CHAPTER VII

FINDINGS, SUGGESTIONS AND CONCLUSION

A brief summary of the findings of the study in the order of the objectives of the study, the emerging suggestions in the light of the findings of the study and also conclusion are given in this chapter.

7.1 SUMMARY OF FINDINGS

7.1.1 The study shows that there exist wide variations in length of coastline, continental shelf, number of landing centres and number of fishing villages. It shows that the Western region has 40.82 per cent of coastline and 70.38 per cent of continental shelf. On the other hand, the Eastern region has 33.67 per cent of the coastline and 22.26 per cent of continental shelf. Further, this region has more than 50 per cent of fishing villages and landing centres. Orissa is having the maximum number of fishing villages (641) and the least in Daman and Diu (22). Gujarat is having the maximum coastal length (1600 km) followed by Tamil Nadu (1,076 km). Tamil Nadu is having the maximum number of fishermen families (1,92,152) followed by Andhra Pradesh (1,29,246). Tamil Nadu is also having the maximum fisherfolk population (790408) followed by Kerala (6,02,234).
7.1.2 The study shows that male outnumber female by 2.68 per cent. Further, adult population is greater than children by 30.34 per cent. It is a healthy sign for the development of labour-intensive industries like fishing.

7.1.3 The study reveals that 50.91 per cent of the fisherfolk have only up to secondary level education and only 5.59 per cent have higher education. Out of 35,19,116 population, 15,30,957 (43.50 per cent) are illiterates.

7.1.4 The study points out that out of 8,89,528 fishermen employed in fishing, 7,17,999 (80.72 per cent) are full time fish workers, 1,17628 (13.22 per cent) are part time workers and the remaining 53,901 (6.06 per cent) are occasional fish workers.

7.1.5 The study shows that 69.63 per cent of fishermen population depends on fishing for their livelihood. Fish marketing provides employment to only 4.28 per cent of fishermen. Net making/repairing provides employment to 8.74 per cent.

7.1.6 The study shows that 42.84 per cent of fisherwomen depend on fish marketing while net making/repairing provides employment to 8.15 per cent. 23.52 per cent of fisherwomen get their livelihood by engaging in fish curing/processing and peeling. The remaining 25.49 per cent of fisherwomen depend on other activities related to fishing.
7.1.7 The study shows that there are 2,38,772 fishing crafts in the coastal areas, of which 58,911 (24.67 per cent) are mechanized boats, 75,591 (31.66 per cent) are motorised crafts and the remaining 1,04,270 (43.67 per cent) are non-motorised traditional crafts. Thus, in total 75.33 per cent of the fishing crafts are traditional in nature.

7.1.8 The study shows that trawl nets and gill nets are the most commonly used fishing gears in all the States. Out of 50,45,764 fishing gears, 81.95 per cent are gill net pieces. This situation may be attributed to the operation of more number of traditional crafts in States like Tamil Nadu, Andhra Pradesh and Orissa. Hooks and lines form 4.90 per cent of the total fishing gears.

7.1.9 The study shows that out of 7,49,056 members of various co-operatives, 5,14,703 (68.71 per cent) are in fisheries co-operatives and the remaining 2,34,353 (31.39 per cent) are in other types of co-operatives. The total adult population of the fisherfolk is 22,93,425, of these only 7,49,056 (32.66 per cent) are members of various co-operative organizations.

7.1.10 The study shows that out of 7,17,999 fishermen involved in full-time fishery operations, only 24,903 (3.46 per cent) have electronic equipments and only 14,620 (2.04 per cent) are provided with life saving equipments. Out of 8,89,528 fishermen engaged in fishing, only 1,795 (0.20 per cent) persons have acquired training of various types related to fishing operations.
7.1.11 The value of coefficient of variation (C.V) also reveals that there is greater variability in number of fishing villages even within the region. The C.V for Western region (114.40 per cent) is also greater than the eastern region (73.59 per cent). Similar type of variation prevails in the case of active fishermen population also. But, the variability in the case of number of fishing crafts remains the same (86 per cent) in both the regions. But, the C.V of fish production is greater in the Eastern region (94.96 per cent) than the Western region (34.02 per cent).

