Chapter X

CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

10.1.1 The study leads to the following conclusions:

10.1.2 Mechanisation of fishing craft has brought about favourable change in the standard of living of the fishermen.

10.1.3 The use of synthetic fibres like nylon fibrillated tape twisted twines, multifilament nylon etc. for the gear materials helped to enhance catch efficiency.

10.1.4 The substitution of knotted webbing of nylon with knotless webbing of nylon for small meshed seine nets has increased the catch and earning capacity. The per day catch shows that the knotless webbing seine nets are 25 per cent more efficient than the knotted seine nets.

10.1.5 The experiments with different category of trawl nets showed that the bulged belly trawl is more efficient for shrimp and six seam and high opening trawls for fish.

10.1.6 One important aspect of the non-mechanised sector is the very low labour productivity compared to the mechanised
sector. Labour productivity in the mechanised sector is nine fold to that of the non-mechanised.

10.1.7 The higher price and very high demand for prawn in the foreign markets are responsible for the anarchic growth of the mechanised boats in Kerala.

10.1.8 If we go for fuel efficiency and economy in material cost, then it is attractive to build hull with lighter materials like aluminium and FRP.

10.1.9 The economic species such as oil-sardine and mackerel in the artisanal sector showed a stagnating tendency for the last 10 years. But living standards of the poor fishermen in the state largely depend on the landings of these two species.

10.1.10 Kerala being the prime producer of marine fish, the total variation in the marine fish production in India is largely related to the production rate in Kerala.

10.1.11 The catch data show that the demersal species of the mechanised sector and the pelagic species of the traditional sector have a southward drifting of these fishery resources. This may be partly due to the presence of 'Wadge Bank' and partly due to the predominance of mechanised fishing in the southern region.
10.1.12 The seasonality aspect of fish landing indicates that there is demonstrable seasonal influence in all the major species. Harmonic analysis of time series shows that the seasonal influence is maximum for oil-sardine and prawn.

10.1.13 The third quarter (July-September) is found to be the major fishing season for most of the species in the mechanised sector. The maximum landing is also noticed for this sector in this quarter itself.

10.1.14 The fishery resource forecast based on Auto Regressive Moving Average (ARMA) shows stagnation with reference to most of the species in Kerala. An important aspect in the forecast value is the decreasing trend with reference to certain species and a marginally increasing trend with reference to certain other species in some quarters.

10.1.15 A 36-fold increase in the value of the output is noticed between 1964 and 1984. But this was mainly due to the very high unit price realisation of the export specie of prawn.

10.1.16 The high value realisation of the marine species in the mechanised sector is because of the composition of fish catch in favour of the relatively very high priced specie of prawn.
The value of output has registered a phenomenal increase in the post 1964 period. A combined analysis of the source of growth shows that volume changes and species-mix changes account for only 3.5 per cent of the increase and 96.5 per cent of the increase is due to price changes alone.

Our consumption of fish and fishery products shows that there is large scale 'unmet' demand for fish. This is the basic cause for the escalation of fish prices in Kerala compared with other Indian states.

Trawlnet in the mechanised sector and boat-seine in the non-mechanised sector are the two principal gears contributing volume and value in the fishery economy.

There exists very high idle capacity in the fish processing industry. This has led more than 50 per cent of the processing units to become sick.

A positive relationship is noticed with respect to idle capacity and the number of shifts. As the number of shifts increases, the idle capacity also increases.

An exploitable quantity of about 5.7 lakh tonnes of resources remain untouched beyond the 50 m depth zone in spite of the improvement in skill and technology in the fisheries sector of the state.
10.1.23 The economic spoilage while transporting fish from the harvesting area to the processing and the marketing area is the highest in non-exportable varieties (₹.7.8 crores) and it is only very little for exportable varieties (₹.56.03 lakhs), transporting an average distance of 66.78 kms.

10.1.24 Schaefer model presents an alarming conclusion: the prawn resource is overfished in Cochin and Sakthikulangara-Neendakara belt.

10.1.25 The effort required to generate \( f_{\text{MSY}} \) for a maximum sustainable yield (MSY) is only 663 boats (at eight hours per day) for landing 27,601.7 tonnes of prawn in Sakthikulangara-Neendakara belt. But more than 1,500 boats are operating in this area leading to very low level of catch per unit effort (CPUE).

10.1.26 The increased export earning from seafood is due to mechanisation and modernisation of the fishing methods, especially shrimp trawling.

10.1.27 Marine products export from Kerala shows very high concentration of a single specie (about 91 per cent) of prawn.

10.1.28 The seafood export earning depends on the market information and the quality control measures adopted by the
10.1.29 The availability of catch, particularly prawn and its price are very crucial in earning profits by the mechanised boats. The availability of prawn varies between seasons. Hence the profitability position of the mechanised fishing sector also varies between seasons.

10.1.30 Mechanised fishing is profitable only in certain seasons. But this season comprises of the most controversial months of June through August. So banning of trawling during these months will practically reduce the mechanised fishing industry into a non-profitable proposition.

