CHAPTER - II

OVERVIEW OF RELATED LITERATURE

2.1. INTRODUCTION

Fisheries economics emerged as an important field of research after the Second World War. Till then, studies relating to fisheries were almost completely confined to biological aspects of fisheries. During 40s and 50s, following the realisation that major constraints on fisheries development was technological, quite a few studies focusing on purely technological aspects were taken up, largely in developed countries. The third world countries' interest in fisheries was aroused in 50s and 60s of 20th century when most such countries embarked upon ambitious schemes of economic development. At this juncture, world development agencies like United Nations (UN) through Food and Agriculture Organization (FAO) took active interest in the development of fisheries as it turned out to be potential source of food and nutrition for the rapidly growing population of the world. These gave rise to growth of prolific studies relating to fish production, marketing, technology, fishery resources, finance, price, socio-economic etc.

2.2. STUDIES RELATING TO PRODUCTION

Sekar, Senthilnathan and Isabella Rani (1993)\(^1\) conducted a study with an objective of analysing the coastal region-wise, craft-wise, gear-wise and month-wise fish production in Tamil Nadu during the year 1992-93. Craft-wise fish production showed that mechanised crafts are contributing around 59 per cent of total catches. Among the gears used for fish production, gill net accounted for 39 per cent followed by trawl net 31 per cent of total fish catch. Month-wise analysis showed that July, August and September are the peak period for fishing activity. Region-
wise fish production showed that Palk Bay recorded the maximum annual growth rate and the West Coast has the lowest. However, production per kilometer of coastal length was the higher in the west coast. Therefore, it was suggested that necessary steps to be taken to involve fishermen effectively by providing infrastructure needed to them for fishing, so that the west coast potential is tapped for increasing the marine fish production.

Sathiadhas (1997)² studied (i) the production trend and variation in catch composition of marine fish over the years, (ii) the economics of different craft - gear combinations in marine fishing operations, (iii) the marine fish marketing problems to determine price spread of different varieties and to assess the share of fishermen and middlemen in consumer's rupee in Tamil Nadu. The author used both primary and secondary data. Data on costs and earnings of different craft - gear combination and price of different varieties of fish including handling and transportation charges at various points of the marketing channel, collected by direct observation at selected centers. The study revealed that (i) both mechanised and non-mechanised sectors are important to increase the fish production, (ii) motorisation of country craft helped the fishermen to improve their living condition, (iii) catch per unit effort of trawlers is continuously declining in Tamil Nadu (iv) lesser the number of intermediaries in the fish marketing chain, higher is the share of fishermen in the consumer's rupee.

Devaraj, Sathiadhas and Reghu (1998)³ in their paper reviewed the marine fish production in the state vis-a-vis the potential yield, assessed the economic performance of trawlers and motorised gillnetters, analysed the distribution pattern of marine fish in the internal market and the performance of marine fishery exports, evaluated the capacity utilisation
of processing plants and suggested policy measures for improvements in production and marketing of marine fish.

Ammini (1999) attempted to assess the present status of marine fish production in Kerala vis-a-vis the production before ban was introduced. The author has made a comparison of fish production between the pre-ban period (1981-1987) and ban period (1988 - 1997). There has been unprecedented growth in the marine fish production in Kerala during the last decade which incidentally coincides with the period during which ban on trawling during monsoon has been in vogue. Comparison of the average landings during 1981 - 1987 and 1988 - 1997 indicate an increase of 69 per cent in overall landings in the state and surprisingly two points which deserve consideration are: (a) the increase (69 per cent) has been uniform in pre-monsoon, monsoon and post monsoon periods, (b) the relative intensity of landings during the three seasons remain the same during pre-ban and ban period (26 per cent during premonsoon, 24 per cent during monsoon and 50 per cent during post monsoon).

Dibakar Naik (2001) made a study on trends in marine fish landings and marine fish marketing in different maritime districts of Orissa during 1996 to 1999. He has given his findings that marine fish production in Orissa has been increased from 38.70 thousand tonnes in 1980-81 to 133.46 thousand tonnes in 1996-97 and it declined to 121.08 thousand tonnes in 2000-01. On an average the State has recorded a growth rate of 8.86 per cent for marine fish production during last one and half decades. Marine fish marketing in Orissa has been carried out by a large number of intermediaries forming a long chain of market channels. In short, five or less number of intermediaries forming the market channel for the marine fish in Orissa. In the existing marketing
system the fishermans share have been decreased to the extent of 22.20 per cent from 26.76 per cent with the increase in middlemen from one to five in the market channel.

Shiyani, R.L, (2002)\(^6\) has made an analysis on district-wise and species-wise growth and instability of marine fisheries in Gujarat. It has been concluded from the study that relative share of Junagadh, Kutch and Jamnagar districts in the total marine fish production of the state increased substantially over a period of time, whereas a drastic decline in the case of Valsad and Amreli districts was noticed. The instability indices were comparatively higher during 1970-80 in all the districts except Kutch, Amreli and Jamnagar. The compound growth rates of fish production of almost all the species were positive and significant. It has been suggested that awareness campaign among the fishermen on the importance of mesh size regulation would be useful for the sustainable benefit of marine fisheries in the long run. The Government should take necessary steps to enforce sea law demarcating different fishing grounds for different craft gear combination which will help maintaining socio-economic balance instead of creating socio-economic conflicts among the fishermen.

Mini, K.G. and M, Srinath (2003)\(^7\) have made an appraisal about the trawl fishery of Tamil Nadu for the period from 1985 to 2000. In this article, the trends of fish production in Tamil Nadu and catch composition have been analyzed. It has been estimated that the annual average of marine fish production during 1985 - 2000 was 3.51 lakh tonnes representing 15.8 per cent of total all India landings. The fish landings showed increasing trend during the year 1985 to 1992, and decreasing trend in 1993, recovered in 1997 and again decreasing trend in 2000. It has been found that the reason for the fluctuations was the increased
number of trawlers and extension of the fishing ground for upward trend. The reason for the downward was the over exploitation. In the analysis of catch composition, it was concluded that Silverbellies was the most abundant constituent (23.2 per cent) followed by Clupeids (14.2 per cent), Penaeid prawns (10.5 per cent), Croakers (4.8 per cent), Carangids (4.3 per cent), Rays (3.9 per cent), Thread-fin-breams (3.9 per cent), Cephalopods (3.8 per cent), other perches (3.3 per cent), Goat fishes (3.1 per cent), Crabs (2.8 per cent), Lizard fishes (2.6 per cent), Ribbon fishes (1.1 per cent) and Pigface breams (1.0 per cent).

Narayankumar, et.al., (2005) had pointed out that the trainees had shown interest and there was improvement in understanding the importance of hygiene in post harvest fishery operation. They have also understood the importance of value addition and hygienic handling of fish in increasing the value or income from their existing catch. In this situation, the study indicated that appropriate awareness campaigns emphasising the importance of cleanliness and hygiene may be organised with the help of the local NGO’s who are working closely with the fishers. Hence, they can take up suitable processing and handling methods to improve their income and their standard of living in the days to come.

Aswathy.N., et.al., (2010) has made a study in Kerala state to analyse the bio-economic conditions of commercially exploited marine fishes for assessing their sustainability in the context of existing management practices. A comparative analysis of the compound annual growth rate during the periods 1985 - 1996 and 1997 - 2006 showed that most of the marine fish species had positive growth during 1985 - 1996, whereas the growth rate was negative for most of the resources during the same period. According to them, even with the regulatory measures of the
ban period, the current fishing efforts is above the economically sustainable level and the effort is very near to the open access equilibrium level. They have stressed that there is an urgent need for capture fisheries management in the state through community based fishery management practices.