7.1.12 To identify the significant variables influencing marine fish production, the number of fishing villages (X1), active fishermen population (X2), number of fishing crafts (X3) and continental shelf (X4) have been taken for analysis of multiple regression analysis: The regression values imply that the area of continental shelf (X4) has the highest influence on marine fish production.

7.1.13 The trend analysis reveals that marine fish production increases by 27860 tonnes per year and inland fish production increases by 1.486 lakh tonnes. This trend value is significant at one per cent level. The independent variable explains 98.3 per cent of variations in the dependent variable. Further, a region-wise analysis of fish production reveals that the average fish production over the years is greater in the Western region than the Eastern region. At the same time, the amount of increase in fish production per year (16980 tonnes) is less than the Eastern region (23751 tonnes).
7.1.14 The study reveals that monthly per capita consumption of fish is very low in both rural and urban areas of all the States in India. It is high in islands like Andaman and Nicobar, Daman & Diu. Among the coastal States, fish consumption is high in the entire Kerala State. The number of households consuming fish per 1000 houses ranges from a minimum of 64 (rural) and 59 (urban) in Gujarat to a maximum of 957 (rural) and 934 (urban) in Goa.

7.1.15 The trend analysis reveals that marine products export in quantity terms increased by 35425.44 tonnes per year during the pre-reform period (1971-72 to 1989-90). The same has increased by 2.33 lakh tonnes per year during the post-reform period (1990-91 to 2008-09). This trend value is significant at one per cent level in both the cases. This situation may be attributed to the starting up of many export-oriented units in order to boost up marine products export.

7.1.16 The trend analysis also reveals that export of marine products in value terms increased by Rs.31.722 crores during the pre-reform period. This trend value is significant at one per cent level. The independent variable explains 96.6 percent of variations in the dependent variable during this period. But, the same has increased by Rs.407.619 crores during the post-reform period. And the independent variable explains 96.1 per cent of variations in the dependent variable during this period. The export in value term has increased by 13 times during the post-reform period.
7.1.17. The study reveals that the amount of export to Japan in total exports of marine products was 45.76 per cent in value during 1996-97. It increased to 49.61 per cent during 1998-99 and finally declined to 19.10 per cent during 2003-04. The share of U.S.A was 10.58 per cent in 1996-97. It increased to an all time high level of 29.81 per cent in 2002-03 and finally decreased to 27.61 per cent in 2003-04. The European Union markets claimed a share of 19.17 per cent during 1996-97. It rose to 24.15 per cent in 2003-04. The share of South East Asia including China, which was 20.73 per cent during 1996-97, decreased to 20.06 per cent in 2003-04.

7.1.18 The study reveals that frozen shrimp, the major category of marine products, which amounted to 52.16 per cent of the total volume of exports of seafood during 1989-90, went on decreasing and reached 31.50 per cent during 2003-04. The share of frozen lobster tails diminished from 1.87 per cent during 1989-90 to 0.33 per cent during 1997-98 and since then till now, this item has not been figured in the export of marine products from India. The share of frozen cuttle fish and fillets, which accounted for 12.77 per cent during 1989-90 fell to 9.61 per cent during 2003-04. The share of frozen squids, which was 10.78 per cent during 1989-90, reached the highest level of 15.20 per cent during 1995-96 and then declined to 9.18 per cent during 2003-04. Similarly, the share of fresh and frozen fish, which constituted 19.15 per cent during 1989-90,
reached the highest level of 48.74 per cent during 1997-98 and then came down to 33.50 per cent during 2003-2004.

