing is most prevalent in the remote markets where as rural and semi-urban markets are primarily operating in both morning and evening and urban markets operate mostly the whole day. The average morning hours are 3 to 4 and that of evening are 5 to 6. Generally the evening time is the most preferred time for fish marketing. In many cases, the morning hours are used for fishing, the catch will be sold in the evening hours for the local fishes.

Market Intermediaries

There are seven categories of operators in the fish markets, viz. producers (fish farmers / fishers either catching or culturing fishes), suppliers (fish farmers / agents / traders supplying fish), auctioneers (assembling and auctioning), wholesalers, retailers (retailing in the markets or roadside places), itinerants (selling the fish in door-to-door basis) and labourers (carrying, packing, cleaning, weighing and other related work). But, all the functionaries are not present in all markets. The average number of these

functionaries is presented in Table 4.95. The total numbers of the operators varied from 66 to 235 per market.

Table 4.95 Market Intermediaries in Fish Markets of Assam

(No./Market)

Functionaries	Type of Market			
	Re-mote	Rural	Semi-Urban	Urban
Producer	12	18	30	35
Supplier	8	6	14	75
Auctioneer	8	3	14	8
Wholesaler	8	6	7	12
Retailer	15	13	32	80
Itinerant	8	6	9	12
Labour	17	14	17	13
Total	**76**	**66**	**123**	**235**

Source: Primary Survey, 2008

Price Spread and Market Margin

The market margins are estimated as the difference between the price paid to the producers and price paid by the consumers. The difference in marketing margins composed of the cost of marketing and profit of the market functionaries. The overall margins for various categories of the fishes are in the range of Rs 12-24 per kg of fish. For all types of the fishes the maximum and minimum margin are estimated to be Rs 29 and 10 rupees per kg. As indicated in the Table 4.96, there is a negative correlation between the price and margin which indicates that the margin of the fishes is less when the prices of the fish are more. In other words, the market functionaries are able to muster higher profit from the low cost prices. The traders are taking a similar amount of the profit across all categories of the fishes.

Table 4.96 Marketing Margins in Fish Markets of Assam

(Rs/kg)

Fish species	Type of Market				
	Remote	Rural	Semi-Urban	Urban	Overall
Carp (big, >2kg)	18.60	15.30	17.10	20.20	17.30
Carp (small, <2kg)	16.40	18.60	20.80	22.60	19.40
Exotic Carp	19.00	21.00	21.40	11.60	19.40
Cat Fish (big>2kg)	14.70	20.20	19.00	17.20	18.30
Cat Fish (small<2kg)	19.30	13.50	19.10	17.10	17.00
Indigenous Fish	28.60	24.00	21.80	25.80	24.30

Live Fishes	13.40	12.80	16.60	13.80	12.30
Prawns	9.70	17.50	16.80	13.40	15.50
Dry Fishes	20.60	25.30	22.20	19.40	22.60

4.4.3 Tripura

Udaipur and Battala are the two major fish markets in Tripura state. The major fish marketing channels observed at Udaipur fish market are as follows:

Channel I	Producer – Auctioneer/Commission agent – Retailer – Consumer
Channel II	Producer – Retailer – Consumer
Channel III	Producer – Auctioneer/Commission agent – Consumer
Channel IV	Producer – Consumer

The major marketing channels at Battala market are as follows:

Channel I	Producer – Auctioneer/Commission agent – Retailer – Consumer
Channel II	Producer – Retailer – Consumer
Channel III	Producer – Auctioneer/Commission agent – Consumer
Channel IV	Producer – Consumer
Channel V	Producer – Auctioneer/Commission agent – Wholesaler (other place) – Retailer – Consumer
Channel VI	Producer – Auctioneer/Commission agent – Retailer (other place) – Consumer

Price Spread for IMC at Udaipur Market

The price spread for IMC at Udaipur market for Channel I is given in Table 4.97.

Table 4.97 Price Spread for IMC at Udaipur Market, Tripura

(Rs/kg)

Particulars	Channel I
Prices received by fish farmer	80.64 (48.38)
Cost of production of fish farmer	31.00 (18.60)

Total price received by fish farmer	111.64 (66.98)
Costs incurred	5.36 (3.22)
Commission agent's purchase price	117.00 (70.20)
Costs incurred	4.58 (2.75)
Margin	8.42 (5.05)
Auctioned price	130.00 (78.00)
Costs incurred by the retailer	4.38 (2.63)
Margin	32.29 (19.37)
Price paid by Consumer	**166.67** **(100.00)**

Figures in parentheses indicate percentages to consumer price

Table 4.98 Marketing Efficiency for IMC at Udaipur Market, Tripura

Particulars	Details
Consumer's price (Rs/kg)	166.67
Fisherman's price (Rs/kg))	111.64
Marketing expenditure (Rs/kg)	55.03
Marketing expenditure as % of consumer's price	33.02
Marketing efficiency	**0.67**

4.5 Consumer Survey

A survey of fish consumers was carried out at Kolkata, Delhi, Chennai, Cochin and Tuticorin. The survey was conducted on random respondents at major fish markets in each city. Respondents were surveyed on average monthly (or weekly) expenditure on fish, preferred species of fish along with a host of other information.

Methodology

Fish were classified into ten groups namely, Indian Major Carps (IMC), Other Fresh Water Fish (OFWF), Prawns/Shrimps, Sardine, Mackerel, Seer fish, Pomfrets, Tuna, Dry fish and Other fish. The respondents were surveyed on type of fish they consumed and the results were grouped according to the ten categories mentioned above.

The consumer survey was post-stratified with respect to the expenditure on fish. The mean of the data was calculated, with the standard deviation and standard error. A range for expenditure was calculated, the upper limit of which was mean + standard deviation and the lower limit was mean – standard deviation. Respondents spending less than the lower limit were classified as the low spending group. Those who spent within the range were grouped as medium spenders and those who spent more than the upper limit of the range were classified as high spenders. The results are presented below.

4.5.1 Kolkata

The Kolkata fish consumer's survey covered four major markets of the area namely, Howrah, Gariahat, New Market and Dum Dum. A total of 864 respondents were surveyed at Kolkata who spent between Rs 12 and Rs 1130 on fish on the day of the survey. IMC and OFWF formed the bulk (> 50%) of the fish purchased. The sale of IMC was 38.57% of the total sales (Figure 4.56).

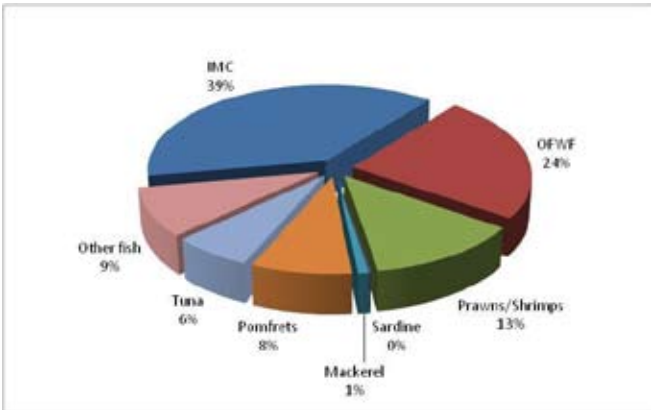


Figure 4.56 Composition of Total Fish Purchased, Kolkata

The average expenditure on the day of survey was highest for Other fish at Rs 199 and lowest for IMC at Rs 66 (Figure 4.57).

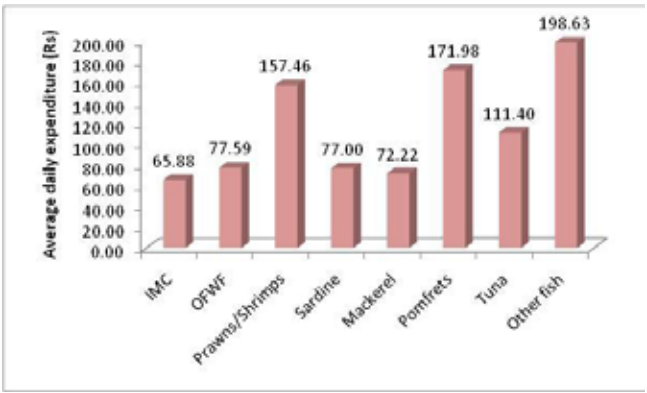


Figure 4.57 Expenditure on Different Fish Species, Kolkata

The mean expenditure for the Kolkata survey was Rs 130. The standard error was 5.76. The standard error was used in post-stratification since the standard deviation was very high. The results of post-stratification of the survey data are given in Table 4.99.

Table 4.99 Details of Post-stratification of Monthly Expenditure Data, Kolkata

Particulars	Results
Sample size	864
Average expenditure on the day of survey(Rs)	130
Standard error of monthly expenditure	6
Upper limit (Average + Standard Error)	136
Lower limit (Average – Standard Error)	124

The details of the classification of respondents based on monthly expenditure are given in Table 4.100.

Table 4.100 Classification of Respondents based on Monthly Expenditure on Fish, Kolkata

Particulars	Results
Low spending group	Expenditure on fish < Rs 124
Medium spending group	Expenditure on fish between Rs 124 and Rs 136
High spending group	Expenditure on fish ≥ Rs 136

Low spending group

This group was characterized by those who spent less than Rs 124 on fish on the day of the survey. The mean expenditure on fish for this group was Rs 59. IMC and Other freshwater fish were the most purchased fish each forming 47% of the total fish purchased. The percentage share of different fish species in total fish sales is shown in Figure 4.58.

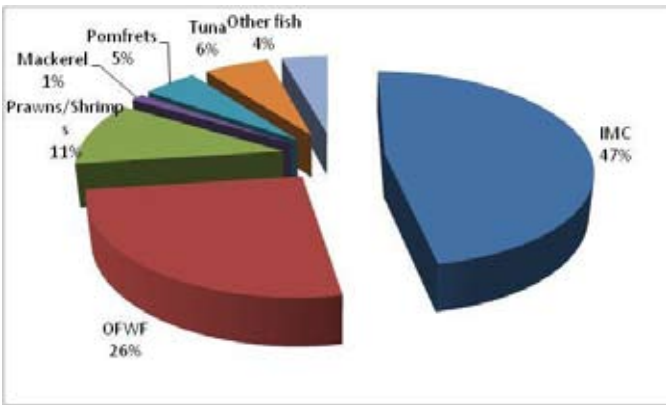


Figure 4.58 Composition of Total Fish Purchased (Low spending group), Kolkata

The highest average expenditure on the day of survey was on pomfrets at Rs 91 and lowest for OFWF at Rs 38 (Figure 4.59).

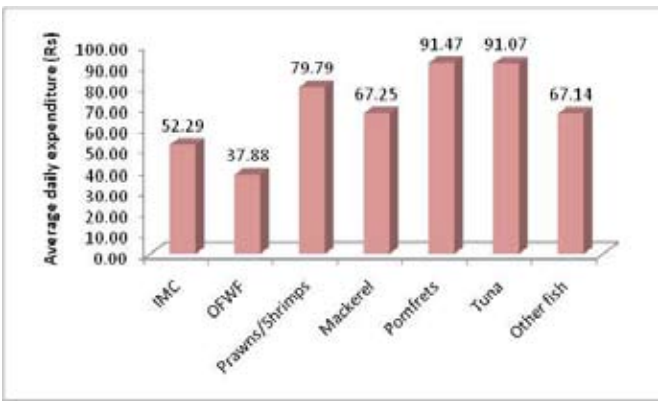


Figure 4.59 Expenditure on Different Fish Species (Low spending group), Kolkata

Medium spending group

This group is characterized by those who spent between Rs 124 and Rs 136 on fish on the day of the survey. The mean expenditure on fish for this group was Rs 129. IMC was the most purchased fish forming 33% of the total fish sales for this group. The percentage share of different species in total fish sale is shown in Figure 4.60.

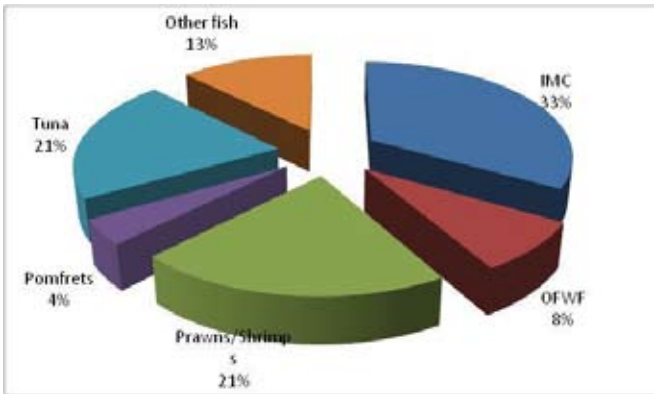


Figure 4.60 Composition of Total Fish Purchased (Medium spending group), Kolkata

The average expenditure on the day of survey was highest for pomfrets at Rs 132 (single observation) and lowest for OFWF at Rs 55 (Figure 4.61).

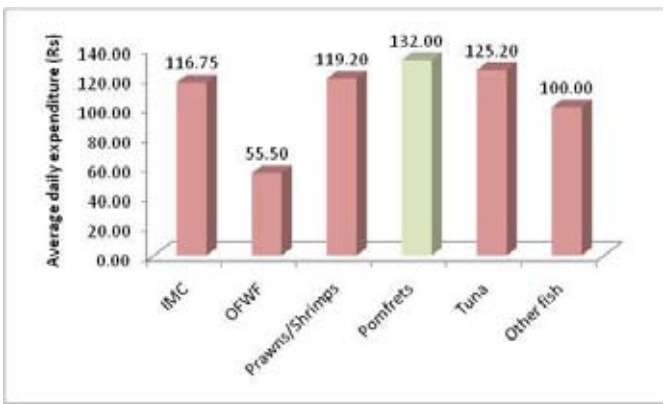


Figure 4.61 Expenditure on Different Fish Species (Medium spending group), Kolkata

High spending group

This group was characterized by those who spent Rs 136 or more on fish on the day of the survey. The mean expenditure on fish for this group was Rs 363. IMC formed the most purchased category forming 22% of the total fish sales. The percentage share of different species in total sales is given in Figure 4.62.

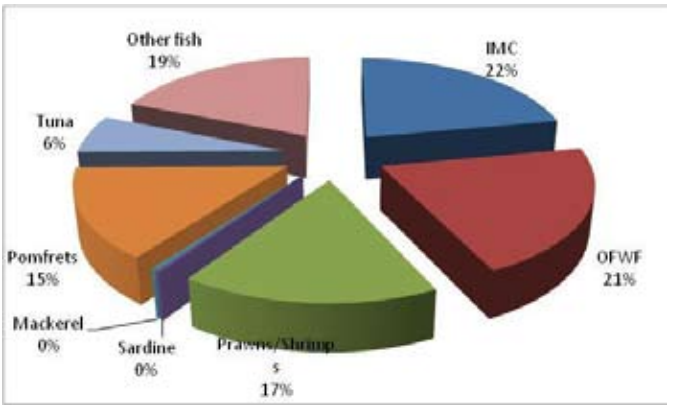


Figure 4.62 Composition of Total Fish Purchased (High spending group), Kolkata

The average expenditure was highest for Other fish at Rs 261 and lowest for sardine at Rs 77 on the day of survey (Figure 4.63).

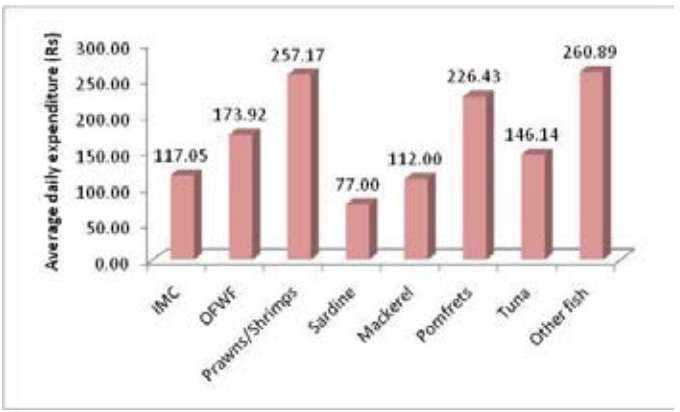


Figure 4.63 Expenditure on Different Fish Species (High spending group), Kolkata

4.5.2 Delhi

The Delhi fish consumer's survey covered four fish markets in the area namely, INA, Chittaranjan Park, R.K. Puram and Mohammadpur. The survey was conducted over two time periods: the first from 13.5.2008 to 16.5.2008 and the second from 28.6.2008 to 1.7.2008. A total of 179 respondents were surveyed in Delhi.

The main group of fish purchased was IMC (Figure 4.64). This was followed by OFWF and Other fish.

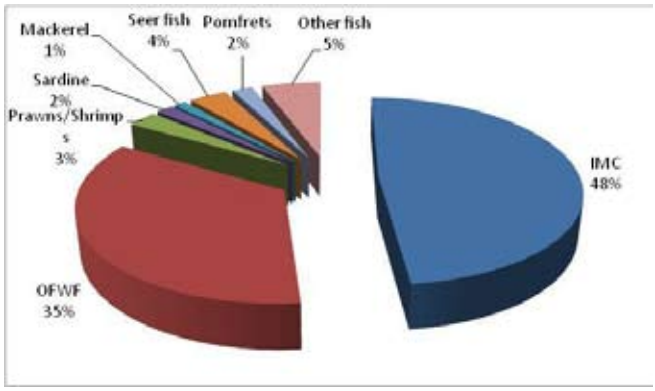


Figure 4.64 Composition of Total Fish Purchased, Delhi

The average monthly expenditure was highest for prawns/shrimps at Rs 557 (Figure 4.65).

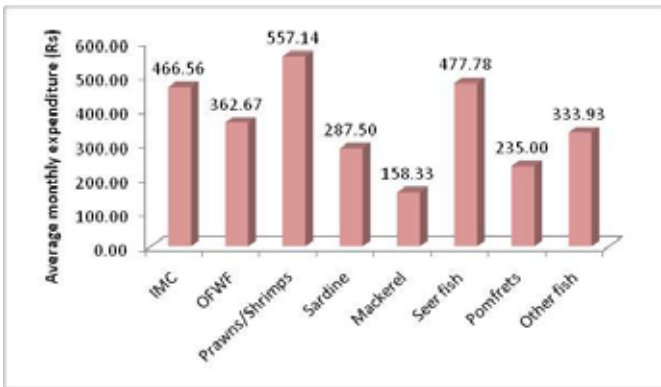


Figure 4.65 Expenditure on Different Fish Species, Delhi

The average monthly expenditure on fish was Rs 583, with minimum expenditure being Rs 80 per month and maximum expenditure being Rs 2000 per month. The results of post-stratification of the survey data are given in Table 4.101.

Table 4.101 Details of Post-stratification of Monthly Expenditure Data, Delhi

Particulars	Results
Sample size	179
Average monthly expenditure (Rs)	583
Standard deviation of monthly expenditure	404
Upper limit (Average + Standard Deviation)	987
Lower limit (Average – Standard Deviation)	179

The details of the classification of respondents based on monthly expenditure are given in Table 4.102.

Table 4.102 Classification of Respondents based on Monthly Expenditure on Fish, Delhi

Particulars	Results
Low spending group	Monthly expenditure on fish ≤ Rs 179
Medium spending group	Monthly expenditure on fish between Rs 180 and Rs 986
High spending group	Monthly expenditure on fish ≥ Rs 987

Low spending group

Nineteen respondents fell in the low spending group. The average monthly expenditure on fish for this group was Rs 128. IMC were the most purchased fish in this group (Figure 4.66).

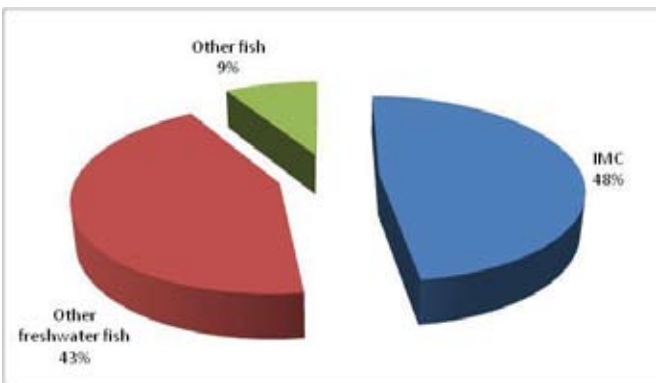


Figure 4.66 Composition of Total Fish Purchased (Low spending group), Delhi

The average monthly expenditure was highest for OFWF (Figure 4.67).

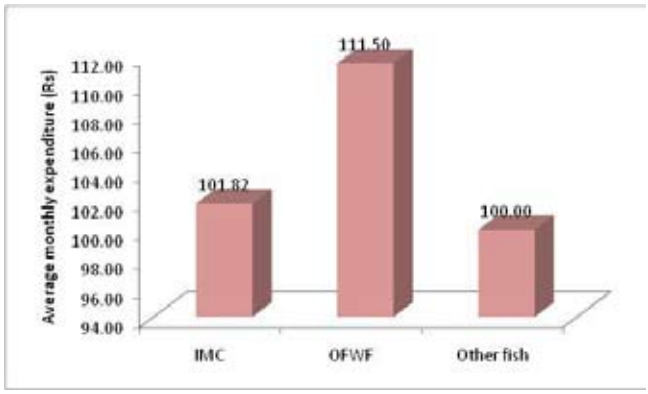


Figure 4.67 Expenditure on Different Fish Species (Low spending group), Delhi

Medium spending group

126 respondents fell under the medium spending group. The average monthly expenditure on fish for this group was Rs 478. IMC was the most purchased fish (Figure 4.68).

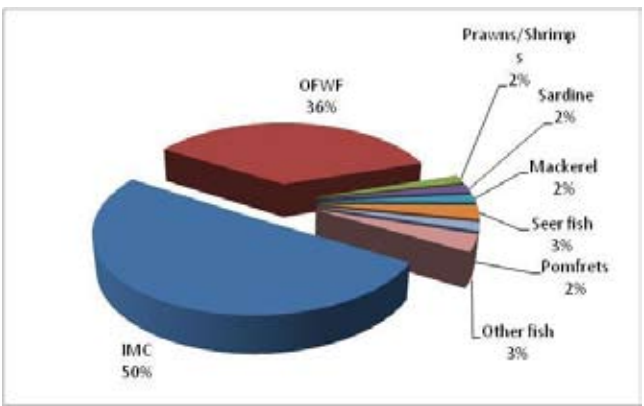


Figure 4.68 Composition of Total Fish Purchased (Medium spending group), Delhi

The average monthly expenditure was also highest for IMC (Figure 4.69).

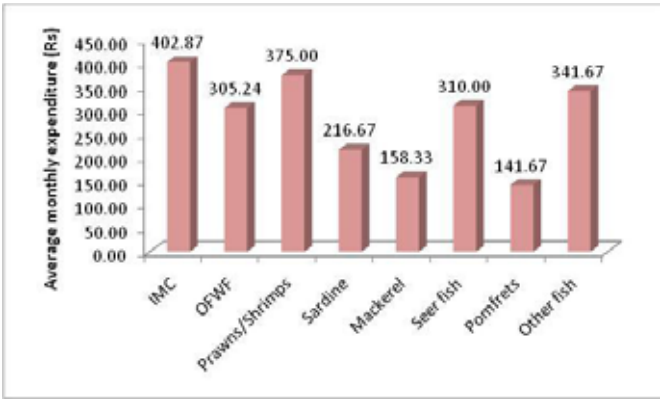


Figure 4.69 Expenditure on Different Fish Species (Medium spending group), Delhi

High spending group

34 respondents fell in the high spending group. The average monthly expenditure on fish for this group was Rs 1230. IMC was the most purchased fish (Figure 4.70).

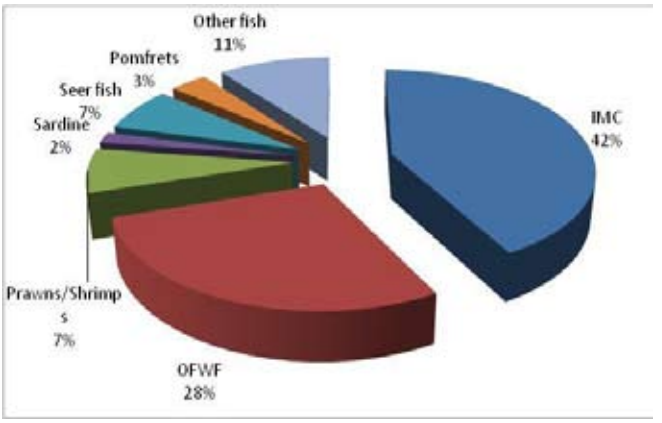


Figure 4.70 Composition of Total Fish Purchased (High spending group), Delhi

The average monthly expenditure was also highest for IMC (Figure 4.71).

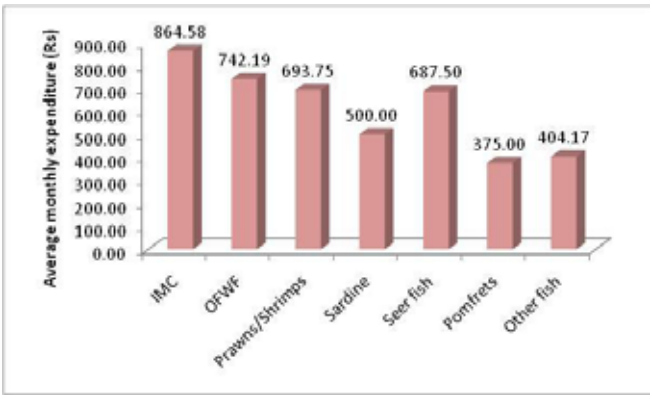


Figure 4.71 Expenditure on Different Fish Species (High spending group), Delhi

4.5.3 Chennai

The Chennai fish consumer's survey was conducted at Chindadiripet, Saidapet and Kasimedu markets and at the Neidhal fish retail outlet operated by TNFDC. A total of 400 respondents were surveyed at Chennai. The respondents were classified based on monthly incomes and the results of the survey are discussed below.

Low income group

The low income group members were defined as those respondents with monthly income less than Rs 10000. This group preferred buying fish from the wholesale markets and landing centre (Chindadiripet and Kasimedu). Very few frequented the modern retail outlet. The most preferred species were low value marine species namely sardine and mackerel and low value freshwater fish namely Indian Major Carps (IMC).

Middle income group

The middle income group was defined as the group with respondents whose monthly income fell between Rs 10000 and Rs 30000. This group showed equal preference for buying fish from landing centres, wholesale markets and modern retail outlets. The most preferred species were prawns, seer fish, pomfrets and mackerel.

High income group

This group was defined as the one with respondents whose monthly income was greater than Rs 30000. This group almost exclusively bought fish from the modern retail outlet and a small portion frequented the Saidapet market. The most preferred species were seer fish and prawns.

4.5.4 Cochin

The Cochin consumer's survey covered 10 fish markets in the area namely, Matasayafed, Ashis, Aroor, Kadavanthara, Varkey's super market, Fort Kochi, Chambakara, Madavana and Vytilla. The survey was conducted by students of the College of fisheries, Panangad, Kochi in the month of September, 2008. A total of 518 respondents were surveyed in Kochi.

A total of 518 respondents were surveyed and the most preferred fish were sardines and mackerel (Figure 4.72).

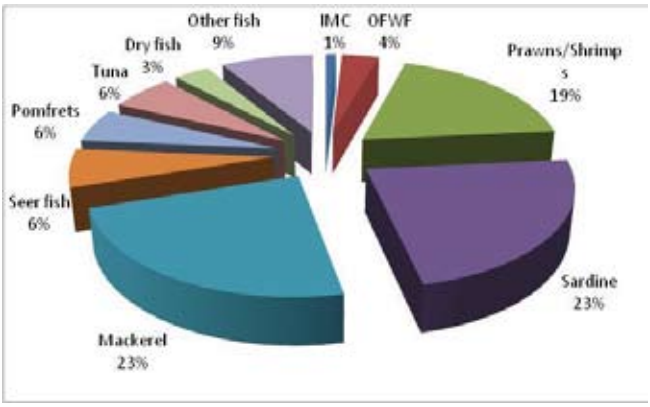


Figure 4.72 Composition of Total Fish Purchased, Cochin

The average monthly expenditure was highest for Other fish at Rs 335 (Figure 4.73).

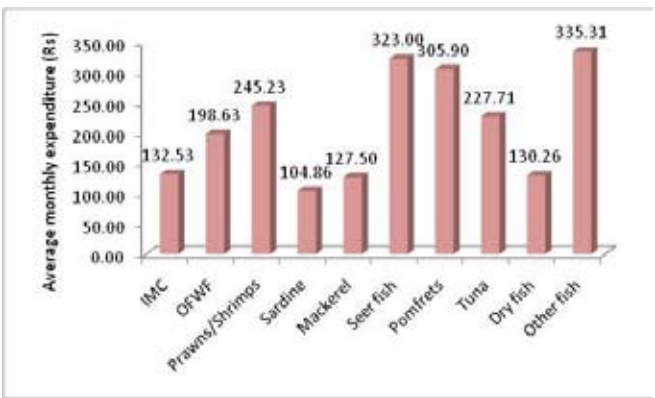


Figure 4.73 Monthly Expenditure on Different Fish Species, Cochin

The average monthly expenditure on fish was Rs 499, with minimum expenditure being Rs 20 monthly and maximum expenditure being Rs 5000. The results of post-stratification of the survey data are given in Table 4.103.

Table 4.103 Details of Post-stratification of Daily Expenditure Data, Cochin

Particulars	Results
Sample size	518
Average monthly expenditure (Rs)	499
Standard error of monthly expenditure	22

The details of the classification of respondents based on daily expenditure are given in Table 4.104.

Table 4.104 Classification of Respondents based on Daily Expenditure on Fish, Cochin

Particulars	Results
Low spending group	Daily expenditure on fish < Rs 477
Medium spending group	Monthly expenditure between Rs 477 and Rs 521
High spending group	Daily expenditure on fish > Rs 521

Low spending group

A total of 312 respondents fell in the low spending group. The average monthly expenditure on fish for this group was Rs 228. Sardine and mackerel were the most purchased fish followed by prawns/shrimps. IMC were the least bought fish (Figure 4.74).

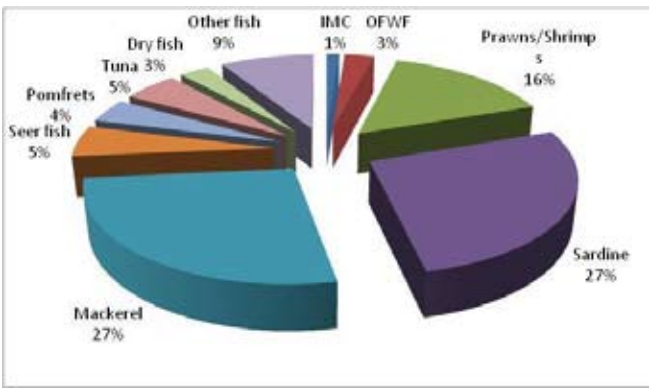


Figure 4.74 Composition of Total Fish Purchased (Low spending group), Cochin

The average daily expenditure was highest for Other Freshwater Fish (OFWF) at Rs 167 followed by pomfrets and seer fish. The lowest expenditure was dry fish (Figure 4.75).

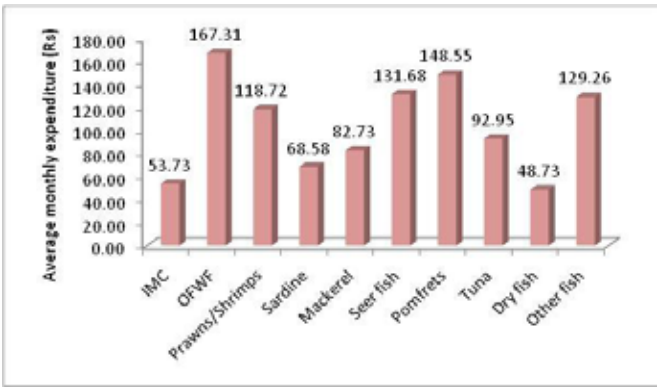


Figure 4.75 Expenditure on Different Fish Species (Low spending group), Cochin

Medium Spending Group

Twenty respondents fell in the medium spending group. The average monthly expenditure was Rs 496. Prawns/shrimps were the most purchased category followed by sardine and mackerel (Figure 4.76).

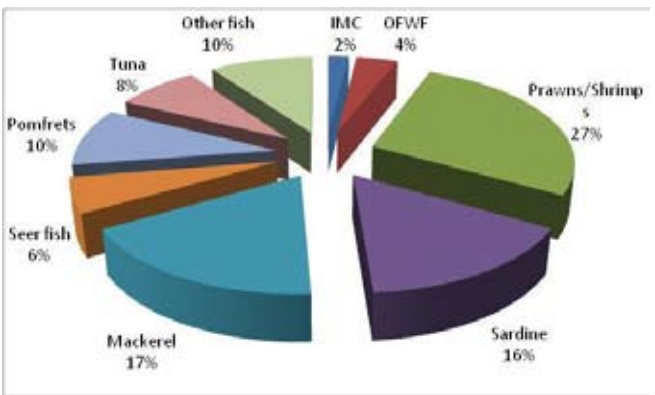


Figure 4.76 Composition of Total Fish Purchased (Medium spending group), Cochin

The highest monthly expenditure was on IMC at Rs 482 but this can be discounted since only a single respondent bought IMC in this group. The second highest monthly expenditure was on pomfrets (Rs 264) followed by OFWF (Figure 4.77).

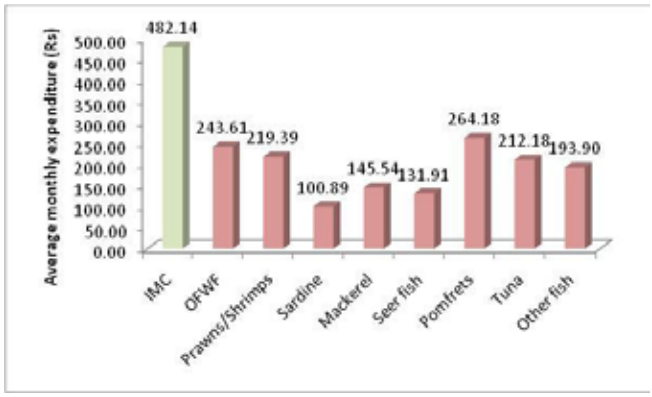


Figure 4.77 Expenditure on Different Fish Species (Medium spending group), Cochin

High Spending Group

186 respondents fell in the high spending group. The average daily expenditure on fish for this group was Rs 955. Shrimps/Prawns were the most purchased category followed by sardine and mackerel (Figure 4.78).

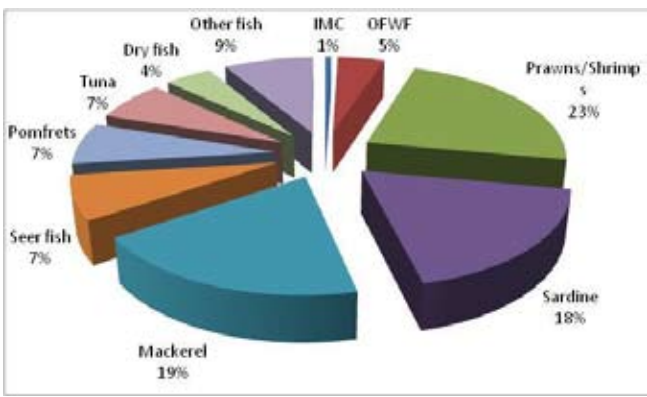


Figure 4.78 Composition of Total Fish Purchased (High spending group), Cochin

The highest average monthly expenditure was seen for Other fish at Rs 646 followed by seer fish and pomfrets (Figure 4.79).

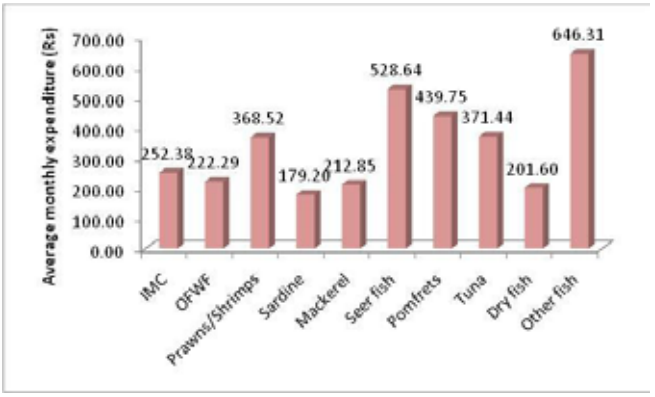


Figure 4.79 Expenditure on Different Fish Species (High spending group), Cochin

4.5.5 Hyderabad

The Hyderabad survey was conducted similar to the Kolkata and Delhi surveys. The classification of respondents was based on their income levels. The results are discussed below.

Low income group

The low income group was defined as consisting of respondents with monthly income less than Rs 3000. The average expenditure on purchase of fish and fishery Products is Rs 62 to 115 per month (2.0% to 3.8% of the income). The survey covered rickshaw pullers, school teachers, govt. officials, business personnels, mechanics, house wives, etc. Majority buy fish once or twice in a month. Freshwater fish, marine fish and dried fish are mostly preferred by this group. More than 92% of the Consumers belonging to this group buy fish at the street corner outlets or from vendors.

Middle income group

This group was defined as consisting of respondents with monthly income between Rs 3000 and 25000. The average expenditure on purchase of fish is Rs 400 to 1200 per month (2.85% to 8.57% of income). The survey covered school teachers, govt. officials, business personnels, mechanics, lawyers, house wives, etc. Majority buy fish 2-4 times a month. Freshwater fish is the dominant group. 60% of the consumers belonging to this group buy fish at the retail outlets (any small outlet or modern outlet). 40% of them prefer to buy from wholesale market or from roadside/fixed/market outlets/vendors.

High income group

This group was defined as consisting of respondents with monthly incomes greater than Rs 25000. The Average expenditure on purchase of fish is Rs 800 to 2000 per month. The survey covered software engineers, business personnels, bank employees, etc. Majority buy fish weekly once, i.e. 4 times a month.

Prawn and marine fish were given top priority. Majority of the high-income consumers prefer to buy in small retail outlets / modern retail outlets due to better quality of raw materials, hygienic handling, use of clean water for dressing and availability of different variety of fish, in spite of higher cost.

An overview of the fish consumer behavior at the different survey locations is given in Table 4.105.

Table 4.105 Overview of Fish Consumer Behaviour in Major Cities

Details	Delhi	Kolkata	Cochin	Hyderabad	Chennai
Markets surveyed	INA, CR Park, R K Puram	Howrah, Gariahat, New Market, Dum Dum	Vypeen, Fortkochi, Vytilla, Champakkara, Aroor	Musheerabad	Chindadiripet, Saidapet, Kasimedu, Neidhal
Low spending group				**Low income group**	
Range	< 179 (Rs/month)	< 124 (Rs/day of survey)	< 477 (Rs/month)	62-115 (Rs/month)	
Average	128	59	228		
Preferred species	IMC	IMC	Sardine, Mackerel	Freshwater fish	Sardine, Mackerel
Medium spending group				**Medium income group**	
Range	179-986	124-136	477-521	400-1200 (Rs/month)	
Average	478	129	496		
Preferred species	IMC	IMC	Prawns/Shrimps	Freshwater fish	Prawns
High spending group				**High income group**	
Range	≥987	≥ 136	≥521	800-2000 (Rs/month)	
Average	1230	363	955		
Preferred species	IMC	IMC	Prawns/Shrimps	Prawns/Shrimps	Seer fish

Conclusion

The consumer survey in different cities of the country reflected the variations in preference for fish in the country. While IMC was the most preferred group of fish in Kolkata, sardines and mackerels were most preferred in Cochin. IMC was the most preferred group of fish at Delhi. The preference for IMC in West Bengal and for marine fish in Kerala is well known though this has not been established scientifically before. Similarly at Delhi the consumer's preference reflects the availability of fish. Since IMC and catfish are more available at Delhi, the preference is more for these species. Marine fish are sold at very limited areas/markets at Delhi.

Regarding consumer expenditure, it was observed that the highest expenditure was made on high value species namely, prawns, pomfrets and other fish. The category "other fish" includes the highly values hilsa (in West Bengal & Delhi) and pearl spot (in Kerala). Though cheaper varieties were preferred more for

daily or frequent use, higher expenditure was made on high value species among all types of spenders. This reflects the trend that people are willing to pay more for high value species even though the frequency of purchase of these species might be less.

Prawns were a favoured item at all three survey locations. They were highly preferred at all locations and the expenditure on this group was also high. There is great potential for marketing prawns in the domestic scenario and this option should be explored further.

CHAPTER V

STATUS OF FISH MARKETING INFRASTRUCTURE

The infrastructure required for marketing the fish includes primary fish markets, cold storage and ice plants, transportation facilities and processing facilities. This chapter looks into each of these infrastructures and their status across the regions of the country.

5.1 FISH MARKETS

In our country, fish markets exist at various points, starting from the point of production or landing till the consuming centres, which may be villages, towns and cities. Hence, it is essential to look at the structure and conduct of these different market places to understand better the dynamics and specificities of each category in fish marketing. The fish markets can be categorized broadly as the following four types. They are:

1. Landing Centres (Fishing Harbours / Fish Landing Centres)
2. Wholesale Fish Market
3. Retail Fish Market
4. Retail Outlets

5.1.1 Delhi

The Delhi fish market consists of two categories, wholesale market and retail markets. The wholesale market is located at Gazipur. The two retail markets are at INA and Chittaranjan Park and apart from these, there several small roadside retailers spread out over Delhi. Fish arrives in Delhi from various parts of the country, is auctioned off at Gazipur and sold through the retail outlets and retailers in the city. Annually, the fish supply to Delhi is about 20,000 tonnes.

5.1.1.1Gazipur Fish Market, Delhi

The Gazipur fish market was established in 2001, before which the principal market for fish trade in Delhi was in the Jama Masjid area. The new fish market at Gazipur has been named as Shaheed Ashfaq Ullah Kahn Fish Market. The market is managed by the Delhi Fish, Poultry and Egg Marketing Committee. Entry into the market is through a license issued by the Delhi Agricultural Marketing Board. The general particulars of the Gazipur market are given in Table 5.1.

Table 5.1 General Particulars of Gazipur Fish Market, Delhi

Particulars	Details
Location	Gazipur

Area/Coverage	National
Time span	Short period
Volume of transaction	Open auction
Nature of transaction	Both cash and credit
Number of commodities	General (all species)
Stage of marketing	Producing market
Extent of public intervention	Regulated
Year of establishment	2001

Source: Primary Survey, 2008

The structure of the Gazipur fish market is given in Table 5.2.

Table 5.2 Structure of Gazipur Fish Market, Delhi

Particulars	Details
No. of registered fish sellers/auction agents	277
No. of sellers/traders operating	197
Condition of entry into the market	License from MCD
Mechanism of market information	Organized market Intelligence
Weighing process	Platform and Spring balance
Scale of operation (daily)	1 ton

Source: Primary Survey, 2008

Both marine and freshwater fish are handled in the market. Fish is supplied to the market mainly from Maharashtra, Andhra Pradesh, Gujarat, Rajasthan, Haryana and Punjab (Figure 5.1).

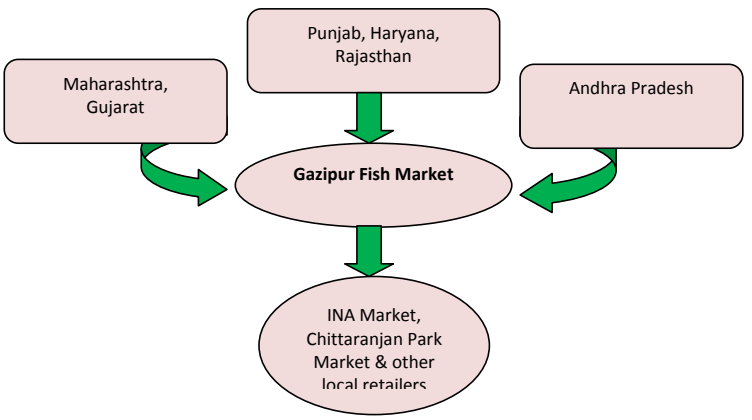


Figure 5.1 Physical Flow of Fish in Gazipur Market, Delhi

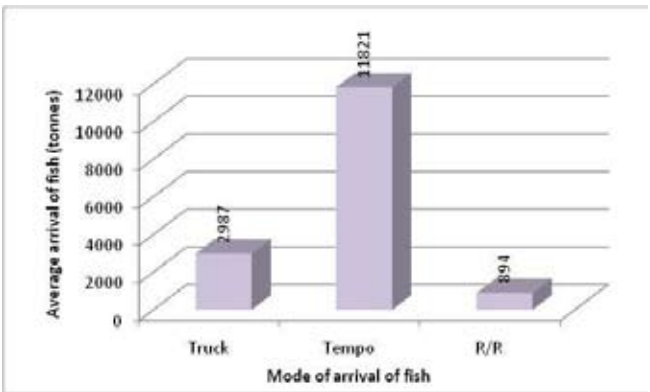
The arrival of fish to Gazipur fish market from 2003-2008 is given in Table 5.3. There has been a steady decline in the arrivals in the last few years, as the fish coming to Delhi are getting off-loaded at various newer markets scattered over different regions of Delhi.

Table 5.3 Arrival of Fish to Gazipur Fish Market, Delhi

Year	Arrival of fish (tonnes)
2003-04	25058
2004-05	21276
2005-06	16729
2006-07	18070
2007-08	17551

Source: Gazipur Fish Trader's Association, 2008

Fish are brought to the market by trucks, tempos and R/R (Figure 5.2). It is observed that tempos and mini-trucks are the main carriers of the fish to the Gazipur market, which receives them from nearby states like Punjab, Haryana and Rajasthan and the trucks come from distant places like Andhra Pradesh, Maharashtra and Gujarat.



Source: Gazipur Fish Trader's Association, 2008

Figure 5.2 Modes of Fish Supply to Gazipur Fish Market, Delhi (2003-2008)

The main species handled include Indian Major Carps (IMC), Cat fish, Hilsa, Pomfrets, Seer fish and Prawns. The daily price information for each species is available online through the Agricultural Marketing Information Network. Price data of fish from 2007 is available online at www.agmarknet.nic.in.

On an average, 75-600 quintals of fish are auctioned at the market each month. The auctioneer or agent charges an auctioning fee to the fish supplier. The auctioning fee is fixed at 7% of total sales value. The auction agent has to pay a fee of 1% of total sales value to the marketing committee. All pre-sale labour charges incurred in loading/unloading, icing, cleaning and transporting fish is borne by the supplier or seller. Total sale value for a year ranges between Rs 30 lakh and Rs 2 crore, with agent's income ranging between Rs 2 lakh and Rs 10 lakh per annum. 80% of the fish is bought by retailers, 10% by hotels and 5% by secondary wholesalers.

The Delhi Fish, Poultry and Egg Marketing Committee provides for security, sanitation and maintenance of electricity and water through private agencies. The committee has constructed a temporary auction platform at the fish market at a cost of about Rs 11.67 lakh. Three chiller plants are being installed at the fish market. The committee is also planning to establish a cold storage for storing the fish. The lack of cold storage facilities was the most common complaint among the auctioning agents. Mention has also been made of several illegal wholesale markets operating in neighbouring areas, which affected the trade at Gazipur negatively.

5.1.1.2INA Fish Market, Delhi

The INA market was established in 1947 and modernized in 1992. The INA fish market is a major fish retail market in Delhi. The general particulars and structure of INA fish market is given in Table 5.4 and Table 5.5, respectively.

Table 5.4 General Particulars of INA Fish Market, Delhi

Particulars	Details
Location	INA
Area/Coverage	Local
Time span	Long period
Volume of transaction	Retail
Nature of transaction	Both
Number of commodities	General
Stage of marketing	Consuming
Extent of public intervention	Unregulated
Year of establishment	1947
Expansion over the years	1992 (modernized)

Source: Primary Survey, 2008

Table 5.5 Structure of INA Fish Market, Delhi

Particulars	Details
No. of registered fish sellers	3

No. of sellers/traders operating	3
Condition of entry into the market	License from Municipal Corporation
Mechanism of market information	No organized mechanism (Price based on demand and supply)
Total no. of fish shops available	5
No. of functioning fish shops	3
No. of non - functioning fish shops	2
Weighing process	Digital balance
Scale of operation (daily)	750 kg

Source: Primary Survey, 2008

Both marine fish and freshwater fish are sold in the market. The main species of marine fish sold are Pomfrets, Seer fish, Tunas, Sardines, Mackerels, Red snapper, Reef cods, Shrimps, etc. The main freshwater species sold are IMC, Prawns, Cat fish, Indian Salmon, etc. Estuarine species like Pearl spot are also sold here. Crustaceans like Crab, Lobster, Molluscs like Green mussel are also sold.

Fish is transported to INA market from Gazipur fish market in ice. Fish are re-iced, cleaned and graded before being sold to the customer. Depending on customer demand, the fish are also dressed and filleted. The costs of ice and labour are added are to the sale price. Costs incurred range from Rs 10 to 50 per kg of fish depending on the species. The marketing margin ranges between 5 and 20% of the sale price. Average daily fish sale volume is 1000 kg with sales value ranging between Rs. 25000 (summer) and Rs 100,000 (winter). 80% of the fish is bought by individual customers and 20% by hotels. Prices of major fish species sold at INA market is given in Table 5.6.

Table 5.6 Prices of Major Fish Species at INA Fish Market, Delhi

(Rs/kg)

Species	Price Range
IMC	60-150
Sardine	60-80
Mackerel	80-120
Seer fish	120-350
Pomfrets	200-500
Prawn	200-450
Cat fish	120-150

Source: Primary Survey, 2008

Note: Prices vary depending on availability of the particular species and season.

Entry into the INA market is through a license issued by the Municipal Corporation of Delhi (MCD). MCD provides electricity and space for the shops. Water supply is through private bore wells or other

private sources. Cleaners are employed by the INA retailers association. Garbage disposal is outsourced by the retailers.

Problems in INA Fish Market, Delhi

1. Lack of cold storage facility in the vicinity of the market
2. Lack of proper drainage (sewers)
3. Lack of proper water supply
4. Lack of MCD involvement in garbage disposal
5. The shop sizes are small with not enough space for customer to examine the fish.