2.3 STUDIES RELATING TO MARKETING

Tim Bostock (1992) explained about a market research study undertaken by BOBP through its ODA funder Post-Harvest Project included in coordination with the Marketing and Research power on fish consumption in Madras city in the year. Sampling method was used in order to select 2500 households in Madras (approximately 0.25 per cent of the population) to study the differences in consumption among families of different income levels. The most significant findings of the study were: (i) 91 per cent of all Madras households are non vegetarian fish consumers (98 per cent in the poorest sectors and 12 per cent in the most well-off). (ii) There appears to be an underlying trend towards non vegetarian and therefore growing demand for fish, (iii) Of the fish eaters, all consume sea fish, 79 per cent consume shrimp, 64 per cent crab, 75 per cent dried fish and 20 per cent fresh water fish. It is of great interest that dried fish is consumed by all income levels. (iv) Overall, the expenditure on all fish products is second only to milk among the animal proteins, but significantly is the most important in the lower income groups. (v) The average quantity of fish products consumed on a per capita basis is 7.2 Kg. The amount of protein supplied by this is roughly equivalent to that supplied by milk, is twice that of eggs and several times that of either chicken or mutton. (vi) Fish is considered economical and better value for money (especially by the poor), more easily available, tastier and easier to cook than any other animal protein food. (vii)
Awareness of marine fish varieties is very high, sankara and seer standing out above all others in all income groups. Consumption of high priced Seer fish, Shark, Pomfret increases with the increase of income, whereas consumption of low priced fishes White fish, Anchovy, Silverbelly decreases. Economy plays a major role mainly in the lower income group. (viii) Research indicated quite clearly that the market was not yet ready to accept processed or packaged food in its strictest sense. (ix) Hygiene, sanitation and fish quality at the point of sale influence the purchasing decision of the consumer. (x) Availability is more of a problem in the upper income groups, who tend to travel further to favoured points of sale. In lower income groups, fish is largely purchased at the doorsteps from itinerant traders.

Bennett and Rogers (1992)\textsuperscript{11} conducted a study about bicycle trader who was doing fish trade in small-scale in Sri Lanka. The authors spent a day following the activities of the bicycle trader. They studied the composition of fish bought and the expenditure incurred for preservation and other marketing fees and the profit earned by the trader on that day. This case study highlights some of the marketing problems faced by bicycle traders selling a perishable commodity like fish - (i) the distance and the time taken to travel from home to the fish market, (ii) the importance and unpredictability of consumer preference, (iii) loss of quality due to poor storage, (iv) the variability of demand, both for fish as a food and for individual species of fish.

Sathiadhas and Panikkar (1992)\textsuperscript{12} attempted in this paper to discuss the marketing margins, and producer's and middlemen's share in consumer's rupee for commercially important varieties of marine fish in Madras region of Tamil Nadu, India. Pudumanikuppam which is a major mechanised landing centre as primary market, Chintatripet as wholesale
market and Pattalam, Chintatripet, Saidapet and Vadapalani (all in Madras city) as consumer markets were selected for the study. Data on landing, wholesale and retail prices of selected varieties of fish were collected for 15 to 20 days in each quarter during April 1984 to March 1985 by following the marketing channel.

Tietze (1995) has attempted to analyse the social, institutional and macro-economic factors which play a vital role in domestic fish marketing operations in Asia and the pacific with the special emphasis on financing of these operations and on the role of institutional credit. According to him, lending norms and terms of lending should be strictly commercial which should not involve any capital or interest rate subsidies. In an era of globalisation and liberalisation, entrepreneurs in the developing countries will not come forward to start an enterprise involved in any type of fishing and fish marketing activity in the advance of any type of capital or interest rate subsidies since such enterprises could not be started and successfully developed in the absence of external capital.

Nongnuch Raksakulthai (1996) made a study on the processing of hybrid Clarias catfish. Most of the production is consumed domestically, where the consumers prefer to buy live fish. Owing to the limited demand of fresh hybrid Catfish, processing the fish into different products will be one way to solve the problem of excess supply by expanding the market, both domestic and international, increasing the shelf-life as well as adding value to the raw material. The various products which may be obtained include: fermented 'Plara', smoked Catfish, semi-dried Catfish stick, Chinese style Catfish sausage, Catfish cracker, frozen cooked Catfish dishes, battered and breaded products, Surimi, and, canned products. The major constraints in processing linked to the hybrid Catfish
is the higher price compared to marine fish, and also the processing techniques, which require further research on appropriate technology to develop products with high acceptability, high nutritive value, low cost and long shelf-life. There should also be a comprehensive marketing strategy, to increase the consumption of the hybrid catfish.

Saiagrarna (1997)\(^1\) explained the experience of a firm established in 1996 in Orissa in marketing of dried fish. The firm (oriental dry fish industries) engaged in processing of fish hygienically into high – quality products in order to get high price than that of traditionally processed fish. The firm marketed its product in the North -Eastern region since the market price in that region was more than three times the price elsewhere. But the firm took risks such as: (i) high transportation costs, (ii) uncertainties in transporting to the distant markets through hilly terrain, (iii) delays in getting payment for the products and (iv) prevailing instability and tension in the area because of terrorism. The experience made the firm to search for other markets, as it is essential to cater to local markets before dealing with distant markets that seem lucrative but loaded with risks.

George Mathew (1997)\(^1\) evaluated the project jointly undertaken by the Post-Harvest Fisheries Project (PHFP) and the Kanyakumari District. Fishermen's Sangams Federation (KDFSF) on commercial operation for marketing rack-dried Anchovies on a pilot scale in the year 1992 in Kanyakumari District. The main aim of the project was to promote the use of drying racks for drying anchovies in order to avoid the physical and value losses sustained by Kanyakumari district fishermen through sand-drying of Anchovies. The rack dried fish got good prices 10 times more than that of sand drying fish because of its high quality, but the market potential is very limited. Only the metropolitan markets of
Chennai and Hyderabad require such a superior quality product. Even though, the project's planning, problem shooting and precautionary foresight were just right, but failed in its effort to market the anchovy product on its own and replace the middlemen since the Anchovy fishery collapsed in 1994. Consequently, two years after the project wound up the Anchovy-drying activity. But one positive outcome is that some individual fishermen have taken up rack-drying of Anchovies. The rack-drying fishes will definitely get high prices for its high quality than that of sand-drying fish.

The Department For International Development (DFID) Post-Harvest Fisheries Project (1997)\textsuperscript{17} conducted an awareness programme on fish and fishery products at Hyderabad in August 1996. The programme brought together 12 producer groups together to discuss problems and prospects in production and marketing of value-added products. In the programme the following three major problem areas were identified, which have to be resolved: (i) lack of awareness on the part of the consumers; the inability of small producer groups to undertake market promotion at any appreciable level; (ii) the inability of agencies in specific areas in creating and sustaining market demand in spite of fluctuation of catches; and (iii) lack of awareness of quality control criteria, and laxity in observing them if known. The problems identified by the programme are prevailing even today in all parts of the country in the marketing of fishery products. It also implies that sustaining market demand is interconnected with awareness of consumers on fish products and the quality control measures. More efforts should be put forth in this direction.