7.1.19 The study reveals that frozen shrimp accounted for as high as 74.25 per cent of the earnings from seafood exports during 1990-91, which decreased to 65.87 per cent during 2003-04. The share of frozen lobster tails decreased from 5.29 per cent in 1989-90 to 1.02 per cent in 1997-98. The share of frozen cuttle fish and fillets declined from 7.45 per cent in 1989-90 to 7.14 per cent in 2003-04. The share of fresh and frozen fish, which was 7.59 per cent in 1989-90, reached the highest level of 15.47 per cent in 1997-98 and then decreased to 10.19 per cent in 2003-04.

7.1.20 On an average, shrimp, lobsters and prawns accounted, for 68.97 per cent of the value of all kinds of marine products exported from India during 1989-90 to 2003-04 followed by frozen fish, which amounted to 16.81 per cent, moluscs, cuttle fish and others. 9.20 per cent and all other items together accounted for 5.03 per cent during the same period.

7.1.21 The study reveals that on an average, 92.54 per cent of marine products was exported in frozen form from India during 1989-90 to 2003-04. Live items accounted for 0.40 per cent, dried items 1.76 per cent and other items amounted to 5.09 per cent of seafood exported from India during the same period.
7.1.22 The study shows that JN port occupied the first place in the total volume of exports of marine products, Pipavav port the second place and Kochi port occupied the third place.

7.1.23 A comparison of port-wise exports of marine products in quantity terms reveals that the Western region’s export is greater than the Eastern region. But, the export of marine products by the former shows a declining trend while that of the latter is increasing year by year.

7.1.24 The study indicates that Chennai port occupied the first place in the total value of export of marine products, while Kochi occupied the second place, Visakhapatnam the third place, JN port fourth place and Pipavav fifth place in value terms.

7.1.25 A region-wise comparison of export of marine products in value terms reveals that the value of export from the Eastern region is greater than the Western region. The contribution of the former in value terms remains more than 60 per cent in all the years under consideration and the latter was only less than 40 per cent.

7.1.26 The rank correlation between total number of fishing crafts and area of continentalshelf is \( r = +0.43 \), number of fishing crafts and number of fishing harbour is \( r = +0.2 \) and fish production and export is \( R = +0.64 \). All these correlation coefficients shows the existing disparities in marine fisheries development.

7.1.27 A SWOT analysis to know the problems and prospects of the marine fishing industry reveals the following facts:
• The strength of the marine fishing industry are the availability of excess human resource, untapped marine resources, increase in the number of mechanized boats, different varieties of fishing gears used, increasing trend in fish production and export of marine products and also the increasing role played by NGOs in the socio-economic uplift of the fisherfolk.

• The emerging opportunities for the development of the marine fisheries sector are: availability of deep-sea resources, chance for improving fishery and non-fishery infrastructure in the coastal villages, giving importance to export of marine products, chances for prawn culture in the near shore areas, possibilities for seasonal migration of fishermen, sustainable management of marine resources, untapped resources in and around Andaman and Nicobar Islands and also chance for increasing consumption of fish in the interior villages of our country to get better price for marine products.

• The Opportunities are the prospects for marine fisheries development in India. Out of 22,93,425 adults, 5,64,433 (24.61 per cent) are remaining without any gainful employment. Untapped resources in the deep-sea could be better utilized for the betterment of the fisherfolk and also for increasing the export earnings of our country. Increase in the fishery and non-fishery infrastructure will help to generate more employment and income to the unemployed. Through
the process of legalizing fishermen migration within our EEZ, more man days of employment could be generated. Seasonal migration of fishermen to Andaman and Nicobar Islands will help to continue fishing throughout the year.

- The *Threats* are the problems that act as impediments for the development of fishery sector. The speedy depletion of marine resources, conflict between the traditional and mechanized craft operators regarding the utilization of the common property, increase in fishing intensity due to increase in the number of motorized and mechanized crafts, intrusion of foreign vessels into our sea waters, problems related to inter-state migration of fishermen, conditions and functioning of fishermen and fisherwomen cooperatives and mounting overdue in the formal and informal credit are the important threats to the development of the fishery sector in India.