5.1.1.3Chittaranjan Park Fish Market, Delhi

Also known as the Bengali market, this is another major fish retail market in Delhi. This market was established in 1965 and modernized in 2005. The general particulars and structure of the market is given in Table 5.7 and Table 5.8 respectively. This Bengali market primarily deals with Hilsa, IMC, Prawns, Pomfrets and Cat fish. Fish are supplied from the Gazipur auction market. The price spread and pricing mechanism is similar to the INA fish market.

Table 5.7 General Particulars of Chittaranjan Park Fish Market, Delhi

Particulars	Details
Location	Chittaranjan Park
Area/Coverage	Local
Time span	Long period
Volume of transaction	Retail
Nature of transaction	Cash
Number of commodities	General
Stage of marketing	Consuming
Extent of public intervention	Unregulated
Year of establishment	1968
Expansion over the years	2005 (modernized)

Source: Primary Survey, 2008

Table 5.8 Structure of Chittaranjan Park Fish Market, Delhi

Particulars	Details
Location	Chittaranjan Park
No. of registered fish sellers	50
No. of sellers/traders operating	50
Condition of entry into the market	None

Mechanism of market information	No organized mechanism (Price based on demand and supply)
Total no. of fish shops available	50
No. of functioning fish shops	50
No. of non - functioning fish shops	0
Weighing process	Physical balance
Scale of operation (daily)	550 kg

Source: Primary Survey, 2008

5.1.2 West Bengal

5.1.2.1Howrah, Kolkata

The Howrah wholesale fish Market was started about 100 years back at Howrah in the state of West Bengal. Till 1975-76, Howrah market was functioning under the control of a private landlord. After that, the State Government acquired the market under the Land Acquisition Act. The department created new infrastructure in an area of 48,000 sq ft with a loan from the World Bank. Kolkata Metro Development Authority (KMDA) leased out the area to Howrah Improvement Trust (HIT) for monitoring and supervision during 1997. HIT leased out the stalls to 75 stallholders with facilities like supply of electricity, water and latrines for the use of the fish traders and daily commuters. The lease amount was Rs 410-440 per sq ft with Rs 290/year as rent per stall. In 1999, Stall owners formed a Co-operative Society, namely, Howrah Wholesale Fish Market Stall Owners Co-operative Society Ltd. and registered it with the Registrar of Co-operative Society, Govt. of West Bengal. The Society has 127 members and nine members in the Board of Directors including Chairman, Vice-Chairman, Secretary and Treasurer. The general particulars of the Howrah wholesale fish market are shown in Table 5.9 below.

Table 5.9 General Particulars of the Howrah Fish Market, Kolkata

General Particulars	Details
Location	Howrah, West Bengal
Area/Coverage	National
Scale of operation	Daily
Time span	Long period (4 a.m. – till night) 5 am – 10 am (Peak hours)
Volume of transaction	Wholesale (About 5% retail)
Nature of transaction	Both credit and cash
No. of commodities	All fish species
Stage of marketing	Consuming

Extent of public intervention	Regulated
Year of establishment	About 100 years ago
Over the years (No. of traders, Volume per day)	1950: 6, 50tonnes/day 1997: 75, 75tonnes/day 2008: 136, 90tonnes/day
No of registered fish sellers	136
No. of sellers/traders operated in the market	136+50
Condition for entry in the market	Registration, Trade license
Mechanism for market information	Organized market intelligence and auctioned price
Weighing process	Weighing Platform, Digital balance

Source: Primary Survey, 2008

Supply of Fish

Marine, inland and brackishwater fish from across the country reaches the Howrah market for sale. It is primarily due to higher price, regular payments and financial benefits. Generally, the fish consignments reach the market in ice-packed containers from the landing centres/primary markets through various transport means like rail and road. The mode of transport from different states is mentioned in Table 5.10.

Table 5.10 Mode and Source of Fish Supply at Howrah Fish Market, Kolkata

State	Mode of transport	Likely type of fish
Andhra Pradesh, Karnataka, Kerala, Tamil Nadu	Truck	Indian Major Carps (IMC), Marine fish and Shrimp
Orissa	Truck, Rail	Indian Major Carps, Marine fish and Shrimp
West Bengal	Truck, Rail, Three wheeler	Indian Major Carp, Marine fish and Shrimp
Bangladesh	Truck	Hilsa
Haryana, Delhi, Punjab, UP, Bihar, MP	Truck, Rail	IMC
Maharashtra	Truck, Rail	Indian Major Carps, Marine fish
Gujarat	Truck, Rail	Marine fish, Hilsa

Source: Primary Survey, 2008

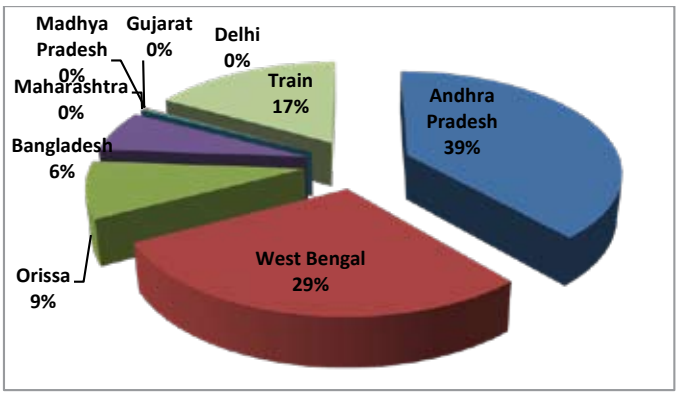
From most of the states, the fish is transported through road/rail. The Indian Major Carps reach the market from all the parts of country, except Gujarat. While the marine fish come from coastal states, the IMC is from inland waters. Hilsa is mostly transported from Bangladesh and Gujarat estuaries. Andhra Pradesh is the main supplier of fish to the Howrah market, followed by West Bengal and Orissa. From May 2006 to October 2008, Andhra Pradesh supplied 32660 tonnes of fish (Table 5.11). West Bengal followed with 24155 tonnes and Orissa with 7513 tonnes. During the above mentioned period, the total fish supplied to the market was over 84422 tonnes. Andhra Pradesh has over 39% share in total market arrivals (Figure 5.3). Nearly 17% of the catch is transported by train from various states of the country.

Table 5.11 Quantity of Fish Arrivals at Howrah Fish Market, Kolkata

(tonnes)

States/Country	Total
Andhra Pradesh	32660
West Bengal	24155
Orissa	7513
Bangladesh	5505
Maharashtra	304
Gujarat	73
Delhi	18
Madhya Pradesh	3
Train	14191
Total	**84422**

Source: Howrah Wholesale Fish Market Stall Owners Co-operative Society Ltd., 2008



Source: Howrah Wholesale Fish Market Stall Owners Co-operative Society Ltd., 2008

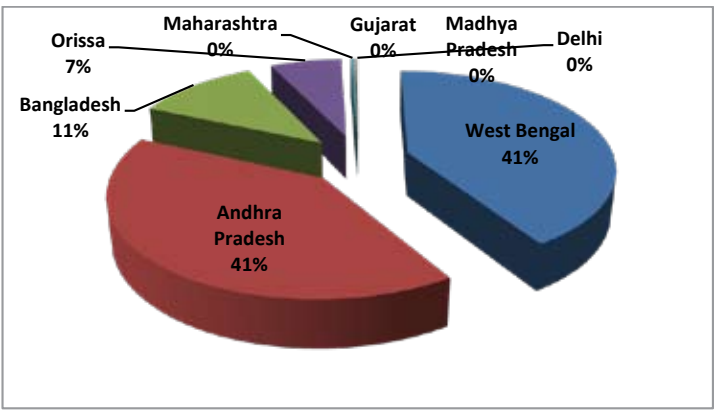
Figure 5.3 Percentage of Fish Arrivals at Howrah Fish Market, Kolkata

The highest number of trucks of fish has come from West Bengal (Table 5.12) during May 2006 to October 2008 (6797) followed by Andhra Pradesh (6718) and Bangladesh (1864). The total number of trucks that reached Howrah market during this time period was 16568. More than 81% of the trucks are either from Andhra or West Bengal (Figure 5.4). Other states have less than 10% share.

Table 5.12 Number of Truck Arrivals at Howrah Fish Market, Kolkata

States/country	Total
West Bengal	6797
Andhra Pradesh	6718
Bangladesh	1864
Orissa	1093
Maharashtra	63
Gujarat	26
Delhi	6
Madhya Pradesh	1
Total	**16568**

Source: Howrah Wholesale Fish Market Stall Owners Co-operative Society Ltd., 2008



Source: Howrah Wholesale Fish Market Stall Owners Co-operative Society Ltd., 2008

Figure 5.4 Percentage of Truck Arrivals at Howrah Fish Market, Kolkata

Disposal of Fish

Howrah fish market is purely a wholesale market and the catch arrivals are auctioned and disposed to different parts of Kolkata, other parts of West Bengal, and surrounding states including north-eastern

states. The fish auctioned at the market may be purchased by the wholesalers of various markets, hoteliers, retailers, vendors and bulk consumers. Since its inception, a system of open auction is prevalent in the market for disposal of all the fish in a reasonable manner on cash/credit basis. On an average more than 500 fish buyers participate in the auction process daily to purchase and supply the purchased fish after icing and packing to six states of North-east India and Uttar Pradesh, Delhi and Punjab (Figure 5.5).

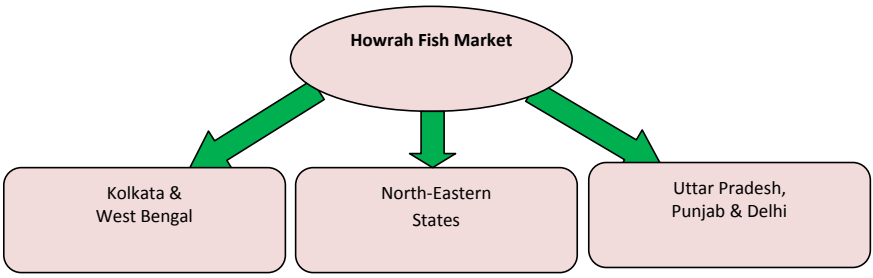


Figure 5.5 Disposal of Fish from Howrah Fish Market, Kolkata

Problems in Howrah Fish Market

- **Lack of proper infrastructure facilities** – There is lack of ice plants, cold storages, loading/unloading and parking facilities, provision of packaging materials and transportation facilities from railway station to market.

- **Lack of proper sanitation** – The market lacks proper sanitary facilities including drainage and sewer system, leading to unhygienic conditions.

- **Lack of supervision by government agencies** – No quality monitoring or assurance carried out by government agencies.

- **Lack of organized credit facility** – There is lack of any nationalized bank in the market, reducing the access to credit facilities for traders.

- **Lack of security** – There is no system of security and maintenance of law and order at the market premises. Presence of illegal/non-licensed traders in the market poses a serious problem to the genuine registered traders.

5.1.2.2 Malancha Market, Kolkata

Malancha fish market is situated in 24 Parganas (N) district. Shrimp is the dominating commodity transacted in this market. The market has two parts, one having 90 shops and other with 52 *arats*. The market is situated beside a canal, which is connected with the river. Aquaculture farms are located in the vicinity of the market. The number of traders in the market increased by one and half times over the past 35 years. The volume of shrimp and fish handled also increased over the years. The market is a national market as shrimps from most of the shrimp culture areas of the country are supplied here. It is a daily wholesale market, with major share of shrimps and nearly 20% of fish. The volume of transactions depends on harvesting season of shrimp. Generally during the period of full moon and new moon, the catch is very high. This time is locally known as *GON* period. Most of the transactions in the market are in credit. The entry of traders is possible, but the trader has to obtain a license before trading. The infrastructural development in this market is comparatively better than other markets due to the rights of land with traders which has influenced the fish marketing practices. The structure of the market is given in Table 5.13.

Table 5.13 Structure of Malancha Fish Market, Kolkata

General Particulars	Details
Location	24 Parganas (N), West Bengal
Area/Coverage	National
Scale of operation	Daily
Time span	Long period 5 am – 10 am and 3 pm – 9 pm
Volume of transaction	Wholesale
Nature of transaction	Cash and credit
No. of commodities	Shrimp (80%), other fish species (20%)
Stage of marketing	Producing market
Extent of public intervention	Regulated
Year of establishment	1973
Expansion (new buildings, cold storages, ice factory)	Yes
Over the years (No of traders)	1973: 90 1977: 142 2008: 142
No of registered fish sellers	142
No. of sellers/traders operated in the market	142
Condition for entry in the market	Panchayat Registration, Trade license
Mechanism for market information	No organized system; Based on demand and supply
Weighing process	Platform, Digital balance
Volume transaction per day	Peak season: 100-150 ton/day Off season: 40-50 ton/day

Source: Primary Survey, 2008

Source of Fish

Shrimp and fish from the aquaculture farms, sewage fed waters (*Bheries*) and natural water bodies come in the market for auction. About 80% of the total market arrivals are shrimp; rest of the amount is finfish. Over 95 % of shrimp is exported and rest amount is distributed in Kolkata and other local markets of West Bengal for consumption. Over 250 wholesalers and retailers come to market to purchase shrimp/fish from *aratdars*. Farmers / producers/ suppliers within and outside the state send their catch to this market for auctioning. The fish and shrimps are transported to the market by trucks and rickshaw van. As stated earlier, flow of raw material (shrimps) is mainly from brackishwater areas.

Disposal of Fish

Fish from Malancha fish market are destined mainly for export and/or processing. Some portions of the arrivals are distributed in Kolkata and regional local markets. Big shrimp/fish farmers cultivating large water areas undertake grading of fish at the farm site while for other farmers grading, sorting, icing and packaging is done by *aratdars* at auction time. Peeling and beheading of shrimp were seen in market performed by a small group of people. Wholesalers and agents lift shrimps/prawns of appropriate size from the market and carryout the beheading and chilling in separate processing units. Thereafter, the processed products are sent to exporters in Kolkata. The heads so removed constitute one of the major ingredients of fish feed. The information gathered indicated that people especially ladies in border areas remain engaged in drying fish and preparing pickles from small-sized marine fish. Pickles have negligible local demand but are supplied to Bangladesh.

Problems in Malancha Market

- Main problem is related to lack of sufficient storage facilities. Shrimp being highly perishable commodity and disposed mainly for processing and export purpose, should be maintained at very good quality. It requires cold storage and large amount of ice, which fall short most of the times. Although, new ice factories are in place, the demand for ice is very high in peak period.

- The irregularity in payments by export/processing companies to agents/*aratdars*/suppliers also affect the marketing process.

- The facilities for cleaning, beheading and icing are very poor. It needs to be improved substantially.

5.1.2.3 Sealdah Market, Kolkata

Sealdah fish market is a wholesale fish market in Kolkata similar to Howrah fish market. Located at Sealdah, the land of the market belongs to Calcutta University. The university charges rent from the traders. The number of traders in the market has tripled over the past five decades, while the volume of fish handled has increased tremendously. The market is a national market as fish arrives here from all parts of the country. It is a daily wholesale market, although about 10% of the auctioned fish is sold in retail. Most of the transactions in the market are in credit. The entry of traders is possible, but the trader has to take license. Infrastructural development in the market is very poor due to the lack of rights of land. Lack of infrastructure has affected the fish marketing practices. The structure of Sealdah market is given in Table 5.14.

Table 5.14 Structure of Sealdah Fish Market, Kolkata

General Particulars	Details
Location	Sealdah, West Bengal
Area/Coverage	National
Scale of operation	Daily
Time span	Short period 3.30 a.m. – 9 a.m.
Volume of transaction	Wholesale: 95% Retail: 5%
Nature of transaction	Both cash and credit
No. of commodities	All fish species
Stage of marketing	Consuming market
Extent of public intervention	Regulated
Year of establishment	1908
Expansion (No. of traders, Quantity traded)	1958: 50, 2.5 tonnes/day 1978: 65, 5 tonnes/day 2008: 150, 50 tonnes/day
No of registered fish sellers	75
No. of sellers/traders operated in the market	75+75
Condition for entry in the market	KMC Trade license – Rs 510 Fishery Dept. – Renewal of license: Rs 50/ year
Mechanism for market information	No organized system; Based on demand and supply
Weighing process	Platform, Digital balance

Source: Primary Survey, 2008

Source of Fish

Compared to Howrah market, the share of local fish is high in this market. The sources of fish for the market included aquaculture farms, sewage-fed fisheries around Kolkata and rivers of different places within and outside this state. Apart from local supply, fish also reaches these markets from Digha, Kakdwip, Namkhana Raidighi, Haroa, etc. besides from Andhra Pradesh, Maharashtra, Orissa, Himachal Pradesh and Bangladesh. Both inland and marine fish are available at this market for auction. The fish are categorized mainly into two classes: i) '*Pona*', fish from freshwaters and ii) '*Nona*', marine fish. Indian Major Carps are under group *Pona.* The landings of marine fish are comparative lower than *Pona.*

The mode of transportation of fish to these markets is the same as Howrah market. The types of containers used along with their capacity, species and source state for local and outside fish transports are mentioned in Table 5.15.

Table 5.15 Types of Fish Containers used at Sealdah Fish Market, Kolkata

Type of Container	Capacity of each container	Species carried	Source State
Plastic crate	Only fish =35 kg Ice + fish = 50 kg	IMC, Local fish	Andhra Pradesh, West Bengal
Wooden box	Only fish =105kg Ice+ fish =150 kg	Hilsa	Bangladesh
Thermocol box	Only fish = 50 kg	All species	Orissa, Maharashtra, Andhra Pradesh
Jhuri (Basket)	100 kg	Hilsa	West Bengal

Source: Primary Survey, 2008

Disposal of Fish

Similar to Howrah fish market, this market is also purely a wholesale market and the catch arrivals are auctioned and disposed to different parts of Kolkata, other parts of West Bengal, and surrounding states including north-eastern states (e.g. Assam). The wholesalers of various markets, hoteliers, retailers, vendors and bulk consumers generally participate in fish auction process at the market. Open auction system is prevalent in the market for selling and disposing of all the fish catch. Proper price fixation through open auction is considered very important in maintaining the good image of the market. On an average, 350 fish buyers participate in the auction process daily at Sealdah to purchase the fish. Fish are exported after icing and packing to Myanmar, Thailand and Bangladesh.

Problems at Sealdah Fish Market

- The space is very less which creates congestion and sanitary problems.
- There is no storage space for fish.
- The drainage system is very poor; water and wastes cannot be disposed.
- There is a lack of proper toilet facilities.
- The cold storage facilities are very less when compared to requirements.
- The same land is used by other commodity traders during day time.
- There is no parking space and hence, there are parking problem of vehicles coming to the market.
- There are no banking facilities at the market for easy transaction in marketing.
- The auctioneers are not maintaining the records properly.
- The recovery of credit from the *Paikars* (retailers/other purchasers) is a problem.
- The heavy traffic congestion at approach road to Sealdah market creates problems for the trucks and other vehicles bringing the catch in the market.

5.1.2.4 B. K. Paul Fish Market, Kolkata

B. K. Paul market (popularly known as Patipukur fish market) is another popular wholesale fish market at Kolkata. Located at Khudiram Bose Sarani at Kolkata, B.K. Paul market is over 110 years old. The number of traders in the market nearly doubled over past five decades, while the volume of fish handled became five times. The land of the market belongs to a private owner. The market may be considered as a national market as fish market arrivals are from all the parts of country. It is a daily wholesale market, although, about 5% of the auctioned fish is sold in retail. Most of the transactions in the market are in credit. The entry of traders is possible, but the trader has to take license. Over 200 traders participate in the auction process at this market. Due to the lack of rights of land, no infrastructural development could be carried out to improve fish marketing practices. The structure of B.K. Paul market is given in Table 5.16.

Table 5.16 Structure of B.K. Paul Fish Market, Kolkata

General Particulars	Details
Location	Khudiram Bose Sarani at Kolkata, West

	Bengal
Area/Coverage	National
Scale of operation	Daily
Time span	Short period 4 am – 8 am
Volume of transaction	Wholesale – 90% Retail – 10%
Nature of transaction	Mainly credit, also cash
No. of commodities	All fish species
Stage of marketing	Consuming market
Extent of public intervention	Regulated
Year of establishment	1898
Expansion (No. of traders, Quantity traded)	1958: 60, 3t/day 1978: 80, 7t/day 2008: 119, 15 t/day In 1958, there was two storied building and two ice factory. Now, the building is collapsed and only one ice factory is remaining)
No of registered fish sellers	119
No. of sellers/traders operated in the market	119+30
Condition for entry in the market	Registration, Trade license
Mechanism for market information	No organized system; Based on demand and supply
Weighing process	Platform, Digital balance

Source: Primary Survey, 2008

The source and disposal of fish are the same as Sealdah market. Constraints or problems for fish marketing are also similar to those at Sealdah market.

5.1.3 Maharashtra

Maharashtra is an important fish producing and consuming state of India. Mumbai district is the leading fish producer in the state of Maharashtra due to the presence of several large and small landing centres. In addition, fish is supplied to Mumbai markets from neighbouring districts and states (Pomfrets and Seer fish from Gujarat; Sardines and Mackerel from Karnataka; IMC from Andhra Pradesh; other fish from Goa, Orissa, West Bengal, etc.). From Mumbai markets, fish is disposed off to sub-consuming centres and secondary markets all over the state. Additionally, fish is also sent to West Bengal, Uttar Pradesh, Madhya Pradesh, Assam, Punjab and Delhi. The physical flow of fish through Mumbai fish markets is depicted below.

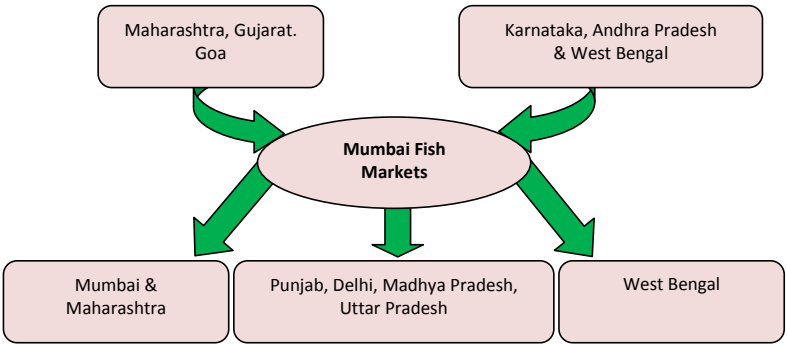


Figure 5.6 Physical Flow of Fish through Mumbai Fish Markets

Mumbai has a number of wholesale and retail markets in addition to markets functioning at landing centres to handle fish. The largest wholesale market in Mumbai is the Chatrapati Shivaji Wholesale Fish Market. Additionally, wholesale trading of fish occurs at landing centres such as Sassoon Dock, New Ferry Wharf and Versova. These landing centres acts as the primary markets and the wholesale markets situated at a distance away from the actual landing centres acts as the secondary markets whereas the various fish retail markets spread in different consuming centres work as the tertiary markets. For freshwater fish wholesale trading there is also a specialized market named as the Dadar Fish market. This market receives its materials from mainly Andhra Pradesh and sells them to the local market retailers. There are many fish retail markets available in the zone which receives materials from the wholesale markets. The retail markets can be classified into big, medium & small ones. There are three big (Andheri, Grant Road, Matunga) and several medium fish retail markets in the city which receive materials from the wholesale markets. There are many small fish retail markets which are getting fish and fishery products from either the wholesale markets or retail markets. The retail markets are in direct contact to the final consumers as the retailers used to do their dealings with the final consumers only. The small retail markets are situated in various places of Mumbai and Navi Mumbai.

5.1.3.1Chatrapati Shivaji Fish Market, Mumbai

The Chatrapati Shivaji fish market is a nationally recognized major fish market of Maharashtra. The market is under the control and maintenance of Brihan Mumbai Municipal Corporation (BMC). It is a highly established market having potential for trading of huge quantity of fish. The market is mainly a wholesale one but it also deals with the retail fish marketing.

The market is a well furnished double storied building in which the upper floor is mainly for wholesale trading while the ground floor is for retail trading. There are also some dry fish suppliers operating in the market, who collects the fish which are not commercially viable, salts them and supplies them to the dry fish processors. There is a good regular maintenance of the overall market. The exterior of

the market is surrounded by secondary wholesalers who sell the fish to the vendors as well as the retailers. There are separate arrangements of platforms for the retailers at the ground floor with good drainage facility. The wholesaling floor is a big hall measuring an approximate 400 sq m area. The market is having a separate space at its back for the unloading of the trucks bringing materials from various places. The health and hygiene of the market is well maintained by BMC by cleaning the fish offal in the market immediately after the disposal of the fish generally at noon. BMC is also having a separate inspection office situated in the market.

Supply and Disposal of fish

Chatrapati Shivaji market is specialized in mainly marine fish marketing with the fish coming from various places from all over India. The market receives fish through completely insulated trucks from various places in thermocol boxes. A single box is of 40 kg capacity. In the peak season, the market records an average arrival of 25 trucks of fish while in slack season the number reduces to an average of 10-15 trucks. The materials arrive from various places like Gujarat (Veraval, Jamnagar), Howrah, Goa and also from various places of Maharashtra like Ratnagiri, Colaba, Madh, Manori and Versova. A small amount of freshwater fish from Nagpur also used to arrive at the market. From the market, the fish goes to all over India such as Howrah, New Delhi, Punjab, Goa and also to the places in Maharashtra like Nashik, Pune, Jalgaon, etc.

The species-wise arrivals from different places to the market during July 2008 are shown in Table 5.17.

Table 5.17 Species-wise Arrivals to Chatrapati Shivaji Market during July 2008

Places	Fish	Quantity	Seasonality
Gujarat (Veraval, Porbander, Okha, Bharauch)	Rawas	1 ton	Annual as well as seasonal
	Black Pomfret	10 tonnes	
	Ghol (Croakers)	1-2 tonnes	
	Hilsa	1 ton	
Kolkata	Surmai	6-10 tonnes	Seasonal
	Black Pomfret	> 10 tonnes	
	Pomfret	5 tonnes	
	Tuna	160 kg	
Mumbai (Kasara, Vasai, Colaba)	Mackerel	5-10 tonnes	Seasonal
	Tuna	200kg	

	Shark	500 kg	
Andhra Pradesh	Pomfret	5 tonnes	Annual
	Freshwater fish	500 kg	
Goa (Karwar)	Mackerel	5 tonnes	Annual
Maharashtra (Nagpur, Ratnagiri)	Freshwater fish	500 kg	Annual
	Mackerel	5 tonnes	
Orissa	Pomfret	5 tonnes	Seasonal

Source: Primary Survey, 2008

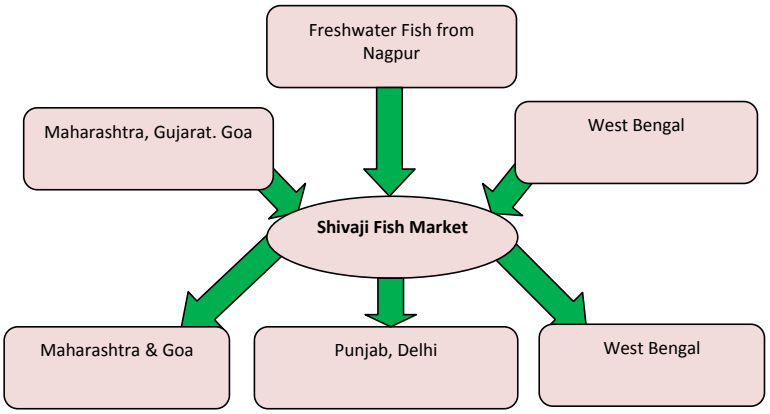


Figure 5.7 Flow of fish through Shivaji Fish Market, Mumbai

According to BMC, the general arrival of the fish fluctuates highly, depending on the season. The arrival of fish varies from 1000-3000 boxes. The slack season may be due to fishing ban, regional effect on consumer behavior, season, etc. During peak season (September- March), the total arrival is about 2000-2500 boxes/day (about 120 tonnes of fish/day). This may account for 75000 boxes per month for a total of 525 tonnes of fish in the season. In lean season (rest months of the year), approximate arrival is about 1500 boxes/day with an average quantity of 60 tonnes fish/day. This may account for about 45000 boxes per month with a quantity of 135 tonnes of fish in the slack season.

According to BMC, there are 85 wholesale fish traders paying a monthly rent of Rs 10/sq ft and about 158 fish retailers paying a monthly rent of Rs 73 to BMC. The registration system for the wholesaler is by tender system. The wholesalers are required to pay Rs 6/box of fish as the arrival charge. For transport the parcel charge is to be paid by the wholesaler to BMC is Rs 10/box. There are 10 ice suppliers who collect ice from their respective ice plants and supply it to the market, as the market does not have ice plants. They are also required to pay Rs 10/sq ft as rent to BMC.

Though Shivaji market trades numerous types of fish, there are some lacunae in the market which need to be rectified in order to make it superior. It needs improvement in the maintenance of hygiene and sanitation. Though there is regular cleaning of the market, there is need for proper drainage facility. The commission agents are the major players deciding the price factors and they cheat at times. Their operation needs to be regulated.

5.1.3.2Sassoon Dock Landing Centre, Mumbai

Sassoon Dock is the largest landing centre of the Maharashtra located at Colaba, Mumbai. The dock is under the supervision of Mumbai Port Trust (MPT) and the maintenance and cleaning of the dock is done by the MPT. Sassoon Dock is highly restricted to Maharashtrian boat owners. In order to avoid any sort of confusion, the boat owners of other provinces are not allowed to unload their materials here. Sassoon Dock involves the operation of both trawlers and purse seiner type of crafts for fishing. The landing centre is specialized for only marine fish like squids, cuttle fish, shrimps, pink perch, ribbon fish, seer fish, pomfrets, etc. among which the prawns, *Dhoma*, pink perch and *Rawas* are the major quantity of fish arriving in the dock. Those fish which are not found suitable for export purpose are used for domestic purpose.

The centre operates daily and commences its operation at 5 am and terminates at 12 noon. Fishermen along with their catch arrive at the dock in early morning session and the trading of fish also starts immediately. The details of the Sassoon Dock landing centre are given in Tables 5.18 and 5.19.

Table 5.18 Details of the Sassoon Dock Landing Centre, Mumbai

Particulars	Details
Location	Mumbai
Area	2 acres
Wharf length	1153 m
Jetties	2 (Old jetty and New jetty)
Ice plants	2
Cold storages	3
Pre-processing plants	65
Fuel outlets	3
Other facilities	Ice crushing machines

Source: Primary Survey, 2008

Table 5.19 Operational Details of Sassoon Dock Landing Centre, Mumbai

Particulars	Details
Total number of boats	750

Average number of boats operating daily	90
Average quantity of fish landed daily	300 - 400 tonnes
Main fish species landed	Squids, Shrimps, Cuttle Fish, Pink Perch, etc.

Source: Primary Survey, 2008

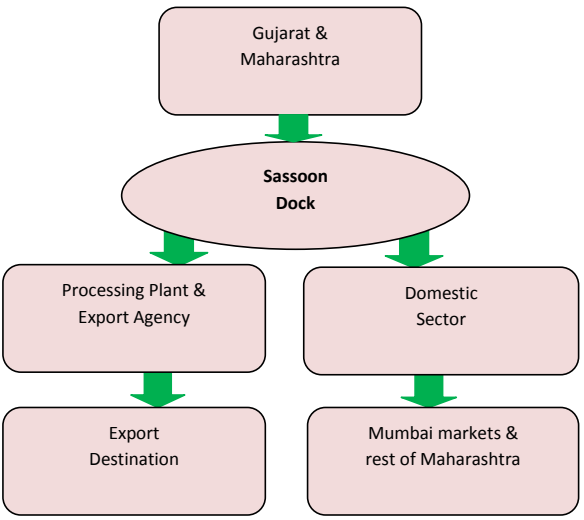


Figure 5.8 Flow of fish through Sassoon Dock Landing Center, Mumbai

The fishermen are required to pay an arrival charge for the landing the boats to MPT every month based on the gross weight of the boat. The charge is Rs 18.75 per ton of boat along with 12% service tax + 2% education cess. There are about 30-35 auctioneers dealing in the centre. The auctioneers get registered under MPT. The auctioneers are required to pay a license fee of Rs 9375 per annum which has to be renewed each year. There are also charges like water charge at Rs 150/ton along with 12% service tax + 2% education cess comprising a total of Rs 170 per month along with transportation charges at Rs 25/truck per day and Rs 625/truck per annum.

5.1.3.3New Ferry Wharf, Mumbai

New Ferry Wharf is the second largest landing centre after Sassoon Dock in Mumbai. New Ferry Wharf is utilized as a landing centre as well as a transport jetty. It was established during the 1980s and was modernized within 2 years of establishment. The landing centre is well maintained by MPT, which has its regional inspection office in the dock itself. The jetty is a landing centre cum wholesale market.

The market is an annual market with the arrival of the catch being through out the year except the months of fishing June, July and August. The market commences its activity at 5.00 am and concludes at 1.00 pm. The peak hours of the market are during 5 am to 11 am.

The New Ferry Wharf landing centre is having good infrastructure facilities. It is situated along a jetty mainly used for transport purposes. The centre for fish trade is a rectangular shaped one having an approximate size of 85 m x 10 m. The landing centre is provided with boat and engine service station. A common petrol pump is also situated in between the fish jetty and the transport jetty. There is no ice and cold storage facility in the centre and the ice needed for the market is being brought from outside private sources mainly from Vashi in Navi Mumbai region. The market is maintained by MPT, which collects rent from the boats landing in the centre as well as looks after the water and other maintenance facilities. The centre is not having any drying facility.

The landing centre possesses a maximum landing capacity of 772 boats. At a time, about 30-40 boats can arrive at the landing centre. In a single boat, approximately 13 fishermen go for a trip. Depending on the season, the fishermen spend around 10-12 days a month for fishing. About 28-35 trips are carried out by a fishing boat in a year. The landing centre experiences an average landing of 200-300 tonnes/day with a maximum landing capacity of 772 boats. The main species landed are Prawns, Dhoma, Pink Perch and Ribbon fish.

There are a total of 24 auctioneers present in the landing centre. They are registered under MPT for which they pay a monthly charge. The charges for arrival, water charge, license fee, etc. are same as that of the Sassoon Dock Charges as both the docks are operated by MPT. The registration of the auctioneers is also based on the same requirement as that of the Sassoon Dock. The auctioneers also pay a transportation charge of Rs 25 truck/day and Rs 625 truck/annum. Ice is being hired from outside private sources and is crushed here in crushing machines whose licenses are issued by MPT to their respective owners. The licenses fee for ice crushing is Rs 7500 per annum.

5.1.3.4Versova Landing Centre, Mumbai

Versova landing centre is the third important landing centre in Mumbai. It is in fact a landing centre cum fishing village. The landing centre was established 30 years ago. It is an important centre in terms of total landing and it has a fish drying centre. A fishermen co operative society, named The Versova Machimar Society Pvt. Ltd., deals with supply of diesel, supply of ice, etc. for the fishermen as well as for the landing centre.

The peak hours of the market are in the evening, from 3.30 pm to 10.00 pm. In morning, it commences at 4.00 am and functions up to 11.00 am. During this time, the fishermen boats arrives at the centre and the fish catches are being sold to small retailers through auction and other less commercial fish are being dried in the landing centre itself. The landing centre is not having any well constructed infrastructure like other landing centres. It is simply located at the side of the beach where the trade happens. Individual Bamboo scaffoldings are erected for carrying out the drying of fish. The landing centre is spread throughout an area surrounding the fishing village. The ice plants and diesel pumps owned by the Machimar society are also present near the centre.

There are 700 fishing vessels present at Versova landing centre. 500 are medium sized boats that go up to Ratnagiri, Vasai, Murud for fishing. The rest are mechanized trawlers, about 270 boats. 300 of them are small boats operating up to Khar, Walkeshawar. The registration of the 15-40 tonnes boat is done under the Maritime Board. This registration is required to be renewed on annual basis. Boats above 40 tonnes are needed to be registered under Central Government. Only 15% of the boats are above 40 tonnes.

The big vessels used to be in sea for around 8-10 days while the medium boats travel up to 30-40 fathoms depth. The small boats operate for 1- 2 days and goes for short trips. In a year, a boat goes for 25-30 trips. The landing centre is specialized with marine fish marketing and deals with variety of marine fish like Shrimp, Pomfrets, Croakers, Anchovy, Oil Sardine, Squid, Crabs, Elasmobranchs (Sharks, Rays), Pink Perch, etc.

5.1.3.5Dadar Fish Market, Mumbai

Dadar fish market is specialized in freshwater fish marketing. The market was established in 1998. It is spread over an area of 1.5 km. The market functions under the regulation of the Brihan Mumbai Municipal Corporation (BMC).

It is an annual market. The fish arrive throughout the year except in the months of June, July and August during which arrivals are less. Fish arrive in early morning and the market commences at 5.00 am and terminates at 11.00 am.

The market is having a single floor where entire fish marketing is carried out. The space is not sufficient for trading of fish here. Many wholesalers are functioning in a relatively small place as a result of which, some retailers occupy space outside the market also. The fish used to arrive in the market in insulated trucks during the morning hours. The trucks carrying fish are unloaded at the front vacant space of the market.

The market receives fish from different parts of the country as shown in Figure 5.9.

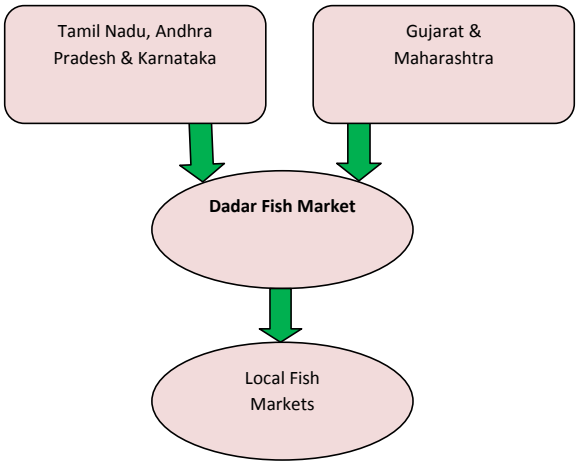


Figure 5.9 Flow of Fish through Dadar Fish Market, Mumbai

A single truck is having a capacity of 10 tonnes. On each day, an approximate total of 50 tonnes fish comes to the market. The composition of fish arrivals is shown in Table 5.20.

Table 5.20 Composition of Fish Arrivals to Dadar Fish Market, Mumbai

Species	Quantity (tonnes)
IMC	20
Cat fish (*Clarias batrachus*)	15
Freshwater shark	15

Source: Primary Survey, 2008

There are 36 licensed wholesalers present in the market registered under BMC. Wholesalers are required to pay a license fee of Rs 1500 per annum to BMC, which also charges Rs 6/tub as arrival charge from the wholesalers. The cleanliness and maintenance of the market is looked after by BMC.

The fish to the market are brought in insulated sawdust packed trucks. The fish are packed in the crates in alternative fish and ice layer and the crates are loaded onto the trucks. Sawdust is filled in order to have complete insulation, which will allow the fish to be in fresh condition for 3 days easily. Each truck carries 10 tonnes of material of which 8 tonnes are fish and 2 tonnes are ice and insulation materials. The transport cost is Rs 50,000 per truck from A.P. The weighing of the fish is generally done on kilo basis using a physical balance. The market is not having its own ice plant and the ice is brought from outside sources. The cost of ice is Rs 35/crate.

Problems in Dadar Fish Market

1. The market requires development of its infrastructure.
2. Lack of market space for hassle-free trade.
3. Lack of sufficient water availability.
4. Lack of hygiene and sanitation facilities.

5.1.3.6Marol Fish Market, Mumbai

The Marol fish market is one the oldest market in the Mumbai region and is the largest dry fish market in Maharashtra. The market was established 70-80 years ago and the market has got its new infrastructure developed by the BMC two years ago and is yet to be delivered to the dry fish traders. At present, the market operates under the control of BMC. It acts as a main trading centre for dry fish where the dry fish in bulk comes from various parts of Thane district, Raigad district and from places in Mumbai such as Versova. The buyers in this market are mainly the wholesalers coming from various districts of Northern Maharashtra as well as from Aurangabad region where fresh marine fish are not available (Figure 5.10).

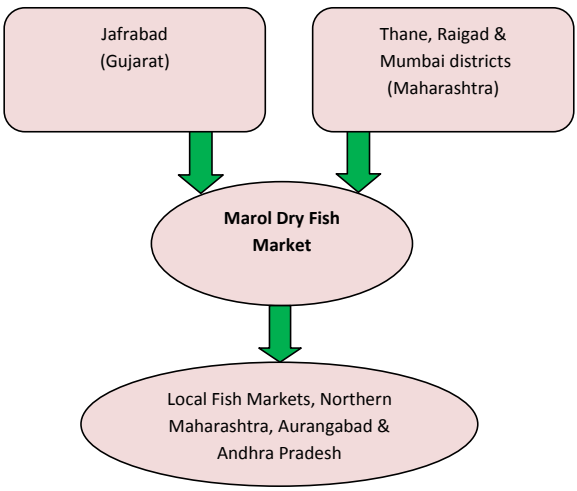


Figure 5.10 Flow of Fish through Marol Fish Market, Mumbai

Marol dry fish market operates for three days in a week (Thursday, Friday and Saturday). On Thursday, dry fish sellers from Jafrabad (Gujarat) do wholesaling in the market, which on this day is dominated by Bombay Duck followed by Ribbon fish and other fish. On Friday and Saturday, the dry fish sellers mainly from Maharashtra do trading. Saturday is the main market day, when both retailing and wholesaling are carried out. Generally, the market starts at 4.00 am and continues up to 2.00 pm.

The market covers a total area of 11000 sq. yards. There are a total of 10 sheds, one each for 10 main places of Maharashtra from where dry fish comes in bulk quantity such as Versova, Uttan, Arnala and Tembi pada, Madh, Manori, Vasai and Gorai. The market is having toilet facility as well as electricity facility, but there is no water supply. The potable water is supplied costing Rs. 1-2 per glass. There is no separate place for parking of vehicles and these are parked along the road side.

In the peak season, 40-45 trucks come to the market carrying 100-150 baskets weighing 40-50 kg each from different parts of Maharashtra and Gujarat. In this market the dry fish from Maharashtra gets higher price than that of the dry fish from Gujarat because of the superior quality. Transaction in the market occurs in cash as well as credit. The dry fish sellers use tempo for transportation, each of which carries about 6-7 ton of dry fish. The tempo charge from Jafrabad to Marol is Rs. 16000. In case of dry fish traders from Maharashtra, the transportation charge ranges from Rs. 20-120 per bag (*topali*) of dry fish depending upon the traveling distance.

5.1.4 Tamil Nadu

Tamil Nadu is the fourth largest producer of fish in India with a fish production of 552363 tonnes in 2006-07. Several fish markets exist in the Chennai district, the details of which are given in Table 5.21. Some markets, viz. Chindadiripet, Saidapet, Kasimedu and Moolakothalam are described in detail.

Table 5.21 Profiles of Fish Markets in Chennai

Name of the Fish Market	Number of Fish Merchants	Quantity of Fish brought for Sales (kg)	Quantity of Fish sold (kg)	Nature of the Market Place	Cold Storage & other details
Nochikuppam	13	338	225	Public place	Nil
Tondiarpet	12	44	30	Private place	Nil
Thiruvottiyur	50	1998	1400	Thiruvottiyur Municipality	Nil
Velachery	8	469	389	Chennai corporation	Nil
Madhuravoyal	33	11000	11000	Private place	Nil
Washermenpet	10	660	560	Private place	Nil
Choolaimedu	7	75	60	Public place	Nil
Kalmandapam	20	105	97	Public place	Nil
Nadukuppam	120	1195	869	Public place	Nil
Aminjakarai	25	2000	1400	Private place	No cold storage facility . Ice cubes are bought from the private shops.
Thiruvanmiyur	14	99	58	Public place	Nil
Olaikadai (Seethakathi Nagar)	19	1300	950	Land taken for lease	Ice cubes are sold here
Nandambakkam	6	135	70	Public place	Nil
Madipakkam Kooturroad	16	2810	1700	Public/Private Rental Building	Nil
Vanuvampettai	8	770	403	Roadside platform	Nil
Tambaram	12	132	132	Land belonging to	Nil

Sanitorium				Kadaperi fish Merchants	
Kottivakkam	35	525	350	Kottivakkam panchayat building	Nil
Palavakkam	25	300	250	Palavakkam panchayat building	Nil
Mylapore	25	600	500	Private place	Nil
Mandaveli	8	200	150	Public place	Nil
Chrompettai	4	150	100	Public place	Nil
Otteri	6	186	166	Public place	Nil
Alandur	12	213	175	Trust building	Nil
Purasawalkkam	43	6000	3000	Private place	Nil
Beasant Nagar	15	200	112	Oorur & Alcottukuppam FWCS place	Nil
Zam bazaar	95	1745	1045	Private place	Nil
Chintadripet	45	10000	8000	Private place	Nil
Kasimedu					
Fishing Harbour	200	2500	Nil	Ikkiya panchayat place	Nil
Jeevarathinam Nagar	30	400	60	Chennai corporation	Nil
Saidapet	47	12000	10000	Private place	Nil
Mint (Sevenwells)	28	135	88	Public place	Nil
Total	**991**	**58284**	**43339**		

5.1.4.1 Chindadiripet Fish Market, Chennai

This is one of the oldest markets in Chennai district. More than 100 varieties of fish are traded in this market. The market is located very close to Chennai railway station which helps the traders to arrange for fish supply from far off places like Howrah and Kerala.

Table 5.22 General Particulars of Chindadiripet Fish Market, Chennai

Particulars	Details
Area (sq ft)	10,000
No. of Wholesalers	19
No. of Processing Sheds	100
No. of Retailers	40
No. of Vendors	400
No. of direct consumers	200 to 300
Fish Varieties	Marine: Inland (80:20)
No. of Ice plants	Nil
Parking place	Nil
Source of fish supply	Kolkata, Andhra Pradesh, Calicut, Chengalpet

Source: Primary Survey, 2008

The market was established about 100 years back and was renovated in 1980. The market is owned by a private party who has pledged the property to obtain a loan. There are 19 wholesale shops at the market and for each shop the rent is Rs 3000/per month. The shop owners let out the shops to retailers after the wholesale business is over for the day by around 9.30 am. Retailers pay Rs 30 as rent and each shop is occupied by 2-4 persons. There are three associations operating among the traders in the market, viz. exporters' association, wholesalers-cum-commission agents' association and retailers' association.

The market opens and the auction starts at 4.00 am with the wholesalers-cum-commission agents starting their business which goes up to 10.00 am. Wholesalers, retailers, vendors, headloaders, bulk purchasers like hotels, etc. participate in the auction process. Chindadiripet market functions as a reference market for fixing fish prices. Retailers sell fish from 10.00 am to 7.00 pm at the same venue. About 10000 people depend on Chindadiripet market directly and indirectly for living and on an average 500 to 10,000 consumers come to market everyday. This market is cleaned at 11.30 am every day.

Supply of Fish

Fish arrives to this market from West Bengal (Kolkata), Maharashtra (Mumbai), Andhra Pradesh, Orissa, Gujarat and Karnataka (Mangalore). Fish catch from nearby landing centre like Pulicat, Kasimedu and Kanthur also come to this market.

Table 5.23 Operational Details of Chindadiripet Fish Market, Chennai

Particulars	Details
Packaging and Storage	Thermocol Boxes, Fibre crates and Baskets
Transportation	Trucks and Railways
Distance from Railway station	10 – 20 minutes
Commission charges/Profit margins	6 – 10 %
Quantity traded	20 tonnes
Species in Demand	Sankara, Sardine, Mackerel, Seer fish, Nethili, Pomfret, Lady fish, Live Murrel, Cutla, Rohu, Prawn, Crab
Seasonal Variation and Demand	High – January to March Low – October to December

Source: Primary Survey, 2008

Table 5.24 Facilities available at Chindadiripet Fish Market, Chennai

Facilities	Status
Auction Hall	No
Water Supply	Good
Power supply	Yes

Drainage	Poor
Cold storage	No
Sanitation	Poor
Market Shed	Yes
Toilet	No
Waste disposal	Good
Individual space	Less
Distance from ice plant	With in 3 to 5 km
Cemented platform	Good
Insect repeller	No
Fish dressing facility	Yes (Rs.10)

Source: Primary Survey, 2008

Problems in Chindadiripet Fish Market

1. The site is owned by private individual who has pledged the site for a loan from a public sector bank. Though the wholesalers can buy the site collectively they hesitate because the loan obtained and interest up to date is much higher than the value of site.

2. Chindadiripet market does not have toilet facility in the market vicinity.

3. The approach road is narrow and trucks coming to offload the fish cause traffic jams.

4. The market place is not regularly cleaned and it is unhygienic.

5. There is no parking facility for two wheelers.

6. This market is located in an ideal place with easy access to the consumers and traders and if the infrastructure facilities are improved the market will attract more customers for buying different varieties of fish at cheaper rates.

5.1.4.2Saidapet Fish Market, Chennai

This is one of the biggest fish markets in the city. This market has been in operation since 1900. This market also serves as both wholesale and retail market. It is located between Saidapet railway station and Saidapet bus terminal. The frequent bus and rail services make this market easily accessible to consumers. Most of the fish arrivals are in the early morning when road traffic is very less. Since the market is located in a busy area, parking area is limited causing problems for consumers who visit the market.

The site of the market is owned by Karneeswarar temple which is under control of Ministry of Hindu Religious Charitable Endowment of the state government. Till the year 2001, the management was carried out by an association named Saidapet Fisheries Co-operative Society. After 2001, the association stopped functioning and the site is auctioned annually by the temple authorities to the highest bidder. Last year, the site was leased for Rs 7,00,000. The successful bidder is permitted to collect rent from individual shop owners. Presently the market has 20 wholesaler and 120 retailers. It also includes 8 specialized dry fish retailers. Wholesalers-cum-commission agents pay Rs 500 as monthly rent. The retailers pay Rs 10 as daily rent apart from Rs 7/basket of fish as entry fee. Water is supplied at the cost of Rs 3/ packet. Fish consignment normally reaches the market with proper ice packing in thermocol containers. The use of bamboo basket and other packing materials for fish transport is almost non-existent.

