# IMPACT OF INTERNATIONAL AGREEMENTS ON MARINE FISHERY SECTOR IN KERALA

*Thesis submitted to University of Calicut*
*for the award of the degree of*
DOCTOR OF PHILOSOPHY IN ECONOMICS

By

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# Certificate

This is to certify that the thesis entitled "**IMPACT OF INTERNATIONAL AGREEMENTS ON MARINE FISHERY SECTOR IN KERALA"** being submitted byMs.**Sajitha M** for the award of the degree of **Doctor of Philosophy**, toDepartment of Economics, University of Calicut, Dr.JohnMatthai CentreAranattukara, is a record of bonafide research work carried out by her under mysupervision. The contents of this thesis, in full or in part, have not been submittedand will not be submitted to any other institute or University for the award of anydegree or diploma.

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# Declaration

I **Sajitha M,** hereby declare that this Ph. D thesis entitled,**"IMPACT OF INTERNATIONAL AGREEMENTS ON MARINE FISHERY SECTOR IN KERALA"**, is a bonafide record of research work done by me for the fulfillment of theaward of the degree of Doctor of Philosophy, under the guidance andsupervision of **Dr. K XJoseph**, Professor, Department ofEconomics, University of Calicut. I also declare that this thesis has not been submitted earlier for theaward of any degree, diploma, fellowship or any other similar title.

Place: Thrissur
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SAJITHA M

*Dedicated*

*to*

*My Parents*

# Acknowledgement

*As my research draws to its end, I would like to express my sincere thanks toall those who have supported me in this endeavour.*

*I shall express my deepgratitude and sincere thanks to my research guide, Dr K X Joseph, Professor, Dept of Economics, University of Calicut, Dr John Matthai Centre, Thrissur, for his guidance, encouragementand support.I would also like to thank all the teaching faculties, of Dr. John matthai Centre Dr. Shyjan D, Dr. K P Mani , Dr.K.V.Ramachandran , and Dr.Zabeena Hameed P for their comments and encouragement.*

*Express my sincere thanks to the staff of Departments of Marine Products ExportsDevelopment Authority, Kochi who have offered support by furnishingall the needful information. I shall also thank the officials of CMFRI and Fisheries College, panangad for giving me the required data. Express my thanks to librarian and staff of Centre for Development studies, Thiruavananthapuram and Dept of Applied Economics, CUSAT.*

*I would like to extend my gratitude to Dr. Parvathy.P faculty, Government Victoria College, Palakkad, for her immense and timely help. I am thankful to my all friends and fellow scholars who helped me in the Research work, especially Saradachechi, flowarin, Shamna, Indira,Smitha, Vineetha, Rajeesh,Unni,Ayana and shiji, office staff of Dr. John Matthai Centre, and Smt. Shreeja (librarian). I take this opportunity to thank my friends angel and vijeytha for their love and enormous support. Special thanks to Dinops Jose, (dj dot net café) for his kind help in editing and neatcompiling of the thesis.*

*My gratitude for my parents can never be expressed in mere words. I am highly obliged to their deep love and tolerance. I also thank my sisters-Jalaja, Aswathi and my brother Biju for their love and prayers. Now I wish to express my heartfelt gratitude to my husband Sharon for hisencouragement and to my sweet baby Pavani for her patience and naughtiness. Take this opportunity to thank all my relatives, colleagues and well-wishers for offering support during the course of my research.*

***Sajitha. M***

# CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# CHAPTER-1
# INTRODUCTION

## 1.1 Introduction

The fishery is the industry or occupation devoted to the catching, processing, or selling of fish, shellfish, or other aquatic animals. According to the FAO, a fishery is typically defined in terms of the "people involved, species or type of fish, area of water or seabed, method of fishing, class of boats, purpose of the activities or a combination of the foregoing features". Fisheries contribute to the economy through employment creation, income generation and foreign exchange earnings and millions of people depends this sector for their livelihood. Seafood has been a traded commodity for thousands of years. Nowadays, the fish and fisheries market is one of the world's fastest growing international commodity markets. Its total world trade value exceeds USD 217 billion. Currently, more than 200 countries supply the global market with more than 800 commercially relevant species of fish. The product variety ranges from canned tuna to boneless salmon fillet, salted herring, dried cod, frozen fish fingers, smoked mackerel and live lobsters, to oysters in sauce or sardines for processing into animal feed. Guaranteeing an adequate supply to this international market requires hundreds of thousands of fishing vessels and fish farms, as well as tens of thousands of fish processing workers, wholesalers and retailers in countries spread all over the world. Then the Fisheries sector also promotes other auxiliary industries such as net making, packaging material industries, boat building etc.

Developing countries are increasingly important suppliers of fisheries products. In many of the developing countries fish export is a significant source of foreign exchange earning that helps to stabilize macroeconomic indicators and provides nutrition and food security to the poor people of these countries. However, performance of fish export of these countries depend on, among other things, continued access to international markets. The WTO has various regulations with a great impact on trade in fisheries, even though none of the

existing agreements deal directly with fish trade. Though traditional barriers to trade such as tariffs and quantitative restrictions are reduced following the World Trade Organization (WTO) agreement, developing countries are concerned about regulatory barriers such as food safety regulations, quality and composition standards, and labeling requirements. Many consider these policies of the major fish importing countries as protectionist measures.

India is one of the major fish producing countries in the world with third position in fisheries and second in inland fish production. The fisheries sector assumes significance in the Indian economy in several respects. The most important amongst them is the providence of livelihood to many poor households especially located in the coastal areas. These households can generate income from the sector due to the fact that many varieties of marine fishes have been exported from the country. The demand for fish and fishery products are increasing both in domestic and export fronts. The globalization has dramatically increased the amount of fish traded internationally. Presently fisheries and aquaculture contribute 1 percent to the national GDP and 5.5percent to agriculture and allied activities (2015-16). The marine fisheries sector in the country contributes about 35 percent of the total fish production and is one of the major contributors to foreign exchange earnings through sea food export. It constitutes about 10.2 percent of the total agriculture products export. Over 55 varieties of marine products are exported to different countries in South East Asia, Europe China, Japan and USA. Though the share of agricultural export in total exports of India in recent years declined, but contribution of fishery sector in the agricultural exports markedly increased. India's marine export performance is also affected by WTO multilateral trade agreements and trade liberalization measures. The major WTO agreements include anti-dumping measures, subsidies and countervailing measures, and technical barriers to trade. Seafood safety issues, in contrast, will likely emerge in the context of sanitary and phytosanitary measures.

Kerala is an important maritime state in India, which contributes nearly 20-25 percent of the country's marine fish landings and 24 percent of the

state's export comes from this sector. It has a coast line of 590 km, which forms 10 percent of the country's coastline. Fisheries sector contribute 1 percent of the GSDP of the state. In Kerala, 71 percent total fish production coming from marine fish sector and 29 percent from inland sector. While marine fish production in Kerala tended to fluctuate the inland fish production showed a sign of improvement from 1999-2000.

The fish and fishery products are treated as industrial goods, and are not bound by the agricultural regulations. Therefore, a number of the provisions and rules relating to agricultural products are not applicable to fisheries products. The multilateral agreements on trade in goods relevant to fisheries are the agreements on non-tariff barriers, sanitary and phytosanitary measures, technical barriers to trade, import licensing procedures, subsidies and countervailing measures and agreement on safeguards. With increasing globalization and declining tariff rates, opportunities for export growth in developing countries like India have increased. The most relevant WTO agreements for fisheries trade are the application of sanitary and phytosanitary measures and technical barriers to trade. These food safety standards and non-tariff trade barriers are mainly implemented by the marine product importing countries like The EU, the US and Japan. Since these countries are the major export destination of Kerala's marine exports, any policy shocks from these countries have significant impact on Kerala's fisheries export. The bans were imposed by EU due to non-compliance of the safety regulation on Indian seafood caused severe injury to the fishery sector of Kerala, as Kerala being the hub of India's seafood export industry. This had affect livelihood of about 200,000 people related to fish harvesting, peeling, processing and marketing. Therefore, the international agreements and regulations are also affecting the socio-economic conditions of fish workers.

**1.2 Reviews of Literature**

Review of literature has been categorized into: -international agreement and trade of marine products, international agreement and fishery production and

market price and international agreement and socio-economic condition of fishermen

### 1.2.1 International Agreements and Trade of Marine Products

The scope for increasing exports of marine products from India is great. K.Chidambaram (1975) suggested the export potential can be exploited by generating adequate infrastructure, accelerating the programmes of production in the offshore and deep-sea fishing grounds, improving methods of processing and effective marketing in an organized and regulated manner. Diversification of products and markets can be effectively done by exporting sardines, deep-sea lopster, frozen fish, eel, tuna, pomfret, breams, laminated Bombay ducks etc to additional markets in Canada, Denmark, Sweden, the federal republic of Germany, Spain, East Europe and South-East Asia.

With the use of multiple double-log regression analysis, C.K.Jalajakshi and M.V.Srinivasa Gowda (1994) estimated the elasticities of demand for Indian shrimps in the importing country namely, Japan, UK and USA during the period 1966-1991. The demand for Indian shrimps is a function of price of Indian shrimps, per capita income in the importing country and total production of shrimps in India. A constant market share model by him shows that Indian shrimps are not competitive in the world market, since the competition effect is negative. It pays India to improve the quality of shrimp processing and harness the economies of scale in shrimp culture so that Indian shrimps become more competitive in the world markets.

DipakarNaik (1994) attempted to examine the existing marketing structure, market price and its impact on fish catch in Orissa, seasonality in the marine fish prices and its fluctuation and the scope for export in the context of liberalization in the world trade. With the use of Nerlovian price expectation model he said that a remunerative price needs to be ensured to the fishermen for augmenting the level of the catch. The study established that with a 1 percent increase in the whole sale price of marine fish, the marine catch can be

increased to the export of 2.11 percent in the short run and 1.18 percent in the long run in the domestic market. Since the export price is more than the domestic market price, the liberalization of the world trade will increase the level of production to a significant extent.

Shyam S. Salim, Sathiadhas, Rand Geetha, R critically reviewed the impact of ASEAN Agreement on the different stakeholders viz., fishermen, consumers, exporters, processors, market functionaries and the resources. According to them, the Geographical similarities between ASEAN and Kerala marineecosystem lead to negative impact. The major countries like Thailand and Vietnam may dump 177 species of fish in the Indian market, which will threaten livelihood security offisherman. If the FTA allows Thai fishing vessels access the Indian territorial waters, it leads to over-fishing and the damage to fish stocks. The present system of fish marketing is highly disorganized where the price spread accounts to more than 40 per cent. Fresh catch of fishes may be replaced by refrigerated cheap imports. It will be also difficult for the traditional sector to coup up with the factory fishing of some of the ASEAN countries like Thailand and Vietnam.

Otsuki*et al.* (2001) investigated the effect of aflatoxin standards in the EU on Africa-EU trade flows and health risks. They examined three regulatory scenarios: standards set at pre-EU harmonized levels, the standard set by Codex Alimentarius Commission (CAC), and the new harmonized EU standards. Using a gravity model, which includes aflatoxin standards as one of the explanatory variables, they predicted the effect of changes in the aflatoxin standard on trade flows between Africa and Europe. They conclude that compared to Codex standards, the implementation of the new harmonized aflatoxin standard in the EU would reduce health risk by approximately 1.4 deaths per billion a year, but would simultaneously decrease African exports to the EU by about US $670 million.

According to Kazuaki Miyagishima (2002), the beneficiaries of the SPS Agreement are not limited to trade partners enjoying the elimination of non-

scientific, unjustified border barriers. The products from developing countries conforming to international standards have an increased chance to find their access to the international market, thanks to the SPS Agreement. The ultimate beneficiary of the Agreement should be the consumer of all countries, importing or exporting alike, who should see his health better protected through a wider choice of food commodities available in the market place and through the improved compliance of health-related food standards based on sound science and evidence.

Md. ZahangirAlam (2002) examined the Impact of Bangladesh Export by Ban Imposed by EC due to noncompliance of the HACCP regulation and hygiene regulation and Its Cause. EU imposed ban considering the objections like, use of unskilled workers with unhygienic habits, Unhygienic transportation and preservation, Untimely procurement of shrimp and Corruption practices for making excessive profit. Eventually, government created a momentum for quick implementation of HACCP in fisheries sector. Moreover, government has undertaken the various programs to assure the quality and safety of the fishery products. The present seafood quality and safety program is based on good manufacturing practices (GMP), Sanitation Standard Operating Procedures (SSOP) and HACCP principles.

Sun and Caswell (2002) revealed that the level of U.S. seafood exports has been sustained despite the U.S. HACCP regulation for fish and fishery products. This means that increased seafood regulation need not have a significant detrimental effect on international seafood trade at the current levels of production. Although higher safety standards raise seafood production costs, the increasing worldwide demand for high-quality seafood has offset these cost increases.

Unnevehr (2003) documents four cases from developing countries whose access to export markets was denied due to sanitary or phytosanitary issues, resulting in substantial costs in terms of lost sales, market share, and

investments required to re-enter export trade. They included fish from Kenya, raspberries from Guatemala, shrimp from Bangladesh and horticulture crops from Guatemala, Jamaica and Mali.

J.S.Wilson and Otsuki.T (2003) emphasize that available evidence indicates that there can be significant cost of food safety regulations especially in context of developing countries. Developing countries trying to penetrate developed country markets may incur significant export losses on account of increasingly restrictive sanitary and phytosanitary (SPS) measures limiting market access. Resulting scenario may be detrimental for low and middle income countries with high share of food export in total trade.

Athukoralu.P and P. Jayasurya (2003) stated that SPS standards can become an impediment for trade for two reasons: firstly, importing countries may go for SPS measures that impose a cost or other disadvantage on foreign competitors to provide protection for domestic producers. Secondly, on account of asymmetry in compliance costs these measures can impede imports even when comparable SPS measures are applied both in imported and domestic products. It is further emphasized by the authors that for agricultural products and especially processed food non-tariff impediments to international trade mainly come from SPS regulations.

Export earnings are given considerable economic importance under the current WTO regime. The share of the fishery industry in total country's export and agricultural export earnings showed a steady increasing and decreasing trend over a period of time. (S.S.Guledgudda, *et al*, 2003)

Anjani Kumar (2004) examined that the export of fish and fish products have performed well and liberalization policies to seem to have augmented their growth. Various sanitary and phytosanitary measures should be taken up vigorously to ensure international hygiene standards for Indian fisheries products. He also found that the impressive growth performance of India in

exports of fisheries may be limited by the stringent international regulations being pursued by importing countries.

S.S.Shyam, C.Sekhar, K.Uma and S.R Rajesh (2004) studied the export performance and potential of Indian marine products under the trade liberalization and explore the possible impacts of WTO Agreements on the Indian fisheries sector. The post liberalization period generated a higher degree of instability for frozen shrimp, frozen lobster and others where as a lesser degree of instability was noticed for frozen squid, frozen cuttlefish and fresh and frozen fish. They also found that the rejection from EU on account of the microbial, antibiotic and bacterial residues, quality issues and higher domestic demand threatens the competitiveness of squid, cuttlefish and pomfrets.

Salagrama.V(2004) pointed out the lifting of tariffs and quantitative restrictions in the fisheries sector during 1990's (trade liberalization) have so far not brought any perceptible benefits or ill effects, but apprehensions about their possible negative effect are widespread. The possible import of foreign fish and fishing systems remains a threat, while export opportunities remain unutilized because of poor catches and systems of organization.

Cathy.A.Roheim (2004) has examined the impact of trade liberalization on the sustainability of international market and fish resources with a particular focus on developing countries. According to him, the impacts of trade liberalization on the sustainability of the markets for the fish products may be negative. The open access leading to the over fishing, increased trade in aqua cultured products can leads to environmental degradation, the fishing subsidies caused the trade distortion and the international trade in fish and fishery products also has an impact on food security.

AparnaSawhney (2005) has stated the India's experience under the quality measures in food trade. The food safety and quality standards in developed countries have posed a significant challenge to the Indian exporters, with consignments having been rejected or outright bans (based on sanitary

measures) imposed. She suggested that there is a need to build a strong base in domestic food health and safety regulations and certification system comparable to international standards.

S.Henson, MdSaquib and D.Rajasenan (2005) found that the food safety and quality requirements continually evolve overtime and that the most successful exporters are those that can meet these requirements in a manner that acts to their competitive advantage. Applying strict food safety controls where necessary to prevent ‘rouge ‘exporters from free riding.

T.Ravisankar, C.Sarada and M.Krishnan (2005) advocated the diversification in fish production as well as exports for assured income to the farmers. Diversification of fish culture helps in avoiding disease incidences and aids in better utilization of resources. Diversification in fish production can become effective only when supporting facilities like hatcheries, feed mills, disease management techniques and packaging techniques for these species were established.

Nandana Baruah (2005) attempted to understand India’s behavior with the anti-dumping measure. She tried to identify the factors that influenced the final decision of the authority to impose anti-dumping duty. Neither imports nor the performances of the domestic industry have any significant bearing on the final decision. A less concentrated domestic industry stands higher chances of getting a favourable verdict. This shows sympathy on the part of the authority towards the domestic industry, which may be a group of small producers and are more vulnerable to the possible injury.

Most of the shrimp producing countries have been moving towards specialization of shrimp production for export because of the high price that shrimp asserts in the international market. But the diversification in fish production as well as export assured income to the farmers and it also helps in avoiding disease incidences and in better utilization of resources (Ravisankar*et al*, 2005).

Jeffrey Franklin and Kishore.G.Kulkarni (2005) analyzed the effect of US Anti-dumping investigations of shrimp imports from Asia on consumer welfare. They argued that high tariffs placed on shrimp imports would be welfare reducing for the welfare reducing. They suggested that, the US should allow for the continuation of shrimp imports without the high tariffs proposed.

ICTSD policy discussion paper (2006) has emphasized the substantial and growing influence of international trade on sustainable development outcomes in the fisheries sector at the global, national and local levels. This paper has argued that regardless of the policy vantage point from which stakeholders operate, the economic and environmental sustainability of the fisheries sector relies on greater efforts by all actors to grapple with the diversity of factors that affect global fishery production, trade and conservation. This paper suggested further research in these areas that will bolster the prospects for meaningful policy dialogue in the fisheries sector.

S.Jayasurya, D.MacLaren and R.Mehta (2006) has illustrated the difficulties that processed food exporters in developing countries are facing with the variety of food safety standards being set by governments in food importing developed countries. On the basis of sample survey of firms engaged in exporting processed food products, the characteristics of the firms and the nature and consequences of the difficulties faced were identified. In particular, it was found using a constructed index of the food safety standards that these firms face, together with a gravity model of exports from India to seven developed country markets, that there were substantial potential losses to India from the strictness of the standards set and from the variation in these standards amongst the seven export destinations. In the long run the trend towards higher food safety standards will be beneficial only if mechanisms are developed to ensure that international trade in processed food is regulated appropriately to meet genuine food safety concerns but is not constrained on spurious grounds.

S. Ayyappan and A.D. Diwan (2007) bring out the progressive outlook of Indian fisheries. He said that, 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. With high growth rates, the different facets of marine fisheries, coastal aquaculture, Mari culture inland fisheries, freshwater aquaculture and cold water fisheries are increasingly being diversified, contributing to food, health, economy, exports, employment and tourism of the country. He gave importance to Code of Conduct for Responsible Fisheries to ensuring the effective conservation, management and development of living aquatic resources with due respect for the ecosystem and biodiversity.

P Shinoj et al (2009) analyzed the changing pattern/ composition and causes of exports of India's fishery products. The study observed that 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. There have been innumerable instances of Indian fishery consignments being rejected by USA, EU and Japan. Therefore, an increasing need for compliance to SPS measures has been realized for which conscious efforts and investment in raising our compliance standards are inevitable.

P.Shinoj, B.Ganesh Kumar, P.K.Joshi and K.K Datt (2009) observed that India's export basket has got diversified and is 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. They also observed the SPS agreement along with agreement on TBT has been acting as strong non-tariff barriers to marine exports from developing countries. An increasing need for which conscious efforts and investment in raising our compliance standards are inevitable.

Parthapratim Pal and Mitaili Dasgupth (2009) did the preliminary evolution of the analysis of India's commitment schedule as well as looking at the production structure of the ASEAN countries, it can be said that the

agriculture sector in India, particularly plantation sector will be negatively affected. Marine products, textiles and garments and the auto components industry are also face increased completion due to AIFTA. The total welfare gain from such a trade agreement depends on the government's ability to adopt policies for alleviating the burden of falling on those adversely affected.

Nikita Gopal et al (2009) analyzed the export performance and has studied the revealed comparative advantage of finfish export from India for the period 2001 to 2005. The finfish exports from India have not revealed any comparative advantage among the total marine products export in the period of study. The paper has suggested reviewing of the policy of finfish export, with a shift in emphasis to export of only high-value finfish and value added low-value finfish.

A. Ramachandran (2010) discussed the various Ecolabeling and Certification Systems developed world over to regulate and introduce Fair Trade in Ornamental Fish Industry. The study revealed serious inadequacies in a number of ecolabels and cast doubt on their overall contribution to effective fisheries management and sustainability. He also discussed the initiative taken in India to develop guidelines for Green Certification of Fresh water ornamental fishes. According to him, judicious use of the "5 Ms" (Men, Money, Materials, and Machines & Markets) within the internal environment will help to improve the quality of ornamental fishes and for cutting down cost.

Rajesh Gangakhedkar (2010) has stated about the sanitary and phytosanitary agreement and suggested some measures for further strengthening the SPS agreement. According to him, the various provisions of SPS agreements have much room for ambiguity consequently leading to disputes among the members. The inclusion of observers from poorest regions of the world such as sub-Saharan Africa in the SPS committee needs to be praised. These are the countries which have suffered the most because of inequitable nature of WTO agreements. The SPS agreement should not operate

as a non-tariff barrier (TBT). If SPS provisions are perpetually misused, it would be a further death blow to the liberalized international trade.

R.Ravanan and K Muthalagu (2010) pointed out that since the liberalization of economic policies in India, several policy measures have been taken with regard to regulation and control of sea food export industries. Measure needed at present is that strengthening infrastructure assumes greater importance both at fish landing centers and fish processing industries which would further increase the demand for Indian sea food in the international market in future.

K.Srinivasa Rao and P.Malyadri (2010) critically analyzed the India-ASEAN Free Trade Agreement. Indian exporters stand to gain additional market access in various sectors as a result of tariff liberalization by ASEAN. It gives opportunity to upgrade its product to compete with others. The major steps towards economic integration within ASEAN, it is planned to open up all sectors for ASEAN investors with the exception of an inclusion list for the ASEAN 6 by 2010 and by 2015 for the CLMV countries (Cambodia, Lao PDR, Myanmar and Vietnam). It is believed that a free trade agreement will adversely affect the unorganized sectors especially agriculture. Domestic markets. So the government of India must meet these challenges by providing all necessary and reasonable support. India's FTA with ASEAN is in the right direction and it will produce satisfactory results but it has many pitfalls and hence to be handled with care.

Jayasekhar.S and C. Nalinkumar (2010) found that food safety regulations imposed by developing countries is trade restrictive for the Indian sea food sector. But at disaggregated commodity level, the stringent regulation can be trade augmenting as well. Thus the analysis exhibits the dual nature of the stringent quality measures at the disaggregate level of seafood items.

Dhananjay Kumar Yadav, M.Rajakumar and triveniKasukurthi (2010) were studied the marketing profile of selected marine fishes at the fish landing

centres of Thoothukudi, Thamilnadu. Two fish marketing channels were identified. They were Fishermen-Auctioneer-Retailer-consumer (channel I), Fishermen-Auctioneer-Vendor-consumer (channel II). High marketing cost on the part of intermediaries considerably decreased the share of fishermen in consumer rupee. The marketing efficiency in channel II was comparatively higher for all the selected marine fishes as per Shepherd's and Acharya and Agrawal's methods. By applying Garret technique while ranking the constraints, high degree of dependency on middlemen for financial support followed by high marketing cost and low landing price were found to be the main constraints of fishermen.

Joseph Itzkovich (2012) has noted the demand and quality requirements of ornamental fish in EU market. He found that the demand for ornamental fish is quite steady throughout the year except for a drastic slowdown in July-August due to vacations. The most popular species of ornamental fish imported in to EU are gold fish and live bearers like guppy, molly, swordtail and platy. The major suppliers of ornamental fish for the EU are South East Asia, South America and Israel and currently India plays a very minor role in supplying fish to the EU. In recent years there is increased awareness about fish disease and quality.

Alex Ploeg (2012) analyzed the global ornamental fish trade regulations and import requirements of major markets. Most countries have legislation on a national level. Some countries have lists of species allowed for export (Brazil, Peru, Colombia) most species have protected species lists, and some have both. Every 2-3 year the EU publishes a new regulation summarizing the situation at that moment. Indian industry is facing a multitude of legislation, on a local level, on a national level and on an international level. The support of MPEDA to develop the aquarium industry is strong, especially to create jobs in under privileged areas.

P.N.Vinod (2012) analyzed the importance of organic fish farming in his article "India forays in to international organic shrimp market". The ecological

concerns of organic fish farming ensure environmental sustainability of the practices as well as the quality of the products. The export of farmed certified organic shrimp from India commenced during this year. The MPEDA has been striving for the production and export of organic black tiger shrimp and fresh water prawn (scampi) under the 'India Organic Agriculture Project (IOAP), since 2007-08. He also pointed out the principles and standards of organic aquaculture.

Joice.V.Thomas, Deepa.A.V and Afsal.V.V (2012) stated the performance of NETFISH (Network for Fish Quality Management and Sustainable Fishing) in fisheries extension services. This extension agency providing technical assistance, public outreach, training & education and also provide an important link between research results and the end users of research findings. Along with the awareness of fisher folk on quality and sustainable fishing, infrastructure development in the fishing sector particularly in the primary sector like fishing harbors and landing centers is needed to bring rapid and noticeable improvements.

T.N.Venugopalan (2012) has analyzed the private sector initiatives for sustainable fisheries. According to him the private initiatives like ecolabelling and certification can play a crucial role on a sustainable fishery management and the relevance of certification will increase in coming days when more and more consumer group and NGO's will demand certified sea food. In recent years, private labels and related certifications have great importance in international trade of fish and fishery products. He pointed out the need for private initiatives in the Indian context too with the involvement of private sector and unit society groups which must be supported by different ministries and departments.

### 1.2.2 International Agreements and Fishery Production and Market Prices

The studies on the relation between international agreements and fishery production are comparatively less.

J. E Houston, A.E.Nieto, J.E Epperson, Ho-shuili and G.W Lewis (1989) identified the factors affecting local prices of shrimp landings. The price behaviour of shrimp market was found to be significantly affected by the composition of catch in each area and in aggregate, as well as by net imports. Increasing real disposable income increased prices for all species in all markets over the 1958-1984 time periods

DipakarNaik (1994) attempted to examine the existing marketing structure, market price and its impact on fish catch in Orissa, seasonality in the marine fish prices and its fluctuation and the scope for export of liberalization of world trade. The fisherman's net share gets reduced with the increased in the member of middleman in the market channel. A remunerative price needs to the catch. This study established that with a 1%increase in the wholesale price of marine fish, the marine catch can be increased to the extent of 2.11%in the short run and 1.18%in the long run in the domestic market. Since the export price is more than the domestic market price, the liberalization of world trade will increase the land of production to a significant extent.

A Kumar et al (2003) observed further enhancement of marine fish production requires diversification of fishing activities not only in the off-shore oceanic regime but also in deep sea fishing which is capital intensive and risk prone. Specialized and hygienic processing and adoption of HACCP in processing will help to fetch better prices for alternate species comparable to that of shrimp in the international markets

Maskas.K.E, T.Otsuki and J.S.Wilson (2004) opined that standards and technical regulations can raise start-up as well as production costs of the firms in a substantive manner. Findings from their study indicate that standards increase short run production costs by requiring additional inputs of labour and capital. One percent increase in investment to meet compliance costs in importing countries leads to a statistically significant increase of 0.6 to 0.13 percent in variable production costs. Although the fiscal cost of compliances was found to be non-trivial. While the relative import on costs of compliance

was relatively small, these costs can be decisive factors driving export success for companies.

P.R.Gardiner and K.KuperanViswanathan(2004) discussed the ecolabelling in fisheries management in developing countries. The new approaches to improving the environmental sustainability of fisheries have included the certification of fisheries harvested by sustainable means, and the ecolabelling of fish and seafood products from certified fisheries. They argued that to avoid the controversy that accompanies ecolabelling, the focus should be on revision of national fisheries management and not on an *ad hoc* approach to individual fisheries. Governments should be encouraged to enter into broad coalitions to improve aspects of fisheries management, and to enhance efforts to develop locally relevant indicator systems for fisheries and for the ecosystem approach. Governments of developing countries must also first address the difficult questions of access to and tenure arrangements for their fisheries, as these are essential prerequisites for successful certification and product labeling.

The fishermen depend up on middlemen for marketing of their catch. I.e., the existing market structure does not favour the poor fishermen and thus both fishermen and consumer have not benefited. It necessitates the market integration where prices are determined interdependently and also the price changes in one market will be fully transmitted to the other markets. Markets that are not integrated may convey inaccurate price information that might distort marketing decisions and contribute to inefficient product movements. With the OLS regression DebduttBehura and DurgaCharan Pradhan (1998) found that the marine fish market in the Orissa state are not integrated. The poor market integration reveals that marine fish markets in the state are quite uncompetitive. They suggested strong and extensive government intervention to improve competitiveness to enhance market efficiency (Ravisankar et al, (2005).

### 1.2.3. International Agreements and Socio-Economic conditions of fisherman

Traditional fishermen in Kerala find in new fishing gear (the purse seine net) a potential threat to their livelihood as it sweeps all waters traditionally considered to be their preserve and leaves no fish to be caught by them or for breeding. On the other hand, the purse seine operators (mostly non-fishermen) considered it a highly productive field for investment despite all the attendant risks. This interest conflicting with the interests of the traditional fishermen. In this context, Ramakrishnanakorakandy (1984) highlighted the need for a judicious exploitation of the marine fishery resources of Kerala by utilizing the new technology without adversely affecting the interests of the traditional fishermen. The Kerala marine fishing Regulation Act has got provisions for it. Mukul (1993) reviewed the conflict between traditional fisher people and mechanized boat owners or trawlers over the use of harbor. The traditional fisher people opposed the fishing harbor because they see these developments as assaults on their shrinking space in the marine sector. In spite of the effects of mechanized boats on fish catch as well as on the economy of the traditional fishing community, the government of India has opened Indian waters to foreign fishing vessels. This invasion which will have a disastrous impact on the economy and the social life of fisher folk, are both traditional fisher folk as well as mechanized boat operators (Ambrose Pinto et al, 1995). The economic rationale of government's policy on joint ventures in fisheries is that these ventures are 100 percent export oriented and this will augment foreign exchange earnings. But the consequences of awarding the licenses are; more conflict between artisanal fishermen and owners of mechanized trawlers, resource ruin, less fish for local consumption, exploitation of workers and stifling of national industry initiative.

Kamal Kumar Dutta, S.S.Dan and Amal Kumar Datta (1989) employed the correlation between the fish productivity and socio-economic factors. The gross return was considered as an indicator of profit. Fishing days, fishing experience, education and training for fishermen are the most important factors

determining the gross return. They suggested government rules for different fishing grounds for different craft combinations to increase more employment and more production. Then it will maintain socio-economic balance in the remote coastal areas.

Ambrose Pinto, BerinLeekas and LathaRadhakrishnan(1995) have mentioned the impact of government policy on the fishery sector as well as on the economy of traditional fishing community in their article "No fish to eat: Impact of Liberalization". In spite of the evil effects of mechanized boats, the government of India has opened Indian waters to foreign fishing vessels keeping with its policy of globalization and liberalization. This invasion has brought a disastrous impact on the economy and the social life of fisher folk, both traditional fisher folk as well as mechanized boat operators. The use of destructive and uncontrolled fishing technologies quickens the depletion of fishery resources. Pressure from foreign fleets and export driven policies will lessen the supply of fish for domestic consumption. The National Fish Workers' Forum urged the government for a new policy which would give importance to small scale fisherman ensure the supply of fish for domestic consumption and should maintain India's marine wealth at subsistence level.

John Kurien (1995) observed the impact of joint ventures on fish economy. The government policies permitting joint ventures between foreign and Indian companies in the Indian Exclusive Economic Zone (EEZ). These ventures are 100 percent export oriented and this will augment out foreign exchange earnings on the current account. But the consequences of license issuing are, more conflict, resource ruin, less fish for local consumption, exploitation of workers and shifting of national industry initiative. To permit this new policy on joint ventures in fisheries to proceed tantamount to allowing a handful of bureaucrats and politicians to usurp the custodianship role of the state and trade the intergenerational heritage of our marine resources to parties who are openly interested only in short run profits. It must be opposed.

Ramachandra Bhatta (2003) observed that the marine production in India is reaching maximum sustainable yield levels and in the case of some commercially important species the symptoms of over harvesting such as stagnation of total production, decline in the catch per unit of fishing effort are observed. This has negative socio-economic implications in terms of lack of fish availability to local community and nutritional insecurity.

V.Sampath (2005) has analyzed the fishery policies of different countries and the national governments and also analyzed the impacts of these policies on the ecology of the aquatic realm, and on the social and economic status of the fishers and the countries as a whole. The FAO developed a Code of Conduct for Responsible fisheries which provides the necessary frame work for international fisheries management, supporting conservation and addressing social and economic concerns. He stated, as per information available from various sources, there is no unified or comprehensive fisheries policy in any of the States in India, except in the State of Kerala, which has recently finalized a Fisheries Policy, in line with the present day requirements.

N.A.Aswathi, T.R.Shanmugam and R.Sathiadas (2011) analyzed the viability of various mechanized fishing units in the Kerala state using different economic and financial indicators. Socio-economic impact of fishing ban on fishing labour was also worked out and suggestions were given for improving the livelihood security of fish workers. The viability of a fishing unit influences the entry or exit of vessels in the fishing industry. The economic performance of fishing operations is affected by various factors including fluctuations in revenue, diminishing cash per unit of effort, unforeseen increases in the cost of key inputs as well as catch and effort restrictions. The economic performance also plays a crucial role in the investment decision at micro level.

Shyam S. Salim, Sathiadhas, Rand Geetha, R critically reviewed the impact of ASEAN Agreement on the different stakeholders viz., fishermen, consumers, exporters, processors, market functionaries and the resources. According to them, the Geographical similarities between ASEAN and Kerala marineecosystem lead to negative impact. The major countries like Thailand

and Vietnam may dump 177 species of fish in the Indian market, which will threaten livelihood security offisherman. If the FTA allows Thai fishing vessels access the Indian territorial waters, it leads to over-fishing and the damage to fish stocks. The present system of fish marketing is highly disorganized where the price spread accounts to more than 40 per cent. Fresh catch of fishes may be replaced by refrigerated cheap imports. It will be also difficult for the traditional sector to coup up with the factory fishing of some of the ASEAN countries like Thailand and Vietnam.

### 1.3 Statement of the Problem

The marine fisheries sector in India is one of the major contributors to foreign exchange earnings through seafood export. This sector is the source of income creation and employment generation. This sector is also providing the livelihood for the millions of people. This study is to find out the impact of international agreement and government policies on the marine fishery sector. The marine fisheries production dominated the total fisheries production of India till the early 1990s. But from the mid-1990s onwards the fisheries production witnessed a significant change, where the share of inland fisheries production surpassed the marine fish production. Certainly, the present marine fisheries scenario is characterized by declining yields from the inshore waters and increasing conflicts among different stakeholders. During the periods from 1980-81 to 2004-05, the inland sector has shown tremendous increase in growth performance from the nineties, while the marine sector growth is decelerating.