10.1.31 It is found that on an average one-third of the total catch value is spent on diesel in the mechanised sector.

10.1.32 The case study of mechanised fishing shows that to improve economic efficiency of the boats, the number of trips is to be increased in the peak landing seasons.

10.1.33 The minimum catch (break-even) can be reduced considerably if the producers are assured of the right price for prawn.

10.1.34 The estimated statistical coefficients of fishing ability shows that Leyland engine boats are the best among the various engines used for mechanised fishing.
10.1.35 The estimated coefficients of fish culture activities based on Cobb-Douglas production function (1.17) shows increasing returns to scale. It also presents the economic efficiency of culture fisheries and its scope.

10.1.36 In order to increase the return from fish culture activities, the stocking rate and application of both organic and inorganic fertiliser are to be increased.

10.1.37 An analysis of production economics of different types of culture activities shows that polyculture of fish is more economical and it is suitable to Kerala conditions.

10.1.38 The farmers are generally unaware of the adoptable techniques of different forms of fish culture, which are in general found to be more profitable than any other form of agricultural operation.

10.1.39 There is very high underutilisation of inland fish resources in Kerala. We have ample scope to develop brackish water, fresh water and reservoir fisheries.

10.2 Recommendations

10.2.1 Based on the study the following recommendations are made:
10.2.2 The income of a fisherman depends to a large extent on the shore prices of fish. So attempts should be made to organise marketing of fish by fishermen themselves through Fishermen Welfare Societies so as to ensure better price for their produce, duly eliminating exploitation of the fishermen by the intermediaries.

10.2.3 Specified fishing zones for different categories of fishcraft as envisaged in the Kerala Marine Regulation Act 1980 will have to be enforced to protect the interests of the traditional fishermen.

10.2.4 The fishery data sources are not completely accurate as there are many left out quantities owing to the unorganised nature of the sector and also the deficiency of the compilation of the data. So steps have to be taken for the collection of fishery statistics on a scientific basis in all the parts of Kerala.

10.2.5 The sectorwise, gearwise intercomparison of the income trends for all the years should be assessed for fishery planning and the formulation of plan priorities in this sector.

10.2.6 Measures are to be taken to publish the shore prices of all the species of importance so as to analyse the correct value change in fisheries.
10.2.7 A fuel conservation survey should be undertaken immediately in areas where there are heavy concentration of mechanised boats like Neendakara, Cochin etc.

10.2.8 As a step to reduce fuel cost in the operation of the inboard/outboard in the traditional sector the inboard/outboard engines must be converted into diesel engines from petrol engines.

10.2.9 Based on resource survey, fishery charts should be prepared indicating productive fishing grounds to induce private capital into such a risky venture as deep-sea fishing.

10.2.10 By considering the demand position and the competition for market, product diversification is very useful for the sound flow of seafood trade.

10.2.11 Two ways are there to solve the idle capacity of the processing plants—(i) to increase the raw material by popularising aquaculture and deep-sea fishing and (ii) to develop new processing techniques with cheap and durable containers and packing materials.

10.2.12 The existing design of the mechanised boats is 30 years old. Based on the technological change taken place
in the hull and gear materials and also with respect to the cost of hull the existing boats are to be updated.

10.2.13 The present number of mechanised boats are more than optimum for exploiting commercially important species. So issuing fishing licences for the mechanised boats should be stopped and the existing excess boats should be deployed to diversified fishing activities.

10.2.14 It is necessary to introduce some conservative measures, particularly for avoiding destructive fishing of fry and juvenile shrimp species which can grow to bigger sizes. Methods like closed seasons for prawn fishery, restricting further issue of licences for stake net fishing etc. But this kind of restriction does not cause any hardship to the weaker sections of the society who have been depending solely on small-scale fishery for their livelihood.

10.2.15 Purse-seining is detrimental to the traditional fishing and fishermen. So a ban of purse-seining is necessary in Cochin as in other districts of the state.

10.2.16 Brackish water fish culture has immense scope in Kerala for generating income and employment to the fishermen. This would also help to earn more foreign exchange at a time exportable species are dwindling from the capture fisheries.
10.2.17 To sum up, this is one of the pioneer studies of this kind dealing with the harvest and post-harvest technology of the fishing industry with special emphasis to the resource base and its iterative aspects. It is also one of the first studies focusing the problem of the industry with regard to cost, earnings and management regulations based on seasonality aspects. The findings of this study is expected to help the policy makers to plan and manage better the fishing industry in Kerala.

10.2.18 Since fishing industry is subjected to various kinds of externalities, and are influenced by technological development pari passu with socio-economic development in the years to come, it will be useful to conduct further studies in this sector. The areas which will have immense scope for further research are (i) the impact of motorisation among the traditional fishermen in getting higher catches and return, (ii) catch and earning aspects of different craft-gear combinations with respect to fishing seasons, (iii) off-shore and deep-sea fishing where large potential resources are available for exploitation and (iv) sharing of cost and earnings based on social profitability.