Table 5.25 General Particulars of Saidapet Fish Market, Chennai

Particulars	Details
Area (sq ft)	1,00,000
No. of Wholesalers	15
No. of Processing Sheds	Nil
No. of Retailers	120
No. of Vendors	1000
No. of direct consumers	300 to 500
Fish Varieties	Marine: Inland (85:15)
No. of Ice plants	Nil
Parking place	Nil
Source of fish supply	Andhra Pradesh, Chengalpet, Kolkata, Chindadripet

Source: Primary Survey, 2008

Saidapet market normally operates from 5.00 am to 12.00 noon and 4.00 pm to 8.00 pm. Some shops are open at other times also. Fish arrivals start at 4.30 am and trucks leave by 7.00 am. The wholesalers are active between 7.00 am to 10.00 am when fish are auctioned. The retailers of the Saidapet market and neighborhood markets purchase fish in the auction and start retail selling. The retailing of fish continues up to 8.00 pm and prices vary widely base on consumer demand as well as the quality of fish. Each day the market witnesses arrival of 15 to 20 trucks.

Table 5.26 Operational Details of Saidapet Fish Market, Chennai

Particulars	Details
Packaging and Storage	Thermocol Boxes, Fibre crates and Baskets
Transportation	Trucks and Railways

Distance from Railway station	10 – 20 minutes
Commission charges/Profit margins	6 – 10 %
Quantity traded	12 tonnes
Species in Demand	Sankara, Sardine, Mackerel, Seer fish, Nethili, Pomfret, Lady fish, Live Murrel, Cutla, Rohu, Prawn, Crab
Seasonal Variation and Demand	High – January to March Low – October to December

Source: Primary Survey, 2008

Table 5.27 Facilities available at Saidapet Fish Market, Chennai

Facilities	Status
Auction Hall	No
Water Supply	Good
Power supply	Yes
Drainage	Poor
Cold storage	No
Sanitation	Poor
Market Shed	Yes
Toilet	No
Waste disposal	Good
Individual space	Less
Distance from ice plant	With in 3 km
Cemented platform	Good
Insect repeller	No
Fish dressing facility	Yes (Rs.7)

Source: Primary Survey, 2008

Fish is supplied to Saidapet market from Maharashtra (Mumbai), West Bengal (Kolkata), Orissa, Andhra Pradesh, Karnataka and even from neighboring countries like Bangladesh. The Indian Major Carps (IMC) are mainly supplied from Andhra Pradesh and from Veedur and Sathanur reservoirs.

Problems in Saidapet Fish Market

1. Market is congested with narrow passage which makes it difficult for consumers purchasing fish.
2. Lack of parking facilities for two wheelers.

3. The adjacent building houses sub registrar office which makes the area very crowded. During the week days, the vehicular movement is very difficult as trucks carrying fish cannot enter or move out of market area freely.

4. Though there is a provision for toilet the facility is presently non-functional which makes it difficult for the traders who spend long hours in the market transacting the business.

5.1.4.3Kasimedu Fish Landing Centre, Chennai

Kasimedu is one of the major fish landing centres in Tamil Nadu state. Organized fish auction started in 1970 at Kasimedu. Kasimedu landing centre is located near a bus terminus and is well connected by frequent bus services, autos and trucks.

Table 5.28 Profile of Kasimedu Fish Landing Centre, Chennai

Particulars	Details
Area (sq.ft)	60000
No. of Wholesalers	50
No. of Processing Sheds	120
No. of Retailers	200
No. of Vendors	2000
No. of direct consumers	300 to 500
Fish Varieties	Marine
No. of Ice plants	7
Parking place	No
Source of fish supply	Direct sea catch, Andhra Pradesh

Source: Primary Survey, 2008

There are many associations operating in the market. They function together as a federation, which decides the major policy matters. At the time of survey the market had 50 wholesalers, 200 retailers including small vendors. There are 2500 daily wage labourers like coolies who carry out loading and unloading jobs. There are 800 mechanized boats and 600 non-mechanized boats operating at the landing centre. There are 120 'sheds' dealing with live fish markets and icing activities. Fishermen prefer landing in Kasimedu since they get reasonably good price. The daily average volume of transaction is around Rs 30,00,000 at Kasimedu. The association collects Rs 200 per month from each mechanized boat owner and Rs 100 per month from wholesalers, retailers and ice making units. This corpus money is used by the office for development and maintenance work including maintenance of road, electricity and routine cleaning of market site.

Table 5.29 Operational Details of Kasimedu Fish Landing Centre, Chennai

Particulars	Details
Packaging and Storage	Thermocol Boxes
Transportation	Fibre boat and Trawl boat
Distance from Railway station	20 – 30 minutes
Commission charges/Profit margins	3-10 %
Quantity traded	30 tonnnes
Species in Demand	Sankara, Sardine, Mackerel, Seer fish, Nethili, Pomfret, Lady fish, Live Murrel, Catla, Rohu, Prawn, Crab
Seasonal Variation and Demand	High – January to March Low – October to December

Source: Primary Survey, 2008

The peak sales occur on Sunday followed by Wednesday coinciding with the boat arrivals. The fishing ban exists from 15 April to 30 May every year, during which the fishermen repair their boat and nets. In Kasimedu market, dry fish is also sold by about 20-30 small traders. There are 7 ice plants producing 30 tonnes of ice. The labourers are paid Rs 50-100 on an average per day depending upon their work.

Kasimedu market opens at 3.00 am with the arrival of boats. The fish catch is sorted by varieties and brought to the auctioning point. The traders stay in the market the previous night so that they can buy fresh fish in the first lot. Institutional purchasers and common consumers start buying fish from the market from 6.30 am to 9.00 am. Though auction process is completed at 9.00 am the market continues to work till 9.00 pm catering to the needs of common people. Ninety % of the fish sold at Kasimedu market are marine fish and rest are farmed fish and dry fish. Fish from Andhra Pradesh, Kerala and Karnataka also reach the landing centre during the fish ban period.

Table 5.30 Facilities available at Kasimedu Fish Landing Centre, Chennai

Facilities	Status
Auction Hall	No
Water Supply	Poor
Power supply	Yes
Drainage	Poor
Cold storage	No
Sanitation	Poor
Market Shed	No
Toilet	No
Waste disposal	Poor
Individual space	Less

Distance from ice plant	150 m
Cemented platform	Poor
Insect repeller	No
Fish dressing facility	No

Source: Primary Survey, 2008

Problems at Kasimedu Fish Landing Centre

1. Kasimedu fish market is also poor in hygiene which should be improved.
2. Even though road exists the condition is poor and local authorities do not keep road in good condition for heavy vehicular movement causing problems in fish transportation.
3. The market is in poor status during rainy season when the sheds leak causing hygiene problems and hindrance in marketing activities.

5.1.4.4Moolakothalam Fish Market, Chennai

The Moolakothalam has a dry fish market established in 1920. It contains 10 wholesale and 18 retailer shops. The building is privately owned. Existing traders function as one unit. Each shop fetches a monthly rent of Rs. 2000 to the building owner. Entry for new traders in this market is restricted.

Table 5.31 Profile of Moolakothalam Fish Market, Chennai

Particulars	Details
Area (sq ft)	5000
No. of Wholesalers	8
No. of Processing Sheds	Nil
No. of Retailers	12
No. of Vendors	400
No. of direct consumers	50 to 100
Fish Varieties	All
No. of Ice plants	Nil
Parking place	Nil
Source of fish supply	Kerala, Gujarat, Andhra Pradesh, Orissa, West Bengal and Tamil Nadu

Source: Primary Survey, 2008

Market operates between 6.00 am and 8.00 pm. The wholesaler operates from 6.00 am to 8.00 am and then the retailers continue their sales till 8.00 pm. In most of the cases, a shop is shared by one

wholesaler and 2-3 retailers. About 5-10 trucks of dry fish reach the market daily. The market employs 50 labourers for loading and unloading, sorting, cutting and related works.

The demand for dry fish has come down in the city and preference has shifted towards fresh and chilled fish. Traditional dry fish users continue to buy a limited quantity which sustains the dry fish industry. Kerala, Gujarat, Andhra Pradesh, Orissa, West Bengal and Southern Tamil Nadu supply dry fish to this market. The vendors from Tiruchirapalli, Kanchipuram and Chengalpattu districts patronize this market and purchase dry fish on wholesale basis (350 to 400 kg).

Table 5.32 Operational Details of Moolakothalam Fish Market, Chennai

Particulars	Details
Packaging and Storage	Palm leaf
Transportation	Trucks
Distance from Railway station	15-25 minutes
Commission charges/Profit margins	10 %
Minimum quantum	1500 kg
Species in Demand	Ribbon fish, Anchovy, Koduva, Seer fish, prawn,
Seasonal Variation and Demand	High - June and July Low - October, November and May

Source: Primary Survey, 2008

Table 5.33 Facilities available at Moolakothalam Fish Market, Chennai

Facilities	Moolakothalam
Auction Hall	No
Water Supply	Good
Power supply	Yes
Sanitation	No
Market Shed	Yes
Toilet	No
Waste disposal	Good
Individual space	Adequate
Cemented platform	Good
Insect repeller	No

Source: Primary Survey, 2008

Problems in Moolakothalam Dry Fish Market

1. Shifting of bus terminus away from market leading to poor sales. Better means of access to the market or shifting of market is needed for better sales.
2. Traffic movement restrictions detain the trucks carrying dry fish which has affected the market adversely.
3. The credit flow from WSCA to retailer and retailer to vendor is essential for smooth performance of dry fish marketing. But in many cases non repayment of loans were reported. Intervention from formal credit institutions like banks, cooperative societies and associations will help in reducing this problem.
4. The cost of spoilage or wastage is mostly borne by retailer or vendor. The waste is disposed as feed poultry fertilizer at the rate of Rs. 2/kg. Appropriate technologies/infrastructure needs to be developed for reducing the wastage.
5. There is no good toilet facility with in the vicinity of the market.

A privately owned modern fish retail outlet located adjacent to a chicken stall at Chennai

Traditional fish retail outlet owned and operated by TNFDC, at Chennai

5.1.4.5Keezhavasal Fish Market, Thanjavur

Keezhavasal fish market is one of the major markets for farmed carps in Thanjavur district. The infrastructure facilities available at Keezhavasal fish market are presented in Table 5.34.

Table 5.34 Facilities available at Keezhavasal Fish Market, Thanjavur

Facilities	Status
Auction hall	Yes
Water supply	Good
Power supply	Yes
Drainage	Yes
Cold storage	No
Sanitation	Good
Market shed	Good
Toilet	Yes
Waste disposal	Good
Individual space	Standard
Distance from ice plant	200m
Platform	Tiled
Fish dressing facility	Yes (Rs.5/kg/small fish)

Source: Primary Survey, 2008

It fish market is located right in the heart of the city at Keezhavasal. It is a good example of modern fish market as for as infrastructure is concerned. The marketing of fish starts at 5 am and extends up to 2 pm. The market has auction hall, good water supply, drainage facility, and sanitation and waste disposal facilities. The number of wholesalers-cum-retailers in the market varied from 20 to 50. On reaching the market, each fish farmer who brings fish for marketing can approach any of the wholesaler-cum-retailers who conduct open auction of the fish and pay the sale proceeds to the fish farmers after deducting 10 % commission. These intermediaries operate first as wholesalers and later when bulk trading is over they also do retailing. Twelve wholesaler-cum-commission agents, 56 retailers and about 300 vendors are involved in the trading of farmed carps in Thanjavur fish market. The retailers sell fish in the market whereas the vendors move door to door to sell the farmed carps. Only the wholesaler-cum-commission agents are the registered intermediaries in the market. The intermediaries trading fish in the market had to pay Rs 10 per week to the municipality. The lobby of the market intermediaries is so strong that it preventes producers selling the fish themselves in the market and does not allow anyone else to get registered with the municipality as authorized sellers of fish in the market. The intermediaries of the market except vendors has to pay a registration fee of Rs 450/year and Rs 40/day to the municipality and electricity charge is Rs 10/bulb.

A retailer selling farmed carps in his open stall at Thanjavur fish market, Tamil Nadu

A retailer showing a live fresh fish kept in a water container at Thanjavur fish market, Tamil Nadu

5.1.4.6Fish Landing Centre, Kanyakumari

In the coastal region of this district, there is only one fishing harbour at Chinnamuttom in Kanyakumari. This harbour lies on the southern coast after Vizhinjam. The water spread area of the harbour is 8.87 ha. The harbour started functioning from 1984. Because of the construction of semicircular backwater enclosure, fishing vessels could be berthed at the time of landing as well as during rough sea. This harbour could accommodate 460 mechanized boats and nearly 1000 catamarans.

Mainly three types of crafts are used for fishing in the district and they are *catamaran*, *vallam* and mechanized boats. Main fish species landed by *catamarans* include Sardine, Mackerel, Seer fish, Tuna and Anchovy, etc. Main buyers are wholesalers, retailers and vendors. The *vallam* or plywood boat is larger in size than a *catamaran* and carries an outboard engine enabling fast movement toward distant shoals of fish. Main fish species landed included Seer fish, Shrimps, Tuna and Squid. The third group of fishermen in the district, the mechanized boat fishermen operates vessels that are more powerful than *vallam* and *catamarans*. Main fish species landed included Sardine, Seer fish, Tuna, Mackerel, Squid and Shrimp. Fish are auctioned at the landing centre by the auctioneer from whom agents of exporting companies, wholesalers, retailers and vendors buy.

In Kanyakumari district, different types of fishing gears are used. They are gillnet, shore seine, trawl net, drift net, set net, hooks and line. Apart from these, there are specific fishing gears for capturing specific species of fish. They are shrimp net (*Eral valai*), lobster net (*Kalral valai*), crab net (*Nandu valai*), bag net (*Pai valai*) and *Chala valai*. The fish landing and marketing are done during night hours from 7.30 pm to 12.30 am. This harbour has basic facilities such as auctioning hall, berthing facilities, petrol bunk and transport facility, which are required for proper handling and marketing of fin fish and shell fish.

5.1.4.7Vadasery Fish Market, Nagercoil (Kanyakumari)

Vadasery fish market is the main retail fish market in Kanyakumari district. This market is situated in Nagercoil, the district headquarters. On an average 2.5 tonnes of fish are marketed daily. The main fish species traded are Sardine, Anchovy, Tuna, Seer fish, Shrimps, Pomfrets and Carangids.

The general particulars and structure of the market are furnished in Tables 5.35 and 5.36.

Table 5.35 General Particulars of Vadasery Fish Market, Kanyakumari

Particulars	Details
Location	Vadasery
Area / coverage	Regional
Time span	Long duration market
Volume of transaction	Retail market
Nature of transaction	Cash
No. of commodities	Fresh fish and dry fish

Extent of public intervention	Regulated
Year of establishment	1933
No. of registered fish sellers in the market	100
No. of sellers / traders operating in the market	70
Condition of entry to the market	Closed
Mechanism of market information	No organized mechanism (Price based on demand and supply)
Fish shops available	40
Fish shops functioning at present	25
Weighing balance	Physical balance
Scale of operation	1.5 ton

Source: Primary Survey, 2008

Table 5.36 Quantity of Selected Fish Species Traded at Vadasery Fish Market, Kanyakumari

(kg)

Species	Quantity
Tuna	400
Lethrinus	350
Anchovy	300
Sardine	250
Seer fish	200
Mackerel	150
Shrimp	50

Source: Primary Survey, 2008

5.1.4.8Ukkadam Fish Market, Coimbatore

The domestic fish demand of Coimbatore district is met by the inflow of marine fish from landing centres in Karnataka, Kerala and Tamil Nadu and inland fish from the reservoirs and irrigation tanks of the district and from other districts of the state and also from Andhra Pradesh.

The wholesale fish market in Ukkadam belongs to the city corporation. The market is fully fenced with 2 auction sheds for the wholesalers to auction the fish. There are 20 wholesalers operating in the market and there are also 20 retailers. The market timings are from 3.00 am to 10.00 am. Marine fish from all over the state and from nearby states like Kerala, Karnataka and Andhra Pradesh are traded in the market. About 30-40 tonnes of marine fish are sold daily in the market to about 2000 retailers and vendors.

Freshwater fish, mostly carps are marketed by two wholesalers in the market to retailers and vendors. About 4 tonnes of carps from Tamil Nadu and Andhra Pradesh are sold per day to retailers and vendors. During weekends the demand reaches to 6 to 10 tonnes per day. The carps arrive the market in iced condition packed in plastic crates by trucks. The demand for carps has not increased due to poor supply from reservoirs combined with higher price when compared to marine fish.

The existing wholesale fish market at Ukkadam, Coimbatore belongs to Coimbatore Municipal Corporation and the facilities available in the market are given below along with details of the market:

Table 5.37 General Particulars of Ukkadam Fish Market, Coimbatore

Particulars	Details
Location	Ukkadam
Area / coverage	Regional
Floor area	1.2168 acres
Time span	Long duration market
Volume of transaction	Wholesale & retail market
Nature of transaction	Cash and credit
No. of commodities	Fresh fish
Extent of public intervention	Regulated
Year of establishment	2002
No. of registered fish sellers in the market	46
No. of sellers / traders operating in the market	40 (Wholesaler - 20; Retailer - 20)
Condition of entry to the market	Closed
Mechanism of market information	Organized market Intelligence
Fish shops available	40
Fish shops functioning at present	40
Weighing balance	Physical balance
Scale of operation	35 tonnes (Marine fish - 30 tonnes; Freshwater fish - 5 tonnes)

Source: Primary Survey, 2008

Table 5.38 Infrastructure Details of Ukkadam Fish Market, Coimbatore

Facilities	Details
Floor of the market	Blue metals (Number of pits were found in the floor)

Number of shops	46 shops of size of 10'x 10' with A/C sheets in three blocks,
Type of shops	Four dise opening type (No walls and doors for each shop)
Drainage facility	No
Drinking water facility	No
Waste disposal system	No

Source: Primary Survey, 2008

In a nut shell, the entire structure is in very shabby and shoddy state. The wholesale market area, during the time of sales is very unhygienic and public are very reluctant to purchase the fish. Hence, the TNFDC Ltd., now, proposes to renovate and modernize the market into an ideal wholesale fish market with latest art of technology.

Based on the NFDB norms, the following works need to the carried out to improve the status of the market.

- There are 46 members in the wholesale market. Each member needs a storage point and an auction area of 20' x 20' at provision of fish auction shed.
- Construction of 10 tonnes capacity flake ice plant to preserve the fish in hygienic condition.
- The drainage system called 'NIL' drainage system should be constructed and linked to all points in auction shed, storing points and retail shed in order to maintain the clean and hygienic condition.
- There should be a provision for toilet facilities.
- The temporary shop facility building has to be converted to storing points with enclosed walls and false ceiling.
- More than 5000 consumers come to the wholesale market daily. Hence, a cafeteria should be built to cater the minimum needs of fish merchants and customers.
- Ground level of the market should be raised upto 1' height and laying of pavers should be done for the mobility of men and vehicles with proper drainage provision.
- Open drainage arrangement with ceramic tiles finishing should be constructed.
- Pipeline and water supply arrangements in the storing points, Auction shed and toilets should be made.
- Electrification including lighting arrangements should be done.

- Power room with generator set of 35 KV arrangements needs to be built.
- Arrangements of overhead tank provision should be made.
- To maintain the more hygienic condition, the handling of fish arrivals is more indispensable. So, the provision of trolley arrangements should be made to proper for clean and hygienic transportation inside the market.
- Lot of vehicle (more than 100) and cycle vendors (more than 200) are used to come for sales and purchase. So, the provision of separate place for cycles and four wheelers is very essential to avoid unnecessary congestion and unhygienic environment.
- Another aspect which needs attention is fish cleaning. The market place is easily prone to unhygienic environment by means of fish cleaning and dressing. So, there should be a provision for a separate area for cleaning of fish to avoid the unhygienic atmosphere, which was linked with water facility, proper drainage, proper lighting and with the waste management. For this, about 25 cutting sheds should be constructed.
- Now, the present compound wall height is very low. Because of that, most of the unauthorized persons are coming in the market during night times to steal the fish, boxes and other materials. Hence, the height of the compound wall should be raised to 3' to 4' to avoid the theft.
- Provision for solid waste management should be created.

5.1.4.9Fish Retail Outlets, Coimbatore

There are about 25 fish retail outlets in the Coimbatore district that are owned and operated by Tamil Nadu Fisheries Development Corporation (TNFDC). They get supply from the three major reservoirs in the district, viz. Aliyar (646 ha), Amaravathy (906 ha) and Thirumoorthy (454 ha) with a total water spread area of 2006 ha which are under the control of TNFDC itself. The corporation is responsible for stocking of fingerlings, exploitation of fish by employing share fishermen and marketing the catches. The stocking of fingerlings are as per the target fixed by the corporation from time to time. The exploitation in these reservoirs is done by the corporation by using share fishermen. Out of the total catch, 1/3rd value of the catch is paid in cash to the fishermen.

The corporation takes the responsibility of marketing the catch. The catch is either directly sold to consumers at reservoirs or marketed through their retail stalls located in Coimbatore and nearby towns like Pollachi, Tiruppur and Udumalapettai. Over and above the corporation sales, the excess catch is sold through wholesalers based on pre approved quotations. It is observed that the fish marketed through the TNFDC stalls are on the rise ever since the concept of direct public intervention in marketing of fish is followed by it. The margin kept by the TNFDC is just below than that of local private market / outlets. During

peak and festival seasons, the supply of fish to the retail outlets is not sufficient to meet the local demand. Such is the confidence level of public on the state owned retail outlets.

Details of reservoir fish marketed through the TNFDC outlets in the district are given in Table 5.39.

Table 5.39 Marketing Details of TNFDC Retail Outlets in Coimbatore district

(tonnes)

Year	Target	Achievement
2000 – 2001	300	189
2001 – 2002	240	107
2002 – 2003	220	153
2003 – 2004	240	207
2004 – 2005	375	260
2005 – 2006	385	290
2006 – 2007	385	442
2007 – 2008	425	325

Source: TNFDC, 2008

Apart from these reservoirs, Bhavanisagar, Uppar and Perumpallam reservoirs located in Erode district and Palar reservoir in Dindigul district which are under the control of the Corporation are supplying carps to cater to the needs of the Coimbatore market. Further, the district is having 28 major irrigation tanks having a water spread area of about 4844 ha, which are leased out to Fishermen co-operative societies for stocking and exploitation. The carps stocked and harvested from these irrigation tanks are also marketed locally in the district.

In Coimbatore, there are 30 retail fish stalls owned by TNFDC and private retailers. It includes 5 stalls of TNFDC and 4 modern fish retail outlets. Each of these retail outlets sells about 500 kg of freshwater fish daily. Supplies to these stalls are from the wholesale market in Coimbatore or Tirupur either directly or through a supplier.

5.1.4.10Tuticorin Fish Market

Tuticorin has four fish landing centres and of these, Therespuram and Fishing harbour are well constructed, with berthing, water bunking, diesel bunking, ice-loading and fish landing facilities for fishing crafts operated along the Tuticorin coast. *Vallam*, *catamaran* and trawlers are operated, which unload their catch at these landing centres. However, the other two fish landing centres, viz. Inigo Nagar and New harbour are not provided with such facilities.

5.1.5 Andhra Pradesh

5.1.5.1 Kolleru Lake

Kolleru Lake is major freshwater wetland (land space area: 674 sq km; depth: 0.9-4 m) situated between Krishna and Godhavari deltas. Construction of 102 fish ponds covering an area of 2,050 ha by the government for the benefit of fishermen and success achieved initially by a few farmers in 1972-74 encouraged other fish farmers in Krishna and West Godhavari districts around Kolleru lake to take up fish culture on a large scale. Since 1980, freshwater fish farming has steadily grown each year and spread to all the coastal districts of the state, resulting in the construction of a total of 10,000 ha of embanked ponds in the fallow, marginal areas of Kolleru lake and conversion of about 20,000 ha of agricultural lands.

Presently, area under carp farming is about 1,70,000 acres (about 70,000 ha) under pond aquaculture. At an average productivity of 3 tonnes per acre per year, the total production comes to about 5,10,000 tonnes per annum. On an average, a farm gate price of Rs 40-45 per kg of fish is paid to the farmer and the volume of money flowing down the market chain to the producers is around Rs 6 billion. About 3.5 to 4 lakh people are estimated to depend directly on Kolleru carp farming for their livelihood and many more indirectly.

Source and Disposal of Fish

Indian Major Carps (IMC) mainly Catla and Rohu are cultured in Kolleru Lake area. The cultured carps are mainly disposed off to Howrah fish market in West Bengal. Fish is also supplied to Orissa, Bihar and the North-Eastern states. The flow of fish from Kolleru Lake area is depicted in Figure 5.11 below.

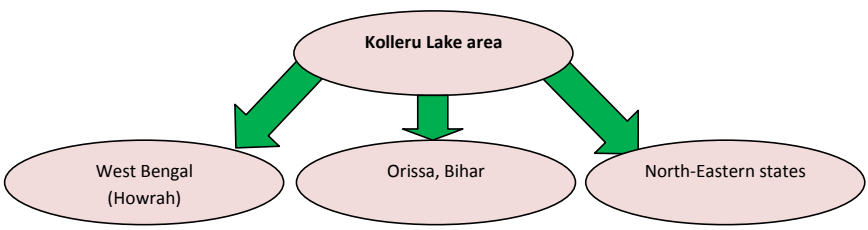


Figure 5.11 Flow of fish from Kolleru Lake area

The traditional and dependable market for Kolleru area cultured fish is only Howrah. It is organized entirely by the private sector. In early days, farmers were exporting the fish by themselves. In recent times majority of the farmers are selling their fish at pond site itself through traders instead of at Howrah.

In Kolleru lake area, Eluru, Kaikaluru, Akiveedu, Bhimavaram and Ganaparam are the major centers of fish trading, packing and export activity. There are about 50 traders or trading firms involved in this business at these places. Almost all the traders have their own infrastructure such as office, ice

factories, plastic crates, graders, packers and packing sheds. Majority of these do not have trucks of their own and engage them on hire. There is one registered body named 'Andhra Pradesh Fish Traders and Packers Association' with the administrative office located in Bhimavaram, West Godavari District. About 20 traders are presently members of this association.

In addition to these major traders, there are about 60-65 small-scale local traders and 2-3 traders of Howrah market, who purchase fish from Kolleru carp farmers. Most of this category of traders functions totally in a different manner by having only an office. Other infrastructure is hired, except in 10-15% of the cases. These people deal in other fish trading also like 'live fish' and may send fish to different states in the country, in addition to West Bengal. Fish on arrival at Howrah market is taken care by '*Aratdars*' who are licensed traders at market place. Prices on day to day basis are determined by these '*Aratdars*' on their own initiative. Bargaining of price by eye estimation is followed and ultimately '*Aratdars*' play a key role to unload the fish on arrival from packed trucks. With recent methods employed in packing of Kolleru fish in trucks, traders are able to wait for 1-2 days at the market place, expecting a better price during their sale.

5.1.5.2 Musheerabad Fish Market, Hyderabad

The Musheerabad fish market is the primary wholesale fish market in Hyderabad. The market place is located in Gangaputra colony, Zamistanpur. It is a regional market, covering fish coming from Kerala, Karnataka and Maharashtra. It is a short period market, which functions in the morning hours between 4 am and 10 am on week days and till 11 am on Sundays. About 80% of the trade is wholesale and rest is retail trade. It is a unregulated market, privately managed by *Gangaputra Sangam*, a traders' association. it is reported that the market started functioning about 80 years ago. It deals about 30-35 tonnes of fish, both marine and freshwater, on week days and the quantum of trade goes up to even 80 tonnes on Sundays. It functions in the land belonging to Gangaputra Fish Traders' Association.

The general particulars and structure of the Musheerabad fish market are given in Table 5.40 and Table 5.41 below.

Table 5.40 General Particulars of Musheerabad Fish Market, Hyderabad

Particulars	Details
Location	Musheerabad, Hyderabad
Area/Coverage	Regional
Time span	Short period market
Volume of transaction	Wholesale (retail-20%)
Nature of transaction	Mainly cash, some credit also
No. of commodities	General
Stage of marketing	Consuming
Extent of public intervention	Regulated
Year of establishment	1928 (approximately 80 years old)
Expansion over the years (no.	1940: 5-6, 2-3 tonnes

wholesalers, Quantity traded)	1990: 70, 15-20 tonnes (weekdays) 30 tonnes (Sundays) 2008: 100, 30-35 tonnes (weekdays) 76-83 tonnes (Sundays)

Source: Primary Survey, 2008

Table 5.41 Structure of Musheerabad Fish Market, Hyderabad

Particulars	Details
No. of registered fish sellers	97 wholesalers, 30 retailers
No. of sellers/traders operating at the market	20 (marine fish) 30 (inland fish) 20 (both) 20 (exclusively for live Murrels)
Condition for entry into the market	Through membership in the *Sangam*
Mechanism of market information	Price discovery based on demand
Fish shops available	100
Functioning	92
Non-functioning	8
Weighing process	Physical balance (Wholesalers) Electronic/digital balance (Retailers)

Source: Primary Survey, 2008

Table 5.42 Scale of Operation at Musheerabad Fish market, Hyderabad

Fish Species	Quantity (tonnes)	
	Week Days	Sundays
Murrels (Freshwater)	1.5 to 2.0	4.0 to 4.5
Indian Major Carps	22.5 to 25.0	60 to 65
Exotic Carps	1.5 to 2.5	4.0 to 5.0
Shrimp/ Prawn	2.0 to 2.5	3.5 to 4.0
Marine Fish	2.0 to 2.5	4.0 to 4.5
Crabs	0.5	1.0
Total	**30 to 35**	**76 to 83**

Source: Primary Survey, 2008

Source of Fish

Freshwater species are mainly supplied from Eluru, Akiveedu, Bheemavaram, Narsapur, Warangal, Nizamabad, Khammam and all the nearby Districts of Nagarjunasagar, Srisailum, Kollapur, Nizamsagar, Singur, Nellore, Badrachalam, Kothagudem, etc. Marine species are supplied to the market from Kakinada, Vishakapatanam, Machilipatanam, Ongole, Chirala, Narsapuram and Nellore.

Inland fish are supplied to the market in trucks. On an average, 12-18 trucks/vans arrive at the market every day except Sunday, on which the number of trucks arriving at the market is more than 30. Mostly, Eischer vehicles (4-5 tonnes) or DCM vehicles (3-4 tonnes) are used. Fish from nearby districts is transported with or without ice packing, depending on the distance. They are loaded into the trucks in heaps or after packed in plastic crates/boxes with ice. Marine fish and prawn arrive in thermocol boxes (100 litre capacity) with 40 kg of material packed along with ice. On an average, 50-60 boxes arrive at the market through bus/trains. Murrels are transported to the market in live condition. Fish are packed along with water and transported in metal cans (15 kg fish) or plastic barrels (30-40 kg fish) or *Sintex* tanks (50 kg fish) having perforated opening on the top for facilitating breathing of fish.

The flow of fish to and from Musheerabad market is depicted in the Figure below.

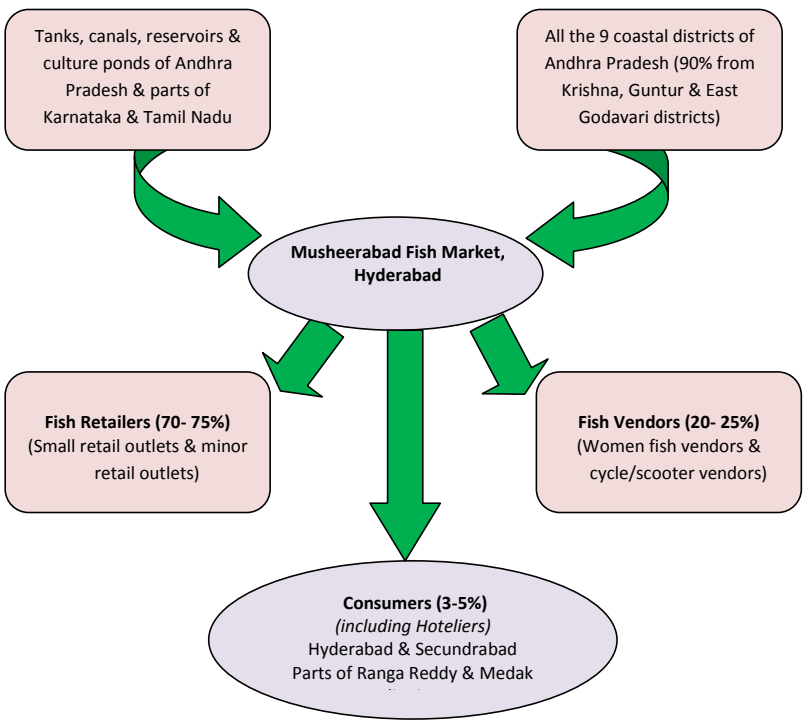


Figure 5.12 Flow of Fish in Musheerabad Fish Market, Hyderabad

Problems in Musheerabad Fish Market

1. **Cold storage facilities:** There is no provision for cold storage/chilled storage facility at the market. The unsold material is packed in plastic baskets with ice and sold next day.

2. **Quality control:** There is no quality control either by the Govt. or by the Municipality. Presently, it is managed by the *Gangaputra Sangam*. If the condition of the fish is bad and casting foul smell, the *Sangam* officials tell the party to take back the product.

3. **Facilities for women:** There are no facilities like toilets, drinking water, shelter to sit, dressing platforms, etc. The women who are in retail business and dressing trade live in same locality, and hence they go home for any emergency.

4. **Maintenance of sanitation in market place:** No sanitation is being maintained. At times, there are frequent social problems between local people and the fish traders. Municipal Authorities need to take care of this teething problem.
5. **Concerns of the consumers:** They don't like to enter the market because of several reasons such as the general unhygienic condition of the market, flow of stinking water from lorries, blocking of the ways by heaps of fish, no clear demarcation for wholesale trading and retail and no proper parking place for vehicles.

5.1.5.3 Retail Outlets, Hyderabad

More than 700 fish retail outlets exist in Hyderabad city. The fish retail outlets in Hyderabad can be classified into minor outlets (roadside/fixed/market retail outlets with temporary roof), small outlets and modern retail outlets.

Minor Retail Outlets

There are almost 600 minor fish retail outlets in Hyderabad. The number of these outlets increases to 1500 on Sundays when more persons take up fish marketing for earning extra money. Such outlets sell 40 kg fish on weekdays and 60 kg on Sundays with profits of Rs 200 to 400 on weekdays and Rs 600 on Sundays. Generally, the profits are shared by two people. Fish is purchased from wholesale market and disposed to consumers after dressing (based on demand). Ninety percent of fish is sold to consumers and 10% to hoteliers, roadside fish snack vendors and fish vendors.

Small Retail Outlets

There are nearly 60 small fish retail outlets in Hyderabad and Secunderabad. Ninety-five percent of the small retail outlets belong to members of the fishermen community. Fish is sourced mainly (80%) from the wholesale market and the rest from nearby ponds and tanks. These outlets have a sale of 50- 60 kg fish on weekdays and 120 kg on Sundays. Fish is disposed off mainly to household consumers (90%) and the rest to hoteliers and roadside snack vendors. Fish vendors rarely purchase fish from these outlets.

Modern Retail Outlets

There are over 30 modern fish retail outlets in Hyderabad. Fish is sourced mainly from the wholesale market and from nearby tanks and ponds. Half of the modern retail outlets are directly connected to wholesalers at the wholesale fish market. Nearly 42% of the retailers receive marine fish and prawns from coastal districts through bus or train. Disposal is mainly to household consumers (98%) and rest to hoteliers (2%) who are regular customers.

Success Stories of Modern Fish Retail Outlets

Andhra Pradesh Fisheries Fish Stall

Started by Mr. Uppalaya, a former employee of the Andhra Pradesh Fisheries Corporation Limited, this outlet has been in business for the past 15 years. The outlet caters to all sections of society. The average sale of fish on weekdays is to the tune of 120-150 kg and on weekends it increases to 300 kg. The net income per day is higher than Rs 2000.

City Seafood Centre

Started by Mr. Sudarshan Murthy, a former seafood processing technologist in 2007, this outlet carries out processing and retailing of a variety of fish and fishery products in a hygienic manner. Consumers prefer to shop here due to the variety of products, freshness, hygiene, correct weighing methods and knowledgeable staff. About 15 varieties of fish, prawns and crabs and 13 varieties of value-added products are sold here. The outlet has monthly sales of about 500 kg.

AFCOF Fish Retail Outlets

The Andhra Pradesh State Fishermen Co-operative Societies Federation Limited (AFCOF) operates five fish retail outlets in Hyderabad. The outlets sell up to 40 kg fish on weekdays and up to 150 kg on Sundays. About 5 % discount is given to regular customers. Though prices are higher, consumers prefer to buy fish from these outlets due to better quality of product. Even though the objective of these outlets is to procure fish directly from producers and sell it to consumers, as of now, fish is being purchased from the wholesale market.

Table 5.43 Comparison of Prices among Different Fish Retail Outlets in Hyderabad

(Rs)

Fish Species	Wholesale Fish Market	AFCOF Retail Outlet	Modern Retail Outlet	Small Retail Outlet	Roadside/ Fixed / Market Retail Outlet
Catla	40-42	55	55	60	50-55
Rohu	40-45	60	60	60	55

Prawn	110-120	160	160	-	-
Lates	120-150	150	150	-	-
Mackerel	40-50	70	70	-	50
Live Murrels	130-140	160	160	160	-
Varieties Sold	All commercial varieties	8-9 varieties	14-15 varieties	4-6 varieties	3-5 varieties

Problems with Fish Retailing in Hyderabad

1. **Minor Retail Outlets**

   i. Burden of travel over large distances to collection/purchase points of fish
   ii. Non-availability of subsidized ice box to all retailers
   iii. No mechanism for disposal of fish waste
   iv. Heavy loss due to loss in weight as well as sudden death of Murrels
   v. Difficulty in procuring of loans for improvement of business
   vi. Lack of raised platform or permanent structures for selling fish
   vii. Under-weighing of fish at wholesale market due to use of physical balance
   viii. Lack of availability of simple dressing implements

2. **Small Retail Outlets –** In addition to above constraints, other problems are:

   i. Payment of commission to municipal authorities and high taxes
   ii. Lack of containers to store live fish
   iii. Difficulty in obtaining ice from nearby locations

3. **Modern Retail Outlets -** In addition to above constraints, other problems are:

   i. Higher prices of fish as a result of high expenditure on labour, rent and electricity
   ii. Lack of provision of infrastructure facilities for further improvement
   iii. Lack of opportunities to lease out public land in prime locations for setting up new outlets

4. **AFCOF Retail Outlets**

   i. Lack of control over prices by salespersons
   ii. Fixed prices during the day leads to less business during evening hours, since private retailers provide more flexible prices
   iii. Reduced profit and even loss due to spoilage

AFCOF Retail Outlet, Kukatpally, Hyderabad

AFCOF Mobile Retail Outlet, Mehadipatnam, Hyderabad

A successfully running fish retail shop at Secundrabad

A fish wholesaler operating a retail outlet at Sainikpuri, Hyderabad

A modern retail outlet inside wholesale fish market at Musheerabad, Hyderabad

A small-scale retailer selling dressed fish in a road side Fish Vending stall in Hyderabad

A modern hygienic retail outlet being successfully run by a private entrepreneur in Hyderabad

An unit in the chain of modern retail outlets promoted and operated by a private firm at Nellore, Andhra Pradesh

Unbranded frozen fish products kept in a freezer in a modern retail outlet at Hyderabad

Branded frozen products on display at a modern fish retail outlet at Nellore

A packet of unbranded frozen fish fillet of Tilapia fish for sale at a privately owned fish retail outlet at Hyderabad

Branded dry fish packets from Bangalore for sale at a modern retail outlet at Hyderabad

High income group consumers purchasing value added fish products in a modern hygienic retail outlet at Hyderabad

Fresh and chilled fish are sold at separate sections in a modern high-end hyper market at Hyderabad

5.1.6 Karnataka

The fisheries sector is one of the major sectors in Karnataka. The marine fish landing of the state for 2006-07 was 1.69 MT. The inland fish landing of the state was 1.24 MT in 2006-07. The state contributed 10.4% of India's total fish landings in 2006-07.

Marine fish are being landed at five major fish harbours and 25 marine landing centres in the state and sold through 198 marine fish markets. Inland fish landed are marketed through 223 fish markets in the state. The main marine fish of the state are Oil Sardine, Mackerel, Pink Perch, Ribbon fish, Silver bellies and Anchovy. Shrimps, Cuttle fish and Squid are also important marine species. The major inland fish species are Indian Major Carps (IMC).

5.1.6.1 Marine Fishing Harbour, Mangalore

Mangalore fishing harbor is one of the five major marine harbours of Karnataka state and contributes 35-40 % of the total marine fish landings of the state. About 160 tonnes of fish is traded at Mangalore harbour daily of which 60% goes to wholesalers (including exporters) and 40% to retailers. Both mechanized vessels (multi-day and single day fishing units) and non mechanized boats operate at the harbour. Small scale fishing units (with less than 20- 25 HP outboard engines) land their catches at village landing centers. The details of crafts operating at the Mangalore harbour are given in Table 5.44.

Table 5.44 Details of Crafts operating at Mangalore Marine Fishing Harbour

Type of Craft/Gear	Number	Type of Catch
Trawlers	992	Shrimps, Squids, Cuttle fish, Pink Perch
Purse-seiners	83	Mackerel, Sardine, Shrimp, Anchovy, Pomfret, Ribbon fish
Gill-netters	895	Seer fish, Cat fish, Tuna, Reef cod
Long liners	42	Tuna, Shark
Non-mechanized boats	748	Anchovy, Sardine, Mackerel

Source: Primary Survey, 2008

Day trawlers work for an entire day and return in the evening, where as the multiday vessels go to sea for 10 days or more. Usually day trawlers and purse seiners do not carry ice for preserving the quality of fish since they incur loss. For ten-day trip the crafts carry 300 blocks of ice. Each block weighs around 50 kg and costs Rs 50 per block. The operating cost for the trip would be as follows:

Table 5.45 Operating Cost of Trawlers for a 10 day Fishing Trip

(Rs)

Items	Amount
Diesel (2500 litres)	90,000.00
Food on board	5,000.00

Engine oil	3,000.00
Net repair	3,000.00
Craft maintenance	8,000.00
Total	**1,10,000.00**

Source: Primary Survey, 2008

There are around 200-250 businessmen including wholesalers and retailers operating at Mangalore marine fishing harbour. Prices are decided on the same day at the same place except for high value fish. The harbour has one auction hall and one market place. Around 50-60 women sell fish at the harbour from 6 am to 10 am everyday. They do not have shops but sit at designated fixed places for selling fish. Fish is weighed using platform scale at the harbour. Retailers use physical balance to weigh fish.

Disposal of Fish

Apart from business at the domestic market, fish from Mangalore is sent to Chennai, Mumbai, Cochin and Bangalore. Fish is mainly sent by trucks but smaller quantities are sent by trains. Fish is sent by train, especially to Mumbai and Chennai. During April – May, the fish load is sent mostly to Chennai where there is a fishing ban during this period. Shrimp, Seer fish, Pomfret, Squid, Cuttle fish, Pink Perch, Crab and Ribbon fish are in demand. Usually fish is sent by insulated trucks (which maintain a low temperature of 0-10^{0}C) in thermocol boxes to maintain the quality. One truck carries 140 boxes of fish. Each box contains 30 kg ice and 40 kg fish. The marketing costs are Rs 300 per box for ice, labour and transportation. When fish is not available at Mangalore harbour, fish from Tamil Nadu is loaded as per demand and sent to Mumbai. On an average, around 200-300 boxes of fish is sent. The price remains almost constant throughout the year for fish supplied to export companies but there is daily variation for fish supplied to domestic market.

5.1.6.2Russell Fish Market, Bangalore

Situated at Shivaji Nagar, Russell market caters to the needs of both middle income and high income group of people. The general particulars and structure of Russell market are given in Table 5.46 and 5.47.

Table 5.46 General Particulars of Russel Fish Market, Bangalore

Particulars	Details
Location	Bangalore
Area/Coverage	Local
Time span	Long period (3 hours for wholesale; 7 hours for retail)
Volume of transaction	Wholesale and retail

Nature of transaction	Cash and credit
No. of commodities	Marine and freshwater fish
Stage of marketing	Consuming
Extent of public intervention	Regulated
Year of establishment	150 years ago
Expansion over the years	Modernization 35 years ago

Source: Primary Survey, 2008

Table 5.47 Structure of Russel Fish Market, Bangalore

Particulars	Details
No. of registered fish sellers	26
No. of sellers/traders operating at the market	26 (8 wholesale, 18 retail)
Condition for entry into the market	
Mechanism of market information	No organized mechanism (Price based on demand and supply)
Fish shops available	26
Functioning	26
Non-functioning	-
Weighing process	Physical balance

Source: Primary Survey, 2008

Fish from various regions of the country like Chennai, Cochin, Pondicherry, Cuddalore reaches Bangalore. Within Karnataka marine fish from Mangalore, Malpe, Karwar and freshwater fish from Kolar, Tumkur and to a small extent from local culture ponds are sold here. During September – November, around 20-25 loads of fish is transported to Russell market every day while during May – July, 60% of the fish comes from Chennai, Pondicherry and Cuddalore. During this period, 20% comes from Mangalore and the rest from Karwar, Malpe and Hubli region of Karnataka. Fish is supplied on Thursdays and Sundays while payment is made on every Sunday. There are 300-350 people involved in local selling business (cluster level, village level sale, cycle vendors, etc).

The species brought from Mangalore are Mackerel, Sardine, Seer fish, Tuna, Pomfret, Shrimp, Squid and Cuttle fish, Crab, Common carp, etc. Freshwater fish such as Rohu, Catla and Mrigal are also sold but to a lesser extent that are brought from Kolar, Tumkur and Andhra Pradesh. Each dealer has a freezer and the left over fish is stored for selling the next day. The ice sent along with the fish load is used to preserve the fish till sale.

Russell market also deals with freshwater fish. It is also called Bengali fish market since the it caters to the needs of the people from north India, especially from West Bengal. This market which was established at Shivajinagar around 150 years ago as an informal market place was renovated 35 years ago. It is a local market, and operates throughout the day from 6 am to 7 pm. Only retail business is there. Both cash and forward market transaction is seen. This is a consumer market which handles the sales of Catla, Rohu, Mrigal, Cat fish, Grass Carp and Common Carp and Tilapia, etc. Bengal market is a regulated market. There are 13 registered fish sellers. The sellers use physical balance for weighing the fish before sale. Around 300 kg of Catla, Rohu, Mrigal, Grass Carp and Silver Carp and around 100 kg of local species, Tilapia and Cat fish are sold here daily.

5.1.6.3Krishna Raja Fish Market (City Market), Bangalore

Unlike Russell market, Krishna Raja fish market caters to the needs of low income and middle income group of people. Other than the wholesale and retail fresh fish stalls, there are three dry fish stalls in the market. Besides these, there are scattered vendors who sell on the roadside outside the market place. Unlike in Russell market, species like Pink Perch, White Sardine, Sole, Anchovy, small sized Shrimp and Cat fish are available apart from Seer fish, Pomfret, Mackerel and Sardine. Since the dealers at both the places are constantly in touch, the daily price is fixed on that basis. The cost, in general is 5-10 % less for some selected species when compared to the price at Russell market. The price of fish also changes according to the quality and shelf life of the fish as observed by the seller. Here, freshwater fish is also given equal preference. Apart from cultured fish like Catla and Rohu, Cat fish are also sold depending on the availability. They are brought from Kolar, Tumkur and Andhra Pradesh.

The general particulars of Krishna Raja fish market are given in Table 5.48.

Table 5.48 General Particulars of Krishna Raja Fish Market, Bangalore

Particulars	Details
Location	Bangalore
Area/Coverage	Local
Time span	Long period
Volume of transaction	Wholesale and retail
Nature of transaction	Cash and credit
No. of commodities	Marine, freshwater and dry fish
Stage of marketing	Consuming
Mechanism of market information	No organized mechanism (Price based on demand and supply)

Source: Primary Survey, 2008

5.1.6.4Bhadravathi Fish Market, Shimoga

Bhadravathi, located in Shimoga district, is an industrial town with large number of migrant industrial workers from Tamil Nadu, Kerala and Andhra Pradesh. This is one of the main markets importing freshwater fish from Andhra Pradesh and also marine fish from Malpe, Bhatkal and other landing centers of Karnataka. The general particulars of Bhadravathi fish market are given in Table 5.49.

Table 5.49 General Particulars of Bhadravathi Fish Market, Shimoga

Particulars	Details
Location	Shimoga
Area/Coverage	Local
Time span	Long period
Volume of transaction	Retail
Nature of transaction	Cash and credit
No. of commodities	Marine and freshwater fish
Stage of marketing	Consuming
Year of establishment	1993
No. of registered fish sellers	31
No. of sellers/traders operating at the market	31
Fish shops available	10
Functioning	10
Mechanism of market information	No organized mechanism (Price based on demand and supply)

Source: Primary Survey, 2008

The seasonal flow of fish from different water bodies is presented in Table 5.50.

Table 5.50 Seasonality of Arrival of Fresh Fish to Bhadravathi Fish Market, Shimoga

Source	Peak Arrivals	Rohu	Catla	Mrigal	CC	GC	SC	Tilapia
Tanks	December- April							
	January- March							
	April- June							
Reservoir	December- April							
	January- March							
	April- June							
Culture ponds	December- April							
	January- March							

	April- June							

(Note: CC: Common Carp; GC: Grass Carp; SC: Silver Carp)
Source: Primary Survey, 2008

A modern fish market was established in 1993 and currently there are 15 fish wholesalers and six commission agents who have license from the municipal corporation. There are 8-10 retail shops. Around 400 tonnes of Catla, 200 tonnes of Common Carp and Silver Carp, 100 tonnes of Tilapia and sizeable quantity Prawn, Pomfret, Mackerel are sold here daily. The main species that are normally sold is presented in Table 5.51.

Table 5.51 Average Sales at the Bhadravathi Fish Market, Shimoga

(Per week)

Species	Quantity (tonnes)	Price (Rs/ton)
Catla	2800	45,000
Common Carp	700	46,000
Silver Carp	700	45,000
Tilapia	700	25,000

Source: Primary Survey, 2008

Fish is supplied from Bhadravathi fish market to neighbouring districts as depicted in Figure 5.13.