Kerala is one of the major contributors in the marine products export from India. But the share of Kerala in the total marine fisheries exports from India had been decreased. Kerala's growth rate in fish production is one amongst the lowest in comparison with other fish producing states. The Gross State Domestic Product of the State has increased by about 97% during the period from 2005-06 to 2010-11 and the share of fisheries sector in the State Domestic Product has declined from 1.81 to 1.29 percent in the same period.

Both the central government and the state government introduce number of policies and programmes for the development of marine fisheries sector. The fisheries sector in India influenced by international agreements and government policies. In recent years, both in the case of India particularly in Kerala, the performance of fisheries sector very weak.

### 1.4 Scope and Importance of the Study

The performance of Indian seafood exports has been remarkable in the Indian context. India has been a major contributor to the world marine fish production and second largest producer of inland fish. The south west comprising Kerala, Karnataka and goa were the highest contributor among regions and Tamilnadu(21 percent) among states followed by Kerala (20percent). However, Kerala continues to be one of the major contributors in the marine products from India. Fisheries contribute to the economy through employment creation, generation of income and foreign exchange earnings and millions of people depends this sector for their livelihood. The demand for fish and fishery products are increasing both in domestic and export fronts. The globalization has dramatically increased the amount of fish traded internationally. With the establishment of WTO, various agreements and regulations are introduced for the regulation of international fish trade. The main WTO agreements relevant for the fisheries sector are the food safety standards which include the agreement on sanitary and phytosanitary measures and the agreement on Technical Barriers to Trade. Many consider these policies of the major fish importing countries as protectionist measures. Food safety standards and non-tariff trade barriers are mainly implemented by the marine product importing countries like The EU, the US and Japan. Since these countries are the major export destination of Kerala's marine exports, any policy shocks from these countries have significant impact on Kerala's fisheries export. The bans were imposed by EU due to non-compliance of the safety regulation on Indian seafood caused severe injury to the fishery sector of Kerala, as Kerala being the hub of India's seafood export industry. This had

affect livelihood of about 200,000 people related to fish harvesting, peeling, processing and marketing. Therefore, the international agreements and regulations are also affecting the socio-economic conditions of fish workers

In general, there are several studies to analyze the conditions of Indian and Kerala fisheries sectors. But the research on the influence of International agreements and national policies on the fisheries sector is limited. The performance of Indian fisheries sector influenced by the international agreements and government policies. The present study is to discuss the problems and prospects of International agreements on fisheries sectors of India and Kerala.

### 1.5 Objectives of the Study

The following are the main objectives of the study

1. To study the impact of international agreements on the socio-economic conditions of fishermen in Kerala.
2. To examine the impact of International agreements on the trade of marine products in Kerala.
3. To examine the impact of international agreements on fishery production and market prices in Kerala.

### 1.6 Hypothesis

Marine fisheries sector in Kerala is negatively affected by International agreements.

### 1.7 Methodology

The study was conducted using both the primary and secondary sources of data. Various secondary data include records and information collected from magazines, journals, published articles, newspapers, published thesis, unpublished data from research institutions, internet sources etc. Records were also collected from various Government Departments including Fisheries Department, and also from research institutions such as CMFRI, Fisheries College, Panangad, CDS (Centre for Development Studies, Trivandrum) and

Fisheries Survey of India. The primary data collected through the interview of fishermen households in three districts in Kerala

This study tried to analyses three objectives. Primary data collected from the fishermen household for first objective. For this analysis of first objective, percentage analysis, compound annual growth rate and diagrams are used.

Second and third objectives analyzed with secondary data. Percentage wise analysis is also used to satisfy these two objectives.

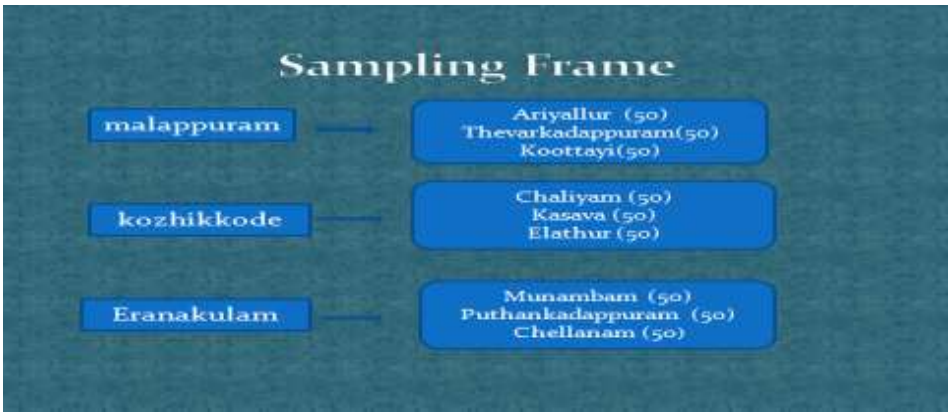
**Sampling Frame**

A sample size of 450 respondents has been surveyed for the proposed study. Multi-stage sampling method is followed in the selection of the locale. The collection of primary data pertains to the coastal villages of Kerala from the three randomly selected districts- Malappuram, Kozhikkode and Eranakulam. Three coastal villages from each district and from each village fifty respondents are surveyed, thus constituting a total of 450 respondents, which form the sample of the study.

In Malappuram district, three villages of Ariyallur,Thevarkadappuram and Koottayiare selectedconstituting sample size of 150. Respondents from chaliyam, kasaba and elathurin kozhikkode district constituting sample size of 150.Munambam, puthankadappuram and chellanamfishing villages were surveyed, thus 150 respondents were interviewed from the Eranakulam district.

Figure 1.1

Sample Frame



## 1.8 Chapter Scheme

The first chapter contains introduction, review of literature, statement of the problem, scope and importance of the study, objectives of the study, hypothesis and methodology. From the literature review it can be found that there is no previous study relating to the impact of international agreements on the socio-economic condition of fishermen.

In the second chapter, explained the main important international agreements influence the fish trade.

The third chapter overviewed the Indian marine fisheries sector. This chapter discusses the production and capture of fish, fishermen community, the trade of fish products and the marine fishery policies and programmes in India.

The fourth chapter discusses the Kerala marine fisheries sector. This chapter explained the fish production and capture, contribution of fisheries towards agriculture sector, trade of fish products in Kerala and fishermen community in Kerala.

The fifth chapter explained the first objective i.e. the impact of international agreements on the socio-economic condition of fishermen community in Kerala. For this purpose, conducted the field survey in three districts i.e. Malappuram, Kozhikkode and Eranakulam which is randomly selected.

The second and third objectives discussed in sixth chapter and the last and seventh chapter explained findings and conclusions.

# CHAPTER 2
# INTERNATIONAL AGREEMENTS ON MARINE FISHERIES SECTOR

Fish and fish products are among the most traded foodstuffs internationally. The level of trade has been growing at an accelerating pace in the last decade, reflecting increased production and increased demand. The GATT/WTO Agreement is the main international agreement which regulating the trade of goods. Since the establishment of GATT in 1947, more than 100 regional trade agreements have been created. The important largest agreements representing different parts of world are NAFTA, MERCOSUR, the Andean Community, CARICOM, EU, EFTA, AFTA (ASEAN), COMESA and SADC.

In America, the NAFTA Agreement covers the north, MERCOSUR and the Andean Community cover the south and CARICOM covers the Caribbean. Together the agreements secure favourable trading conditions for the American continent. As for Europe, the EU is the important legislative unit and also EFTA with Iceland and Norway is significant in fish trade. The ASEAN Free Trade Area (AFTA) covers 10 Asian countries, and has great importance for fish trade. As for Africa, COMESA and SADC together cover nearly all sub-Saharan countries. The regional trade agreements are beneficial for member nations for the development of fish trade. However, the GATT/WTO regulations are reducing their significance as they contain regulations on both tariffs and quotas, which are the basis for many of the regional trade agreements.

There are several agreements in WTO that have a strong influence on the fish trade. The Sanitary and Phytosanitary Measures and the agreement on Technical Barriers to Trade are the most important, as these agreements try to prevent sanitary standards and quality measures as obstacles to trade. The Anti-Dumping Agreement contains a possibility for interpretation in the country's own interest. The Agreement on Subsidies and Countervailing Measures shows the necessity for an international regulation concerning state aided production. The Dispute Settlement Body and more stringent enforcement of WTO

regulations are to show that international regulations are actually worked. The Committee on Regional Trade Agreements controls the establishment of new regional agreements and this is an important control mechanism for the WTO. Since the environmental issues are becoming more important, a section on sustainable fisheries and environment is included in the WTO chapter. In addition, agreements on preservation and environmental issues such as CITES have increased importance for trade in living resources. Even if these agreements are adapted to the global regulations in principle, they are often more restrictive allowing more specified market access than the international agreements.

**2.1 World Trade Organization (WTO)**

The WTO is the successor to the GATT, which came in to force from January 1, 1995. The Uruguay Round of GATT negotiations concluded on April 15, 1994 at Marrakesh, Morocco. India signed the Final Act incorporating the Eighth round of multilateral trade negotiations. The Final Act consists of (1) the WTO Agreement which covers the formation of the organization and the rules governing its working; and (2) the Ministerial decisions and declarations which contain the important agreements covering trade in goods, services, intellectual property and plurilateral trade. They also contain the dispute settlement rules and trade policy review system. There were 77 member countries of the WTO on January 1, 1995. Now there are 153 members.

The WTO agreements are lengthy and complex because they are legal texts covering a wide range of activities. They deal with: agriculture, textiles and clothing, banking, telecommunications, government purchases, industrial standards and product safety, food sanitation regulations, intellectual property, and much more. But a number of simple, fundamental principles run throughout all of these documents. These principles are the foundation of the multilateral trading system.

1. Trade without discrimination
    - Most-favoured-nation (MFN): treating other people equally:

Under the WTO agreement, a country should not discriminate between its trading partners (giving them equally "most favoured- nation" or MFN status). Grant someone a special favour (such as a lower customs duty rate for one of their products) and it have to do the same for all other WTO members.

But there are some exceptions are allowed. For example, countries can set up a free trade agreement that applies only to goods traded within the group — discriminating against goods from outside. Or they can give developing countries special access to their markets. Or a country can raise barriers against products that are considered to be traded unfairly from specific countries. And in services, countries are allowed, in limited circumstances, to discriminate. But the agreements only permit these exceptions under strict conditions.

- National treatment: Treating foreigners and locals equally:

Imported and locally produced goods should be treated equally — at least after the foreign goods have entered the market. The same should apply to foreign and domestic services, and to foreign and local trademarks, copyrights and patents. This is the principle of "national treatment".

National treatment only applies once a product, service or item of intellectual property has entered the market. Therefore, charging customs duty on an import is not a violation of national treatment even if locally-produced products are not charged an equivalent tax.

2. Freer trade: gradually, through negotiation

Lowering trade barriers is one of the most obvious means of encouraging trade. The barriers concerned include customs duties (or tariffs) and measures such as import bans or quotas that restrict quantities selectively. As a result of the negotiations, by the mid-1990s industrial countries' tariff rates on industrial goods had fallen steadily to less than 4%. From time to time other issues such as red tape and exchange rate policies have also been discussed.

3. Predictability: through binding and transparency

In the WTO, when countries agree to open their markets for goods or services, they "bind" their commitments. For goods, these bindings amount to

ceilings on customs tariff rates. A country can change its bindings, but only after negotiating with its trading partners, which could mean compensating them for loss of trade. Sometimes in the case of developing countries, they import at rates that are lower than the bound rates. In developed countries the rates actually charged and the bound rates tend to be the same.

The binding system tries to improve predictability and stability. After Uruguay Round of multilateral trade, there was increase the percentage of tariff bound. In the case of developed countries, it increased from 78percent (before Uruguay Round) to 99 percent (after Uruguay Round), in the case of developing countries, it increased from 21 percent to 73 percent and in transitional economies, it increased from 73 percent to 98 percent.

4. Promoting fair competition

Sometimes the WTO is described as a "free trade" institution, but the system does allow tariffs and, in limited circumstances, other forms of protection. More accurately, it is a system of rules dedicated to open, fair and undistorted competition. The rules on non-discrimination — MFN and national treatment — are designed to secure fair conditions of trade. So too are those on dumping (exporting at below cost to gain market share) and subsidies. Many of the other WTO agreement like agreement in agriculture, intellectual property, services etc., aim to support fair competition.

5. Encouraging development and economic reform

The WTO system contributes to development and reforms. Over three quarters of WTO members are developing countries and countries in transition to market economies. During the seven and a half years of the Uruguay Round, over 60 of these countries implemented trade liberalization programmes autonomously. At the same time, developing countries and transition economies were much more active and influential in the Uruguay Round negotiations than in any previous round, and they are even more so in the current Doha Development Agenda. The current Doha Development Agenda includes developing countries' concerns about the difficulties they face in implementing the Uruguay Round agreements.

## 2.2 WTO and Marine Fisheries Sector

The World Trade Organization is the main international organization dealing with the rules of trade between nations, and hence the primal forum for world trade. The multilateral trading system within the WTO is based on various agreements which give the legal frame work for international commerce. To understand how the world fish trade is regulated, it is essential to consider the regulations of the WTO that are relevant for fish trade.

### 2.2.1. Tariff Schedule

The fish and fishery products are treated as industrial goods, and are not bound by the agricultural regulations. (As a result the Agreement on Subsidies is valid for fishery sector). whereas tariffs on industrial products imported by developed countries were reduced by 40 percent on average, tariff cuts only 26 percent for fish and fishery products in 1994. Tariff rates for the three largest importers; the EU, the USA and Japan are very low or zero for some products. This is the case for most fish, whether raw, fresh, chilled or frozen, while the tariffs rate is high for processed products. The tariff rates escalate with the level of processing. Products such as canned tuna face high tariff in the most important markets.

Major importing countries offer preferential rates to a wide range of fishery products. In Japan 20 percent of tariff lines on fishery products are granted reduced rates (Generalized System of Preference) and Least Developed Countries (LDCs) have duty-free access to the GSP (Generalized System of Preference) covered products. As for the US, 20 percent of total tariff lines on fishery products receive duty free access under GSP scheme. The EU offers duty free access for all fishery products to the LDCs under the GSP scheme and to the African, Caribbean and Pacific (ACP) countries under the Lome Convention. In addition, the EU is giving the Andean Countries and other countries from Central America favourable treatment in fish trade. Hence tuna is exchange for programmes to combat drugs (lasting until 2001). EU also has an agreement on frame work co-operation with MERCOSUR (1995), Chile (1996) and Mexico (1997). In other respect, the EU has for a long time had

bilateral fisheries agreement with a number of third countries to obtain access for EU vessels in third countries waters.

### 2.2.2. The Agreement on Sanitary and Phytosanitary Measures (SPS)

The SPS Agreement is one of the most relevant agreements for fish trade as sanitary measures could be used as protection of own products for importing countries. The SPS has three main requirements:

- The requirement of using harmonization principles in the first resort;
- The requirement, when international standards do not exist, to use the alternative equivalence principle; and
- The requirement for either scientific evidence or appropriate risk assessment if a country intends not to rely on harmony or equivalence but rather on its on domestic standards.

The regulations with regard to quality control, the Hazard Analysis Critical Control Point (HACCP), have been adopted by major importing countries like the US, the EU, Thailand and Brazil, and have been made compulsory for their fish processing industries. The regulations based on HACCP make the processor or trader fully responsible for the quality of the product in terms of food safety. Some companies feel that this regulation is a non-tariff barrier on imports from developing countries. The EU members had to comply with the SPS regulations by 1 January 1996. Canada has applied a Quality Management Programme based on the same principles as those of HACCP, which controls imported fish products to prevent mislabeling and unsafe products. Other OECD countries, which have adopted similar regulations based on HACCP, are Iceland, Canada, Thailand, Brazil, Morocco, Australia and New Zealand. Now all major exporting countries have implemented the HACCP. In general, seafood safety has gained importance over the last years as a result of increased trade in fishery product.

### 2.2.3. The Agreement on Technical Barriers to Trade (TBT)

The TBT agreement is intended to ensure that requirement such as quality, labeling and methods of analysis applies to internationally traded goods to not be misleading to the consumer or discriminate in favour of

domestic producers or goods of different origin. Thus the TBT Agreement would apply to a country intending to impose the using of eco-labels on internationally traded fish products. The ISO environmental labelling standards are being developed as to increase the awareness of ecological products and promote environmentally friendly consumption. Eco-labelling for fish products started in 1997 with the establishment of the Marine Stewardship Council (MSC). By using the MSC logo, the producers of fish products will give consumers the option to buy fish products derived from sustainable and well-managed sources. The certification process has been completed for Alaskan salmon, Australian rock lobster and the Thames herring.

### 2.2.4. The agreement on Anti-Dumping Measures

The anti-dumping measures have not been extensively used in international fish trade. The USA imposed anti-dumping duties on imports of Norwegian Atlantics salmon, fresh and frozen, and as Norway protested this conflict was brought up for the GATT Dispute Settlement in 1991. There have been complaints by the EU that the US violates the anti-dumping regulations by GATT and WTO. The EC contends that the US Anti-Dumping Act of 1916 still is in force and is applicable to the imports and internal trade of any foreign product irrespective of its origin, including products from WTO member countries. Hence, a panel was set up for dispute settlement in which India, Japan and Mexico reserved their third party rights.

### 2.2.5. The Agreement on Rules of Origin

The rules of origin are the criteria used to define where a product was made. They are linked to the application of trade measures such as quotas, preferential tariffs, anti-dumping measures and countervailing duties. The agreement was established to provide common harmonized rules of origin on the non-preferential trade of members that would be objective, transparent and predictable.

### 2.2.6. The Agreement on Import Licensing Procedures

Various types of import licenses and import quotas are included in the ILP agreement of WTO. These include licensing schemes for live, fresh,

chilled and frozen fish; import control of certain species such as flying fish; import control on fish product used as animal feed; and quantitative restrictions on import of smoked trout, cod, salmon, lobster and scallop.

Import quotas are maintained in two importing areas: Japan and Taiwan, Province of China. The Republic of Korea removed its import restrictions in July 1997, and the same year changes were made to Japans import quota system. Mackerel, sardines, herring scallops, squid and cod were separated from the global import quotas and received individual quotas. Taiwan maintains import bans on squid, herring and mackerel.

**2.2.7. The Agreement on Safeguards.**

The EU seems to be using the safeguard measures on fishery product, there are two types of measures within the EU; a safeguard clause and a reference price system. The safeguard clause protects the volume of imports, and is allowed if the imports of a product into the customs territory exceed a trigger level, which relates to the existing market access opportunity. The reference price system regulates the price of imports if the import price falls below a trigger price fixed on the average production prices in the EU.

**2.2.8. Dispute Settlement**

Nearly 200 disputes have been handled by the Dispute Settlement Body since the establishment of the WTO, whereas eight involved the trade of fish.

In 1991, the US prohibited the imports of tuna by Mexico in the Eastern Pacific Ocean by fishing fleets whose nets had allegedly caught and killed dolphins. The GATT dispute panel found that imposing a domestic environmental measure by means of import restriction by the US was not in conformity with the GATT's general elimination of quantitative restrictions. The GATT rules did not allow one country to take action to enforce its own domestic laws in another country. The panel report was appealed and was never adopted under the old GATT regulations, as all decisions needed absolute majority. The absolute majority is not needed under the present WTO regulations. If the Dispute Settlement Body does not by consensus reject a

panel report after 60 days, it is automatically accepted. Still this dispute continues to create uncertainty, as the case has not finally settled.

In 1995, two panels were established after a complaint by Canada, Peru and Chile with regard to a French Government order laying down the official name and trade descriptions of scallops. The two panels concluded their work, but suspended the proceedings in view of a mutually agreed solution among the parties in July, 1996.

In August 1997, Chile filed a complaint in respect of a countervailing duty investigation by the US Department of commerce on imports of salmon from Chile. To avoid prohibition of exports, the Chilean producers reduced their exports to the US.

Since 1975, Australia has prohibited the import of fresh, chilled and frozen salmon due to alleged fish health concerns. Canada protested against this in 1997, and the Dispute Settlement Body declared that Australia violated the SPS regulations. The decision was appealed in 1998, resulting in the same conclusion. In 1999, the US requested a new review as Australia persisted in not complying with the decision.

A panel was set up in 1997, after protests from Thailand, Pakistan, Malaysia and India against the US ban on imports of certain shrimp products from these countries. The US reason for stopping the imports was the environmental regulation in the Endangered Species Act, which prohibits importing shrimp, harvested using commercial fishing technology that may affect sea turtles. The panel concluded that the US performance was not consistent with the article XI: 1 because their protection measures discriminated against foreign suppliers.

### 2.2.9. Agreement on Subsidies and Countervailing measures (SCM)

The subsidies in the fishery sector provided to reduce operating and capital costs of harvesting fish, fishing vessel construction or maintenance costs, or indirect costs such as income support and fishery management schemes. The SCM Agreement made it possible to question present subsidies

in different WTO countries. It has not yet resulted in significant reduction of subsidies in developed countries.

EU representatives emphasized that subsidies do not necessarily exert increased pressure on fisheries resources, as there was no direct link between subsidies and over fishing. On the contrary it was the view of the EU representatives that subsidies could be designed to assist sustainable fisheries management. As for other countries i.e. Australia, Iceland, New Zealand, the Philippines and the US, they welcomed the High Level Symposia on Trade and Development and Trade and Environment to highlight what "the elimination of environmentally damaging and trade distorting subsidization of the fisheries sector" would do to the conservation and sustainable use of fish stocks and the promotion of sustainable development.

Milazzo's studies in 1997, estimated global fisheries subsidies to be between US $ 14 billion and US $ 20 billion. The economic support in fisheries, i.e. subsidies and trade protection, was estimated to between one-fourth and one-third of total revenues. This indicates that subsidies, including trade protection such as tariff barriers, play an important role in the fishery sector. Milazzo maintain that subsidies may cause negative environmental impacts and are often highly non-transparent.

**2.3 Fisheries and the WTO Doha Round**

For the first time in the history of the multilateral trading system, fisheries figure prominently in the negotiating round of the World Trade Organization, started in 2001.

In the Doha round of trade negotiations at the WTO, issues related to fishery resources are being discussed on two fronts, namely, in the Rules negotiations and as part of the Non-Agricultural Market Access (NAMA) negotiations. Apart from the Doha Round negotiations, a series of judicial decisions have been made by WTO dispute settlement panels on import bans for the purpose of protecting living marine resources and trade in fishery products.

In the NAMA negotiations, which primarily concern tariff reductions, the need to provide special and differentiated treatment (S&DT) to developing countries is taken into account but no specific consideration is given to environmental conservation. On the other hand, the Rules negotiations, which cover among others WTO disciplines on fisheries subsidies, give consideration to both the environment and developing countries. Meanwhile, on the judicial front, an importing country's unilateral prohibition on certain shrimp and shrimp products for the purpose of protecting sea turtles had become a major issue with a series of exporting developing countries filing complaints with the WTO Dispute Settlement Body. The ruling by the WTO's dispute settlement panel on the case shows consideration to the environment but little to developing countries.

Fish and fishery products are discussed as part of the NAMA negotiations that cover all non-agricultural products. In the NAMA negotiations, Japan, South Korea, and Chinese Taipei are calling for balancing the two goals of liberalizing trade and protecting natural resources, whereas fish and fish product exporters, namely, New Zealand, Iceland, and Thailand, insist that tariffs on all fish and fishery products should be brought down to zero. At the moment, the negotiations are moving in the direction of treating fish and fishery products as subject to tariff-cutting without exception, no different from industrial products.

Although the fisheries subsidies negotiations and the NAMA negotiations are the primary areas of interest to the fisheries sector, it may be noted that the "regular" work outside the negotiations may also be of potential interest to the fisheries sector such as the work being undertaken over the last several years in the WTO Sanitary and Phytosanitary Committee with respect to private standards. At its last meeting at the end of March 2011, the SPS Committee agreed on an initial five actions, namely;

i) to develop a working definition of private standards related to SPS, and limit any discussions to these

ii) for the SPS Committee and its three sister organizations to inform each other regularly about the work they are doing in the area — the "three sisters" are: the WHO-FAO Codex Alimentarius on food safety, the World Organization for Animal Health (OIE) and the International Plant Protection Convention (IPPC)

iii) for the WTO Secretariat to inform the committee of relevant developments in other WTO councils and committees

iv) for member governments to help relevant private sector bodies in their countries that are setting standards related to SPS understand the issues raised in the SPS Committee and the importance of the international standards of Codex Alimentarius, OIE and IPPC

v) for the committee to explore co-operation with the three sisters in developing information material underlining the importance of international SPS standards

The WTO agreements influenced the trade of fishery products across the world. The Uruguay Round on multilateral negotiations reduced import duties and led to liberalization of international trade. The new Multilateral Trade Negotiation will probably lead to further trade liberalization and tariff reduction to the benefit of trade in fishery products, in particular value added products. The most relevant Agreements for fish trade are the SPS and the TBT Agreements. The growing focus on environmental concerns resulted in new issues such as Eco-labelling, certification and quality controls. Since the agreement on agriculture of 1994 did not apply to fisheries, the fishery sector is regulated by stronger disciplines such as the Agreement on Subsidies and Countervailing measures, although there remains a lack of clarity as to which of the regulations that count for fisheries. The Dispute Settlement Body has improved the solving of disagreement between the different regions, and the Committee on Regional Trade Agreements gives an important control mechanism of regional trade.

# CHAPTER- 3

## INDIAN MARINE FISHERIES SECTOR: AN OVERVIEW

Fishing is one of the oldest avocations of man, older than even hunting and farming. The successively progressive technological developments in fishing and related fields and the increasing economic importance of fisheries have transformed this primitive occupation into a major industry. Fisheries sector in India has witnessed an impressive growth from a subsistence traditional activity to a well-developed commercial and diversified enterprise. The fisheries sector has been playing an important role in the Indian economy by its contributions to employment generation, income augmentation, foreign exchange earnings, providing food and nutrition security.

Fisheries activities in India can be classified mainly in two ways. *First* classification based on sources of fish harvested – whether harvested from sea under marine fisheries or from sweet water / brackish water bodies under inland fisheries. Disaggregated data using this distinction suggests that Indian fisheries were earlier dominated by marine fisheries. Inland fisheries production outpaced marine fisheries since the beginning of the present millennium and the gap has been rising since then. The *second* differentiation is in terms of the nature of harvesting. Fish can be either captured or cultured. Culture involves a business process that takes care of growing fish involving investments in production and subsequent harvesting. Obviously, investments in production are proportionately higher than that in harvesting. Capture involves no investment in production with almost the entire investment concentrated in harvesting efforts. The production efforts are solely carried out by nature. It clearly suggests that Indian fishermen are predominantly engaged in capture fisheries i.e., more than 60% (S.K. Datta et al, 2010).

` The fisheries sector is an important player in the overall socio-economic development of India. India is endowed with a wide diversity of water resources, which sustain a large fisheries sector in the country. India has a coastline of 8,118 km with an Exclusive Economic Zone (EEZ) stretching over

2.02 million $km^2$, and a continental shelf covering 0.53 million $km^2$. India also has inland water sources covering over 190,000 km and open water bodies with a water-spread area of about 740,000 hectares. Brackish water area that could be used for aquaculture is 1.24 million hectares, of which only 165,000 hectares have been developed. The total fish Production in India during 2014-15 was 10.16 MT, an increase of 6.18 per cent over 2013-14 (Economic Survey 2015-16).

The marine subsector contributed approximately 35 percent of total fish production, or 3.49 million tones. The balance, termed inland fisheries, was accounted for by freshwater aquaculture, inland capture, and coastal aquaculture. India contributes nearly five percent towards global fish production. The country ranks third in the world in total fish production and second in inland aquaculture. The fisheries sector has registered an average annual growth rate of around four percent during the last five years. The sector contributes around one per cent to Gross Domestic Product (GDP) and 4.7 percent to agriculture GDP (Central Statistics Organization 2007 and Government of India 2010).

**3.1 Production and Capture**

In all over the world the importance of fish has been increasing. Capture fisheries and aquaculture supplied the world with about 148 million tonnes of fish in 2010 (with a total value of US$217.5 billion), of which about 128 million tonnes was utilized as food for people, and preliminary data for 2011 indicate increased production of 154 million tonnes, of which 131 million tonnes was destined as food (The State of World Fisheries and Aquaculture, 2012). So the countries have been making concerted and systematic efforts at developing and exploiting their fisheries wealth. As a result, that world fish production has been steadily increasing during the last few decades and now the global fish production has grown as 201 million tonnes.The trends in world fish production after 1950 are presented in Table3.1.

Table 3.1

Trends in World Production of Fish

(Million Tonnes)

| Year | World Production | % increase |
|---|---|---|
| 1950 | 19.8 | |
| 1955 | 28.6 | 44.44 |
| 1960 | 36.7 | 28.32 |
| 1965 | 51.2 | 40 |
| 1970 | 67.3 | 31.44 |
| 1975 | 68.3 | 1.5 |
| 1980 | 75.6 | 11 |
| 1985 | 91.6 | 21.2 |
| 1990 | 103.6 | 10 |
| 1995 | 124.1 | 23 |
| 2000 | 131.2 | 6 |
| 2005 | 136.4 | 3.96 |
| 2010 | 148.5 | 8.87 |
| 2011 | 154.0 | 3.70 |
| 2017 | 201 | |

Source: Hand Book on Fisheries Statistics (2000), Ministry of Agriculture, Government of India &WORLD REVIEW OF FISHERIES AND AQUACULTURE, 2007, 2010, 2012

The Table 3.1 shows that the world fish production recorded 10.15 times increase from 19.8 million tonnes in 1950 to 201 million tonnes in 2017. Due to the steady increase in fish production, the average per capita fish supply during the period increased from 8 kg in 1950 to over 15 kg in 1996 (Richard Grainger, 2004).

The fisheries production in India during 1960s was more pronounced in the marine fisheries and it remained the major contributor till early 1990s (Table 3.2). Its share in the total fish production was more than 70 per cent in 1960s, but thereafter it started declining and came down to about 62 per cent in 1970s and to 59 per cent in 1980s. In the mid-nineties, the fisheries production witnessed a significant change. The share of inland fish production became almost half of the total fish production in 2000. It seems that marine fisheries production has reached a plateau and at best, it can register only a marginal increase in the near future. On the other hand, inland fish production was on

constant rise and its share raised to 38 per cent in 1970s to 41 per cent in 1980s and jumped to over 45 per cent in 1990s. This rise in inland fish production is attributed to the development of aquaculture in our country.

Table 3.2

Marine and inland fish production in India (000' Tonnes)

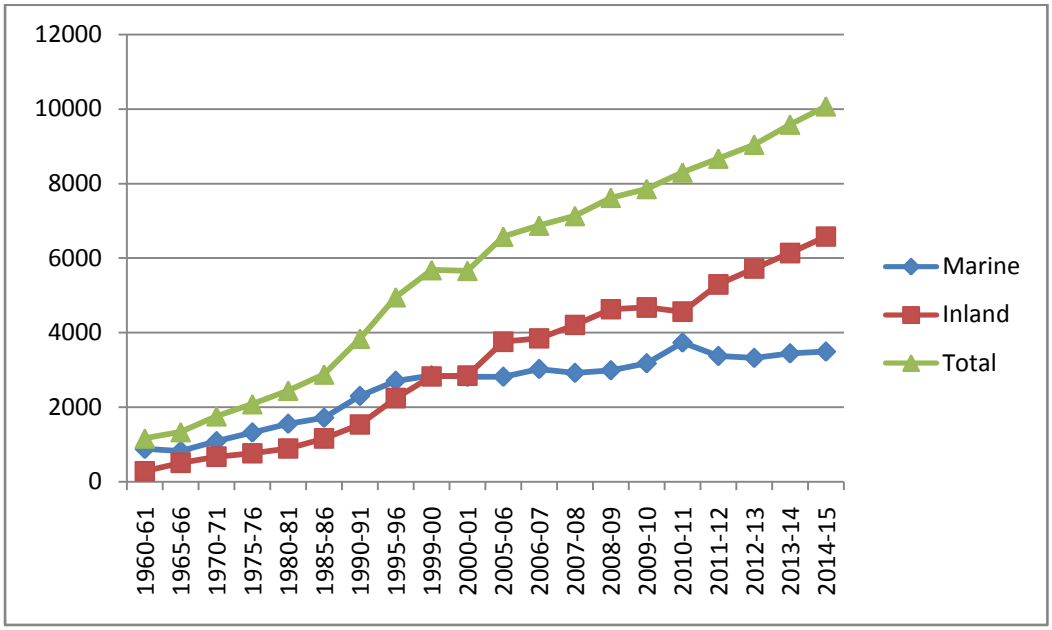
| **Year** | **Marine** | **Inland** | **Total** | **Marine (%)** | **Inland (%)** |
|---|---|---|---|---|---|
| 1960-61 | 880 | 280 | 1160 | 75.86 | 24.14 |
| 1965-66 | 824 | 507 | 1331 | 61.90 | 38.10 |
| 1970-71 | 1086 | 670 | 1756 | 61.85 | 38.15 |
| 1975-76 | 1320 | 760 | 2080 | 63.46 | 36.54 |
| 1980-81 | 1555 | 887 | 2442 | 63.68 | 36.32 |
| 1985-86 | 1716 | 1160 | 2876 | 59.67 | 40.33 |
| 1990-91 | 2300 | 1536 | 3836 | 59.96 | 40.04 |
| 1995-96 | 2707 | 2242 | 4949 | 54.70 | 45.30 |
| 1999-00 | 2852 | 2823 | 5675 | 50.25 | 49.74 |
| 2000-01 | 2811 | 2845 | 5656 | 49.70 | 50.30 |
| 2005-06 | 2816 | 3756 | 6572 | 42.85 | 57.15 |
| 2006-07 | 3024 | 3845 | 6869 | 44.02 | 55.98 |
| 2007-08 | 2920 | 4207 | 7127 | 40.97 | 59.03 |
| 2008-09 | 2990 | 4626 | 7616 | 39.26 | 60.74 |
| 2009-10 | 3177 | 4675 | 7852 | 40.47 | 59.53 |
| 2010-11 | 3733 | 4562 | 8295 | 45 | 55 |
| 2011-12 | 3372 | 5294 | 8666 | 38.91 | 61.09 |
| 2012-13 | 3321 | 5719 | 9040 | 36.74 | 63.26 |
| 2013-14 | 3443 | 6136 | 9579 | 35.94 | 64.06 |
| 2014-15 | 3491 | 6577 | 10069 | 34.68 | 65.32 |

Source: Hand Book on fisheries statistics, 2008, Annual Report 2011-112, Department of animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India, New Delhi (http:// www.dahd.nic.in), MPEDA

The production has increased in both inland and marine sectors since 1960-61. The increase was more in case of marine sector as compared to the inland sector. But after the mid-1990s the situation was changed i.e., the inland fish production dominated in total fish production.

Figure 3.1

Fish production in India




Source: Hand Book on fisheries statistics, 2008, Annual Report 2011-112, Department of animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India, MPEDA

The growth trends in fisheries production in India during 1960-61 to 2014-15 is given in Table 3.2. A disaggregated view of the pattern of growth shows that growth in inland fisheries production has accentuated in the 1990s while marine fish production witnessed deceleration. The share of culture fisheries in both fresh water as well as brackish water in inland sector has increased in recent years. The policy for fisheries development has also been given a tilt towards inland fisheries particularly aquaculture in recent years.