Gordon Ann (1997)\textsuperscript{18} made a study on the trends in fish marketing in India. Growing urban population, higher income and improved
communication contributed to increase in fish marketing in urban centres. This paper deals with the identification in processing and marketing opportunities that would enable fishing communities to increase their income. The study considered fishermen’s radio programme, which provide daily price information to them. Fisher folk found weather forecast is of greater use than the information on price. However, it was felt in some cases the information was used by traders to the disadvantage of fishermen and where they are indebted to merchants, knowledge of price does little to improve their bargaining position.

Basuki and Nikijuluw (1998) made a survey on fish consumption patterns in selected major cities of Java. The fish consumption in Java seems to be influenced by fondness and preferences, as well as by the products availability. The results of a survey in four major cities show that processed marine fish products are consumed by the majority of people. In Surabaya and Bandung fresh fish and salted boiled fish became favourite foods, while in Semarang pressure-cooked fish and salted fish became the most favourite ones. In Yoyakarta, almost all respondents prefer to consume fresh, salted and salted boiled fish. Generally, the consumer complained about the quality of products, especially for salted and salted boiled fish. More than 60 per cent of respondents in Surabaya did not satisfy with salted and salted boiled fish qualities. In Semarang, consumer dissatisfaction reached more than 20 per cent for salted fish and more than 50 per cent for salted boiled fish. In Bandung, fermented fish and salted fish were admitted as low quality products. Regarding the consumer budget, the more they earned the more fish they consumed. Compared with the total expenses, the fish consumption reached 10 to 14 per cent. Finally, the improvement of the quality and the products diversification apparently would increase the demand.
Sutton (1998)\textsuperscript{20} in his article presented a series of necessary reforms and suggested how by working together, conservationists, scientists, fishers, industry and Governments can help shape the future of world fisheries. WWF and Unilever Corporation have taken the first step by launching the Marine Stewardship Council, an innovative plan to bring market forces and the power of consumer choice to bear in favour of sustainable, well managed fisheries. If marine fish populations are to be sustained - both as an important source of food and as a vital component of ecosystems - increased public support and consumer power must be used to create social, economic, and political incentives for fishing that is both sustainable and clean. That will not be easy; fish neither sing like whales nor look like pandas. But the stakes are high, the future of the world's fisheries their associated marine ecosystems and the millions of people that depend on them for food and employment.

Khan and Raga (1999)\textsuperscript{21} had analysed different aspects of fish marketing in Bangladesh. 10 per cent of the people derive their livelihood from fish and fish products. They had differentiated between different channels of marketing. The major elements of marketing cost per quintal of fish were transportation 33 per cent, personal expenses 24 per cent, wastage 21 per cent, market tolls 13 per cent and incidental expenses 9 per cent. They also identified problems of fishermen like low price of fish, lack of marketing facilities, high transportation cost and defective weighing system. Intermediaries also face problems as follows: shortage of capital, political instability, perishability of fish and inadequate storage facilities. Suggested remedial measures were the immediate sale of fish, timely supply of credit, introduction of proper weighing system and installation of the factories.
Sathiadhas, R and Kanagam, A (1999) found that the demand and the price of marine fish are continuously increasing in our domestic and export markets. Fish marketing system in India is rapidly changing in recent years due to the vast improvement in handling technology, transportation and consequent market penetration. The fishermen’s share in consumers’ rupee varied from an average of about 30 to 68 percent for different varieties. Marketing costs including transportation ranged 5 to 32 percent and retailer from 14 to 47 percent of consumers’ rupee for different varieties of fish. Considerable interstate variation in consumers’ preference and fishermen’s share in consumer rupee for different varieties of fish has been observed.

Ann Gordon (1999) stated that the increased commercialisation of the fisheries sector in Asia, whilst benefiting fishermen through higher prices, has tended to displace the livelihood of those who depend on traditional processing or local marketing. This study describes the research undertaken in India to identify processing and marketing opportunities that would enable traditional fishing communities to retain a greater share of the benefits derived from the growing commercialisation of fish products. The key role of strong and sustainable community level groups is also emphasised, along with the need to empower such groups, giving them greater control over fish marketing and other activities.

Yoshiaki Matsuda (2000) has reviewed the history of fish marketing in Japan. The Japanese experience is rich in terms of long history, species handled, products forms, cooking methods, ways of utilisation and interaction with domestic fisheries. Along with the change of people's life style from hunting to farming, marketing and trade have developed. Traditional marketing and trade include commercialisation of
dried, smoked, salted and fermented seafood seasonings seasoned boiled seafood and organic fertilizer. Modern marketing and trade include commercialisation of cultural species, fish paste, canned fish, frozen, fresh, live fish, fish oil, fish meal, fertilizer, and potential resource species. Cultural and food diversity is essential for the human survival in the 21st century. Despite the conventional use of fish, most marine organisms are not utilised yet. As healthy food, drugs, raw materials, ornamental use, and contribution to solve environmental problems, there is a great potential in fisheries and fish trade if the resources are wisely managed under the WTO framework started in 1994.

Srivastava, U.K (2001)\textsuperscript{25} analysed that marine fisheries will have to play a crucial role in augmenting supplies both in the domestic as well as export markets. Thrust of the development will be on deep sea and brackish water resources. The exploitation of these resources, particularly deep sea, will require a rapid transition from charter of vessels to joint venture and owned fleet with modern and sophisticated technology. Attention requires developing the necessary infrastructure to handle such vessels, onshore processing facilities, better management of fishing harbours, cold chain grid in the domestic markets, development of transit and terminal markets at wholesale and retail levels. All these developments require massive efforts for training and development of man power.

Chand and Nityananda Das (2002)\textsuperscript{26} have given an account of basic requirements for an organised fish market. They have specified the essential infrastructure facilities needed for an organised market. It has been suggested that to make the entire fish marketing system successful, apart from having an organized fish market, right marketing strategies are
essential. For this, identification of consumers' needs and nature of demand for products and services is necessary.

Al-Maxrooei, N., G.V. Chomo and A. Omezzine (2003)\(^{27}\) conducted a study in order to provide information on Oman consumers' attitudes and preferences for fish purchase form and market outlets using an information processing model, It identifies factors for predicting changes in market demand for fish products and services as a result of changes in consumers attributes. Results indicate that on-shore fish markets are the most preferred outlets for the coastal population while retailers and Oman National Fisheries Company are the commonly used outlets. Results also show that whole fish is the most preferred form of purchase for both rural and urban medium to low income consumers while a large proportion of high-income consumers in urban regions prefer mainly sliced fish. It has been suggested that market development efforts should focus on the organization of on-shore fish markets in coastal regions and retailers and Oman Fisheries Company's outlets in the island areas. It is further suggested that forms other than whole fish may be promoted for sale in super markets and specialised shops for the urban high income consumers group.

MPEDA (2003)\(^{28}\) reviewed the marine products export scenario for the year 2002-03. It has been mentioned that the export of marine products showed an increasing trend in 2002-03. The increase was 10.09 per cent in quantity, 15.52 per cent in rupee realization and 13.69 per cent in US $ realization. The average unit value realised was US $ 3.05 per Kg compared to US $ 2.95 per Kg of the previous year. Frozen shrimp continued to be largest item in terms of value. Shrimp contributed 26.85 per cent in volume and 66.97 per cent in value of the total export of marine products from India. U.S.A. emerged as the single largest market
for Indian marine productions in value terms during 2002-03 relegating Japan to the second position. Chennai continued to be the largest port through which the marine products exported.