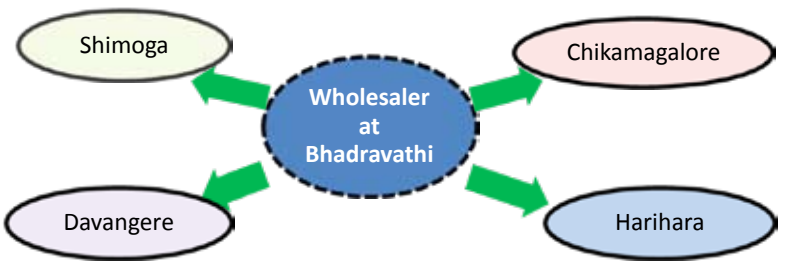


Figure 5.13 Disposal of Fish from Bhadravathi Market to Neighbouring Districts

5.1.6.5Devaraj Fish Market, Mysore

Devaraj fish market was established in 1995 and is located at the heart of the city of Mysore. It is essentially a local market operating throughout the day. It is a regulated market where both wholesale and retail transactions take place. Both cash and forward market are in existence. Freshwater and marine fish are sold here. It is a consuming market rather than producing market.

Table 5.52 General Particulars of Devaraj Fish Market, Mysore

Particulars	Details
Location	Mysore
Area/Coverage	Local
Time span	Long period
Volume of transaction	Wholesale and retail
Nature of transaction	Cash and credit
No. of commodities	Marine and freshwater fish
Stage of marketing	Consuming
Extent of public intervention	Regulated
Year of establishment	1995
Expansion over the years	2005 – 35 sellers – 37 tonnes 2006 – 40 sellers – 52 tonnes 2007 – 45 sellers – 56 tonnes

Source: Primary Survey, 2008

Table 5.53 Structure of Devaraj Fish Market, Mysore

Particulars	Details
No. of registered fish sellers	40
No. of sellers/traders operating at the market	5
Condition for entry into the market	License
Mechanism of market information	No organized mechanism (Price based on demand and supply)
Fish shops available	45
Functioning	43
Non-functioning	2
Weighing process	Electronic balance and Physical balance

Source: Primary Survey, 2008

There are 40 registered fish sellers at the market but only 5 fish sellers are currently operating at the market. To operate at the market, the sellers have to obtain a license from the Mysore City Corporation. There are 45 fish shops available out of which 43 are functioning. Electronic/digital balance and physical balance are used at the market place for weighing the commodities. On a daily basis, around 3 tonnes of Catla, Rohu and Mrigal, 2 tonnes of Grass Carp, Common Carp and Silver Carp and 0.25 tons of Tilapia and other local species are sold daily here.

5.1.6.6Yeshwanthpur Fish Market, Bangalore

This market situated at Sharif Nagar is 25 years old. The main feature of this market is that it is a consuming market but not organized or regulated. There are no shops but 15 sellers are there. The retailers sell on the footpath. These sellers are not registered under the city corporation. Hence, the sellers are regularly harassed by the policemen to whom they pay Rs.50 per visit. Both wholesale and retail business is there. Wholesale business generally lasts for 4 hours from 4 am to 8 am while the retail market operates from 8 am to 8 pm. Only freshwater fish is sold here. Usually there is good sale on Sundays. The sellers use physical balance with weighing stones. Around 100 kg of freshwater fish such as Catla, Rohu, Mrigal, Grass Carp, Common Carp and Silver Carp are sold here daily.

The wholesalers procure the fish from places like Tumkur, Kunigal, Hassan, Yediyur and from local Government farms and also from Andhra Pradesh. The secondary wholesaler purchases the fish from them which is sold to the retailers who in turn sell the fish to the vendors, village sellers, hotels and consumers. Sometimes the hotels also purchase the fish from vendors.

5.1.6.7Lashkar Mohalla Fish Market, Shimoga

It is around 60 years old and is a local market which operates the entire day. It is a retail market. Both cash and forward market is observed. Marine fish like Pomfret, Seer fish, Mackerel, Prawn and Shrimp and freshwater fish like Catla, Rohu, Mrigal, Grass Carp, Common Carp, Silver Carp and Tilapia, etc. are sold in this consuming market. The weighing process involves the use of weighing stones and crude physical balance.

Problems in Fish Markets of Karnataka

Several issues exist in fish marketing in Karnataka are listed below:

1. Almost all fish markets lack sufficient space, leading to congestion inside.
2. The fish shops are not modern. They are old and not maintained. Shops are in dark, as the lighting is insufficient.
3. There are no easy transportation facilities to visit most of the markets. Added to that, transportation charges are high.
4. There is a widespread expectation from the traders for training on handling of fish hygienically.
5. Almost all the markets don't get sufficient ice supply. It stresses the demand for creation more ice factories with enhanced capacity.
6. General hygiene and sanitary conditions are poor at the market place. Fish are displayed and sold on the earth and very few traders sell them in containers.

7. Water supply is also inadequate in fish markets.
8. Drainage system is also poor.
9. Storage facilities present in the markets are not sufficient.

5.1.7 Kerala

Kerala has average annual marine fish landings of 6 lakh tonnes of which majority (5 lakh tonnes) are consumed in the domestic market itself. The inland fish production was 0.78 lakh tonnes. The per capita consumption of fish in Kerala is 23 kg compared to the national average of 2.4 kg. Marine, brackish and freshwater fish are marketed in Kerala. There are 43 major markets, 123 small markets and 15000 vendors involved in fish marketing in the state. In addition, there are 13 marine fishing harbours and 61 marine fish landing centres.

Source of Fish

The main marine fish landed in Kerala are Sardine, Mackerel, Seer fish, Tuna, Pomfret, Pink Perch, Snapper, Bream, Carangid, etc. Brackishwater fish landed include Pearl Spot, Mullet, Milk fish, Tilapia, etc. Freshwater fish sold include IMC, Cat fish, etc. In addition, other commercially important species marketed are Shrimp, Prawn, Cuttle fish, Squid, Lobster, Crab, Mussel, Clam, etc.

Fish is also supplied to Kerala from Tamil Nadu, Karnataka and Andhra Pradesh. Supply of fish from other states is a year-round process but the quantity varies depending on demand in Kerala markets, with maximum supply during the monsoon trawl ban period in Kerala. Fish from Tamil Nadu is transported in trucks whereas fish from Andhra Pradesh and Karnataka are transported through trains to Kerala. Four trucks of iced fish reach Cochin markets daily from Tamil Nadu with the number increasing to eight trucks during the trawl ban period. Each truck supplies 100 boxes of fish (one box of fish = 40 kg). The trucks offload a part of their fish in Cochin and supply the rest to various other markets in Kerala. 25 insulated boxes from Andhra Pradesh reach Cochin markets daily. Tamil Nadu mainly supplies White Sardine, Mackerel and Tuna while Andhra Pradesh mainly supplies Pearl Spot and IMC to Kerala. Fish from Karnataka is mainly supplied to northern and central parts of Kerala whereas fish from TN is supplied mainly to southern and central parts of the state.

Table 5.54 Source and Mode of Fish supplied to Kerala from neighbouring states

Source	Mode	Fish species
Tamil Nadu	Truck	Sardine, IMC
Andhra Pradesh	Train	Pearl spot, white sardine
Karnataka	Truck / Train	Sardine

Source: Primary Survey, 2008

5.1.7.1Marine Fishing Harbour, Cochin

There are 13 marine fish harbors in the states. Fish is landed and auctioned at the harbors. The details of the Cochin fisheries harbour are given below in Table 5.55. The Cochin Fishing harbor was established by the Cochin Port Trust as a grant-in-aid project of the Ministry of Food and Agriculture, Government of India. The Fishing was commissioned in 1978. The harbour is managed and administered by the Cochin Port Trust, with the controlling officer being the Chief Engineer and Administrator.

Table 5.55 Infrastructure Facilities available at Marine Fishing Harbour, Cochin

Particulars	Details
Location	Cochin
Area	28 acres
Wharf area	5 acres
Auction-cum-packing hall	2 (total area of 3942 sq. m.)
Net repair shed	2 (total area of 1966 sq. m.)
Ice plants (privately owned)	12 (total capacity of 200 tonnes)
Cold storages (privately owned)	7 (total capacity of 700 tonnes)
Freezing plants (privately owned)	3
Fuel outlets	2
Slipway	1 (300 ton capacity)
Other facilities	Marine engine workshops, police station, comfort station for crew members, incinerator, shop and office rooms

Source: Primary Survey, 2008

Nearly 330 fishing boats operate at the Cochin Fishing harbour (Table 5.56). All fishing boats are issued licenses to operate at the harbor. The license is valid for 11 months. On an average 300 tonnes of fish and shrimps are landed at the harbour daily. Nearly 2245 people are directly employed at the fishing harbour including boat crew. About 1000 people are indirectly employed including local vendors, truck drivers, labourers, etc.

Table 5.56 Details of Fishing Crafts operating at Marine Fishing Harbour, Cochin

Particulars	Details
Total number of boats	330
Type of fishing boats	
Trawlers	*157*
Gill netters-cum-long liners	*157*
Purse seiners	*16*
Average quantity of fish landed daily	300 tonnes
Main fish species landed	Sardine, Mackerel, Shrimp, Cuttle fish

Fishing duration	
Trawlers	*Up to 15 days*
Gill netters	*Up to 15 days*
Purse seiners	*Daily trips*
Type of catch	
Trawlers	Shrimp, Cuttle fish, Squid, Ribbon fish
Gill netters	Seer fish, Tuna, Ray, Shark
Purse seiners	Sardine, Mackerel

Source: Primary Survey, 2008

The average numbers of vehicles that access the harbour to transport fish are given in Table 5.57. All vehicles that transport fish out of the harbour are charged a small fee by the Port Trust authorities. All auctioneers and traders operating at the harbour are issued licenses by the Port Trust authorities.

Table 5.57 Details of Fish Transport Vehicles accessing Marine Fishing Harbour, Cochin

Type of vehicle	Number	No. of fish boxes per vehicle	Likely destination
Motorcycles/Mopeds	300	3	Local markets and household consumers
Auto rickshaws/ Three wheelers	75	15 - 30	Local markets up to a distance of 25 km
Mini-trucks	75	30 - 60	Distant markets up to 200 km
Large trucks	25	80 - 110	Other state markets, markets more than 250 km distance

Source: Primary Survey, 2008

The details of the traders operating at the harbor are given in Table 5.58.

Table 5.58 Details of Traders operating at Marine Fishing Harbour, Cochin

Type of trader	Number
Auctioneer/Boat agents	
Large boat agents (more than 10 boats)	52
Medium boat agents (less than 10 boats)	12
Fish merchants	
Ordinary grade (License fee 100 Rs)	24
Higher grade (License fee 250 Rs)	37
Prawn merchants	9
Prawn/fish merchants	12

Source: Primary Survey, 2008

A relatively well maintained auction hall at marine fishing harbour, Cochin

A fully active auction hall engaged in business at marine fishing harbour, Cochin

Sardine being iced, packed and arranged for disposal at marine fishing harbour, Cochin

A big haul of Sardine fish at marine fishing harbour, Cochin getting ready for further distribution to different markets

A huge pile of ice bars for getting loaded onto the fishing trawlers for fishing trip at marine fishing harbour, Cochin

Auction platforms at marine fishing harbour, Cochin

5.1.7.2Mariyanad Fish Landing Centre, Thiruvananthapuram

Majority of the fishing crafts operating in the area are marine plywood canoes fitted with Out-Board Motors (OBMs). The cost for one such canoe is Rs 1 lakh excluding cost of OBM. The OBM used is either 9.9 hp or 25 hp. Each canoe employs around 10 people. Value of fish caught by each canoe ranges from Rs 100 to Rs 500 a day. This value can go up to Rs 800 a day depending on season.

Fish is landed and auctioned on the beach itself by the auctioning agents. Primary handling of fish is poor at Mariyanad. Larger amounts of fish are carried from the boat in boxes or Palmyra leaf baskets. Weighing of fish prior to auctioning is not done, nor is any record made of the species or quantity auctioned. Main fish species landed include Sardine, Mackerel, Seer fish, Tuna, Anchovy, Squid, Prawn, etc. Main buyers included agents of exporting companies, Wholesalers, vendors and retailers.

5.1.7.3Vypeen Fish Landing Centre, Cochin

The Vypeen fish landing centre on Vypeen island on the outskirts of Cochin is a private landing centre that deals primarily with the non-mechanized sector. The main fishing crafts are plank-built canoes and dug-out canoes.

Table 5.59 General Particulars of the Vypeen Fish Landing Centre, Cochin

Particulars	Details
Location	Vypeen (Cochin)
Ownership	Private
Duration	Short period market
Volume of transaction	Auction
Nature of transaction	Cash and carry
Species	Marine fish

Source: Primary Survey, 2008

Table 5.60 Structure of Vypeen Fish Landing Centre, Cochin

Particulars	Details
No. of registered fish auctioneers	10
No. of fishing crafts	580 Inboard *vallams* – 30 OBM *vallams* – 50 Dug-out canoes – 500
Condition for entry into the market	Open
Mechanism of market information	No organized mechanism (Price based on demand and supply)

Source: Primary Survey, 2008

Three types of fishing crafts operate at Vypeen, viz. plank-built canoes (with inboard motors), plank-built canoes (with OBMs) and dug-out canoes. Plank-built canoes or *vallams* are of two types, those with inboard motors and those with OBMs. The former employs around 50 people per *vallam* and the gear operated is '*Thangu vala*', a type of purse seine. Main fish landed by such *vallams* are shoaling fish like sardines. The average fish quantities landed by such *vallams* are around 5-7 tonnes a day. The quantity of fish landed per day could be as much as 10-14 tonnes in the peak season.

The *vallams* with OBMs employ around 5 to 20 persons and the gear used is *'Chooda vala'* (a type of gill net). Such boats land around 250 kg of fish a day. The dug-out canoes employ two people and they use gill nets. On an average, 200 tonnes of fish are landed daily at Vypeen. The total value of fish landed is Rs. 20 lakh.

The fish landed at Vypeen is auctioned off to the buyers. Ice is added only after auctioning. There are 10 auctioneers operating at the landing centre who charge 6% auction fee. Both the agents and the fishermen are members of the co-operative society. All money is transacted by the co-operative society. Fish landed at Vypeen is sold in Kerala as well as in other states. For a fish sale of Rs. 100, the auction charges Rs. 6 as auction fee. Of this Rs.1.25 goes to the agent, Rs. 0.75 to harbor owner, Rs. 1.5 to Matsyafed, Rs.1.5 to co-operative society and Rs. 1 is returned to fishermen as incentive.

Fish Markets of Kerala

There are 2703 fish markets in Kerala. The details of the different types of markets in the state are given in Table 5.61. Fish from marine landing centres and harbours is brought to wholesale markets for sale to retailers and vendors. Fish supplied from other states is also traded at the wholesale markets. Fish caught from inland sources like ponds, lakes and lagoons are also traded at the wholesale markets.

Table 5.61 Details of Fish Markets in Kerala

Details	Number
Total number of fish markets	2703
Wholesale markets	185
Retail markets	2518
Public markets	1459
Local Body owned markets	682
Private markets	428
Other markets (owned by co-operatives, churches, mosques)	134
Way side markets	1126

5.1.7.4Champakkara Fish Market, Cochin

Champakkara market is the main wholesale fish market in Cochin. On an average, 20 tonnes of fish is treated in the market daily. The main fish species traded here are Sardine, Carp, Seer fish, Tuna, Prawn, Pomfret, Carangid, Mullet, etc. The general structure and structure of Champakkara fish market in Cochin are given in Table 5.62 and 5.63 respectively.

Table 5.62 General Particulars of Champakkara Fish Market, Cochin

Particulars	Details
Location	Champakkara (Cochin)
Area/Coverage	Regional
Duration	Short period market
Volume of transaction	Wholesale Retail (10%)
Nature of transaction	Both cash and credit
No. of commodities	Marine, Freshwater and Brackishwater fish
Extent of public intervention	Unregulated
Expansion over the years	In 2000, new buildings added

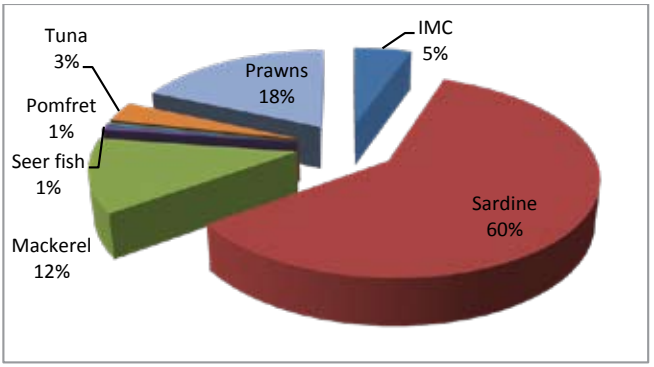
Source: Primary Survey, 2008

Table 5.63 Structure of Champakkara Fish Market, Cochin

Details	Market
No. of registered fish sellers	10
No. of sellers/traders operating at the market	10
Condition for entry into the market	Closed
Mechanism of market information	No organized mechanism (Price based on demand and supply)
Weighing process	Electronic/digital balance

Source: Primary Survey, 2008

The Champakkara fish market trades about 20 tonnes in a day, comprising Sardine, Mackerel, Prawn, IMC, Tuna, Seer fish, Pomfret, etc. Among these species, Sardine dominates the sale (60%), which is mainly purchased by middle income consumers followed by Prawn.



Source: Primary Survey, 2008

Figure 5.14 Fish Sale at Champakkara Fish Market, Cochin

Fish is brought from other areas of Kerala, Tamil Nadu and Andhra Pradesh. Iced fish is brought from Tamil Nadu in trucks mainly during the trawl ban period in Kerala. Fish from Andhra Pradesh reaches Kerala mainly by train.

Table 5.64 Supply of Fish to Champakkara Fish Market, Cochin

(Per day)

State	Quantity	Mode of Transport
Tamil Nadu	4000 kg (100 boxes)	8 Trucks
Andhra Pradesh	100 kg	Train

Source: Primary Survey, 2008

There are 5 companies (10 wholesalers) operating at Champakkara market. Entry into the market is closed, i.e. no new person is permitted to enter the market as a wholesaler. Each company employs its own auction agents. Auction is generally on one day credit basis. Fish can be bought on credit basis from the agent but he should be paid cash the next day or else the buyer cannot buy fish on that day. The agent charges 6-10% commission. The wholesaler has a money collector in the market for collecting money due to the wholesaler. Restaurant formed a small percentage of the buyers.

One section of the market dealt with local, small scale catches of small-sized fish and prawns. The catch is auctioned off and the buyers are mainly vendors. Main disposal of fish is through retailers, vendors and village merchants.

Problems in Champakkara Fish Market

1. There is lack of facilities for proper disposal of garbage.

2. Presently, most of the garbage is disposed off into the backwaters behind the market, which leads to clashes with the local residents of the area.

3. There is no ice plant or cold storage in the market.

4. Also there is no roofing, fish remain in the open even during rain and conversely when it is very sunny, it results in faster spoilage of fish.

5.1.7.5Retail Outlets, Cochin

There are innumerable retail outlets in Cochin City and in the state of Kerala. The retail outlets can be classified as roadside outlets, temporary outlets, medium outlets and modern retail outlets.

Roadside retail outlets

Retailers sell fish by roadside generally in the evening hours. They chose locations close to crowded areas or near other markets. They generally sell only one box (40 kg) of fish daily and their species variety is limited to 2 or 3 types. Such retailers opt for cheaper varieties of fish that he/she can finish selling at the end of the day. Main customers of roadside retail outlets are household consumers.

Temporary retail outlets

Temporary retail outlets are generally found near bust stops and small markets. Such retail outlets have a temporary structure to display fish and shade is provided with a tarpaulin sheet. Such temporary retail outlets are very common in Cochin. The quantity of fish sold daily ranges from 50 to 100 kg. The species variety is greater than roadside retail outlets. These retail outlets offer a mix of cheap and high value fish. Main customers of temporary retail outlets are household consumers.

Medium retail outlets

Medium retail outlets operate out of permanent structures. A large number of varieties are offered at such outlets and more preference is given to medium and high value species. Nearly 200 kg of fish is available for sale daily. Any unsold fish is preserved in ice/insulated containers for sale the next day.

Modern retail outlets

Modern retail outlets are the large retail outlets that sell fish along with other consumables. At most modern retail outlets a separate section/room is available for fish and meat retail. Preference is given to high value species. Fish is sold in a hygienic ambience. Low value species are marketed in ready-to-cook forms. Fish are sourced from fishermen through an agent/vendor who is authorized by the outlet to purchase fish for them. The agent/vendor will operate a consolidation centre for washing and grading fish. Based on the outlet's demand the relevant consignments are dispatched by the vendor.

5.1.8 Orissa

5.1.8.1 Bhubaneshwar Fish Market

Bhubaneswar has one wholesale market for fish with about 39 commission agents (called *Gaddiwala*). These commission agents are the central points in the fish distribution network. The wholesale market is connected with about 20 retail markets and about 50 fish selling points in the city. The retail markets are stipulated market places with license from the Bhubaneswar Municipal Authority. The selling points are operated by one or two retailers at the roadside for a small period of time in the day (2-3 hours).

Source of Fish

There are five major sources of fish to the Bhubaneswar market, viz, (i) marine fish from Gopalpur, Puri, Astaranga, Paradip; (ii) freshwater small aquaculture ponds in the districts of Cuttack, Puri, Khudra distrcts located around 80 kilometer radius, area; (iii) freshwater big aquaculture and culture based fisheries of medium and large reservoirs from Nayagarh, Baluagaon, Brahmapur Chilka and Brahmapur area; (iv) brackishwater capture fisheries from Chilka, and (v) fish from Andhra Pradesh. These diverse sources of the fish bring in four categories of the fish namely, Indian Major carps (IMC), Cat fish, Prawn, marine fish and Crab to the Bhubaneswar market.

Table 5.65 Type and Source of Fish to Bhubaneshwar Fish Market

Fish Species	Source of fish	Distance (km)
IMC	Andhra Pradesh Reservoirs Local ponds	800-1000 150-200 30-80
Marine/Brackish water fish	Sea (Puri, Paradip, Chilika)	100-120
Prawn	Chilika, Sea, rivers	50-120
Catfish	Andhra Pradesh, local ponds, local capture fisheries	800-1000 50-80
Crab	Chilka	100-120

Source: Primary Survey, 2008

The various sources interact with each other to adjust to the demand supply scenario. In the season when the landing of the fish from seas was high, the freshwater fish supply is reduced to half. The most controlled supply like ponds and tanks is adjusted more where as in capture fisheries one can't have control over their supply. The fish from the Andhra Pradesh are the most flexible one, as the fish are delivered to the market only after evaluation of the arrival of the fish from other sources. In case of sufficiency, fish are either moved to other markets or kept waiting for one to two days in order to sell at better price.

Disposal of Fish

The Bhubaneswar wholesale market caters to the retail markets and vendors within 30 km radius of Bhubaneswar. It caters to the urban and semi-urban areas of Cuttack and Puri also, though these cities have their own wholesale markets. It has interaction with the other regional markets as large indigenous Cat fish like Murrels (*Sala*), Wallago (*Balia*), etc. are sent to North India such as Delhi and Amritsar.

Problems in Bhubaneshwar Wholesale Fish Market

- **Sanitary problems:** The market is in the central place of the city and surrounded by residential areas. The cleanliness of the whole market area is not maintained properly. Hence, it needs to be improved in order to avoid social problems.

- **Waste disposal:** The major constraint identified by the commission agents is the lack of proper waste disposal system in the market. The fish waste and waters are not being taken out of the yard by the municipal corporation properly. Hence, a modern and mechanized waste disposal system needs to be developed to improve the hygiene of the market and its surrounding areas.

Problems in Bhubaneshwar Retail Fish Markets

- **Lack of infrastructure:** The retail markets lack the basic infrastructure like sheds, water, sanitation, electricity, etc. In most of the cases, water facilities such as tube well or open well are created by the traders associations. Alternately, they are dependent on the unhygienic and unreliable sources like ponds for their cleaning and other marketing activities. The lack of sheds are also seen as a major constraint as they are operating under temporary sheds or umbrella, particularly the women traders operating in the scorching sun is a common sight in the retail markets of Orissa.

- **No facilities from urban bodies**: The urban bodies with jurisdiction over the retail markets are collecting the license fees (annually) and municipality fee (daily) from all retailers. But, they are not creating or providing the needed facilities for the retailers.

- **Waste disposal**: In all the retail markets the waste disposal is found to be a major problem. In absence of proper waste disposal mechanism, the retailers are forced to abandon or throw the wastes like viscera, fins, etc. in to the nearby open dumping yards. Such practices lead to unhygienic situations in the areas surrounding the fish markets. The foul smell of the fish markets is a factor that discourages the people to visit and eat fish from the fish markets. A modern waste disposal and sanitation facility needs to be created at the earliest to improve condition of the retail fish markets.

- **Credit facilities**: The retailers are facing the problems of lack of short term credit facilities which are presently offered by the wholesalers or commission agents at exorbitant rates of interest. They require the short term credit of 2-7 days to acquire stock and sell in the market, a mechanism for which needs to be developed as market support to the retailers.

- **Loss due to price fluctuations:** The retailers also face occasional loss on account of fluctuations in the market price due to sudden big arrival of fish as well as poor supply on account of bad weather. On the other side, demand also falls during religious occasions. In such cases, they are forced to sell the fish at the price lower than the purchase price. The unsold fish get spoiled resulting in loss to the retailers. Hence, proper market information system needs to be put in place, covering local, regional and national demands.

5.1.8.2 Chilka Lake

The Chilka Lake is the largest brackish water lagoon in the Indian sub-continent. It produces 5% of the total fish production of the state of Orissa. The total fish landed from the lake during 2004-05 was 13260.37 tonnes.

Disposal of Fish

The fish caught from Chilka Lake is being consumed locally, within the state as well as sent to neighbouring states and distant markets like Kolkata, Chennai, Hyderabad and Delhi. The details of packaging and transportation of fish from Chilka Lake are discussed below.

The Indian Railways are the most important means for long distance transportation of the fish. Over the years the urban centres outside the state like Kolkata, Chennai, Delhi, and Mumbai have been demanding more for the fish from Chilka lake. Even the urban markets of the state Bhubaneswar, Cuttack, Berhampur, Rourkela and Sambalpur consume good quantities of fish produced from Chilka. Among all of them, Kolkata is the biggest consumer of fresh fish from Orissa as Howrah fish market reportedly pay the highest prices for fresh fish in the country. Delhi is another important demand centre, and over the last decade it has become a very important market for suppliers. With increasing immigration of population into Delhi, there is an ever-increasing demand for fresh fish. Chennai is the third most important market for fresh fish from Orissa. The collection agents or local traders have regular contracts with wholesalers and other commission agents at the destination markets. The baskets sent by each trader are marked carefully and the wholesalers of destination market use their agents to get them released from the railway station soon after arrival and carry to their wholesale market. Here, fish are weighed and auctioned to the retailers, who pack their purchases in ice and carry them to their respective markets. The wholesalers or commission agents at the destination market send the money due to their counterparts in Orissa weekly.

Most of the fish exported to other states are packed in bamboo baskets with *Sal* leaves to act as insulator or thermocol. Although plastic crates are increasingly used for transport of fish to other states, bamboo baskets are still preferred in Orissa for packaging fish. The baskets come in many sizes and can carry from 20 to 250 kg. Fish are packed in alternate layers with ice and carried to the railway station for transport. The proportion of the ice varies from 1 to 2 parts of that of fish depending on type of fish, distance to be transported and season. The baskets are stacked one above the other while being loaded into the train and the lower basket could often be carrying a weight of 600 to 1000 kg. Generally the traders use thermocol, plastic box and bamboo basket for keeping the fish for longer period of time (24 to 48 hours), carry safely and for the purpose of trade and export.

Problems in Chilka Lake Fish Market

There are two systems of fish marketing at Chilka Lake, the traditional system and the modern marketing system. Each system of marketing has several constraints associated with it.

The constraints associated with the traditional system of marketing are:

- **Lack of credit for investment:** The traders lack access to organized credit and hence use high risk credit sources such as private money lenders.

- **Lack of collective bargaining** - As the traders work individually, they fail to exert collective bargaining power to access better product and price in the landing centres.

- **Access to poor quality fish:** The traditional traders are compelled to deal with the poor quality and cheaper fish as they are not able to compete with the organized traders in accessing to the better quality fish. Therefore, they realize lower price and lesser profit for their product. They are also forced to handle low value high volume fish.

- **Bottlenecks in transportation:** The landing centres are either not connected or poorly connected by motorable roads. Therefore, the traders have to spend considerably more time in transportation leading to the deterioration of the quality and reduction of fish prices. In most of the cases, the traders are dependent on the public transportation systems which many times hesitate to carry fish loads or charge higher price for the service, resulting in reduction in their profit margin.

- **Poor facilities in the market:** There are lack of adequate facilities in the market. The traders and vendors are making use of the drain side and dirty road sides without proper water, light and sanitation facilities. The local authorities collected license fees but they don't provide any facilities for them.

The constraints in the modern marketing system as described below:

- **Credit dependence of fisher:** The credit dependence of the fisher with trader make the fishers attached to specific traders, for selling the fish to them thus making the system exploitative. As a result, fishers are offered lesser price than that ideally expected.

- **Access to ice:** The access to ice is controlled by traders, thus making the fishers dependent upon them and forces them to settle for lesser prices than they deserve.

- **Lack of collective bargaining** - As the traders work individually, they fail to exert collective bargaining power to access better product and price in the landing centres.

- **Poor accessibility:** Inaccessibility and poor transport systems in inland area reduce the fishermen's bargaining power. On the one hand, they could not take their products to the markets themselves. In other words, the number of traders willing to travel long distances is limited, thus the prices received by them are about 25% less than the market price due to forced selling in the nearest landing centres.

- **Organized trading and cartel:** The traders union in the landing centres formed cartels which artificially reduce the price than those in competitive markets. As a result of credit dependence, the fishermen having an obligation to sell their product to particular agents or traders can opt to sell their product to another buyer who might agree to pay a better price, but must pay a percentage (generally 10%) of his earnings from the transaction to his lender-trader, which act as an effective hindrance to selling catches to the outsiders.

- **Lack of market information:** Lack of market and price information is found to be a major constraint as the fishing crew onboard lack the access to the market information. The fishing villages are placed in the remote localities with limited access to modern informative gadgets like newspaper, television, etc.

5.1.9 Assam

Assam is a major fish consuming state in north-east India. There are four types of fish markets in Assam, viz. remote markets, rural markets, semi-urban and urban markets.

Supply of Fish

There are five major categories of supply sources, i.e. beels (wetlands), rivers, other open water (open access capture fisheries), ponds (aquaculture) and outside state (iced fish from states like Andhra

Pradesh, Utter Pradesh, Rajasthan and West Bengal, etc.; also locally called '*Chalani*' fish). The categorization is based on the uniqueness of these supply sources.

Table 5.66 indicates presence (or absence) of supply source of the fish in the market. The supply sources are diverse for all categories of the markets as fish from all sources are flown into the common markets. But, among them the semi-urban markets had highest access to all supply sources. The fish from outside state are highest for the urban markets and lowest for the inaccessible market. This indicates greater access of the urban centres to the organized supply of fish with lesser penetration of such fish towards the rural markets, mainly because of better infrastructure facilities such as roads and communication in the former than in the latter.

Table 5.66 Source of Supply as Percentage of Respondents

Type of Market	Source				
	Beels	Rivers	Other Open Waters	Ponds	Import from Other States
Inaccessible Area	83.3	61.1	77.8	66.7	44.4
Rural	88.1	81.0	78.6	81.0	78.6
Semi-Urban	95.3	95.3	69.8	86.0	93.0
Urban	78.3	82.6	60.9	73.9	91.3
Average	**87.5**	**80.6**	**72.9**	**77.8**	**76.4**

Source: Primary Survey, 2008

The type of fish from various sources is distinctly different. The riverine sources provide all categories of the fish where as the beels and other open access capture fisheries resources supply all fin-fish other than Prawn and Mollusc. The predominant fish from the ponds are Indian Major Carps (IMC) and Exotic Carps with limited supply of catfish and other indigenous fish. The fish from other states are mostly IMC with occasional supply of exotic carps. This indicates that the natural fisheries are the source of the diverse fish where as the aquaculture supply only limited species spectrum to the market at present.

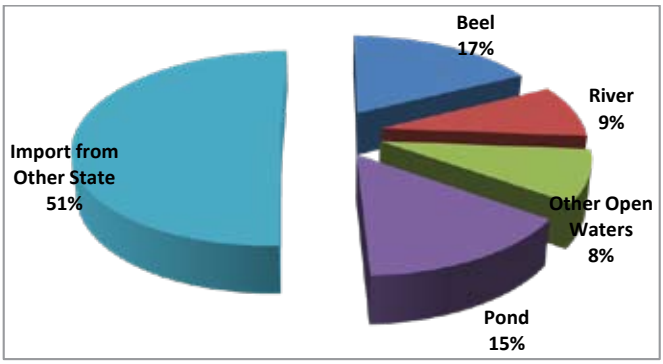
Table 5.67 Category of Fish Supply across Sources

Fish Species	Source				
	Beels	Rivers	Other Open Waters	Ponds	Import from Other States
IMC	25.8	21.2	9.0	87.0	96.1
Exotic	8.1	0.9	6.0	10.2	3.9
Catfish	20.2	33.6	19.0	0.9	-

Indigenous	25.8	28.3	65.0	1.9	-
Live	1.6	4.4	1.0	-	-
Prawn	-	1.8	-	-	-
Mollusk	-	0.9	-	-	-
Others	18.5	8.8	-	-	-

Source: Primary Survey, 2008

The average landings are estimated to be 0.67, 2.37, 4.95 and 18.57 quintal per day for the remote, rural, semi-urban and urban markets, respectively. The average landings per market are 5.3 quintals per day. Of this, the import from other states is the maximum (51%), followed by beels (17%), ponds (15%), rivers (9%) and other open waters (8%).

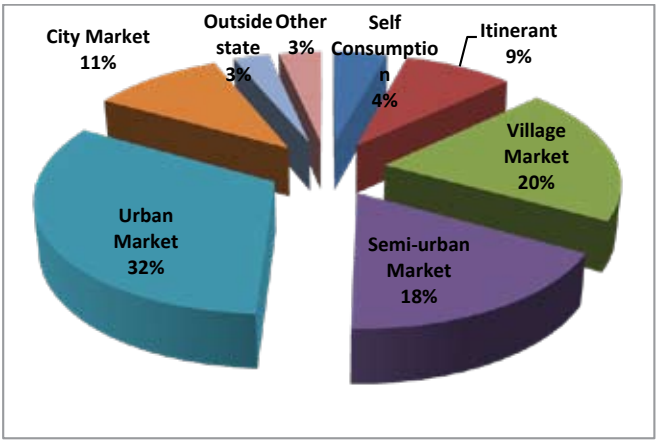


Source: Primary Survey, 2008

Figure 5.15 Source of Supply to Fish Markets in Assam

Disposal of Fish

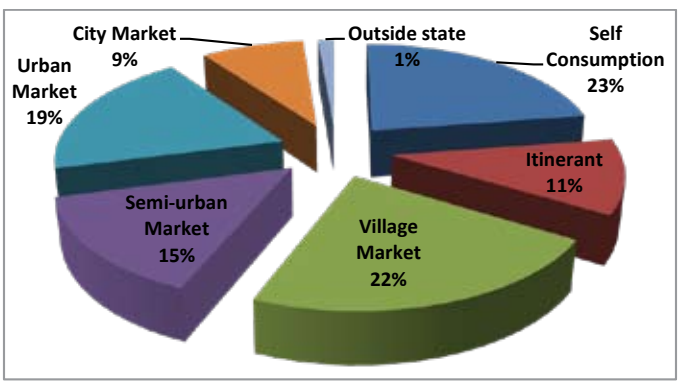
The fish disposal pattern is determined by the market channel alternatives, surpluses and fish marketing practices. Eight major fish disposal systems were identified viz, self-consumption, itinerants, village market, semi-urban markets, urban markets, city markets and outside states. The disposal pattern is primarily dependent on the location of the production unit, distance to urban centre and state boundaries. The disposal of fish across all channels from beels is presented in Figure 5.16. Most of the fish from the beels are sent to urban markets (32%) followed by village market (20%) and semi-urban markets (17%). A smaller percentage is sold through itinerant and large city markets. About 4% of the fish from the beels is self consumed.



Source: Primary Survey, 2008

Figure 5.16 Disposal Pattern of Fish from Beels in Assam

In case of ponds, the fish find themselves mostly consumed by the producers (23%). The remaining fish reach village market (22%), urban market (19%), semi-urban market (15%), itinerant (11%), city market (9%), outside state (1%). The pattern reminds us about the dependence of the fishers on their ponds for livelihood and food security. Since ponds are owned by private individuals and the output is smaller, they mostly sell the fish in nearby village markets as they don't have enough means to transport them to farther markets (Figure 5.17).

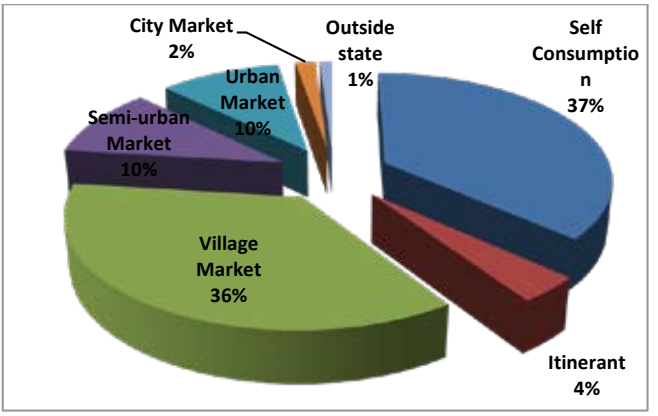


Source: Primary Survey, 2008

Figure 5.17 Disposal Pattern of Fish from Ponds in Assam

In case of fish captured from other open waters, similar pattern as in the case of ponds is observed, but in a much definite manner. Fish are mostly consumed by the fisher (37%), the remaining fish

reach village market (36%), followed by semi-urban and urban markets (10% each). Itinerant, city market and market outside state also receive a small portion of fish captured from these sources (Figure 5.18).



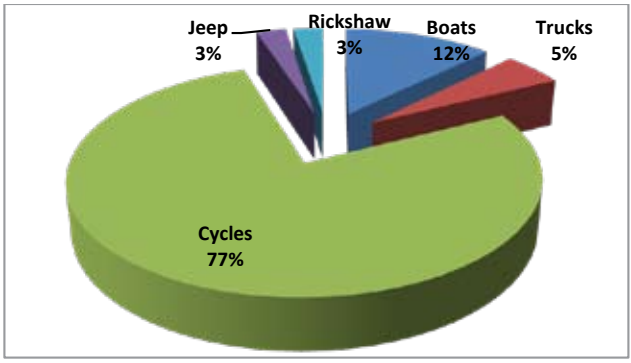
Source: Primary Survey, 2008

Figure 5.18 Disposal Pattern of Fish from Other Open Waters in Assam

Transportation of Fish

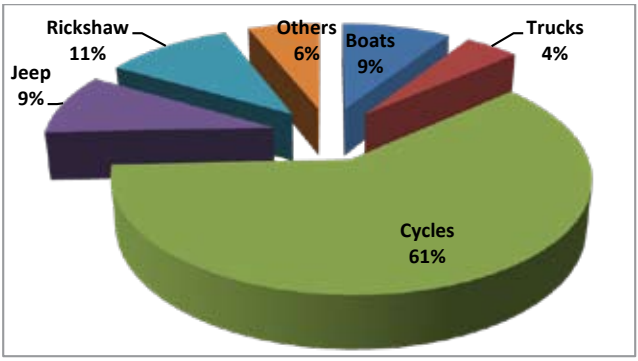
The means of the transportation for carrying the fish to and away from the markets were primarily boats, jeeps, rickshaws, cycles and other means. The average number of the carriers operating in the markets varied across the season as well as type of markets. The cycle was the predominant means of the fish carrier reported in the markets. Each cycle can carry about 25-40 kg of fish. Other means of transportation are very limited in number. In the remote markets, the cycle is used by 77% of the respondents that reduced gradually in rural, semi-urban and urban markets. The role of trucks is more common in the urban markets, but jeeps are important in semi-urban markets. In the remote markets, the boats are used more than in other markets.

Various modes of transport of fish in rural, semi-urban, urban and city markets in Assam are depicted in Figure 5.19, 5.20, 5.21 and 5.22 respectively.



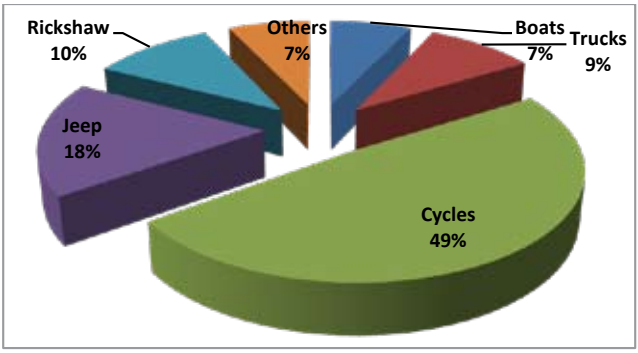
Source: Primary Survey, 2008

Figure 5.19 Mode of Transport used in Rural Market of Assam



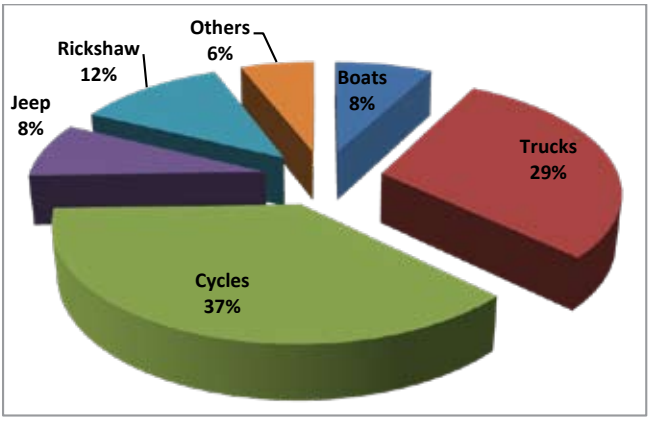
Source: Primary Survey, 2008

Figure 5.20 Mode of Transport used in Semi-Urban Market of Assam



Source: Primary Survey, 2008

Figure 5.21 Mode of Transport used in Urban Market of Assam



Source: Primary Survey, 2008

Figure 5.22 Mode of Transport used in City Market of Assam

Infrastructure Facilities at Fish Markets

The infrastructural facilities are not well developed in the fish markets in the state. The availability of sheds is reported in 74% cases, and fish by the rest are sold in open. The electricity is available in about 57% of the cases and it is lower in the remote markets (44%). Only 60% of the markets have cleaning facilities. The availability of water in the markets for washing and cleaning of the fish is present in less than half of the cases which is considered as highly essential for fish trading.

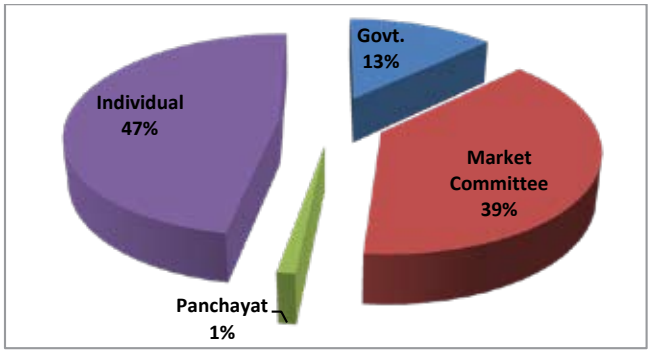
Table 5.68 Infrastructural facilities at Fish Markets of Assam

Facility	Percentage of Markets
Shed	74
Light	57
Cleaning facilities	60
Water	48
Other equipments	41

Source: Primary Survey, 2008

Figure 5.23 depicts the contribution of various agencies in creating and/or maintaining the infrastructure facilities in fish markets in Assmam. Most of these facilities are created or provided by either the traders themselves (47%) or fish marketing committee (39%). Only about 13% of the facilities are

provided by government agencies. This is indicative of the dismal state of the support provided by the government for the development and promotion of the fish marketing in the state.



Source: Primary Survey, 2008

Figure 5.23 Agency providing Infrastructural facilities at Fish Markets of Assam

5.1.10 Gujarat

The state of Gujarat was the leading producer of marine fish in India in 2006-07 at 6.20 lakh tonnes.

5.1.10.1 Veraval Fish Market

Veraval is the most important fish landing centre in Gujarat and it alone contributes 30% of the total marine fish landings of the state. Fisheries and fish related activity is the mainstay of the economy of Veraval, which is a major supplier of fish to various consuming centres in the country.

Disposal of Fresh Fish

Fresh fish supply from Veraval to various consuming centres in the country is carried out from the Kharakuva centre. The Kharakuva Marine Fish Suppliers Association deals with supply of fresh marine fish to the domestic markets which include Ahmedabad, Surat, Vadodara, Navsari, Mumbai, Delhi, Howrah, Chennai, Jaipur etc. (Table 5.69). There are 170 suppliers in the association. Suppliers collect the fish from fishermen directly or from other suppliers. The fish which do not have export market but fetch higher price at domestic markets such as *Dhada*, Rawa, Pomfret, Hilsa, *Halwa*, Mackerel, Seer fish, *Kati*, *Ghol* and *Koth* are used for domestic marketing. Transportation is by road or rail.

Table 5.69 Disposal of Fresh Fish from Veraval Fish Market

Particulars	Consuming Centres		
	Mumbai	Delhi	Howrah
Fish items	*Dhada*, Rawa, Pomfret, *Halwa*, Hilsa, Mackerel	Seer fish, *Kati*, *Koth*, *Dhada*, Rawa	*Ghol*, *Koth*, Hilsa
Mode of transportation	Road/ Rail	Road	Rail
Transportation charges per box	Rs 120 (Rs 20000 per trip)	Rs 240	Rs 425
Material sent per day	12 tonnes	6-8 tonnes	6-8 tonnes

Source: Primary Survey, 2008

The major chunk of the fish goes to Mumbai's Shivaji market. Each day fish up to 25-30 tonnes is transported to the important domestic markets in the country. The fish is packed in thermocol boxes than can carry up to 80-90 kg of fish along with ice. The transportation charges are based on the distance of the destination from Veraval and are charged per 100 kg (Table 5.70).

Table 5.70 Transportation Cost for Fish by Rail from Veraval

(Rs/100 kg)

Destination	Cost
Ahmedabad	46
Vadodara	110
Mumbai	170
Delhi	355
Chennai	500

Source: Primary Survey, 2008

The infrastructure facilities in the market are very poor. The roads are not properly constructed; drainage facility is not provided, and no attention is given to sanitation or for the disposal of waste material.

Disposal of Dry Fish

The dry fish supplied from Veraval can be classified as edible dry fish and non-edible dry fish. The edible dry fish include Cat fish, Tuna, Ribbon fish, Half Beak, Dry Shrimp, Reef cod, Golden Anchovy, Mackerel, Dhoma, Seer fish etc. These are the high value fish which are rejected by the suppliers due to lower quality and are passed on to the dry fish processors. The low value by-catch, consisting mainly of non-Penaeid Shrimp, Golden Anchovy and small Sciaenid are also dried, separated into species and used for human consumption.

The dry fish are transported to Maharashtra, Assam and Tamil Nadu. Transportation cost for Mumbai goes up to Rs. 12000-14000 per trip, for Assam Rs. 20000-25000, for Tamil Nadu Rs. 25000. To

Assam mainly the bigger sized Bombay Duck (12") is packed. During peak season, as many as 20-25 trucks are transported to the various destinations.

Non-edible dry fish processing mainly deals with preparation of fish meal from low value fish such as juvenile Bombay Duck, small mixed fish and Crustaceans and also from remains of the fresh fish as well as dry fish industry like fish heads, fish offal, etc. The fish meal industry is based on the use of 'trash' fish from the trawl by-catch and the material left over after the higher value species have been sorted out. The fish meal is used in poultry, piggery and also in aquaculture feed mills. At the export market, the fish meal goes to China and also to Thailand and Indonesia. The market for meal is ever increasing with the development and expansion of poultry farming in Andhra Pradesh, Tamil Nadu, Punjab, Karnataka and Kashmir and particularly at Pune where one of the largest battery farms in Asia is located.

Boats with out-board motors anchored at the Veraval fish landing centre, Gujarat

Women auctioneers performing auction of the marine fish at the Veraval fish landing centre market

A push cart mobile fish vendor leaving the landing centre market at Veraval, Gujarat

Mobile women headloaders/vendors leaving the landing centre market at Veraval, Gujarat

5.1.11 Tripura

Battala and Udaipur are two major wholesale and retail fish markets in the state of Tripura. Battala market is the biggest market in Tripura and supplies fish to the entire state, while Udaipur market feeds the local area and nearby districts.

5.1.11.1Battala Fish Market, Agartala

Supply of Fish

Large number of local fish farmers and fishers from reservoirs bring their fish to Battala market. Apart from these, fish also comes from Andhra Pradesh, West Bengal, Orissa, Gujarat, Assam, Uttar Pradesh and Bangladesh. The composition of fish market arrivals indicates that one third share comes from local sources and remaining two third from outside, which includes about 50% from Andhra Pradesh, 10% from Bangladesh and remaining dry fish and minnow from Gujarat and Uttar Pradesh through Assam. The local fish landed include 90% of IMC and remaining 10% Cat fish and other fish species. The composition of catch may vary over the months in a year. The market share of freshwater fish arrivals is more than marine fish in this market, as they are the preferred species of the Tripura consumers.

Disposal of Fish

The demand of fish in Tripura is more than the supply. Therefore, the wholesalers and retailers never face problem of fish disposal. Nearly 20% of fish auctioned at the market is sold in the retail market. Out of total, the fish disposed to other markets in Agartala has about 40% share. Remaining market arrivals at Battala market are disposed to different parts of the state. Most of the disposed fish species included fresh fish from Andhra and Bangladesh and the dry fish.

The general structure of Battala fish market is given in the Table 5.71.