During 2016-17, India's total fish production has touched 11.41 million tonnes from mere 0.75 million tonnes in 1950-51. The world production during the same period has gone up from 23.5 million tonnes to around 211million tonnes. The trend of fish production in India as compared to the world production is given in Table 3.3. The share of India in global fish production has grown gradually, from about 3.19 per cent during the 1950s to 5.4 per cent in 2016-17. It shows that growth in fish production in India has been at a faster

rate than that in the world; mainly due to increasing contributions from inland fisheries.

Table 3.3

Fish production in India and world

| Year | World (million tonnes) | India (million tonnes) | India's share (%) | | |
|---|---|---|---|---|---|
| | | | Total | Marine | Inland |
| 1950-51 | 23.50 | 0.75 | 3.19 | 2.26 | 0.92 |
| 1960-61 | 43.60 | 1.16 | 2.66 | 2.02 | 0.64 |
| 1970-71 | 66.20 | 1.76 | 2.66 | 1.64 | 1.02 |
| 1980-81 | 72.30 | 2.44 | 3.37 | 2.15 | 1.22 |
| 1985-86 | 85.60 | 2.88 | 3.36 | 2.00 | 1.36 |
| 1990-91 | 97.97 | 3.84 | 3.92 | 2.35 | 1.57 |
| 1999-00 | 120.00 | 5.66 | 4.72 | 2.37 | 2.35 |
| 2001-02 | 129.00 | 5.96 | 4.62 | 2.19 | 2.43 |
| 2004-05 | 135.35 | 6.30 | 4.65 | 2.05 | 2.60 |
| 2005-06 | 136.85 | 6.58 | 4.81 | 2.06 | 2.74 |
| 2006-07 | 138.75 | 6.87 | 4.95 | 2.18 | 2.77 |
| 2007-08 | 141.4 | 7.13 | 5.04 | 2.06 | 2.98 |
| 2008-09 | 143.95 | 7.67 | 5.33 | 2.09 | 3.24 |
| 2009-10 | 146.9 | 7.85 | 5.34 | 2.16 | 3.18 |
| 2010-11 | 151.25 | 8.3 | 5.49 | 2.47 | 3.02 |
| 2016-17 | 211 | 11.41 | 5.4 | | |

Source: Hand Book on Fisheries Statistics (2008), Ministry of Agriculture, Government of India & Annual Report 2011-12, Department of Animal Husbandry, Dairying & Fisheries Ministry of Agriculture, Government of India, New Delhi.

Indian share in global production has reached 5.4 per cent during 2016-17. This table shows that the India's share in global fish production is very low i.e., 5.4 percent in 2016-17. Till 1990s the share of marine fisheries sector is greater than that of inland sector. But after 1990s the share of inland fisheries sector has been increasing. For inland sector India is ranked second after China. Other major producer countries are China, Japan, the United States, the Russian Federation and Indonesia. There is a steady increase in the exports which indicate a positive trend.

The demand for fish and fishery products are increasing both in domestic and export fronts. In India, about 3.9 million tonnes fishery potential are estimated from marine sector only 2.6 million tonnes are tapped. 93 per cent of the fish production contributed by artisanal, mechanized and motorized sector, remaining 7 per cent is contributed by deep sea fishing. India has been a major contributor to the world marine fish production and second largest producer of inland fish. The south west comprising Kerala, Karnataka and Goa were the highest contributor among regions and Tamil Nadu among states (21 per cent) followed by Kerala (20 per cent).

The state-wise production of marine fish products in India during 1992-93 to 2016-17 is described in Table3.4.

Table 3.4

Marine Fish Production by States / Union Territories (1992-93 to 2016-17)

(In '000 tonnes)

| Sl. No: | State/U T | 1992-93 | 1995-96 | 2000-01 | 2005-06 | 2010-11 | 2016-17 |
|---|---|---|---|---|---|---|---|
| 1 | Andhra Pradesh | 113.07 | 151.99 | 182.50 | 218.84 | 254.89 | 192 |
| 2 | Goa | 101.49 | 84.21 | 67.33 | 100.91 | 32.26 | 61 |
| 3 | Gujarat | 589.00 | 600.00 | 620.47 | 663.88 | 644.53 | 774 |
| 4 | Karnataka | 234.19 | 247.51 | 205.90 | 176.97 | 175.57 | 530 |
| 5 | Kerala | 496.24 | 532.55 | 566.57 | 558.91 | 586.29 | 523 |
| 6 | Maharashtra | 387.55 | 387.00 | 402.84 | 445.34 | 419.82 | 292 |
| 7 | Orissa | 119.38 | 123.20 | 121.09 | 122.21 | 130.77 | 117 |
| 8 | Tamil Nadu | 308.00 | 340.00 | 367.86 | 307.99 | 393.27 | 707 |
| 9 | West Bengal | 145.00 | 153.00 | 181.00 | 160.00 | 182.74 | 272 |
| 10 | A & N Island | 24.17 | 25.68 | 27.62 | 12.05 | 28.60 | |
| 11 | Daman & Diu | 13.43 | 15.28 | 16.38 | 17.72 | 26.28 | 117 |
| 12 | Lakshadweep | 9.73 | 9.82 | 12.00 | 11.96 | 11.04 | |
| 13 | Pondicherry | 35 | 36.82 | 38.95 | 19.27 | 33.44 | 45 |
| | **India** | **2576.25** | **2707.06** | **2810.50** | **2816.05** | **2919.49** | **3630** |

Source: Handbook on Fisheries Statistics, 2008

Fisheries have made a significant progress over the successive five year plans. Fish production levels have increased from 0.75 million tonnes of fish and shell-fish in 1950-51 to 5.65 million tonnes in 1999-2000. During 1950s-1990s, the marine and inland fish production levels have increased with a

growth rate of 3.43 per cent and 5.27 per cent per annum respectively with an overall annual growth rate of 4.14 per cent during this period. The inland and marine fish production levels during the corresponding period have risen from 0.22 million tonnes and 0.53 million tonnes to 2.82 million tonnes and 2.83 million tonnes respectively. The share of inland fishery sector, which was 29 per cent in 1950- 51, has gone up to about 50 per cent in 1999-2000. At present the production levels of inland fish is higher than that of marine fisheries sector.

Table 3.5

Fish Production over the Plan Periods – India

| Plan Period | Fish Production at the end of the period (‘000) | | | Growth (Per cent) during the plan period | | | Average Annual Growth Rate |
|---|---|---|---|---|---|---|---|
| | Marine | Inland | Total | Marine | Inland | Total | |
| Pre-Plan Period (1950-51) | 534 | 218 | 752 | - | - | - | - |
| 1st Plan (1951-56) | 596 | 243 | 839 | 11.61 | 11.47 | 11.57 | 2.31 |
| 2nd Plan (1956-61) | 880 | 280 | 1160 | 47.65 | 15.23 | 38.26 | 7.65 |
| 3rd Plan (1961-66) | 824 | 507 | 1331 | -6.36 | 81.07 | 14.74 | 2.95 |
| Annual Plans (1966-69) | 904 | 622 | 1526 | 9.71 | 22.68 | 14.65 | 4.88 |
| 4th Plan (1969-74) | 1210 | 748 | 1958 | 33.85 | 20.26 | 28.31 | 5.66 |
| 5th Plan (1974-79) | 1490 | 816 | 2306 | 23.14 | 9.09 | 17.77 | 3.55 |
| Annual Plan (1979-80) | 1492 | 848 | 2340 | 0.13 | 3.92 | 1.47 | 1.47 |
| 6th Plan (1980-85) | 1698 | 1103 | 2801 | 13.81 | 30.07 | 19.70 | 3.94 |
| 7th Plan (1985-90) | 2275 | 1402 | 3677 | 33.98 | 27.11 | 31.27 | 6.25 |
| Annual Plan (1990-91) | 2300 | 1536 | 3836 | 1.10 | 9.56 | 4.32 | 4.32 |
| Annual | 2447 | 1710 | 4157 | 6.39 | 11.33 | 8.37 | 8.37 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Plan (1991-92) | | | | | | | |
| 8th Plan (1992-97) | 2967 | 2381 | 5348 | 30.42 | 69.83 | 45.44 | 9.09 |
| 9th Plan (1997-02) | 2830 | 3126 | 5956 | -4.62 | 31.29 | 11.37 | 2.27 |
| 10th Plan (2002-07) | 2910 | 3559 | 6469 | 2.83 | 13.85 | 8.61 | 1.72 |
| 11th Plan (2007-12) | 3238 | 4672 | 7910 | 11.27 | 31.28 | 22.35 | 2.03 |
| 12th plan (2012-17) | 3471 | 6144 | 9615 | 7.19 | 31.51 | 21.55 | |

Source: Handbook on Fisheries Statistics, 2008

The Table 3.5 shows, in the plan period the growth rate of fish production is highly fluctuated from 1.47 percent to 45.44 percent. During third and ninth plan period the marine fisheries sector expressed the negative growth rate. During the plan period, the growth rate of inland fisheries sector is higher than that of marine fisheries sector. Average Annual Growth Rate during this period is more or less stable.

**3.2 Contribution towards Agriculture Sector**

Fisheries sector contributes to the national income, exports, food and nutritional security and employment generation. It is a principal source of livelihood for a large section of economically underprivileged population of the country, especially in the coastal areas. The share of agriculture and allied activities in the GDP is constantly declining. The agriculture sector is also diversifying towards high value enterprises, including fisheries. The contribution of fisheries sector to the GDP has gone up from 0.46 per cent in 1950-51 to 1per cent in 2015-16 (at current prices). The share of fisheries in agricultural GDP (AgGDP) has impressively increased during this period from a mere 0.84 per cent to 5.5 per cent.In fact, the fisheries sector is booming and contributing increasingly to the economic growth of the nation.

Table 3.6

Contribution and growth of fisheries sector in India

| Year | Percent Contribution to | |
|---|---|---|
| | GDP | Ag.GDP |
| 1950-51 | 0.46 | 0.84 |
| 1960-61 | 0.54 | 1.18 |
| 1970-71 | 0.61 | 1.37 |
| 1980-81 | 0.73 | 1.98 |
| 1990-91 | 0.93 | 3.00 |
| 1999-00 | 1.16 | 4.19 |
| 2001-02 | 1.03 | 4.01 |
| 2007-08 | 0.75 | 4.56 |
| 2015-16 | 1 | 5.5 |

*Source*: *National Accounts Statistics,* (different volumes) Central Statistical Organization, Government of India

The role of fisheries in agricultural economy of almost all the states has been increasing as is evident from its enhancing share in the agricultural state gross domestic product (AgGSDP) (Table 3.7).

Table 3.7

Share of fisheries in gross state domestic product (GSDP) and in agricultural State gross domestic product (AgSGDP), 1980-81 to 2001-02

(In per cent**)**

| Sates | Share of fisheries in GSDP | | | | | |
|---|---|---|---|---|---|---|
| | 1980-81 | | 1990-91 | | 2001-02 | |
| | SGDP | AgSGDP | SGDP | AgSGDP | SGDP | AgSGDP |
| Andhra Pradesh | 1.2 | 2.6 | 0.6 | 1.7 | 2.14 | 7.69 |
| Assam | 1.9 | 4.0 | 1.6 | 3.9 | 2.05 | 5.84 |
| Bihar | 1.0 | 1.9 | 1.0 | 2.4 | 1.63 | 4.11 |
| Goa | 2.3 | 9.9 | 2.2 | 15.8 | 2.67 | 23.54 |
| Gujarat | 0.8 | 2.1 | 1.1 | 4.3 | 1.06 | 6.39 |
| Haryana | 0.0 | 0.1 | 0.3 | 0.6 | 0.27 | 1.21 |
| Himachal Pradesh | 0.2 | 0.3 | 0.2 | 0.5 | 0.14 | 0.41 |
| Jammu & Kashmir | 0.4 | 1.0 | 0.5 | 1.2 | 0.48 | 1.50 |
| Karnataka | 0.6 | 1.3 | 0.4 | 1.2 | 0.37 | 1.29 |
| Kerala | 2.0 | 5.2 | 1.8 | 5.0 | 1.93 | 7.81 |
| Madhya Pradesh | 0.1 | 0.1 | 0.2 | 0.4 | 0.17 | 0.57 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Maharashtra | 0.6 | 2.1 | 0.4 | 1.7 | 0.43 | 2.95 |
| Orissa | 1.1 | 2.1 | 2.0 | 5.2 | 2.42 | 7.45 |
| Punjab | 0.0 | 0.1 | 0.1 | 0.2 | 0.37 | 0.94 |
| Rajasthan | 0.2 | 0.5 | 0.0 | 0.1 | 0.07 | 0.26 |
| Tamil Nadu | 0.6 | 2.5 | 0.3 | 1.3 | 0.74 | 4.38 |
| Uttar Pradesh | 0.2 | 0.3 | 0.3 | 0.7 | 0.52 | 1.51 |
| West Bengal | 3.0 | 9.4 | 3.1 | 9.9 | 3.14 | 11.82 |

*Source*: Gross Domestic Product of States of India 1960–61 to 2000–01, EPW Research Foundation.

### 3.3 Fishermen Community in India

Millions of people around the world find a source of income and livelihood in the fisheries sector. The most recent estimates indicate that in 2010 there were 54.8 million people engaged in the primary sector of capture fisheries and aquaculture. Of these, an estimated 7 million people were occasional fishers and fish farmers (of whom 2.5 million in India, 1.4 million in China, 0.9 million in Myanmar, and 0.4 million each in Bangladesh and Indonesia) (FAO, 2012).

A National Marine Fisheries Census (NMFC) was conducted in 2005 by theCMFRI, Kochi (for mainland coastal States/UTs) and the Fishery Survey of India (FSI), Mumbai (for the two Island groups). Evidences from the NMFC 2005, show that there were 2132 fishing villages and 3.33 lakh households in India in 1980. After two and half decades the number of fishing villages has increased to 3202 and number of households has raised to 7.6 lakh- an increase of around 50 and 127 percentages respectively. The total number of fishing villages was higher in Orissa (641) and least in Karnataka (156). An important point to be noted is that Kerala is the only State Where the number of fishing villages declined from 304 in 1980 to 222 in 2005(Marine Fisheries Census, 2005). The reclassification of village boundaries may be a reason for the reduction in number of villages from 1980 to 2005.

During 1980, Kerala had been the highest in the case of number of fishermen households (99894) and population (639872) among other states and UTs. But during 2005, Kerala ceased to be the state with highest number of

fishermen households and population leaving the position to Tamil Nadu (192152 and 790408 respectively).

Table 3.8

Share of fishermen and total population as a percent of Indian totals

| State & UT | Total Population | | Fishermen Population | |
|---|---|---|---|---|
| | 1981 | 2001 | 1980 | 2005 |
| Andhra Pradesh | 7.8 | 7.4 | 17.2 | 14.5 |
| Gujarat | 5.0 | 4.9 | 8.0 | 9.2 |
| Karnataka | 5.4 | 5.1 | 6.0 | 4.9 |
| Kerala | 3.7 | 3.1 | 33.8 | 17.1 |
| Maharashtra | 9.2 | 9.4 | - | 9.1 |
| Orissa | 3.9 | 3.6 | 6.2 | 12.8 |
| Tamil Nadu | 7.1 | 6.0 | 20.9 | 22.5 |
| West Bengal | 8.0 | 7.8 | 4.4 | 7.7 |
| Pondicherry | - | - | 1.3 | 1.2 |
| Goa, Daman &Diu | - | - | 2.1 | 1.1 |
| **India** | 100 | 100 | 100 | 100 |

Table 3.8 shows that the percentage share of fishermen population had been highest in Kerala during 1980-close to one third of the national fishermen population. After twenty-five years, the percentage share of fishermen population in Kerala almost halved and Tamil Nadu becomes the state with highest percentage of fishermen in India leaving Kerala second position. But when we compared with Kerala's total population, it indicates the relative significance of Kerala fisheries in the national context.

As per the NMFC, 2005 the marine fisheries sector provides employment to about 0.9 million fishers in active fishing and about 0.7 million fishers in various other fishing operations. The number of people involved in marine fisheries related activities include nearly 0.2 million in fish marketing, 0.1 million in repairs of fisheries requisites, around 0.2 million in fish processing and 0.1 million in other ancillary activities. In all, an estimated 3.51 million people depend on marine fisheries for their livelihoods in India.

Compared with the previous NMFC undertaken in 1980, it is seen that marine fisher population has nearly doubled from 1.87 million in 1980 to 3.51 million in 2005. Among the maritime states, West Bengal has the highest

concentration of fishers per kilometer of coastline (1 706), followed by Kerala (1 012) and Odisha (938). More details can be seen in Table 3.9below:

Table 3.9

State and activity-wise marine fisher population in India

| **State/UTs** | **Active Fishermen** | **Fishing allied** | **Non fishing/ working** | **Total Population** |
|---|---|---|---|---|
| West Bengal | 70 750 | 57 741 | 141 074 | 269 565 |
| Odisha | 121 282 | 152 534 | 176 575 | 450 391 |
| Andhra Pradesh | 138 614 | 152 892 | 218 485 | 509 991 |
| Tamil Nadu | 206 908 | 104 509 | 478 991 | 790 408 |
| Puducherry | 10 341 | 10 095 | 22 592 | 43 028 |
| Kerala | 140 222 | 71 074 | 390 938 | 602 234 |
| Karnataka | 37 632 | 45 699 | 87 583 | 170 914 |
| Goa | 2 515 | 3 382 | 4 771 | 10 668 |
| Maharashtra | 72 074 | 81 780 | 165 543 | 319 397 |
| Gujarat | 83 322 | 75 082 | 164 811 | 323 215 |
| Daman & Diu | 5 868 | 1 603 | 21 834 | 29 305 |
| A & N Islands | 4 247 | 6 580 | 4 439 | 15 266 |
| Lakshadweep | 8 040 | 3 561 | 28 721 | 40 322 |
| **India** | **901 815** | **766 532** | **1 906 357** | **3 574 704** |

Source: Planning Commission, Government of India, 2011

Among those engaged in active marine fishing, majority (81%) are full-time, 13 percent on part-time basis and the rest in occasional fishing. Fishing as a full time profession is relatively popular in the west coast States/UTs (Gujarat, Goa, Daman & Diu, Maharashtra, Karnataka, Lakshadweep and Kerala) where 84 percent of active fishers are engaged in full-time fishing as compared to the east coast States/UTs (West Bengal, Orissa, Andhra Pradesh, Puducherry, Andaman & Nicobar Islands and Tamil Nadu), where 79 percent fishers engage in full-time fishing. This is also supported by the fact that fishing operations are more capital-intensive in the west coast States/UTs than in the east coast States/UTs.

The 2005 NMFC also provides information on work of women in marine fisheries. It notes that among women, the major fishing-related activities are marketing (41.8 percent), labour (18.4 percent) and curing/processing (18 percent). Further, as many as 73.6 percent of those

engaged in marketing are women, while 75.7 percent of those in curing and processing are also women. It is apparent that women dominate marketing and processing activities in marine fisheries. State-wise data indicates that the largest numbers of women engaged in marketing are in Maharashtra (39 288), Tamil Nadu (31 019) and Andhra Pradesh (27 160). Significant numbers of women engage in processing/curing activities in Andhra Pradesh (24 524), Orissa (16 447) and Maharashtra (8 584).

### 3.4 International Trade of Fish and Fisheries Products

Fish and fishery products are widely traded, with no less than 195 countries having exported part of their production and some 180 countries having reported fishery imports of varying amounts. In parallel with the increase in production, international trade has continued to grow, and at an accelerating rate in recent years. An increasing proportion of fish products traded come from aquaculture, which accounts for over one third of global fisheries production. Most of this trade is regulated by the World Trade Organization. China is the world's number one producer and exporter of fish products. It was responsible for 10 % of world exports by value in 2006, much of which was re-exports (fish that has been imported processed and exported again).

India has also a significant role in world's fish and fishery product exports. The major marine products exported were frozen shrimp, frozen fish, frozen cuttlefish, frozen squid, dried items, live items and chilled items. Since the beginning of modernization in the 1950s, the fisheries sector, especially the marine and the coastal aquaculture sub-sectors, have had a growing focus on export markets (MPEDA 2006), particularly for shrimp, which now makes up 65.89 percent of total exports by value. Frozen fish, cuttlefish and squid account for another 22.07 percent of total export value. The remainder is comprised of dried fish products, as well as live and chilled exports (Table 3.10).

Table 3.10

Composition of fisheries export (Percentage)

| Item | 1989-90 | | 1995-96 | | 2005-06 | | 2015-16 | |
|---|---|---|---|---|---|---|---|---|
| | Quantity | Value | Quantity | Value | Quantity | Value | Quantity | Value |
| Frozen shrimp | 52.16 | 73 | 32.3 | 67 | 28 | 59 | 39.53 | 65.89 |
| Frozen Fish | 19.2 | 10 | 33.8 | 10.6 | 36 | 14 | 24.18 | 11.38 |
| Frozen Cuttlefish | 12.8 | 7 | 11.4 | 7.5 | 10 | 7.5 | 6.93 | 5.38 |
| Frozen Squids | 10.8 | 6 | 15.2 | 9 | 10 | 8 | 8.64 | 5.31 |
| Others | 5.04 | 4 | 7.3 | 5.9 | 16 | 11.5 | 20.71 | 12.04 |

Source: MPEDA

About 20 percent of India's total marine fish production is exported in value terms. There has been a steady increase in exports by volume, value, and unit value realization since the 1960s. Processed fish products for export include conventional block frozen products, Individual Quick Frozen products (IQF), minced fish products like fish sausage, cakes, cutlets, pastes, surimi, textured products and dry fish etc. Exports of marine products have been erratic and on a declining trend which could be due to the adverse market conditions prevailing in the EU and US markets. The anti-dumping procedure initiated by the US Government has affected India's shrimp exports to the US.

The share of fish and fish products in total exports was about 2 per cent in 1970-71 and thereafter it has been hovering around 3 per cent in 2000-2001. Currently, the share in total exports declined to around one percent in 2010-11. Similarly, the contribution of fish and fish products' exports to agricultural exports increased from 1.68 per cent in 1960-61 to about 16 per cent in 1990-91 and became about 21 per cent in 1999-00. But in 2010-11, the share of fish and fish products in total agricultural exports reduced to 10.2 percent. It seems that the liberalization policies helped the fisheries sector in attaining a higher growth in exports in the 1990s (Kumar A et.al, 2003). After 2000, the share of fish and fishery products in both total and agricultural exports shows a diminishing trend.

Table 3.11

Development of India's exports of fisheries products

| Year | Quantity (000 tonnes) | Value (million US $) | % Share in | |
|---|---|---|---|---|
| | | | Ag Export | Total export |
| 1960-61 | 19.9 | 10 | 1.68 | 0.74 |
| 1970-71 | 32.6 | 40 | 6.21 | 1.97 |
| 1980-81 | 69.4 | 274 | 10.53 | 3.23 |
| 1990-91 | 158.9 | 535 | 15.19 | 2.95 |
| 2000-01 | 502.6 | 1394 | 22.28 | 3.13 |
| 2009-10 | 664 | 2087 | 11.62 | 1.17 |
| 2010-11 | 746.6 | 2531 | 10.2 | 1.01 |

Source: Economic Survey 2011-12

During 2015-16, export earnings for marine products from India are US $ 4.7 billion. In volume terms the exports aggregated to 945892 tonnes, valued at Rs. 30420.83 crore. The increased production and productivity of shrimps, L. vannamei(white leg shrimp) and P. monodon(black tiger shrimp) and better price realization of major items like cuttlefish, shrimp and squid helped realizing a higher export turnover. Table 14provides a glimpse of the trend in exports from 1961-62 to 2015-16.

Table 3.12

Trends in Export of Marine Products

| Year | Quantity (Tonnes) | Value (Rs. Crore) | Unit Value (Rs./Tonnes) |
|---|---|---|---|
| 1961-62 | 15732 | 3.92 | 2491.74 |
| 1965-66 | 15295 | 7.06 | 4615.89 |
| 1970-71 | 35883 | 35.07 | 9773.43 |
| 1975-76 | 54463 | 124.53 | 22865.06 |
| 1980-81 | 75591 | 234.84 | 31067.19 |
| 1985-86 | 83651 | 398.00 | 47578.63 |
| 1990-91 | 139419 | 893.37 | 64078.07 |
| 1995-96 | 296277 | 3501.11 | 118170.16 |
| 2000-01 | 440473 | 6443.89 | 146294.78 |
| 2005-06 | 512163 | 7245.73 | 141473.12 |
| 2010-11 | 813091 | 12901.46 | 158671.78 |
| 2015-16 | 945892 | 30420.83 | |

Source: Handbook on Fisheries Statistics, 2008, MPEDA

According to the Planning Commission (2006), India's share in the global fish products trade increased from 6.1 percent in 1992 to 6.5 percent in 2003. India is now estimated to account for five percent of the global fish products trade. But the contribution of Indian marine fishery sector to global fish exports is negligible and also stable i.e., around 2 percent during the last 30 years.

Table 3.13

India's share of Marine Fish Exports in World Fish Exports (US $ million)

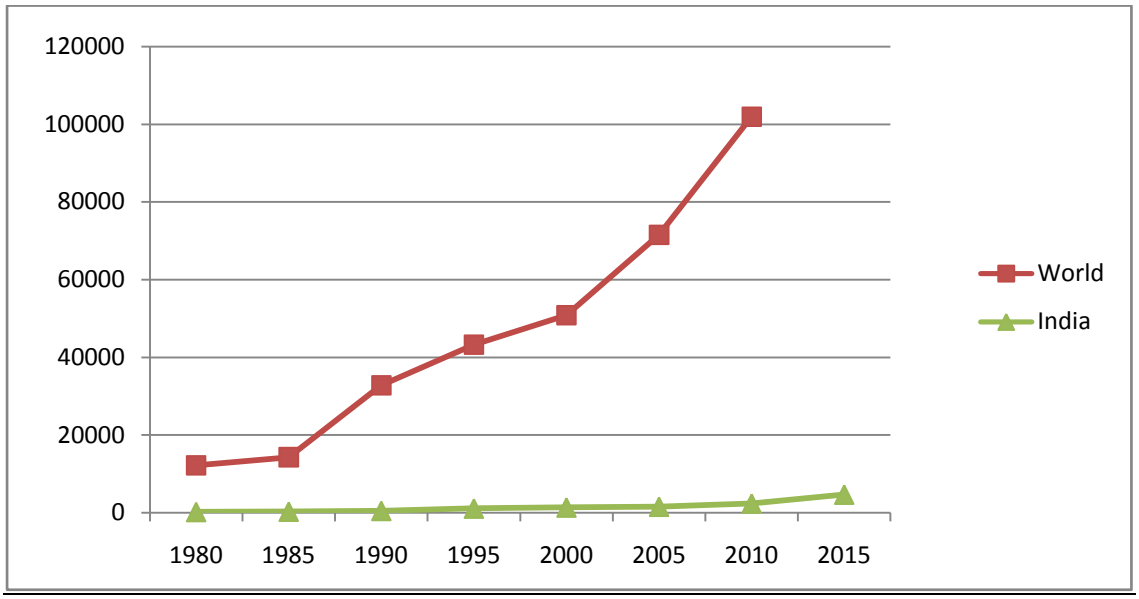
| Year | World | India | India's share |
|---|---|---|---|
| 1980 | 12258 | 242 | 2.0 |
| 1985 | 14335 | 337 | 2.4 |
| 1990 | 32847 | 521 | 1.6 |
| 1995 | 43297 | 1123 | 2.6 |
| 2000 | 50875 | 1391 | 2.7 |
| 2005 | 71559 | 1590 | 2.2 |
| 2010 | 101931 | 2403 | 2.4 |
| 2015 | | 4687 | |

Source: Economic Survey 2011-12, Handbook of statistics on Indian Economy 2011-12, MPEDA

The share of Indian marine fish exports to the global exports has remained insignificant during last several years. In fact, the gap has widened further. This shows that urgent steps are necessary to increase share of India in global fishery exports.

Figure 3.2

India's share of Marine Fish Exports in Global Fish Exports




Source: Economic Survey 2011-12, Handbook of statistics on Indian Economy 2011-12, MPEDA

Japan, the USA, the European Union (EU) and Southeast Asia (including China) are the main export markets of Indian fisheries product. The EU remains the largest export market, now accounting for 26.8 percent of total value in 2010-11. South-East Asia emerged as the largest market for marine products from India accounting for a share of 28.77 percent in quantity but 16.4 percent in value followed by European Union with 2 percent in quantity but 26.8 percent in value. In value terms China accounted for 15.4 percent and 19.57 percent in quantity. Japan's share was 13.1 percent in value and 8.70 percent in quantity, the US 15.3 percent in value and 6.16 percent in quantity and West Asia 5.40 percent in quantity and 5.19 percent in value. Exports to countries like Libya, Reunion islands, Australia, Puerto Rico, Dominican Republic, Kenya, Ukraine, Brazil etc. showed a positive trend

Table 3.14

Destination Pattern of Indian Marine Product Exports (% share by value of exports), 1990–2011

| Year | Japan | USA | EU | China | SE Asia | Middle East | Others |
|---|---|---|---|---|---|---|---|
| 1990-91 | 49.5 | 11.8 | 18.8 | 0 | 7.2 | 1.0 | 11.7 |
| 1991-92 | 45.0 | 10.6 | 19.8 | 0 | 7.2 | 3 | 14.4 |
| 1992-93 | 43.6 | 10.9 | 18.7 | 0.1 | 6.6 | 7.0 | 13.1 |
| 1993-94 | 44.8 | 12.3 | 14.2 | 1.3 | 5.9 | 6.1 | 15.4 |
| 1994-95 | 44.0 | 12.9 | 11.0 | 3.5 | 6.2 | 8.3 | 14.1 |
| 1995-96 | 41.2 | 9.7 | 15.3 | 2.1 | 5.2 | 10.0 | 16.5 |
| 1996-97 | 42.3 | 9.7 | 10.0 | 8.6 | 5.8 | 8.6 | 15 |
| 1997-98 | 46.3 | 11.5 | 5.0 | 10.5 | 3.8 | 11.7 | 11.2 |
| 1998-99 | 47.0 | 14.3 | 8.3 | 5.7 | 3.9 | 8.1 | 13.7 |
| 1999-00 | 41.5 | 15.3 | 9.3 | 8.3 | 3.2 | 5.4 | 17 |
| 2000-01 | 36.6 | 17.1 | 9.7 | 10.8 | 3.2 | 5.1 | 17.5 |
| 2001-02 | - | - | - | - | - | - | - |
| 2002-03 | 22.3 | 29.8 | 20.2 | 11.1 | 9.3 | 3 | 4.3 |
| 2003-04 | - | - | - | - | - | - | - |
| 2004-05 | 18.1 | 23.4 | 27.4 | 10.4 | 9.4 | 3.7 | 7.6 |
| 2005-06 | 16 | 23 | 29 | 12 | 8 | 4 | 8 |
| 2006-07 | 16 | 16 | 32 | 14 | 8 | 5 | 9 |
| 2007-08 | 16 | 13 | 35 | 13 | 8 | 5 | 10 |
| 2008-09 | 14.3 | 11.9 | 33.2 | 15.1 | 10.1 | 5.5 | 9.9 |
| 2009-10 | 13 | 10 | 33 | 18 | 15 | 6 | 9 |
| 2010-11 | 13.1 | 15.3 | 26.8 | 15.4 | 16.4 | 5.2 | 7.8 |

Source: calculations based on data in RBI (2002 and 2003a). & MPEDA (data in 2001-02 and in 2003-04 are not available)

During the last decades, marine product emerged as the highest foreign exchange earning food export item in India. For a long time, USA was the principal buyer for Indian frozen shrimp but after 1977, Japan emerged the principal buyer of the product. Japan retained its position till 2001-02 accounting for about 31 per cent in the total export value. During the year 2002-03 USA emerged as the single largest market for Indian seafood products. Due to the imposition of a set of SPS standards on India's fishery exports by EU, India's fish export to EU is very low i.e., only 5 percent in 1997-98. After the removal of restriction in December 1998, exports to EU market began to recover. During the year 2004-05 the EU has collectively become the largest

importer of Indian seafood products and it retained its position since 2005-06.The table-16 also shows, during 2006-07exports to USA dropped by 20 percent compared to the previous year. This is due to the anti-dumping issues in US on Indian shrimp.

In a recent study conducted by ASSOCHAM (Associated Chambers of Commerce and Industry of India) on the seafood market in India by 2014, it is said that the seafood exports that totaled US $ 1.9 billion in 2008-09 and moved up to US $ 2.857 billion in 2010-11 are likely to touch US $ 4.7 billion by 2013 -14, provided the key thrust areas like value-addition, expansion of aquaculture, technological upgrade and tapping unexplored resources get a boost. Further, the growing demand from EU, USA, China, Southeast Asia and Japan (after the 11 March 2011 tsunami) is likely to give a boost to the seafood exports from the country.

**3.5 Processing and Problems in Fisheries Sector**

Indian fisheries and marketing have recently been facing the serious crisis. The most important problems are related to processing or value addition and food quality.

1. *Compliance of code of conduct of responsible fisheries*

For all round development of fisheries sector, it is necessary to implement the code of conduct for responsible fisheries (FAO, Rome, 1995). The code of conduct consists of collection of principles, goals and elements for action. Governments, in cooperation with their industries and fishing communities, have the responsibility to implement the code. The fisheries establishments should comply with the recommendations of the Code of Conduct for Responsible Fisheries (CCRF) in order to minimize any adverse impact on human health and the environment, including any potential ecological changes. But the compliance is difficult to India because of the lack of technical abilities, testing facilities etc. therefore; the effective compliance of CCRF has adverse effect on fish export marketing.

2. *Food safety and quality standards*

One of the major challenges facing exporters of fish and fishery products of India is the stricter food safety requirements in major export markets like European Union (EU) and USA. These concerns are legitimized by SPS and TBT agreements of WTO. The various studies (FAO 1999, Henson and Loader 2001, Satish Y. Deodhar 2005) suggested that exporters in developing countries have experienced problems complying with these requirements. The expanding market of processed and specialty foods in Western Europe and the US has encouraged Indian exporters to focus on value-added products. But the challenges in market access to these countries are higher due to their stringent safety and quality standards (Aparna Sawhney, 2005).

There is a discernible change in the pattern of seafood export from India, namely market segmentation, which is attributable to the differential safety and quality code standards across the countries. During the late 1980s, Indian exports of shrimp to the U.S. were subject to high rates of border detention related to filth and/or decomposition. During 1990–2001, in terms of value share Japan was the largest country market for Indian seafood exporters, followed by the US (Table3.14). From 1997, the European Union (EU) imposed and enforced a set of SPS standards on India's fishery exports. This led to conditional ban of seafood exports and a subsequent crisis within the fish processing and export industry when the required SPS could not be met. Due to this ban India's fish export to EU is very low i.e., only 5 percent in 1997-98 (Table 16). Simultaneously, the share of exports going to China, Japan, the UAE and the USA jumped for the year 1997–98, as the EU ban forced Indian exporters to target alternative markets in the former group of countries. The new EU standards were followed by the enforcement of the seafood HACCP (Hazard Analysis Critical Control Point) law in the USA from December 1999. Following the removal of restrictions imposed by the European Commission in December 1998 and the recognition of hygiene controls in India as equivalent to those in the EU, exports to that market began to recover. Thus, Indian fish

and fishery exports to the EU were increased and from 2004-05 it has been the largest export market of Indian fisheries products. The quality problems experienced with exports of aquaculture–produced shrimp to Japan have been more protracted than the restriction on exports to the EU. These restrictions resulted in a decline in India's exports to Japan. While Indian exports were valued at $563 million in 2000–01, they declined to $383 million in 2001–02 and US $ 317 million in 2002–03 (Henson S, M. Saqib and D. Rajasenan, 2004). These Food safety and quality standards had a crucial impact on the seafood export industry in the country

India's competitive position among Asian competitors regarding food safety is relatively better in the recent period (Jayakumar. S). India's position in the total number of detentions had improved in 2006-07. The number of detentions in 2006-07 is 55 while 2002-03 had accounted for 93 refusals (Table 3.15).