Devadasan (2003)\textsuperscript{29} has given an account of a good potential for India to increase its share in international fish trade by exporting value added fish products. It has been concluded that most of the market channels currently used are not suitable to trade value added products. A new and an appropriate channel would be the super market chain, which would want to procure directly from the source of supply. Appearance, packaging and display are all important factors leading to successful marketing of any new value added product. The retail pack must be clean, crisp and clear and make the contents appear attractive to the consumer. The customer must be given confidence to experiment with a new product launched in the market.

Sathiadhas,R (2011)\textsuperscript{30} has examined the efficiency of domestic marine fishing marketing in India and he has pointed out that the marine fish prices showed an average annual growth rate of 3 to 9 per cent at all India level, whereas the growth was comparatively less in retail level. The distribution pattern of marine fish is determined by the number of intermediaries between the primary producer, namely the fishermen and the ultimate consumer depending upon the quantum of fish landing, the effort involved in carrying out the marketing function like assembling, storing, grading and transportation. In his view with the price spread, the minimum difference between the prices indicates the efficiency of the marketing system. State-wise analysis of the Percentage Share of Fishermen in Consumer’s Rupee (PSFCR) showed that, Kerala and Maharastra stood the highest. Unhygienic handling, insufficient ices for preservation, transport difficulty are the problems associated with the
domestic fish trade in India. The infrastructure for marine fishing in India is principally oriented only towards the export markets. He has suggested that the supply chain in domestic marketing can be increased by enhancing private investment in value addition and transportation sector.

2.4 STUDIES RELATING TO FISHING TECHNOLOGY

Jean Gallene and Robert Hall (1992)\(^\text{31}\) undertook a project to demonstrate the technical and economic feasibility of small-scale offshore fishing for large pelagic species by introducing two 10 metre FRP boats acquired from Sri Lanka using driftnets and long lines. The project was undertaken during the year 1991 at Chinnamuttam, Tamil Nadu. The results of the project indicated that the performance and results of the fishing trials have been on the whole satisfactory. But they were not upto full commercial standard because of the inexperience of the crew and the exploratory nature of fishing by one or two boats operating in isolation. The financial viability of the offshore operations has been demonstrated, generating an internal rate of return 21 per cent and a net present value of Rs. 1,09,787 at a discount rate of 14 per cent. This marginally profitable return, however, does not leave much incentive to offset the high risk involved in this or any other fishing operation.

Sathiadhas, Panikkar and Kanakkan (1992)\(^\text{32}\) undertook a study to evaluate the changing pattern of craft - gear combinations, their catch composition and comparative economics of operations at Nagapattinam centre of Tamil Nadu coast during the year 1987-88. They collected primary and secondary data for this study. The primary data were collected through schedules regarding the information pertaining to initial capital investment on hull, engine, nets and other accessories, year of purchase, resale value of the unit, source of finance, sharing pattern of crew wages, annual repairing expenses, operational cost, species-wise
catch and revenue. The secondary data pertaining to mechanised and non-mechanised fish landings, crafts and gears etc. were collected from Central Marine Fisheries Research Institute, Review of production trend showed that the contribution of mechanized boats in the total marine fish landings of Tamil Nadu steadily increased from about 28 per cent in 1976 to 62 per cent in 1990. The trawl catch forms more than 90 per cent of the mechanised landings and 50 per cent of the total landings of the state. The introduction of single and two boats with high opening trawl nets were economically efficient. The pair trawling further provided a new technique to fishermen to harvest the hitherto underexploited valuable resources. The convenience of shifting from trawling to pair trawling or vice-versa depending on the availability of various resources within the region enhanced the overall catch rates of these units offering further scope to increase the trawl landings along Tamil Nadu coast.

Kemparaju (1994)\textsuperscript{33} made a study on the drift gillnet fishery of the Goa state during the period 1985-88. It was found out from the study that the drift gillnet fishery during the period from 1985 to 1988 in major centres showed a steady improvement indicating its continued importance in the exploited fishery of Goa despite the fluctuations noticed. It was also observed that in the small-scale fisheries sector, the drift gillnet fishing was significant as it exploits the higher value fishes such as seer fishes, Tunas and Sharks. Thus the drift gillnet fishery has better development prospects in the state.

Mahesh V, Joshi (1996)\textsuperscript{34} studied the factors affecting the mechanisation of fishing crafts and the impact of mechanisation on marine fish production and income and the standard of living of fishermen's households. He also studied the hazardous effects of mechanisation and foreigner's deep fishing in Indian Ocean and identified
the problems of small fishermen. The main findings of his study are, (i) There is direct relationship between fishing mechanisation and employment opportunity. It was also observed that the average earning of crew members households in mechanised fishing were substantially higher than those of non-mechanised fishing. Mechanisation and higher wages are co-related to each other. (ii) Generally fishermen may borrow from the commercial banks, fish merchants, money lenders, relatives’ and friends. Co-operatives have failed in providing credit to the fishermen. Finance is a main obstacle in fishery development. (iii) The variable cost per trip for a trawler is higher than the O.B.M. boat. The cost of fuel is a single prime item in the case of trawlers. The salary of crew members is high in mechanised boats. (iv) The fishermen have strongly, unanimously and aggressively opposed for deep fishing permission to the foreigners. (v) It is found that arrangement of maintenance of mechanised boat is very difficult compared to same for non-mechanised boats. (vi) Mechanised boat owners have more income and relatively much higher standard of living as compared to non mechanised boat owners. (vii) It was observed that there were serious problems, limitations and litigations of mechanisation. It badly affected the small fishermen. There is unstable issue of exhausted fish stock due to mechanisation. It affected the employment. There are problems of fuel, finance, maintenance, repairing, higher costs, etc., due to mechanization. (viii) Contribution of the government and co-operative institutions for finance is very negligible. Fishermen prefer loans from fish merchants, friends and relatives. Banks are also one of the sources of borrowing.

Rathnakumar, K (1998)\(^{35}\) analysed the effectiveness in adoption of these technologies and constraints encountered. The department of fish process technology of Fisheries College and Research Institute, Tuticorin
has conducted training programmes sponsored by District Rural Development agency on “Value added fishery products” for the upliftment of fisher folk and downtrodden under integrated rural development programme. The institute has offered 20 programmes for 500 trainees. Of the trained person, about 10 percent are involved in producing and marketing fishery products. Out of this 10 percent, progressive entrepreneurs constitute 4 percent.

Chennubhotla, V.S.K., et.al. (1999)\(^{36}\) have conducted a study about the different kinds of non-mechanised and mechanised crafts used and gear employed along the Andhra Pradesh coast. They have observed that until the middle of 1960s fishing for marine fin fishes and shellfishes along the Andhra Pradesh coast used to be carried out employing indigenous non-mechanised crafts. Subsequently, trawlers and later mechanized vessels operating gillnets came into use which resulted in the increased fish production. Use of outboard engine on indigenous crafts for reaching fishing grounds is a recent feature of near the coast fishing.