### 7.2 SUGGESTIONS

The analysis of data clearly reveals that there exist wide disparities in the availability of fishery resources, human resources, infrastructure for fishing and also other infrastructure necessary for the accelerated development of the marine fishing industry and also socio-economic uplift of fisherfolk in India. It is the right time to take the following steps to accelerate fisheries development in general and marine fisheries in particular:
7.2.1 The length of the coastline may vary among the maritime States, but the continental shelf and establishment of fish landing centres should be made by considering the number of fishing villages, fishermen population and the number of fishing crafts in operation.

7.2.2 The overall family size came to 4.68 and population has been increasing year after year. This situation will necessitate the fuller utilization of available fishery resources and increase in the number of fishing days and fishing trip, which ultimately results in the speedy depletion for fishery resources. To avoid this unwanted situation, steps should be taken to make the fisherfolk to be aware of the need for family planning practices. To achieve good results in this respect, the NSS and NCC volunteers and PHCs may be used.

7.2.3 To eliminate the disparities in the number of mechanized and motorized crafts in operation and also the number of fishing gear units, the following steps have to be taken:

- Establishment of a Fisheries Development Bank exclusively for financing fishermen and fisherwomen;
- Encouraging the Nationalised banks to lend liberally for fisheries development;
- Group lending to fishermen by NCDC should be continued without any halt;
- Fishermen and Fisheries Co-operatives should be revitalized by supplying more credit and supplying inputs for fisheries development.
7.2.4 The infrastructure facilities like jetty, link roads, ice and cold storages, transport and drying / curing yards are not found in most of the fish landing centres. By providing all these facilities, we can reduce the amount of wastage of fish during post-harvest operations and increase the income of the fisherfolk.

7.2.5 Other infrastructure facilities like link roads, safety drinking waters, hospitals, banks and co-operative societies should be established in adequate numbers considering the population of a group of fishing villages if not individual villages.

7.2.6 There is too much of underemployed and unemployed fishermen in the coastal villages. They suffer like anything to meet even their daily necessaries. To generate employment to fishermen during the lean season, (i) sea weed collection, (ii) training in repairing the outboard /inboard engines, and (iii) collection of shellfish may be initiated, and (iv) engage in non-fishing activities.

7.2.7 Out of 11,23,924 adult female population only 3,65,463 (32.52 per cent) are employed in fishery related and other activities. To generate gainful employment to the unemployed fisherwomen, the State Government should take the following steps:

- The habit of making fish nets in the coastal villages themselves may be encouraged in order to generate employment to fisherwomen;
• Infrastructure such as fish processing units, cold storages should be established in the coastal villages to provide employment opportunities to willing people and also avoid too much of wastages which may occur while handling to reap the full benefit of lucky catches.
• Cottage and small scale industries producing coir and palm products may be opened in the coastal villages to increase the household income from non-fishing activities.
• Self-Help Groups may be formed with financial support from the government to start income generating small enterprises.

7.2.8 Fixation of support prices for at least commercially important fishes and making the co-operatives to involve in the field of marketing will help the fishermen to get higher prices and reduce the pressure to fish for long hours to catch huge amount of fish. To help this, the following infrastructure (ice factories, cold storages, freezing plants, canning plants curing yards, peeling sheds and fishmeal plants) have to be established to every cluster of villages considering the number of crafts in operation and the amount of daily landings.

7.2.9 It is claimed that a fishery that is free for all and exploited on a ‘catch-as-catch-can’ basis is on a sure path to over fishing. For the sustainable management and use of marine resources, marine fisheries policies should be aimed at:
(i) Preventing the mechanized trawlers from fishing in the inshore areas to provide life to lakhs of traditional fishermen;

(ii) To avoid class conflicts which lead to loss of men and material;

(iii) Fixing uniform duration of ban on fishing considering the season prevailing in different regions;

(iv) Ban on fishing affects the livelihood of crew members of mechanized boats and generation of alternate employment opportunities is a must to provide for at least minimum subsistence to the fisherfolk;

(v) Night trawling should be strictly prohibited to prevent speedy depletion of fishing resources; and

(vi) Deep-sea fishing produces only three per cent of total fish catch and so it should be encouraged to avoid class conflict in the inshore waters and to increase fish production.