Table 3.15

Refusal actions on Indian fishery export by FDA

| Month | 2002-03 | 2006-07 |
|---|---|---|
| March | 5 | 6 |
| April | 1 | 1 |
| May | 7 | 0 |
| June | 19 | 4 |
| July | 10 | 1 |
| August | 3 | 7 |
| September | 17 | 3 |
| October | 4 | 2 |
| November | 5 | 5 |
| December | 5 | 18 |
| January | 15 | 4 |
| February | 2 | 4 |
| Total | 93 | 55 |

Source: FDA Detention Reports (www.fda.org)

The Food safety and quality standards measures can lead to import bans which means higher cost of compliance for the developing country exporters. This, in turn, could lead to reduced trade or division of trade between exporters due to high cost. The developing countries like India face number of

constraints to implement these standards as there is lack of SPS control systems, lack of awareness and understanding of standards, lack of technical abilities to implement standards, and the organizational structures are not geared for such standard setting.

3. *Overseas market fluctuations*

The market fluctuations due to several reasons like financial crisis are also having significant impact on Indian export marketing. The global financial crisis of 2008 adversely affected the export of Indian marine products.

Global economic recession, especially in the EU, coupled with the slowdown in exports of shrimp to Japan, caused a fall in India's seafood exports for the first half of the financial year.

Quantity exported in the year of 2006-07 was 612 thousand tonnes and it has been reduced in the year 2007-08 to 541 thousand tonnes (Table 3.16), it shows the negative impact of economic crisis on fisheries export. However, after the outbreak of global Economic Crisis, demand for Indian fisheries has suddenly declined in foreign markets. It is reported that, in European Union, wholesale prices of Indian fishes imported sharply fall down. Collectors have to reduce their scale of transaction and reduce purchase prices of Indian fishes/shrimp.

Table 3.16

Trend of fisheries Export

| year | Export of marine products | |
|---|---|---|
| | Qty (‘000 tonnes) | Value (Rs in crore) |
| 2006-07 | 612 | 8363 |
| 2007-08 | 541 | 7620 |
| 2008-09 | 602 | 8608 |
| 2009-10 | 664 | 9921 |

Source: Economic Survey, 2011

Anti-dumping and other tariff measures in world market also affect the Indian fish export. During the year 2002-03 and 2003-04 USA emerged as the single largest market for Indian seafood products. During the year 2004-05, the EU collectively becomes the largest importer of Indian seafood products and it retained its position since 2005-06. Except USA all other countries increased

their import of seafood products from India during 2006-07 (Table 3.14). Exports to USA dropped by 20 percent compared to the previous year due to the anti-dumping issues in USA on Indian Shrimp.

4. *Lack of infrastructure and testing facilities*

The Indian seafood industry experienced with several infrastructures related problems. The Indian fish export markets are highly un-organized and unhygienic and the fish storing and handling facilities are extremely poor. There is lack of proper transportation system including roads, refrigerated vehicles, etc. There is considerable time lag during the transportation of fish from the landing center to the interior markets which results in poor quality of the material leading to high nutritional and post-harvest losses. Handling facilities for seafood products at ports are also inadequate and obsolete. Indian fish export markets are also experienced with inadequate infrastructure for proper processing, packaging, preservation and marketing of fresh/ chilled fish and processed fish products.

Table 3.17

Fisheries infrastructure

| Ice Factories | Cold Storage | Freezing Plants | Canning Plants | Curing Yards | Peeling Sheds | Fishmeal Plants |
|---|---|---|---|---|---|---|
| 905 | 108 | 113 | 13 | 992 | 293 | 46 |

Source:CMFRI (2006).

Table 3.17 shows the port facilities and markets also vary markedly across the country but most are overcrowded with old wholesale market places in need of upgrading. Some upgrading is occurring as international retail chains are expanding in major cities and taking an increasing volume of fish. Most of the states have inadequate facilities for drying fish and storing dried products. Fish factories, canneries and fish meal plants exist in all states with most of the modern European Union certified plants being located in Gujarat. Ice plants and freezing plants occur around the coast but ice availability and price are constraining factors, and the handling and sanitary quality of ice is commonly

unsatisfactory. A notable feature of the seafood industry is the declining number of sizeable export processing enterprises

The railway vans, air transport, containers, and cold chain of refrigeration units for preservation of seafood products are the essential components for efficient fish marketing system. As a result of lack of infrastructure and technological facilities, the performance of seafood export is affected and not able to expand their market share further in the international market.

5. *Large number of intermediaries*

Major portion of trade is mostly in the hands of agents and middlemen with a very high level of business commission. In India there are many consolidators, traders, wholesalers and number of intermediaries who delay the transit time of sea food stuffs. This causes a large scale loss in the process. Storing of seafood in bags in go-downs leads to about 10 per cent wastage.

6. *Lack of raw materials*

The availability of raw material for processing is one of the crucial issues affecting the health of the sea food processing industry. The most suitable method in the Indian context appears to be contract supply of sea foods from the wholesalers and supplier of sea food under advance money paid method. At the same time, the export growth of sea food cannot be expected from sea catch alone and it is also expected from its value addition. One of the major growth areas in supplying the raw material for sea food export is aquaculture. But due to the Supreme Court relies banning on aquaculture, it has stagnated the performance of sea food export growth in India (Ravanan R and Muthalagu K, 2010).

7. *Fluctuations in exchange rate*

From 2002, export volumes and value showed modest gains. A worrying trend from April 2007 to January 2008 however, was the 18 percent drop in the volume of seafood exports and a corresponding decline in value of 13 percent. The decline is attributed largely to the appreciating India rupee relative to the US$ during this period (The World Bank Report, 2010).

The rupee appreciation has affected sea food exports from India with a 12 per cent fall in exports from April 2007 to February 2010. The sector is now faced with its biggest crisis caused by the strengthening of the Rupee by more than 15 per cent, the increase of fuel price by more than 80 per cent, the anti-dumping duty levied by the US Government and the oversupply of shrimps of the Vannamei species by Thailand, Indonesia, Vietnam and others at prices, which are 25-30 per cent lower than black tiger shrimp cultured in India (Ravanan R and Muthalagu K, 2010).

8. *Effects of Globalization*

Globalization may have a number of positive or negative effects on the economic, social and nutritional roles and performance of the fisheries sector. Globalization of fish trade, coupled with technological developments in fish catching, handling, processing and distribution, and the increasing awareness and demand of consumers for safe and high quality food have put food safety and quality assurance high in public awareness and a priority for governments. This is exacerbated by the series of food safety scares in the 1990s. Consequently, many countries have tightened food safety controls, imposing on imports additional costs and requirements that are not always technically or scientifically supportable. The differences between importing countries regulations, standards, organization and function of inspection services, and the *modus operandi* of such services are among the most important practical difficulties of compliance faced by India. A key problem is the border control where products are rejected or put in detention awaiting resolution or destruction (FAO, 2005).

Due to globalization, the production costs were increased to meet quality and sanitation standards applicable in main foreign markets and also led to higher prices for tradable fish products in domestic markets and potential reduction of fish supply from local fisheries to domestic markets. Negative effects of globalization on fisheries in Asia and the Pacific were also identified in the form of increased market competition between the small-scale fisheries sector products and imported low priced fish products. The studies also

identified changes in the structure of demand for fishery products, incorporation of new technologies and changes in the marketing and distribution systems as important factors of change of the fishery sector.

### 3.6 Fisheries Research in India

For the development of fisheries sector in India, the Government of India established number of research and development institutions under its administrative control across the country.These institutions help in providing technical trained manpower to the sector, preparation of techno economic feasibility report for setting up of fishing harbour / fish landing centresetc, training in fish processing and other related activities.

1. **Fisheries development**

**Central Institute of Fisheries, Nautical and Engineering Training, Kochi (CIFNET):** The CIFNET was established in 1963 by the Ministry of Agriculture, Governmentof India at Cochin. Subsequently, two units of the Institute were set up atChennai and at Visakhapatnam. The primary objective of CIFNET is to makeavailable sufficient number of trained operatives for fishing vessels andtechnicians for shore establishments. For this purpose, the CIFNET offers different courses for students.

**National Institute of Fisheries Post Harvest, Technology & Training, Cochin (NIFPHATT):** The NIFPHATT formerly known as the Integrated Fisheries Project (IFP) was set up in October 1952 when a tripartite agreement between the

Government of Norway, India and the United Nations was signed to set up an Indo-Norwegian Project (INP) for fisheries and fishermen community development at Neendakara in the Travancore- Cochin State (present Kerala State). In 1961 the Project moved to Kochi and in 1972 the administration of the Project was completely taken over by the Government of India and the INP was renamed as IFP. In 2008, the IFP was further renamed as the National Institute of Fisheries Post-Harvest Technology and Training (NIFPHATT). The Institute is mainly mandated to develop value added products by way of

process and product diversification; technology development and transfer to beneficiaries consisting of rural fishermen community; capacity building and popularization and test marketing of value added products of fish varieties including low value, unconventional species and seasonally abundant fishes. The Project also has a unit in Visakhapatnam.

**Fishery Survey of India, Mumbai:** The FSI is responsible for survey and assessment of marine fishery resources of the Indian EEZ. The FSI has six operational bases at Mumbai, Mormugao and Kochi along the west coast, Chennai and Visakhapatnam along the east coast and Port Blair in the Andaman & Nicobar Islands. A total of 13 ocean ongoing survey vessels are deployed for fisheries resources survey and monitoring for various commercially important fin and shell fish species and other biological investigations. Besides resource survey, the FSI monitors fishery resources for the purpose of regulation and management, makes an assessment of suitability of different types of craft and gear for deep-sea and oceanic fishing, imparts in-vessel training to CIFNET/Polytechnic trainees, disseminates information on fishery resources through various media to the fishing community, industry, other end users, etc.

**Central Institute of Coastal Engineering for Fishery, Bangalore (CICEF):**TheCICEF formerly known as the office of the Pre-Investment Survey of Fishing Harbours (PISFH), under the Ministry of Agriculture was established in January 1968, under technical and manpower assistance from the FAO of the United Nations. The main objectives were to identify potential fishery harbour sites existing along the coastline of the country; to undertake engineering and economic investigations for selected fishery harbour sites; and to prepare techno-economic feasibility reports. The office of PISFH was renamed as CICEF in August 1983 and additional mandates were entrusted to undertake reconnaissance surveys for selection of suitable sites in the maritime states for development of brackish water shrimp culture farms.

**National Fisheries Development Board, Hyderabad:** The National Fisheries Development Board (NFDB) was set up in July, 2006 to realize the untapped

potential of fisheries sector in inland and marine fish capture, culture, processing & marketing of fish, and overall growth of the sector with the application of modern tools of research & development including biotechnology for optimizing production and productivity. The activities of the Board are focused towards increasing fish production of the country to a level of 10.3 mmt, to double the exports and provide employment to 3.5 million people by extending assistance to various agencies for implementation of activities under inland, brackish water and marine sectors. It is also mandated to be a platform for public-private partnership in fisheries sector.

**Coastal Aquaculture Authority, Chennai:** The Coastal Aquaculture Authority (CAA) was established under the Coastal Aquaculture Authority Act, 2005. The main objective of the Authority is to regulate coastal aquaculture activities in coastal areas of the country in order to ensure sustainable development without causing damage to the coastal environment. The Authority is empowered to make regulations for the construction and operation of aquaculture farms in coastal areas, inspection of farms to ascertain their environmental impact, registration of aquaculture farms, fixing standards for inputs and effluents, removal or demolition of coastal aquaculture farms, which cause pollution, etc. For the purpose of registration of shrimp farms, the Authority has constituted State and District Level Committees in all the coastal States/UTs.

## 2. Scientific research

The current components of fisheries research can be broadly grouped under the following organizations: (a) Indian Council of Agriculture Research (ICAR) system; (b) Ministry of Agriculture; (c) Ministry of Commerce and Industries; (d) Ministry of Food Processing Industries; (e) Ministry of Earth Sciences and (f) Other Bodies such as the Council of Scientific and Industrial Research and the State Agricultural Universities. However, the ICAR is the main organization for conducting fisheries research in the country and the following institutes form part of the ICAR system:

***1. Central Marine Fisheries Research Institute (CMFRI), Kochi, Kerala:*** The Institute carries out work on marine fisheries resources and theirexploitation besides training and extension programmes.

***2. Central Inland Fisheries Research Institute (CIFRI), Barrackpore, West Bengal:*** The Institute conducts research activities on open inlandwater systems and fishery resources in rivers, reservoirs, wetlands, lakes andestuaries besides, extension and training related to these systems.

***3.Central Institute of Fisheries Technology (CIFT), Kochi, Kerala***: The Institute Conducts R & D programmes on design of fishing crafts and gear, fishing technology, fish processing, preservation and also helps in quality control certification for export of fishery products.

***4. Central Institute of Fisheries Education (CIFE), Mumbai, Maharashtra:*** The Institute is a 'Deemed University' responsible for fisherieseducation at post graduate and doctoral level. It also takes a lead role indeveloping and updating syllabus for fisheries education at post graduate anddoctoral levels, which provide model for State Agricultural Universities tofollow. The Institute also conducts various training programmes catering toState Fisheries Officials and private participants through its regional centers.In view of research being integral part of higher education, CIFE alsoconducts upstream, basic, applied and action research on various aspects offisheries and aquaculture, including policy and socio-economics.

5. ***Central Institute of Brackish Water Aquaculture (CIBA), Chennai, Tamil Nadu:*** The Institute concentrates on brackish water aquaculture fordeveloping technologies for shrimp and brackish water fish culture systemsand also connected extension and training programmes.

6. ***Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar, Orissa:*** The Institute deals with research programmes and studies evolvingtechnologies related to production and productivity in freshwater aquacultureas well as extension and training.

7. ***National Bureau of Fish Genetic Resources (NBFGR), Lucknow, Uttar Pradesh:*** The Bureau conducts work on genetic characterization, gene-

banking,bio-diversity database and conservation of various fish species. TheBureau coordinates with the resources specific fisheries institute and othernational agencies in so far as fish conservation programmes are concerned.

8. ***Directorate of Cold Water Fisheries Research (DCFR), Bhimtal, Uttar Pradesh:*** This Directorate carries out research and studies on Coldwaterfishery resources and biology, ecology, breeding etc. of cold water fishes. Itis also developing hatchery and aquaculture technologies for indigenous andexotic Coldwater fishes.

3. **International cooperation**

Many fisheries issues and protection of marine environment need international and regional cooperation as spelled out in the 1982 United Nations Convention on Law of the Sea (UNCLOS). Fisheries arrangements are the natural outcomes of UNCLOS and the 1995 UN Fish Stocks Agreement. India signed the UNCLOS in 1995 and ratified the Convention in 1996. India has also ratified the UN Fish Stocks Agreement in 2003. Apart from these global initiatives in fisheries, India also actively participates in organizations such as World Trade Organization, Convention on Biological Diversity (CBD), etc., where issues concerning fisheries are articulated and decisions taken on sustainable use of the fisheries resources.

India's participation in key UN Fisheries organizations such as the FAO; Regional Fisheries Management Organizations and Regional Fisheries Bodies are described below:

**Food and Agriculture Organization of the United Nations:** Being a member of the United Nations, India is also a member of the FAO. Since the establishment of FAO in October 1945, India has actively cooperated with FAO in development and implementation of both binding and non-binding (voluntary) fisheries instruments, the most notable being the Code of Conduct for Responsible Fisheries. To promote sustainable utilization of the fisheries resources and also contribute to national and global food security, India has implemented several technical cooperation projects with assistance from FAO.

**Other UN Organizations**

Besides FAO, India is also actively participating in fisheries and related matters promoted by other UN Bodies such as the United Nations Development Programme, International Labour Organization, World Maritime Organization, United Nations Environment Programme, etc.

**Regional Fisheries Management Organizations**

Apart from UN organizations, India is member to several organizations with management and regulatory mandates. These organizations are more focused on conservation of resources and designing of resource allocation rules. A brief description of these Organizations is given below:

***The Indian Ocean Tuna Commission (IOTC):*** The IOTC was established during 1996-97 as an Article XIV body of FAO. Its objective is to promote cooperation among its Members with a view to ensuring the conservation and optimum utilization of tuna and tuna-like fishes and encouraging sustainable development of fisheries based on such stocks through appropriate management. The main operational area of the IOTC is the high seas (beyond the EEZ of coastal states in the Indian Ocean) although some of its measures have bearings on EEZ of the countries also. India is a founder member of IOTC.

***Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR):*** The CCAMLR came into force in 1982, as part of the Antarctic TreatySystem, in pursuance of the provisions of Article IX of the Treaty. It wasestablished mainly in response to concerns arising from increase in krill catches inthe Southern Ocean. CCAMLR is different from many other international fisheriesmanagement organizations as it considers both commercial harvesting andconservation of marine living resources from an ecosystem perspective.

***Regional Fisheries Advisory Bodies***

The regional bodies with advisory mandate on the other hand, assist their member- countries in promoting regional cooperation for sustainable uses of

their resources and help in in-country capacity building to move towards this objective.

***The Asia-Pacific Fishery Commission(APFIC):*** APFIC was established under the APFIC agreement as the Indo-Pacific Fisheries Council in 1948 by the FAO. It is a Regional Consultative Forum and functions as an Article XIV body of the FAO. It works in partnership with other regional organizations and arrangements and members. It provides advice and acts as an information broker to increase knowledge of fisheries and aquaculture in the Asia-Pacific region to underpin decision making.

***Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation(BIMSTEC):*** Bangladesh, India, Sri Lanka, and Thailand formed an Economic Cooperation in June 1997 and named it BIST-EC. Consequent upon the joining of Myanmar, Nepal and Bhutan, the name was changed to BIMST-EC.

In the first Summit on 31 July 2004, the member-countries agreed to change the name to BIMSTEC. The prime objective of BIMSTEC is to create an enabling environment for rapid economic development, accelerate social progress in the sub-region and promote active collaboration and mutual assistance on matters of common interest. The Fisheries Secretariat of the BIMSTEC is entrusted to Thailand.

***Bay of Bengal Programme Inter-Governmental Organization(BOBPIGO):***

The BOBP-IGO evolved from the erstwhile Bay of Bengal Programme of the FAO in 2003. India is the host country of the BOBP-IGO. Other members are Bangladesh, Maldives and Sri Lanka. The objective of the Organization is to promote and establish responsible fisheries in a time bound manner to ensure socio-economic well-being of the marine fishers and ecological security of fisheries resources in the Bay of Bengal. Major work of the Organization in recent times include critical policy support to the Government on European Union regulation on catch certification, training programmes on sustainable management of fisheries, capacity building on fisheries data strengthening, technical support for improvement of fisheries harbour, etc.

***INFOFISH:*** INFOFISH was originally launched in 1981 as a project of the FAO.Since 1987, it is an inter-governmental organization providing marketing information and technical advisory services to the fishery industry of the Asia-Pacific region and beyond from its headquarters in Kuala Lumpur, Malaysia.

***Indian Ocean Rim Association for Regional Cooperation (IOR-ARC):*** The Indian Ocean Rim-Association for Regional Cooperation (IOR-ARC) was established in 1997. The Association disseminates information on trade and investment regimes, with a view to helping the region's business community better understand the impediments to trade and investment within the region.

***Network for Aquaculture Centres in Asia-Pacific(NACA):*** NACA is an intergovernmental organization that promotes rural development through sustainable aquaculture. NACA seeks to improve rural income, increase food production and foreign exchange earnings and to diversify farm production.

***South Asian Association for Regional Cooperation (SAARC):*** SAARC was founded in December 1985 and is dedicated to economic, technological, social and cultural development emphasizing collective self-reliance. Its seven founding members are Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. Afghanistan joined the organization in 2005. The 16 stated areas of cooperation are agriculture and rural, biotechnology, culture, energy, environment, economy and trade, finance, funding mechanism, human resource development, poverty alleviation, people to people contact, security aspects, social development, science and technology; communications, tourism.

***The South Asia Cooperative Environment Programme (SACEP):*** SACEP was established in 1982 by the governments of South Asia to promote and support protection, management and enhancement of the environment in the region. SACEP member countries are Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

**3.7 Marine Fisheries Legislation in India**

Fishery is a state subject under the Seventh Schedule of the Constitution of India (Item 21 in the State List) while fishing and fisheries beyond territorial waters are in the Union List (Item No. 57). Fisheries development are within

the purview of state governments, the Government of India through the Ministry of Agriculture (Fisheries Division in the Department of Animal Husbandry, Dairying and Fisheries) plays a crucial role in the promotion of new ideas and propagation of better technologies including external participation wherever necessary.

For sustainable development of the marine resources, India amended its constitution in 1976. The Indian Parliament enacted the Territorial Sea,Continental Shelf, Exclusive Economic Zone and other Maritime Zones Acts in1976, pursuant to which a 200 nautical mile EEZ was established. Since then,India also enacted a number of other laws and regulations, including theMarine Products Export Development Authority Act, 1972; the Indian Coast Guard Act, 1978, the Maritime Zones of India (Regulation of Fishing by Foreign Vessels), Act, 1981 and the related Rules of August, 1982, the Environment Protection Act, 1986, etc. The marine Product Export Development Authority (MPEDA) was established in 1972 under the Marine Product Export Development Authority Act (Act 13 of 1972) under the Ministry of Commerce. The other Central legislation, which has important bearing on the fisheries sector include the Merchant Shipping Act, 1956 and the Wildlife Protection Act, 1972. However, there is still no law to regulate the wholly Indian-owned fishing vessels operating in the EEZ. A Bill prepared by the DAHD&F to regulate fishing in the Indian EEZ is under process.

The Marine Fishing Regulation Act (MFRA) of the maritime States/UT Governments and the Maritime Zones of India (Regulation of Foreign Fishing Vessels) Act, 1981 of the Government of India provide for prohibition of fishing by mechanized fishing vessels in the areas earmarked for traditional and small-motorized crafts. For monitoring the fishing activities in different assigned fishing zones by respective fleets, patrol boats have been provided under a Central Scheme to the Department of Fisheries of the maritime States. The resources monitoring surveys conducted by the FSI, Mumbai are being linked with the management measures for sustainable development of fisheries in the country.

The inland fisheries sector is regulated through the provisions of the Indian Fisheries Act, 1897, which repealed by most of the inland States as their own Act. Many States also formulated their own acts for regulating specific activities such as seed production, etc. Regulation of coastal aquaculture is being carried out through the Coastal Aquaculture Authority Act, 2005. Further, a model bill for regulation of inland fisheries and aquaculture has been prepared by the DAHD&F and circulated to the States for their consideration. Similarly, Guidelines for Fish Seed Certification have also been prepared and circulated to the States.

**Appointment of Expert Committees**

1. Majumdar Committee (1976)

The committee was appointed to study the situation regarding conflicts between traditional and mechanized fish workers, and to examining the questions of delimiting the areas of fishing for different types of boats. The committee submitted its report in December 1978, with a model Marine Fisheries Regulation Bill and suggested seasonal ban on trawlers. The Model Bill was circulated to all maritime states and Union Territories for enacting suitable legislation.

2. New Deep Sea Fishing Policy (1991)

In March 1991, Indian Government announced NDSP as part of the economic reforms. The policy involved thee schemes- leasing out of foreign fishing vessels to operate in the Indian EEZ, engaging foreign fishing vessels for test fishing and forming joint ventures between Indian companies and foreign companies on 49: 51equity basis in deep sea fishing, processing and marketing. Government of India started giving licenses to joint venture, lease and test fishing vessels. This was opposed by fishers all over the coastal states.

3. Murari Committee (1995)

The government appointed the Murari committee to review the Dee Sea Fishing Policy, made 21 recommendations, which were approved by the cabinet in 1997. Some of the recommendations are: - No renewal, extension or new licenses be issued in future to joint venture/ cluster/ lease/ test fishing

vessels; The present licenses be cancelled as per going through legal procedures; Upgrade the skill of the fishing community to equip them with exploiting the deep sea resources; Stop pollutions; supply of fuel at subsidized rate; fishing regulations in the entire EEZ; A separate ministry to deal with the entire fisheries and Monsoon trawl ban. The area already being exploited or which may be exploited in the medium term by fishermen operating traditional craft or mechanized vessels below 20m size should not be permitted for exploitation by any vessels above 20m length except currently operated Indian vessels which may operate in the current areas for only 3 years. However, few of these 21 recommendations have been implemented.

In 1999, an expert group led by K.Gopakumar, then Deputy Director of Fisheries, Indian Council if Agricultural Research, was constituted to elaborate a comprehensive marine fisheries policy. The report was submitted to Government in 2001 (FAO, 2006).

The Sudershan committee had also called for regulation of deep sea and coastal fishing, mandatory catch-reporting system for deep-sea vessels operating in India's EEZ, comprehensive legislation covering conservation and utilization of marine fishery resources and a code of conduct for fishing vessels, at the state and national level. New guidelines for fishing operations in the India EEZ issued in November 2002, allow large deep sea fishing vessels to employ foreign crew, do not require them to land with their catch in Indian ports, have no specifications regarding the age of the vessel and have no quotas and fees to judge the value of the haul. In July 2004, an expert committee headed by Prof. M.S.Swaminadhan to carry out a comprehensive review of the CRZ and submitted its report in February 2005. The committee had observed that CRZ legislation should be established and recognized the traditional rights of the fishing community. It recommended the expansion of Coastal Zone to include the territorial waters. It also recommended introducing Coastal Management Zones by replacing the concept of Coastal Regulation Zones. The zone demarcation proposed by Swaminadhan Committee could not be accepted by a state like Kerala where the population density is high. The new coastal

regulation guidelines (CRZ) have not met with the approval of the traditional fishermen community of the Kerala coast.

Marine Fishing Policy adopted the strategy: (1) to augment marine fish production of the country to the sustainable in a responsible manner so as to boost export of seafood from the country and also to increase per capita fish protein intake of the masses, (2) to ensure socio-economic security of the artisan fishermen whose livelihood solely depends on this vocation (3) to ensure sustainable development of marine fisheries with due concern for ecological integrity and bio-diversity. It also highlighted to promote exploitation in the deep sea and oceanic water for reduce fishing pressures and resources within 50m depth zone are showing the symptoms of depletion. Stringent fishery management system is needed.

In January 2004, Government of India, ministry of agriculture, DAHD&F constituted a national level committee under the chairmanship of Prof. Mohan Joseph Madayil, Director, CMFRI, Kochi to study and report the impact of closed fishing season, on the marine fishery resources of the country. The committee was of the strong view that a closed season is very essential for the recovery of the fish stock and recommended a mandatory closed season shall be imposed along the west coast of India from 15$^{th}$ June to 31$^{st}$ July (47 days) and 15$^{th}$ April to 31$^{st}$ may (47 days) every year along the east coast of India. The committee also recommended that only sustenance fishery using traditional non-motorized or motorized with OBM/IBM of less than 10 HP vessels should be permitted for fishing during the closed season.

Establishment of National Fisheries Development Board (NFDB) during the Tenth plan is a major fillip to the Indian fisheries sector. NFDB was formed by a decision of the Union Cabinet on June, 2006. It has been registered under the Andhra Pradesh Societies Regulation Act, 2001. It aims to increase fish production from aquaculture and culture based fisheries, to enhance the value of fish output through better post-harvest practices, and to provide effective marketing prospects and employment opportunities. It also intends to undertake conservation and management of fisheries resources, as well as to provide

diversified income earning opportunities for fishers, especially women. This sector is also hold in ensuring nutritional security.

### 3.8 Marine Fishery Policies and Programmes in India

The development plans for India's fisheries sector were aimed at increasing the fish production, improving the welfare of fishermen, promoting export and providing food security. The first step towards developing the fishing as an industry was made in 1898, when the Madras Presidency was advised to strengthen the fishery so that it could fight famine. After the independence, the first All India

Fisheries Conference, held in 1948 in New Delhi, decided to seek foreign co-operation to create necessary infrastructure for modernizing the fisheries sector. In 1952, a tripartite technical co-operation agreement was signed between India, the USA and the United Nations for fisheries development and a year later, the Indo-Norwegian Project (INP) in Kerala was started. From then onwards the modernization of fisheries was initiated in the coastal states in India. Fisheries development in India is coupled with the plans that were adopted by the government.

**First Five Year Plan (1951-56)**

Emphasis of this plan was mainlygiven on marine sector

(a) Mechanization of country crafts

(b) Development of harbours

(c) Market developments

(d) Provisions for ice storage and transport

(e) Provision for offshore fishing

**Second Five Year Plan (1956-61)**

(a) Improvements of fishing methods and mechanization of crafts

(b) Supply of nylon nets to fishermen

(c) Provision of landing centre and harbor

(d) Integration of fish transport, storage, marketing and utilization

(e) Deep sea fishing

**Third Five Year Plan (1961-66)**

(a) Increased fish production

(b) Improved economic status of fishermen community

(c) Development of export trade

(d) Formation and operation of fisheries cooperatives

(e) Expansion of freezer plants and canning plants

**Fourth Five Year Plan (1969-74)**

(a) Increase productions of fishes to meet cheaper source of protein

(b) Developing the export potential

(c) Improving socio-economic conditions of fishermen

(d) Training in fisheries and utilization of institutional finance were emphasized

(e) Networking features of this period

(f) Abolition of licensing the crafts

(g) Distribution of Taccavi loans (short term loans) to needy fishermen

(h) Provision of loans to fishermen cooperatives with subsidy

(i) The agricultural refinance corporations and IDBI Started finding some fisheries schemes

**Fifth Five Year Plan (1974-79)**

It had two important viewpoints:

(1) Production programme intended to explore and exploit (economically) the national fishery resources

(2) New food programme- To reach out to the weaker section with better quality protein at cheaper prices

**Strategies**

1. To encourage private sector to take up deep sea fishing (import DSFV)
2. To increase number of farms for increased fish production and to enhance F.W prawn culture

**Strategies for betterment of fishermen community**

(a) Development of appropriate technology

(b) Provision of share capital through cooperatives

(c) Marketing and processing facilities

(d) FFDAs were established

**Sixth Five Year Plan (1980-85)**

(a) Increase in production in both marine and inland sector

(b) Extension intensification

(c) Intensive resource assessment surveys in marine sector (EEZ)/ optimum exploitation

(d) Intensification of processing, marketing and value additions

**Seventh Five Year Plan (1985-90)**

(a) Exploitation of EEZ through higher investment in deep sea fishing (beyond 40 fathoms)

(b) Diversification of fishing methods

(c) New gears were introduced

(d) FRP and Ferro cement boats

(e) Laws were enforced to avoid conflicts between traditional fishermen and mechanized boaters

(f) Suggested having small landing centers for traditional fishermen

(g) Insurance welfare schemes foe fishermen

(h) Value addition in domestic fishing products

(i) Proposal for 'hygienic fish market' through a chain of integrated cold chain of whole sale and retail outlets perfectly under cooperative sector

(j) Fisheries industrial estates

(k) FSI and CIFNET were reorganized and strengthened during plan span

**Eighth Five Year Plan (1992-97)**

(a) Promotion of maritime

(b) Conservation policies

(c) Closed seasons, closed areas, fisheries sanctuaries

(d) Welfare facilities for fishermen community

(e) Housing

(f) Financial assistances

(g) Sanitation

(h) Education in free for fishermen community

**Ninth Five Year Plan (1997-2002)**

(a) Enhancing production of fish and productivity of fishermen/ fisherwomen/ fishing industry and thereby generating employment

(b) Increasing the percapita consumption to 11 kg/hr from last plan periods8 kg/annum

(c) Integration of approach to marine and inland taking in to account of sustainable ecofriendly aquaculture

(d) Conservation of aquatic resources and genetic diversity

**Tenth Five Year Plan (2002-2007)**

(a) Strengthening of the post-harvest infrastructure through construction of fishing harbours and fish landing centers.

(b) Upgradation of Fishing Harbours/ Landing centres with basic and essential requirements (platforms, sheds, storage facilities, sanitation, water facilities, etc.).

(c) Need to develop resources – product – market linked fishery harbours with facilities of global standards.

(d) Training in low cost techniques of fish products development to be implemented through IFP

(e) Supply of input subsidy to self-help groups of fisherwomen for setting up processing units (through State Fisheries Departments or women development Departments)

(f) Assistance for setting up of fish vending kiosks and mobile retail marketing units through three wheelers with refrigerated/ice hold. This would generate considerable employment opportunities and provide fresh fish to consumers in hygienic conditions.

(g) Setting up of model fish markets and establishment of cold chain at identified sites.

(h) Strengthening of Data Base and Information Networking

(i) To allow additional subsidy on housing scheme to beneficiaries in hilly areas on account of high cost of materials and transportation.

(j) To cover seasonal fishers also under savings-cum-relief scheme

(k) To include a component for renovation of existing houses

(l) To include platforms for fish-drying / fish trading in fisher villages as a community facility.

**Eleventh Five-Year Plan**

In the Eleventh Five-Year Plan, the scheme was implemented with three major components *viz.* (i) Development of Marine Fisheries; (ii) Development of Infrastructure and Post-Harvest Operations; and (iii) Provisions for taking up innovative activities.

**A. Development of Marine Fisheries**

(i) Motorization of traditional craft,

(ii) Safety of fishermen at sea,

(iii) Fishermen development rebate on HSD Oil,

(iv) Introduction of intermediate craft of improved design including prototype study of new intermediate vessel design,

(v) Establishment and operation of Vessel Monitoring System,

(vi) Promotion of fuel efficient and environment-friendly fishing practices,

(vii) Management of marine fisheries.

**B. Development of Infrastructure and Post-Harvest Operations**

(i) Establishment of fishing harbours and fish landing centres,

(ii) Strengthening of post-harvest infrastructure,

(iii) Assistance for maintenance dredging of fishing harbours and fish landing centres.

**C. Taking up innovative activities**

i. Motorization of traditional craft

ii. Safety of fishermen at sea

iii. Fishermen development rebate on HSD Oil

iv. Conversion of trawlers to resource specific fishing vessels

v. Management of marine fisheries

vi. Enhancement of production through Mari culture

**Twelfth Five-Year Plan**

The objectives for development and management of fisheries and aquaculture in the Twelfth Five-Year Plan are proposed as follows:

• Enhancing production of fish on an environmentally sustainable and socially equitable basis;

• Ensuring optimum exploitation of fisheries resources in the Indian Exclusive Economic Zone in a manner consistent with the principles of ecologically sustainable development;

• Conserving aquatic resources and genetic diversity and preservation of health of ecosystems while ensuring bio-security;

• Maximizing net economic returns to the fishers and fish farmers through technological support and implementing efficient and cost –effective aquaculture and fisheries management practices;

• Strengthening infrastructure in harvest, post-harvest, value-addition and marketing;

• Increasing the per capita availability and consumption of fish to about 11 kg/capita/annum;

• Augmenting export of fish and fish products;

• Securing and increasing employment opportunities in the sector;

• Improving safety and labour conditions in fisheries and aquaculture;

• Uplifting the social and economic conditions of fishers and fish farmers and ensuring their welfare; and

• Improving overall governance and management of fisheries sector in the country through institutional strengthening and human resource development.