Krishnan, C.K. (2003)\(^{37}\) has examined the recent trends in mechanisation of Malabar fishery sector. He has studied the operating cost of trawlers fitted with in-board engines using diesel as fuel and out-board engines using kerosene for ring-seiners. He worked out that the average cost of operation per day for a ring-seiner unit using out-board engine run by kerosene was between Rs.5000 and Rs.6000 and for dieselised Leyland in-board engines came down to Rs.2000. In view of this, more and more active fishermen were attracted towards the introduction of in-board engines.
2.5 STUDIES RELATING TO FISHERY RESOURCES

Mahadevan Pillai, Balakrishnan and Alagaraja (1994) studied the exploited fisheries of Tamil Nadu and Pondicherry for the period from 1985 to 1989. The contribution of the mechanised and artisanal fisheries sectors, share of pelagic and demersal groups in the fish production, the trend of district-wise fish landings, the resources of non-conventional fisheries, the present status of marine products exports and the recent scenario of mechanisation of country craft have been dealt in this study. They concluded that the annual average exploited marine fishery resources of Tamil Nadu state during the period 1985-89 was estimated to be 2.6 lakh tonnes indicating an increase by nine per cent over the preceding five year period. They also observed that higher returns from the mechanised sector over the non-mechanised sector during the study period. This increase in fish production was possible by the large scale introduction of artisanal gear and motorization of country crafts. The region 0 - 50 m depth was heavily exploited and the zone beyond 50 m depth has to be concentrated for future exploitation. The share of pelagic fishes during the study period was 48.8 per cent which 5.8 per cent higher than the preceding five year period. In the district-wise fish landings, Thanjavur and Ramanathapuram dominate which together contribute 38 per cent to the total landings of Tamil Nadu. During the period 1985-89, Tamil Nadu contributed 17 per cent of the total marine products exported from India. There was an increase of 15 per cent and 58 per cent respectively in total quantity exported and the value realised in India during 1985-89 than the previous year period 1980-84, whereas Tamil Nadu accounted an increase of 53 per cent and 120 per cent respectively. In respect of Pondicherry Union Territory, the fish production has increased by 13 per cent during the period 1985-89 than the previous five...
year period 1980-84. The fish production by the mechanized and artisanal
sector shows that only marginal increase by mechanized sector whereas
18 per cent increase by the non-mechanized sector. The pelagic and
demersal constituents of the marine fish landings during the period were
68 per cent and 32 per cent respectively.

Pauly (1994)\textsuperscript{39} given a brief review of the demersal and pelagic
fisheries of South East Asia, with emphasis on biological and socio-
economic factors (such as, the presence of inshore shrimp stocks and
mass unemployment respectively) and which tend to promote over-
exploitation of marine fish resources. It is shown that several models
routinely used by fishery biologists to assess Southeast Asian fish stocks
tend to lead to management advice that is less conservative than
warranted. Straightforward remedies exist for the latter set of problems.
On the other hand, non-traditional approaches will have to be identified to
deal with problems related to resource over-exploitation.

FAO (1997)\textsuperscript{40} reviewed the state of the world's marine fish stocks,
based mainly on statistics. The introduction refers to the limits of world
fish production and to major trends in world fisheries since 1950.
Attention is drawn to the generalised high level of exploitation of the
more valuable marine resources. More detailed remarks are provided for
each FAO statistical area, together with a discussion of the major changes
and trends that have occurred in specific resources and the fishery
assessment strategies in current use in support of fisheries management in
each region. Special sections address the global issue of Tunas and Tuna-
like species and other special topics dealing with Lantern fishes as a
potential resource, and global synchrony in fish populations. Summary
tables are provided for each statistical area showing historical and recent
landings for the major marine resources and judgments on their current state of exploitation.

Desai and Bhargava (1998) carried out a comprehensive work on primary and secondary production in the northern Indian Ocean including the Arabian Sea and the Bay of Bengal. A large amount of data is available for different seasons from four sectors of India's Exclusive Economic Zone. The authors estimated the primary and secondary rates of production. Based on biologic data, fishery potentials have been computed to be 4.72 million tonnes in the entire EEZ of India. The present marine fish catch is about two million tonnes, therefore, the fish catch could be increased substantially. They also described the seasonal picture of biologic production and fishery potentials in all sectors of the EEZ. It shows the Southwest monsoon period (June to September) to have a high fishery potential. This is reflected in fish catches in the post monsoon months, especially along the east coast of India.

Hameed (1998) estimated the exploited and potential fishery resources of the EEZ of India. 2.02 million sq.km. Exclusive Economic Zone of India has a fishery potential of 3.9 metric tonnes of which 2.21 metric tonnes are within the 50 metre depth zone and 1.69 metric tonnes beyond it. The demersal stock is about 0.65 metric tonnes, the coastal pelagic about 0.74 metric tonnes and oceanic resources about 0.30 metric tonnes. The depth-wise, region-wise and resource-wise potential yields of demersal, pelagic, oceanic and allied resources are presented and major exploited and under-exploited resources offering scope for increased production are outline. The landing patterns of marine fish during 1980-1996 are analysed.

Somvanshi (1998) reviewed that the marine fishery resources potential is estimated to be 3.92 X 10 super (6) tonnes. The data collected
through the exploratory surveys conducted by the Fishery Survey of India (FSI) have not only been the basis of this estimated potential but the source of knowledge on the types of resources and their distribution in time and space. Considering the current level of annual marine fish production, $2.69 \times 10^6$ tonnes, the potential entails additional harvestable yield of about $1.3 \times 10^6$ tonnes. This additional yield will be mainly from the deep-sea and oceanic sectors. For further development of fisheries in the Indian EEZ, application of a number of fishing techniques viz. bottom trawling for deep-sea fin-fishes, cephalopods, deep-sea shrimps and deep-sea lobsters; mid-water trawling for columnar species and tuna long lining for oceanic stocks of Tuna and allied species should be considered. These techniques used in exploratory surveys were proved to be effective. The effectiveness of these and the availability of the resources were further confirmed by the deep-sea fisheries vessels operated under various deep-sea fishing schemes. However, some of the commercial techniques such as mid-water trawling for columnar resources and purse-seining for oceanic tunas need to be experimented for recommending its commercial scale application in the Indian seas. In the present scenario of fisheries development, there is a need for adapting suitable strategies for rational development aimed at sustainable exploitation and conservation of the fish stocks in the Indian EEZ.

Bakari and Kiangi (1999) studied about the sustainable use of marine and coastal resources in Tanzania. The Coastal Zone (CZ) is a dynamic area surrounding the interface between land and sea. The coastal area and its natural resources offer great benefits and opportunities for human use. The authors focused their emphasis on marine fishing and tourism which are the predominate activities in the CZ on Tanzania. The
challenge is to maintain and improve the resources base on which those activities are dependent, while developing new economic opportunities in a way that benefits the coast and the nations as a whole. A major constraint is the inadequate institutional and legal framework for coastal management. The CZ is made up of both renewable and non-renewable resources, which are finite. To avoid the unsustainable use of coastal resources in both its economic and social values, economic development and the well-being of the coastal population has to be reconciled in order to strike a healthy balance between marine and coastal conservation and development. This forms the main basis for sustainable development, which has a three-dimensional focus, namely, economic, ecological and socio-cultural approaches. The authors also assessed the implications of effort to revive the economy on the use of coastal resources.

Nayar and Gupta (1999)\(^45\) remarked that in developing countries such as India, marine fish production is far lower than the estimated capacity. Currently, fishing activities are carried out mainly in coastal waters; fishing areas in high seas and outside of the country's EEZ are under exploited. Methods of fishery management are ineffective and advanced technologies for fish detection are practically absent. With the launching of the Indian remote sensing satellite, it is believed that India will be in a position to exploit its resources fully.