Table 5.71 General structure of Battala Fish Market, Tripura

Particulars	Details
Location	Battala, Agartala, Tripura (West)
Area/Coverage	State
Market Association	Battala Matsha Aratdar Samiti, Battala Bazar, Agartala
Scale of operation	Daily
Time span	Long duration (Wholesale: 5 am - 6 pm Retail: 6 am - 6 pm)

Volume of transaction	40-45 tonnes (Retail - 25% of wholesale)
Nature of transaction	Both credit and cash
No. of commodities	All fish species
Stage of marketing	Consuming
Extent of public intervention	Regulated
Year of establishment	1950
Expansion over the years (No.of traders, Quantity traded)	1960 - 20, 10 tonnes 1980 - 30, 25 tonnes 2000 - 40, 35 tonnes 2008 - 50, 45 tonnes
No of registered fish sellers	50
No. of sellers/traders operated in the market	Wholesaler: 50; Retailers: 40
Condition to entry in the market	Registration, Trade license
Mechanism for market information	No organized system (Price based on demand and supply)
Weighing process	Platform, Physical/Digital balance
Sanitary arrangements	Poor

Source: Primary Survey, 2008

5.1.11.2Udaipur Fish Market

Source of fish

The fish catch from local aquaculture ponds reaches Udaipur market. Apart from these ponds, fish also comes from the state reservoirs and other states like Andhra Pradesh, West Bengal, Orissa, Gujarat, Assam, Uttar Pradesh and Bangladesh. The composition of fish market arrivals indicates that 70% of the share is from local sources and remaining is from outside. Most of the fish arrivals at the market are from freshwater sources. Marine fish are rarely seen in the market. Dry fish also reaches the market from Gujarat and Uttar Pradesh through Assam. Some of the retailers are procuring fish from Battala fish market at Agartala, mainly IMC from Andhra Pradesh and Hilsa from Bangladesh.

Disposal of Fish

Nearly one fifth of fish is disposed off to the retail market and about 50% to the local retailers, vendors and other wholesalers, 10% directly to bulk consumers and remaining to other parts of the district.

The bulk consumers prefer IMC coming from Andhra Pradesh due to its low prices, while the maximum price is for Hilsa from Bangladesh.

Table 5.72 General Structure of Udaipur Fish Market, Tripura

Particulars	Details
Location	Udaipur, Tripura (South)
Area/Coverage	Local
Market Association	No
Scale of operation	Daily
Time span	Short duration (Wholesale: 5 am - 9 am Retail: 6 am - 1 pm)
Volume of transaction	4 tonnes (Retail – About 20% of wholesale)
Nature of transaction	Both credit and cash
No. of commodities	All fish species
Stage of marketing	Consuming
Extent of public intervention	Regulated
Year of establishment	1960
Expansion over the years (No.of traders, Quantity traded)	1960 - 4, 0.8 tonnes 1980 - 4, 2 tonnes 2000 - 5, 3.5 tonnes 2008 - 8, 4 tonnes
No of registered fish sellers	8
No. of sellers/traders operated in the market	Wholesaler: 8 Retailer: 41 (35 deals Fresh fish & 6 deals with Dry fish)
Condition to entry in the market	Registration, Trade license
Mechanism for market information	No organized system (Price based on demand and supply)
Weighing process	Platform, Physical/Digital balance
Sanitary arrangements	Poor

Source: Primary Survey, 2008

Problems in Battala and Udaipur Fish Markets

- The market is small and congested.
- The ownership of land is not with market functionaries/Association which hampers the infrastructural development in the market.
- Storage space for fish is very less.
- Sanitary, toilet and drainage system are poor.
- Existing cold storage facility is insufficient, even though less storage facility is required because of high demand for fresh fish.
- There is parking problem of vehicles, particularly large trucks coming from Andhra and other parts of country.
- There is no market information system and hence, documentation of market arrivals, disposals and prices is very poor.
- Recovery of credit from the *Paikars* (retailers/other purchasers) is poor.

5.2 COLD STORAGE AND ICE PLANTS

Fish being highly perishable should be iced as soon as it is harvested. For this, sufficient quantities of ice need to be supplied to fishing boats and fish landing centres and markets. Similarly, fish cannot be stored at room temperature and needs to be stored at low temperatures to prevent spoilage. Thus, cold storages and ice plants are critical infrastructural inputs for efficient marketing of fish.

Cold storages are mainly used in India to store frozen products destined for various export markets. Ice plants on the other hand produce ice that is used considerably in domestic marketing of fish. Most processing (freezing plants) have ice plants of their own. The most common complaint raised by fishermen and traders is the lack of enough quantities of ice. The little amounts of ice available is very costly due to high electricity charges and most often are available far away from fishing harbours and landing centres.

The data on number of cold storages in the coastal states of India in 1993 and 1996 was analyzed and the results are displayed in Table 5.73 and Figure 5.24. Except in Orissa and Maharashtra, the number of cold storages increased from 1993 to 1996 in all coastal states. In Orissa, the number of cold storages fell from 21 in 1993 to 20 in 1996. The largest growth was seen in Gujarat, Andhra Pradesh, Tamil Nadu and Kerala, which are leading exporters of seafood from the country. This directly reflects the fact that presently cold storages are being exclusively used by seafood exporters.

Table 5.73 Number of Cold Storages in Coastal States of India, 1993 and 1996

States	1993	1996
West Bengal	28	29
Orissa	21	20
Andhra Pradesh	37	52
Tamil Nadu	46	66
Gujarat	27	43
Maharashtra	37	37
Goa	7	10
Karnataka	24	26
Kerala	153	167

Source: Handbook on Fisheries Statistics, 2006

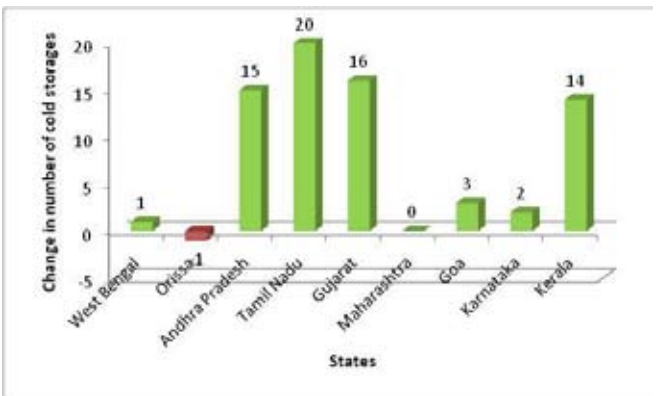


Figure 5.24 Change in Number of Cold Storages in Coastal States of India during 1993-1996

The analysis of ice plants in the coastal states of India from 1993 to 1996 further points to the dismal nature of infrastructure for domestic fish marketing. Only 4 states of the total 9 states showed increase in number of ice plants (Table 5.74). Goa showed a doubling in the number of ice plants from 3 in 1993 to 6 in 1996. Four states showed no change in number of ice plants and Maharashtra showed a decline in number of ice plants (Figure 5.25). As mentioned earlier, ice is critical for preserving fresh fish. Lack of ice will lead to poor keeping quality of fish, thereby affecting all the players in domestic fish marketing. Hence, it is critical to increase the number of ice plants in all the coastal states of India.

Table 5.74 Number of Ice Plants in Coastal States of India, 1993 and 1996

States	1993	1996
West Bengal	2	2
Orissa	4	7
Andhra Pradesh	9	9
Tamil Nadu	21	30
Gujarat	7	7
Maharashtra	10	9
Goa	3	6
Karnataka	26	26
Kerala	51	53

Source: Handbook on Fisheries Statistics, 2006

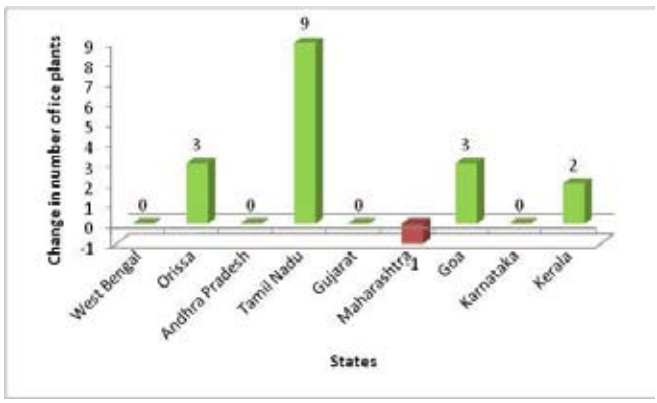


Figure 5.25 Change in Number of Ice Plants in Coastal States of India during 1993-1996

5.3 TRANSPORTATION FACILITIES

Transportation facilities are important for quick disposal of fish from landing centre or farm site to consuming centres. Fish being perishable the shortest time it takes to reach consumer, higher is the price realized.

The transportation facilities are well-developed at most urban centres and are efficiently utilized by the traders. The fish traders had to rely on public transportation facilities in rural areas where the places were either not connected or poorly connected with motorable roads. In such cases the traders had to spend considerably more time in transportation leading to the deterioration of the quality and reduction of fish prices. Additionally the traders were dependent on the public transportation systems which many times denied them passage to carry fish or charged higher price for that leading to the reduction in their profit margin.

Similarly the transportation facilities were better developed at coastal areas as compared to inland areas. Inaccessibility and poor transport systems in inland area reduced the fishermen's bargaining power. On the one hand, they could not take their products to the markets themselves and on the other, the number of traders willing to travel long distances was limited, thus the prices received by them were up to 25% less due to selling in the nearest landing centres.

The most prevalent modes of fish transportation included use of bicycles, mopeds, motorcycles, three wheelers, tempos, jeeps, non-insulated trucks, insulated trucks and trains. The mode of transportation used for fish depended on the distance involved (Table 5.75).

Table 5.75 Vehicles used for Transporting Fish in Domestic Markets of India

Type of vehicle	Quantity of Fish (tonnes)	Likely Destination
Bicycles/Motorcycles/Mopeds	0.1-0.2	Local markets and household consumers
Autorickshaws / Three wheelers	0.5-1.0	Local markets up to a distance of 25 km
Mini-trucks/tempos	1.0-4.0	Distant markets up to 200 km
Large trucks (insulated)	4.0-10.0	Other state markets, markets more than 250 km distance
Train	6.0-12.0	Other states, markets more than 250 km distance

Source: Primary Survey, 2008

Bicycles, tricycles, mopeds, autos etc. are used in short distances, mainly between landing centres and wholesale markets or between wholesale markets and retail markets or between retail markets and individual consumer doors. These kinds of mode of transport are very common in all the coastal states.

Mini-trucks and tempos are used between bigger and smaller consumer centres. Neighbouring states like Tamil Nadu and Kerala transport fish among themselves by both tempos and trucks. Large trucks are used, when fish are travels inter-state. Andhra Pradesh operates maximum number of trucks in fish trade. They send the fish to all parts of the country, even up to the north-eastern region. Transportation of fish between distant states like Gujarat and Delhi is usually by train. But, small amount of fish consignments also move between nearer states in trains.

The modes of transporting fish between different states in India are shown in Table 5.76.

Table 5.76 Modes of Fresh Fish Transport between Different States of India

From/ To	Delhi	Gujarat	Maharashtra	Karnataka	Kerala	TN	AP	Orissa	WB	Assam	Tripura
Delhi	Tempo	-	-	-	-	-	-	-	Truck/ Train	-	-
Gujarat	Train	Truck/ Tempo	Truck	-	-	Train	-	-	Truck/ Train	-	-
Mah	Train	Truck	Truck/ Tempo	Truck			Truck	-	Truck/ Train	-	-
Kar	-	-	Train	Truck/ Tempo	Truck/Train	Train	Truck	-	Truck	-	-
Ker	-	-	-	Truck	-	Truck/Train	-	-	Truck	-	-
TN	-	-	Truck	Tempo/ Truck	Truck	Truck/Tempo	Truck	-	Truck	-	-
AP	-	-	Truck/Train/Bus	Truck	Train	Truck/Train/Bus	Truck/Tempo	Truck	Truck	Truck	Truck
Orissa	Train	Train	Train	Train	Train	Train	Train	-	Truck/ Train	-	-
WB	-	-	Truck	Truck	-	Train	-	-	Truck/ Tempo	Truck	Truck
Assam										Jeep	Truck
Tripura										-	Jeep

Source: Primary Survey, 2008

The most common practice is to pack fish with ice in either plastic crates or thermocol boxes before transportation. Each crate or thermocol box carries up to 40 kg of fish with an addition 40 kg of ice. Trucks are insulated with thermocol or saw dust before packing fish, so that the fish can be delivered in good condition to the destination. The usual practice when fish is transported by road to distant markets is to offload some of the fish enroute to the final destination. The money for the offloaded fish is collected on the return trip by the supplier.

The biggest issue during fish transportation is the lack of loading/unloading space at most fish markets. The arrival of large number of trucks and other vehicles to offload and load fish, leads to congestion at most fish markets in the country. This congestion is an issue of concern as it leads to problems between fish traders and neighbouring residents. Customers also are not keen on visiting the market places due to the vehicle congestion.

In the regions where beels, estuaries, rivers and other open water bodies exist and capture fisheries system is practiced, the transportation facilities are entirely different. Boats are one of the main vehicles of transporting the fish from landing centre to nearby markets. Cycles are used in those regions predominantly when the fish reach the shore or landing site for transporting them to nearby primary markets. While planning for improving the domestic marketing, these location-specific and system-specific requirements need to be kept in mind.

In hilly and undulating terrains, jeeps are used mostly for transporting fish from production site or capture site to the markets. This is mostly prevalent in interior semi-urban markets in some parts of our country.

Fish getting loaded into trains for transportation to wholesale markets located at long distances

Trucks are commonly used for transporting fish to distant states, requiring more than 2-3 days

Fish coming from Bangladesh into West Bengal and Assam in trucks

Trucks carrying fish on the way to other north eastern states beyond Assam in difficult roads

Mini-vans carrying fish loads from Chatrapati Shivaji market to retail markets of Mumbai

Push carts loaded with fish boxes heading towards various retail markets in Mumbai

An open three-wheeler motor rickshaw bringing ice to the Kasimedu fish landing centre at Chennai

An insulated truck loaded with marine fish waiting to leave from a landing centre to an export processing unit at Chennai

A mobile vendor leaving for a day's business in his moped at Musheerabad wholesale market, Hyderabad

Cycles of mobile fish vendors parked in Musheerabad wholesale market, Hyderabad

Mini-three wheeler vehicles are used for bringing fish from nearby pond sites and reservoirs to Hyderabad fish markets

A van used for bringing Live Murrels in special tin containers with perforated lid to Hyderabad fish markets

A typical fabricated three-wheeler being in use for operations related to fish transport at Veraval fish market, Gujarat

Tri-cycle are used for transporting fish and other materials involved in fishing in Tuticorin, Tamil Nadu

Vehicles lined-up in a non-mechanized fish landing centre near Kanyakumari, Tamil Nadu

An insulated van waiting to receive fish from Marine fishing harbour at Cochin

Three-wheeler mini-van with ice bars standing at a Hyderabad wholesale fish market

Ice bars being manufactured in an ice factory unit located at Andhra Pradesh

Thermacol boxes and plastic crates are nowadays very popular for packing fish to transport to far-away places

Saw dust, thermacol pads and tarpaulin sheets are commonly used low-cost insulation materials for truck carrying fish

Ice crushing machine in operation at Marine fishing harbour at Cochin

Ice being crushed for loading into the trawler at Veraval fish landing centre, Gujarat

Boats anchored to the shore at the non-mechanized landing centre at Tuticorin, Tamil Nadu

A fleet of fishing trawlers at the Veraval fish landing centre, Gujarat

Transportation of Fish from Kolleru Lake

Transportation of fish has been developed into a modern and efficient system in Kolleru Lake carp culture region. Transportation of fish is mainly through trucks. A truck's capacity is about 15 tonnes. The trucks are loaded with fish packed in either plastic crates or thermocol boxes. A truck carries about 240 plastic crates with 35 kg fish each (total fish biomass is 8.4 tonnes). When thermocol / Styrofoam boxes are used, 250 boxes are packed with 40 kg fish each, thus carrying 10 tonnes. Presently, traders have shifted to thermocol box packing and transportation rather than plastic crates, since for the same cost of transportation they are able to transport more fish (approx. 1.6 tonnes).

With every truck loaded, a 'Data Entry Sheet' is prepared and sent along with it. This sheet contains the name of the farmer, village name (pond location), traders mark on plastic crates, truck registration number and date of packing. It gives all the details of the fish loaded such as number, size, special materials like females with egg, etc. It is almost like an agreement paper between the trader and the farmer for completing all the money transactions. So, care is taken to fill the data sheets correctly by both trader and farmer. These printed data sheets are provided by the trader and the details are filled at the time of packing fish in crates and loading into the truck in the presence of representatives of both farmer and trader. 5% of the material is discounted for weight loss during handling. This will be carried forward till the vendor/retailer in the marketing chain.

All the buyers/ traders are wholesalers. The mode of payment is cash or bank draft and there is no credit system or buy back system. The trader may delay the payment by 1-4 weeks. During 1980s, the Andhra Pradesh State Fish Farmers Welfare Association used to help the farmers in problems related to recovering money. There is no written agreement between the trader and the fish farmer except the 'Data Sheet' filled while loading the fish into truck. Despite all this, the voluminous money transactions taking place had been very smooth and fair. A typical data sheet used in the Kolleru lake area by both the farmer as well as the trader/transporter is given below:

A Sample Data Sheet used in Transportation of Fish in Truck

Name of the Farmer: Trader's Mark on Crates: Truck Registration Number:			Village Name: Date of Packing:	
Sl. No.	**Crate No.**	**Variety**	**No. of Fish**	**Weight (kg)**

Note: Variety denotes fish species, viz. Rohu and Catla

Since 1980's, method of transportation of Indian Major Carps from Kolleru area has been standardized into a very economical activity by the combined endeavour of fish farmers, traders and

transporters. During the early days, trucks used to rush to the market in about 30-36 hours to cover a distance of approximately 1,200 kms. For every one or two hours saved, the truck drivers used to get incentives on the basis of benefits resulting from keeping the fish quality. In those days, fish used to get repacked with fresh ice at Howrah before proceeding to Siliguri, Tripura, etc. The bottom layer of crates used to melt faster due to hot air from below the truck chassis.

Presently, the same trucks are engaged, but thermocol / Styrofoam boxes insulated with panels of same material and rice husk packed between the boxes and the truck body has resulted in enhanced shelf life of iced fish for up to 10 days so as to reach even more distant fish markets at Siliguri and Agartala. It is observed that the trucks loaded with fish in plastic crates are catering to the markets of West Bengal, Bihar, Uttar Pradesh, Delhi. The trucks carrying fish packed in thermocol boxes are used for transporting to the extreme reaches of north-eastern states. On an average, 160-170 truckloads of fish per day is exported from Kolleru carp culture region, measuring about 1300 tonnes of fish per day.

An attempt was made by the farmers to dispatch fish from Kolleru area by train. A train running between Eluru (West Godavari District headquarters) to Howrah Railway Station (West Bengal) named 'Blue Parcel Express' used to cover the distance within 24 hours. By train, farmers could save Rs. 5/- (approximately) per every kilogram of fish compared to road transportation between the same places. However, this method has been discontinued since the fish on arrival by train used to create 'glut' in the market. As on date, only small quantities of fish especially those sent to interior markets are sent through train.

An attempt has been made by some innovative farmers to carry 200-300 kg of Indian Major Carps in large HDPE (High Density Poly Ethylene) tanks in 'live condition' to Hyderabad market from Eluru (less than 8 hours journey) but this practice is still in the process of standardization and popularization. This is being practiced only for murrels at present.

Trucks are getting loaded with fish for transportation to Howrah and north east states in a packing unit at Bhimavaram

Truck loaded with fish kept in thermacol boxes are insulated with thermacol pads in a packing unit at Bhimavaram

M/s Ananda Fisheries Pvt. Ltd., Bhimavaram, Andhra Pradesh

M/s Ananda Fisheries Pvt. Ltd., was started in the year 1989 by Sri U.K. Viswanatha Raju, K. Radha Krishna Murthy, Dr. T.S. Rama Rao and other family members. They were primarily Rice Millers looking for new opportunities in their native village. Freshwater fish (carp) farming was the only other significant activity at that point of time. In 1989, about 50 truck loads (5-6 tonnes of fish per truck) was being sold by the fish farmers of the region to Howrah market. There were only a few traders and mostly farmers used to directly sell the fish at the wholesale fish market in Howrah. The packing was done in bamboo baskets and fish had to be transported within 48 hours. Since farmers used to take the fish directly, there was no co-ordination in the supply and there were huge fluctuations in the price leading to wind fall gains and some times such severe losses that fish used to be sold at prices below the cost of transportation.

It was then that M/s Ananda Fisheries introduced Plastic Crates and Polyurethane Foam (PUF) Insulated Vehicles for fish transportation. The difference in quality was very significant and due to better insulation the holding time increased from a mere 48 hours to seven days. The consequent result was that in cases of excess supply, the farmers could hold the fish for one or two days at the market, bringing in the much needed stability in price. Another unexpected benefit was that the increased holding time allowed traders to take the fish to even distant Markets like those at Siliguri, Assam, Meghalaya, Tripura and other North Eastern states.

The fish supply chain which was like:

"Farmer – Trader – Howrah Wholesaler – Trader – Sub-Market (Siliguri, Assam) Wholesaler – Paikar – Buyer"

got shortened to:

"Farmer – Trader – Sub-Market Wholesaler – Paikar – Buyer".

The resultant benefits passed on to both the consumer as well as buyer and led to increased consumption. Farmed fish (Carp) production used to be about 250 tonnes per day in 1989 (farmed in 20,000 hectares) and has now gone up to 2,000 tonnes or more per day and it would not be incorrect to say that innovations brought about by M/s Ananda Fisheries in Fish Packing allowed for these increased volumes to be absorbed and distributed efficiently.

PUF Trucks were very popular for 5-6 years (up to 1997) and traders started experiencing some problems with them too. One was that the trucks could not carry any other load in the return direction (as they had to transport empty crates) which led to very high freight rates. Also, fish trading had some degree of seasonal variation. When traders needed to load higher number of trucks, there was a shortage of insulated trucks which led to very high freight rates and in other periods they were idle and unable to carry any other commodity other than fish.

To solve this problem, M/s Ananda Fisheries developed a very simple solution by applying traditional knowledge that rice husk, which was available aplenty at almost zero cost, was a very good insulator. So, they loaded fish crates into open (non-insulated) trucks using only rice husk as insulator. It proved even better than PUF and increased the holding time from 7 days in PUF insulated trucks to 11 days. It also obviated the need for engaging specialized trucks for fish transport, and traders can now use any ordinary truck for transporting fish. Also these trucks could carry other loads in the return

direction leading to freight savings. The system of 'Husk Packing' has been popular for another 5-6 years (up to 2002).

M/s Ananda Fisheries was looking for further ways to improve fish packing. Internationally, fresh fish is packed in Thermocol (Expanded Poly-Styrene) Boxes. EPS is a food grade, hygienic, good insulator, disposable and relatively inexpensive. To produce EPS boxes at very competitive price, M/s Ananda Fisheries started M/s Shri Venkateswara Polymers in 2002 and later on as demand increased another M/s Shri Padmavthi Polymers in 2005. These firms are producing EPS boxes (installed capacity currently at more than 7000 boxes per day). Using these boxes instead of plastic crates led to 30% savings in fright costs as each truck could now carry 30% more fish. Also it has become very popular with markets like Assam and Bihar where fish sold at wholesale markets needs to be distributed to villages nearby. Previously, buyers repack the fish from crates into baskets for further distribution adding to cost. Now, they could buy the fish along with EPS boxes and distribute them very easily. The availability of EPS boxes at a competitive price also allowed both marine fish and fish from reservoirs, which used to be transported in baskets in trains, to also improve their quality. Now M/s Shri Padmavathi Polymers is India's largest single location manufacturer of EPS boxes supplying throughout the East Coast from Chennai to Orissa.

Not satisfied with their efforts in fish trading and fish packing, they wanted to bring innovations in fish culture too, as they realized that although lot of changes have taken place in fish packing, fish production remained the same without much changes. They now realized that the quality of fish can be improved by the farmers by changing their farming practices and by improving the nutritional quality of fish feed. By studying the fish farming practices in other countries, the promoters (Ananda Group) have started two new units – M/s Uno Feeds and M/s. Ananda Enterprises dedicated exclusively to manufacture Nutritionally Complete Extruded (floating) Feeds. These Units have just commenced operations and they are sure that they would revolutionize fish farming, the way their innovations created revolution in fish distribution and marketing. M/s Ananda Fisheries is also introducing alternate species like Tilapia (having got permission from MPEDA) and other indigenous species like Anabas, Magur, etc., with their own hatcheries to bring stability and improve fish production and consumption.

They are also working on establishing Fish Retail Chains to sell fresh fish, pre-processed fish, value added fish products, etc.

5.4 PROCESSING (FREEZING) UNITS

Freezing plants are essential for producing frozen fish products mainly for export. A very small percentage of the frozen fish and fishery products is consumed domestically. Indian consumers prefer fresh fish to frozen fish products though the latter is gaining popularity in metropolitan cities.

An analysis of the number of freezing plants in the coastal states of India in 1993 and 1996 reflects the growing trend seen in India's fishery exports. For the past decade India's fishery exports have shown a positive growth rate (further details in Chapter 8). The analysis reveals that barring Maharashtra all the other coastal states of India showed an increase in the number of freezing plants from 1993 to 1996 (Table 5.77).

Table 5.77 Number of Freezing Plants in Coastal States of India, 1993 and 1996

States	1993	1996
West Bengal	31	35
Orissa	17	21
Andhra Pradesh	35	51
Tamil Nadu	35	47
Gujarat	29	41
Maharashtra	40	29
Goa	5	7
Karnataka	12	14
Kerala	104	121

The highest absolute increase in number of freezing plants was seen in Kerala (Figure 5.26). The highest growth rate was seen in Andhra Pradesh followed by Gujarat and Tamil Nadu (Figure 5.27).

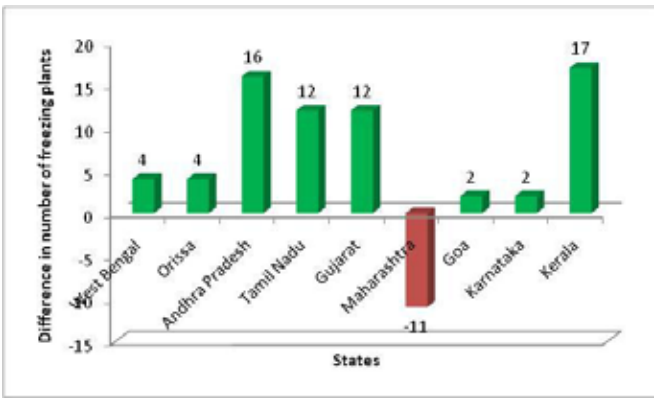


Figure 5.26 Change in Number of Freezing Plants in Coastal States of India during 1993-1996

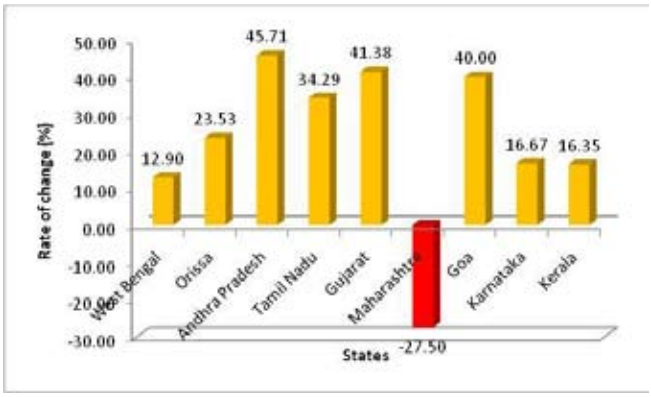


Figure 5.27 Rate of Change in Number of Freezing Plants in Coastal States of India during 1993-1996

CHAPTER VI

ROLE OF PUBLIC AGENCIES IN FISH MARKETING

6.1 CENTRE

6.1.1 Department of Animal Husbandry, Dairying & Fisheries (DAHDF)

This department comes under the Ministry of Agriculture and is mainly focused on:

1) Development of requisite infrastructure in States/UTs for improving animal productivity
2) Preservation and protection of livestock through provision of livestock health care
3) Strengthening of central livestock farms
4) Expansion of aquaculture in fresh/brackish water
5) Welfare of fisherfolk

The department is responsible for matters relating to livestock production, preservation, protection and improvement of stocks, dairy development and also for matters relating to the Delhi Milk Scheme and the National Dairy Development Board. It also looks after all matters pertaining to fishing and fisheries, which includes inland and marine sectors and matters related to the National Fisheries Development Board. The Department advises the State Governments/Union Territories in the formulation of policies and programmes in the field of animal husbandry, dairy development and fisheries.

The Department has several schemes operating in the fisheries sector. These include:

i) Development of inland fisheries and aquaculture
ii) Development of marine fisheries, infrastructure and post harvest operations

Development of post harvest infrastructure – A central sector scheme was introduced in 1992-93 for providing remunerative price to the fish farmers for their produce and making available fresh fish at reasonable prices to the consumers. Under this scheme, State Fisheries Cooperative, Cooperative Federation and primary cooperatives are assisted to strengthen their marketing infrastructure in the shape of fish handling sheds, ice plants, cold storage, retail outlets, etc. With a view to strengthen the post-harvest infrastructure and minimize post-harvest losses through ideal marketing system, this scheme was modified and continued as a component of the macro scheme during the 10th Plan. During this period, 13 ice plants/cold storages, 45 fish retail outlets/kiosks, 31 insulated/refrigerated vehicles were set up in the country. During 2006-07 and 2007-08 an amount of Rs. 4.78 crore and 0.92 crore respectively have been released.

Development of post harvest infrastructure consists of two sub-components, i.e. i) developing fish preservation and storage infrastructure and ii) developing marketing infrastructure such as retail vending kiosks, aqua-shops, insulated/refrigerated vehicles, ice box, fish display cabinets, visi coolers, etc. This programme is implemented through self-help groups of fisherwomen, NGOs, cooperatives, joint sectors, government undertakings and corporations in a location specific

manner. The funding pattern under the component is i) 100% grant (limited to Rs. 1 crore) to government undertakings/corporations/federations ii) 75% grant (limited to Rs. 0.75 crore) to NGOs/cooperatives/joint sector/group of fisherwomen in NE Region/hilly/tribal areas and iii) 50% grant (limited to 0.40 crore) to assisted/private sector in NE Region/hilly/tribal areas and 25% grant (limited to Rs. 0.25 crore) in general areas.

iii) Welfare programme for fishermen
iv) Fisheries Training and Extension
v) Strengthening of database and Information Networking
vi) Assistance to Fisheries institutes

6.1.2 National Cooperative Development Corporation (NCDC)

Functions of NCDC include:

1) Planning, promoting and financing programmes for production, processing, marketing, storage, export and import of agricultural produce.
2) Planning, promoting and financing income generating stream of activities such as fishery.

Activities of NCDC include:

i) Purchase of operational inputs such as fishing boats, nets and engines.
ii) Creation of infrastructure facilities for marketing, transport vehicles, ice plants, cold storages, retail outlets, processing units, etc.
iii) Development of inland fisheries, seed farms, hatcheries, etc.
iv) Preparation of feasibility reports.
v) Integrated Fisheries Projects (Marine, Inland and Brackish water).

6.1.3 National Federation of Fishermen's Cooperatives Ltd. (FISHCOPFED)

The National Federation of Fishermen's Cooperatives Ltd. (FISHCOPFED) is a national level federation of fisheries cooperatives and the apex institution of Indian Fisheries Cooperative Movement. Its Motto is to promote and develop the fishery cooperative movement in India, to educate, guide and assist fishers in their efforts to build up and expand the fishery cooperative sector and serve as an exponent of cooperative opinion in accordance with cooperative principles. It was established in 1980 as All India Federation of Fishermen Cooperatives and was rechristened as National Federation of Fishermen's Cooperatives Ltd. in 1982.

FISHCOPFED is well promoted through schemes and funds of the Dept. of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Govt. of India and National Cooperative Development Cooperation. The objectives of FISHCOPFED are:

1) To undertake or promote own or on behalf of its member institutions, inter-state and the international trade and commerce in fish products and undertake, whatever necessary, sale, purchase, import, export and distribution of fish and fish products and other articles and goods from various sources for pushing up its business activities and to act as the agency for canalization of export and import and inter-state trade of fish and other commodities or articles and to facilitate these activities, wherever necessary, and to open branches/sub-offices and appoint agents at any place within the country and abroad

2) To undertake purchase, sale and supply of fish and fish products, marketing and processing requisites such as machinery, spare parts and other fisheries requisites

3) To act as an insurance agent and to undertake all such work which is incidental to the same

4) To organize consultancy work in various fields for the benefit of the member cooperative institutions

5) To undertake manufacture of fishing vessels, marine engines and other fishery requisites by setting up manufacturing units either directly or in collaboration with or as a joint venture with any other agency, including import and distribution of spare parts and components for upkeep of the fishing vessels and gears, etc

6) To set up storage units including cold storage for storing various commodities and goods by itself or in collaboration with any other agency in India or abroad

7) To maintain transport units of its own or in collaboration with any other organization in India or abroad for movement of goods on land, sea, air etc

8) To undertake marketing, research and dissemination of market intelligence

9) To subscribe to the share capital of other cooperative institutions as well as other public and joint sector enterprises, if and when considered necessary for fulfilling the objectives of FISHCOPFED.

10) To arrange for training of employees of the fishery cooperative societies, State Fishery Departments and State Cooperative Departments;

11) To establish processing units for processing and preservation of fish and fish products;

12) To undertake grading, packing and standardization of fish and fish products;

13) To acquire, take on lease or hire lands, buildings, fixtures and vehicles and to sell/ give on lease or hire them for the business of FISHCOPFED.

14) To advance loans to its members and other cooperative institutions on the security of goods or otherwise; and

Activities of FISHCOPFED with reference to fish marketing are:

1) Inter-state and local retail of fish and fishery products of Integrated Fishery Products
2) Creating a chain of Retail Fish Centres in controlled and proper hygienic conditions in metropolitan cities
3) Establishment of Cold chain for providing remunerative prices to fish farmers
4) Transportation through refrigerated trucks
5) Fish retail shop in Delhi to cater to hotels and consumers

6.1.4 National Fisheries Development Board (NFDB)

The NFDB was set up at Hyderabad in 2006 to realize the potential of fisheries sector in inland and marine capture, culture, processing and marketing of fish and overall growth of fisheries sector with the application of modern tools of research & development including biotechnology for optimizing production and productivity from fisheries. The objectives of NFDB are:

1) To bring major activities relating to fisheries and aquaculture for focused attention and professional management
2) To coordinate activities pertaining to fisheries undertaken by different Ministries/Departments in the Central Government and also coordinate with the State/Union Territory Governments
3) To improve production, processing, storage, transport and marketing of the products of capture and culture fisheries
4) To achieve sustainable management and conservation of natural aquatic resources including fish stocks
5) To apply modern tools of research and development including biotechnology for optimizing production and productivity from fisheries
6) To provide modern infrastructure mechanism for fisheries and ensure their effective management and optimum utilization
7) To generate substantial employment
8) To train and empower women in the fisheries sector
9) To enhance contribution of fish towards food and national security

The major activities of the Board are:

i) Intensive aquaculture in ponds and tanks
ii) Reservoir fisheries
iii) Coastal aquaculture
iv) Deep sea fishing and tuna processing
v) Mariculture
vi) Sea ranching
vii) Seaweed cultivation
viii) Infrastructure for post harvest processing
ix) Fish dressing centres and solar drying of fish – includes:
    a. Setting up of model fish dressing centres in coastal states
    b. Setting up of solar fish drying units and sun drying platforms
    c. Training of fisherwomen
    d. Demonstration of units
    e. Funds for technology upgradation

Anticipated benefits – Hygienic marketing of fish, better dry fish for domestic consumption as well as export, reduction in post-harvest losses

x) Domestic marketing – includes:
    a. Modernization of wholesale markets
    b. Cold chains of varying levels
    c. Hygienic retail outlets
    d. Funds for design of outlets and technology upgradation

    Anticipated benefits – Hygienic marketing of fish, better quality of fish to the consumers, stability in prices, reduction in post-harvest losses

xi) Other activities

6.2 STATES

6.2.1 Directorates/Departments of Fisheries

6.2.1.1 West Bengal

The Fisheries Department of the Government of Bengal was first set up in the year 1911. Thereafter, on the recommendation of Bengal Retrenchment Committee, the Department was abolished in the year 1923. In the year 1942, to cope up with the growing fish demands due to i) preference of fish in the diet of every Bengali family and ii) increase in population, it was felt necessary set up the department. It resulted in revival of the department in the year 1942. The formation of the department led to increase in

production of fish by exploration and utilization of all the available impounded water resources of undivided Bengal. The department has been functioning continuously since then. The scope and activities of the Department had been expanding since first Five Year Plan. Large number of schemes was undertaken for development of fisheries and aquaculture in the state with a goal of attaining self-sufficiency in fish production and exploring possibilities of requirement of fish and fish products across the country and abroad. Due to the involvement of the Department in multi-directional fishery related activities, it has been renamed as the Department of Fisheries, Aquaculture, Aquatic Resources and Fishing Harbors in May, 2001.

The department has under its administrative control one Directorate i.e. Directorate of Fisheries set up in the year 1952. This Directorate is the nodal agency in planning, development and promotion of fisheries and aquaculture in the State. With gradual involvement of the Department in diversified activities since late seventies, the Directorate executed the policies and programmes of the Government in the field for the socio-economic upliftment of the fishermen community. It gave equal emphasis on research and training activities. The Directorate has been playing very significant role in rendering assistance in modern methods of culture, providing technical guidance, registration of fishermen's/fisherwomen's co-operative societies, development of infrastructure, promotion of export, updating of statistics, creation of database and networking on fishery related activities, implementation of relevant Acts, etc. The major objectives of the Directorate are to i) increase fish production of various species by way of exploring different methods of culture for keeping parity with the modern scientific and technological developments in the world and ii) disseminate this knowledge to the fishers, aquaculturists, and entrepreneurs through regular trainings.

For administrative convenience, the department is divided into four zones viz. Kolkata, Central, Western and Northern. Each of these are under the charge of one Deputy Director of Fisheries, who exercises supervision on the district level and block level functionaries. For each district there is one Assistant Director of Fisheries (ADF) under whom there are three District Fisheries Officers (DFO), two Fishery Extension Officers (FEO) and four Assistant Fishery Officers (AFO) at the district headquarters. The ADF also has Fishery Extension Officers in the district for looking after the work at block level. The Fishery Extension Officer is assisted by one Fishery Development Assistant and one Fisherman Attendant.

The department has a wing for Monitoring, Evaluation and Market survey headed by a Joint Director, stationed at Kolkata. The wing collects statistical information including that of marketing from various parts of the state.

The Directorate was first created with the Director of Fisheries, West Bengal assisted by two Deputy Directors, one Special Officer, five Superintendent of Fisheries, one Officer-on-Special duty, one Personal Assistant and one Assistant Engineer (Civil) at the headquarters. In addition, a post of Advisor, Fisheries Department, West Bengal was also created with a view to putting special stress on the Fish Technology Research Station at Kulia in Kalyani and fisheries development at Junput and Frasergunj.

At the district level there were four zonal Superintendents of Fisheries, one Superintendent of Fisheries for experimental farm at Kalyani in Nadia, 34 District Fishery Officers, one Superintendent of

Fisheries in charge of the experimental Farm, Kalyani with headquarters at Kalyani, Nadia, one yard Manager of Govt. Fish Curing Yard at Junput, one Project Officer on the scheme for increasing the rate of production of shark liver oil, fish meals etc. at Frasergunj, one Technical Officer on the scheme for increasing the rate of production of shark liver oil, fish meals etc. at Junput and nine Farm managers.

The Directorate is also responsible for monitoring and supervising the activities of Fish Farmers' Development Agency (FEDA) and Brackish Water Fish Farmers' Development Agency (BFCA). There are 18 FFDAs were established in West Bengal along with 3 BFDA.

The Department has also under its control two Corporations viz. State Fisheries Development Corporation (SFDC) and West Bengal Fisheries Corporation (WBFC) and one apex body of Fishermen's Co-operative viz. West Bengal State Fishermen's Co-operative Federation Ltd. (BENFISH). The WBFDC was established in 1966 for Development and promotion of aquaculture in impounded fresh and brackish water, while West Bengal Fisheries Corporation (WBFC) was established in 1980 initially to augment fish production vis-à-vis fish seed production afterwards assigned the job for marketing, creation of infrastructure and other engineering works also. BENFISH was established in 1978 for promotion of ornamental fisheries, formation of fisher co-operatives, food parks, sea-food processing centres, reclamation of beels and training of fishers and fisherwomen

6.2.1.2 Andhra Pradesh

The development of Fisheries Industry started long ago, with the establishment of Bureau of Fisheries in 1907, with an 'Honorary Director' as it's Head in the Madras state. The Department of Fisheries was reorganized in 1918 with the Director of Fisheries, as the Head of the Department in the Madras State. The First Director was Sir Frederick Nicholson. After the separation of Andhra from Composite Madras state on 01.10.1953, the Department was attached to the Agriculture Department under the Director of Agriculture. After the formation of Andhra Pradesh in 1956 (01.11.1956), the Fisheries wing was attached to the Director of Animal Husbandry.

After careful examination, the Government of Andhra Pradesh, have taken a decision to constitute a separate Directorate of Fisheries and created a post of 'Director of Fisheries' on 04.11.1959 to initiate various developmental schemes and exploit vast potentialities of the Andhra Pradesh state both in Inland and Marine Fisheries. Sri V. John was appointed as Director of Fisheries and assumed charge on 02.12.1959.

Functions of Department of Fisheries

The main functions of the Department of Fisheries are as follows:

1. To increase Fish and Prawn Production for sustainable yields.
2. To improve income of the Fishermen.
3. To render Fishermen welfare measures.

4. To promote exports to earn foreign exchange.
5. To improve the infrastructure facilities.
6. To increase the per capita consumption of Fish, by the people of the state.

With special reference to fish marketing the following schemes are being proposed from the Agricultural Marketing Committee Funds (2003), accumulated from the collection of Market Cess @ 0.5% on the value of Fish and Prawn:

1. Establishment of 8 Modern Fish Markets @ Rs. 70 lakhs each : Rs. 560.00
2. Stocking of Fish / Prawn Seed in Tanks / Reservoirs : Rs. 300.00
3. Construction of 18 Fish Landing Centers (50% of CSS matching grant) : Rs. 775.00
4. Construction of Shore based facilities (100 villages @ Rs. 4.0 Lakhs) : Rs. 400.00
5. Creation of Hygienic & Sanitary facilities in Municipal Markets 44 Nos. @ Rs. 10 Lakhs : Rs. 440.00
6. Laying approach Roads for landing centres (50 Kms. At Rs. 5.00 Lakhs/Km) : Rs. 250.00
7. Providing Fish Drying Facilities : Rs. 275.00

Achievements in Fish Marketing

1. One Modern Fish Marketing Complex at L.B Nagar, Hyderabad was taken up at a total cost of Rs. 87.00 Lakhs. 71 shops were constructed in 3500 Sq. meters area, handed over by Marketing Department.
2. Construction work at 15 landing centres was completed.
3. Construction of shore based facilities was completed in 66 villages.
4. Modernization of Urban Fish Market – (to maintain Hygiene and Sanitation facilities in Urban Fish Markets viz. partitioning of shops, fixing glazed tiles, fish sale platforms, water supply and drainage facilities, etc.).
5. 220 Fish drying plat forms were constructed.

6.2.1.3 Kerala

Directorate of Fisheries

Fisheries sector of Kerala is considered as one of the important productive and developing sectors of the state. Governance of the fisheries sector is vested with the Minister of Fisheries.

The Chief Executive responsible for fisheries in the Government is the Secretary to Government (Fisheries). All the development and management programmes envisaged by the Government in the fisheries sector are being implemented by the State Department of Fisheries. The Department of Fisheries

is headed by the Director of Fisheries. The Department of Fisheries in the state is structurally stratified and organized under the following Executive Officers.

State Level

Directorate of Fisheries
Director of Fisheries
Additional Director of Fisheries (Technical)

Zonal Level

Joint Directorate of Fisheries
Joint Director of Fisheries (South/Central/North Zones) – 3

District Level

Deputy Directorate of Fisheries
Deputy Director of Fisheries - 14

Panchayat Level

Matsya Bhavans
Matsyabhavan Officers - 200

Agencies under Department of Fisheries

1. **MATSYAFED** – Kerala State Co-operative Federation for Fisheries Development.
2. **MATSYA Board** – Kerala State Fishermen's Welfare Fund Board
3. **ADAK** – Agency for Development of Aquaculture, Kerala

   The headquarters of ADAK is at Trivandrum. This is a state level agency constituted by the Government of Kerala for implementing various projects on development of aquaculture in the State.
4. **FFDA** – Fish Farmer's Development Agency

   This is a district level agency constituted by the Government of Kerala. There are 14 such FFDAs in the state, one each in every district. FFDA is a Government of India Scheme implemented by the State Government for the development of freshwater fish culture in the State.
5. **BFFDA** – Brackishwater Fish Farmer's Development Agency

This is a zonal/district level agency constituted by the Government of Kerala. There are 6 such BFFDAs in the state. BFFDA is a Government of India Scheme implemented by the State Government for the development of brackishwater aquaculture in the State.

6.2.1.4 Tamil Nadu

Department of Fisheries

The prime responsibility of the department is to judiciously balance and enhance fish production with sustained conservation of resources as well as to improve the socioeconomic standards of the fishermen.

The Commissioner of Fisheries is the Head of the Department and also the Managing Director of Tamil Nadu Fisheries Development Corporation Limited an undertaking of the Tamil Nadu Government. He is the Functional Registrar of all fishermen cooperative societies including Tamil Nadu State Apex Fisheries Cooperative Federation. The State is divided into six regions headed by three Joint Directors of Fisheries and three Deputy Directors of Fisheries who monitor and supervise the activities of Assistant Directors of Fisheries, and implement various developmental schemes including fishermen welfare schemes.

Objectives of Fisheries Department

1) To encourage fisherfolk to exploit the under-utilized fishery resources and to reduce fishing pressure in the inshore areas.
2) To augment aquatic resource production in the inshore areas by conservation measures, stock enhancement, establishing artificial reefs etc.,
3) To promote sustainable eco-friendly aquaculture practices.
4) To strengthen the infrastructure facility for fish landing and marketing as per Hazard Analysis and Critical Control Point (HACCP) and European Union (EU) norms.
5) To uplift the socio-economic status of the fisherfolk through welfare measures and also by generating employment opportunities.
6) To modify the present fisheries legislation suiting the requirements of the fisherfolk and conservation.
7) Impetus to ornamental fish culture, and deep sea fishing including Tuna.

XI Five Year Plan–A Focus on Fisheries Development

During the XI Five Year Plan period from 2007-08 to 2011-12, the following Schemes will be taken up for implementation in the Department:

1) Develop fishery resources and potential including alternate livelihood programme to improve the economic well being of the fishermen.

2) Modernize and equip all the Fishing Harbors and Fish Landing Centres in accordance with the guidelines of Export Inspection Council Government of India, to satisfy Hazard Analysis and Critical Control Point (HACCP) norms to avail opportunities under the World Trade Organization (WTO) regime.

3) Empower fish producers to compete both in domestic and international markets.

4) Facilitate organized market network and modernize domestic fish markets including cold chain facility.

5) Conservation of fishery resources, enhancement of resources, reduce over-capitalized fishing efforts.

6) Modify policies to achieve conservation and diversification efforts.

7) Encourage alternate livelihood support programmes, through skill upgradation and professional training to fisherfolk.

8) Identify vulnerable areas and prepare a comprehensive plan for disaster preparedness and mitigation.

9) Develop aquarium and oceanarium for the promotion of fisheries tourism.

6.2.1.5 Tripura

Department of Fisheries

The Department of Fisheries of the Tripura state was set up with the following objectives:

- Increase in fish production for making the state self-sufficient in fish.
- Increase of productivity level and sustainable aqua-culture by 2012 A.D.
- To create self-employment opportunities, especially in rural areas and income generation for local people.
- Socio Economic upliftment of fishermen community.
- To maximize utilization of aqua resources available within the state.

The strategies being adopted by the department in order to achieve the objectives are:

- Bringing all culturable water areas under scientific fish culture with average fish production of 3050 kg/ha/year

- Entrepreneurship development among educated unemployed youths by organizing Self Help Groups (SHGs) and encourage women to participate actively in fishery development
- Reclamation of seasonal and silted water bodies to retain water upto desired level for fish culture
- To develop one Model Aqua Panchayat in each block of the State
- Revitalization of existing Fishermen Co-operative Societies/Self Help Groups for higher fish production
- Improvement in the post harvest technology for value addition and creation of transportation, preservation and marketing infrastructure

Major achievements

Development of post harvest facilities and capacity building

The presently available post harvest facilities in the State are very limited and of preliminary in nature. The viable Fishermen Co-operative Societies and Self Help Groups are being assisted to develop post harvesting infrastructure and transportation facilities like setting up ice plant, modern fish selling stalls, retail vending Kiosks, supply of mini truck etc. Seven mini trucks have been supplied to fisher co-operative societies. Besides, training programmes on preparation of value added products like fish pickle, fish cutlet, fish finger, *etc*. have been organized for the members of SHG and Co-operative Societies (fisher women groups).

Construction of new market shed

Four new market sheds for selling of fish have been constructed by the Department during 2006-07.

6.2.2 State Fisheries Development Corporations/Marketing Federations

6.2.2.1 Andhra Pradesh

A.P. State Fishermen Cooperative Societies Federation Ltd. (AFCOF)

The A.P. State Fishermen Cooperative Societies Federation Ltd. (AFCOF) was established as an Apex Co-operative Society under A.P. Co-operative Societies Act 7 of 1964 in the year 1987 with Regd. No. 11/IU/87. The Federation comes under co-operative public sector unit of the Government of Andhra Pradesh. The Federation has a membership of 580 societies with a share capital Rs 644.112 lakhs. The Federation has staff strength of 44 and its area of operation is entire Andhra Pradesh State.

Objectives

The objectives of the federation are:

1) To arrange for the disposal of catches of the primary societies at remunerative prices through District Societies / State Federation.

2) To set up fish stalls (in Twin Cities and other suitable urban consumption centers in the State) for sale of fish to the consumer at reasonable rates.

3) To undertake procurement of fishery requisites like synthetics and cotton yarns for manufacture of nets, manufactured nets, floats, etc. and its distribution through the District Fishermen Co-operative Societies to the primary societies.

4) To undertake procurement of fish fertilizers like oil cakes, chemical fertilizers, dried fish, fish meal, etc. and to arrange for their distribution through the District Fishermen Co-operative Societies.

5) To import fish from outside the State and sell the same to the consumers in the State.

6) To export processed fish and other fish products of the primary societies through District Fishermen Co-operatives Societies.

7) To set up yarn and net manufacturing plant and arrange for supply of gill nets, cast nets, sieves, trawl nets, etc. to the District Fishermen Co-operative Societies, who will arrange the distribution to primary societies.

8) To educate and innovate introduction of methods of preservation of fishes and also create facilities for drying of fish, production of fish meal and oil and for the that matter arrange for installation of rotary disk, drier, steam heater, boil drier, indirect tube drier, grinding mills, fish meal plants, silages, drying yards etc.

9) To set up fuel deposits in coastal areas for use of mechanized boats and arrange for supply of fuel and other lubricants to the fishermen / primary societies through District Co-operative Societies.

10) To purchase, hire or otherwise acquire boats motors or steam boats for the benefit of the Dist. Fishermen Cooperatives / Primary Fishermen Co-operative Societies.

11) To arrange fishery rights either by obtaining fishery leases or by public auction.

12) To educate for culture and catching of fish in the big Dams, Reservoirs etc., where it is not possible for its affiliated members.

13) To purchase, take on lease or in exchange or otherwise acquire lands, buildings or any moveable property necessary for the business of the Federation.

14) To set up Cold Storages, Ice Plants of all varieties for benefit of member Societies.

15) To arrange for supply of fish sees to primary Fishermen Co-operative Societies through Dist. Fishermen Co-operative Societies.

16) To open branches at suitable centers for the smooth conduct of business of the Federation with the approval of the Registrar of Co-operative Societies.

17) To develop, assist, supervise and co-ordinate the activities of the District Fishermen Co-operative Society and its affiliated societies and render the technical guidance to them.

18) To undertake such other activities as an incidental and conducive to the attainment of its objects.

19) To endeavor for socio-economic development of fishermen and also business of the Federation.

20) To act as an agent of State Government agreeing to implement policies formulated by the State Government for the development of fishery wealth and fishermen.

Membership Details

Initially the AFCOF used to give the membership to both Primary Fishermen Co-operative Societies and the District Fishermen Co-operative Societies, but as per the orders issued by Government for implementation of 3 Tier System in Co-operatives, the Regional Societies, *i.e.* the Telangana Fishermen Central Co-operative Society, Hyderabad and the Andhra Fishermen Central Co-operative Society, Kakinada were merged into AFCOF w.e.f. 01.07.2003. As per the enblock amendment to the Byelaws of AFCOF, the membership is restricted to only District Fishermen Co-operative Societies.

Marketing Activities of Federation

1. Operational of HSD Outlets

At present there are 5 HSD Outlets are being operated by AFCOF at Visakhapatnam, b) Kakinada, c) Nizampatnam d) Machilipatnam and e) Vodarevu. The profit from the operation of above 5 HSD outlets is about Rs. 60.00 lakhs per annum.

It is also proposed to establish 16 Consumer HSD Outlets (for Boats and Motorized crafts) in Coastal Districts and 7 Retail Outlets for general purpose. The profit from the 16 consumer HSD outlets is estimated at Rs. 100.00 lakhs per annum and from 7 retail outlets is about Rs. 50.00 lakhs.

2. Operation of Fish Marketing (Stalls)

There are 5 Fish Retail Fish Outlets in Hyderabad at a) Gaganvihar, b) Shantinagar, c) Liberty cross Road, d) Vanastalipuram and e) Kukatpally and 2 Mobile Fish Stalls at a) Saroornagar and at b) Mehdipatnam.

It is proposed to install Fish Stalls in the Districts under the schemes "Strengthening of Post Harvest Infrastructure Development" and "the C M's Special Package". An amount of Rs. 8.5 lakhs is released to install 6 Fish Stalls in Kurnool (2), Nizamabad (1), Chittoor (1), Anantapur (1) Nalagonda (1) districts under Post Harvest Infrastructure Development Scheme.

3. Construction of Modern Fish Marketing Complex

AFCOF has taken up for construction of Modern Fish Marketing Complex at Road No. 10 Banjara Hills Hyderabad with an amount of Rs. 27.00 lakhs (Rs. 7.00 lakhs from Post Harvest Infrastructure Schemes + Rs. 20.00 Lakhs from Marketing Funds). It is proposed to construct the marketing complex under ppp model. An amount of Rs 140.00 lakhs was allocated under Chief Minister's Special Package Scheme for creation of additional facilities *viz.* construction of 1st Floor, 2nd Floor, Cold Storage Plant, Processing Unit, Fast Food Center, Aqua shops, to promote Fish Marketing activities in twin cities.

4. Wholesale Fish market at L.B. Nagar

The Wholesale Fish market at L.B. Nagar has been constructed at Agriculture Marketing Committee, L. B Nagar with an amount of Rs. 85.00 lakhs with 71 stalls in 3,500 Sq. Meter area. The Wholesale Fish Market has been taken over into possession of AFCOF during the month of April 2007. An amount of Rs. 30.00 lakhs was allocated under the Chief Ministers Special Package Scheme to provide the water supply, sewerage and power connection. The modalities for its maintenance and operation are prepared. Action is being taken to identify and select the whole sale fish traders for allotment of fish stalls.

5. Retail Fish Sales

i) Procurement of Fish: As per the mandate to undertake procurement / purchase and disposal of catches of the Primary Societies at remunerative prices through District Societies / State Federation.

ii) Varieties sold:

- The fish retail outlets are selling not less than 15 fish and prawn varieties, as per the customer preferences.
- The Live Murrel fish, Live Crab, live Catfish are also sold.
- The Inland fish sold include Catla, Rohu, Mrigala, Common carp, Pearl spot, Catfish, Wallago, Eels, etc.
- The marine fish sold include Black Pomfret, White Pomfret, Chinese Pomfret, Seer, Konam, Lates, Perches, Carangids, Nemipterus, Lactarius , Anchovies, sardines, Mackerel, Indian salmon, Hilsa, Shark, Sole fish, Catfish, Anguilla, Eel, etc.
- The prawn/shrimp sold include Tiger shrimp of marine and cultured varities, Brown shrimp, Scampi, Deep sea shrimp.

- The crab varieties sold include sea crab and crab from backwaters
- The frozen varieties PUD (Peeled and De-veined)-in 3 sizes.
- The dried fish sold such as Anchovies, Bombay Duck, Ribbon fish, Silver bellies, Shark, Ray fish, Seer fish, Lates, Sardines, Mackerel, Perches.
- The dried prawn is also sold such Deep sea Kari kadi, Poovvalan.

iii) Management:

- The fish is processed at the retail outlet, such as skin-less fish meat, fillets, bone-less fish meat, etc. as per the requirements of consumers.
- Electronic weighing machines are used to give correct weight to the consumer.
- Packing of processed fish in plastic bags under hygienic condition
- Disposal of fish waste by keeping them in closed containers and care is taken to disinfect the area from flies.
- The timings are flexible (from 7.30 a.m. to 7.30 p.m) with out lunch break.

iv) Fish Mobile Outlets:

- AFCOF is running 4 Fish Mobile Outlets in Hyderabad. They are basically stationed near to Rytu Bazars located at Mehdipatnam, Kookat pally, Saroor Nagar and Erragadda at Vanasthalipuram. 2 numbers of Ashok Leyland (4 tonnes capacity), 1 Tempo trax and 1 Triwheeler are used**.** AFCOF has 3 tri-wheelers (including 2 taken on hire) which are being to work as sale outlets and distribution vehicles.

v) Canteen:

- AFCOF is running 2 Fish Canteens in Hyderabad at Liberty Cross Road and Shantinagar.
- The door delivery of fish items is arranged, as per the requirement of the consumers.
- Silver foil packing is used.

6.2.2.2 Kerala

Matsyafed - Kerala State Co-operative Federation for Fisheries Development (Matsyafed)

Matsyafed was registered on 19th March 1984 as an Apex Federation of primary level welfare societies in the coastal fishery sector with the objective of ensuring the economic and social development of the fishermen community by implementing various schemes aimed at promoting the production, procurement, processing and marketing of fish and fish products.

The headquarters of Matsyafed is at Thiruvananthapuram with the Managing Director being the Chief Executive Officer. Matsyafed is an Apex Federation of 653 primary level Fishermen Development Welfare Co-operative Societies. In order to achieve its objectives of socio-economic development of the fishermen community, several activities have been undertaken by Matsyafed, namely:

1) Developmental activities
2) Employment generation programmes
3) Women empowerment programmes
4) Commercial activities
5) Welfare activities
6) Aquaculture programmes
7) Extension and Mass Communication programmes

Developmental Activities

1) **Control over first sale of fish by producer –** The main focus of the Federation is to equip the producer fishermen to achieve control over the first sale of fish. The system of beach level fish auctions developed across the state through the primary co-operatives have enabled the producer fishermen to exercise right over first sale of fish. The fishermen are ensured cash payment at the beach itself through the primary co-operatives. A tie-up has also been made with seafood exporting companies for procurement of high value and bulk quantity of fish through the primary societies so that the producers get a reasonable price for their catch at the beach itself. This has ensured that prices do not plummet during bulk landings. The producer fishermen are also assured timely assistance for replacement of fishing inputs and working capital requirements. Also Matsyafed provides working capital assistance to the primary co-operatives for strengthening the beach level auction and supporting the member fishermen during off-season.

Women Empowerment Programmes

1) **Production and marketing of value added fish products from trash fish -** A project with an outlay of Rs. 100 lakhs for producing value added fishery products utilizing trash/bulk landed fishes is being implemented for fisherwomen of five districts of Kerala. Till date, 500 women have been provided financial assistance for setting up production units and marketing units for fish and fish products.

2) **Production and marketing of value added fish and fish products –** A scheme for large scale production and marketing of value added fish and a fish product is being implemented with financial assistance from Government of India under the Swarna Jayanti Grama Swarozgar Yojana. The project envisages providing alternate employment to 2500 fisher youth in hygienic preparation of value added fish and fish products.

Commercial activities

1) **Fresh Fish Point –** A retail outlet for fish was started at Cochin for supplying good quality fresh fish in hygienic conditions at reasonable prices. The outlet had a net profit of Rs. 1.07 lakhs in its first year of operation.

Welfare activities

1) **Special bus service for fisherwomen vendors (Vanitha bus) -** Matsyafed is operating Vanitha buses for transporting fisherwomen vendors from landing centres to markets and back, at nominal rates. These buses are being operated as a welfare service for the fisherwomen vendors who are normally denied access in public transport.

Proposed schemes by Matsyafed

1) **Proposal for creation of infrastructure at landing centres and wholesale markets for better value realization for fishermen** – Creation of infrastructure namely, chill rooms, ice storages, ice plants, pre-processing areas, insulated trucks, pick up vans and insulated boxes at landing centres. These facilities will ensure storage of fish in bulk landings and realization of the stored fish when landings are low, for better value realization to the fishermen. Infrastructure at wholesale markets will include min-chilled storages, insulated boxes and transportation facilities in addition to basic facilities like better floor, proper drainage, waste disposal system, cleaning facility and water supply system.

2) **Establishment of 500 retail outlets and 14 base stations for fish marketing in Kerala** – Based on the successful model of its first Fresh Fish Point, Matsyafed is proposing to start 500 similar retail outlets all over the state. Base stations will also be set up which will act as fish supply centres to the retail outlets. The aim is to source fish directly from the fishermen through the auction system with participation of co-operative societies. The system will ensure a better price to the producer and a fair price to the consumer.

Matsya Board – Kerala State Fishermen's Welfare Fund Board

The headquarters of Matsya Board is at Thrissur. Matsya Board implements various welfare schemes for the fisherfolk by operating a contributory fund viz. Fishermen's Welfare Fund envisaged as per the Kerala Fishermen's Welfare Fund Act-1980. 15 Welfare Schemes are being implemented by the Matsya Board.

6.2.2.3 Tamil Nadu

Tamil Nadu Fisheries Development Corporation Ltd. (TNFDC)

Tamil Nadu Fisheries Development Corporation Limited was established in 1974 with an authorized Share Capital of Rs.500.00 lakh and the paid up Share Capital as on date is Rs.445.52 lakh.

The Corporation undertakes the following activities:

1) Reservoir fisheries
2) Fish seed production
3) Fish processing
4) Diesel outlets
5) Fish marketing - The Corporation is marketing fresh and fried fish in the cities like Chennai, Madurai, Coimbatore, Trichy, Pollachi, Thiruvannamalai through retail outlets in order to benefit fishermen from harness harvest and to get better price so as to sell the fishes to public at an affordable price . During the year 2007-2008, 828.01 tonnes of fish were sold for Rs.581.27 lakh.
6) Fish net making factory
7) Shrimp hatchery
8) Model shrimp farm
9) Production and marketing of ornamental fishes
10) Supply of OBM/IBE under subsidy to motorized traditional fishing crafts

New schemes proposed to be taken up by TNFDC

1) Establishment of modern fresh fish stalls in the major cities of the State.
2) Strengthening of infrastructure of marketing under Post Harvest Technology funded by Government of India, Ministry of Agriculture in 4 places @ Rs.4.00 lakh each - Rs16.00 lakh
3) Provision of insulated trucks @ Rs.5.00 lakh each for 3 nos. under funding from the above scheme-Rs.15.00 lakh
4) Modernization of Teynampet stall into fish stall, aquarium and Value Added Product sales counter under funding from Post Harvest Technology, Ministry of Agriculture, Government of India (Rs.10.00 lakh grant-in-aid)-Rs.27.40 lakh.

Tamil Nadu State Apex Fisheries Co-operative Federation Limited (TAFCOFED)

Tamil Nadu State Apex Fisheries Co-operative Federation Ltd was registered and started functioning from 6.11.1991 with head quarters at Chennai. At present, 589 Primary Fishermen Co-operative Societies and 9 District Fishermen Co-operative Federations have become members in TAFCOFED and have paid Rs.89.06 lakh as share capital. To uplift the socio-economic status of traditional fishermen, TAFCOFED has been implementing Integrated Marine Fisheries Development Project with financial assistance from NCDC. Under this project, TAFCOFED distributed fishing inputs consisting of fishing crafts, engines and gears to the members of the Fishermen Co-operative Societies. A sum of Rs.19.79 crore was disbursed to 147 Fishermen Co-operatives benefiting 5669 beneficiaries who had acquired 2736 fishing inputs.

TAFCOFED have recently started diversifying it's activities to achieve sustainable and independent existence by establishing diesel bunks, sale of out board motors and service centres to facilitate marine fishermen.

Fish marketing

TAFCOFED is marketing fresh fish at Neyveli through retail outlet.

6.2.2.4 Karnataka

The Karnataka Fisheries Development Corporation (KFDC)

KFDC was established in 1970 as a Government of Karnataka Enterprises under the Companies Act, 1956 by transferring the various Ice, Cold Storage and Freezing Plants of the Department of Fisheries situated in Ullal, Mangalore, Kulai, Gangolli and Karwar to the Corporation along with the staff working in them. The present authorized share capital of the Corporation is Rs.6.00 Crores and paid up share capital is Rs.4.54 Crores (Rs.1.63 Crores cash and Rs.2.91 Crores Assets). The main activities of the corporation are:

- To provide fair price to the fishermen for their catches.
- To provide Ice to fishermen at reasonable rate for presentation of fish.
- To provide cold storage facilities for preservation of raw fish.
- To assist the fishermen in mechanized fishing by supplying nets, spare parts, diesel and accessories at subsidized rates.
- To produce and market fish products, fish meal and fish oil.
- To help in transportation of fish products from production centres to market places through insulated trucks and vans with cold storage facilities.

Karnataka Fisheries Development Corporation on its own in the last three decades has set up Ice plant at Malpe, Fish Meal and Oil Plant at Karwar, Diesel Bunks at Mangalore, Malpe and Karwar Fishing Harbours besides opening a number of Fish Sales units and Fish Canteens in the inland areas to serve the fishermen community and fishing industry. The Managing Director is in over all charge, responsible and accountable for the functioning of the company. He has the powers to control, direct and administer the functioning of the company.

Marketing Manager is in overall charge and responsible and accountable for marketing fish, diesel sales, fishing harbour gate fee collection and canteen sales of the corporation. He will contact the Branch Managers situated in various districts and inspect the Branches. He is also in charge of the various plant machineries and marketing of fish catches etc. He will conduct inspection of the activities of the various branches of the Corporation situated at coastal and Bangalore districts of the State and any other duties entrusted by the Managing Director.

Schemes implemented by KFDC

1) **Mathsyashraya Yojane 3rd stage -** The State Government through Fisheries Department has released an amount of Rs. 10 crores in the year 2006-07 for construction of 2500 houses to the poor fishermen spread over 29 districts of Karnataka. Karnataka Fisheries Development Corporation releases Rs. 40,000 per house in 3 instalments through Fisheries Department offices in the State.

2) **Diesel sales** - Tax free Diesel supply to the fishermen is one of the major activities of the Corporation and Corporation supplies diesel from 1983 onwards.

3) **Purse-seine fish marketing** - This one of important services rendered to the fishermen by the Corporation particularly for purse-seine boat parties. This activity started in 1982 and at present, Corporation is marketing purse-seine boat fishes at Bhatkal and Tadri Fishing Harbours. In the year 2006-07 Corporation has marketed purse-seine fish worth Rs.8 crores and it has earned commission of Rs.49 lakhs. By marketing this service corporation helps fishermen to get higher prices and to save them from the exploitation of fishermen by merchants.

4) **Fish harbour maintenance** - Corporation maintains Fishing Harbour at Mangalore, Malpe and Honnavar. By taking up this activity, Corporation not only collects different fees prescribed by the State Government but also maintains hygienic conditions and security of the Harbour.

5) **Fish Canteen Sales** - Corporation is running 3 fish canteens in Bangalore city. In this canteen corporation provides fish curry-rice and value added fishery items and sale daily around 800 meals are served to the public. In the year 2006-07 canteen has recorded sales of Rs.1 crores.

Future activities of KFDC

Government of Karnataka in the present financial year has sanctioned Rs. 10 crores as share capital for the development of marketing activities of Corporation. Corporation proposes to take up following activities utilizing this financial assistance:

- Establishment of Integrated Fish kiosks in 10 cities of Karnataka State.
- Modernization of Fish Canteen and Fish Kiosks in Bangalore city and its expansion.
- Establishment of Retortable Pouch Unit in Mangalore with the technical collaboration of CIFT Cochin.
- Aquarium Fish breeding and marketing activities.
- Improvement to the Ice plant and Cold Storage.
- Establishment of Diesel Bunks.
- Improvement to Cold Storage and purchase of Refrigerated Vehicles.
- Improvement of Purse seine Marketing.

In addition to this, Corporation proposes to establish Modern Fish Processing Units in Mangalore, Kulai, Gangolly and Karwar on B.O.T. basis. Already Corporation has tendered its Fish meal plant at Karwar on B.O.T. basis and a modern fish meal plant will be established at Karwar there by serving fishermen community to get better price for low value fishes.

Karnataka Co-operative Fisheries Federation Ltd. (KCFF), Mysore

The main objectives of KCFF are:

i. Implementation of 'integrated Reservoir Fisheries Development Project' through Primary Fishermen Co-operative Societies (FCS).
ii. Providing financial and technical assistance to FCS and imparting training to directors, members of FCS.
iii. To produce quality fish seeds at fish seed production centers and to supply them to FCS and fish farmers.
iv. Developing fishery wealth in tank and reservoirs through FCS and directly by KCFF.
v. Purchase of fish from FCS at fair price and arranging for its sale through kiosks in towns and cities.
vi. Marketing of fresh and frozen fish.
vii. Establishment and maintenance of ice factory and cold storage.

viii. Implementation of fishermen housing scheme and other social welfare programmes of fisheries department.

With the financial assistance of National Co-operative Development Corporation Ltd., New Delhi KCFF has implemented 'Integrated Reservoir Fisheries Development Project' in Mysore, Chamarajanagar, Mandya and Hassan districts at a total project cost of Rs.428.39 lakhs. Implementation of this project has resulted in formation of more FCS, better price realization, increased fish demand and enhanced fish production, etc.

Some schemes of KCFF

1) Fish seed production and rearing.

2) Fish seed stocking in tanks and reservoirs.

3) **Fresh fish marketing** - During 1993-94, Federation has started marketing fresh fish with a sale of 501 kg in the first year. Federation has established 99 fresh fish retail outlets (kiosks) in the districts of Mysore, Mandya, Bangalore, Chamarajanagar, Chikamagalore, Kodagu and Hassan. Because of this, fishermen are getting better price for their fish and customers are getting good quality fish at a fair price. During 2007-08 513.870 tonnes of fish was sold at a cost of Rs. 241.005 lakhs.

4) Ice production and sale.

5) Housing scheme.

6) NCDC assisted Integrated Inland Fisheries Development Project (2nd phase) – The marketing programmes under this project are:
    a. Providing bicycles and insulated boxes to 245 men and 870 women to store and market the fresh fish.
    b. Operation of fixed and mobile kiosks for sale of fish.
    c. Procurement of 4 wheelers and 3 wheelers insulated vehicles for fresh fish transport from landing centers to cold storages and from there to retail outlets.

7) Central Sector Scheme on "Development of infrastructure for fish marketing" - The central government has accorded sanction for Rs. 75.22 lakhs to implement this scheme. Under this scheme, provision is made for purchase of vehicles, setting up of kiosks, supply of insulated boxes, deep freezers and electronic scales, etc. So far, an expenditure of Rs.39.61 lakhs has been incurred to purchase deep freezers, stabilizers, electronic weighing machines, TATA 407 VEHICLE, insulated boxes and setting up of kiosks.

8) Development of fisheries in tanks and reservoirs

Major Gains in Fish Marketing due to KCFF Projects

Marketing of inland fish was by large monopolized by a few businessmen and middlemen in the locality. Vagaries in monsoon, absence of timely stocking of seed in the reservoirs, want of nets and coracles, social problems posed by local people at the time of harvest, want of nets and coracles, social problems posed by local people at the time of harvest, lack of organized market had rendered the sustainable development of inland fisheries as highly uncertain. As a result irregular fish catching, harvesting and its availability supply to the consumer has become highly irregular. The effective demand for the inland fishes despite the presence of large section of the fish eating population has been quite low for want of regular fish supply in hygienic conditions. The fishermen in the inland sectors are totally dependent on the businessmen for their short term loan requirements and for purchase of fishery inputs. As a result, fishermen are compelled to sell their catches at a very low price to businessmen, consequently leading him to poor price realization. In the inland sector even the merchants are also faced with the variety of problems related to poor infrastructural facilities for collection, pooling and sorting of fish in a scientific manner and under hygienic to ensure the regular supply fish to consumers. Therefore providing marketing network with infrastructural facilities like Ice Plant and Cold storage, fish pooling centers and retail outlets are imperative for overall development in the field of fisheries. This objective has been incorporated in the IRFDP scheme implemented by KCFF. The federation has performed creditable in the field of inland fish marketing for establishing a network of fish marketing outlets. They are being run on franchise basis through educated unemployed youths. Women agents have also been employed.

The table fish will be procured from the primary fishermen cooperative societies in the projected area during the fish available season by organizing systematic fishing and transport them through Federation Vehicle from private fish culturists within the state and outside the state as and when the local fish is not available to supply to the kiosks. Care has been taken to supply table fish to the consumers on regular basis at fair price of the market value.

Dakshina Kannada and Udupi District Fish Marketing Federation

The DK & U District Cooperative Federation was established during the year 1954. It is serving the fishermen community and primary fisheries cooperative societies. There are 8958 individual members, 64 primary cooperative societies, 1 representative from the Karnataka state government and 1 member for implementing the NCDC project.

Growth rate in sales of DK and Udupi District Cooperative Federation from 1998-99 to 2006-07 has increased by 203.11 %; whereas commission earned for sales has increased by 323.9%. Though the annual turnover has increased by 219.52 %, the net profit shows a declining trend i.e., it has decreased by -44.19%.

6.2.2.5 West Bengal

West Bengal State Fishermen's Co-operative Federation Limited (BENFISH)

The West Bengal State Fishermen's Co-operative Federation Limited, commonly known as BENFISH was established and registered under the West Bengal Co-operative Acts and Rules in the year 1978 as an apex body of fishermen's co-operatives in the state. It started with a meager working capital of Rs two lakh. After traveling a long path with various obstacles in its way for more than twenty nine years, it has emerged as an idol of co-operative movement not only in the state but also in the country. The present working capital of this organization is about Rs. 250 crore. It has significantly progressed in both inland and marine sectors by extending its diversified activities on fisheries related scheme. The achievements of BENFISH were in 3 tier Co-operative system in West Bengal, through increased fish production and better marketing of fish and fish products, including ornamental fishes by women co-operative societies.The objectives of BENFISH are:

i) Encouraging scientific pisciculture for the development of fishery industry

ii) Modernization of marine fishing

iii) Upliftment of socio economic condition of the poor fishermen by introducing modern crafts and gears

iv) Infrastructural development for fish marketing (both domestic and export)

v) Providing various welfare measures to the poor fishermen

vi) Providing training to the fishermen and officers

In order to attain the objectives, the following activities are carried out by BENFISH:

- Development Activities
- Employment generation programmes
- Women empowerment programmes
- Commercial activities
- Welfare activities
- Aquaculture programmes
- Extension and Mass communication programmes

Major Achievements of BENFISH

International Sea Food Processing Centre, Chakgeria, Kolkata

A unique project built up for the first time in Asia in co-operative sector with potential for generating employment of skilled and unskilled groups to the tune of 6000 persons. The project was planned within

one integrated complex on an area of 13 acres. It consisted of 10 processing units along with following associated common facilities:

- A business centre
- Quality control laboratory
- Container terminal
- Cold storage (-24^{0}C)
- Ice plant
- Peeling sheds
- Water reservoir
- Water treatment plant
- Pollution control system
- Utilities
    - Roads and parking facilities
    - Water supply
    - Power supply (regular and emergency)
    - Drainage and sewerage network
    - Fire fighting system
    - Provision of workers' quarters (both male and female)
    - Provision of two additional processing units for future

Ten processing units who are member of BENFISH were permitted to operate in this area along with peeling set on lease @ Rs 60 lakh for 33 years. Prawn export from Chakgeria during 2007-08 earned foreign exchange to the tune of Rs 124 crores.

Project on Development of Marine Fish Production and Processing

This project has been taken up by BENFISH with the financial assistance from the State Fisheries Department and NCDC in order to save the marine fishermen from clutches of the middlemen. Eight Khuti Marine Fishermen's Co-operative Societies have been included in the project. These societies were provided with *Doba/Vasa Behundi* nets, mechanized and non-mechanized boats, temporary sheds, central godown *etc* as per their requirement.

Project in Contai sector, Purba Midnapur

The project is for production of hygienically dried fish and fish processing by fisherwomen co-operative societies. Project involved 11 marine fishermen's co-operative societies and provided following facilities:

- 1000 boat
- Nets - Bhasa Behundi, Doba Behundi
- Platform for fish drying
- Store room for storing dry fish and nets

The ultimate produce is marketed through different fishermen/fisherwomen co-operative societies.

Food Processing Plant

It is located at Kolkata (Salt Lake) with the most modern equipment (such as plate freezer, cold room, fish drying machine, *etc*) and the latest technology for producing dressed fish ready to cook fish products and meals produced in absolute international hygienic standard. Products are processed and packed in this factory with the highest quality and safety standard. Apart from Kolkata, BENFISH has established marketing outlets in Delhi, Darjeeling, Siliguri, Coochbehar and other places. Species generally processed: *Mystus aoar*, Bhetki (*L calcarifer)*, Para fish, Prawn (*P. monodon*).

Sale of Processed Fish Items

Processed items such as fish butter fry, fish fry, fish fingers, fish rolls, prawn fish pakora, samosas and chop, fish tikia, fish chilli, prawn/fish pickles, dry fish, etc. are sold through mobile vans and retail outlets in Kolkata as well as other places like Darjeeling Coochbehar, Siliguri, Haldia and Delhi.

CHAPTER VII

INNOVATIVE MARKETING MODELS IN FISH MARKETING

The system of fish marketing in our country has traditionally been very unorganized and unregulated, which is the prime cause of inefficiency in the whole process. Because of these, neither fishermen nor consumers benefit in terms of remunerative prices for the produce in case of former and better quality product at an affordable price in case of latter. This perennial problem has been overcome by the concerted attempts of fishermen group as well as government agencies in some pockets of our country. But, this kinds of efforts have large been confined to few small locations and few species and highly scattered. Unlike poultry or dairy industry, innovations in fish marketing have not been on a macro-level.

To understand the nuances of these kinds of marketing models and to draw lessons from the success of these models to upscale and replicate in similar socio-politico-economic scenario in other parts of country, it is imperative that some of the innovative initiatives in domestic fish marketing need to be documented. An attempt has been made in this direction here.

A marketing organization is more than a sales agency, and typically performs an array of functions involved in reaching a product from the production point to the consumption point, whether raw, semi-processed or processed. This process of moving product from farm gate to the consumer is one of adding value in terms of time, place and/or form utilities. Cooperatives have been argued to be one of the best systems in agricultural produce marketing and processing especially in situations of market failure which obtain very often in agricultural markets and that too in agrarian economies. Cooperatives could also be organized when producer members would like to corner a larger part of the returns associated with the value adding process, through better coordination of supply with demand. While cooperatives perform a variety of marketing functions, they are no different from what must be performed by other types of business organizations. They are not unique in the functions they perform, but in the manner and philosophy in which they are performed (Planning Commission, 2007).

Inefficient marketing system leads to avoidable wastes that can be saved by introducing scale and technology in agricultural marketing. Milk and egg marketing are two success stories of role of scale and technology in marketing. The extent to which the farmer-producers will benefit depends on the group-marketing practices adopted by the farmers. In this sense, farmers' organizations need to be promoted for undertaking marketing activities on behalf of the individual members of the group (Planning Commission, 2007).

7.1 The Thenkumari Self Help Group, Chennai, Tamil Nadu

During the last two decades, a large number of self-help groups (SHGs) have emerged in the country. A nation-wide program to link SHGs to the banking systems was launched in 1992. Currently there are three types of SHGs, namely, a) formed and financed by banks; b) formed by other agencies but financed by banks; and c) financed by banks using NGOs (Planning Commission, 2007).

The *Thenkumari* Self Help Group (SHG) was organized in 2003 with 15 members. They were assisted by the *Magalir Membattu Thittam* (Women Development Plan) and Confederation of Indian Industry. This group received Rs 10000 from one of the Project Officers and took loans from private moneylenders to be used as capital for fish marketing.

This SHG engages in fish marketing for about 4 to 14 hours a day and 5 to 7 days a week. In addition, the women also procure fish from auction through group purchase at Chindadiripet fish market at Chennai. The mode of payment to the auctioneers at Kasimedu landing centre in Chennai is by cash and at Chindadiripet market is on credit or cash. Only one labourer is engaged for cleaning and dressing the fish. The cleaned fish is stored in a thermocol ice box. The fish with sufficient ice are transported by auto to the city. Usually, the SHG tries to sell the fish in fresh condition. Only the leftovers are dried and marketed locally.

Thenkumari SHG undertook a pilot project to supply fresh seafood to a key customer (Taj Coromandal, a premier 5 star hotel) at Chennai on a contract basis. Taj made it clear to the *Thenkumari* group that it was looking at the supply as a business venture and not as a charity programme. Taj emphasized the need for high quality products and timely delivery. The fisherwomen in *Thenkumari* SHG were then trained on issues such as quality, hygiene, quality, delivery and cost management. The produce supplied by Thenkumari SHG passes stringent quality parameters. The fresh and packed produce is frequently inspected for microbial content. Their produce always passes the test in Taj Hotel as they meet the expectations of its customer's standards and expectations. The SHG were supplying 2 kg initially thrice a week and now the quantity supplied by it increased to 500 kg per month. Taj management gave the best vendor award for the year 2008 to the *Thenkumari Magalir* SHG. This project has been a win-win situation for both hotel and SHG. The hotels get quality products directly from the SHG and the SHG has sustained business. Initially cash payments were made. Now, all the payments are made by a cheque and each woman is a proud signatory to her own bank account.

Credit and Repayment details

Indian Bank, Micro Credit Branch, Chetpet, Chennai offered short term loan of Rs 70,000 for a period of 10 months (at the rate of interest of 8.75%) in 2005, followed by Rs 1,50,000 (at the rate of interest of 11%) for a period of 15 months in 2006 and Rs 3,00,000 (at the rate of interest of 13.25%) for a period of 20 months in 2007 . The members have shared equally the amount of loan.

The members of SHG are found to have regularly contributed to the savings and pay the installments towards repayment of loans to the Bank. The repayment records of the members in general

are observed to be exemplary. The lending institutions such as Indian Bank have also confirmed that the repayment record of the SHG has been almost 100% for which the SHG was awarded the 'SHG Bank Linkage Programme State level Award for 2006-07' for timely repayments. Concurrent loans from the same branch were encouraged and increased from Rs 70,000 to Rs 3,00,000.

The utilization pattern of loan amount by the SHG members shows that investment in unproductive purposes has been minimum and over half of it was invested for income generation.

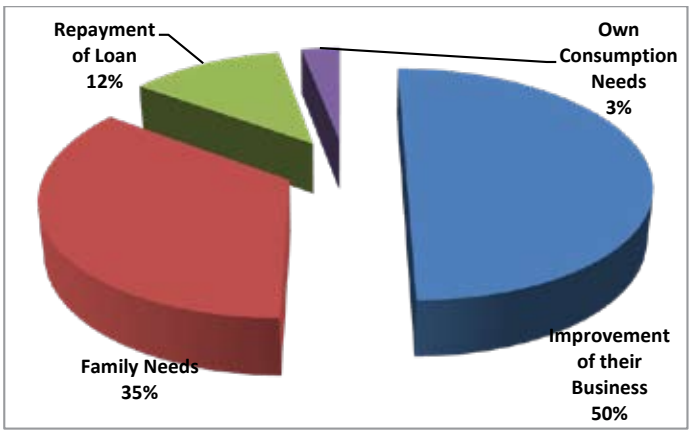


Figure 7.1 Utilization Pattern of Loan by the *Thenkumari* SHG Members

Savings

In this group, the monthly savings is a minimum of Rs 100. The amount of savings collected from the members is rotated as a loan internally among themselves. Thus, they are motivated to increase their monthly savings for their socio-economic betterment and also for the sustainability of their SHG. The interest rate charged by the SHG members for internal circulation of loan amount was 2 paise for every Rs 100 per month and this interest amount is added to the SHG's savings. The interest savings is provided as dividend to members at a later period.

Impact of the Model

1. One of the major benefits achieved by this SHG is that the fisherwomen members are free from moneylenders. With more capital at hand, fisherwomen in these groups have been able to increase their fish trade by increasing the volume of fish they sell.

2. Internal borrowings of members have also enabled them to provide for consumption needs, especially during closed or lean fishing seasons, and to take up other alternative income-

generating activities such as fruit selling, vegetable selling and other petty trade. (During the closed season, they were given little more than the usual contract rate from Taj Hotel).

3. This SHG played a positive role in helping the fisher folk in their socio-economic development, emancipation and empowerment. The entrepreneurship has helped them to express their individuality as well as the self confidence. It has enabled them to live with self esteem and gain the awareness that everyone has a right to live honorably.

Constraints faced by the Thenkumari SHG

1. **Competition –** One of the major constraints faced by the SHG is that they have to compete with other men traders who by cartel try to stamp out the women SHG from the arena of domestic marketing of fish and consequently affect their social and economic empowerment in the society.

2. **Transport facilities -** High on the group's priority list is the need of a mini- truck for transporting the fish to required places. The private transport such as auto charge very high hiring rates and they sometimes refuse to load fish baskets unless the fishes are well packed and free of smell. In such cases, the SHG find it difficult to reach customers in time. The viability of a common fish transport system is doubtful. Hence, it is felt that that without subsidies, mini- truck would give SHGs no economic advantages.

3. **Insulated ice box -** It was thought that improved fish handling after auction, by means of icing and storage in insulated boxes, might increase profits. But the cost of thermocol boxes is about Rs 250/box which can hold 20 kg of fish with 20 kg of ice. There is no guarantee for such box. So, could provide insulated ice box at free of cost could be provided to them.

4. **Modern fish retail stall -** At present, the post harvest facilities in the State are very limited and inadequate. The viable Self Help Groups could be assisted to develop infrastructure facilities such as setting up ice plant and modern fish selling stalls.

5. **Income during lean season -** Although women comprise about half of the population, their role in development is not significant because of lack of empowerment. Training on preparation of value added products like fish pickle, fish cutlet, fish finger etc. could also be organized for the members to earn during lean season and the trained SHG could be connected to regular marketing. However, there is a considerable difference in the income earned between males and females with the former receiving the higher benefits even in the lean season.

6. **Speed *vatti* -** The biggest problem faced by the SHG is that this group is charged an exorbitant and exploitative rate of interest by money lenders. Some money lenders collect Rs 100 per day for every loan of Rs 1000, while still others collect Rs 120 per day for every loan of Rs 1000. The rate of interest is not spoken in terms of percentage per annum but in terms of Rs 100 for every Rs

1000 per day. This transaction is called "speed *vatti*". If bank could come forward to increase their loan amount, this problem could be shoved to some extent.

Factors for success of Thenkumari SHG

- Effective Leadership.
- Win-win situation.
- Enthusiasm and discipline among the members..
- Could feel the necessity and strength of organized power.
- Could learn how to plan the activities for their own development.
- Learnt to take decisions by themselves in matters they found important for them.
- Self-confidence among them to raise voice against exploitation and to do their own development.
- Art of speaking in public and express their valid points in front of their men folk for judicious decision making.

They could make profit out of small business enterprises and could initiate their business proposition through their own small savings. *Thenkumari* SHG proves that contrary to the common belief that poor women are not credit worthy, they are far more credit worthy, honest and most importantly '*bankable*'.

It is understood that the *Thenkumari* SHG played a positive role in helping the fisher folk in their socio-economic development and empowerment. The entrepreneurship has helped them to express their individuality as well as the self confidence. It has enabled them to live with self esteem and gain the awareness that everyone has a right to live honorably. The constraints mentioned need to be holistically addressed for further improvement in development and empowerment of women.

7.1.2 Paminiaru Shrimp Farmers' Association, Tambikkotai, Tamil Nadu

An innovative model of collective marketing of a shrimp farmers' association in Thambikottai village in Tiruvarur district of Tamil Nadu has been documented here. Popularly known as DCM cluster (land owned by M/s. DCM textile company and later sold to the local villagers), this Paminiaru (Pamini river) Shrimp Farmers' Association was formed by the farmers themselves in the year 2003, mainly to prevent and manage the disease outbreaks collectively in the cluster by enforcing better management practices.

The cluster started with just 5 farms (35 ponds) in 2003, has grown to 50 farms (320 ponds) today. One season of shrimp culture (February-July) was practiced in this cluster. All the farmers are from the same village and most of them are agriculturists. The association controls most of the farm activities within

this cluster beginning from pond preparation, stocking, farm management, harvesting and marketing to prevent the vertical and horizontal transmission of diseases.

Compulsory bird fencing, reservoir, collective seed booking, determined stocking period and density, inputs, disease management, bio-security measures, ban on antibiotics, restriction of movement of people, maintenance of common infrastructure and marketing are its major code of practices.

Collective disease management led to collective marketing. White Spot Syndrome Virus (WSSV) causes one of the most fatal diseases in shrimp. There is no treatment for this disease, however, prevention is possible through adoption of Better Management Practices and farm level bio-security measures. However, in spite of the measures taken if the disease breaks out in the system before 60 days of Culture, then it may be either due to seed or water quality or poor pond management.

The agreed term of understanding is that once the disease is noticed in a pond, the affected farmer should alert the fellow farmers and the association immediately. The association then convene its meeting and depending on the day of culture, nature and magnitude of problem appropriate measures are taken. The association handle disease outbreaks collectively.

Marketing

In case of marketing their cultured shrimp, the association calls for quotations from buyers and negotiate with them to fix a price for the shrimp produced in the cluster. However, the price is not binding and the individual member can negotiate with the buyer for a higher price. A stamped agreement is signed between the farmer and the buyer. It is then given to the association by the farmers who are selling their produce to that buyer mentioning that a sum of agreed amount per kg of shrimp sold would be deducted at buyer's office towards the association fund to compensate the affected farmers and for managing the common resources. It is the responsibility of the buyer to ensure this payment to the association, which is deposited in the bank as three member joint account to ensure the safety and for unanimous decisions.

Factors for the success of Paminiaru Shrimp Farmers' Association

Since formation of this Shrimp Farmers' Association in 2003, all the crops have been successful barring 2007. The association attributes its triumph to inclusive membership, tangible deliverables, social cohesiveness and conviction of the farmers.

- Complete membership: All the farmers in the cluster are compulsory members.
- Deliverability of the Association: Economic (tangible) deliverables and accountability are also critical. Compensation to the disease affected farmers bears testimony to it.
- Social Cohesiveness: Same community or locality is also a critical factor for its success.
- Conviction of the members: Conviction that group action alone could be beneficial for all the members is one of the factors responsible for its success.

7.3 Marine Fish Marketing by Fishermen Associations, Kombuthurai, Tamil Nadu

Kombuthurai is a fishing village in Thoothukudi district of Tamil Nadu. The total population of the village is nearly 1250 from 250 families. The main occupation is fishing and fishermen of this village mainly engage in longline fishing to catch seer fish. Most of the fishermen of this village have migrated from Kadiapattinam, Muttom and Colachel fishing villages of Kanyakumari district.

Along the Thoothukudi coast, longline is used to catch seer fish, Lethrinids, perch, tuna, sharks and rays. Seer fish is one of the commercially important groups of fishes landed in this coast. Seer fish rank first in consumer preference and hence fetch the highest price among the marine fishes landed at Thoothukudi.

Evolution of an Innovative Marketing Practice by Fishermen

Fish marketing in Kombuthurai was similar to the other landing centres of the region initially. But, the demand for premium varieties of fish like seer fish, barracudas, carangids, etc. landed in fresh condition and in good quality by line fishing at Kombuthurai attracted many wholesalers to purchase fish at a better price compared to other landing centres of the region, where fishes from gill netting and trawling are landed.

Hence, in the late 80's the first fishermen association was formed, to which, the wholesalers would quote the price for the different varieties for the next fortnight. The highest price quoted for the species was binding between the wholesaler and the association for the next two weeks similar to the forward pricing method hitherto unheard in fish marketing.

Later when the wholesalers underbid the rates in collusion, the fishermen organized one more association and the wholesalers needed to quote prices to both associations. The highest bid quoted for a specific type of fish in any one association is the accepted price for the next two weeks; the period was reduced to a week's time considering the price fluctuation over the period.

Advantage of the Kombuthurai Innovative Marketing Model

1. Fish prices are quoted per kg and the fishes are marketed on weight basis with proper recording of the quantity of different varieties landed by each boat.

2. The price at which the fishes are sold and the total revenue realized are properly accounted by the fishermen association for weekly disbursement of sale proceeds.

Present Marketing Strategy

Later, the fishermen realized that the rates quoted did not reflect the market price of the different species in distant markets. The developments in communication technology (fixed land lines and mobile phones) provide adequate market information on supply, demand and price in different markets within the state and in the neighbouring state of Kerala.

Hence, the fishermen of Kombuthurai resorted to daily auction. The difference from other landing centres is that in Kombuthurai the fishes are segregated species-wise and auctioned on per kg basis and later sold on weight basis. Hence, the fishermen are able to compare the market price per kg of a particular variety of fish and are able to realize a better price for their catch.

In Kombuthurai fish landing center, two types of intermediaries namely auctioneers and wholesalers are present. All the fishes landed are sorted species-wise and are kept on cement floor in heaps and auctioned on weight basis through the auctioneer. The auctioneers take the responsibility of collecting the money from the wholesalers and distribute the money to the fishermen through the fishermen associations. The auction charge is 10% of sales which is collected from the fishermen by the association.

In Kombuthurai, there are five fishermen associations as given in Table 7.1 and each association has authorized one auctioneer to auction the fishes landed by its members. Each auctioneer is paid Rs 5000 per month from the 10% auction charge collected by the association.

Table 7.1 Details of Fishermen Associations functioning in Kombuthurai, Tamil Nadu

Name of the Fishermen Association	No. of years in Existence	No. of *Vallams* under control
St. Francis Xavier	25	58
St. Mudiapper	20	28
St. Rayapper	8	4
St. Christuraja	7	25
T.M.S.S.S.	7	25

Source: Primary Survey, 2008

In Kombuthurai fishing village, there are about 12 wholesalers who regularly participate in the auction and purchase fishes from the fishermen through the auctioneer. The wholesalers from Thoothukudi, Kanyakumari, Manappad and from Kerala purchase fish through auctions either directly or through their agents.

Fish Price

The average price of different varieties of fishes marketed at Kombuthurai is given in Table 7.2.

Table 7.2 Landing Price of Different Fish Species in Kombuthurai, Tamil Nadu

Type of Fish	Price (Rs/ kg)
Seer fish	235
Cuttle fish	150
Squid	150
Katsuwonus Sp	70
Alectis sp	65

Spyraena sp	65
Carangids	60
Lethrinus sp	55
Tuna	50

Source: Primary Survey, 2008

The fish auction is conducted in the open auction platform of the landing centre where there is no proper lighting, water and drainage facility. Hence, providing a modern auction hall with raised platform, electronic weighing balance, potable water and drainage facility is the need of the hour for Kombuthurai fish landing centre.

The innovative marketing model followed by the fishermen of Kombuthurai fishing village in Thoothukudi is a worthy model to be followed in other marine fish landing centres. Segregating the fish catch species-wise and auctioning on weight basis through fishermen associations, combined with proper market information would result in maximizing the income to the fishermen as well as minimizing the exploitation by middlemen.

7.4 Fish Marketing by TNFDC, a State Development Corporation

The Tamil Nadu Fisheries Development Corporation Limited (TNFDC) has been involved in fresh fish marketing through its chain of retail shops for many years. But, these stalls are not of very hygienic one with aesthetic appeal so as to attract the fish consumers. However, these stalls used to have the authenticity and assurance of better quality products at comparatively cheaper prices than it is available in fish retail markets of Chennai.

In the wake of rapid strides in consumerism, particularly on health foods such as fish and fishery products, the TNFDC has rightly felt the effectiveness of selling the fishes through modern hygienic fish retail outlets of corporate style and functioning. Accordingly, it has started two modern fish retail outlets called 'Neidhal' in Chennai city.

These outlets are equipped with a display vesicular unit of deep freezer, fish cleaning and cutting space, electronic balance and storage space. While one of the units is being operated by TNFDC, management of the second unit is planned to be outsourced. The premises are kept in hygienic conditions. The fish rates are kept little lower than the traditional fish retail markets. Fish is also sold in chilled form. Freshwater fish like Murrels are sold in live condition. Fish dressing is done in front of consumers while buying so as to get the confidence of consumers in the whole process of marketing. The consumer can pick his choice of fish while buying since all the fishes are kept in the glass-top freezer.

The objective of starting the modern retail outlets through state intervention was to source fish directly from fishermen and to sell to consumers at affordable rates in hygienic conditions. This would also

enable the fishermen to trade without the intervention of middlemen and as a result, they would get remunerative price for his catch. But at present, the fishes are being sourced from the wholesale market.

Table 7.3 Comparison of Neidhal, Other Modern Retail Outlets and Traditional Fish Market

Parameter	Neidhal	Reliance	Spencer (MRF chain)	Fish-o-fish (Private Outlet)	Traditional Wholesale Markets	Traditional Retail Markets
Varieties	8 to 12	50 to 150	10-15	10 to 15	25 to 40	4-5
Price	Close to traditional wholesale market	Fixed by Company	Fixed by Company	Close to TNFDC rates	Based on variety and arrival	+20 to 35 % of wholesale market
Other Services	Cleaning & Cutting	Cleaning & Cutting	Cleaning & cutting	Cleaning & Cutting	Nil	Nil / on Payment
Availability	2 stalls*	49 stalls	15 stalls	4 stalls*	5 markets	150 localities
Timings	9.00 am to 7.00 pm	9.00 am to 9.00 pm	9.00 am to 9.00 pm	9.00 am to 9.00 pm	4.00 am to 11.00 am	11.00 am to 7.00 pm
Parking	Yes	Yes	Yes	Yes	No	No
Availability of substitutes	No	Yes	Yes	Yes	No	No
Hygiene	Good	Good	Good	Fair	Poor	Very Poor

* in Chennai city only

Neidhal, a modern retail outlet conceived by TNFDC on a busy week end business at Chennai

Factors for success of Modern Retail Outlets run by TNFDC

The modern retail outlet operated by TNFDC, a government organization is now very popular among the fish consuming public of Chennai city for the following reasons.

1. Fishes are available at a very hygienic shop.
2. All operations are transparent.
3. The weighing is done in electronic balance.
4. The prices are lower than that prevailing in conventional fish markets.
5. Dressing is done by trained personnels so that the consumers can get fillets and steaks.

Suggestions for Improvement

1. Presently, only a few fish varieties are available for sale at the outlet. Hence, more species could be kept for sale as there is an increasing demand from the consuming public.
2. Fish sale happens only for few hours, both in morning and in evening. This could be made the whole-day affair.
3. In the evening time, fish items and eateries could be prepared for sale, as there is a demand.
4. Arrangements may be made for dining in the front of the outlets. Umbrellas may be erected above the dining tables so that fish eaters can stand and take the fish items and eateries.