**Plan Outlay for Fisheries Sector**

The outlay for fisheries sector as per cent of outlay for the agricultural sector over the Five Year Plans has increased from 1.45 per cent in the first Five Year Plan to about 6.52 per cent in the Sixth Five Year Plan (Table 3.18). In

subsequent Plans, its share hovered around 4 to 5 per cent. It shows the importance given to the fisheries sub-sector within agriculture sector. Its share in the total plan outlay during different plans periods has been hovering between 0.26 and 0.52 per cent.

Table 3.18

Outlay for fisheries sector during different Five Year Plans, India

(In crores Rs)

| Five Year Plans | Total Outlays | Outlay for agricultural Sector | Outlay for fisheries Sector | Share of fisheries sector (%) | |
|---|---|---|---|---|---|
| | | | | Total Outlay | Agricultural Outlay |
| 1st(1951-56) | 2378 | 354 | 5.13 | 0.22 | 1.45 |
| 2nd(1956-61) | 4500 | 501 | 12.26 | 0.27 | 2.45 |
| 3rd(1961-66) | 8577 | 1089 | 28.27 | 0.33 | 2.60 |
| Annual Plans(1966-69) | 6625 | 1107 | 42.21 | 0.64 | 3.81 |
| 4th(1969-74) | 15779 | 2320 | 82.68 | 0.52 | 0.52 |
| 5th(1974-79) | 39426 | 4865 | 151.24 | 0.38 | 3.11 |
| Annual Plan(1979-80) | 12177 | 1997 | -- | -- | -- |
| 6th(1980-85) | 97500 | 5695 | 371.14 | 0.38 | 6.52 |
| 7th(1985-90) | 180000 | 10525 | 546.54 | 0.30 | 5.19 |
| Annual Plans(1990-92) | 123120 | 7256 | 292.74 | 0.24 | 4.03 |
| 8th(1992-97) | 434100 | 22467 | 1205.39 | 0.28 | 5.37 |
| 9th(1997-02) | 859200 | 42462 | 2069.78 | 0.24 | 4.87 |
| 10th(2002-07)* | 398890 | 20668 | 765.00 | 0.19 | 3.70 |

Source: Handbook on Fisheries Statistics, Ministry of Agriculture, Government of India and Tenth Five Year Plan 2002-2007, Planning Commission, Government ofIndia, New Delhi.

*Allocation of central funds only.

The above table shows that there has been increasing the outlay for fisheries sector during the five year plans. The outlay for fisheries sector as percentage of total plan outlay is more or less stable. However, during the five year plans the fish and fisheries production have been continuously increasing (Table 3.18).

## 3.9 Trade Policies in Fisheries Sector in India

For the growth of fisheries trade, the government of India introduced various import and export policies.

### Import Policies

*1. Import Restrictions*

In the case of agriculture, including fisheries, India had followed protective trade policies i.e., trade was being regulated through Quantitative Restrictions (QRs), canalization, licenses, quotas and high tariff rates. To make trade policies consistent with the new economic policies and the provisions of World Trade Organization (WTO), a number of fish products were moved to the Special Import License (SIL) and freely importable lists in 1997 onwards. In the exim policy (2002), the import of fisheries commodities further liberalized. The restrictions on the five groups of live and Whale Shark (Rhinocodon) are maintained under the Wildlife Protection Act, 1972, the Convention on International Trade in Endangered Species (CITES). In addition, it appears that the SIL has been discontinued since April 1, 2001 (WTO, 2002, P-41). Some contingency measures pertaining to anti-dumping, countervailing and safeguards are also in operation. In the recent Exim policy (2009-14) the imports for technological upgradation under EPCG in fisheries sector are liberalized.

*2. Standards, testing and certification*

In India, the Bureau of Indian Standards (BIS) has been designated as the WTO-Technical Barriers to Trade (TBT) Enquiry Point, while the Ministry of Commerce is responsible for implementing and administering the WTO agreements on TBT. India also accepted the Code of Good Practice on 19 December 1995. Indian standards are formulated by the BIS, to align Indian standards with international standards. Indian and foreign manufacturers who meet a BIS standard may carry the BIS certification. The BIS laboratories provide conformity testing for products that require BIS certification. Voluntary certifications are also issued for environment-friendly products,

environmental management systems, quality systems and hazard analysis and critical control points (HACCP). BIS carries out regular surveillance audits and inspections to ensure that the systems and products meet the relevant standards.

*3. Sanitary and phytosanitary measures*

These measures are related with food safety and quality of products. For imports, a notification was issued recently requiring all packaged products when produced, packed or sold in India, to carry information on name and address of importer; generic or common name of the commodity; net quantity in terms of standard unit of weights and measures; month and year in which the commodity was manufactured, packed or imported and maximum retail sale price. Further, all imports of edible products, for which the domestic manufacture and sale are governed by the Prevention of Food Adulteration Act,1954, must at the time of importation, have a valid shelf-life of not less than 60% of their original shelf-life.

*4. Import tariffs*

The tariff structure in the fisheries sector has also undergone a tremendous change. The tariff rate applicable for import of fish products was 60 per cent till 1993-94 (Table 3.19). After the establishment of WTO in 1995, it was reduced to 24 per cent in 1998-99 and further to 21 per cent in 1999-00. In April 2000, India removed QRs on 715 items, therefore, more than 120 items of fish and fish products have been affected by these regulations. After complete dismantling of QRs, tariff rates were perceived as the only instrument for restricting imports. In 2000-01, the tariff on imports of fish and fish products was raised to 44 per cent and, after observing for a year, it was again moderated to the level of 35 per cent in 2002-03. In view of the continuing economic liberalization policies, tariff rate is expected to decline further. With the reduction of tariff rate, better overseas market would become available for Indian fish products.

Table 3.19

Custom tariff rate on import of fish products, 1988-89 to 2002-03

| Year | Tariff Rate (%) |
|---|---|
| 1988-89 | 60.00 |
| 1993-94 | 60.00 |
| 1998-99 | 24.20 |
| 1999-00 | 21.16 |
| 2000-01 | 44.04 |
| 2002-03 | 35.20 |

Source: Exim Policy, Ministry of Commerce, Government of India (various issues).

**Export Policies**

Various domestic and international export policies are influenced by Indian fish exporting sector. Some of these are discussed below:

1. *Export procedures and restrictions*

Export policies for the fish and fish products were liberal with few licensing restrictions. In the fisheries sector, exports restricted through licensing include silver pomfrets of weight less than 300 grams and beche-demer of sizes below 3 inches. Export of seashells (excluding polished seashells) and handicrafts made out of five specific species, namely *Trochusniloticos*, *Turbo* species, *Lambis*species, *Tridacuagigas*, *Xancuspyrus*, are prohibited. These restrictions have been imposed due to ecological and environmental reasons and for the conservation of exhaustible natural resources (Dr. Mruthyunjaya, 2004).

2. *Quality control and pre-shipment inspection*

The Export Inspection Council (EIC) of India ensures quality control of products for the export market. Pre-shipment inspection and certification services are provided by five export inspection agencies (EIAs) with a network of 44 sub-offices, including laboratories located in several industrial centers and ports. The Government, through EIC, also recognizes other government and private sector agencies that provide pre-shipment inspection services for exports based on international standards. Standard specifications for fish and fish products have been laid down and tests for

bacteria, virus, heavy metal contamination, etc. are carried out in co-operation with Marine Products Export Development Authority (MPEDA) and the Indian Institute of Packaging. The EIC offers export inspection and certification services under the following systems: consignment-wise inspection (CWI); in-process quality control (IPQC); or self-certification. However, fish and fish products along with egg products and milk products are subject to mandatory export certification based on Food Safety-Based Management Systems (FSMSC). The FSMSC is based on international standards of food safety management systems such as HACCP/GMP/GHP and involves approval and surveillance of food processing units. The EIC is also working to develop equivalence agreements, as envisaged under the SPS Agreement, with the official import control bodies of its major trading partners. The EIC's certification for fish and fish products is recognized by the EU and the Australian Quarantine and Inspection Service (AQUIS)

3. *Export promotion and assistance*

The Marine Products Export Development Authority (MPEDA) is responsible for the promotion and regulation of exports of fish and fish products. In the Export-Import Policy (2002-07), there are provisions of central assistance to states for the development of critical infrastructure for export. It provides support to export promotion and market development, strengthening of market intelligence and information channels, development of infrastructure and human resource capacity, modernization of processing facilities and research and development in fisheries sector. The Government also provides marketing development assistance to facilitate promotion of exports of Indian products. To supplement the market development scheme, the Market Access Initiative (MAI) was launched in 2001-02. The MAI aims to promote potential Indian exports in selected countries by supporting the collection of marketing intelligence data and helping exporters in display of their products.

4. *Export finance, insurance and guarantees*

Export credit may be provided in either domestic currency or one of the convertible foreign currencies. The credit in domestic currency is provided at concessional rates of interest announced by the RBI while the credit in foreign currency is provided at internationally competitive rates. Exporters have the option to borrow money in either domestic or foreign currency

The Export Credit Guarantee Corporation of India Limited (ECGC), a Government of India public sector undertaking provides insurance to exporters against the risk of non-realization of export proceeds for political or commercial reasons and a range of guarantees for banks and other financial institutions to enable them to extend credit facilities to exporters on a liberal basis.

5. *Non-tariff barriers imposed on exports of fish and fish products from India*

Exports of fish and fish products from India face non-tariff measures (mainly SPS and TBTs) in India's main markets. The US is perhaps the only country which provides information on detention of shipments based on pre-inspection basis. The information based on January 2002–December 2002 shows that 106 Indian shipments of fish products were rejected by the USFDA. This constitutes more than 20 per cent of the rejected Indian shipments of agricultural products. A majority of Indian consignments of fish products were rejected by USFDA on the ground of (a) filthy, i.e. the article appears to consist in whole or in part of a filthy, putrid or decomposed substance, (b) presence of Salmonella, i.e. the article appears to contain a poisonous and deleterious substance, and (c) Insanitary, i.e. an item prepared, packed or held under in-sanitary conditions. On an average, each consignment was rejected on the basis of more than one reason (Kumar and Kumar, 2003).

The fisheries sector has been quite competitive. However, the competitiveness of fisheries exports has been substantially eroded with the additional burden of compliance with SPS measures.

Fisheries sector plays an important role in Indian economy by its contributions to the national Income, exports, food and nutritional security and in employment generation. After independence, the Government of India gives importance for the development of fisheries sector. India is one of the important fish producing countries in the world. During the first four decades after independence, the share of marine fish production is greater than inland fish production. But after mid-1990s, the situation has changed, i.e. the inland fish production surpassed the marine fish production. Around 20 percent of fish production is used for trade. For years, the export of fish and fishery products has been increasing. But India's share in total world fish export is very low i.e. around 2 percent. To increase the trade of fishery products, government liberalized the trade policies. For the development of marine fisheries sector, the central and state governments have established number of research and development institutions across the country. The governments also implement large number of development and welfare programmes and policies during different five year plans. These developmental activities can be improved the situation of Indian marine fisheries sector.

# CHAPTER 4
# MARINE FISHERIES SECTOR IN KERALA: AN OVERVIEW

Fishery is one of the major activities which play a vital role in the Kerala economy. Kerala's share in the national marine fish production is about 20-25 percent. The coast of Kerala constitutes approximately 10 percent of India's total coastline. This coastline of 590 km and the Exclusive Economic Zone (EEZ) extends up to 200 nautical miles far beyond the continental shelf, which covers an area of 218536 sq km provide opportunities in traditional fishing in inshore waters from ages. The continental shelf area is 39139 sq.km, the area within the 18m depth range accounts for 5000 sq.km, the area between 18-73m is approximately 25000 sq.km and 73-182 is the balance area. The high rate of rainfall and the large number of rivers make Kerala the most fertile for fish. One speciality of the Kerala coast is mud banks, known in Malayalam as "Chakara". Fisheries sector contribute 1.58 percent of the GSDP of the state (Kerala Fisheries Statistics, 2014-15).

As per the Marine Fishery Census 2005, about 1.20 lakh fishermen families were in the state living in 222 fishing villages along the coast. The coast of Kerala spread over nine coastal districts, the maximum coastline being shared by Alleppey and Kannur (82 Kms). Trivandrum district has maximum fishing villages (42) and Kannur with minimum (11). Number of landing centers is found proportionate to fishing villages. Average fisher households per village in the state is 543 while the highest is in Trivandrum (813) and lowest is in Kasargod (299). Maximum fisher population was observed in Trivandrum (24percent) followed by Alleppey (17percent) and Kozhikode (15percent).

## 4.1 Production and Capture

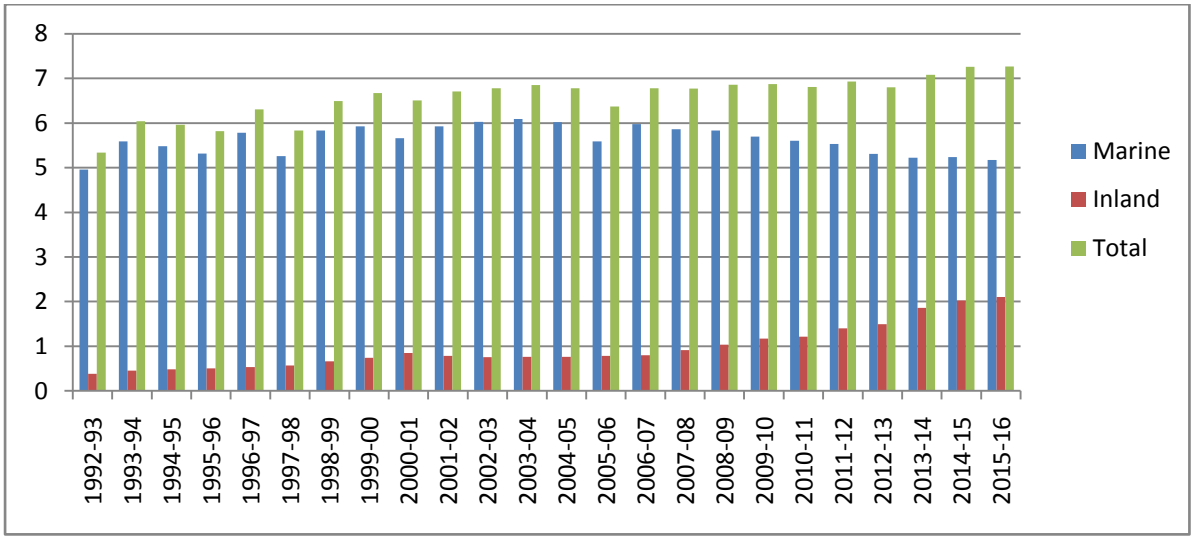
Kerala is one of the premier fish producing states in India. Estimates of the fishery resources assessment shows that among the maritime states in India, Kerala occupies the second position in marine fish production. Kerala's share in the national marine fish production is about 15 percent. The fish production

in Kerala during 2015-16 was 7.27 lakh tones. The marine fishery resource of the state has almost attained the optimum level of production.

Figure 4.1

Fish production in Kerala

(Lakh tonnes)




Source: Handbook on Fisheries Statistics, 2008 & Economic Review, Kerala Planning Board

Figure 4.1 shows that during 2015-16, 71.11 percent of total fish production in Kerala coming from marine fisheries sector and the remaining from inland fisheries. While marine fish production in Kerala tended to fluctuate the inland fish production showed a sign of improvement (Economic Review, 2016). Inland production sustained on increasing trend. District wise marine fish production showed that Kollam contributed the highest (21.08 percent) followed by Kozhikkode (18.19 percent) and Ernakulam (15.47 percent).

The marine fish production in India and Kerala and their percentage share of Kerala are shown in Table 4.1.

Table 4.1

Marine Fish production in India and Kerala and the % share of Kerala from 1980-2015 (Lakh tonnes)

| Year | Kerala | India | % Share of Kerala |
|---|---|---|---|
| 1980 | 2.8 | 12.5 | 22.4 |
| 1985 | 3.33 | 17.34 | 19.2 |
| 1990 | 6.78 | 23 | 29.47 |
| 1995 | 5.33 | 27.07 | 19.69 |
| 2000 | 5.67 | 28 | 20.25 |
| 2005 | 5.59 | 28.16 | 19.85 |
| 2010 | 5.64 | 37.33 | 15.1 |
| 2015 | 5.1 | 34.8 | 14.66 |

Source: Handbook on Fisheries Statistics, 2008 & Economic Review, Kerala Planning Board.

Table 4.1 expressed that during 1980-2015, the marine fish production in India shows an increasing trend. It is increased from 12.5 lakh tonnes in 1980 to 34.8 lakh tonnes in 2015. During the same period, the marine fish production in Kerala also increasing up to 1990 and then decreasing. The Kerala's share in total marine fish production is more or less same during this period.

Table 4.2

Species wise composition of Marine fish landings in Kerala (2005-2006 to 2015-16)

| Sl. No. | Species | 2005-06 | 2010-11 | 2015-16 |
|---|---|---|---|---|
| 1 | Elasmobranchs | 3159 | 3001 | 4464 |
| 2 | Eels | 168 | 168 | 679 |
| 3 | Cat Fish | 168 | 167 | 1112 |
| 4 | Chirocenrtrus | 265 | 244 | 733 |
| 5a | Oil Sardine | 149949 | 151839 | 72257 |
| b | Lesser Sardine | 65268 | 67009 | 30873 |
| c | Anchovilla | 30167 | 31949 | 37063 |
| d | Trissocles | 3175 | 3073 | 8037 |
| e | Other Clupeids | 15533 | 15305 | 2165 |
| 6 | Saurida&Saurus | 5551 | 5594 | 3560 |
| 7 | Hemirhamphus& | 691 | 701 | 146 |

| | | | | |
|---|---|---|---|---|
| | Belone | | | |
| 8 | Flying fish | 0 | 0 | 0 |
| 9 | Perches | 30400 | 30468 | 30780 |
| 10 | Red Mullets | 1676 | 1621 | 572 |
| 11 | Polynemides | 67 | 68 | 1224 |
| 12 | Sciaenides | 9887 | 8805 | 8015 |
| 13 | Ribbon fish | 15679 | 15196 | 16256 |
| 14a | Caranx | 26987 | 27166 | 9691 |
| b | Chorinemus | 985 | 967 | 55 |
| c | Other Carangids | 20766 | 20757 | 19021 |
| 15 | Leiognathus | 5306 | 5263 | 2662 |
| 16 | Lactrious | 3525 | 3444 | 706 |
| 17 | Pomfrets | 1501 | 1543 | 6948 |
| 18 | Mackerel | 44202 | 44991 | 7789 |
| 19 | Seerfish | 2475 | 2537 | 10395 |
| 20 | Tunnies | 11923 | 12062 | 30767 |
| 21 | Sphyraena | 2094 | 2085 | 791 |
| 22 | Mugil | 42 | 858 | 6 |
| 23 | Soles | 13951 | 13915 | 10613 |
| 24a | Penaeid Prawn | 48006 | 47620 | 51971 |
| b | Non Penaeid Prawn | 1738 | 1688 | 9829 |
| c | Lobsters | 398 | 402 | 0 |
| d | Crabs | 4515 | 4527 | 12789 |
| e | Stomatopods | 9547 | 9447 | 0 |
| 25 | Cephalopods | 14203 | 14262 | 45794 |
| 26 | Miscellaneous | 14948 | 11656 | 10880 |
| | **TOTAL** | **558913** | **560398** | **516745** |

Source: Directorate of Fisheries

The fish catches from the Kerala coast include more than 300 different species, the commercially important number is about 40 only. The high value species among the fish catches are still few, prominent among them are seer fish, prawn, Ribbon fish and mackerel. The quality of these high value species in the total catch ultimately decides the income of the fishermen. Oil sardine accounted for the major share of landings (13.98 percent), heavy landing of juvenile oil sardine in ring seine was also recorded. The catch of oil sardine was 72257 metric tonnes during 2015-16, shows a decreasing trend, which is the most important variety consumed mainly by the poorer sections of the society (Economic Review, 2016).

## 4.2 Contribution towards Agriculture Sector

The Gross State Domestic Product of the State has increased by about 69 percent during the period from 2005-06 to 2012-13 and the share of fisheries sector in the State Domestic Product has declined from 1.3 to 0.82 percent in the same period. The share of Primary Sector in GSDP has also declined from 17.11 to 9.34 percent. The contribution of fisheries sector in the GSDP is given in the table.

Table 4.3

Contribution of fisheries sector to Gross State Domestic Product of Kerala

[At Constant Price 2004-05 (Rs. in Crore)]

| Year | Gross State Domestic Product | Fishing | Share of Fisheries sector in GSDP | Share of Primary Sector in GSDP | Percentage Share of Primary Sector in GSDP |
|---|---|---|---|---|---|
| 2005-06 | 131293.93 | 1704.8 | 1.3 | 22466.88 | 17.11 |
| 2006-07 | 141666.69 | 1800 | 1.27 | 31038.1 | 14.85 |
| 2007-08 | 154092.68 | 1795.44 | 1.17 | 20802.12 | 13.51 |
| 2008-09 | 162659.2 | 1784.03 | 1.1 | 21256.5 | 13.07 |
| 2009-10 | 177571.35 | 1886.81 | 1.06 | 21140.55 | 11.91 |
| 2010-11 | 189850.71 | 1764.13 | 0.95 | 19778.75 | 10.42 |
| 2011-12 | 204956.72 | 1843.54 | 0.9 | 19900.72 | 9.71 |
| 2012-13 | 221849.9 | 1819.18 | 0.82 | 20710.81 | 9.34 |

Source: Directorate of Fisheries, Government of Kerala, Thiruvananthapuram

## 4.3 International Trade of Marine Fisheries Sector

Kerala is one of the main seafood exporting states in India. In Kerala sea food industry is growing over the years and is dominated by exports of shrimps, cuttlefish, squids and finfish varieties. The export has been mainly directed to destinations like European Union, U. S, Japan and China. The exports, in fact stimulated the growth of post-harvest facilities and fast infrastructure development of fishery sector. The sector in the initial phase of

development could absorb substantial investment and manpower due to its potential of significant export earnings and vast scope of domestic market expansion. The population depending on fisheries has steadily increased over the years. In 2005, there are about 6, 02,234 people solely depending on fisheries for their livelihood. The export trend of marine products from India and Kerala is shown in Table 4.4.

Table 4.4

Export Trend of Marine Products – India & Kerala, 1992-93 to 2015-16

| YEAR | INDIA | | KERALA | | KERALA's Share % | |
|---|---|---|---|---|---|---|
| | Quantity (Tonnes) | Value (Rs crore) | Quantity (Tonnes) | Value (Rs crore) | Quantity | Value |
| 1992-93 | 209025 | 1768 | 49094 | 414 | 23.49 | 23.42 |
| 1993-94 | 243960 | 2503 | 63848 | 622 | 26.17 | 24.85 |
| 1994-95 | 307337 | 3575 | 74653 | 817 | 24.29 | 22.85 |
| 1995-96 | 296277 | 3501 | 78895 | 856 | 26.63 | 24.45 |
| 1996-97 | 378199 | 4121 | 92288 | 936 | 24.40 | 22.71 |
| 1997-98 | 385818 | 4697 | 89366 | 948 | 23.16 | 20.18 |
| 1998-99 | 302934 | 4627 | 70641 | 817 | 23.32 | 17.66 |
| 1999-00 | 343031 | 5117 | 92148 | 1148 | 26.86 | 22.43 |
| 2000-01 | 440473 | 6444 | 88852 | 1046 | 20.17 | 16.23 |
| 2001-02 | 424470 | 5957 | 72756 | 951 | 17.14 | 15.96 |
| 2002-03 | 467297 | 6881 | 81392 | 1046 | 17.42 | 15.2 |
| 2003-04 | 412017 | 6092 | 76627 | 1099 | 18.6 | 18.04 |
| 2004-05 | 461329 | 6646 | 87337 | 1157 | 18.94 | 17.41 |
| 2005-06 | 512164 | 7245 | 97311 | 1257 | 19 | 17.36 |
| 2006-07 | 612642 | 8363 | 108616 | 1524 | 17.74 | 19.00 |
| 2007-08 | 541701 | 7620 | 100318 | 1430 | 18.52 | 18.77 |
| 2008-09 | 602835 | 8607 | 100780 | 1572 | 16.72 | 18.26 |
| 2009-10 | 678436 | 10048 | 107293 | 1670 | 15.81 | 16.62 |
| 2010-11 | 813091 | 12901 | 124615 | 2002 | 15.33 | 15.52 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2011-12 | 862021 | 16597 | 155714 | 2988 | 18.06 | 18.00 |
| 2012-13 | 928215 | 18856 | 166399 | 3435 | 17.93 | 18.22 |
| 2013-14 | 983756 | 30213 | 165698 | 4706 | 16.84 | 15.58 |
| 2014-15 | 1051243 | 33441.6 | 166754 | 5166.1 | 15.86 | 15.45 |
| 2015-16 | 945892 | 30420.8 | 149138 | 4644.4 | 15.77 | 15.27 |

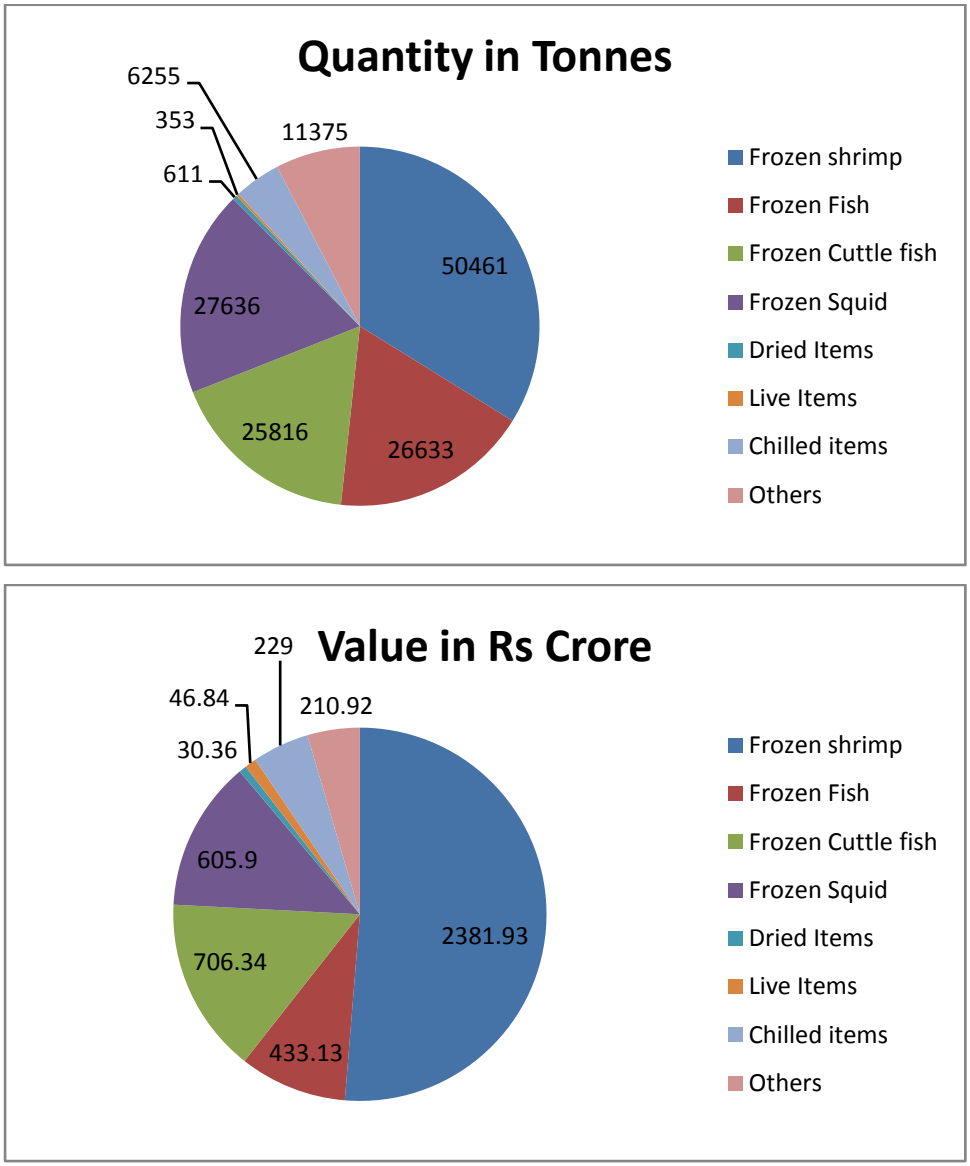
Source: Economic Review (various issues), Kerala State Planning Board

Export trend of marine products from India and Kerala during the period 1992-93 to 2015-16 expressed in Table 4.4. The data shows that during the period, the exports of marine products in India and Kerala are increasing both in terms of quantity and value. Kerala has made vital contribution in the export of marine product from the country. But the Kerala's share in national marine fish exports has been declining in terms of quantity as well as value after 1990s.

The main species exported from Kerala are shrimp, frozen cuttle fish, frozen squid and fin fishes. Shrimp is the main item of export and accounts for over half the total value of seafood export from Kerala. Frozen cuttlefish and squid are also important items of export. Frozen fishes such as ribbon fishes, which are relatively low value, are exported in large quantities.

Figure 4.2

Item wise Exports of Marine Products from Kerala during 2015-16




The major markets of Kerala's marine fish exports are the EU, Japan, USA and South East Asia. European Union has been the major export destination of Kerala's marine exports. EU holds around fifty percent value share of Kerala's export destination during the year 2009-10. Japan and USA are other major markets with around 30 percentage shares in value of export. South East Asia accounted for 8.40 percent of total marine product exports in terms of value.

Table 4.5

Market wise export share of marine products from Kerala (value in percentage)

| Country | 1999-2000 | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2009-10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Japan | 22.73 | 18.07 | 18.75 | 13.1 | 18.74 | 15.40 | 11.76 | 10.03 | 10.86 | 9.20 |
| USA | 21.69 | 22.06 | 17.50 | 18.37 | 12.92 | 12.01 | 11.56 | 9.16 | 9.32 | 8.77 |
| EU | 36.61 | 36.30 | 42.35 | 48.35 | 47.77 | 49.50 | 50.32 | 56.56 | 56.56 | 53.31 |
| China | 7.77 | 12.13 | 6.70 | 7.14 | 7.01 | 6.41 | 7.98 | 6.84 | 4.86 | - |
| S.E Asia | 4.53 | 4.92 | 6.50 | 5.31 | 4.46 | 5.18 | 5.53 | 5.71 | 5.55 | 8.40 |
| Middle East | 2.70 | 2.90 | 2.84 | 3.22 | 3.28 | 5.04 | 4.86 | 3.32 | 3.96 | 4.90 |
| Others | 3.97 | 4.62 | 5.36 | 4.52 | 5.55 | 6.45 | 8.00 | 8.36 | 8.89 | 15.42 |

Source: Economic Review, Kerala Planning Board, Various Issues

**4.4 Fishermen Community in Kerala**

As per the population census 2011, the fisher folk population in Kerala is 10.02 lakh covering 7.71 lakh in coastal area and 2.31 lakh in inland sector. It is also estimated that about 71600 people are engaged in fishery allied activities. These fishermen of the state contribute about 8 percent of the GSDP from the agriculture sector which gives the significance of the sector to the state economy. The total fishermen population in Alappuzha district is 1.91 lakh which is the highest fishermen populated district, followed by Trivandrum (1.70 lakh) and Ernakulam (1.36 lakh).

Table 4.6

District wise fisher families and population

| District | Length of Coast line | Landing Centres | Fishing Villages | Fishermen Families | Fisher folk Population | Average Fisher Households/ Village |
|---|---|---|---|---|---|---|
| Thiruvanantha puram | 78 | 51 | 42 | 33340 | 146326 | 799 |
| Kollam | 37 | 18 | 26 | 12273 | 63300 | 480 |
| Alappuzha | 82 | 16 | 30 | 20278 | 92033 | 667 |
| Eranakulam | 46 | 20 | 21 | 9318 | 42083 | 445 |
| Thrissur | 54 | 21 | 18 | 5448 | 27572 | 303 |
| Malappuram | 70 | 11 | 23 | 14940 | 98120 | 650 |
| Kozhikkode | 71 | 19 | 35 | 14157 | 82129 | 404 |
| Kannur | 82 | 12 | 11 | 4331 | 27949 | 399 |
| Kasaragode | 70 | 19 | 16 | 4637 | 30653 | 299 |
| Total | 590 | 187 | 222 | 118937 | 610165 | 536 |

Source: Marine Fisheries Census of CMFRI. 2005

Out of total coast of Kerala, the maximum coastline shared by Alleppey and Kannur (82 Km) and the minimum with Kollam (37 km). As per Marine Fisheries Census of CMFRI, 2005, there are 222 fishing villages in Kerala. Trivandrum district has maximum fishing villages (42) and Kannur with minimum (11). Number of landing centers is found proportionate to fishing villages. Average fisher households per village in the state is 536 while the highest is in Trivandrum (799) and lowest is in Kasargod (299).

**4.5 Problems in Fisheries Sector**

After the sanitary and phyto sanitary regulations came into force, stringent quality controls for marine products were made as a result and fish and fishery products are subjected to a number of food safety requirements related to hygiene and stipulated microbiological and chemical containments. The demand for stringent and high hygienic standards in the production and processing facilities greatly increased, after the stipulation of Hazard Analysis Critical control point (HACCP) in 1993 by United States Food and Drug

Authority (USFDA) Codex Alimentarius Commission (CAC, 1996) such as ISO 9000 and other European community directives and the EC ban on Indian Marine Products in 1997 (Rajasenan, 2005).

Competition is increasing in the international markets and Kerala has to keep the quality standards in order to retain the market share. The Sanitary and Phyto Sanitary (SPS) agreement under the world trade agreement stipulates maximum permissible chemical residue and other standards. Poor sanitation conditions and bad handling practices, degradation of harbors and landing centers start from the day of commissioning this heavily contributes to fish spoilage and wastage leading to high value erosion. The infrastructure facilities available in Kerala are of great relevance in the present scenario. Out of 14283 fishing vessels operating in India, 4971 is in Kerala. There are 106 freezing plants in Kerala with a capacity of 2289 tonnes per day. There are 152 cold storages in Kerala out of a total of 477 in all India. The cold storage in Kerala has capacity of handling 33566 tonnes per day. The infrastructure facilities of the seafood industry in Kerala and India are given in Table 4.7.

Table 4.7

Infrastructure facilities of seafood industry in Kerala and All India (2006-07)

| Sl. No | Facilities | All India | Capacity Tonnes/day | Kerala | Capacity Tonnes/day |
|---|---|---|---|---|---|
| 1 | Fishing Vessels | 14283 | | 4971 | |
| 2 | Conveyance | 305 | | 164 | |
| 3 | Freezing Plant | 358 | 1332 | 106 | 2289 |
| 4 | Canning Plant | 8 | 30.5 | 3 | 11.5 |
| 5 | Ice Plant | 164 | 3216 | 61 | 207 |
| 6 | Peeling Sheds | 545 | 6592.7 | 245 | 2926 |
| 7 | Cold Storages | 477 | 169492 | 152 | 33566 |
| 8 | Other Storages | 131 | 7464.5 | 3 | 27 |

Source: MPEDA

State should move towards international standards of product hygiene, in order to retain the market, share in future. A good number of countries have specified Hazard Analysis and Critical Control Point (HACCP) based regulations of fish and fish products.