(vii) The mesh size should be fixed to the maximum to reduce by-catches and avoid unnecessary depletion of marine resources.

(viii) As a step to introduce responsible fishing fishing gears like hooks and long lines should be encouraged in order to avoid the catch of young ones.
7.2.10 The Central as well as the State Governments should take the following steps to increase fish consumption by the people of India:

(i) Create awareness among the people regarding the benefits of fish consumption

(ii) Opening fish markets; and

(iii) Link roads and transport facilities should be increased between coastal villages and urban areas.

(iv) Various types of advertisements pointing the benefits of fish consumption may be made through different media.

7.2.11 The number of fishing harbours and landing centres should be constructed by taking into account the length of the coastline, number of fishing villages, number of people depending on fishing, and number of fishing crafts in operation. To establish these infrastructure, the Central Government should take the following steps:

• Allocate more funds for fisheries development and the outlay should be fully utilized for the intended purposes;

• State Governments should be encouraged to establish these facilities by obtaining necessary funds from the Centre;

• Like other rural development projects, the NABARD may be encouraged to operate projects of various types for fisheries development also.
7.2.12 The unexploited marine resources in the Andaman and Nicobar Islands area may be exploited either by increasing the fishing crafts and fishery infrastructure in that area or by encouraging migration of fishermen during the ban period in the other areas.

7.2.13 Since the area of continental shelf plays an important role in the determination of marine fish production, steps may be taken for the even distribution of continental shelf considering the number of crafts in operation and also the number of active fishermen population.

7.2.14 Above all, there is need for regulation of fishing activities to achieve sustainable use of marine resources and to encourage responsible fishing by those engaged in fishing. As suggested by Watson and Getz (1986) the following regulatory measures may be taken:

(i) Limiting fishing to a few months reduces the amount of fishing efforts that can be applied;

(ii) Regulations of fishing efforts, detailing the kinds of boats, the kinds of gear and season and hours of fishing should be made;

(iii) Limiting fishing vessels to large mesh; and

(iv) Induce firms not only to choose the optimum amount of fishing efforts but also the optimum mesh size.

(v) To make the fisherfolk to know the impact of their fishing on fish stock, they have suggested a tax per pound of fish caught.
(vi) To preserve the resource and to avoid class conflicts in the West coast (Kanyakumari district), the Boat Union has taken the following steps:

- Fixed a fine of Rs.5000/- or a ban on fishing for 10 days on those trawlers which fish beyond the stipulated time. But, it is not effective since they are ready to pay the fine because their catches are more valuable species in bulk quantities;
- Confiscation of total catch on a particular day; and
- A ban on fishing for 2 to 3 months.

7.2.15 Steps may be taken to encourage the use of hooks and long lines for fishing for responsible fishing as in the case of Kombothurai in Thoothukudi District of Tamil Nadu.

7.3 CONCLUSION

From the above analysis pertaining to fisheries development, one can conclude that there is wide spread disparities in the development of marine fisheries in India. In total, the maritime States in the Western part are well ahead of Eastern part with regard to fishery infrastructure, number of mechanized boats in operation, fish production, Ports for fish export and institutions (Central Marine Fisheries Research Institute and Marine Products Export Development Authority at Cochin and Central Institute for Fisheries Education, Mumbai) related to Research and Development. On the other hand, the Eastern part is having maximum number of fishermen villages, fisherfolk population, traditional and non-motorised crafts. Considering these situations, the Central as well as the State Governments should
frame policies with the participation of representatives from fishermen communities for the equitable and sustainable use of marine resources with better infrastructure for the socio-economic uplift of the fisherfolk and fisheries development of our nation in the years to come.