7.5 Fish Marketing by Kerala Matsyafed, a State Cooperative Agency

Matsyafed, the Kerala State Cooperative Federation for Fisheries Development Ltd. has been in to sales of fish ever since it came into existence and had been trying different models. The major initiative made in this regard was 'the organizing the primary auction' at the landing centre (beach) itself. As the major exploitation of the fisherman was with their produce Matsyafed has taken initiative to organize and interfere in the first sale of the fish. By providing the productive inputs to the fishermen and by making them to be the owners of the inputs, the bonded labour system could be avoided. Along with this initiative, Matsyafed has taken up the auction system in the fishing villages and the cooperatives have become the major force in setting up the beach level auction. Over a period of time, Matsyafed could make it as the major activity in the coastal area and many societies have reached very high level of turnover in the beach level auction.

Further initiatives have been taken to sell fish in the secondary market as well as in the retail system. The latest attempt is to sell the fresh fish directly to the customers and as such a model has been created at the premises of the Matsyafed Net Factory in Kochi.

A new system of procurement and sales with staff participation has been designed to ensure efficiency and effectiveness. Focus was given to the customer satisfaction and a better environment for fish sales compared to the old and traditional system.

Success Story of Modern Retail Outlet (Fresh Fish Point)

There are many retail outlets in and around Cochin that sell fish, directly to the consumers. An innovative outlet started by the Kerala State cooperative federation for fisheries development Ltd. (Matsyafed) is the Fresh Fish Point, in Cochin.

The unit started functioning on 20th November 2006 and has completed successfully two years of operation. The procurement of fish for the unit is aligned with the wholesale market and selling price is fixed according to the market trends. Workers are paid incentives on the basis of their performance. The unit could make a sale for about Rs 40 lakhs in a year with a gross profit of about Rs 8 lakhs and net profit of Rs 1.07 lakhs. The performance of the fresh fish point from 20.11.2006 to 30.11.2007 is given in Table 7.4.

Table 7.4 Performance of Fresh Fish Point, a Modern Retail Outlet in Cochin

Particulars	Amount
Quantity of fish purchased	32.21 tonnes
Quantity of fish sold	32.15 tonnes
Cost of fish purchases	Rs. 30.57 lakh
Total expenses	Rs. 32.01 lakh
Total sale value	Rs. 40.92 lakh
Gross profit	Rs. 8.91 lakh
Fixed expenses	Rs.4.64 lakh
Incentives	Rs. 3.20 lakh
Net profit	Rs.1.07 lakh

The time of operation of the stall is from 8 am to 8 pm. On the basis of the one year experience, it is found that the model of fresh fish point is going to be the ideal model for the fresh fish sale. Based on the success of this fresh fish point, Matsyafed would like to scale up the model to a larger volume by adding about 500-1000 outlets in next 3 years.

Fresh Fish Point, a modern retail outlet developed ands promoted by Matsyafed, Kerala at Cochin

Objectives of Fresh Fish Point

These outlets are operated by the vendors and members of fisherman community that will improve the efficiency of fish marketing. This is be a major initiative where fish can be sourced directly from fisherman through auction system with participation of cooperative societies. The system assures a better price to the producer and a fair price to the consumer. The project of establishing about 500-1000 outlets by Matsyafed of Kerala Government would result in handling a large volume that would give a real opportunity for the sale of quality fish to the consumers and a supplementary income to fishermen.

The project will start initially in 5 districts with 10 outlets in each district. Each district will have a base station to supply fish to the outlets. In the second year of operation, the number of units will be increased to 150 with additional coverage in 10 more districts and in the third year of operation, about 500 outlets (Fresh Fish Points) will function in all 14 districts. Each district will have a base station which will be developed as the wholesale market in the long run. In the fourth year of operation, the number of units can be increased to 1000 numbers. The ideal Fresh Fish Point will be a place where fresh fish, fish products of both short storage life and long storage life and value added products at room temperature can be sold. At a later stage, even live fish can be sold through this network of retail outlets in the State.

Infrastructure of the Retail Outlet (Fresh Fish Point)

The proposed Fresh Fish Point will have the following infrastructure. The location of the outlet plays a major role in the success of unit. For this, Matsyafed may approach Government to give permission to construct semi permanent structures for fresh fish outlets in the Government land so that the accessibility as well as cost can be saved. This can be obtained from Government in line with the approval given to Milma for the marketing of the milk and milk products.

The proposed fish outlet will have following infrastructure which will be common in all freshfish points :

1. A readymade semi-permanent building with plinth area of 200 sq ft
2. Fish display table
3. Cutting table
4. Cutting tools
5. Freezer and cooler
6. Racks
7. Computer with billing machine
8. Phone and internet connection
9. Insulated boxes
10. Plastic crates
11. Exhaust fan

Infrastructure of the Base Station

The proposed base station in each district will be having the following facilities.

1. An area of 4000 sq ft
2. Build up area of 1000 sq ft
3. Insulated boxes
4. Plastic crates
5. Mini truck
6. Watch and ward
7. Computer and printer
8. Phone and internet connection
9. Racks
10. Freezer and chiller

Working of the Retail Outlets

The entire operation of the retail outlets and base station will be on the basis of the Self Help Group concept. The infrastructure will be owned by the federation and the operation will be handled by the

group. The outlet will be operated by a group of 3 people, one in charge of the booth, a cutter and an assistant. The base station will supply the fish as per the requirements of the outlets and availability. The base station will source the material from the local landing centres through primary co-operative societies and from the nearby major landing centers. Sourcing may be required from neighbouring states and also from the major wholesale markets. The transportation facility at the base station will be strengthened to supply the fish before opening of the stall and the outlet can easily be operated by the group. The outlet will be supplied with other fish products from the production centers.

The base station will be operated by a team of 5 people wih a Station Manager who must be a graduate with computer knowledge and one Supervisor and 3 workers. The Supervisor and the Manager will be given training on quality and management of station respectively. There will be Marketing Officers for the supervision of 10 fish outlets. One Manager will be in charge of the entire operation of the district and an accountant to compile the accounts and audit of the operation. The performance of the each outlet and base station will be continuously evaluated and the groups of the outlet or base station can be changed if performance is not up to the desired level.

The outlet will be connected with a computer and internet connection and would like to be linked with online software so that the sales and other details can be monitored online. The base station, district office and even head office can be connected to this system so that performance of the units can be analyzed.

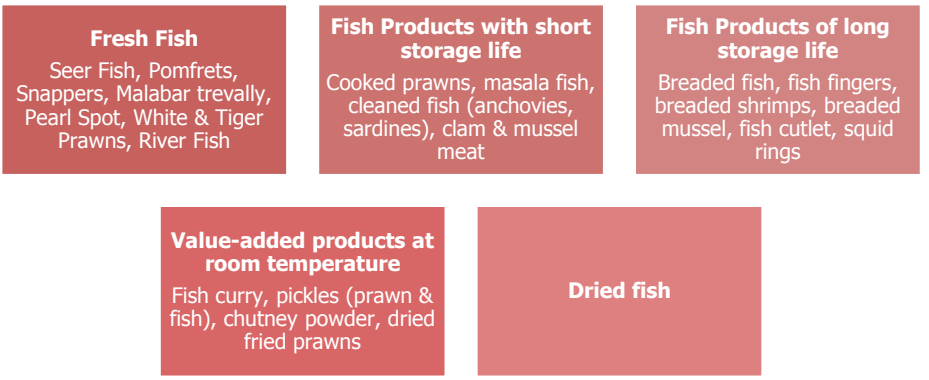
There will be an incentive system on the basis of the sale of outlet as well as of the base station. The group will be provided with a minimum wage and the additional income will be given on the basis of the sales and profitability.

Likely Social Impact of the Project

The major impact of the project is that Federation is going to handle a volume of about 15000 tonnes of quality fish per year once the 500 fish outlets are commissioned. This will create a sizeable portion of the total market in the state and can have a control on price and create transparency in the market. This model will make a direct link between members of primary cooperatives and the consumers. Hence, they will be offered a better price compared to the market price so that the income of the members of primary co-operatives, fishermen can be improved. The better distribution of fish especially when bulk landings are available in any landing centre can be possible. The problem of lack of information and uncertainty in market leads to higher risks and which lead to reduction in the price and thereby income of the fishermen. This distortion can be reduced to a considerable level with the information network developed between base stations and the retail outlets and it can be further reduced when the base stations are integrated into the wholesale markets in the future.

Product Mix

The product mix proposed for sale at Fresh Fish Point is displayed below:



7.6 Aquachoupals in Andhra Pradesh

The e-Choupal is a web supported initiative offering farmers information, customized knowledge products and services to enhance farm productivity and farm-gate prize realization on various crops viz., soybean, coffee, wheat, rice, pulses and shrimp (Mahalakshmi *et al*., 2006). The aquachoupal network, launched in February 2001 in the state of Andhra Pradesh, includes 55 kiosks reaching 10,000 shrimp farmers in over 300 villages (http://www.digitaldividend.org/pubs/pubs_01_echoupal.htm**).**

Aquachoupal Model

The model is centered on a network of Aquachoupals, information centers equipped with a computer connected to the Internet, located in rural farming villages. Aquachoupals serve both as a social gathering place for exchange of information and an e-commerce hub. A local farmer acting as a *Sanchalak* (*Prathinithi* or Operator) runs the village Aquachoupal, and the computer is usually located in the *Sanchalak*'s home. ITC also incorporates a local commission agent, known as the *Samyojak* (collaborator), into the system as the provider of logistic support. They play an important role in the initial stages of setting up a Aquachoupal, because they know which farmer is educated, the composition of families, their financial situation, and who is seen as acceptable in the villages and might thus make a good *Sanchalak*.

The farmers can use the computer to access daily prices at the closing time in local markets, as well as to track global price trends, either directly or indirectly via. the *Sanchalak,* since farmers are illiterate particularly on computer literacy.

Figure 7.2 shows the Aquachoupal model in Andhra Pradesh.

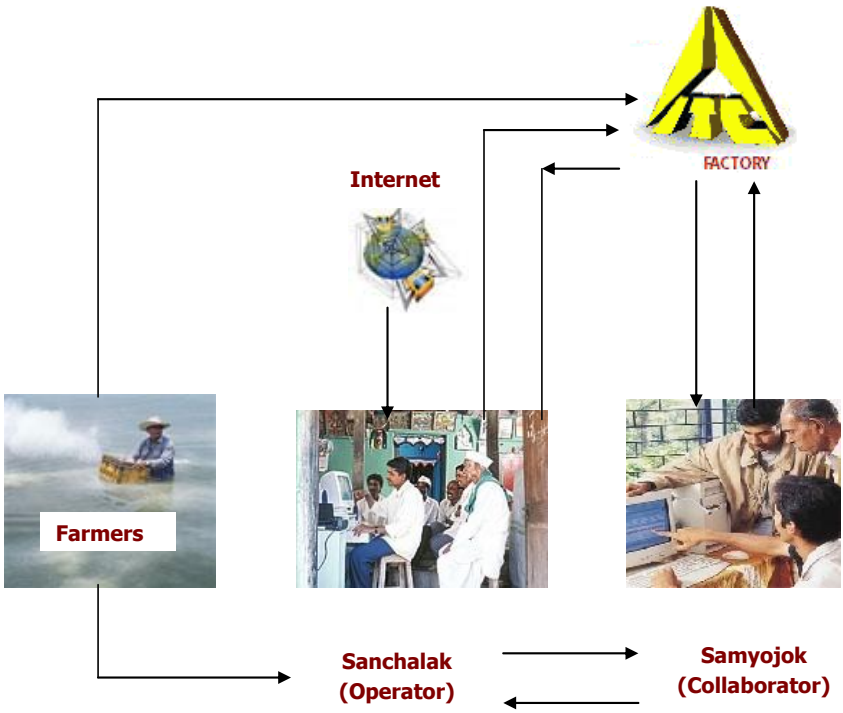


Figure 7.2 The Aquachopal Model in Andhra Pradesh

Operation of Aquachoupals

The supply chain for the Aquachoupal marketing system is depicted in Figure 7.3. The previous day's marketing closing price is used to determine the benchmark price at the Aquachoupal. The benchmark price is static for a given day. To initiate a sale, the *Prathinithi* inspects the produce and based on his assessment of the quality, makes appropriate deductions (if any) to the benchmark price and gives the farmer a conditional quote. The benchmark price represents the upper limit on the price a *Prathinithi* can quote. If the farmer chooses to sell his crop to ITC, the *Prathinithi* gives him a note comprising of his name, his village, particulars about the quality tests the seed and the produce has been subjected to, approximate quantity and conditional price. The farmer takes the note from the *Prathinithi* and proceeds with his crop to the nearest ITC procurement hub (processing center) in Andhra Pradesh.

At the ITC procurement hub, a sample of the farmer's produce is taken and set aside for laboratory tests. After the inspection of quality, the farmer's cart is weighed. After the inspection and weighing are complete, the farmer then collects his payment in full at the payment counter. The farmer is also reimbursed for transporting his crop to the procurement hub. Every stage of the process is accompanied by

appropriate documentation. The farmer is given a copy of lab reports, agreed rates, and receipts for his records.

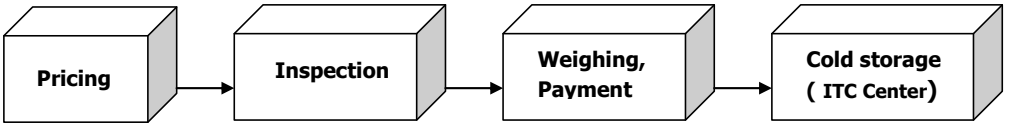


Figure 7.3 Supply Chain in Aquachoupal in Andhra Pradesh

Usage Pattern of Aquachoupals

Services generally provided in all the centers include information on government schemes / procedures, weather forecast, market prices, general FAQs (Frequency Asked Questions), transactional services like communication through e-mail and chat, buying / selling goods (Table 7.5).

Table 7.5 Services Provided by Aquachoupals

Services	Meanings
Weather	Localized weather information at the district level.
Market Pricing	Local and international company's rates. ITC's next day rates are published every evening. The prices are displayed prominently on the top of the web page on a scrolling sticker.
Customized quality solution	After the sale of a crop is completed, ITC performs laboratory testing of the sample collected. Based on these results, farmers are given customized feedback on how they can improve crop quality and yield.
Best practices	Scientific practices organized by crop type are available in the web site.
FAQs	This feature enables two-way communication. Additional questions are answered through FAQs and access to experts who respond to emails from the village.
Communication	*Prathinithi* use the Internet to chat extensively among themselves about the status of operations and aquaculture in their villages.
Others	In addition to aquaculture related information farmers are getting information on government schemes / procedures, educational

	information and also they benefited through health oriented programmes such as eye camp, blood testing, and blood donation etc.

The services provided through Aquachoupal and utilized by farmer indicated that 36% of the respondents made use of the weather report facility rarely (Figure 7.4). They are interested to know about the weather reports through the radio and TV. Majority of the respondents (64%) made use of the pricing facility frequently. They also felt that the Aquachoupal allows farmers access to prices on a daily basis at their nearby centers. Moreover, through Aquachoupal, farmers have access to prices and make the critical decision of when and where to sell their crop. About half of the respondents (51%) made use of the customized quality solution facility frequently. The farmers showed keen interest to know the ways to prevent the occurrence of disease, easy ways to detect them and methods of effective disease control. They also believe that they can improve crop quality and yield owing to customized quality solution given by the Aquachoupals. More than 15% of the farmers made use of the best practices and FAQ facilities.

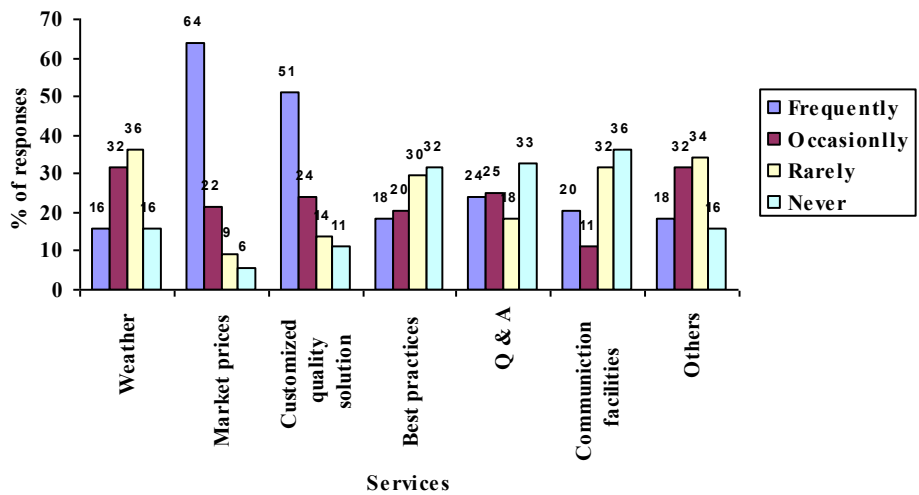


Figure 7.4 Usage Pattern of Aquachoupal Services

More than 30% of the respondents made use of information pertaining to activities other than aquaculture related facilities provided by the Aquachoupal. In most of the cases, children and youth are using the Aquachoupals for eliciting information on computer education, examination results, job information etc. While in other cases women users sought child care as well as health oriented information and programmes.

Benefit to Farmers

1. Prior to the introduction of Aquachoupal, farmer's access to aquacultural information was incomplete or inconsistent. The only sources of information were word of mouth within the village and the commission agent. Aquachoupal allows the farmers access to prices on a daily basis at their nearby centres. As a result, farmers make the critical decision of when and where to sell his crop.

2. Under ITC's system, farmers no longer bear the cost of transporting their crops to the procurement hub. Finally, the ITC procurement centre is a professionally run operation where the farmer is treated with respect and served as a customer.

3. Farmers also can make use of the information available to them through Aquachoupal to improve yields.

4. Moreover, the seed, fertilizer, and consumer products offered to them through aquachoupal cost substantially less than through other local sources such as village traders.

Benefit to ITC

1. The commission charges of 0.5% paid to *Sanchalak* for their services by ITC is significantly less than the costs associated with the traditional marketing system.

2. Direct reimbursement of transport costs to the farmer is estimated to be half of what ITC used to pay the commission agents for transport of the produce to their factory.

Farmer's Perception of Aquachoupal

1. More than 80 percent of the medium and big farmers are aware and utilize the services of Aquachoupal model, but small farmers rarely visit the centre due to lack of awareness about internet based information system and online marketing and ignorance about the services and activities of Aquachoupal.

2. Nearly 79 percent of the respondents agreed that the prompt payment is made in the aquachoupal system, unlike in other marketing systems.

3. More than 60 percent of the respondents pointed out that it provides discounted inputs at the farm gate and also farmers no longer bear the cost of transporting their crops and are instead reimbursed for transport to the procurement hub.

4. They also expressed that the *Prathinithi* gets 1 percent share in the final share. This shows that there is an economic benefit to the *Prathinithi*.

5. More than half of the respondents opined that the aquachoupal system can be considered as an alternate resource for accessing up to date information in aquaculture.

Constraints in Implementation of Aquachoupal

Following are some of the constraints experienced by the farmers:

- Ignorance of the farmers about Internet based information system and online marketing.
- Lack of awareness about services and Aquachoupal activates.
- Lack of interaction with shrimp farmers' association.
- Functioning of Aquachoupals at the *Prathinithi's* house.
- Aquachoupal has limited number of processing plants and soil and water testing facilities.
- Females do not have access to the computer.

7.7 Collective Marketing of by Aqua Farmers Association, Tangutur, Andhra Pradesh

Brackishwater aquaculture is identical with shrimp aquaculture of Black Tiger shrimp (*Penaeus monodon*) which is being cultured along the coastal districts in about 1.4 lakh hectares mostly by small farmers with less than 2 ha of farming area. Shrimp culture farms are located along the creeks as clusters where the farms draw water from the same creek and release the drainage in to the same source either directly or through a separate canal.

Presently shrimp aquaculture is being affected with a dichotomy of hike in production cost and an all time low market price in addition to the production risks. In this scenario, farmers operating in the creek or cluster organized themselves to enforce certain code of culture practices (Better Management Practices) aiming to prevent the occurrence of fatal diseases and market their hard earned produce for a better price collectively.

Farmer Groups (FG) organised by farmers themselves or by public agencies have proved to be an effective institution ensuring successful farming for all by enforcing certain code of practices such as collective seed booking, simultaneous stocking, common stocking density, compulsory reservoir, farm and pond fencing, exchange of technology, water use, collective disease management, drainage management and collective marketing play a significant role in responsible and sustainable aquaculture. Several researchers also found that Farmers Groups and their voluntary code of conduct are very important for sustainable aquaculture development.

Aqua Producer Associations have a range of purposes that include providing technical services; facilitating access to markets; developing and promoting codes of conduct, best management practices and

self-regulatory practices; and sharing of knowledge (FAO, 2006). Farmers Groups adopt the kind of innovative marketing arrangements to benefit their member farmers. Collective sales are an important component which leads to organizing the farmers into associations or cooperatives which allow them to negotiate prices much better with the buyers. Collective marketing is found to increase the prices for farmers by 5-15%. Recent research shows that farmers marketing together tend to gain more favourable prices and terms of trade than they can on their own.

The post harvest handling and marketing of the cultured shrimp by a shrimp farmers' association in Andhra Pradesh has been documented here.

Tangutur is a coastal village and mandal in the Prakasam district of Andhra Pradesh. Shrimp farmers operating in the Paleru and Moosi creeks in the Tangutur mandal in Andhra Pradesh established Tangutur Aqua Farmers Association (TAFA) in the year 2004 and registered as society with Registrar of Societies, Govt. of Andhra Pradesh.

The major cause for the establishment of TAFA was the sheer exploitation by the shrimp traders/exporters who were duping the farmers in post-harvest handling of shrimps especially in weighing and count (no. of shrimps/kg) which lead to 'significant losses' to the already aggrieved farmers. The harvested shrimp were taken to the buyers place for post-harvest washing, grading and weighing. The traders used their own calibrated weighing machines and baskets for handling and weighing. It was later found that the weighing machines at the traders place were calibrated wrongly and hence were showing considerable weight differences. Further, the baskets used for weighing the shrimp were also assigned a weight of 1.7 kg/basket, which in reality weighed less. These two practices reduced the shrimp count, which is the criterion to fix the market price. It was reported that the farmers were cheated up to 15 kg shrimp per ton and a count. Hence, the farmers in the mandal decided to handle and weigh their shrimp at farmers place instead of buyers.

Since 2004, it has been mandatory that the harvested shrimps in the Tangutur mandal should be brought to TAFA premises, washed and weighed in the presence of the office bearer of the TAFA and then transported to buyers' factory. The farmers and TAFA office bearers reported that this collective effort and mechanism gave them the power to bring the buyers to their place and helped them to have fair post harvest handling and marketing.

The association collected common fund from all its members and constructed its own office premises with laboratory and washing-cum-weighing yard for a hygienic handling and weighing of shrimps harvested in the ponds of its members. Buyers who purchase shrimp from the members have to bring the harvested produce to the office premises for washing and weighing the shrimps using the weighing machines of the association. The association charges 60 pasie per kg of shrimp up to 50 (50 shrimps/kg) count as service charge from the buyers. Weighing is done in the presence of a office bearer of association, concerned farmer and the trader. After weighing, the produce is iced and taken for processing by the trader. Shrimps of >50 counts are not charged anything for washing and weighing. Grading of shrimps is also done at TAFA premises. In this approach, the whole process is transparent and hence there

is no dispute. The association provide 'market intelligence' to its members but it is not directly involved in price fixation/negotiation.

It is found that farmers have more market share in the value chain and greater success as groups in marketing their produce. Collective bargaining has given the aqua farmers a better deal in the whole process of post harvest handling and subsequent marketing of shrimp. Group marketing empowers the farmers to take effective marketing decisions for their produce and it is a win-win situation for both farmers and buyers. The government needs to formulate and implement favorable seafood marketing policy with supportive mechanisms. It is hoped that NFDB would play a key role in organizing domestic marketing for seafood in the country.

Marketing yard of Aqua Farmers' Association, Tangatur, Andhra Pradesh

7.8 Community Based Cooperative Marketing System in Mangalore

There are strong community based cooperatives for the marketing of fish harvested by the traditional fishers and gill net operators in Karnataka. For example, *Hadinaaru Patna Meenugaarara Market Vyavasthaapana Samithi* is such an organization providing credit and marketing services to small scale fishermen. One of the community based co-operative organization, the *Mangalore 16 Patna Meenu Marata Vyavastha Samithi* was established in 1962 in the Mangalore fishing harbour, with its jurisdiction from Uppal (Kerala) to Suathkal (Karnataka). The *Samithi* was originally formed to fight exploitation of fisherwomen by the middlemen-cum-financiers. Whenever a woman seller could not repay the loan, the trader would exploit the woman, often sexually. This led to strong determination among Mogaveer leaders

to form their own co-operative organization for marketing the catch, mainly brought by the traditional fishing units.

The specific objectives of the *Samithi* are as follows:

- To organize the marketing of fish brought by the traditional fishing units and help women in retail distribution.
- To advance loans for purchase, repairs and maintenance of traditional fishing crafts and gear.
- To offer credit facilities for fisherwomen to take up retail distribution of fish and fishery products.
- To extend advance credit for processing of fish.
- To provide welfare services such as support for education and unforeseen contingencies to members and non-member families which are in distress.

Management

The Board of Directors of the *Samithi* consists of both elected and nominated members. The member village Sabhas, through their federal body, i.e. Samastha Sabha, select 10 members. The General Body members elects 9 members through secret ballot. The Board of Directors co-opt 2 members from any of the 16 villages. Thus, there are one 21 Board of Directors who in turn elect one President, one Vice President and one Secretary. Secretary meets every month to discuss matters relating to operations and development. The President is vested with maximum authority and the Secretary is the office executive head. The present President has been in office for the last 12 years. He has technical knowledge about fishing and has grown up with the institution. To become a member to the *Samithi*, each Gramsabha has to pay Rs 15,000 as membership fee. If an individual wants to become a member he/she has to subscribe minimum one share of Rs 50, to a maximum Rs 5000 (100 shares).

Though loan is given to all irrespective of caste, membership is only for Mogaveer community people. There are 14 staff members headed by a Manager. The 9 auctioneers of the *Samithi* are the vital link between the fishermen and the management. They have good knowledge of the fishermen and operate in different small landing centres, mainly in Panambur and Bunder at Mangalore. The auctioneers are paid commission on their sales. Hence, these auctioneers have a long term multifaceted interaction with fishermen. Apart from the auctioneers, there are 5 accountants who maintain the general accounts of the member fishermen, one of them an internal auditor.

The accounts are verified by a chartered accountant every year. Whenever there is vacant position in the *Samithi,* it is notified to all the 14 villages and the recommendations of the village Sabhas s sent to the federal body, Samatha Sabha. The Head of this Sabha, in consultation with the President of the Samithi, appoints the best possible person among the candidates. In the selection, more weightage is given to personal character and background of the individual than to educational qualifications. The membership profile and advances given to fishermen owning different fishing gears are given in table 7.6.

Table 7.6 Membership Profile and Advances (2007-08) given by *Mangalore 16 Patna Meenu Marata Vyavastha Samithi*

Type of gear	Loan Advance per Unit (Rs)	No. of Members	Loan Recovery (% of sale proceeds of daily fish catch)
Gill nets	30,000-40,000	30-40	10
Traditional fishermen	25,000-30,000	40-50	10
Kiarampani	1,00,000	10	10
Small mechanized boats	20,000	8	5
Women			
Sellers of high value fishes	25,000-40,000		
Sellers of small fish	5,000-10,000		

Business Activities

Originally, the *Samithi* was formed to help small fisherwomen to take up retail fish marketing and to reduce their exploitation by the outsiders. However over the years, the society expanded its activities into marketing of catches of small scale traditional fishermen who are deprived of such support from the state sponsored Karnataka Fisheries Development Corporation and State Marketing Federation.

These two institutions, with their branches in different major landing centres provide marketing and credit services to purse seiners and trawlers which operate 40-50 ft boats with 80-110 hp engines. They go for multiday fishing from September to May. The *Samithi* has been helping small scale fishermen by providing marketing services and advances for purchase, repair and maintenance of fishing crafts and gear. As soon as the fish is landed, it is transported to the nearest landing centre by tempo, either to Panambur during monsoon or to Bunder during post monsoon period. The fish is unloaded into baskets which weigh around 30-35 kg. The auctioneer of the co-operative invites bidding from the fisherwomen who buy them for fresh fish retailing or for drying. Daily on an average 120 fishermen sell sweet water fish.

Table 7.7 Description of the Fishing Units in *Mangalore 16 Patna Meenu Marata Vyavastha Samithi*

No of fishers selling fish	Description of the fishing unit
40-50	Traditional fishermen (*Pattebale*, *Kanthale*)
30-40	Gill net boat
10	Kairampani
8	Small mechanized boats

The sales proceeds are paid to the representative of the boat after deducting 6% commission. The fisherwomen and other retailers in turn make payment within a week. No interest is charged for the credit to the fisherwomen. The main income of the *Samithi* is through the commission charges of 6%, which is less than the 10% commission charged by the private commission agents. The co-operative has been declaring a dividend of 25-30 % every year. If a member defaults, the matter will be brought to the notice of the village Sabha with a request to persuade the member. The Samithi also sends reminders to its members to repay the loan. Though the village Headman (Gurkar) can initiate certain social sanctions, the need for such actions has not arisen in the recent past. However, whenever there is a genuine case recommended by the Gurkar, the repayment could be postponed or relaxed. Some of the main items of expenses are administrative expenses, telephone expenses, office rent @ Rs 1900/month, stationery, rent for the *Karnataka Purse seine Meenugarara Sangha* @ Rs 700/month, etc.

The *Samithi* has evolved a unique system of providing incentives to the staff over the years. Unlike in other cooperative organizations, the staffs of both office and marketing are never given a salary. The auction commission (6% of the sale value) is divided on 70:30 ratio. 70% is distributed among the 16 members as their remuneration and the remaining 30% is used for declaring dividends to the members.

Reasons for Success

1. The *Samithi*, although functioning like a co-operative organization, is not a registered body. This has enabled the co-operative to be more flexible in its operation.

2. The *Samithi* is specialized in doing business with small scale fishermen with a homogenous socio-economic background who fish in inshore waters.

3. The co-operative operates with a limited boundary of 16 villages. The fishermen who do not belong to the Mogaveer community cannot become members, though they can avail of the services. For example, the gillnet fishermen and kairampani operators from the coastal villages also sell their catches through the co-operative and avail credit facilities. This has greatly helped the migratory fishermen from Kerala.

4. Though the society does not provide direct loans for non- productive purpose, like wedding, festivals, etc., it gives support when the families are in distress.

5. The parent body of the society operates with least bureaucratic constraints with its President enjoying full freedom. All the employees have long experience with the member-fishermen with a commitment to the welfare of the members.

During 2007-08, the *Samithi* made a turnover of Rs 5 crores. So far, the *Samithi* has declared a dividend at the rate of maximum 35% to a minimum of 20%.

7.9 Fresh Fish Retailing by Women Enterprise Group, Mangalore

The 'Sagar Nidhi' is a self help enterprise activity group was formed by mobilizing fresh-fish retailers of Bengare ward of Mangalore Port in August 2006. Since then, the group has been active in fresh fish business. The group which initially consisted of 10 retailers added additional 5 members who had no alternative employment and had interest in fish business. The group members were first enrolled as members of the Karavali Fishers Processing and Marketing Cooperative Society Ltd. and provided with financial and technical assistance.

Various developmental options were discussed here. Some of them are:

- Direct supply of valuable fishes to hotels and restaurants.
- Investment requirements' for trading valuable fishes.
- Opening of a retail shop dealing with fishes harvested by following eco-friendly fishing practices and which confirms to other features of sustainable practices such as avoiding juvenile fishes, gillnet fishes.

Finally, group agreed for setting up of retail workshop by employing unemployed girls to market sustainable harvested fish and fishery products. The process of establishing the shop has been initiated by the project.

With the introduction of the project, the women retailers have been benefited in two ways:

- ***Empowerment of the women***: women retailers were able to participate directly in the auction market and thus saving 20-30% in the purchase price.
- ***Increased net sales***: Retailers were able to increase their sales from one basket to almost two baskets (30-35 kgs) per day. The net earnings from Rs.100 to 150-175.
- The share of commercially important valuable fishes has increased.

The group agreed to make purchase of fresh fish suitable for drying on behalf of the Padubidri Group in view of the difficulties faced by them to access fish in the harbour. However, due to the lack of mutual understanding and trust transactions under this scheme was not materialized we are exploring such possibilities with other groups.

CHAPTER VIII

FISH TRADE

8.1 INTRODUCTION

India's vast coastline of 8129 kilometers stretching almost two-thirds of the country and encompassing an exclusive economic zone of 2 million square kilometers offers sufficient surplus for external trade after catering to the domestic demand. Though meek as compared to the global volumes, fishery products of Indian origin are being relished by a substantial majority in the rest of the world. Fishery products, thus, have long been serving as an important source of foreign exchange to India's exchequer through substantial amount of exports to almost all over the world. Having said this, it is imperative to have a glance on the composition, pattern and trends of India's fishery trade, over the years, beginning from a comparison with the global scenario, before melting down to the finer details.

8.2 TRADE IN FISHERY PRODUCTS: THE GLOBAL SCENARIO

Table 8.1 Fishery Trade: The Global Scenario, 2006

Country	Exports	Imports	Total
	US$ million		
EU[1]	21600	37500	59100
China & Hong Kong	10800	6700	17500
USA	4100	13300	17400
Japan	1400	14000	15400
India	1800	100	1900
World	**85900**	**89600**	**175500**

[1]Including intra-trade

Source: FAO, 2008

The international trade in fish and fishery products has been growing steadily, the primary stimulus being the rising trend of consumption in Europe and America and a build-up in Asia and other developing regions. The growing demand of fishery products across the world during the recent years is attributed to a change in the dietary habits towards fish due to its health enhancing features. Moreover, the establishment of a number of processing industries in the countries like China, Thailand and Vietnam also resulted in the boosting up of fishery trade in processed form.

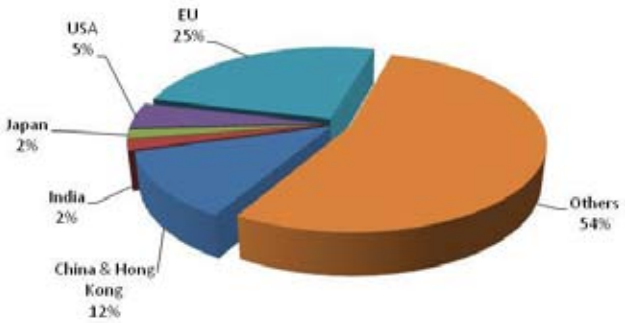


Figure 8.1 Global Fishery Exports: 2006

The total world export of fishery products was estimated to be USD 85900 million in 2006. EU was the largest exporter of fish and fish products with a gross share of 25 per cent of the total world exports (Figure 8.1). EU is also the largest fish importer of the world and its prime status of being the largest exporter and importer of fish in the world can be attributed to the significant intra-regional dynamics. However, it is important to note that exports from developing countries account for close to 50 per cent of the total world trade in fish and fishery products. Among them, China adores the position of world's single largest exporting country with an estimated export of USD 8900 million in 2006.

In the recent years, China's imports are also growing due to its increasing involvement in outsourcing raw fish from all over the world for subsequent processing and re-export. The rising domestic consumption in China also contributes to its rising import bills. Contrary to this, the domestic consumption in Japan is on a downfall owing to a long term trend away from fish consumption, leading to a reduction in its imports. As of in 2006, Japan contributes to 15 per cent of the total global imports nearly equaling Unites States.

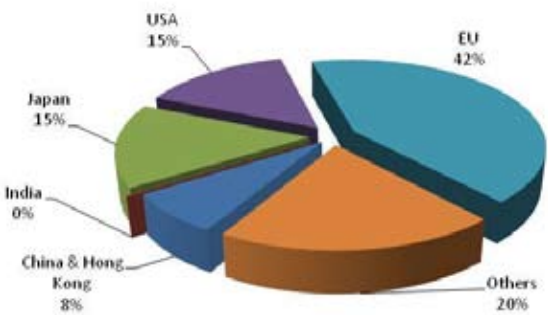


Figure 8.2 Global Fishery Imports: 2006

8.3 INDIA'S EXPORTS OF FISH AND FISHERY PRODUCTS

India's share of world fish exports comes merely 2 per cent only. India hardly imports any fish products and hence India's contribution in the global fish trade is negligible. However, among the various agricultural commodities exported from India, fishery products, especially marine products, holds a prime status. It is clear from the Figure 8.3 that, around 13 per cent of the total agricultural exports from India in 2005 comprised of marine products. Other major exported commodities are basmati and non-basmati rice, Oil meals, spices, meat and preparations, cashew, fresh fruits and vegetables, tea, coffee etc.

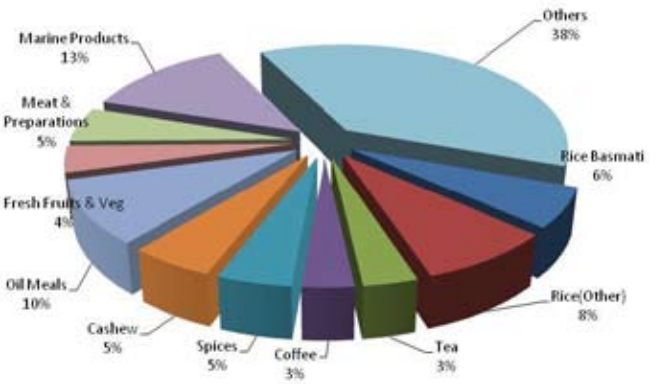


Figure 8.3 Composition of India's Agricultural Exports: 2005-06

8.3.1 Commodity Composition

The marine products are exported in various forms, viz. live, fresh/chilled, frozen, dried/salted/in brine, cooked and frozen, cooked and smoked, prepared/preserved etc. However, majority of the lots are dispatched in frozen form. Frozen shrimp was the largest exported item, both in terms of quantity and value, among the various marine products exported from India during the period 1995-96 to 2006-07. A major source of India's shrimp exports is the *Penaeid* shrimp from Maharashtra and Kerala coasts. *Penaeus mondon*, commonly known as '*Jumbo tiger shrimp'* is a highly demanded and priced commodity in the international market, a prominent share of which is exported to Japan and European Union. Cultured black tiger shrimp, mainly from West Bengal and Andhra Pradesh, is another major source of exports which faces a crisis in the recent years in the wake of outbreak of viral diseases.

The shrimp export industry in India is also facing severe threat from the *Vennamei* shrimp exports originating mainly from the Central and South American countries. Even though the quantity of shrimp exports have increased fairly in the last decade, the comparative reduction in the share of shrimp exports, both in quantity and value terms is notable. This can be attributed to a relative shift of export towards low value alternatives like finfish and diversification of the export basket.

The important finfish which are exported are Yellow fin tuna, Sardine, Mackerel, Pomfret, Seer fish, etc. which find their market mainly in the South east and Middle East Asian countries. The share of fin fish increased from 33.8 per cent in 1995-96 in terms of quantity to 44.2 per cent in 2006-07. In value terms this has been from 10.6 per cent to 17.4 per cent over the same period.

However, there was a reduction in export of Frozen Squid and Cuttle fish. The share of dried items, live items and chilled items were comparatively lesser. The share of other products has also increased underscoring greater diversification and value addition (Table 8.2).

Table 8.2 Commodity-wise Performance of Marine Products Exports from India

(Quantity in million tons, Value in Rupees crores)

Country	EXPORT				SHARE			
	1995-96		2006-07		1995-96		2006-07	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Frozen Shrimp	95724	2356.8	137397	4506.0	32.3	67.3	22.4	53.9
Frozen Finfish	100093	372.2	270751	1452.8	33.8	10.6	44.2	17.4
Frozen squid	45025	319.5	55701	797.3	15.2	9.1	9.1	9.5
Frozen Cuttlefish	33845	260.8	47252	568.3	11.4	7.5	7.7	6.8
Dried items	7415	44.2	24293	183.1	2.5	1.3	4.0	2.2
Live items	1756	31.3	2478	64.0	0.6	0.9	0.4	0.8
Chilled items	2773	26.0	7200	117.3	0.9	0.7	1.2	1.4
Others	9646	89.9	67571	674.3	3.3	2.6	11.0	8.1
Total	**296277**	**3501.11**	**612641**	**8363.53**	**100.0**	**100.0**	**100.0**	**100.0**

Source: MPEDA, 2008

Even though a change in composition of the fishery exports has taken place, all the exported commodities registered positive growth rates during 1995-96 to 2006-07. While Frozen Shrimp, Frozen Squid and Frozen Cuttle fish exhibited moderate growth rates, the growth in dried items and chilled item were in double digits. The growth in exports of frozen fin fish was found to be higher than that of frozen shrimp, which hints a change in demand pattern in the importing countries. However, the export of frozen fin fish was also associated with high rates of instability meaning greater inter-year fluctuations in the quantity exported. High levels of instability were also observed in case of dried, live and chilled items exports (Table 8.3).

Table 8.3 Commodity-Wise Growth and Instability in India's Marine Products Exports: 1995-96 to 2005-06

Market	CGR (%)		Instability Index	
	Export quantity	Export value	Export quantity	Export value
Frozen shrimp	3.90	2.59	4.60	9.76

Frozen finfish	4.46	5.04	24.31	22.53
Frozen squid	2.79	5.41	2.61	4.42
Frozen cuttle fish	3.62	4.81	6.17	6.45
Dried items	8.81	13.29	13.81	12.40
Live items	3.16	3.92	8.48	10.93
Chilled items	8.94	11.01	15.00	20.27
Others	20.40	17.09	6.85	15.67
Overall	**5.16**	**4.19**	**9.63**	**10.69**

Source: MPEDA, 2008

8.3.2 Market Composition

South East Asia was the largest market for Indian marine products during 2006-07. Around 33 per cent of the total exported quantity of marine products from India found market in various South East Asian countries.

However, it is interesting to note that, European Union claimed the largest share in terms of the value of exported commodities. This clearly indicates that, even though a huge bulk of exports is directed towards South East Asia, they are mostly low value products. The export basket consists mainly of frozen finfish, frozen squid, dried and live items etc. Most of the high value products are exported to EU followed by USA and Japan mainly because of higher purchasing power of the consumers in these developed economies.

It is also worth mentioning that, over the last decade Japan's status as a supreme market for Indian marine products has suffered a jolt as indicated by the alterations in relative market shares. The share of Japan as a destination market of India's fishery exports has reduced from 45 per cent to 16.2 per cent in value terms and from 17.5 percent to 11.0 per cent in terms of quantity exported between 1995-96 and 2006-07. The prominent reason for this is the drastic reduction of shrimp exports to Japan due to various reasons like slump in domestic production of shrimp, gradual erosion in preference among Japanese consumers etc. Another associated cause is Japan's greater preference for shrimp imports from Thailand and China. The figures for the recent years indicate such a gradual shift, the reason for which is a matter of a thorough investigation. A similar recent study also cautioned against the higher comparative advantage of these two countries for marine exports as compared to India. The share of Middle East for overall marine exports has slightly improved, while that of Hong Kong and China has reduced in quantity terms during the same period (Table 8.4).

Table 8.4 Market-wise Performance of Marine Products Exports from India

(Quantity in million tons, Value in Rupees crores)

Country	EXPORT				SHARE			
	1995-96		2006-07		1995-96		2006-07	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value

Japan	51789	1576.7	67437	1353.4	17.5	45.0	11.0	16.2
USA	26008	366.3	43758	1347.8	8.8	10.5	7.1	16.1
EU	86023	900.2	149773	2760.3	29.0	25.7	24.4	33.0
South East Asia	41954	264.6	203513	1157.0	14.2	7.6	33.2	13.8
China & Hong Kong	69387	232.1	67650	616.7	23.4	6.6	11.0	7.4
Middle East	8800	77.6	23585	371.1	3.0	2.2	3.8	4.4
Others	12315	83.6	56924	757.3	4.2	2.4	9.3	9.1
Total	**296277**	**3501.1**	**612641**	**8363.5**	**100.0**	**100.0**	**100.0**	**100.0**

Source: MPEDA, 2008

The picture becomes vivid when viewed against the growth scenario of exports to various markets over the above mentioned period. The reduction in exports to Japan becomes obvious from the negative growth rate of -0.48 in quantity terms and -7.78 in value terms (Table 8.5). A negative growth in quantity was also observed in exports destined to China and Hong Kong.

The highest growth in exports was associated with that of South East Asia which registered a compound growth of 13.44 percent (value) and 10.37 per cent (quantity). Growth trends of exports directed towards European Union was also notable. However, the exports to South East Asia and China and Honk Kong were associated with high instability which suggested substantial inter-year fluctuations. Exports to USA, China and Hong Kong and Middle East were also found to be fairly instable.

Table 8.5 Market-Wise Growth and Instability in India's Marine Products Exports: 1995-96 to 2006-07

Market	CGR (%)		Instability Index	
	Export quantity	Export value	Export quantity	Export value
Japan	-0.48	-7.78	11.43	15.33
USA	6.57	12.51	10.33	23.97
EU	9.11	10.89	7.27	7.78
South East Asia	13.44	10.37	17.56	12.95
China $ Hong Kong	-2.76	1.80	23.82	21.03
Middle East	6.98	11.70	16.51	12.97
Others	12.67	18.82	9.30	3.24
Overall	**5.16**	**4.19**	**9.63**	**10.69**

8.3.2 Port-wise Exports

Jawaharlal Nehru Port (JNP), India's biggest container port located at Mumbai handles majority of the marine exports from India presently. In the year 2006-07, around 137 thousand tons of marine exports were shipped from this port, far higher than the corresponding figure in 1995-96 (Table 8.6). The cargo

earlier handled by the Mumbai port has been gradually shifted to JNP due to higher capacity and better facilities available here.

Cochin is another major port from where substantial quantities of marine exports are dispatched to various overseas destinations. Other ports of importance are Chennai, Vizag and Kolkata. Shipments from the ports like Kandla, Porbandar and Mumbai were found to be negligible, though a major chunk of the exports were routed through these ports a decade ago.

Table 8.6 Port-wise Performance of Marine Products Exports from India

(Quantity in tons, Value in Rupees Lakhs)

Port	EXPORT				SHARE			
	1995-96		2006-07		1995-96		2006-07	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Kandla	23462	13195.8	565	3.6	7.9	3.8	0.1	0.0
Porbandar	59096	26332.0	0	0.0	19.9	7.5	0.0	0.0
Mumbai	31213	27248.4	2892	67.5	10.5	7.8	0.5	0.8
J N P	24144	21188.1	137153	1279.5	8.1	6.1	22.4	15.3
Goa	13938	7035.9	16152	89.4	4.7	2.0	2.6	1.1
Cochin	78682	85375.5	106454	1476.5	26.6	24.4	17.4	17.7
Tuticorin	13028	19153.5	30611	735.5	4.4	5.5	5.0	8.8
Chennai	18302	52765.4	42272	1332.6	6.2	15.1	6.9	15.9
Vizag	20016	60887.9	36594	1264.7	6.8	17.4	6.0	15.1
kolkata	14044	35459.8	23238	655.6	4.7	10.1	3.8	7.8
Others	351	1468.3	189986	1309.0	0.1	0.4	31.0	15.7
Total	**296277.0**	**350110.7**	**612641.5**	**8363.5**	**100.0**	**100.0**	**100.0**	**100.0**

Source: MPEDA, 2008

8.4 PRICE BEHAVIOUR OF MAJOR FISHERY PRODUCTS

The prices prevailing in the international markets and their differentials with respect to the domestic prices are important factors which govern external trade. A comparative analysis of the international prices and domestic prices of prominent marine products exported was attempted and are presented in Figures 8.4 to 8.7.

Cochin was selected as the representative domestic market where as Tokyo central market was considered as the international market for comparison. In general, all the prices depicted upward trend except in case of international prices of shrimp. A common observation was that in all cases, the international market prices were much higher than the domestic market prices and the differential explains their exportability.

The price differential was found to be the highest in mackerel where as they moved in parallel and close in case of yellow fin tuna.

However in shrimp[1], the wedge was found to get narrow down considerably towards the end of the last decade, and both prices coincided in most part of the years 2005 and 2006. This reinforces the earlier discussion and explains the reason for a considerable dip in shrimp exports to Japan during the period. The downward trend in prices was also evident in the US market which also attracted less imports. As a result, the shrimp exporters have re-routed their cargos to Europe where they have more takers for their produce.