The evidence available from the survey as well as the MPEDA records points out that the majority export firms operates with one freezing, although there is a shift toward consolidated businesses that operate multiple plants. The seafood industry in *Kerala* is highly export oriented where a very little share finds its way to the domestic markets The period from 1990s to 2006 has witnessed significant increase in processing plant capacity, but the availability of raw material for processing has not kept in pace with the capacity build up in processing sector which has ultimately resulted in less than 25 percent capacity utilization of the processing plants (Jayasekhar S).

**4.6 Research and Development in Kerala Marine Fisheries Sector**

For the development of marine fisheries sector in Kerala, the state and central government give more priority for research in this sector. The research institutions like CMFRI, CIFT and MPEDA in Kerala is under the government of India. The programmes and policies for the development of fisheries sector is mainly under the control of the Department of Fisheries, Government of Kerala.

*The Institutions are coming under the control of the State Fisheries Department*

Each state government has institutions of its own which conduct research and training in fisheries. These are mainly in the form of Colleges of Fisheries and University departments. In addition, many states have specialized bodies such as fish marketing agencies (such as Matsyafed in Kerala) that work for the welfare of the fishing population within the state.

i. Matsyafed
ii. Kerala Fishermen Welfare Fund Board (KFWFB)
iii. Agency for Development of Aquaculture, Kerala (ADAK)
iv. Fisheries Resource Management Society (FIRMA)
v. Brackish water Fish Farmers Development Agency (BFFDA)
vi. Fish Farmers Development Agency (FFDA)
vii. National Institute of Fisheries Management and Administration (NIFAM)

viii. Coastal Area Development Corporation (CADC)

ix. Society for Assistance to Fisher Women (SAF)

The Government of Kerala adopted a multi-faceted strategy to improve fisheries and fishermen's life under pressures from the fishermen's union. The measures included enactment of Kerala Marine Fishing Regulation Act (KMFR Act of 1980), The Kerala Fishermen Welfare Societies Act (KFWS, 1980), Enactment of Kerala Fishermen Welfare Fund Act, (1985).

The Kerala Marine Fishing Regulation Act (KMFR Act) the first of its kind in the country was based on the 'draft bill' of the Majumdar Committee constituted by the government of India in 1976 for examining the question of delimiting the areas of fishing for different types of boats. This act provides for a regulation of fishing in the territorial sea along the coastline of the State through registration and licensing, mesh size regulation, prohibition of certain fishing methods, delimitation of fishing zones and declaration of closed seasons. Under the provision of the KMFR Act, the coastal waters up to 20 m depth from the shore north of Kollam to Manjeswar (about 512 Km coast) and 30 m depth south of Kollam (78 Km) were declared to be the exclusive reserve of the artisanal craft while the mechanized boats were to operate beyond this depth and the purse seiners were banned from operating in the territorial waters. The KMFR Act aimed at protecting the interests of the artisanal fishermen, establishing law and order in the sea and ensuring regulation of marine fishing and conservation of resources.

The KMFR Act provided for a grass root level nodal agency of the fishermen to organize production, marketing, welfare and credit in order to provide a real thrust to artisanal fishing. Accordingly, the coastal villages were delimited into 222 villages and an equal number of Fishermen Welfare Societies (FWS) were constituted, one for each fishing village. Each society was conceived as an autonomous body to administer the activities and a fishery official was posted as its Secretary. A nominated Managing Committee drawn of fishermen's representatives was made responsible for its management. For want of development funds, the activities of the FWS during the first 2-3 years

confined to merely distribution of welfare funds previously handled by the Department.

In 1984, a Kerala State Cooperative Federation for Fisheries Development Limited (MATSYAFED) was set up under the Kerala Cooperative Societies Act to activate, coordinate and guide the working of the village societies. Three District Cooperative Societies were registered as primaries to the federation as the FWS were formed outside the Cooperative Societies Act. Although the National Cooperative Development Corporation (NCDC) initially provided certain funds for the working of the FWS, they insisted on the reorganization of the welfare societies under the Cooperative Societies Act for easy inflow of cooperative funds. Accordingly, the FWS were replaced in 1988 with 81 Fishermen Development Welfare Cooperative Societies covering the entire coast of Kerala. The State Government also enacted another legislation viz. the Kerala State Welfare Fund Act (1985) to implement all the welfare schemes handled by the Department. Old age pensions, lump sum grant to fisher children, compensation against loss of life and other welfare schemes were brought under Welfare Board.

*Expert Committees studied the 'Trawling Ban' in Kerala*

The State of Kerala is very much concerned about the protection of the marine fishery resources and to achieve the said object, Kerala has introduced trawling ban as early as in 1988. Kerala is the first State in the country to introduce a trawling ban. The trawling ban thus introduced was pursuant to various scientific studies conducted by Expert Committees specially appointed by Government of Kerala from time to time. Eleven Expert Study Committees were constituted by the Government of Kerala since 1981. The name of the committees and the year in which it was constituted are as under:

Table 4.8

Expert Committees for Fisheries

| Sl.No | Name of Committee | Year |
|---|---|---|
| 1 | Babu paul Committee | 1981 |
| 2 | Kalawar Committee | 1985 |
| 3 | Balakrishnan Nair Committee I | 1989 |
| 4 | Balakrishnan Nair Committee II | 1991 |
| 5 | P.S.B.R. James Committee | 1992 |
| 6 | Sailas Committee | 1992 |
| 7 | Balakrishnan Nair Committee III | 2000 |
| 8 | D.K. Singh Committee | 2006 |

Committee appointed under the Chairmanship of Shri. D. Babu Paul, I.A.S, the then Government Secretary to Fisheries was appointed in1981. The committee was of 'unanimous opinion' in respect of recommendations of general nature for the conservation and management of fishery resources of the state. But with regard to the specific need for adopting a closed season for trawling boats as a management measure, the opinion of the Committee was divided. Some of them recommended that trawl fishing should be banned in the territorial waters of Kerala during the months of June, July and August. A few members of the committee impugned the imposition of closed season as a management measure maintaining that there was no sign of biological over fishing but there were indications of economic over-fishing owing to the unregulated entry into fishing and insufficient management measures. The Babu Paul Commission Report was submitted the following year. The report did not recommend a ban on bottom trawling during the Monsoon months. The Commission's main recommendations were - Mesh size of the trawl nets should not be less than 35mm, the Marine Regulation Act of 1980 should be strictly enforced, registration of all the trawling boats should be ensured, purse seine, ring seine, pelagic and mid-water trawls should be banned within 22 km of the inshore waters. As the Commission was silent on the issue of the ban on bottom trawling during the monsoon period, which essentially meant that the harmful fishing practices during the spawning season would continue leading

to the peril of the marine eco-system, the Federation launched a series of agitations from 1982 to 1983.

Considering the persistent unrest in the artisanal fisheries sector the Government of Kerala constituted in 1984, another Expert Committee (Kalawar Committee) consisting of three Fishery Experts from outside the State. The Committee studied the ban issue with special reference to the breeding season of prawns and they opined that since the breeding season of prawns is protracted, shrimp trawling during June, July and August need not be banned but strongly recommended to limit the number of trawling boats in the state to 1145 with a strict regulation of the mesh size of the cod end of trawl nets to be not less than 35 mm. It recommended that only 1140 number of trawlers are required in Kerala for exploiting the fishery wealth while the permitted fleet size of OBM fitted canoes and traditional canoes was 2620 and 20000 respectively. The committee also recommended in unequivocal terms that shrimp trawling during monsoon season (June, July, and August) be permitted, but restricted to daytime and beyond a depth of 20m.

In 1987 the Government appointed yet another Commission - the Prof. Balakrishnan Nair Commission to study the issue of trawl ban. In 1988, the Commission recommended a ban on trawling during the monsoon period, of 90 days, on an experimental basis for three consecutive years. The Commission suggested that the impact of the ban should be studied subsequently. Though the Government accepted this recommendation in principle, the spirit of the recommendation was diluted by announcing a partial ban for 45 days. However, since 1997, the duration of the ban became uniform for all the years which lasted for a period of 45 days barring 2006 during when the ban was extended to 62 days in compliance with the verdict of the Supreme Court. The Committee recommended a mission oriented study called Save Coastal Resources Project (SCORP). The Government of Kerala constituted two more committees under the chairmanship of Prof. Balakrishnan Nair during 1990 and 1999 to make scientific evaluations on the impact of trawling ban along Kerala coast. These committees were of the view that the ban on trawling during

monsoon should be continued it was found to be an effective measure for enhancement of marine fisheries resources of Kerala. The other expert committees constituted in between Prof. Balakrishnan Nair 1 and 2 committees were P.S.B.R.James committee in 1993 and Dr.E.G.Silas committee in 1994. The Silas Committee recommended the demarcation of a separate zone as an artisanal exclusive fishing zone (EAFZ) for the exclusive fishing of non-motorized and motorized crafts of less than 15 HP and standardization of overpowered artisanal fishing gears like mini trawls and ring seines (Kurup, 2006).

The Aquarian Reforms Committee (2000) headed by Dr K Ravindran, constituted by the Kerala government to recommend basic reforms in the fisheries sector submitted their report to the State Fisheries Minister S Sarma. The Committee, in its report said 'the state government shall adopt and implement some basic reforms in the fisheries sector for securing the livelihood and occupation of *bona fide* traditional and artisanal fisher folk and for assuring sustainable growth and development of the sector through effective and participatory management and good governance'. The objective for such an enactment was to protect the water bodies and to conserve the natural fisheries resources at sustainable levels, to ensure the rights of traditional/artisanal fisher folk for occupation and livelihood in the fisheries sector, to establish a 'regulated marketing system' in Kerala and to ensure availability of appropriate quality and quantity of fishes to the consumers in the state. Other objectives of enactment were to bestow legally, the right of fishing in the inland and territorial waters exclusively to the traditional/artisanal fisher folk, to evolve an appropriate and to reserve legally, the right of first sale of raw fish caught by fishermen exclusively to those who fish and to reserve the right of ownership of fishing crafts and gears being deployed for fishery in the inland and territorial waters exclusively for the traditional/artisanal fisher folk (Suchitra and Venugopal, 2006).

The latest study by the 12-member committee headed by T.K. Singh to study the extent of habitat destruction and evaluate the suitability of

introducing uniform fishing ban along Kerala coast taking into consideration the magnitude of monsoon fishery prevalent in Kerala and livelihood and employment associated with this sector. The report submitted in July 2007, recommended for the continuation of the present 47-day ban. The purpose of Kerala Monsoon Fishery (Pelagic) Protection Act, 2007, is to grant traditional fishermen the right to conduct pelagic fishery during the monsoon season using traditional and modified traditional crafts and gear within the territorial waters. Authorized officers may enter, search and confiscate any vessel if they have reason to believe that the misuse of such fishery has been harmful to fish breeding and fish wealth, and the Government may order to ban the right to conduct pelagic fishery.

**4.7 Plans and Policies in Marine Fisheries Sector**

The major developmental programmes implemented during the Plan period in the state include inland fisheries development, development of fishing harbors and landing centers and programmes ensuring social and livelihood security of fishermen. The developmental programme undertaken in the marine sector include modernization of country craft, popularization of new generation crafts and distribution of suitable components of fishing gear, development of fishing markets, development of deep sea fishing etc.

The Key elements of the XII$^{th}$ Plan Approach paper in the fisheries sector are launching of a comprehensive coastal area development project covering infrastructure, housing, sanitation, drinking water and livelihood, action plans for augmenting inland fish production to 2 lakh tonnes by the end of the plan from 1.17 lakh tonnes, enhancement of seed production, strengthening of post-harvest infrastructure like better fish landing and handling facilities, cold chains, storage facilities as well as marketing facilities for the development of the sector and improvement in the production of value added products, micro enterprises, credit support and coverage under social security. Accordingly, the first year plan programme of the XII$^{th}$ Five Year Plan was launched in 2012-13.

The total approved outlay during the XIth Plan under the fisheries sector was Rs 255.25 crore which accounts 0.6 percent of the total state plan outlay and 11 percent of the outlay under Agriculture & Allied Sectors. But the actual amount budgeted during the plan period was Rs 380 crore and the expenditure was Rs 437.21 crore (115 percent). In addition to this an amount of Rs 55.89 crore was set apart for Integrated Coastal Development Scheme under Special Area Development Programme and the expenditure incurred was Rs 40 crore (71.64 percent). The total expenditure under state plan schemes during 2011-12 was Rs 143.87 crore which accounts 117.4 percent of the state plan outlay. There are 10 partially aided central sector schemes having an outlay of Rs 42.72 crore and the expenditure during this period was Rs 47.61 crore. Additional allocation was provided for fishing harbours and share capital contribution to NCDC (National Cooperative Development Corporation) assisted schemes and thus the expenditure exceeds the outlay provided under Central Sector Schemes.

Table 4.9

Outlay and Expenditure under Fisheries Sector during 2007-08 to 2011-12

(Rs in Lakh)

| Name of Schemes | 2007-08 | | 2008-09 | | 2009-10 | | 2011-12 | |
|---|---|---|---|---|---|---|---|---|
| | Budget Estimate | Expenditure | Budget Estimate | Expenditure | Budget Estimate | Expenditure | Budget Estimate | Expenditure |
| State Plan Schemes | 5166.00 | 5707.27 | 9069.00 | 7001.12 | 5000 | 7550.14 | 12260.03 | 14387.16 |
| Centrally Sponsored Schemes | 1322.50 | 1795.40 | 1367.59 | 1702.12 | 1881 | 1909.73 | 4271.55 | 4760.9 |
| NCDC assisted integrated Fisheries Development Project (NCDC loan) | 1500.00 | 934.75 | 1449.00 | 1361.00 | 1925 | 1023 | 1500 | 1497.85 |
| Integrated Coastal Area Development Project under Special Area Development Programme (State Plan) | 727.00 | 727.94 | 1000.00 | 0.00 | 1009 | 1009 | 400 | 400 |
| **Total** | **8715.50** | **9165.36** | **12885.59** | **10064.24** | **9815** | **11491.87** | **18431.58** | **21045.91** |

Source: Economic Review, Various Issues, Kerala State Planning Board

The share of total plan outlay and expenditure for fisheries sector during the plan period has been increasing. The plan outlay and expenditure coming under state plan, centrally sponsored plan and other institutional programmes.

It has been estimated that fisherman have a debt liability of Rs 524 crore. During the period 2008-09 to 2011-12, an amount of Rs 36 crore was provided with budget for debt relief measures to fishermen and as on 31.03.2012, Rs 35.69 crore has been released for this programme.

Government has initiated the new project Matsyakeralam during 2008-09. From 2009-10 to 2011-12, the total amount budgeted for this scheme was Rs 5.50 crore as state share and the provision was fully utilized for the scheme. The total project cost estimated as Rs 71.16 crore. The achievement of the project during the first phase shows an encouraging result especially in shrimp and mussel farming. Under Special Area Development Programme a new project viz., Integrated Coastal Area Development project was started during 2007-08. During the period 2007-10, the project was implemented in Kannur, Kasargode and Thrissur districts covering the projects of water supply, fish landing centres, public centres, dispensaries, biogas plant, anganavadies etc. During 2011-12 had taken up the coastal area development infrastructure works viz., drinking water supply schemes, hospital buildings, fisheries roads, matsyabhavan etc. at a total outlay of Rs 18.69 crore. During 2012-13, a new scheme viz., model fishing villages was envisaged in the budget with an outlay of Rs 50 crore under state plan for the development of 25 fishing villages at Rs 2 crore per village. More proactive steps in the implementation of the coastal area development project are required since the progress is quite slow.

The Government of Kerala has so far implemented 9 fishing harbour and the works of other 8 harbours are in progressing. The completed fishing harbours are Thangassery, Neendakara, Kayamkulam, Munambam, Beypore, Puthiyappa, Chombal, Moplabay and Azheekal. The fishing harbours now supported is Koyilandi, Thalai, Cheruvathoor, Chettuvai and Muthalapozhi. The works of Ponnani, Chethi, Thalai and Koyilandi fishing harbours were completed soon. The construction of Muthalapozhi fishing harbor is lagging.

NABARD is the institutional agency at the national level which undertakes refinancing all agricultural and allied activities. Under RIDF XI, NABARD has approved two projects viz balance work of Kayamkulam fishing harbour and modernization of Neendakara fishing harbour and sanctioned a loan amount of Rs 1062.54 lakh and Rs 895 lakh respectively. Under RIDF XIII, NABARD has sanctioned a loan of Rs 1026.43 lakh for the construction of fishing harbour at Thalai. The expenditure up to March 2012 is Rs 717.06 lakh.

**Social security schemes**

The state government introduced various social security schemes for the welfare of fishermen community through the Department of Fisheries and Kerala Fisherman's Welfare Fund Board. The major highlights of social security schemes of fisheries department are NFWF Housing, Group Accident Insurance Scheme for Fisherman, Group Accident Insurance Scheme for allied workers, fishermen old age pension and pension for wives of diseased fisherman. During 2011-12, 578 number of houses were completed including spillover from 2010-11and the expenditure incurred was Rs 276 lakh. The saving cum relief schemes provided assistance to about 185348 beneficiaries at an amount of Rs 2120 lakh. Kerala Fisherman's Welfare Fund Board also implemented the welfare relief schemes like old age pension, widow pension, Group insurance premium (Matsya Suraksha Scheme), marriage assistance, maternity assistance, Hospital expenses, educational assistance etc.

**Matsyafed**

Matsyafed (Kerala State Cooperative Federation for Fisheries Development Ltd), established in 1984, is an apex federation of 666 primary level Fishermen Development Welfare Co-operative Societies, of which 341 numbers are in marine sector, 192 are in inland sector and 133 women co-operative societies. The total membership in these societies is more than 3 lakhs. Matsyafed has a district office in each of the nine maritime districts and one in the inland district of Kottayam. The paid up share capital of the federation is Rs 150 crore. Matsyafed have organized more than 14715 SHGs

with 179532 members. The groups have mobilized Rs 5248 lakh as thrift. The achievement of various programmes implemented by Matsyafed is given in Table 4.10.

Table 4.10

Major Programmes of Matsyafed

| Sl No | Name of Programme | Unit | Physical achievement during 2011-12 | Financial achievement during 2011-12 (Rs in Lakh) |
|---|---|---|---|---|
| 1 | Fish Auction | No. of fisherman | 44079 | 26207 |
| 2 | Integrated Fisheries Development project | beneficiaries | 1825 | 1491.76 |
| 3 | Motorisation of Country craft | beneficiaries | 400 | 40 |
| 4 | Bankable Scheme | beneficiaries | 142 | 30 |
| 5 | Subsidy for suitable complements of fishing gear | beneficiaries | 666 | 40 |
| 6 | Matsyafed input security scheme | beneficiaries | 1825 | 59.67 |
| 7 | Scheme with financial assistance of NBCFDC and NMDFC | beneficiaries | 1040 | 840 |
| 8 | SHG's (Microfinance) | beneficiaries | 45500 | 4000 |

Source: Economic review, 2012

In the last Five Year Plan, marine fisheries sector has achieved better growth in its infrastructure development. The XII$^{th}$ Plan strategy is to ensure sustainable growth of Fish and Fisheries for nutrition, food security and economic growth by ensuring proper utilization of infrastructure created in the last plan. Special emphasis has to be given to conservation and management of inshore fishery resources, enhancement of offshore marine fish production and maximum utilization of harvested fish and its value addition. The major issues in the sector are price exploitation of selected stock, ineffective regulation, ever increasing fleet size, lack of responsible fishing practices etc. The marine environment has to be revitalized with the introduction of artificial reef to

enhance its productivity. Maximum utilization of harvested resources can be ensured for its proper storage, transportation and distribution. Effective preservation of fish quality as per international standard, promote export as well as domestic marketing legislation is needed for the assurance of hygiene and quality in domestic fish marketing. The hygiene conditions of the harbours need to be modernized by integrated harbor management societies may be constituted for each harbor. Regarding social infrastructure, provision for safe shelter and drinking water, improvement of public health and education facilities, total sanitation and solid waste management etc. needs special care and attention. Focused attention for the implementation of coastal area development project including livelihood security is urgently required.

# CHAPTER 5

# INTERNATIONAL AGREEMENTS ON THE SOCIO-ECONOMIC CONDITIONS OF FISHERMEN IN KERALA

This chapter tries to examine the impact of international agreements on the socio-economic condition of Kerala fishermen. The coast of Kerala spread over nine coastal districts and there are 222 fishing villages in Kerala as per Marine Fisheries Census of CMFRI, 2005. As per the census 2011, the total number of fishermen in Kerala is estimated as 771249. Trivandrum district has maximum marine fisher population (21.19 percent) and minimum with Kasaragod (5.5 percent). For the purpose of the study take three districts randomly then take 150 samples from each.

## 5.1 Demographic Features of Fisher folk

In the study area, we consider 150 households as a sample from each district and the total sample size is 450. The total population studied are 2436.In this, Malappuram has the highest number of fishermen that has been studied (931) and lowest in Ernakulam (692).

Table 5.1

Population in study area

| District | Frequency | Percent |
|---|---|---|
| Malappuram | 931 | 38.2 |
| Kozhikode | 813 | 33.4 |
| Eranakulam | 692 | 28.4 |
| Total | 2436 | 100.0 |

Source: Survey data

From the sex wise classification, we can have considered the people having age 15 and below as children. The total male population in the study is 1045, it is 42.9 percent of total population, the female population is 836 (34.4 percent) and the total number of children is 555 and it is 22.7 percent of total population

On the basis of age distribution, classified the total number of fishermen into five categories (Table 5.2).

Table 5.2

Age-Wise Distribution of Fishermen

| Age | Total |
|---|---|
| 0-15 | 555 |
| 16-31 | 963 |
| 32-47 | 552 |
| 48-63 | 319 |
| Above 63 | 47 |
| **Total** | **2436** |

Source: Survey data

Table 5.2 shows that the largest number of fishermen falls under the category of 16-31. The most efficient working groups are 16-31 and 32-47. But only the male members are engaged in fishing. It is noted that in the study area almost all male members above the age of 16are engaged in fishing. The lowest numbers of fishermen are included in the category of 'above 63'. They are not actively engaged in fishing.

Table 5.3

Gender-wise distribution

| Age | Male | Female | children | Total |
|---|---|---|---|---|
| 0-15 | 0 | 0 | 555 | 555 |
| 16-31 | 554 | 409 | 0 | 963 |
| 32-47 | 272 | 280 | 0 | 552 |
| 48-63 | 199 | 120 | 0 | 319 |
| Above 63 | 17 | 30 | 0 | 47 |
| **Total** | **1042** | **839** | **555** | **2436** |

Source: Survey data

## 5.2 Educational Profile

The literacy rate of fishermen is very much lower than the all population percent share. In the study region most of the people have only primary and secondary education and the highly educated people are very low. The following table describes the educational distribution of fishermen.

Table 5.4

Educational status of Fishermen (percent)

| **Education** | **No. of fishermen** |
|---|---|
| Ineligible members | 7.1 |
| illiterate | 2.8 |
| primary education | 32.8 |
| secondary education | 38.5 |
| higher secondary education | 10.9 |
| graduation | 6.9 |
| post-graduation | 0.3 |
| others | 0.7 |
| Total | 100.0 |

Source: Survey data

The professional and technical educated people are very low in the study area. In the table, infants and disable people are included in the ineligible members to attend school.

**5.3 Occupational profile**

The specific information on occupation of people in pre-WTO period is not available because of house-shifting, ignorance of respondent etc. the following table describe occupational distribution of fishermen during pre and post WTO periods.

Table 5.5

Occupational Distribution of Fishermen

| **Occupation** | **Pre-WTO period** | **Post-WTO period** |
|---|---|---|
| Govt Servant | 0 | 0.22 |
| Agriculture | 0 | 0 |
| Private Non-Govt Worker | 0.20 | 2.63 |
| Self-Employment | 0.20 | 2.53 |
| Coolie | 0 | 1.64 |
| Fishing | 99.18 | 91.23 |
| Fish Vending | 0.42 | 0.11 |
| Others | 0 | 1.64 |
| Total | 100 | 100 |

Source: Survey data

Even in present period most of the fishermen are engaged in fishing. As a result of improvement in education level of fishermen, there is slow increasing trend in seeking other job than fishing. From the table we can see that, in the pre-WTO period 99.18 percent members are engaged in fishing, 0.42 percent is doing fish vending, 0.20 percent is private non-government worker and 0.20 percent members are doing self-employment. In the case of present situation 91.23 percent of total employed persons are engaged in fishing, 0.22 percent of people are government servant, 2.64 percent are employed in non-government private sector, 2.52 percent are engaged in self-employment, 1.64 percent is coolies, 0.11 percent is fish venders and 1.64 percent is engaged in other works especially they are NRIs. From this data it can be declare that not any factor influences the occupational structure of fishermen during pre and post WTO periods.

In the study area, from the total number of employed person about 8.66 percent of the fishermen occupied are observed as depending on sectors other than fishing and fish vending. In pre-WTO period it is only 0.4 percent. These evidences point to the fact that even during the recent period, the fishermen are very slow in employment diversification.

From the total employed population in the study area male members are more occupied. In pre-WTO period 100 percent of employed population is male. i.e., no female is engaged in occupation. Also in the present situation male members is more employed i.e., in the total employed population, 99.34 percent are male but the female employees are only 0.66 percent they working in private sector.

**5.4 Income-Wise Distribution of Fishermen**

The monthly income of the fishermen households is categorized in table 5.6. The fishing income is affected by seasonal variation. They earn comparatively high income in monsoon season and this season characterized by ‘chakara’. In summer season, the income is very low. The income wise distribution of fishermen differentiated in two periods, i.e., pre-WTO period and post-WTO period.

Table 5.6

Income-Wise Distribution of Fishermen in pre-WTO period (percent)

| Income | Total |
|---|---|
| 1000-2000 | 1.23 |
| 2000-3000 | 19.8 |
| 3000-4000 | 52.65 |
| 4000-5000 | 15.31 |
| 5000-6000 | 6.73 |
| 6000-7000 | 3.67 |
| 7000-8000 | 0.61 |

Source: Survey data

The above table 5.6 shows that in pre-WTO period the monthly income of the fishermen was below Rs 8000 and the lowest income in this period was 1000. In the study area only 0.61 percent of fishermen are enjoyed the income level 7000-8000. Most of the fishermen are fall under the income category of 3000-4000, it is 52.65 percent. Like that from this income category we can see that 99.18 percent of fishermen are engaged in fishing.

Table 5.7

Monthly income and Occupation in pre-WTO period

| income | Govt servant | Agriculture | Private non-govt worker | Self-employment | Coolie | Fishing | Fish vending | Others | Total |
|---|---|---|---|---|---|---|---|---|---|
| 1000-2000 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 |
| 2000-3000 | 0 | 0 | 0 | 0 | 0 | 96 | 1 | 0 | 97 |
| 3000-4000 | 0 | 0 | 0 | 0 | 0 | 257 | 1 | 0 | 258 |
| 4000-5000 | 0 | 0 | 0 | 1 | 0 | 74 | 0 | 0 | 75 |
| 5000-6000 | 0 | 0 | 1 | 0 | 0 | 32 | 0 | 0 | 33 |
| 6000-7000 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 |
| 7000-8000 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 |
| Total | 0 | 0 | 1 | 1 | 0 | 486 | 2 | 0 | 490 |

Source: Survey data

In pre-WTO period no fishermen engaged in the occupations like government job, agriculture, coolie etc. (Table 5.7). 99.18 percent of fishermen are engaged in fishing, 0.20 percent working in private sector, 0.20 percent in self-employment and 0.42 percent of fishermen doing fish vending. From the total 490 employed fishermen, 258 members are earning the income Rs 3000-4000 from fishing.

Table 5.8

Income wise distribution of fishermen post-WTO period

| Income | Total |
|---|---|
| 3000-5000 | 2.19 |
| 5000-7000 | 10.32 |
| 7000-9000 | 56.21 |
| 9000-11000 | 28.11 |
| 11000-13000 | 1.09 |
| 13000-15000 | 0.12 |
| 15000-17000 | 1.33 |
| 17000-19000 | 0 |
| 19000 & Above | 0.6 |

Source: Survey data

In the case of post-WTO period the lower income of fishermen is 3000 and higher income is above 19000. From the table we can see that, 56.21 percent of fishermen are earned income Rs 7000-9000. The lower income level 3000-5000 is earned 2.19 percent of fishermen. 10.32 percent of fishermen earned Rs 5000-7000. 9000-11000 income level earned by 28.11 percent of fishermen, 1.09 percent earned Rs 11000-13000 income, 0.12 percent fishermen earned13000-15000, 1.33 percent fishermen earned 15000-17000 income level and only 0.6 percent fishermen earned the higher income i.e., 19000 and above.

These income levels are earned by fishermen from different occupation. They are engaged in different occupation like government job, private sector employment, self-employment, coolie, fishing, fish vending, employment in abroad etc.

Table 5.9

Income distribution and occupation in post-WTO period

| Income | Govt servant | Agriculture | Private non-govt worker | Self-employment | Coolie | Fishing | Fish vending | Others | Total |
|---|---|---|---|---|---|---|---|---|---|
| 3000-5000 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 20 |
| 5000-7000 | 0 | 0 | 2 | 3 | 2 | 85 | 1 | 1 | 94 |
| 7000-9000 | 1 | 0 | 14 | 16 | 6 | 475 | 0 | 0 | 512 |
| 9000-11000 | 0 | 0 | 6 | 3 | 6 | 238 | 0 | 3 | 256 |
| 11000-13000 | 0 | 0 | 0 | 0 | 1 | 9 | 0 | 0 | 10 |
| 13000-15000 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 15000-17000 | 0 | 0 | 1 | 1 | 0 | 3 | 0 | 7 | 12 |
| 17000-19000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19000 and Above | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 6 |
| Total | 2 | 0 | 24 | 23 | 15 | 831 | 1 | 15 | 911 |

Source: Survey data

In the total employed population, 831 members are earned income from fishing (Table 5.9). The lowest income is 3000 and the highest income is 17000 from fishing. In these 831 fishermen, 20 members earned Rs 3000-5000, 85 members earned Rs 5000-7000, 475 members are earned Rs 7000-9000, 238 fishermen earned Rs 9000-11000, 9 members earned Rs 11000-13000, only 1 persons earned Rs 13000-15000 and 3 members earned Rs 15000-17000. Only 1 member is doing fish vending and he earned the income level 5000-7000. Remaining 79 (8.67 percent) employed persons are doing other jobs like government job, private sector employment etc. in the total employed

population 6 members are earned higher income Rs 19000 and above, they are 1 government servant, 1 private employer and 4 NRIs.

Table 5.10

Working days per month and Occupation pre-WTO period

| Working days/month | Private non govt worker | Self-Employment | fishing | Fish Vending | Total |
|---|---|---|---|---|---|
| Below 10 | 0 | 0 | 1 | 0 | 1 |
| 10-15 | 0 | 0 | 6 | 0 | 6 |
| 15-20 | 0 | 0 | 47 | 0 | 47 |
| 20-25 | 0 | 0 | 250 | 1 | 251 |
| 25 and above | 1 | 1 | 182 | 1 | 185 |
| Total | 1 | 1 | 486 | 2 | 490 |

Source: Survey data

To earn income 88.89 percent of fishermen engaged in fishing were going to fishing more than 20 days in a month in pre-WTO period (Table 11). But in the present condition 99.04 percent of fishermen are going to fishing more than 20 days.

Table 5.11

Working days per month and Occupation in post-WTO period

| Working days/month | Govt Servant | Private non-govt worker | Self-employment | Coolie | Fishing | Fish Vending | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Below 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10-15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15-20 | 0 | 0 | 0 | 1 | 8 | 0 | 0 | 9 |
| 20-25 | 1 | 5 | 6 | 4 | 310 | 0 | 2 | 328 |
| 25 and above | 1 | 19 | 17 | 10 | 513 | 1 | 13 | 574 |
| Total | 2 | 24 | 23 | 15 | 831 | 1 | 15 | 911 |

Source: Survey data

In pre-WTO period, 61.93 percent of fishermen engaged in fishing for eight or nine months in a year for their livelihood (Table 5.12). 8.44 percent of fishermen doing fishing less than 8 months and 29.63 percent of fishermen engaged in fishing for 10 or more than 10 months a year.

Table 5.12

Working month/year and occupation in pre-WTO period

| working month/yr | Private non-govt worker | Self-employment | Fishing | Fishing Vending | Total |
|---|---|---|---|---|---|
| 5 | 0 | 0 | 1 | 0 | 1 |
| 6 | 0 | 0 | 14 | 0 | 14 |
| 7 | 0 | 0 | 26 | 0 | 26 |
| 8 | 0 | 0 | 121 | 1 | 122 |
| 9 | 0 | 0 | 180 | 0 | 180 |
| 10 | 0 | 0 | 60 | 0 | 60 |
| 11 | 0 | 0 | 81 | 0 | 81 |
| 12 | 1 | 1 | 3 | 1 | 6 |
| Total | 1 | 1 | 486 | 2 | 490 |

Source: Survey data

During post-WTO period, 78.1 percent of the fishermen engaged in fishing for 10 or 11 months in a year. 7.94 percent doing fishing in 7 or 8 months, 13.24 members doing in 9 months and 0.72 percent engaged in fishing for 12 months (Table 5.13).

Table 5.13

Working month/year and occupation post-WTO period

| working month/yr | Govt servant | Private non-govt worker | Self-employment | Coolie | Fishing | Fish Vending | NRI | Total |
|---|---|---|---|---|---|---|---|---|
| 7 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| 8 | 0 | 0 | 0 | 1 | 64 | 0 | 0 | 65 |
| 9 | 0 | 0 | 2 | 1 | 110 | 0 | 2 | 115 |
| 10 | 1 | 10 | 3 | 2 | 350 | 0 | 11 | 377 |
| 11 | 0 | 3 | 10 | 5 | 299 | 0 | 1 | 318 |
| 12 | 1 | 11 | 8 | 6 | 6 | 1 | 1 | 34 |
| Total | 2 | 24 | 23 | 15 | 831 | 1 | 15 | 911 |

Source: Survey data

Table 5.14 and Table 5.15 explain the distribution of fishermen on the basis of daily wage in the pre and post-WTO period. In pre-WTO period, 45.27 percent fishermen are earning Rs 100 as daily wage. 20.57 percent fishermen earned below Rs 100 and 34.16 percent fishermen earned daily wage above Rs 100.

Table 5.14

Daily wage and occupation in pre-WTO period

| Daily Wage | Private non-govt worker | Self-employment | Fishing | Fishing Vending | Total |
|---|---|---|---|---|---|
| 50 | 0 | 0 | 23 | 0 | 23 |
| 60 | 0 | 0 | 1 | 0 | 1 |
| 70 | 0 | 0 | 2 | 0 | 2 |
| 75 | 0 | 0 | 61 | 0 | 61 |
| 80 | 0 | 0 | 10 | 0 | 10 |
| 90 | 0 | 0 | 3 | 0 | 3 |
| 100 | 0 | 0 | 220 | 2 | 222 |
| 140 | 0 | 0 | 1 | 0 | 1 |
| 150 | 0 | 0 | 67 | 0 | 67 |
| 200 | 1 | 1 | 55 | 0 | 57 |
| 250 | 0 | 0 | 15 | 0 | 15 |
| 260 | 0 | 0 | 1 | 0 | 1 |
| 300 | 0 | 0 | 26 | 0 | 26 |
| 350 | 0 | 0 | 1 | 0 | 1 |
| Total | 1 | 1 | 486 | 2 | 490 |

Source: Survey data

In post-WTO period most of the fishermen (77.38 percent) earning Rs 400 to Rs 500 as daily wage.