Varghese, S., and V.S. Somvanshi (2001)\(^46\) have presented the coastal country-wise finfish, crustacean and cephalopod species/species-groups contributing to the fish production, as well as the similarities and variation among them in the Arabian sea. The fish landings reported by most of the countries in the region contributed similar set of species with varying abundances. The most common species reported are groupers, Threadfins, Barracudas, Seer fishes and Mullets among fin fishes, besides
a number of species of shrimps and cephalopods. Barring localized and specialized fishing methods employed for catching pelagic fish resources, trawling has been the single largest technology being practiced in the region for harvesting the demersal stocks by almost all the countries. The conservation and management measures emanating from the FA0 Voluntary Code of Conduct for Responsible Fishing could be a common agenda for the coastal nations in the region.

2.6 STUDIES RELATING TO FINANCE

Senthilathiban and Selvaraj (1990) have conducted a study in Chedambaranar district to estimate the credit requirements, credit availability and repayment performance of the fishermen. Their study reveals that the sufficiently greater positive net worth for the traditional, motorised and mechanised craft categories showed financial soundness of marine fishing. The highly solvency ratio for the mechanised boats showed that the borrowing capacity of this group was higher. To them, the deplorable repayment performance may be the reason for the hesitation of individuals and institutions to advance loans to marine fisheries sector. They have also briefly explained the problems faced by the fishermen while availing credit. They have recommended training programmes in financial management and household budgeting for the benefit of fishermen.

In his study, Murickan (1991) has analysed the existing power structure and credit system in two marine fishing communities in Kerala. His study reveals that there is inter-village variation in the availability of credit. The access of institutional credit depends crucially on the ownership position of the willing borrower. The study reveals that the boat owners were comparatively in a better position. Frequent
encroachments by the mechanised trawlers into the inshore water bought about a series of conflicts between the mechanised and traditional sectors.

Discussing on the role of Financial Institutions in the promotion of fisheries sector, Pathak (1997)\(^49\) indicated that the availability of adequate and timely credit is the most crucial input for increasing the fish production and export. He also mentioned that the NABARD had so far sanctioned more than 5200 fisheries schemes with total refinance assistance of Rs.4037 million and the disbursement of credit for fisheries has increased at a compound annual growth rate of 36.7 per cent in the last ten years, when the aggregate assistance provided to all the scheduled banks reached a level of Rs. 1071.7 million in 1995-96 from Rs.133.5 million in 1985-86. Thus the bankers’ contribution could best be realised from the fact that out of the total marine fish landings of 2.469 million tonnes reported in 1992-93, more than 28 per cent of the catch was from those boats that availed bank’s credit facilities. In future, the bankers will take up fisheries programme and can invest over Rs.8000 million by the end of Ninth Five Year Plan and the seafood export would have a business of three billion US dollars in the international markets.

Palaniswamy, K and Pathak, S.C. (1999)\(^50\) found that the contribution of the fisheries sector to the GDP from agriculture has almost doubled from 1.90 percent in 1980-81 to 3.89 percent in 1993-94. The Government, through public plan outlays, and the private sector through credit support from financial institutions and banks, have been playing creditable role in creation of diversified fisheries infrastructure for the growth of fisheries. Fisheries being a ‘priority sector’ have been attracting large private investment through concessional credit support.

Rajan (2000)\(^51\) had studied to what extent fishermen depended on credit for investment in fishing units and also the association between
magnitude of investment and borrowings. He had analysed the capital structure, debt equity ratio and solvency ratio. He had also examined the correlation between investment and debt. He had found that the investment is small scale fisheries is heterogeneous and the loans provided by organised sector are insufficient.

2.7 STUDIES RELATING TO PRICE

Efficiency of different types of nets has been compared in the study by Jacob et.al. (1990)\textsuperscript{52}, they studied the efficiency of purse seiners, trawlers and drift gill-netters, cost and earnings were calculated. Over the years from 1982 - 1986 fishing returns over operating cost increased by about 2.5 times. The increase in wages and auction charges would not affect net income because it was a fixed percentage of revenue. The operating cost of produce 1 Kg of fish was estimated as Rs.4.6 for drift gill netters, Rs.3.81 for trawlers and Rs.1.50 for purse seiners. However, the number of days fished was minimum at 124 days for purse seines and maximum of 184 days for trawlers. In 1986, the trawlers picked up very well due to selective fishing resulting in higher fish catches. This encouraged the industry to introduce new trawler units in the years to come.

Senthilathiban and Selvaraj (1992)\textsuperscript{53} conducted a study on the price spread of some of the commercially important fishes in Chidambaranar district in the year 1989 and 1990. Four landing centres were randomly selected and data on landings, auction price, marketing costs and marketing margins were collected. The collected data were analysed to find out the variation in mean retail price of different varieties of fishes and to find out relationship between retail price and the net amount realised by the fishermen. The study revealed that (i) the fishermen's share in consumer retail price was above 60 per cent for all the important
fish varieties in the selected fish landing centres, (ii) there was a positive
correlation between the retail price and the net amount realised by the
fishermen at one per cent level for almost all the fish varieties, (iii) the
fishermen got a better share of those varieties having high consumer
preference, (iv) the share of marketing margins accruing to retailers vary
from 14 to 23 per cent.

Shajahan (1999)\textsuperscript{54} studied about the financial facilities given to
fishermen and the fluctuations in the quantity of price of fish among
different intermediaries in Kerala. He found out that the wholesalers were
playing a crucial role in making up the deficit in the supply of fish in
Kerala. He had recommended for a price monitoring of different varieties,
linking primary and wholesale markets and a regulation of marketing
intermediaries. He suggested a set of interventions at various levels of
primary and wholesale markets for better management of surplus leading
can do wonder. He also recommended removing the demand and supply
gap of fish in Kerala by adopting appropriate measures including legal
intervention.

2.8 STUDIES RELATING TO SOCIO-ECONOMICS

Rajalakshmi, V et.al., (1990)\textsuperscript{55} emphasised that in recent years, the
development of fisheries has been given priority as fishery has significant
impact on the overall economic scenario of this country. Although fishery
sector has developed, most of the fishermen in the country are
impoverished and downtrodden due to seasonal occupation and high
irregularity income. Several rural credit schemes and fishermen welfare
programmes implemented so far have not been able to uplift their socio-
economic status to the desired level. The fisher folk should be taught the
importance of approaching formal credit institutions instead of depending
on indigenous credit system. Fishery cooperatives should put their efforts
to improve the socio-economic status of fisher folk through need-based financial assistance.

The economic motive of the fisherman is to maximum net return, which is girded by monetary return out of the catch and cost of production. Kamal Kumar Datta and Dan (1992)\textsuperscript{56} assessed the productivity of gill and fishing units in West Bengal. To know the cost and earning as well as returns from the investment, both mechanised and non-mechanised boats using gill nets have been calculated. The variation in earnings from month to month has been explained by the availability of species. It has been observed that the rate of return on investment is higher than the opportunity cost of capital, which means that the owner is making the best of his investment.

Vedavyasa Rao and Sriramachandra Murthy (1993)\textsuperscript{57} have elaborately discussed various controversies and complexities in management of inshore fishery resources of India. They concluded that none of the management measures adopted in the country can be considered as successful. Taking into various complexities of issues in management of fishery resources such as heavy fishing pressure in the inshore fisheries of the country, its impact on sustainability of resource and deepening conflicts among the resources users, they put-forth the following suggestions in policy making: (a) provide increased role to the local or regional fishing communities in the formulation of regulatory measures and their managerial responsibility; (b) ensure positive access in favour of local fishing communities; (c) formulate regulatory measures with a strong conservation policy through careful regulation of fishing effort and restrictions on gears; and (d) incorporate a system of fishing zones within the regional management scheme transmuting the conflict to co-existence or even symbiosis.
Tewari, Acharya and Singh (1997) described the findings of a macro-level study and a participatory appraisal study of demographic characteristics of fishing communities in India, carried out in the context of the project "Strengthening of research and training in population and development dynamics of rural fishing communities". The marine fishing fleet, marine fisher-folk population, marine fish production, coastal environmental problems, and perceptions and views of the fisher-folk are outlined. Findings indicate that production has increased along with the increase in the number of fishermen and boats. However, overexploitation, deterioration in environment quality, fall in catch per unit effort, high price of fuel and equipment, and high labour and service charges are detrimental to the rate of growth of fisheries. It is concluded that proper management of resources and judicious exploitation are necessary.

Narayana Kumar, R (1998) analysed the socio-economic condition of the marine fishermen and their attitude towards development schemes. The central marine fisheries research institute has been continuously monitoring the socio-economic conditions of the traditional fishermen and conducted several studies along the coastal belt to assess the existing socio-economic status using the parameters such as family size, age structure, educational and occupational pattern, customs, beliefs and the standard of living of the coastal fishermen household have been analysed. The changes that have been brought about by the mechanisation of fishing industry in term of income and employment generation and investment on family equipments have been discussed.

Balasubramanian, S (2001) analysed that the socio-economic status of fishermen in two marine fishing village of Orissa state viz., Pentakola and Belinoliasahi were measured using a Socio-Economic
Status Index (SESI). It was seen that the mean SESI scores of respondents in the two villages (57.53 percent) had differed significantly at 1 percent level of the nine regression coefficient of 2 variables namely knowledge about technological practices and sources of information used were found to be positive and significant in Pentakota village and the $R^2$ (73.38 percent) was not significant. But in Belinoliasahi, the $R^2$ (28.30 percent) was not significant. The result also revealed that the fishermen had favourable attitude towards the modernisation of fishing crafts in both the villages.

Rao (2001) had found that the fisheries sector occupies a very important place in the socio-economic development of India. This sector has been recognised as a powerful income and employment generator as it stimulates the growth of a number of subsidiary industries and also it serves as a source of economical nutrition. More than six million fishermen and fish farmers depend on fishing and aquaculture for their livelihood. Fisheries sector is one of the major contributions of foreign exchange, contributing Rs.222, 230 million to the GDP during 1988 which was 14 per cent of the GDP.

Md. Istiaque Hossain et.al.,(2009) in their study has classified the fishermen into two social groups, namely land owner fishermen and landless fishermen. It was found out that the majorities of the landless were illiterate, lived below poverty line, healthy, per capital income less, while land owners were educated, healthy and per capita income more. Seasonally flooded ecosystem played a vital role in the livelihoods of the inhabitants. Water productivity enhancing measures like alternative rice fish culture could provide additional food and income for the socio-economic development of the stakeholders.
Istiaque Hossain et al., (2009) conducted a survey of socio-economic condition of the Landowners (LO) and Landless (LL) fishermen group who fully or partly depend on fishing activities in two seasonal flood - plain beels of Rajshahi district, Bangladesh. LL fishermen were illiterate, lived in Kutcha houses and their income was below poverty line. A majority of the LO fishermen literate, lived in semi-pucca houses and their Per-capita income was high. Ecosystem played a vital role in the livelihood of the inhabitants’ water productivity enhancing measures like alternating rice fish culture can provide additional food and the income can be utilised to achieve the socio-economic development of the poor fishermen group.

Shyam S Salim, et al., (2010) has analysed the impact of the ban on monsoon trawling in employment pattern, poverty and income distribution. He has applied Garrett ranking technique in order to analysis the problems encountered during the monsoon trawl period and probit model to evaluate and identify the factors that influence towards the ban. According to him, unemployment existed at a considerable level, which forced them to avail credit from moneylenders or financial institutions. But most of the experienced labour in the field has given positive opinion towards ban which shows their concern towards conservation of resources. He has also stressed that implementation of a separate fishing, based on scientific principle, highlighting the needs of the common fisher folk is the need of the hour.

Sathiadhas R., et al., (2010) has analysed the economic losses in marine fisheries resulting from poor management, inefficiency and over fishing. According to him, the marine fish production from near shore waters had reached almost a plateau and, only marginal increase is predicted from this zone. In his view on marine fish marketing, he has
noted that the system is not well organised unlike the marketing of agriculture, horticulture or livestock products. He also opined that the strengthening of co-operative marketing and popularising responsible fish marketing is a welcome step in this direction to promote quality control, consumer welfare and marketing efficiency. He has pointed out that despite improvements in the sector; benefits are not uniformly distributed among different stakeholders of fishing industry. He has concluded that to conserve the fishery resources, national fisheries policy should pay greater attention through regulatory measures.

2.9 OTHER STUDIES

Timothy Bostock (1991)\textsuperscript{66} described simple technologies to cut post harvest losses and thereby raising the income of small-scale fisher-folk. One of the more fundamental problems encountered in small-scale fisheries is that the catch often does not earn the revenue that it could. A study carried out on fresh fish marketed to Delhi from Veraval, Gujarat in 1986, indicated annual economic losses of around Rs.70 million due to down gradation of fish as a direct result of quality deterioration. The author, being a fisheries adviser of BOBP, identified a number of specific problems related to economic loss through close association with several small-scale fishing communities in Kanyakumari District of Tamil Nadu: (a) Introduction of aluminium fish container which has the advantages of durability, tight fitting lid, leak-proof, easily borne on the head or hips and easy acceptance by women fish vendors; (b) making use of elevated open drying rack system for drying fishes since the traditional drying method suffered losses; (c) development of ice and ice box system which provides an overnight storage facility and fetch premium price to the fishermen. Overall, all the above three activities described attempt to address community problems by applying
simple, known technologies and by testing basic economic viability, i.e.
an increase in the individual fisherman's earning potential.

Sathiadhas, et.al., (1991)\(^6^7\) have conducted a study along the
Madras coast to analyse the economics of catamaran fishing with
catamarans of various length and different initial investments. According
to them, the poor economy coupled with scant availability of finance
from the institutional agencies force the fishermen to sustain the less
equipped fishing crafts which in turn results in lesser returns putting them
in a vicious circle of poverty. Supply of credit on easy terms and
conditions, controlling the cost escalation of catamaran logs, regulation of
area of fishing or period of operation for mechanised and non-mechanised
boats and fishing outboard engines on catamarans are some of the
suggestions given to improve the earnings.

Ibrahim (1992)\(^6^8\) examined the economic implications of the rise
and growth of capitalism in Kerala fisheries exclusively depending on
secondary data. This study looked at fisheries development of the state
from a dialectical perspective which attributed all the major problems
experienced by the fishery sector such as declining fish production,
resource depletion, deterioration of traditional fishery, conflicts between
traditional fishermen and mechanised boatman, declining per capita
availability of fish and skyrocketing fish prices, to the growth of capitalist
pattern of fishing.

Devaraj et. al., (1996)\(^6^9\) evaluated the growth of fishing industry in
the east coast of India which consists of the coastal states of West Bengal,
Orissa, Andhra Pradesh, Tamil Nadu and Pondicherry. They came to the
conclusion that during the past three decades the availability of fishing
area has been increased; the number of mechanised vessels increased by
about 10 times from 1,228 in 1961 to 12,223 in 1991; the marine fish
production in the east coast increased by 3.4 times i.e. the average landings increased from 1,87,000 tonnes in 1960-64 to 6,34,252 tonnes in 1990-94; the annual average yield during 1990-94 was 42.3 per cent of the potential yield and there is a production gap of 57.7 per cent. Their view was that the inshore area (less than 50 m depth) is intensively exploited and there is considerable scope for intensifying the effort in the offshore area (more than 50 m depth).

Hansen (1996)\textsuperscript{70} presented that small pelagic comprise almost half of the world marine fish catches, which were once considered mainly for the reduction industry. Now, based on the increasing demand for fish for human nutrition, new efforts to increase the food uses of these small fish are developed. An examination is made of improved methods of handling and preserving the fish, which may provide nutrition and food security to the world at large.

Jacob Jerold Joel and Ebenezer (1996)\textsuperscript{71} made a study on present status of trawl fishery at Colachel for a period of five years from 1990 to 1994. The study indicated that the annual average gross income per fishing trip worked out to a minimum of Rs.8,121 in 1990 to a maximum of Rs.22,683 in 1994. Therefore, it was found that trawl fishing at Colachel was more productive and profitable.

D’cruz (1998)\textsuperscript{72} studied that co-operative had been recognised as an important institution for the socio economic upliftment of fisher-folk in Kerala. But the historical background shows failure since 1917. Matsyafed was formed in the year 1984. After a decade, the co-operative umbrella of Matsyafed comprises of 292 primary co-operative societies with an average membership of 502, covers about 75 per cent of active fishermen of the state. On an average 12.5 per cent active fishermen of the State were provided soft loan assistance for acquiring means of
production through Integrated Fisheries Development Project (IFDP). The beneficiaries repaid 77 per cent of the loan amount of the first two phases. The fish auctioned through the primary co-operatives over the years was only one per cent of the State's marine fish landings, need attention for further improvement. The improving trend of performance indicators of IFDP and the attempt for resource mobilisation of Rs.210 crores under IFDP phase IV for the period 1996-2002 are expected to provide impetus for the take off in the co-operative processes of Matsyafed. If future course of action is not set in the right direction, catastrophe cannot be avoided.

Motongwa (1998)\textsuperscript{73} in his article, presented that the marine fisheries provide food protein, employment and income for the coastal population and the surrounding inhabitants in Kenya. Both artisanal and commercial fisheries are carried out, although the artisanal fishery dominates and supports approximately 6,500 fishermen. Fishing is done in shallow waters using beach seines, traps, fishing lines and cast nets as major gears. During the last decade, the total annual marine fish output has varied from 5,000 to 8,000 tonnes. Approximately, 80 per cent of the total fish landings come from shallow coastal waters and 18 per cent from offshore trawlers. The fisheries have been overshadowed by shoreline and water-dependent tourism activities and the development of residential and commercial establishments. Marketing of fish is mainly done by middlemen on whom the fishermen also depend for vessels for a price resulting in poor returns. The bulk of the fish landed along the Kenyan coast is to a greater extent consumed locally. Generally, the production of the marine fish and other products has declined in the last two years due to lack of adequate capacity to utilise the Exclusive Economic Zone (EEZ) effectively in the Indian Ocean and the inefficiency in
transforming semi-processed fish products to standard finished outputs. In order to assist in fish marketing, fishermen's co-operatives have been encouraged. They aim at ensuring fair practices and reasonable returns to the fishermen for their landings.

Vijayakumaran and Haridas (1998) remarked that the marine fish production in India has been more or less stagnant in the recent past. The mean annual production of 2.7 metric tonnes is nearly 70 per cent of the estimated potential of 3.9 metric tonnes from the EEZ. Coastal region up to 70 metre depth is the main contributor. In multi-species, multi-gear fisheries catch per unit effort is a poor indicator of stock or gear efficiency. 0.239 Million fishing crafts are being operated along the Indian coast. Marine Fishing Regulations Act (MFRA) has now been enacted in the maritime states earmarking zones for each type of fishing craft. The Maritime Zones Act 1976 defines the area under territorial waters, continental shelf, EEZ and the maritime zones of India. Regulation of Fishing by Foreign Fishing Vessels Act 1981 contains provisions to allow fishing by foreign owned vessels. The provisions of Deep Sea Fishing Policy (1991) now rescinded are explained. There is an urgent need for comprehensive regulation to cover all fishing operations in the EEZ to ensure responsible fishing. Future strategies for sustainable production are also discussed.

Somvanshi, V.S., et. al., (1999) have studied the current status of the Monitoring, Control and Surveillance (MCS) system in India, its implementation and proposed strengthening at national and state levels, with special reference to Gujarat State. It has been remarked that the progress in increasing fish catches narrows the gap between the potential estimate and the current yield from the marine sector and the application
of MCS is essential in the fisheries sector for maintaining long-term sustainability and for conservation of fish stocks for the future.

Pazhani (2000) has analysed the need for non-governmental organisation, the structure and functioning of Kanyakumari District Fishermen Sangams Federation (KDFSF), the various activities undertaken by the federation for the upliftment of fishermen. According to him, lack of assured funds in a major problem felt by KDFSF. Pazhani has suggested establishing a financial institution, i.e., National Fisheries Development Bank (NFDB) to supplement the steps taken by KDFSF. Further he has also stressed the need to provide the basic infrastructure facilities in the coastal villages.

Sam Benet, P and Arumugam, G (2001) found that changes have taken place during recent years in the fishing sector by traditional crafts and gear at Tuticorin. This study refers to the changes taken place due to the introduction of mechanisation of traditional fishing crafts. The fishermen are benefited by increased catch per unit as well as increased price for the catch by arriving earlier. Encouraged by the Government many fishermen took mechanisation of craft. However, this has benefited only few people who could operate large fishing boats while the small and indigenous fishermen were left in the same old state with their traditional methods.

Thingran, A.G and Paul, S.,(2009) pointed out that the Indian fisheries economy for the last several years has been characterised by sluggish growth rates in production, inadequate marketing infrastructure, demand and supply imbalances, intersectional conflicts, insignificant contribution of deep-sea fishing, lack of diversification in export trade and apathetic entrepreneurship in offshore fishing. Unlike marine fisheries, inland fisheries have registered a higher growth rate of
production. Despite imperfections of marketing system, land-based culture fisheries have been favourably placed. Fish Farmers Development Agencies (FFDA) have brought 150000 ha under scientific fish farming. Reservoirs (3 million ha) afford opportunities for enhancing inland fish production for augmentation of domestic availabilities.

The literature review attempted above is not exhaustive though substantial. The review reveals that while several studies are available on the fisheries of a few regions/states, there is hardly any noteworthy work relating to fisheries development in other stated regions. India being a country of continental size has the very long coast line and enormously vast continental shelf, very large fishing population. Characterised by widely varying geographical, demographic, social, cultural, educational and economic background and states with different levels of economic development and fishery potential, interregional differences in fisheries development are quite likely to occur.

Ramanathapuram District of Tamil Nadu state is a maritime one with unique problems and features. No comprehensive and systematic study on fisheries development of this district has been carried out till date. Studies pertaining to fish catching and fish marketing have been done separately so far, but the fishing community as a whole has not been covered yet. Therefore in this study the fishing community has been classified according to their occupation as fish catching, fish processing, fish marketing and net mending. The ensuing chapters are the outcome of humble effort to fill up this research gap.
FOOT NOTES


22. Hameed, M.S., (1998), “Exploited and potential fishery resources of the EEZ of India”, *Society of Fisheries Technologists*, India, pp.6-12,