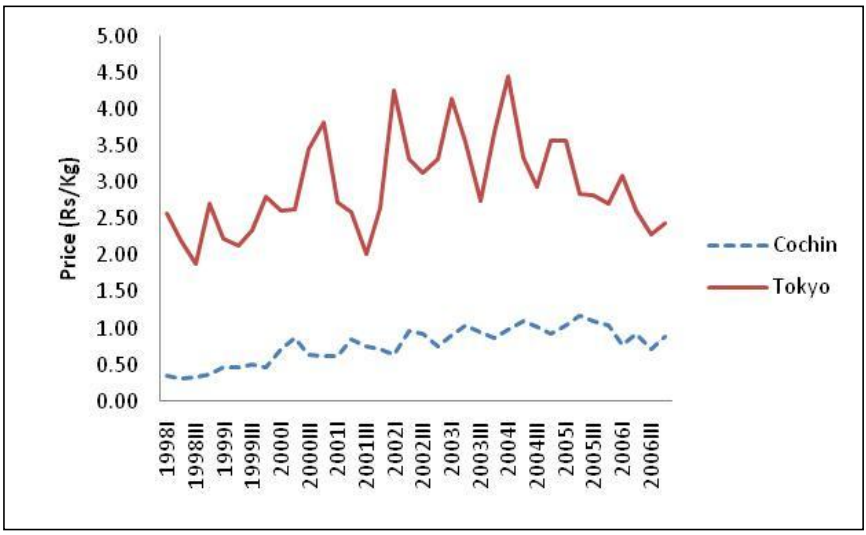


Figure 8.4 Domestic and International Price Trends of Sardine

[1] Black tiger, headless, 16/20

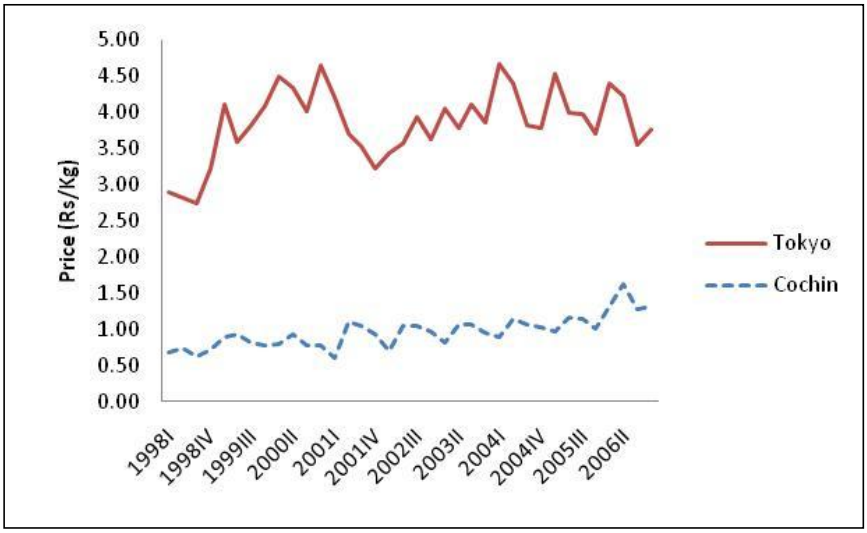


Figure 8.5 Domestic and International Price Trends of Mackerel

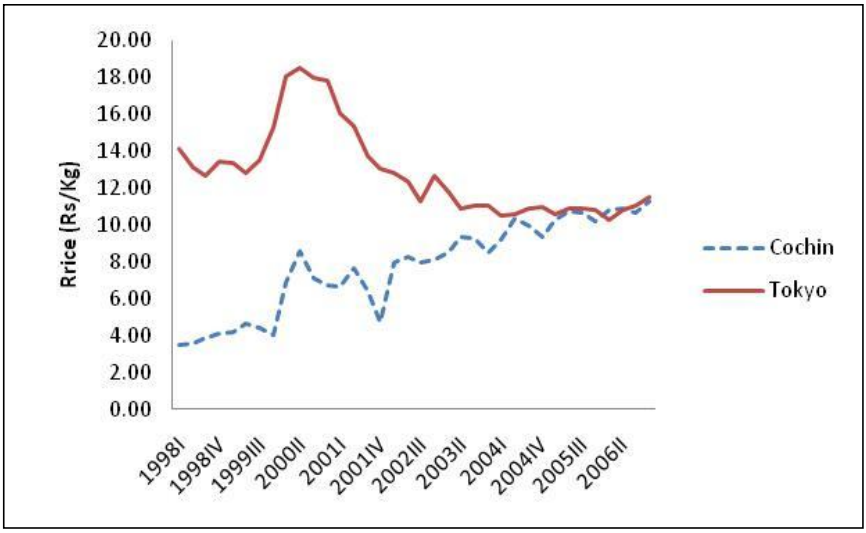


Figure 8.6 Domestic and International Price Trends of Shrimp

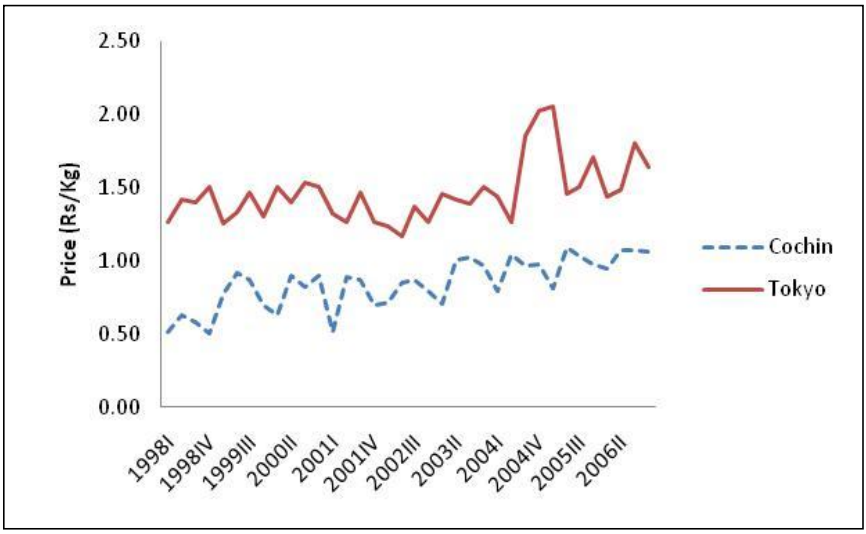


Figure 8.7 Domestic and International Price Trends of Yellow Fin Tuna

In comparison to the domestic prices, international market prices were found to be more volatile with high intra-year and inter-year instability. The instability in prices was measured using Cuddy-Della index as was done in exports. Lack of stability in international market prices exposes the exporters to greater price risk. High fluctuation in prices also makes the exports dwindling and acts unfavorably on the exporters.

The instability in prices was measured using an index. The results suggested that, highest intra-year instability was associated with commodities like Squid, Skip jack tuna and Yellow fin tuna (Table 8.7). Also the level of instability was in general higher in the later years for most of the commodities. This trend was particularly relevant for mackerel, crab and shrimp. The shrimp prices were relatively stable as also the case of crab. The inter-year instability for the period 1997 to 2006 was highest for mackerel, skip jack tuna and squid.

Table 8.7 Intra-Year and Inter-Year Price Instability of Major Fish Species in Tokyo Central Market

Year	Yellow fin Tuna	Skipjack Tuna	Sardine	Mackerel	Crab	Squid	Shrimp
	Instability Index						
1997	10.96	8.38	6.50	10.91	11.16	20.84	2.61
1998	8.61	15.71	10.35	5.90	1.59	15.11	1.56

1999	11.10	28.23	9.43	5.98	1.31	17.29	0.83
2000	8.27	8.06	25.59	5.85	4.03	15.91	1.42
2001	9.39	34.26	11.08	5.38	4.39	24.12	0.62
2002	11.44	22.53	4.95	7.92	6.13	22.24	3.40
2003	6.48	14.04	6.68	8.64	2.53	19.25	0.66
2004	8.91	22.16	2.84	12.11	5.17	21.40	3.63
2005	11.36	22.21	4.05	11.46	14.22	14.16	2.37
2006	8.10	30.06	13.13	10.44	13.96	25.00	2.34
1997-2006	**5.89**	**10.67**	**9.86**	**11.31**	**7.08**	**10.58**	**7.04**

8.5 SUPPLY CHAIN OF EXPORTED FISHERY PRODUCTS

The fish and fishery products exported from India originate both from marine capture and aquaculture production, even though capture is the dominant source. In capture sources, the fish are caught with boats / trawlers and landed at the registered landing sites. Auctioning is a mandatory procedure at landing sites through which the agents procure the fish lots. Most of the processing units have their own agents to procure the produce from the landing sites. The lots which are designated for exports may either go through common independent pre-processing units or directly to big processing facilities. The pre-processing units are meant for cleaning and de-shelling the raw material before processing. After processing and packaging, the consignments are sent to overseas importers with the intermediation of agents. One or more agents may be involved in the chain, who undertake various facilitation activities. Kerala and Karnataka are the hubs of capture fisheries for exports.

In aquaculture, the fish farmers generally sell the produce to agents of processing units at pre-fixed prices. No auction is undertaken in this channel. The processing units, after carrying out value addition, change hand to the exporting agencies, which ultimately send the consignments to foreign buyers. Cultured shrimp mainly from Andhra Pradesh, Tamil Nadu and West Bengal are routed to many foreign destinations including Japan, EU and USA.

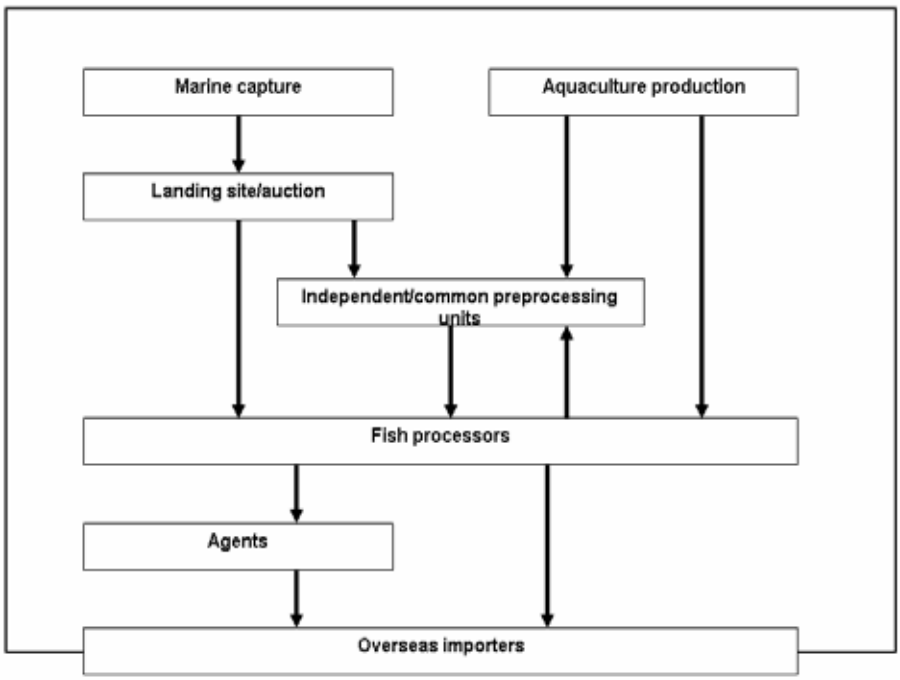


Figure 8.8 Supply Chain of Fishery Products exported from India (Source: Henson *et al*, 2004)

Shrimps being washed, cleaned and run on a sorting machine at an export processing unit at Bhimavaram, Andhra Pradesh

Shrimps being graded according to size (counts) in a sorting equipment

Frozen shrimps in specific sized crates ready for packing and storing in deep freezing chamber

Skilled female workers manually sorting and grading the shrimps before freezing them

Labours sorting the blanched shrimp before packing

Workers packing, final checking and sealing of blanched and frozen shrimp

Quality Control Manager displaying a peeled, deveined and blanched prawn meat packet ready for export

Frozen fish products stored in a cold chamber in a temperature of 18-20^0 C

8.6 QUALITY AND SAFETY OF FISH EXPORTS

Food safety has assumed unprecedented attention in the recent years, with the increasing awareness among the consumers about importance of safe food both in terms of economic and health perspectives. This has resulted in the development of various regulations on food trade at the international level. The Codex Alimetarius Commission (CAC) was established jointly by Food and Agricultural Organization (FAO) and World Health Organization (WHO) as early as 1960. However, the subject became more relevant when the World trade Organization (WTO) has put forward a separate agreement on Sanitary and Phytosanitary (SPS) measures to be followed at global level. The agreement was intended for the member countries to protect their human/animal/plant health from potential hazards associated with food.

In the year 1993, CAC recommended Hazards Analysis and Critical Control Point (HACCP) system as a global requirement to ensure food safety. It uses the approach of controlling critical points in food handling to prevent food safety issues. Good Manufacturing Practices (GMP), Good Hygiene Practices (GHP) and personnel hygiene practices are strong foundations of HACCP and it involve a system approach to identification of hazard, assessment of chances of occurrences during each phase, raw material procurement, manufacturing, distribution, usage of food products, and in defining measures for hazards control.

In India, Bureau of Indian standards (BIS) is the national standards body to deal with all matters concerning standardization, certification and quality. It offers various certification schemes to the food industry and ensures conformity to the codex and other international standards of the exported products.

The Export Inspection Council of India (EIC) undertakes quality control and pre-shipment inspection to ensure safety of the exported consignments. It is important to note that fish and fishery products are subject to mandatory export certification based on Food Safety Based Management System (FSMSC) unlike other cereal and vegetable commodities.

Fish processing sector is particularly prone to health hazards arising out of widely prevalent unhygienic practices followed during various stages of processing, packaging and storage. Recognizing this, various countries have put in place stringent rules and regulations to ensure the quality of imported fish and fishery products.

In Japan, the administration of food safety is under the jurisdiction of Department of Food Safety, Ministry of Health, Labor and Welfare. A separate office of Import Food Safety is concerned with the safety of imported foods in the country. The European Union has a well developed system in place known by Rapid Alert System for Food and Feed (RASFF) since 1979 to provide effective exchange of information regarding food safety of the imported food and feed commodities. The RASFF issues alert/information notifications to the member countries when a risk is detected in food products entering the territory. Alert notifications are issued when immediate action is required and aims at giving all the members of the network the information to take necessary actions and usually results in rejection/recall. Information

notifications however, are less serious in nature and are intended to inform about a possible threat of contamination or other risks associated.

The reasons for notification were classified broadly under cases of adulteration and that of non-adulteration issues. The adulteration was mainly on account of biological, chemical and others like filth. Common biological contamination in fish lots include bacteria, false catfish, *Salmonella*, *Listeria*, etc. while the chemical adulterants are histamines, unsafe additives, veterinary drugs, other poisonous chemicals and heavy metals etc. Violation of HACCP rules on labeling, packaging etc were also important reasons for rejection. Some other reasons like illegal import with false license, unauthorized establishment, Spoilage of the container cooling system while transportation, etc were also noted.

Table 8.8 Alert/Information notification on Imports by European Union: January, 2007 to December, 2007

Country of Origin	Adulteration			Non-adulteration		Grand total
	Biological	Chemical	Others	HACCP issues	Others	
Within EU	47	125	6	2	2	173
China	4	43	0	0	0	47
India	6	21	0	0	2	29
Indonesia	1	15	0	0	1	17
Brazil	0	16	0	0	0	16
Sri Lanka	4	11	2	0	0	16
Vietnam	1	15	0	0	0	16
Morocco	3	7	2	0	1	13
Panama	0	10	0	0	0	10
Thailand	0	14	0	0	0	10

Source: European Commission, 2008

Table 8.8 presents details on such notifications issued by RASFF on fishery products originating from various exporting countries in the year 2007. Majority of the alerts/information notifications were issued against the consignments from various countries within European Union, mainly Spain and France. Among consignments from outside Europe, China and India were leading the list, with 47 and 29 cases respectively in the year 2007. Chemical contamination was the major causal factor for notifications, while cases of biological contamination were also not less.

In USA, the United Sates Food and Drug Administration (USFDA) is the national quality body for food products regulation and consumer safety and the fishery products also comes under the ambit of its

operations. This agency regulates imported food worth of USD 49 billion every year in the country. In 2007, the USFDA released the food protection plan (FPP) to address both food safety and food defense for domestic and imported products. The Federal Food, Drug and Cosmetic Act of 1938 is the principal law associated with seafood safety in America. A Federally Mandated Seafood Rule promulgated in 1995 constitutes the basis for sanitary procedures processing and importing fish and fishery products into the country including good hygienic practices and HACCP. The FDA also regularly prepares imports refusal reports (IRR), which gives detailed account of the rejected consignments of all food products due to various safety and sanitary reasons. The report is generated using the data collected by Operational and Administrative system for Imports Support (OASIS).

Table 8.9 Refusal of Fishery Imports by USFDA: May, 2007 to April, 2008

Country of Origin	Adulteration			Non-adulteration		Grand total
	Microbial	Chemical	Others	HACCP issues	Others	
China	34	176	106	3	18	337
Indonesia	61	30	181	1	2	275
Vietnam	87	39	76	4	5	211
Philippines	11	7	63	0	31	112
Taiwan	18	8	47	0	8	81
Thailand	13	0	50	6	5	74
South Korea	13	2	2	14	20	51
India	21	0	24	0	2	47
Malaysia	23	8	16	0	0	47
Japan	4	0	2	2	36	44

Source: USFDA, 2008

The IRR reports pertaining to fisheries products for the period May 2007 to April 2008 for top ten countries' is presented in Table 8.9. It was observed that the highest number of refusals were of Chinese exports with a total of 337 cases during the period. Refusals of Indonesian and Vietnam exports were also notable. Forty seven cases of Import refusals were registered against India during the period of one year.

Most of the rejections were due to microbial and filth contamination of the exported lots. It is of particular relevance that all the countries that topped the list were Asian and no exports from other developed countries were subject to rejection. This highlights the poor emphasis given to sanitary issues in these countries. Rejections not only lead to economic loss, but also tarnish the reputation of the countries in the global market which has more serious implications. It is therefore important to build up adequate

infrastructure and stringent enforcement of the regulations in the country to enable the exporters to stick to strict safety standards.

8.7 FISHERY TRADE AND THE WTO NEGOTIATIONS

Unlike other agricultural and allied commodities, fish and fishery products are not covered under Agreement on Agriculture (AoA) of the WTO. The Doha round negotiations on improved market access for fishery imports is included in Market Access for Non-Agricultural Products (NAMA). Following the completion of Uruguay Round, average weighted import tariffs on fishery products in developed countries were reduced to approximately 4.5 per cent. However, the provisions like tariff peaks and tariff escalation for processed or value added products keeps the level of market access restrictions in value added fishery products high. Such restrictions continue to hinder economic development of the fish processing sector in many developing countries (FAO-GLOBEFISH, 2000).

In addition, a number of non-tariff barriers also hinder fishery trade. These are mostly related to the agreements on Sanitary and Phytosanitary issues and Technical Barriers to Trade. The fishery subsidies are considered to be an important facet of Doha Development Round. There are wide concerns existing about the likely negative effects of trade distorting subsidies that contribute to over exploitation of marine resources. However, some advocates highlight on the exceptions which are to be negotiated.

A recent proposal by China, India and Indonesia submitted to the chair of WTO's rules committee emphasizes on the importance of Special and Differential (S&D) treatment for developing countries given the particular importance of fisheries for livelihoods, poverty reduction and food security. It calls for exemptions from subsidy disciplines for developing country's small and artisanal fishermen, as well as fisheries infrastructure and capital and operating costs (GLOBEFISH, 2008). The Doha Agenda also underlines the importance of providing technical assistance and capacity building to developing countries to adjust to WTO rules, implement existing obligations and negotiate and fully exercise the rights of membership (FAO, 2008b).

8.8 INDIA'S EXPORT POTENTIAL IN MARINE PRODUCTS

India's export potential in fishery products with respect to major trading partners was worked out by employing a gravity model of trade. The model is a widely acclaimed empirical tool for modeling bilateral trade flows and to estimate the trade potentials of participating countries. The model postulates that trade flows between two countries is proportional to the product of each country's 'economic mass' generally measured by Gross Domestic Product (GDP) divided by the distance between respective economic centers – usually using as a proxy, the distance in kilometers between the countries' capital cities. The selection of the gravity model in the present analysis is based on its success in other empirical studies, although criticisms regarding weak linkages to a theoretical basis are acknowledged.

The model takes agricultural GDP as a variable to measure the economic size of the countries that determines export. The per capita income of the people and the average import duty on fishery products prevailing in the partner countries were also included to augment the model. In addition, a dummy variable to capture the effect of Regional Trading Agreements (RTA) between the India and other importing countries was also added in the model.

The trade potential is defined as the ratio of the estimated values of trade as obtained from the estimated model with respect to the actual values (E/A). A value of export potential greater than one indicates the existence of unexplored trade potential which in turn suggests the scope for improvement in exports. Values lesser than one suggest that actual trade has crossed the potential in terms of geographical proximity, economic size and per capita income. Consistently high values of export potential for an extended period indicate strong reasons to expand trade.

In the present analysis, the countries were selected based on India's export ties with these countries over the period 2000 to 2006. The bilateral agricultural trade data used in the analysis was obtained from various volumes of *Foreign Trade Statistics of India - Principal Commodities and Countries* published by Directorate General of Commercial Intelligence and Statistics (DGCI&S). Data on other macro economic variables were collected from international sources like World Bank and Food and Agricultural Organization (FAO).

The estimated model suggested that all the variables included in the model were statistically significant. The existence of regional trading agreement with the trading partners was found to have a catalytic effect on trade. The estimated values of trade potential are presented in Table 8.10 and bring out evidence on the existence of unexplored export potential for Indian marine products with respect several importing partners.

Table 8.10 India's Export Potential in Marine Products with Major Trading Partners

Country	Year						
	2006	2005	2004	2003	2002	2001	2000
ASIA							
Bahrain	0.04	1.24	0.55	0.64	0.63	0.69	0.73
China	0.98	0.31	0.25	0.17	0.21	0.14	0.16
Cyprus	0.90	0.88	2.01	12.44	60.85	3.14	3.76
Hong Kong	0.10	0.06	0.04	0.05	0.05	0.04	0.05
Indonesia	2.84	3.41	2.82	2.69	2.60	1.86	4.03
Israel	3.89	6.23	11.47	5.31	4.02	3.70	3.14
Japan	2.12	0.33	0.27	0.20	0.18	0.12	0.11
Kuwait	0.01	0.95	0.56	1.26	0.65	0.59	0.94
Malaysia	1.44	0.26	0.39	0.47	0.27	0.30	0.26

Maldives	0.88	1.64	1.50	1.49	0.20	0.69	2.65
Oman	3.97	3.27	5.45	2.32	13.40	4.11	4.90
Singapore	2.20	1.14	1.03	0.87	0.75	0.69	0.68
South Korea	0.77	0.98	1.07	0.89	1.45	2.22	2.78
Sri Lanka	0.11	2.13	2.16	1.95	1.49	1.68	1.43
Thailand	6.28	2.61	1.52	0.77	0.90	0.98	1.08
Turkey	0.68	13.32	31.49	41.81	18.72	9.01	15.33
UAE	11.12	0.52	0.48	0.43	0.30	0.16	0.17
Viet Nam	0.18	0.01	0.06	0.09	0.17	0.15	0.29
EUROPE							
Belgium	11.94	0.09	0.07	0.10	0.32	0.23	0.32
Denmark	0.13	7.49	4.33	7.08	10.59	9.23	7.66
France	12.17	1.39	1.44	1.36	1.35	1.39	1.69
Germany	0.85	1.32	1.11	1.17	1.47	1.46	1.26
Greece	0.30	0.66	0.50	0.31	0.48	0.44	0.81
Ireland	3.23	3.19	3.43	13.17	10.33	52.18	15.69
Italy	0.86	0.88	0.69	0.67	0.70	0.71	0.85
Netherlands	2.69	2.05	1.04	1.27	0.39	0.61	0.42
Norway	13.47	26.22	11.72	16.82	31.31	57.98	102.56
Poland	13.69	32.07	23.25	20.38	18.81	9.34	19.42
Portugal	0.46	0.47	0.34	0.28	0.30	0.30	0.30
Spain	1.56	0.20	0.22	0.19	0.22	0.29	0.30
Switzerland	19.35	42.30	403.10	20.87	40.42	12.75	39.45
UK	0.47	0.29	0.26	0.24	0.28	0.22	0.29
AMERICA							
Canada	0.11	0.32	0.27	0.38	0.38	0.40	0.45
Mexico	5.55	5.12	4.65	7.70	4.27	3.29	3.08
Uruguay	2.22	2.20	1.75	1.77	1.02	1.21	2.07
USA	1.03	0.26	0.13	0.14	0.17	0.18	0.24
OCEANIA AND AFRICA							
Australia	0.31	0.53	0.34	0.33	0.24	0.49	0.74
New Zealand	2.25	0.39	0.74	0.74	0.44	0.27	0.26
Mauritius	0.01	0.12	0.12	0.17	0.16	0.14	0.10
South Africa	0.12	0.12	0.18	0.31	0.31	0.27	0.27

Within Asia, India has scope to increase exports to the countries like Thailand, Singapore, Oman, Indonesia etc as observed from the greater than unity values of the index. India's marine exports to UAE, Japan and Malaysia in 2006 were less than its potential as opposed to the previous years. The slump in exports to Japan is notable and reinforces the observations brought out in the earlier part of this chapter.

France, Norway, Netherlands, Poland and Switzerland were the countries in Europe where India's export potential lied unexplored during the past many years in a row. This corroborates the fact that, European Union, presently a major importing partner of marine products still offers unexplored avenues for trade.

However, in other countries like Germany, UK, Portugal, Italy etc., India seems to utilize its opportunities. India's has optimally utilized the trading ties with the USA, though a slight dip was noticed in the year 2006.

In the North American continent, Mexico still offers sufficient room for possible enhanced trade in fishery products.

8.9 CONCLUSIONS

Frozen shrimp and fin fish are the largest exported items, the primary destinations being European Union, Japan and USA. The supreme status of Japan being the largest Indian seafood market has got largely eroded over the last decade.

It has also been observed that, India's export basket has been showing a dent towards low-value exports routed to South East Asian and Middle East countries at the expense of premium priced shrimp which used to find markets in Japan. However, European Union continues to be a preferred destination for the shrimp exports. The plummeting prices of shrimp, towards the later part of the decade, which resulted in narrowing of price differentials between domestic and international markets, also worked against shrimp exports.

The Sanitary and Phytosanitary Agreement along with agreement on Technical Barriers to Trade has been acting as strong non-tariff barriers to marine exports from developing countries. The increasing need for compliance to these measures hence has been highlighted in the study. India's export potential with respect to major fish importing countries has been quantified by carrying out a gravity model analysis. The results suggested the existence of unexplored export potential in many importing countries that has to be effectively tapped in the future. In essence, the study brought into light many important facts related to India's fish and fishery products exports in the last decade and gave insights on the various measures to be taken to enhance fisheries exports from the country.

CHAPTER IX

STARTEGIES AND POLICY RECOMMENDATIONS

A research study on 'Exploring Market Opportunities for Fisheries Sector in India' was undertaken on behalf of National Fisheries Development Board during the year 2008. This was carried out in different parts of the country, especially in major maritime states like Tamil Nadu, Andhra Pradesh, Kerala, Karnataka, Orissa, West Bengal, Maharashtra, Gujarat and some inland states like Assam, Tripura and Delhi.

The study was planned with the following objectives:

1. Project demand for and supply of fish and fish products in India.

2. Diagnose existing marketing structures, and assess their performance in marine and inland sectors.

3. Undertake successful case studies on innovative marketing arrangements in fisheries sector to assess their feasibility and benefits to fisher folks.

4. Assess the feasibility and sustainability of adapting innovative marketing models from dairy and poultry sectors and conceptualize a model terminal market / cold chain for fisheries sector through PPP mechanism

5. Analyze export opportunities and its implications on prices of fish and fish products.

The study was conducted with the uniform approach and methodology across locations and fish species with the help of structured questionnaires and focussed group discussion. The findings were also corroborated with the points emerged from the interaction with the state officials, traders, producers and consumers at various points of time and locations.

After careful understanding of the present system of fish marketing in the country, the following strategies and action plan are suggested for better and efficient marketing system for fishes in the country. These are categorized into the following broader heads:

1. Producers (Fishermen / Fish farmers)
2. Traders (Wholesalers / Retailers / Mobile vendors)
3. Consumers
4. Infrastructure
5. Institutions

9.1 PRODUCERS

9.1.1 **Producer companies, Fishermen societies, Self help groups should be promoted** in order to have better bargaining power in the auctioning or selling process to the next intermediary in the value chain in fish marketing. At present, fishers are not united as a

result of which, they remain exploited at the hands of auctioneers for disposal of their catch or harvest. Some states are doing exceeding well in this regard. For example, Kerala facilitates auction at the landing centres through Matsyafed, its cooperative federation. Similarly, a producer company has taken up the task of direct marketing of shrimps produced by their members for retailing domestically. This could prove to be a measure of achieving both equity among the fishers and ensuring nutritional security among consumers. NFDB could think of working with FISHCOPFED in identifying the potential areas where cooperative movement has been bearing fruits of prosperity among fishermen / aquaculturists in the country. Schemes could be devised for promoting them in consultation with FISHCOPFED.

9.1.2 **Training in Responsible Fisheries / Good Harvest and Management Practices must be provided to the fishermen / aquaculturists** with the help of resource personnels from the respective field, since the fish from the point of production to the consumption should be able to withstand the vagaries of present bottlenecks in the domestic marketing system of the country. The state fisheries departments could be funded for organizing such training programmes.

9.1.3 **Subsidies for ice and boxes could be provided to the fishermen, especially in the marine sector**. Since trawl boats need to be inside the sea for about 7-10 days at present as a result of decline in the catch from marine sector, the crew members are required to carry sufficiently large quantities of inputs such as ice and containers/boxes. The use of these critical inputs needs to be promoted by finding the state fisheries departments adequately. Efforts must be made to invite periodic proposals from every state in this regard.

9.1.4 **Subsidies for boats could be extended to those fishermen who are not covered under any other welfare programmes.** The life of a country craft may extend from 7-10 years depending on the usage by the fishermen. They require capital for either rebuilding the old ones or for buying a new one after it becomes impossible and unsafe to use the boats, for which they often fall into the clutches of private money lenders, who exploits the fishermen by charging high interest rates. Hence, while we continue to encourage fishermen to avail credit from institutional financial sources, we should also extend them subsidies for the purpose of buying new boats or rebuilding the old boats, as per the needs of fishermen. Care must be taken to cover those fishermen, who are not availing subsidies for similar purpose to ensure targeted service.

9.1.5 **The women members of the fishermen family should be encouraged to form Self Help Groups (SHGs) so that they could be financed with soft loans for establishing small-scale units of production and undertaking many vocational activities such as fish products** making (fish pickle, fish curries, fish cutlets, fish balls, fish wafers etc.), net mending, dry fish making, establishing a fish cafeteria etc. Many fisherwomen SHGs are active in southern parts of the country. These success

stories could be propagated in other states too with attractive schemes to bring them into economic prosperity and empowerment.

9.1.6 **Grading and brand creation should be promoted** among the fishers for achieving better price in the market**. Awareness programmes and skill building trainings / demonstration could be financed to the State departments or NGOs.**

9.2 TRADERS

9.2.1 Wholesalers are holding the fishes for maximum period in the supply chain of fishes in our country because of their physical and financial capacity. **Schemes should be developed to provide them the inputs required such as ice, packing materials and fuels, on which they spend maximum in the process.** A combination of subsidy and soft loan with 3-4% could be thought of, as it would encourage them to use these inputs for maintaining a better quality fishes so that it is beneficial for both sellers in getting maximum prices and buyers in getting good quality fishes. It must be ensured that subsidy on fuels could be applicable only to those who have their own vehicles in transporting the fishes from the landing centres / other production points.

9.2.2 **The traders, both wholesalers and retailers, should be provided with electronic balances** for better efficiency in the weighing process. Subsidy should be given for it.

9.2.3 The **retailers** do the maximum value addition in the selling process in the fisheries sector. They **need sufficient ice, boxes, cutting knifes and boards** etc. A combination of subsidy and soft loan must be given to these traders.

9.2.4 Sizeable quantity of fishes is traded by the small and petty traders and mobile vendors. They move around either on foot and by **vehicles such as bicycles and motor cycles. These inputs along with boxes should be provided to them through subsidy in a large scale**, as it is apprehended that they may lose their existence on account of emergence of big retail chains.

9.2.5 **Training in Good Hygienic Practices must be provided to traders** with the help of resource personnels of the respective field, as they are the ones who provide fishes to the ultimate consumers. Hence, it should be of good quality. The state fisheries departments / any private firms who are leaders in retailing the perishable food items in a hygienic manner could be funded for organizing such training programmes.

9.2.6 **Entrepreneurship Development Programmes need to be conducted by appropriate agencies** to be identified by NFDB in consultation with management experts with technical backstopping from fisheries technologists **for those interested unemployed youth in fish retailing** to offer quality, convenient and healthy fishery products to the domestic consumers.

9.2.7 The system of packing the fishes harvested from ponds and reservoirs is well established in states like Andhra Pradesh, which transports the fishes to far away places like north-eastern states. **Schemes should be devised for establishing packing units with all infrastructures** required such as ice plant, thermocol box manufacturing unit, loading platform, generator room etc. in places of major production or landing.

9.3 CONSUMERS

9.3.1 Consumer awareness should be created about the healthy aspects of fish and fishery products in order to boost fish consumption by large sections of the society. **Advertisements may be done through some professional agencies in print and electronic media about the nutritional qualities of fish.** This may be done on the lines of National Egg Coordination Council (NECC) and Bromark in which producers, processors, transporters / packers, govt. officials, private traders, etc. are to be made members.

9.3.2 Consumers generally feel averse to go to fish markets for purchase as a result of poor sanitary conditions of the market, even though they prefer to consume it. This would be reversed once the hygienic conditions improve there by investing on construction / modernization of the fish markets.

9.3.3 Indian fish consuming public have not been aware of various value added fishery products yet, in spite of substantial efforts in developing the technologies. Hence, **the awareness on the availability of these kinds of 'ready-to-cook' and 'ready-to-eat' fish items needs to created** among the both fish consuming public and likely-to-be fish consumers **by conducting regular 'fish mela' at various major and potential fish consumption cities in the country.** The recent event called 'MatsyaMahotsav' at Guwahati is an event to note in this direction.

9.3.4 The consumption habits and preferences of our fish consuming public is not uniform across regions / states. In general, **people surrounding coastal states prefer marine species, while those who are living interior consume freshwater species**, notwithstanding the fact that there are some states which are major maritime states but mostly comprise vegetarian population. Similarly, the fish eating population prefer the fish species as per their income status. High income group of consumers prefer species such as prawns, seer fish, pomfret, hilsa, etc. while the middle and low income group of consumers prefer sardine, mackerel, IMC, catfish, etc. Hence, any effort in promoting fish consumption should take into account the species preference of the fish consuming public and those species should be made available in sufficient quantities regularly.

9.4 INFRASTRUCTURE

9.4.1 Metropolitan cities especially Kolkata, Mumbai and Chennai are major fish consuming centres where consumers insist on hygienic conditions at fish markets. **The wholesale markets at the metro cities namely, Howrah fish market, Chatrapati Shivaji fish market and Saidapet fish market should be modernized through PPP mechanism**.

9.4.2 **Fish markets with capacity handle 2 tonnes of fish daily should be constructed at major cities of fish consuming states**, especially, Cochin, Mangalore, Bangalore, Bhubaneshwar, Coimbatore, Hyderabad, Guwahati, Veraval, Delhi, Chandigarh, Lucknow and Patna.

9.4.3 **Approach roads** from the main fish markets of the town / city nearby to landing centres / fishing villages / pond-river-reservoir sites **should be constructed**. Most of the landing centres lack motarable roads at present to transport the fish efficiently and quickly from the site to the market. There is virtually little importance given to such infrastructure creation by any agencies in our country. Fishermen also fail to prevail upon the development agencies or their representatives to get this infrastructure created. Hence, substantial spending could be made to lay roads in the major landing centres, fishing villages and some of the important reservoir sites at the earliest.

9.4.4 Other **related infrastructure such as cold storages at major collection points, ice factories, etc. should be constructed based on the requirement or shortage of each market**. The demand could be obtained from respective state governments. Lack of ice and increasing cost of ice was a major complaint at most fish markets. Large quantities of fish get spoilt due to lack of ice, leading to loss in income of fishermen. Similarly presence of cold storages at major collection points can protect the fishermen from the economic effects of fluctuating fish catches. In the season of glut, the fish can be stored for marketing at lean seasons. This is especially critical at the monsoon trawl ban periods when fishermen are out of work and have no means of income.

9.4.5 **Diesel outlets exclusively for the use of marine fishermen could be created at all the major fish landing centres and fishing harbours, wherever it is not available at present. Efforts should be continued to provide diesel at the subsidized rates to the fishermen.** This input has become a critical one as the availability of this energy source would be decreasing in the years to come in our country, but at the same time, fishermen would be requiring more quantities of fuel as a result of longer stay inside the sea due to declining fish catch. Presently, fishermen face lot of problems in getting diesel at right time in sufficient quantities before embarking on a fishing trip. Many harbours and landing centres do not have diesel pumps operated by either fishermen association or state fisheries department or corporation. Hence, sufficient investment could go into creating such infrastructure so that marine fishing could sustain in spite of

the present stressful situations, since many fishermen have their livelihood dependent on it.

9.4.6 Private entrepreneurs could be encouraged in setting up modern retail outlets with enhanced share of subsidy from NFDB**. Subsidy component for starting modern retail outlets could be enhanced** to 75% up to a budget of Rs 5 lakh; beyond which, it could be 50%. Youth from fishermen family could be given preference.

9.4.7 **Drying yard should be constructed in major production centres** like Veraval, Mangalore and Chennai. This will ensure that good quality dry fish is made available to consumers with better shelf life as compared to fish dried under improper conditions (e.g. on the beach, etc.).

9.4.8 **Waste disposal systems should be established at all major fish markets of the country**. The lack of a waste disposal system has been a common drawback at all surveyed markets. A biogas plant for each market could be planned which would utilize the fish waste and produce biogas to be used in the market as well as fertilizer that could be sold for further use.

9.5 INSTITUTIONS

9.5.1 **Producer companies, Fishermen societies, Self Help Groups should be promoted** with the help of FISHCOPFED / NGOs / state governments and should be specifically trained for hygienic fish marketing. The entry of fishermen families/cooperatives into domestic fish marketing on an organized level will ensure higher remuneration for fishermen and reasonable prices for consumers.

9.5.2 The **women members of the fishermen family should be encouraged to form Self Help Groups (SHGs)** and be financed with soft loans for establishing small-scale units of value-added fish production. The additional income earned by women members will be critical during off-season and trawl ban periods.

9.5.3 The prevalence of variable prices at different markets is the main factors responsible for market imperfections in the Indian fish marketing system. This is mainly because of unsure and erratic supply, especially in marine sector and variable demand in our people's preference. This becomes handy for the middlemen to exploit the fishermen communities as they don't have the capacity to hold the produce as per market demand. To remove anomalies to a great extent, **a domestic market intelligence cell could be established in state headquarters** under the aegis of respective fisheries departments / fisheries development corporations to disseminate the daily or weekly prices of important fishes through media. They could also take up periodic market research to know the demand and supply pattern of some major fish species, specific to the states.

9.5.4 **Fish should be brought under APMC Act** so that the trader / commission agents pay the commission to the market committee.

9.5.5 **Auction process at landing centres could be regulated with the help of State Cooperative Federation** officials, as in the case of Kerala.

9.5.6 **Contract farming may be promoted in aquaculture** especially carp and shrimp farming, as it will reduce the risk of price fluctuation and ensure assured market for the producer as well as better quality product for the company.

9.5.7 **Fixing a 'Minimum Support Price' could be thought of for some high value fish species**, as in the case of agricultural commodities in order to support the fishermen / aquaculturists to remain in the activity, since they face the threat of shunting-out of the business due to various market fluctuations of both short-term and long-term periods.

9.5.8 **Efforts may be made to rope-in the big retail giants / MNCs in hygienic fish marketing** in urban and sub-urban areas of the Indian cities. Schemes may be appropriately devised to attract them into this business, keeping in mind at the same time the responsibility of sharing the benefits to the fishers in this process.

9.5.9 **Domestic quality standards could be established for major fish and fishery products, keeping in view of international trade requirements.** In due course of time, these standard practices for producing quality fish production, handling and processing would be widely spread in the country so that good quality fish products are available in the domestic market also.

Common Names of Some Important Freshwater Fish

Scientific Name	Common English Name	Oriya	Telugu	Malayalam	Tamil	Kannada
Catla catla	Catla	Bhakuda	Bocha	Katla/Karakatla	Japan kendai/Theppu meenu	Catla
Labeo rohita	Rohu	Rohi	Bocha gandumeenu	Rohu	Kannadi kendai	
Labeo calbasu	Kal basu	Kala baisi	Kaki bonda/Nala gandumeenu	Karuthaeen	Kakkameenu	
Cirrhinus mrigala	Mrigala	Mir kali	Mrigal/Arju	Mrigal	Mrigal/Pudu kendai	
Hypophthalmichthys	Silver carp	Silver carp				
Ctenopharyngodon	Grass carp	Grass carp			Pullu kendai	
Cyprinus carpio	Common carp	Bilati rohi/China rohi		Cypran		
Tor mussullah mahanadicus	Mahaseer	Mahanadi mahaseer		Katti	Masundi	
Tor khudree	Deccan/Black mahaseer		Arrayam/Iraham	Katta/Kuyil	Biriga/Pumeen	
Tor tor	Mahseer		Pedha polika	Mahseer/Meruval	Kooral/Ponmeen	
Labeo bata	Bata	Bata/Raj pohada			Kindameen/Kolarinjakendai	
Cirrhinus reba	Reba	Chhunchitha pohada				
Puntius sarana	Serana/Olive barb	Serena	Doodha paraga	Kuruchi/Kuruva	Pungella	
Puntius sophore	Punti/Barb	Kerandi	Budda	Undakanni	Salli/Sarmutti	
Esomus danricus	Minnows	Dandakiri	Astapakke	Meesa parava	Meesai paravai	

Rasbora daniconius	Minnows/Blackline rasbora	Dandakiri	Jobidayee	Thuppal kudiyan	Ovaree kendai	
Puntius ticto	Punti/Barb	Kerandi	Parigi	Paral/Kadungali	Pulli kendai/Vennatti	
Amblypharyngodon mola	Mola/minnows	Mahurala				
Salmostoma bacaila	Minnows	Jarali				
Chela cachius	-	Baunsa patia				
Ailia coila	Minnows	Baunsa patia				
Osteobrarma vigorsii	-	Chalata				
Clarias batrachus	Magur	Magur	Marpoo	Eri/Mushi	Karupputheli	
Heteropneustes fossilis	Singhi/Stinging cat fish	Singi	Mapujella/Ingilayee	Kaari/Theili	Theilimeen	
Wallago attu	Freshwater shark	Balia	Athiyala	Vaala	Valai	
Aorichthys seenghala	Giant silver cat fish	Singada/Adi	Nare-jellah	Karatta	Pona-keluthi	
Arius aor		Adi				
Mystus gulio	Longwhiskered catfish/ Aquarium catfish	Kantia		Kadal keluthi	Nai-kelithi	
Pangasius Pangasius	Pungash catfish	Jalanga	Banka jella/Choluva jella		Aie	
Bagarius bagarius	Gangetic goonch	Salu				
Eutropiichthys vacha	Vacha	Bacha/Bachua				
Ompok bimaculatus	Indian butter catfish	Pabda	Duka damu	Thonnan vaala	Chaithavelai/Silaivalai	
Ompok pabda	Pabda	Pabda				
Goniolosa manmina	River gizzard	Maakendi				

	fish					
Gudusia chapra	River shad	Gudua				
Ambassis nama	Minnows/Glass fish	Guachupi		Arinjil/Nandan		
Ambassis ranga	Minnows/Glass fish	Phulguni		Arinjil/Nandan		
Anabas testudineus	Climbing perch	Kau	Kavaiyan	Karooppu	Panaiyeri-kendai	
Nandus nandus	Perch	Bhudasi	Septi	Muthukki		
Glossogobius giuris	Gobbies	Baligirida	Isakee doondoo	Poolaan	Uluvai/Nullatan	
Channa marulius	Giant spotted murrel	Sala	Poola malle, Poomeenu	Bhral/Varaal	Puveral	
Channa striatus	Stripped murrel	Seula	Korra matta	Pulli varal	Karuppu veral	
Channa gachua	Murrel/Snakehead	Chenga				
Channa punctatus	Murrel/Snakehead	Gadisa	Kurra meenu	Pulli viral/Araccan	Korava/Koravai	
Channa orientalis	Asiatic snakehead		Malamatta gudisa	Vattudi/Vatton	Parakoravai	
Notopterus chitala	Feather back(Hump back)	Chithala				
Notopterus	Feather back	Fali	Ulakathatta	Vaala	Chinna vazhai	
Xenontodon cancila	Freshwater gar fish	Mithapani gania		Kolaan	Kokkumeen	
Hemiramphus gaimardi	Half beak	Ekadanti gania			Mural	
Hyporhamphus limbatus	Garfish half beak	Saragara			Mural	
Mastacembelus armatus	Tire-track spinyeel	Bamitodi	Mudibommidai	Pana aarakan	Araa/Aral	
Mastacembelus pancalus	Stripped spinyeel	Todi				

Macrognathus aral	Lesser spinyeel	Todi		Aaral	Mona-arel	
Rhinomugil corsula	Freshwater mullet	Endula		Thirutha	Mizhugu meen	
Oreochromis mosambicus	Tilapia	Tilapia		Tilapia	Jelebi meen/Tilapia	
Clarias gariepinus	Thai magur	African magur/Thai magur		African mushi		
Osphronemus goramy	Giant gouramy		Gourami	Gourami	Sankara	

Common Names of Some Important Brackishwater Fish

Scientific Name	Common English Name	Oriya	Telugu	Malayalam	Tamil
Elops machnata	Lady fish	Naham	Jinnagow	Vallipoomeen	Manna
Megalops cyprinoides	Oxeye tarpon	Paniakhia	Kundinga	Palaankanni	Moran-kendai
Anguilla bengalensis	Longfined eel	Thumbi	Malamgulu/Malugu	Malanjil/Vilangu	Porivelangu/Seram pambu
Muraenesox cinereus	Doggertoothed pikelconger	Danti			Kadal vilangu
Hilsa(tenualosa) ilisha	Indian shad	Ilisha	Palasa	Hilsa/Paluva	Ullam
Hilsa kelee	Kelee shad		Kelee	Vattakanni	Kolimeen/Soodai
Anodontostoma chacunda	Gizzard shad	Babana balingi	Kome	Noona	Kullapoy-kendai
Chanos chanos	Milkfish	Sebakhainga	Pallabontha		
Mystus gulio	Longwhiskered catfish	Kantia			
Osteogeniosus militaris	Soldier catfish	Sunga			
Arius caelatus	Spotted catfish	Singada			
Plotosus canius	Canine catfish	Kaunda			
P.lineastus	Canine catfish	Kanda			
Hyporhmphus limbatus	Garfish/half beak	Saragara			
Strongylura strongylura	Needle fish	Gania			
Xenentodon cancilla	Needle fish	Saragara			
Platy cephalus indicus	Bartail Hathpd	Takara			
Lates calcarifer	Seabass/cock-up	Vecti	Dadhara		
Ambasis gymnocephalus	Glossy perchlet	Chandi			
A.commersoni	Glossy perchlet	Phulguna			
Pseudambassis ranga	Glossyfish	Chandi/phulguna			
Terapon jarbua	Terapon(perch)	Gaanna	Baikeeli/Ganam		

T.putta	Terapon(perch)	Gaanna	Baikeeli/Ganam		
Sillago sihama	Silver sillgo	Jhudanga/Guji kadama	Arriti-ki		
Carangoides praeustus	Brownbacked trevally	Tirana			
Caranx carangus	Blacktailed trevally		Jarra-dendree parah		
Lutjanus argentimaculatus	Snapper	Angarua	Kaliviyya		
L.johni	Snapper	Kokaraba	Kaliviyya/Rangu		
Datnioides qudrifasciatus	Four barred tiger fish	Veranda			
Gerreomorpha setifer	Silverbiddy	Jagili			
Gerres filamentosus	Silverbiddy	Jagili			
G.oyen	Silverbiddy	Jagili			
Crenidens crenidens	Karanteen(perch)	Haribolia khuranta			
Rhabdosargus sarba	Karanteen(perch)	Dhala khuranta			
Dendrophysa russelli	Croaker	Kania			
Johnius macropterus	Croaker	Kania			
Mugil cephalus	Greymullet/flathead mullet	Khainga	Kathi-parenga		
Liza macrolepis	Largescale mullet	Mengi	Dingliah/Bonthaparigi		
L.parsia	Goldspot mullet	Parsi	Bonthalu		
L.subvirideis	Greenback mullet	Mengi	Bonthaparigi		
L.tade	Tade mullet	Tuadi	Bonthaparigi		
Valamugli cunnesius	Longarm mullet	Sorada			
V.speigleri	Speigler's mullet	Chanra			
V.seheli	Blue spot mullet	Mengi	Bonthaparigi		
Eleutheronema	Threadfin	Sahala	Boddumaga		

tetradctylum					
Mastacembalus armatus	Tire-track spinny eel	Bamigedi	Mudibommidai		
Cynoglossus lingua	Long tongue sole	Dudhapatua			
Triacanthus biaculeatus	Tripod fish	Sukura			
Scatophagus argus	Spotted scat	Pita chandi			

Common Names of Some Important Marine Fish

Scientfic Name	Common English Name	Oriya	Telugu
Pampus argenteus	Silver pomfret	Chandi/phirki	Chanduva
Pampus chinensis	Chinese silver pomfret	Dhala Bahal	Chanduva
Parastromateus	Black Poomfret	Ghusura Bahal	Chanduva
Rastrelliger kanagurta	Mackrel	Marua/kanagurta	Kamangadachalu
Scomberomorus commerson	Seer fish	Champa	Ayaokaro
Sardinella longiceps	Oil sardine	Kokali	Noona-kavallu
Sardinella fimbriata	Lesser sardine	Kaula	
Strongylura strongylura	Spottail needlefish	Gania/Gangatuda	Wadlah muku
Terapon jarbua	Terapon	Gahan	
Terapon puta	Terapon	Gahan	Keelputa
Drepane punctata	Moonfish	Ghichandi	Thotha
Trichiurus haumela	Ribbon Fish	Rupapatia	Kothisavallu
Trichiurus savala	Ribbon fish	Rupapatia	Kothisavallu
T.lepturus	Ribbon fish	Rupapatia	Kothisavallu
Elops machnata	Lady fish	Naham	Jallagu
Nematalosa nasus	Gizard shad	Balangi	Balangi/Balango/Kome
Anadontostoma chacunda	Gizard shad	Babana balangi	Muddeera/Kome

Anchovilla indica	Anchovy		
Himantura bleekeri	Whitetail stingray	Sankucha	
Rhinobatos granulatus	Granulated gutterfish	Sankucha	
Scoliodon sorrakowah	Dogfish	Magar	
Eusphyra blochii	Winghead hammer head	Hatudi munda magar	Kama-sorrah, sappa-sorrah
Pristis microdon	Largetooth sawfish	Karatanaki magar	
Dasyatis marginatus	Blackedged stingray	Sankucha	
Himantura imbricatus	Scaly stingray	Kati sankucha	
Himantura uarnak	Homeycomb stingray	Baghua Sankucha	Pulli-thirukkai
Aetobatus narinari	Spotted eagle ray	Sankucha	Eel-tenkee
Stolephorus bagenensis	Spined anchovy	Tampudi/Fasi	
Setipina phasa	Hairfin anchovy	Tampudi/Phasi	
S.commersonii	Anchovy	Chauli patua	
S.indius	Indian anchory	Balikokali	
Thryssa hamiltonii	Anchovy	Kancha patua	Engallu
T.Kammalensis	Anchovy	Kanapatua	Engallu
T.mystax	Anchovy	Phasa	Nedum-poruva/Engallu

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