Table 5.15

Daily wage and occupation of fishermen in post-WTO period

| daily wage | Govt servant | Private non-govt worker | Self-employment | Coolie | Fishing | Fish Vending | NRI | Total |
|---|---|---|---|---|---|---|---|---|
| 200 | 0 | 0 | 0 | 1 | 22 | 1 | 0 | 24 |
| 250 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 |
| 300 | 0 | 8 | 7 | 4 | 83 | 0 | 0 | 102 |
| 350 | 0 | 5 | 1 | 0 | 43 | 0 | 0 | 49 |
| 375 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 400 | 0 | 8 | 10 | 4 | 300 | 0 | 1 | 323 |
| 450 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 19 |
| 500 | 1 | 2 | 5 | 3 | 324 | 0 | 5 | 340 |
| 550 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 600 | 0 | 1 | 0 | 3 | 31 | 0 | 2 | 37 |
| 700 | 1 | 0 | 0 | 0 | 4 | 0 | 2 | 7 |
| 800 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 |
| 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 2 | 24 | 23 | 15 | 831 | 1 | 15 | 911 |

Source: Survey data

## 5.5. Housing

Most of the people in fishing community are living in their own house in pre and post WTO periods. Only the less number of households is depending on the rented and other facilities for their shelter (Table 5.16). Also there is an improvement in case of housing in post-WTO period as compared to pre-WTO period.

Table 5.16

Distribution of household based on housing (percent)

| Housing | pre-WTO period | post-WTO period |
|---|---|---|
| Owned | 88 | 99.56 |
| Rented | 1.78 | 0.44 |
| Others | 10.22 | 0 |

Source: Survey data

In pre-WTO period, most of the houses are thatched or tiled, but now a day, they start to build terraced house. It shows in table 5.17.

Table 5.17

Types of House of Fishermen Household (percent)

| Type of House | pre-WTO period | post-WTO period |
|---|---|---|
| Terraced | 6.44 | 58.67 |
| Tiled | 60 | 36.22 |
| Thatched | 33.56 | 5.11 |

Source: Survey data

## 5.6 Other Amenities

The evidences from the sample survey states that there is an improvement in basic facilities like electricity, water supply, latrine facilities, health care etc in post-WTO period compared to the pre-WTO condition. In post-WTO period 99.44 percent houses are electrified but it is only 12 percent in pre-WTO period. In pre-WTO period 14.89 percent of households depend on ponds or water-pit in the region for water. Even though the government makes some facilities for water supply, more people are depending on ponds, neighbours' ponds and water-pit. Latrine facility is also improved in the study

area. In the past 14.89 percent of fishermen had latrine facility and it is also improved to 94.89 percent. For health care people depends on public health centers in the region.

Table 5.18

Infrastructure Facilities in Fisheries Region

| Item | pre-WTO period | post-WTO period |
|---|---|---|
| Electricity | 12 | 98.44 |
| Water Facility | 14.89 | 89.11 |
| Latrine Facility | 14.89 | 94.89 |
| Health Care | 89.56 | 93.56 |
| Others | 4 | 0.45 |

Source: Survey data

**5.7 Particulars of Assets**

The asset distribution of fishermen is expressed in Table 5.19 In the past the main form of asset is land. But at present the fishermen owned other form of asset also like vehicle, for travelling and fish vending, fishing gears, fishing crafts, consumer durables etc.

Table 5.19

Particulars of Assets

| item | pre-WTO period | post-WTO period |
|---|---|---|
| Land | 433 | 447 |
| Vehicles | 0 | 203 |
| Fishing Gears | 2 | 12 |
| Fishing Crafts | 15 | 58 |
| Consumer Durables | 1 | 376 |
| Others | 4 | 14 |

Source: Survey data

**5.8 Details of Savings and Borrowings**

It is observed that in the study area the savings of fishermen is very negligible in pre-WTO period but in post-WTO period the savings are increased slowly. In the case of borrowing there is an increasing trend. Most of

the fishermen make borrowing from banks and other financial institutions for various purposes.

Table 5.20

Pattern of saving and Borrowing (percent)

| Item | pre-WTO period | post-WTO period |
|---|---|---|
| Savings | 0.89 | 2.45 |
| Borrowing | 4.44 | 41.34 |

Source: Survey data

Table 5.20 shows that the percent of people who make saving increased from 0.89 percent in pre-WTO period to 2.45 percent recently. The borrowings are higher than savings in fishing region. The percent of people who make borrowings increased from 4.44 percent to 41.34 percent in two different periods. It shows most of the fishermen borrow money for various purposes. The main purposes of savings are shows in table 5.21.

Table 5.21

Distribution of fishermen on the basis of the purpose of saving

| Purpose of saving | pre-WTO period | post-WTO period |
|---|---|---|
| Purchase of Inputs | 1 | 0 |
| Education of children | 0 | 2 |
| Marriage of Daughter | 3 | 9 |
| Earning interest | 0 | 0 |
| For Business | 0 | 0 |
| Other | 0 | 0 |

Source: Survey data

In the study region, 0.23 percent of people save money for the purchase of fishing inputs and 0.67 percent are saved for marriage of daughter in pre-WTO period. Recently, 0.45 percent of fishermen make saving for education of children and 2 percent of fishermen are making for marriage.

Table 5.22

Distribution of fishermen on the basis of the Agency of saving

| **Agency** | pre-WTO period | post-WTO period |
|---|---|---|
| Banks | 2 | 4 |
| Post Office | 0 | 0 |
| Cooperatives | 0 | 0 |
| Chit Funds | 0 | 4 |
| Others | 2 | 3 |

Source: Survey data

The fishermen depend on banks and other institution like curies, chit funds for their saving (Table 5.22).

It is observed that 41.34 percent of fishermen in the study region borrow money from bank and other financial intermediaries for various purposes. The main purpose of borrowings is purchase of fishing inputs, education of children, marriage of daughters, building and maintenance of housing, for business purposes etc.

Table 5.23

Distribution of fishermen on basis of purpose of borrowing

| purpose | pre-WTO period | post-WTO period |
|---|---|---|
| Purchase of Inputs | 8 | 17 |
| Education of children | 0 | 3 |
| Marriage | 6 | 30 |
| Housing | 6 | 133 |
| For Business | 0 | 2 |
| Other | 0 | 1 |

Source: Survey data

Table 5.23 shows that the main purpose of borrowings is purchase of inputs, marriage of daughter and construction and purchase of housing. In pre-WTO period 1.78 percent of fishermen households are borrow money for the purchase of fisheries inputs, 1.34 percent of fishermen households to meet the

expense of marriage and 1.34 percent for the building and maintenance of house. In post-WTO period 3.78 percent of fishermen household made borrowing for the purchase of inputs, 6.67 percent household doing for marriage and 29.59 percent household borrow money for housing. The borrowings are very low for education and other purposes. For the education only 0.67 percent, for business 0.45 of fishermen households borrow money and only 0.23percent of household made borrowing for other purposes.

**5.9 Determinants of Fish Price**

Table 5.24

Distribution of fishermen on the basis of price determination of fish

| **Determinants** | pre-WTO period | post-WTO period |
|---|---|---|
| Forces of supply and demand | 277 | 264 |
| By the wholesale merchant | 2 | 2 |
| By the commission agent | 120 | 128 |
| By the consumers | 0 | 0 |
| Quality of fish | 3 | 7 |
| Others | 48 | 49 |
| Total | 450 | 450 |

Source: Survey data

The main determinant of the price of fish is the forces of demand and supply of fish in pre-WTO period and also at present. The wholesale merchant, the commission agent, the seasonal variations in fish catching and quality of fish are also plays an important role in price determination of fishery products.

**5.10 Preservation Facility**

Table 5.25

Preservation facility in Fishing Area

| Preservation | pre-WTO period | post-WTO period |
|---|---|---|
| Iced | 250 | 332 |
| Cold storage | 7 | 5 |
| Dry fish curing | 27 | 3 |
| Iced & dry fish curing | 22 | 37 |
| Total | 306 | 377 |

Source: Survey data

Most of the fishermen used ice for the preservation of fish, because usually they do not kept fish more than two days. 47.56 percent of fishermen

households were used ice for preservation before 15 years. Now it is increased to 71.34 percent. During 1990s, 5.11 percent of fishermen using ice and dry fish curing for preservation in study area. It is increased to 8.23 percent of fishermen at present. During the 1990s the fishermen preserve the fish one or more than one days. But now the fishermen try to sell out fish as early as possible (Table 5.26).

Table 5.26

Distribution of fishermen on the basis of period of preservation

| **Period** | pre-WTO period | post-WTO period |
|---|---|---|
| 6 Hours | 6 | 222 |
| Overnight | 34 | 85 |
| One Day | 75 | 52 |
| Two Days | 12 | 7 |
| More than Two Days | 179 | 11 |
| Total | 306 | 377 |

Source: Survey data

## 5.11 Expenditure Pattern of fishermen Household

In Table 5.27 and Table 5.28 explained the monthly expenditure pattern of fishermen households in the past and present situations respectively. For this we classified the total expenditure in to eight categories.

Table 5.27

Expenditure Pattern of fishermen Household in pre-WTO period

| Expenditure | Food | Clothing | Medicine | Housing | Electricity | Water | Education | Others |
|---|---|---|---|---|---|---|---|---|
| Below 100 | 0 | 83 | 65 | 0 | 45 | 13 | 0 | 28 |
| 100-500 | 19 | 311 | 273 | 2 | 7 | 1 | 48 | 146 |
| 500-1000 | 101 | 43 | 18 | 6 | 2 | 0 | 28 | 142 |
| 1000-1500 | 247 | 12 | 0 | 0 | 0 | 0 | 5 | 90 |
| 1500-2000 | 53 | 1 | 0 | 0 | 0 | 0 | 1 | 7 |
| 2000-2500 | 25 | 0 | 0 | 0 | 0 | 0 | 2 | 16 |
| 2500-3000 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 3000-3500 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 3500-4000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4000-4500 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 450 | 450 | 356 | 8 | 54 | 14 | 84 | 434 |

Source: Survey data

It is found that the people spend more of their income for food rather than other categories. From the Table 5.7 and 5.8 we can see that most of the fishermen earned income level Rs 3000-4000 before 15 years. From this they spend for food up to Rs 4500. Out of total 450 households, 247 household spend Rs 1000-1500 for food. They spend up to Rs 2000 for clothing. 356 households spend up to Rs 1000 for medicine, 8 household spend Rs100-1000 for housing, 54 households spend up to Rs 1000 for electricity, 14 households spend up to Rs 500 for water, 84 households spend from Rs 100 to Rs 2500 for education and 434 households spend up to Rs 3500 for other purposes.

Table 5.28

Expenditure Pattern of fishermen Household in post-WTO period

| Expenditure | Food | Clothing | Medicine | Housing | Electricity | Water | Education | Others |
|---|---|---|---|---|---|---|---|---|
| Below 500 | 0 | 25 | 32 | 0 | 407 | 9 | 29 | 3 |
| 500-1000 | 0 | 291 | 217 | 0 | 28 | 12 | 154 | 96 |
| 1000-2000 | 23 | 108 | 130 | 2 | 8 | 0 | 58 | 288 |
| 2000-3000 | 83 | 21 | 21 | 0 | 0 | 0 | 29 | 25 |
| 3000-4000 | 77 | 3 | 0 | 0 | 0 | 0 | 4 | 15 |
| 4000-5000 | 100 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| 5000-6000 | 138 | 2 | 2 | 0 | 0 | 0 | 0 | 4 |
| 6000-7000 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7000-8000 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8000-9000 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9000-10000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10000& Above | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 450 | 450 | 402 | 2 | 443 | 21 | 276 | 438 |

Source: Survey data

Table 5.28 explained the monthly expenditure pattern of fishermen in the post-WTO period. From the Table 5.8 and 5.9 we can found that about 84 percent of employed persons earned monthly income from Rs 7000 to Rs 11000. The total households spend Rs 1000 to Rs 10000 for food expenditure and Rs 100 to Rs 5000 for clothing. 402 households spend their monthly income for medical purpose from Rs 100 to Rs 5000. Only 2 households are living in rented house and they spend Rs 1000 as rent for house. 443 households have electricity facility and they spend from Rs 50 to Rs 1500 for electricity. 21 households spend for water up to Rs 1000, 276 households spend

Rs 100 to Rs 4000 for education purpose and 438 households spend Rs 100 to Rs 5000 for other purposes monthly.

**5.12 Selling Details of Fish Variety**

The main varieties that the fishermen are used to sales are sardine, mackerel, shrimp, anchovy, pomfret, seer fish, tuna etc. For simplicity we take only seven varieties of fish.

Table 5.29

Selling Details of Quantity of fish in pre-WTO period

| Quantity sold | Anchovy | Mackerel | Pomfret | Sardine | Seer fish | Shrimp | Tuna |
|---|---|---|---|---|---|---|---|
| 0-500 | 59 | 94 | 146 | 65 | 87 | 250 | 116 |
| 500-1000 | 143 | 290 | 65 | 130 | 4 | 66 | 67 |
| 1000-1500 | 0 | 45 | 1 | 215 | 0 | 0 | 0 |
| 1500-2000 | 0 | 9 | 0 | 33 | 0 | 1 | 0 |
| 2000-2500 | 0 | 0 | 1 | 2 | 0 | 0 | 0 |
| 2500-3000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3000-3500 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| 3500-4000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4000-4500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4500-5000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5000-5500 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Total | 203 | 439 | 213 | 447 | 91 | 318 | 183 |

Source: Survey data

Table 5.29 explained the quantity of fish which were sold in market by fishermen in pre-WTO period. From the table we can found that the fishermen sold the fishes in the market below 1000-1500 kilogram per day. Only 2 fishermen sold fish, sardine, above 5000 kilograms per day in the market.

But in post-WTO (Table 5.30) the fishermen can sale fish up to 3000-3500 kilogram per day especially sardine and mackerel in the market.

Table 5.30

Details of the Quantity of fish sold in post-WTO period

| Quantity sold | Anchovy | Mackerel | Pomfret | Sardine | Seer fish | Shrimp | Tuna |
|---|---|---|---|---|---|---|---|
| 0-500 | 55 | 59 | 187 | 59 | 150 | 198 | 65 |
| 500-1000 | 151 | 66 | 56 | 18 | 9 | 115 | 60 |
| 1000-1500 | 2 | 162 | 15 | 96 | 0 | 2 | 4 |
| 1500-2000 | 1 | 41 | 0 | 37 | 0 | 2 | 0 |
| 2000-2500 | 1 | 93 | 0 | 79 | 0 | 0 | 0 |
| 2500-3000 | 0 | 25 | 0 | 30 | 0 | 0 | 0 |
| 3000-3500 | 0 | 0 | 0 | 133 | 0 | 0 | 0 |
| 3500-4000 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 4000-4500 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 4500-5000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5000-5500 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Total | 210 | 446 | 258 | 458 | 159 | 317 | 129 |

Source: Survey data

The details of the price of fish variety in the past and present situations explained in Tables 5.31 and 5.32. In pre-WTO period the fishermen get almost Rs 200 per kilogram per day. But in the case of present situation (Table 5.32) the fishermen get up to Rs 350 t0 Rs 450 per kilogram per day especially for shrimp and mackerel.

Table 5.31

Details of the price of fish variety in pre-WTO period

| Price | Anchovy | Mackerel | Pomfret | Sardine | Seer fish | Shrimp | Tuna |
|---|---|---|---|---|---|---|---|
| 0-50 | 195 | 427 | 158 | 446 | 8 | 231 | 176 |
| 50-100 | 6 | 11 | 53 | 1 | 77 | 68 | 5 |
| 100-150 | 1 | 0 | 1 | 0 | 6 | 17 | 1 |
| 150-200 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| 200-250 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 250-300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 300-350 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 350-400 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 400-450 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 450-500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 500-550 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 203 | 439 | 213 | 447 | 91 | 318 | 183 |

Source: Survey data

Table 5.32

Details of the price of fish variety in post-WTO period

| Price | Anchovy | Mackerel | Pomfret | Sardine | Seer fish | Shrimp | Tuna |
|---|---|---|---|---|---|---|---|
| 0-50 | 140 | 101 | 1 | 403 | 1 | 30 | 107 |
| 50-100 | 63 | 298 | 48 | 51 | 14 | 96 | 7 |
| 100-150 | 5 | 31 | 118 | 4 | 28 | 151 | 7 |
| 150-200 | 2 | 0 | 79 | 0 | 115 | 11 | 1 |
| 200-250 | 0 | 10 | 12 | 0 | 1 | 19 | 6 |
| 250-300 | 0 | 4 | 0 | 0 | 0 | 8 | 1 |
| 300-350 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 350-400 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 400-450 | 0 | 2 | 0 | 0 | 0 | 1 | 0 |
| 450-500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 500-550 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 210 | 446 | 258 | 458 | 159 | 317 | 129 |

Source: Survey data

The fish market is the competitive market and around 90 percent of fishermen households are sold their products to the commission agents (Table 5.33).

Table 5.33

Sales of fish products

| to whom sold | pre-WTO period | post-WTO period |
|---|---|---|
| street vendor | 1 | 0 |
| street vendor & retailer | 12 | 0 |
| retailer | 16 | 2 |
| commission agent | 400 | 410 |
| wholesaler | 18 | 38 |
| Total | 447 | 450 |

Source: Survey data

The ban on monsoon trawling came to stay in the state in 1988. Traditional fishermen were of the view that the depletion in the landing was caused by the operation of trawl net, purse seine and ring seine. In the study region the fishermen are used the traditional fish net and other equipment for fish catching. Therefore, they do not affect the trawl ban. In the study area only 2 households in past and 16 households in present period are affected by trawl ban.

In the primary survey, it can be note that there is an improvement in all socio-economic factors in the study area. Government of Kerala implemented various plans and schemes to ensure the socio-economic development and livelihood for fishermen community. Fisheries Department, Matsyafed and Kerala Fisherman's Welfare Fund Board also implement such schemes. Some schemes are centrally sponsored, include schemes for housing, insurance and pension. These institutions also implement measures which enable fishermen to earn livelihood. The WTO and its agreements do not make any influence on the socio-economic condition of fishermen in Kerala.

# CHAPTER 6
# INTERNATIONAL AGREEMENTS ON THE TRADE, PRODUCTION AND PRICE OF MARINE PRODUCTS IN KERALA

This chapter presents the impact of WTO agreements on international trade, production and price of marine products in Kerala. The marine fisheries products have significant role in Indian economy as a foreign exchange earning food item. The various factors are affecting the trade of marine products of India and also Kerala. The main determinants of marine fish exports are; food safety and quality standards (concerned with SPS and TBT agreements of WTO), market fluctuations, economic crisis, infrastructure facilities, role of intermediaries, availability of raw materials and trade policies in different countries. With the variation of these factors, there are fluctuations in the export of marine products and the value of foreign exchange earnings in India. These fluctuations are also affected the marine product export of Kerala.

## 6.1 Impact of International Agreements on Marine Fish Trade from India and Kerala

India has faced a number of challenges meeting hygiene requirements for fish and fishery products in its major export markets, especially the EU and U.S. During the late 1980s, Indian exports of shrimp to the U.S. were subject to high rates of border detention related to filth and/or decomposition. In 1979 the U.S. imposed an import alert on all shipments. In January 1980, a certification program was agreed between the FDA and the Indian government that established an agreed list of exporters exempt from automatic detention. This program operated two years, through 1981, but was abandoned in 1982 because of high rates of violation by certified exporters, which continued for over a decade through 1993 and 1994. Subsequently**,** the FDA established its own registry of firms that were exempt from automatic detention based on their histories of compliance established through border inspections.

Major reasons for rejection are filth and *salmonella*, indicating the continued importance of general hygiene controls to accessing U.S. markets.

More general labeling issues are also an issue but account for a small proportion of total rejections.

Since the mid-1990s, the major concern has been compliance with the EU's requirements for hygiene throughout the fish supply chain, alongside the U.S. requirements for HACCP to be implemented in fish processing facilities. Compared to many developing countries, the Indian government made efforts relatively early to comply with these requirements. New legislation implementing the required controls was drafted in 1994 and passed into law in August 1995 through the Export of Fresh, Frozen and Processed Fish and Fishery Products (Quality Control, Inspection and Monitoring) Rules, 1995. Furthermore, specific procedures were laid down within the purview of this legislation for the approval of processing facilities for export to the EU. The Export Inspection Council (EIC) was designated the Competent Authority, with inspection and export certification undertaken by the five regional Export Inspection Authorities (EIAs). In 1996 MPEDA put in place a "HACCP Cell" to assist the Indian fish and fishery products sector industry in the effective implementation of HACCP.

As happened in the U.S., exports of fish and fishery products from India are subject to relatively high rates of border rejections in the EU. Recent rejections are only infrequently related to broader hygiene uses, such as salmonella. Rather, new concerns have arisen related in particular to residues of antibiotics (table 6.1). While salmonella was a major issue in 1998, rates of rejection have declined in line with the implementation of stricter controls in processing facilities. Antibiotics and bacterial inhibitors became the prominent concerns through 2002 and 2003.

Table 6.1

Kerala detentions of fish and fishery products at the EU border, 1997–2003

| **Year** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|---|---|---|
| Salmonella | 10 | 0 | 3 | 2 | 3 | 4 | 1 |
| Aerobic mesophiles | 1 | 0 | 0 | 0 | 3 | 1 | 1 |
| Vibrio cholerae | 2 | 1 | 0 | 1 | 0 | 1 | 1 |
| Vibrio cholera non-01 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| Vibrio parahaemolyticus | 1 | 1 | 0 | 0 | 2 | 1 | 1 |
| Faecal streptococci | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| S. Aureus | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Antibiotic residues | 0 | 0 | 0 | 0 | 0 | 5 | 6 |
| Bacterial inhibitors | 0 | 0 | 0 | 0 | 0 | 9 | 4 |
| Heavy metals | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 16 | 2 | 3 | 4 | 9 | 22 | 16 |

Source: EIC

In 2002 and 2003, India was subject to high rates of EU border rejections because of antibiotics and bacterial inhibitors, with 27 and 22 consignments rejected, respectively. The Indian government responded to the emergence of the 2002 and 2003 rejections by prohibiting the use of antibiotics and other pharmacologically active substances in aquaculture. Currently India does not have the capacity to test to the level of the equipment employed in many EU Member States.

While Indian exporters have not faced major problems with limits on heavy metals and other environmental contaminants, these are widely acknowledged to be an emerging issue particularly for exports to the EU. Thus, in August 2001 the Indian government established maximum levels for mercury, cadmium, lead, arsenic, nickel and chromium as well as a number of pesticides and other contaminants in fish and fishery products. These levels were revised down in July 2002. Likewise, in April 2003 the government specified a maximum level for dioxins that is equivalent to that of the EU.

The direct impact of the testing requirements and then ban on exports imposed by the European Commission over the period May to December 1997

was a decline in the value of exports to the EU both from Kerala and India as a whole. Thus, Indian exports of fish and fishery exports declined from $221 million in 1996–97 to $114 million in 1997–98. Exports of shrimp declined from $137 million in 1996–97 to $54 million in 1997–98. Likewise, exports of fish and fishery products from Kerala declined from $96 million in 1996–97 to $51 million in 1997–98.

Despite the loss of EU markets, over the period 1997–98, exports of fish and fishery products actually increased; the decline in exports to the EU was more than offset by increased exports to other countries. Thus, total fish and fishery product exports expanded from $1,153 million in 1996–97 to $1,296 million in 1997–98. In real (constant 1995 prices) terms, exports also increased from $1,058 million in 1996–97 to $1,109 million in 1997–98. Indeed, there was a sharp hike in exports to non–EU countries toward the end of 1997, which overshadowed the drop in trade with the EU. In particular, exports increased to Japan and South Asia. Thus, Japan accounted for 67.9 percent of exports of fish and fishery products in 1997– 98 compared with 62.6 percent in 1996–97. Likewise, the contribution of exports to Southeast Asia increased from 4.3 percent in 1996–97 to 7.3 percent in 1997–98. Following the removal of restrictions imposed by the European Commission in December 1998 and the recognition of hygiene controls in India as equivalent to those in the EU, exports to that market began to recover. Thus, Indian fish and fishery exports to the EU valued $161 million in 1998–99 and $210 million in 1999–00. Exports to the EU reached $225 million, finally exceeding their pre–1997 level, in 2000–01.

Likewise, exports of shrimp increased to $89 million in 1998–99, $121 million in 1999–2000 and $137 million in 2000–01. Kerala exports of fish and fishery products to the EU recovered more rapidly, increasing to $66 million in 1998–99 and $97 million in 1999–00. However, overall, exports of fish and fishery product from India through 1998–99 and 1999–00 were actually lower in 1997–98. This decline suggests that the period in which restrictions were

applied by the EU fortuitously coincided with a sudden and not sustained surge in global demand.

The quality problems experienced with exports of aquaculture–produced shrimp to Japan evolved gradually over time and have been more protracted than the restriction on exports to the EU. The gradual and long-term impact of these problems makes it even more difficult to isolate the impact on trade. It is evident, however, that fish and fishery product exports to Japan have declined markedly in recent years. While Indian exports were valued at $563 million in 2000–01, they declined to $383 million in 2001–02 and US317 million in 2002–03. Thus, Japan's share of exports declined from approximately 50 percent in 1998–99 to 40 percent in 2000–01, 30 percent in 2001–02 and 22 percent in 2002–03. Likewise, exports of shrimp to Japan declined from $563 million in 2000–01 to $338 million in 2001–02 and $317 million in 2002–03. It is not clear, however, that this quality problem had a significant impact on overall exports; the value of exports was actually higher in 2000–01 and 2001–02 than in 1999–00. Clearly, exporters were able to divert to other markets, as they had done during the period of restriction on exports to the EU.

**6.1.1a. Marine product exports from Kerala during pre-WTO period**

The data (Table 6.2) shows that during the period 1985-86 to 1994-95, the exports of marine products in Kerala are increasing both in terms of quantity and value.But the Kerala's share in national marine fish exports has been declining in terms of quantity as well as value.

Table 6.2

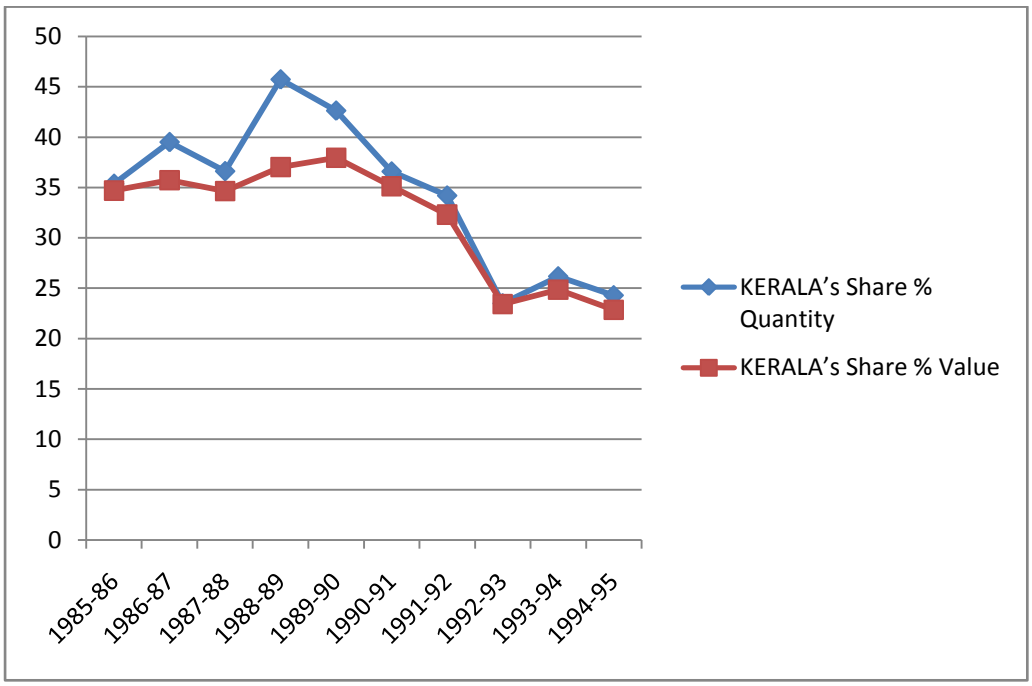
Export Trend of Marine Products –Kerala, 1985-86 to 1994-95

| YEAR | KERALA | | KERALA's Share % | |
|---|---|---|---|---|
| | Quantity (Tonnes) | Value (Rs crore) | Quantity | Value |
| 1985-86 | 29580 | 138.08 | 35.36 | 34.69 |
| 1986-87 | 33906 | 164.57 | 39.50 | 35.72 |
| 1987-88 | 35576 | 183.94 | 36.61 | 34.63 |
| 1988-89 | 45614 | 221.31 | 45.72 | 37.02 |
| 1989-90 | 47245 | 240.94 | 42.62 | 37.94 |
| 1990-91 | 50997 | 313.79 | 36.58 | 35.12 |
| 1991-92 | 58743 | 444.47 | 34.19 | 32.30 |
| 1992-93 | 49094 | 414 | 23.49 | 23.42 |
| 1993-94 | 63848 | 622 | 26.17 | 24.85 |
| 1994-95 | 74653 | 817 | 24.29 | 22.85 |

Source: Economic Review (various issues), Kerala State Planning Board, MPEDA

Figure 6.1

Percentage share of marine product export from Kerala to national total during pre-WTO period




Source: Economic Review (various issues), Kerala State Planning Board, MPEDA

### 6.1.1b. Marine product exports from Kerala during post-WTO period

As well as the pre-WTO period, during post-WTO period also shows that the export of marine product from Kerala increasing both in terms of quantity and value. The export of marine product increased from 78895 tonnes in 1995-96 to 149138 tonnes in2015-16 in terms of quantity. It is also increased from 856 crores in 1995-96 to 4644.4 crore in 2015-16 in terms of value. But it also shows that Kerala's share of marine product export to national total declining in terms of quantity and value.

Table 6.3

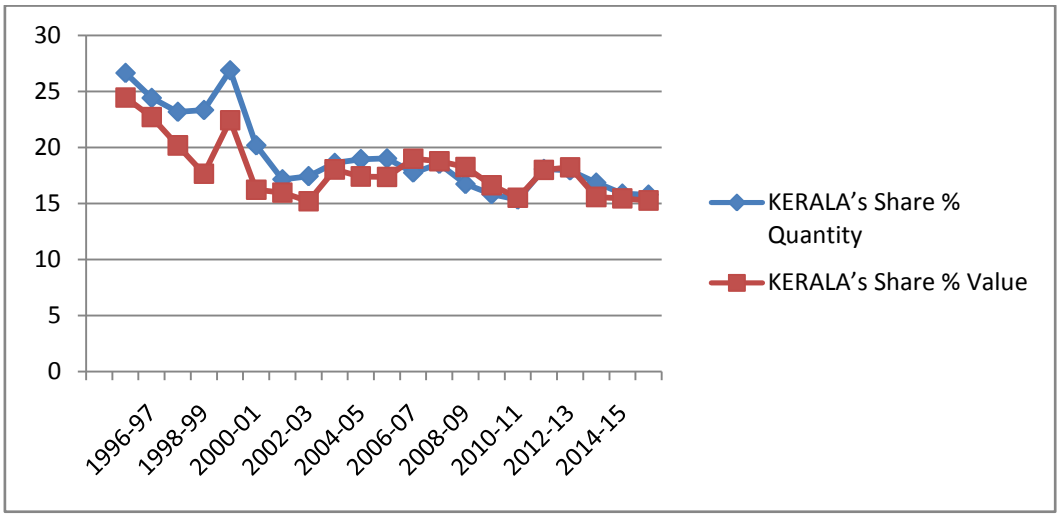
Export Trend of Marine Products –Kerala, 1995-96 to 2015-16

| YEAR | KERALA | | KERALA's Share % | |
|---|---|---|---|---|
| | Quantity (Tonnes) | Value (Rs crore) | Quantity | Value |
| 1995-96 | 78895 | 856 | 26.63 | 24.45 |
| 1996-97 | 92288 | 936 | 24.40 | 22.71 |
| 1997-98 | 89366 | 948 | 23.16 | 20.18 |
| 1998-99 | 70641 | 817 | 23.32 | 17.66 |
| 1999-00 | 92148 | 1148 | 26.86 | 22.43 |
| 2000-01 | 88852 | 1046 | 20.17 | 16.23 |
| 2001-02 | 72756 | 951 | 17.14 | 15.96 |
| 2002-03 | 81392 | 1046 | 17.42 | 15.2 |
| 2003-04 | 76627 | 1099 | 18.6 | 18.04 |
| 2004-05 | 87337 | 1157 | 18.94 | 17.41 |
| 2005-06 | 97311 | 1257 | 19 | 17.36 |
| 2006-07 | 108616 | 1524 | 17.74 | 19.00 |
| 2007-08 | 100318 | 1430 | 18.52 | 18.77 |
| 2008-09 | 100780 | 1572 | 16.72 | 18.26 |
| 2009-10 | 107293 | 1670 | 15.81 | 16.62 |
| 2010-11 | 124615 | 2002 | 15.33 | 15.52 |
| 2011-12 | 155714 | 2988 | 18.06 | 18.00 |
| 2012-13 | 166399 | 3435.85 | 17.93 | 18.22 |
| 2013-14 | 165698 | 4706.36 | 16.84 | 15.58 |
| 2014-15 | 166754 | 5166.1 | 15.86 | 15.45 |
| 2015-16 | 149138 | 4644.4 | 15.77 | 15.27 |

Source: Economic Review (various issues), Kerala State Planning Board, MPEDA

Figure 6.2

Percentage share of marine product export from Kerala to national total during post-WTO period

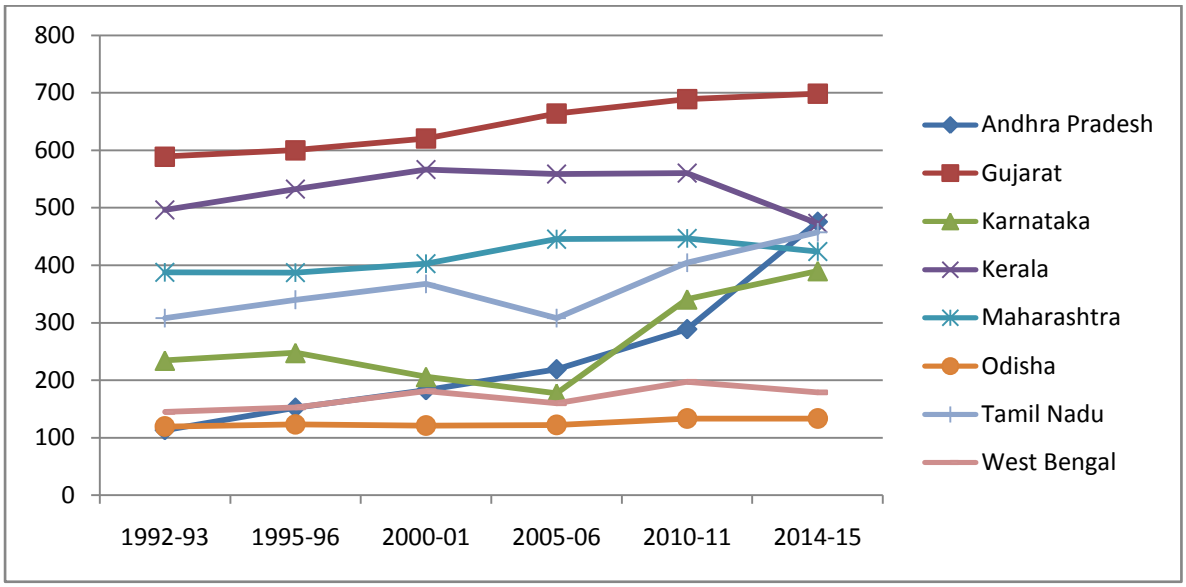



Source: Economic Review (various issues), Kerala State Planning Board, MPEDA

When we compared the trend of marine product exports from Kerala and its share during pre and post WTO period, it is clear that the export of marine product increasing in terms of quantity and value and Kerala's share in national total decreasing in both periods. This declining trend is mainly due to the growth of aquaculture in states like Gujarat, Andhra Pradesh, Orissa, West Bengal etc.

Figure 6.3

Marine Fish Production by States




Source: Handbook on Fisheries Statistics, Department ofAnimal Husbandry, Dairying & Fisheries

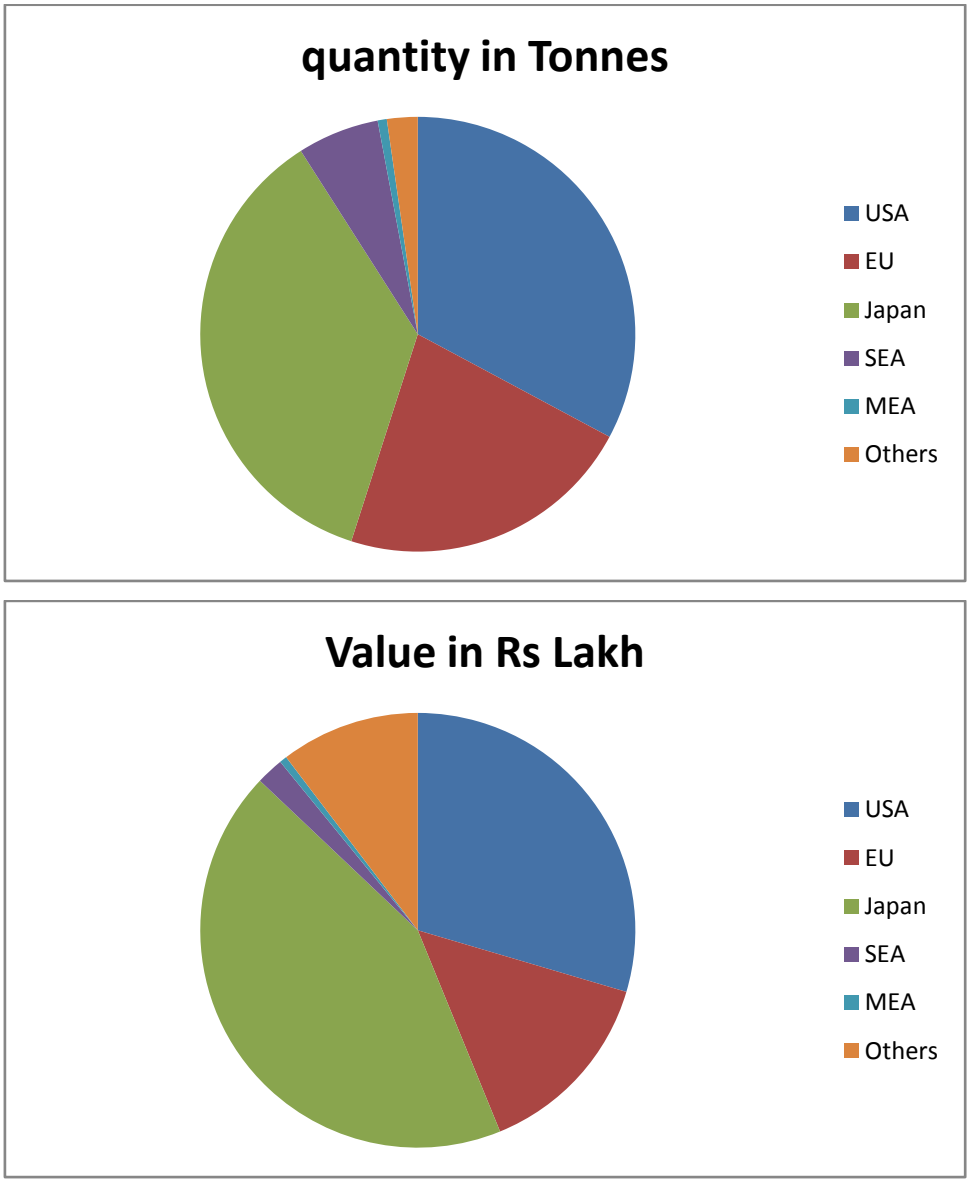
Figure 6.3 shows that the marine fish production in the states like AP, Gujarat, Karnataka, Maharashtra etc. is increasing. That is the share of these states to national marine product export is also increasing and the Kerala's share is decreasing.

**6.1.2a. Marine product exports from Kerala to various markets during Pre-WTO period**

The USA, EU and Japan are the important traditional export markets of marine products from Kerala. The combined share of these markets in marine product export is 90.96 percent in terms of quantity and 87.07 percent in terms of value during 1987-88. The share of USA, EU and Japan stood at 32.82 percent, 22.13 percent and 36.01 percent respectively in terms of quantity and 29.57 percent, 14.25 percent and 43.25 percent in terms of value. The other markets like SEA (South East Asia), MEA (Middle East Asia) and 'Others' are rather insignificant.

Figure 6.4

Market wise export of marine products from Kerala in 1987-88




Source: Computed from MPEDA data

Table 6.4

Compound Annual Growth Rate of Marine Product Exports from Kerala in the Pre WTO Period (1987-88 to 1994-95)

| Markets | Quantity (in tonnes) | Value (in Lakh) |
|---|---|---|
| USA | 5.92 | 20.9 |
| EU | 19.28 | 35.09 |
| Japan | -2.86 | 10.48 |
| SEA | 22.14 | 45.45 |
| MEA | 25.33 | 36.81 |
| Others | 8.53 | -3.48 |

Source: Computed from MPEDA data

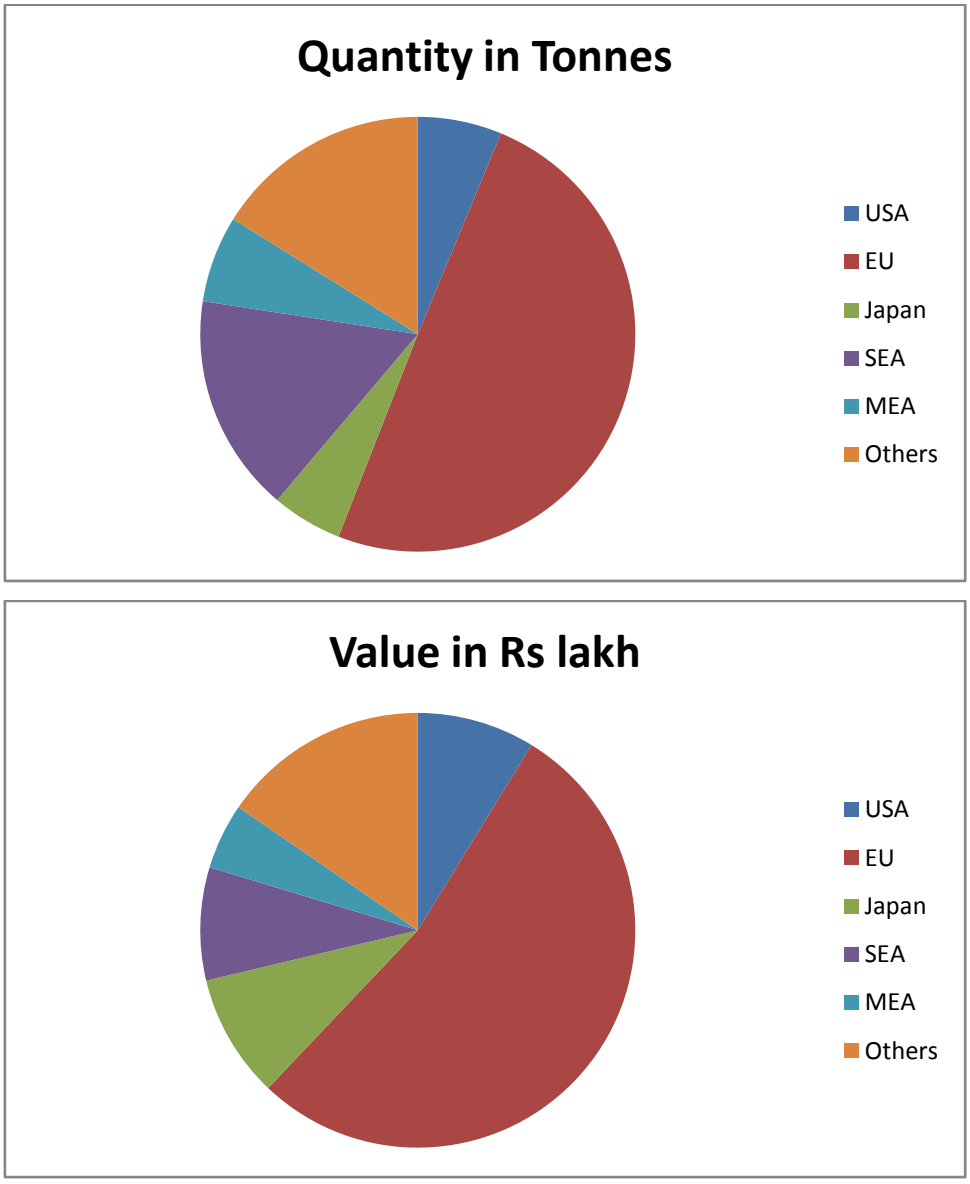
Among the traditional export markets EU was the prominent in terms of quantity (19.28 percent) and value (35.09 percent) during pre-WTO period. Japan showed a slowdown sign especially in terms of quantity. USA also an important market of marine products and it accounted at 5.92 percent in terms of quantity and 20.9 percent in terms of value. The compound annual growth rate of marine products to SEA and MEA registered high values and it indicating the emergence of new markets for Kerala's marine product export. Exports to 'others' showed comparatively insignificant role in trade.

**6.1.2a. Marine product exports from Kerala to various markets during Post-WTO period**

There is a drastic change in market wise export of marine product export from Kerala during post-WTO period. In 1987-88 Japan and USA were the highest market of marine products of Kerala. But in 2009-10 EU is single largest market of Kerala's marine product both in terms of quantity and value. That means as compared to pre-WTO period, the role of USA and Japan is slow down and EU emerged as the prominent market of marine products of Kerala.

Figure 6.5

Market wise export of marine products from Kerala in 2009-10




Source: Computed from MPEDA data

The post WTO phase has witnessed the emergence of the SEA, MEA and 'Others' as major importers of marine product exports from Kerala. Besides improving the individual shares over the period 1995-96 to 2009-10, there has also been a steady increase in the quantity and value of marine product exports to these markets during the post WTO period. The compound annual growth rate of quantity and value of marine product exports to various markets computed for the post WTO period is given in Table 6.5.

Table 6.5

Compound Annual Growth Rate of Marine Product Exports from Kerala in the Post WTO Period (1995-96 to 2009-10)

| Markets | Quantity (in tonnes) | Value (in Lakh) |
|---|---|---|
| USA | -4.57 | -1.48 |
| EU | 1.56 | 5.39 |
| Japan | -3.36 | -0.51 |
| SEA | 8.45 | 8.87 |
| MEA | 10.79 | 13.14 |
| Others | 6.17 | 11.47 |

Source: Computed from MPEDA data

Compared to the pre WTO period, the compound annual growth rate of quantity and value of marine product exports from Kerala to all the above markets declined in the post WTO period. The compound annual growth rate of marine product exports from Kerala to Japan has turned negative during this phase in terms of quantity and value. The compound annual growth rate of quantity and value of marine product exports from Kerala to the US was as low as -4.57 percent and -1.48 respectively. Compared to the US and Japan, the newer markets of the SEA and the MEA registered higher compound annual growth rates in terms of quantity and value.

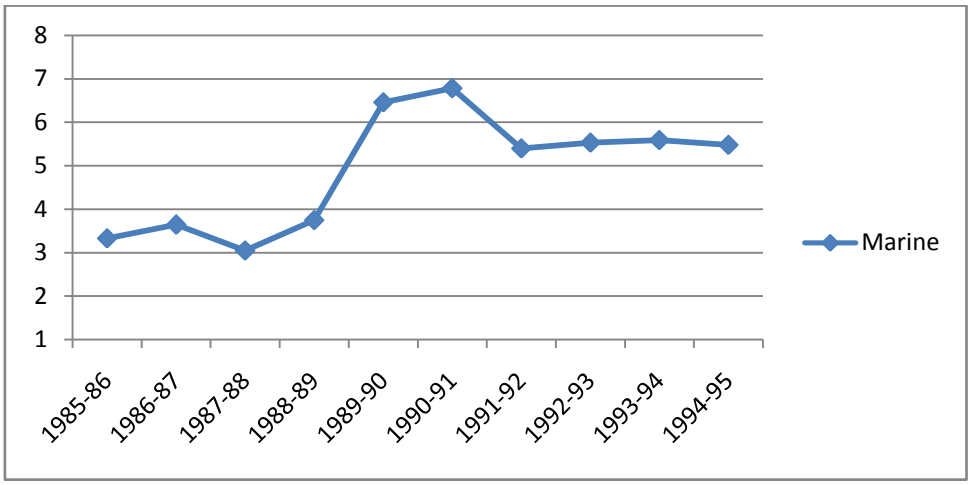
## 6.2 Impact of International Agreements on Marine Fish production and capture in Kerala

Figure 6.5 expressed that during 1985-86 to 1994-95, the marine fish production in Kerala shows an increasing trend. In 1985-86 the marine fish production was 3.33 lakh tonnes and it is increased to 6.78 lakh tonnes in 1990-91. In 1991-92 it is decreased to 5.40 lakh tonnes and this trend is continued.

Figure 6.6

Marine Fish production in Kerala During pre-WTO period

(Lakh tonnes)



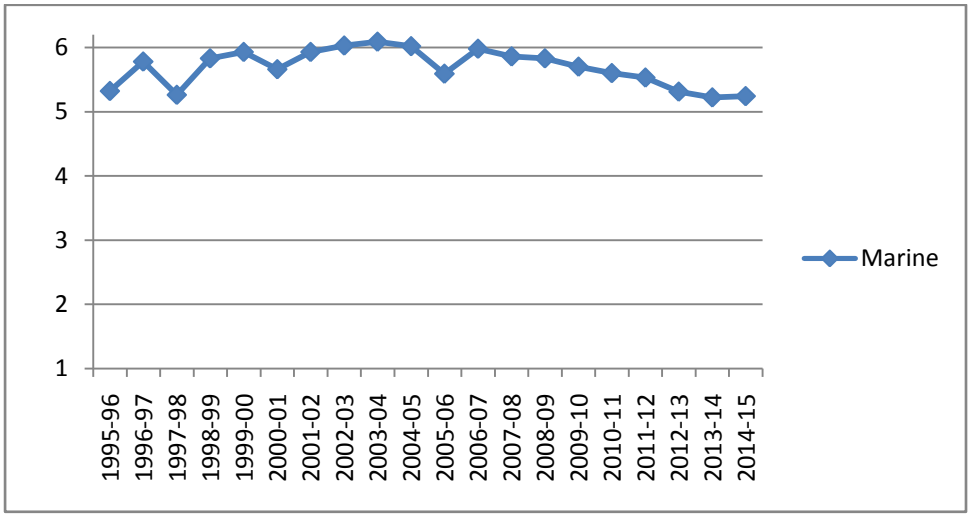

Source: Computed from MPEDA data

In the beginning of post-WTO period in 1995-96, Kerala's marine fish production was 5.32 lakh tonnes and it is 5.24 lakh tonnes in 2014-15 (Figure 6.6). Here we can see that from the middle of pre-WTO period to the present (2014-15) the marine fish production Kerala is more or less same. So it is declaring that the WTO could not make any impact on the marine fish production in Kerala.

Figure 6.7

Marine Fish production in Kerala During post-WTO period

(Lakh tonnes)




Source: Computed from MPEDA data

## 6.3 Marine Fish Marketing and Price Behaviour

Regarding fish marketing the following channels are usually followed (i) Producer-retailer-consumer, (ii) Producer-wholesaler-retailer-consumer, (iii) Producer-commission agent (or broker)-wholesaler-retailer-consumer, (iv) Producer-wholesaler-commission agent-retailer-consumer and (v) Producer-commission agent-wholesaler-commission agent-retailer-consumer.

In the first channel cycle vendors or head load vendors purchase fish directly from the landing centre (producer) and sell to consumer either at a market place or at door step of houses and hotels. In all other channels wholesalers are also involved. In some cases, commission agents are involved either at landing centre or at the consumer markets and sometimes at both centres. Usually commission agents are engaged by wholesalers to purchase as well as dispose the consignments. These agents get certain percentage of the fish value from the wholesaler.

However, some of the commission agents made some investments to bridge the time gap between payments by retailers to wholesalers. At consumer market wholesalers usually hand over the truck load of fish to commission agent and the retailers purchase fish from this agent. The retailers make the payments after one or two days and at certain places after one week. Depending upon the personal relationship between agent and retailer those payments will be sometimes delayed. But the agent has to make payments to wholesaler within the allowed time period.

In such circumstances the agent has to pay from his own pocket. For this type of investment, the agent gets a margin from the retailer in addition to his commission from wholesaler which usually reflects in the retail price.

The price behaviour of fish is mainly characterized by wide fluctuations at all stages of transactions in the marketing chain, which is resulted from the highly perishable nature of fish and the high variation in its short run supply. Price is determined by the interaction of demand and supply at both producing centres (Primary markets) and consumer markets. At landing centres (Primary markets) the market demand is the aggregate demand from wholesalers and

also from cycle vendors, retailers and individual purchasers. There will not be much variation in the day to day volume of transactions by these purchasers or in other words the short run demand is more or less stable. However, the level of supply on any day is completely unpredictable and short run supply is highly inelastic. Hence on any day a bumper catch at a landing centre will slash down the fish prices and a small catch will boost the prices to very high levels. This explains the wide day to day fluctuations in fish prices. For any commodity price stability is a major factor which induces the producer to increase the level of production (K. K. P. Panikkar and R. Sathiadhas, 1989).

Table 6.6

Distribution of fishermen household on the basis of price determination of marine fish in Kerala (%)

| **Determinants** | **Pre-WTO period** | **Post-WTO period** |
|---|---|---|
| Forces of supply and demand | 61.56 | 58.67 |
| By the wholesale merchant | 0.44 | 0.44 |
| By the commission agent | 26.67 | 28.44 |
| By the consumers | 0 | 0 |
| Quality of fish | 0.67 | 1.56 |
| Others | 10.66 | 10.89 |
| Total | 100 | 100 |

Source: Survey Data

As seen in the primary survey 61.56 percent of fishermen households said that demand and supply of fish determine the price in the pre-WTO period and the same opinion said by 58.67 percent in present situation.

Table 6.7

Average Beach Price of Selected Marine Fishes in Kerala

| **Species** | **1988-89** | **1990-91** | **1992-93** | **1995-96** | **2014-15** |
|---|---|---|---|---|---|
| Anchovy | - | - | - | 12.33 | 44.21 |
| Mackerel | 6.50 | 8.00 | 13.00 | 17.03 | 69.12 |
| Pomfret | 11.00 | 17.50 | 24.00 | 38.40 | 122.21 |
| Sardine | 3.00 | 5.00 | 12.00 | 7.47 | 32.74 |
| Seer fish | 13.50 | 18.50 | 25.00 | 58.74 | 138.58 |
| Shrimp | 23.00 | 32.50 | 40.00 | 42.30 | 102.87 |
| Tuna | 7.00 | 11.50 | 15.00 | 12.81 | 45.23 |

Source: Survey Data, Economic Review

From this table we can found that the average daily price of all selected varieties of fish increased from 1988-89.

The landing centre prices and retail prices were highly correlated for fishes. Even the retail prices of those varieties for which there is strong consumer preference were highly correlated in retail markets situated within the city and in distant markets within the same distance from the landing centre, the degree of market integration was much less due to regional preferences for certain varieties and market arrivals from different landing centres (K. K. P. Panikkar and R. Sathiadhas, 1989). The present marketing system and price structure do not provide any inducement to the fishermen to increase the fish production.

# CHAPTER 7

# SUMMARY, FINDINGS AND CONCUSION

The study tried to explain the WTO agreements and its impacts on marine fish trade, production, price and on the socio-economic conditions of fishermen in Kerala. The fisheries sector assumes significance in the Indian economy in several respects. The most important amongst them is the providence of livelihood to poor households especially located in the coastal areas. These households can generate income from the sector due to the fact that many varieties of marine fishes have been exported from the country.The demand for fish and fishery products are increasing both in domestic and export fronts. The globalization has dramatically increased the amount of fish traded internationally. Over 55 varieties of marine products are exported to different countries in South East Asia, Europe China, Japan and USA. Though the share of agricultural export in total exports of India in recent years declined, but contribution of fishery sector in the agricultural exports markedly increased. India's marine export performance is also affected byWTO multilateral trade agreements and trade liberalization measures.

Kerala is an important maritime state in India, which contributes nearly 20-25 percent of the country's marine fish landings and 24 percent of the state's export comes from this sector.The fish and fishery products are treated as industrial goods, and are not bound by the agricultural regulations. Therefore, a number of the provisions and rules relating to agricultural products are not applicable to fisheries products. The multilateral agreements on trade in goods relevant to fisheries are the agreements on non-tariff barriers, sanitary and phytosanitary measures, technical barriers to trade, import licensing procedures, subsidies and countervailing measures and agreement on safeguards. With increasing globalization and declining tariff rates, opportunities for export growth in developing countries like India have increased. The most relevant WTO agreements for fisheries trade are the application of sanitary and phytosanitary measures and technical barriers to

trade. These food safety standards and non-tariff trade barriers are mainly implemented by the marine product importing countries like The EU, the US and Japan. Since these countries are the major export destination of Kerala's marine exports, any policy shocks from these countries have significant impact on Kerala's fisheries export. The bans were imposed by EU due to non-compliance of the safety regulation on Indian seafood caused severe injury to the fishery sector of Kerala, as Kerala being the hub of India's seafood export industry. This had affect livelihood of about 200,000 people related to fish harvesting, peeling, processing and marketing. Therefore, the international agreements and regulations are also affecting the socio-economic conditions of fish workers.

**Findings:**

There are seven chapters and three objectives in this study. The first chapter comprises introduction, discussion of various studies relates to the concerned area, objectives, problems and methodology. The relevant WTO agreements relates to marine fisheries sector are discussed in the second chapter. The Sanitary and Phytosanitary Measures and the agreement on Technical Barriers to Trade are the most important, as these agreements try to prevent sanitary standards and quality measures as obstacles to trade.

The third chapter overviewed the Indian marine fishery sector. In all over the world the importance of fish has been increasing. Capture fisheries and aquaculture supplied the world with about 148 million tonnes of fish in, of which about 128 million tonnes was utilized as food for people, and preliminary data for 2011 indicate increased production of 154 million tonnes, of which 131 million tonnes was destined as food. The production in India has increased in both inland and marine sectors since 1960-61. The increase was more in case of marine sector as compared to the inland sector. But after the mid-1990s the situation was changed i.e., the inland fish production dominated in total fish production. During 2016-17, India's total fish production has touched 11.41 million tonnes from mere 0.75 million tonnes in 1950-51. The world production during the same period has gone up from 23.5 million tonnes

to around 211million tonnes. The share of India in global fish production has grown gradually, from about 3.19 per cent during the 1950s to 5.4 per cent in 2016-17. It shows that growth in fish production in India has been at a faster rate than that in the world; mainly due to increasing contributions from inland fisheries. The contribution of fisheries sector to the GDP has gone up from 0.46 per cent in 1950-51 to 1per cent in 2015-16 (at current prices). The share of fisheries in agricultural GDP (AgGDP) has impressively increased during this period from a mere 0.84 per cent to 5.5 per cent.In fact, the fisheries sector is booming and contributing increasingly to the economic growth of the nation.

In parallel with the increase in production, international trade has continued to grow, and at an accelerating rate in recent years. India has also a significant role in world's fish and fishery product exports. The major marine products exported were frozen shrimp, frozen fish, frozen cuttlefish, frozen squid, dried items, live items and chilled items. There has been a steady increase in exports by volume, value, and unit value realization since the 1960s. Exports of marine products have been erratic and on a declining trend which could be due to the adverse market conditions prevailing in the EU and US markets. The anti-dumping procedure initiated by the US Government has affected India's shrimp exports to the US. The share of Indian marine fish exports to the global exports has remained insignificant during last several years. In fact, the gap has widened further. This shows that urgent steps are necessary to increase share of India in global fishery exports. Japan, the USA, the European Union (EU) and Southeast Asia (including China) are the main export markets of Indian fisheries product. After the introduction of WTO, there is a market diversification in case of export of marine products from India.

The fourth chapter explains the overview of marine fishery sector in Kerala. Estimates of the fishery resources assessment shows that among the maritime states in India, Kerala occupies the second position in marine fish production. Kerala's share in the national marine fish production is about 15 percent. The marine fishery resource of the state has almost attained the

optimum level of production. During 2015-16, 71.11 percent of total fish production in Kerala coming from marine fisheries sector and the remaining from inland fisheries. While marine fish production in Kerala tended to fluctuate the inland fish production showed a sign of improvement. Inland production sustained on increasing trend. The Gross State Domestic Product of the State has increased by about 69 percent during the period from 2005-06 to 2012-13 and the share of fisheries sector in the State Domestic Product has declined from 1.3 to 0.82 percent in the same period. The share of Primary Sector in GSDP has also declined from 17.11 to 9.34 percent. During the 1992-93 to 2015-16, the exports of marine products in India and Kerala are increasing both in terms of quantity and value. Kerala has made vital contribution in the export of marine product from the country. But the Kerala's share in national marine fish exports has been declining in terms of quantity as well as value after 1990s. The main species exported from Kerala are shrimp, frozen cuttle fish, frozen squid and fin fishes. The major markets of Kerala's marine fish exports are the EU, Japan, USA and South East Asia. European Union has been the major export destination of Kerala's marine exports. EU holds around fifty percent value share of Kerala's export destination during the year 2009-10.

As per the population census 2011, the fisher folk population in Kerala is 10.02 lakh covering 7.71 lakh in coastal area and 2.31 lakh in inland sector. It is also estimated that about 71600 people are engaged in fishery allied activities. These fishermen of the state contribute about 8 percent of the GSDP from the agriculture sector which gives the significance of the sector to the state economy.

First objective, the impact of international agreements on the socio-economic condition of fishermen in Kerala, is discussed in the fifth chapter. Data of various socio-economic factors are collected from fishermen in three districts of Kerala. Data about educational status, occupation, monthly income, housing, assets and other amenities, monthly expenditure, quantity of fish landings, fish prices etc are collected for two different periods-pre and post

WTO phases. From the primary data, it can be see that there is an improvement in the socio-economic condition of fishermen in post-WTO period compared to pre-WTO period. This improvement is the result of various plans and schemes implemented by the state and central governments. The WTO and its agreements do not affect the socio-economic condition of local fishermen in Kerala.

The analysis of second and third objectives included in sixth chapter. The WTO and its agreements affect the marine fish trade from Kerala. There occurs market diversification of marine product export from Kerala. The quality problems experienced with exports of aquaculture–produced shrimp to Japan evolved gradually over time and have been more protracted than the restriction on exports to the EU. The gradual and long-term impact of these problems makes it even more difficult to isolate the impact on trade. It is evident, however, that fish and fishery product exports to Japan have declined markedly in recent years.

During 1985-86 to 1994-95, the marine fish production in Kerala shows an increasing trend. In 1985-86 the marine fish production was 3.33 lakh tonnes and it is increased to 6.78 lakh tonnes in 1990-91. In 1991-92 it is decreased to 5.40 lakh tonnes and this trend is continued. In the beginning of post-WTO period in 1995-96, Kerala's marine fish production was 5.32 lakh tonnes and it is 5.24 lakh tonnes in 2014-15 (Figure 6.6). Here we can see that from the middle of pre-WTO period to the present (2014-15) the marine fish production Kerala is more or less same. So it is declaring that the WTO could not make any impact on the marine fish production in Kerala.

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said that demand and supply of fish determine the price in the pre-WTO period and the same opinion said by 58.67 percent in present situation

**Conclusion**

The study revealed that there was a change in the direction of marine product exports in Kerala. That is there is market diversification occurred in the export of marine products. It was the consequence of the evolving requirements in importing countries. The strengthening of requirements in the import markets caused an increase in cost of the marine product export units of the state. It leads the reduction in export from the state. In the study it also revealed that the international agreements do not affect the socio-economic condition of local marine fishermen in Kerala. There is an improvement in their socio-economic condition is the result of the various plans and schemes implemented by central and state governments. The marine fish production in Kerala is increasing in terms of quantity and value. But after 1990, states' share of marine fish production to national total is more or less same. The study also states that the price of marine fish products is mostly determined by their demand and supply.

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http://www.globefish.org

http://www.wto.org

# APPENDIX

## Interview schedule

District…… Name of Fishing Village…… Name & No. of Ward ……. Date of Survey……

1. Name of Respondent :
2. Religion and Community :
3. Number of Family Members :
4. Details of Family Members

| Relation | Age | Sex | Education | Occupation | Monthly Income | No. of working days/month |
|---|---|---|---|---|---|---|
| Self | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

5. Nature of Occupation

| **Item** | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|
| Government Servant | | |
| Agriculturist | | |
| Private non-government worker | | |
| Self employment | | |
| Coolie | | |
| Fishing | | |
| Fish Vending | | |

6. If you have fishing:

| **Item** | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|
| No. of working days per month | | |
| No. of working month per year | | |
| Daily wage (in Rs) | | |

7. Housing:

| Item | Pre-WTO Period | Post-WTO Period |
|---|---|---|
| Owned | | |
| Rented | | |
| Relative's House | | |

8. Type of House:

| Item | Pre-WTO Period | Post-WTO Period |
|---|---|---|
| Terraced | | |
| Tiled | | |
| Thatched | | |

9. Other amenities:

| Item | Pre-WTO Period | Post-WTO Period |
|---|---|---|
| Electricity | | |
| Water facility | | |
| Latrine facility | | |
| Health care | | |

10. Particulars of Assets

| Item | Pre-WTO Period | Post-WTO Period |
|---|---|---|
| Land owned (cents) | | |
| No. of Vehicles | | |
| Fishing gears | | |
| Fishing crafts | | |
| Consumer Durables | | |
| Others | | |

11. Expenditure Pattern (Average monthly expense)

| Item | Pre-WTO Period | Post-WTO Period |
|---|---|---|
| Food | | |
| Clothing | | |
| Medicine | | |
| Housing | | |
| Electricity | | |
| Water | | |
| Education | | |
| Others | | |
| Total | | |

12. Do you have Saving: Yes/No

13. If yes, how often do you save? :

| | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|
| daily | | |
| weekly | | |
| monthly | | |

14. Purpose of Saving

| **Purpose** | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|
| Purchase of Inputs | | |
| Education of children | | |
| Marriage of Daughter | | |
| Earning interest | | |
| For Business | | |
| Other | | |

15. Where do you Save:

| **Agency** | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|
| Banks | | |
| Post office | | |
| Cooperatives | | |
| Chit funds | | |
| Others | | |

16. Do you borrowed Money: Yes/no
17. Purpose of borrowing

| **Purpose** | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|
| Purchase of Inputs | | |
| Education of children | | |
| Marriages | | |
| Earning interest | | |
| Construction & purchase of house | | |
| For Business | | |
| Other | | |

18. Source of borrowing

| **Items** | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|
| Banks | | |
| Cooperatives | | |
| SHGs | | |
| Money Lenders | | |

| | | |
|---|---|---|
| Friends and Relatives | | |
| others | | |

19. Repayment Period:

**Pre-WTO Period** [ ] **Post-WTO Period** [ ]

20. How often do you repay:

| | **Pre-WTO Period** | **Pos-WTO Period** |
|---|---|---|
| Daily | | |
| weekly | | |
| monthly | | |

21. Name of the nearest fish market :

**Pre-WTO Period** [ ] **Post-WTO Period** [ ]

22. Distance from the landing centre :

**Pre-WTO Period** [ ] **Post-WTO Period** [ ]

23. Details of sales of fish:

**Pre-WTO period**

| Fish variety | To whom sold* | Quantity sold (in kg) | Selling price (in Rs) | Unsold quantity |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Post-WTO period**

| Fish variety | To whom sold* | Quantity sold (in kg) | Selling price (in Rs) | Unsold quantity |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

[*(a) in a local market to the consumer (b) Street vendor (c) Retailer (d) Commission agent (e) Wholesaler (f) Export agency (g) Other specify]

24. Kind of Market situation

| **Type** | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|
| Competitive market | | |
| Monopoly market | | |

[Competitive market-(large No. of sellers and large No. of buyers), Monopoly market-(one seller and many buyers)]

25. Price determination in market

| **Determinants** | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|

| | | |
|---|---|---|
| Forces of supply and demand | | |
| By the wholesale merchant | | |
| By the commission agent | | |
| By the consumers | | |
| Quality of fish | | |
| Others, specify | | |

26. Which type of preservation do you adopt

| **Type** | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|
| Iced | | |
| Cold storage | | |
| Dry fish curing | | |

27. Period of preservation

| **Period** | **Pre-WTO Period** | **Post-WTO Period** |
|---|---|---|
| 6 hours | | |
| Overnight | | |
| One day | | |
| Two days | | |
| More than 2 days | | |

28. Has the Government provided any storage facilities? :

**Pre-WTO Period**: Yes/No **Post-WTO Period**: Yes/No

29. If yes, specify:
30. Whether the storage facilities provided by the Govt. are adequate? :

**Pre-WTO Period**: Yes/No **Post-WTO Period**: Yes/No

31. Whether fish drying yard facility is available at the landing centre? :

**Pre-WTO Period**: Yes/No **Post-WTO Period**: Yes/No

32. If yes, whether it is adequate? :

**Pre-WTO Period**: Yes/No **Post-WTO Period**: Yes/No

33. Whether fish processing facility is available?

**Pre-WTO Period**: Yes/No **Post-WTO Period**: Yes/No

34. Is there increase in demand for stringent and high hygienic standards in production and processing facilities? Why?

35. How is it affecting your community?

36. Whether the Government of India takes important steps to maintain the highest standards in fish processing?

37. Is there any problem with packaging and processing of fish products?

38. Procedure and conditions of packaging of fish products?

39. Is fishing is profitable always or sometimes?
40. In which season you get more income?
    (a)Peak (b) Normal (c) Lean season
41. Are you affected by trawl ban? : Yes/No
42. Average monthly income during trawl ban:
43. Do you think seasonal trawl ban is a necessary measure? Why?
44. Suggestions: