LIVELIHOOD ANALYSIS OF FISHERFOLK FAMILIES AT KUTTAPULY FISHING VILLAGE OF TIRUNELVELI DISTRICT, TAMILNADU

THESIS SUBMITTED IN PART FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF FISHERIES SCIENCE IN FISHERIES ECONOMICS TO THE TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY, CHENNAI

G. MARY BASIL BINDHU, B.F.Sc.,

I.D.NO.MFT 01004 (FEC)

DEPARTMENT OF FISHERIES ECONOMICS AND STATISTICS
FISHERIES COLLEGE AND RESEARCH INSTITUTE
TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY
THOOTHUKKUDI – 628 008

2003

ACKNOWLEDGEMENTS

I wish to express my sincere thanks to my Chairman **Dr.R.Senthilathiban**, Associate Professor, Department of Fisheries Economics and Statistics, for his guidance, creative ideas, suggestions and help throughout the research work.

I would like to sincerely thank **Mr.M.Rajakumar**, Asst. Prof.(Sr.Scale), Department of Fisheries Economics and Statistics ,for his valuable guidance and suggestions and also for critically going through the thesis manuscript.

I am grateful to **Dr.P.Selvaraj**, Professor (Retired) and **Dr.B.Ahilan**, Associate Professor, Department of Aquaculture for their continuous help, valuable suggestions and for critically going through the manuscript.

I would like to thank to **Dr.R.Santhanam**, Dean of the Fisheries Faculty and **Dr.G.Sanjeeviraj**, Professor and Head (additional charge) Department of Fisheries Economics and Statistics for their encouragement throughout the study period.

I thank **Mr.R.K.Ramkumar**, Assistant Professor (S.G), **Dr.R.Jeyaraman**, Assistant Professor (S.S), for their suggestions.

I also thank **Mr. P. Jawahar**, Department of Fisheries Biology and Capture Fisheries and **Mrs.Ramani**, Typist for their generous help.

I am grateful to **Dr.R.Suresh,** Associate professor and **Mr.S.A.Shanmugham** Assistant Professor (Sr. Scale) ,Department of fish processing technology, for their moral support and encouragement throughout my study period.

I also wish to express my gratitude to Parish Priest of Kuttapuly, **Fr.Thominic Arul Valan** and **Mr. Ahilan, Mr.Izhazhi** and **Mr. Joney** and village committee members for their support and timely help in data collection.

I also wish to extend my thanks to all the fisherman - respondents of the study area for their kind co-operation during data collection.

I thankfully acknowledge the helping hands of my friends and classmates. I wish to specially thank my friends **Santhiya, Franklin, Loveson, Aruloli, Nithya, Sudha, Ramya, Anusha** and **Nagalakshmi.**

I thank **Mr.R.Kumaresan,** Assistant Librarian and **Mrs.R.Ezhil Rani**, Library Assistant and **Mr.Mariyappan** for their timely help in the reference collection.

I thank Mr.**N.A.P.Anbukumar,** Fishery Assistant and **Mr.K.Ramasamy,** Attendant for their help.

I thank my parents, **Mr.D.George** and **Mrs. S.Mary Joice** and my brother **Mr.G.Amalatheeban** for their love and support, which, helped me to complete my Post Graduate Studies.

Finally I thank the staff of **J.J. Computer Centre**, Teachers' Colony, Thoothukkudi for their neat typing of the thesis.

(G. MARY BASIL BINDHU)

CERTIFICATE

This is to certify that the thesis entitled, **Livelihood Analysis of Fisherfolk Families at Fishing Village of Tirunelveli District, Tamil Nadu** submitted in part fulfilment of the requirements for the award of the Degree of **Master of Fisheries Science** in **Fisheries Economics** to the Tamil Nadu Veterinary and Animal Sciences University, Chennai is a record of bonafide research work carried out by **Selvi .G. Mary Basil Bindhu** under my supervision and guidance and no part of thesis has been submitted for the award of any other degree, diploma, fellowship other similar titles or prizes and that work has not been published in part or full in any scientific or popular journal or magazine.

Date:

Place: Thoothukkudi

R.SENTHILATHIBAN

(Chairman)

Approved by

Chairman: Dr. R. Senthilathiban

Members: 1. Dr.P.Selvaraj

2. Dr.B.Ahilan

Date:

External Examiner:

LIVELIHOOD ANALYSIS OF FISHERFOLK FAMILIES AT FISHING VILLAGE KUTTAPULY, TIRUNELVELI DISTRICT, TAMILNADU.

Thesis submitted in part fulfillment of the requirements for the degree of

Master of Fisheries Science
in

Fisheries Economics

to the

Tamil Nadu Veterinary and Animal Sciences University

Chennai

by

G.MARY BASIL BINDHU
MFT 01004 (FEC)

DEPARTMENT OF FISHERIES ECONOMICS AND STATISTICS
FISHERIES COLLEGES AND RESEARCH INSTITUTE
TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY
THOOTHUKKUDI – 628 008

2003

CONTENTS

Chapter No.	Contents	Page No.
5.	Results and Discussion	33 – 59
	5.1. Demographic features	33
	5.2. Pattern of fish landings	34
	5.3. Occupational status	35
	5.4. Capital investment	36
	5.5. Level and Pattern of Employment	37
	5.6. Estimation of Fish Catch	39
	5.7. Estimation of Gross Income	40
	5.8. Estimation of Costs	42
	5.9. Estimation of Net Income	44
	5.10. Consumption Expenditure	47
	5.11. Method of Disposal of fishes	48
	5.12. Cohesiveness in fishing	50
	5.13. Awareness on Fisheries Resource Management Issues	53
6.	Summary and Conclusion	60 - 71
	6.1. Conclusions	66
	6.2. Policy Implications	70
7.	Bibliography	72 - 75

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

ABSTRACT

Title	:	Livelihood Analysis of Fisherfolk Families at Kuttapuly Fishing Village of Tirunelveli District, Tamilnadu.
Name	:	G. Mary Basil Bindhu
Degree	:	M.F.Sc.
Chairman	:	Dr.R.Senthilathiban
Department	:	Fisheries Economics and Statistics
College	:	Fisheries College and Research Institute
Year	:	2003
University	:	Tamilnadu Veterinary and Animal Sciences University

The present study was conducted in the Kuttapuly fishing village of Tirunelveli District, Tamilnadu to analyse the livelihood of fisherfolk families. The specific objectives of the study include the livelihood status of fishing families in the realm of human resource, employment, income and levels of living; to analyse the socio-economics of methods of fishing, fish landings and fish sale; and to assess the levels of cohesiveness in fishing occupation. Tirunelveli district has seven fishing villages, out of which, Kuttapuly was purposively selected. The study was restricted to owner cum operator of catamarans fitted with out-board engine. All the fishermen owning catamarans with out-board engine (n = 75) were considered as sample to conduct a census survey. The overall mean size of household in absolute units was 5.60. The earner-dependent ratio was 1:2.38. The fishermen having fishing as a primary occupation was 90.32 % and the percentage of fisherwomen involved in fishery related and non-fishing activities were 4.03% and 5.65%, respectively.

The mean capital investment per respondent on catamaran was Rs.16,180 and on outboard engine and fishing gears, it worked out to Rs.14,053 and Rs.30,967 respectively. The total number of fishing trips performed during moderate, peak and lean fishing seasons were 60 trips, 154 trips and 30 trips, respectively aggregating to 244 trips per annum. Fisherwomen were involved in fishery related and non-fishing activities for 233 days and 307 days per annum, respectively. The overall mean total fish catch per fishing trip was 15 kg and for moderate, peak and lean seasons it was 5 kg, 18 kg and 4 kg, respectively. The overall mean fish catch per respondent per annum was 3945 kg. The mean gross income per fishing trip for moderate, peak and lean was Rs.905, Rs.440 and Rs.131, respectively. The overall mean gross income per fishing trip was Rs.516. The overall mean gross income from fishing per annum was Rs.1,26,125. The mean total fixed cost (TFC) per fishing trip was Rs.72 uniformly for the three seasons. The mean total variable(TVC) cost per fishing trip for moderate, peak and lean seasons was Rs.437, Rs.227 and Rs.131, respectively. The mean total cost per fishing trip for moderate, peak and lean was Rs.509, Rs.299 and Rs.202, respectively. The net income on TVC per trip for moderate, peak, and lean was Rs.468, Rs.213 and below Rs.1, respectively. The net income on total cost (TC) per trip for moderate and peak was Rs.396 and Rs.141, respectively. The net income on TC per trip for lean season was found to be negative. The overall mean total cost for fishing per annum came to Rs.82,687 which was distributed as Rs.17,563 and Rs.65,124 for mean total fixed cost and mean total variable cost per annum. The net income from fishing on TVC and TC per annum came to Rs.61,001 and Rs.43,437, respectively. The mean annual income earned by fisherwomen per respondent-household in fishery related and non-fishing activities came to Rs. 587 and Rs.857, respectively. The annual gross income per fisherman household from all sources was estimated as Rs.1,27,568. The household net income on TVC and on TC was Rs.62,444 and Rs.44,881, respectively. The overall mean consumption expenditure per fisherman household

was Rs.56,693 in which, 63.13 % accounted for food. The level of cohesiveness with reference to fishing operation in the village was 100 % and it was 66.67 % in resource conservation. Centpercent respondents supported the method of resolving inter-group conflict and about 86.67 % of the respondents supported the method of resolving intra-group conflict. The percentage of fisherman-respondents who, had positive and conservative attitude towards fishing occupation came to 48.00 and 52.00, respectively. Chi-Square test was applied and it was found that the implementation of fisheries management measures would help for the sustainability of fisheries resources. Kendall co-efficient of concordance (W) was calculated to interjudge the consensus among the fishermen in ranking the eight constraints affecting fishing occupation. The estimated χ^2 values were highly significant at 1 % level. It could be concluded that the respondents ratings were highly related and there was good consensus among the fisherman- respondents.

1. INTRODUCTION

India has a coastline of 8129 km and fishing is one of the oldest professions practiced by a large section of people living along the coastal areas. Fisheries sector is regarded as an important source of income and employment generation and it stimulates the growth of a number of subsidiary occupations. The backward linkage of boat-building and forward linkage of fish processing contribute to the diversification and strengthening of the local and national economy. The fisheries sector also serves as an important source of foreign exchange earnings. Fishing, in India, is the principal avocation of livelihood for a large segment of the population living in the coastal regions and on the banks of rivers. While in most of the countries, fishing is considered as a business, in India, like agriculture, it is still considered as a mode of living or a way of life for many people (Ali, 1996). Yamamoto (1982) defined small-scale fisheries in terms of possession of a fishing boat, ranging from those without a boat, having a non-powered boat or an outboard or an inboard powered boat of less than eight metres length.

A small-scale fishery uses low technology gear, small boats and in general, oriented towards local markets. It is labour-intensive form of fishing outside of urban areas and the average fish catch per fisherman is less. The small-scale fisheries sector is a dominating feature of the fishing industry in South East Asia (Juntarashote and Daosukho, 1986). In India, more than 6 million fishermen and fish farmers are engaged in fishing and aquaculture industries for their livelihood. Most of them are small-scale farmers and fishermen.

The physical assets of Indian marine fisheries are the longest coastlines over 8000 km with a very wide continental shelf of 0.5 million sq.km along the North-West Coast and North-East West, over 2 million sq.km area in the Exclusive Economic Zone (EEZ) and the resource potential has been assessed as 3.94 million tonnes annually by Fishery Survey of India. (Somvanshi, 1999).

India's seafood export has increased again and the export figure for the year 2000-2001 indicates 28.41% increase in terms of quantity , 5.94% in terms of value and 19.12% in US Dollars, comparing to the same period during 1999-2000 (Anonymous, 2001). Tamil Nadu has 1076 km coastline with a continental shelf of 41,412 sq.km. There are 591 fishing villages in these coastal areas. There are 362 marine fish landing centres. It has a total marine fisherfolk population of 8.45 lakhs. (Anonymous,2001). The living conditions of the fisherfolk in the coastal rural area are very much influenced by economic inequality. Living conditions on the whole are deplorable, because of the great incidence of poverty of the population. Small cultivators and fishermen generally own their dwelling places; but their houses are inferior in every respect. Walls are made of stones and mud and with a thatched roof with almost no ventilation. There are no amenities worth to mention. Clothing, utensils, bedding etc. are poor both in quality and quantity. Comforts and luxuries are totally absent. Greater portion of cash income is spent on purchase of foodstuffs. Indebtedness is universal and common (John Kurien, 1981).

Protecting the interests of the coastal fishing communities is an important requirement, since, in most parts of India, they are fully dependent on fisheries for their life and livelihood. Even in situations, where, fishing communities benefit from an increase in disposable income, the levels of education are generally low and very limited alternative jobs exist for fisherfolk. It is , therefore, paramount task for the fisheries administrators to defend the larger interests of the fisheries sector against other conflicting interest from outside. This is necessary to build up a relationship of trust between the state and fishing communities, which is essential to introduce a sense of ownership for legislative and prospective measures among fishing communities (Sebastion Mathew, 2000). To increase the fish production in Tamil Nadu and to improve the living conditions of the fishermen in coastal areas, the Government of Tamilnadu have implemented several welfare schemes for the benefit of the fishermen (Anonymous, 2002).

Even though, fishing is techno-economic in nature, not many fisheries scientists take economic consideration into account in planning for fisheries development. The Government has to regulate fishing to the maximum, social and optimum exploitation of the fishery resources. Studies on livelihood of coastal fisherfolk are useful to know about the social and cultural life of fisherfolk and also about living conditions, educational status, health conditions, income levels and employment status.

1.1. Objectives

1. To study the livelihood status of fishing families in the selected fishing village in the realm of human resource, employment, income and levels of living.
2. To analyse the socio-economics of methods of fishing, fish landings and fish sale at the fishing village.
3. To assess the levels of cohesiveness in terms of social control, particularly with regard to access to resource use and in fish marketing and rural development.

1.2. Scope of the study

The study would provide the necessary information on livelihood status of fisherfolk in the selected village. The study would shed light on the socio-economic performance of fishing sector, which helps for planning and implementation of development programmes. The livelihood study would also provide a framework to formulate suitable programmes for the upliftment of small–scale fisherfolk. In short, the study would be highly useful to researchers, planners and policy makers in overcoming the problems of fishermen and in formulating strategies for the sustainable development of small-scale fishing and thereby, improving the livelihood status in Tamil Nadu, in general and in Tirunelveli district in particular.

1.3. Limitations of the study

Though the study is important for the above reasons, it has been confined to the respondents, who are having catamaran with outboard engine (OBE) in

Kuttapuly fishing village of Tirunelveli district, Tamil Nadu, as a part fulfilment of graduate research programme.

The present study covers a single fishing village and the data were related to only the owners having catamarans with OBE. The fishermen usually do not maintain records of their income, expenditure and the details of fishing. The required data were, therefore, collected from the respondents by direct personal contacts. Recording responses and cross checking of information were attended to minimise respondent bias. As it is a single fishing village study, the accuracy of data could be assessed by repeat sessions of field survey.

The reporting has been organised in the following chapters:

Chapter 1 : Introduction – deals with problem recognition, objectives, scope and limitations of the study.

Chapter 2 : Concepts and Review – Presents the concepts and a review of earlier studies.

Chapter 3 : Design of the Study – Provides the methodology and tools of analysis used in the study.

Chapter 4 : Description of the Study Area – gives an account of the profile of the study area.

Chapter 5 : Results and Discussion – discusses the results of the study in the present context

Chapter 6 : Summary and Conclusion – summarises the study with conclusion and policy implications.

2. CONCEPTS AND REVIEW

Conceptualisation is an essential part in any research study. The concepts identify the objects and phenomena and bring clarity in making inferences and permit comparison with other studies with similar concepts. Review of concepts used in earlier studies helps the researcher adopt, modify and improve the conceptual framework and provide link with the past approaches. The concepts used in the study have been defined after reviewing other definitions used in earlier studies.

2.1 Concepts

2.1.1. Fishermen household

Sathiadhas and Venkataraman (1981) defined a fishermen household as any household, wherein atleast one member of the family was engaged either in fishing or fishery related activities. Prabakaran (1978) defined a fishermen-household as one whose major source of income was from fishing and it consists of a group of persons usually living together, pooling their incomes and taking principal meals from a common kitchen. In the present study, the definition given by Sathiadas and Venkatarman has been followed.

2.1.2. Labour force

According to George (1980) labour force includes all those 16 years or above, who have a job or self-employed or looking for a job. Rogar Waud (1983) included all persons over the age of 16, who are employed plus all those actively looking for work. In the present study, the members of a household whose age is 16 or above and who are employed or are seeking employment were included in

the labour force. In estimating the size of labour force, children, who are studying and the individuals, who cannot work were excluded.

2.1.3. Fishing Employment

In the present study, the term fishing employment refers to a fisherman, who is engaged in fishing for the specified period per annum.

2.1.4. Fishery related activities

Activities like fish trading, processing, curing, net mending are called fishery related activities. In the present study fisherwomen were engaged in such as dry fish and fresh fish trade .

2.1.5. Non - fishing activities

Activities other than fishing and fishery related activities were called non-fishing activities (Sathiadhas and Panikkar, 1991). The same definition was used in the present study, in which fisherwomen were engaged in tailoring, petty shops keeping, running a tiffin centre and working in the readymade shops.

2.1.6. Costs of fishing

Capital involved in fishing constitute investment capital and working capital. Fixed capital is defined as the capital invested on fishing crafts, fishing gears and other accessories. (Senthilathiban, 1994) This definition was followed in the present study.

2.1.7. Fixed costs of fishing

Theodore Panayotou *et al.* (1985) defined fixed costs are those costs that do not depend on the level of operation, but on the value of fishing assets. For the present study, depreciation on fishing crafts, gears and engines, interest on fixed capital, money spent on repairs and maintenance were considered as the components of fixed costs of fishing. The economic life of boats, engines and nets

was considered as seven years and three years, respectively. In the present study, the interest on fixed capital includes the interest for the money borrowed from commercial banks and other sources at the rate of 13 % per annum.

2.1.8. Variable cost of fishing

Variable cost of fishing consists of payments made to hired labour, fuel charges, opportunity cost of family labour and other miscellaneous item of expenditure like cost of ice, fees and maintenance (Theodore Panayotou *et al.*1985). Senthilkumar (2001) in his study included crewshare, cost of fuel oil and marketing expenses as variable costs of fishing. The same definition was used in the present study.

2.1.9. Gross Income

Prabhakaran (1978) defined gross income as the sum of income received from fishing activities, crop enterprises, livestock enterprises, wages and salaries received for services and miscellaneous income like interest, dividends, rent and also receipts in kind. Daniel Viswasam Samuel (1986) defined gross income as the revenue realised from fish catch and also the imputed value of fish catch given in kind as wages to the labourers. In the present study, gross income is defined as the revenue realised from the sale of fish catch, fishery related activities and other sources of income earned by family members.

2.1.10. Net income

Prabhakaran (1978) obtained net income by deducting the expenditure on fuel and contingencies, crewshare, depreciation on vessel and gear, insurance premium payment annual interest on cost of boat and nets and expenses on maintenance of boat and nets, from gross income from fishing. For the present study, net income from fishing is the difference between gross income from fishing and production expenses. The production expenses are cost of fuel oil, crewshare, and marketing expenses.

2.1.11. Consumption Expenditure

Friedmen (1970) defined consumption expenditure, functionally as the actual expenditure on goods and services, directly used for satisfaction of wants and it would exclude expenses on consumer durables. Senthilathiban (1985) included expenditure on food, clothing housing, education, health, fuel and lighting, transport, social and religious ceremonies and recreation and consumer durables under consumption expenditure. In the present study also consumption expenditure includes expenditure on food, clothing, household durables, education, health, transport, social and religious ceremonies, recreation and miscellaneous items.

2.1.12. Standard of Living / Levels of Living

Puhazhendhi (1980) considered income per household and income percapita are the measures of standard of living of labour households. Rajakumar (1990) in his study reported that the levels of living are reflected by disposable income and consumption expenditure and the pattern of the latter. In the present study, the levels of living is defined as income received from fishing and other sources, consumption expenditure and nutritional uptake put together.

2.1.13. Community Study

Community study means an empirical (usually ethnographic) study of the social relations, social structure within clearly defined locality (Sharma, 1992). In the present study, the term fisherman community is used to mean fishing groups and the social and cultural life within.

2.1.14. Livelihood

Livelihood comprises the capabilities, assets, (including both material and social resources) and activities required for a means of living (Ronald A Maine and Richard Coutts, 2000). In the present study, fishermen's livelihood was used to mean the capabilities, assets (including materials like craft and gear, fish

landing and berthing facilities and social resources like houses, school, drinking water, electricity, etc.) and fishing activities for a means of living.

2.1.15. Livelihood Analysis

Livelihood analysis may include the variables like household, livestock and land ownership, proportion of income by source, expenditure, seasonality, relative income and credit and debt. (Ray, 1999). In the present study, fishermen's livelihood analysis includes the variables like household size and composition, number of catamaran owners, livestock, craft and gear ownership, proportion of income by source, expenditure, seasonality and method of fishing, relative income, credit and debt.

2.1.16. Marine Capture Fisheries

In the present study, the term marine capture fisheries means capturing of marine fishery resources by using catamarans and gill nets.

2.1.17. Fish Landings

In the present study, the term fish landings referred to the quantity of fish catch in terms of kilogram, landed in the Kuttapuly fish landing centre.

2.1.18. Fish Sale

In the present study, the term sale is defined as the transfer of title to fish catch from the fishermen to the next middlemen in the marketing channel.

2.1.19. Auctioning

The term auctioning is used in the present study as bidding of fish by different marketing middlemen and the highest bidder taking the fish catch after paying the money.

2.1.20. Fishing Group

The term fishing group in the present study refers to a group of fishermen involved in fishing.

2.1.21. Cohesiveness

Cohesiveness literally means sticking together. Cohesiveness is the strength of the forces that keep the group together (Kuppuswamy,1973). The Encyclopedic Dictionary of Sociology defines group cohesion as a quality characterising the strength, unity and stability of personal interactions and relations in a group (Sharma, 1992). In the present study, Kuppuswamy's definition was followed.

2.1.22. Group Size

In the present study, the size of group is defined as the number of persons engaged in fishing in one catamaran.

2.1.23. Group Dynamics

Group dynamics is a field of inquiry with the aim of advancing knowledge about the nature of groups, the laws of their development and their interrelations with individuals and other groups. The aim of group dynamics is to study the physiological and social forces associated with groups. (Kuppuswamy, 1973) In the present study, group dynamics is defined as the study of the nature of fishing groups and their development and their interrelations with individuals and other groups.

2.1.24. Coastal Fishing Village

The term coastal fishing village, as used in the present study, is a village located near the coastal area and the primary occupation of the people residing in the village is fishing.

2.1.25. Fish Landing Centre

A landing centre is defined as the landing site in the seashore with some shore facilities such as guiding lights, workshops, fuel station, ice plant, and a boat jetty (Kalavathy, 1984). The same definition was considered for the present study.

2.1.26. Social Control

It refers to all the social efforts to discourage deviant behavior and to the mechanism designed to ensure conformity to norms, rules and laws. (Erich Goode, 1988). Social control is the pattern of influence the society exerts on individuals and the group to maintain order and establish rules in the society (Ray , 1991). In the present study, Ray's definition was followed.

2.1.27. Self-Regulation

The term self-regulation as used in the present study means each individual formulating rules and regulations and following them.

2.1.28. Group Action

In the present study, group action is defined, when a group of people join together and do some work with a common goal and successfully complete that work.

2.1.29. Socio-Economic Status

Sathidhas and Panikkar (1988) in their study used the term socio-economic parameters of fishermen to include family size, age structure, customs ,beliefs and habits ,employment potentials, education and living standards of fishermen, their response to new technology and their participation in development schemes . The same definition was used in this present study.

2.1.30. Awareness

The individuals come to know about an innovation without knowing the details of it (Adivi Reddy,1971) .This refers to the extent to which, the respondents are aware of the improved fishing technologies (Sujath Kumar, 1988 . In the present study, the term awareness means that extent to which the respondents are aware of the improved fishing technologies, fishery regulations and guidelines for fishery resource management.

2.1.31. Adoption

In the present study, it represents a decision to continue the fishing practices by fitting with outboard engines in catamarans and to follow the improved fishing methods.

2.1.32. Participation

Guruswamy (1987) defined participation as the involvement of an individual , who has a common identity, atleast some feeling of unity and certain goals and shared norms in a small face to face group. In the present study, social participation of fishermen was defined in terms of their role in fishermen associations like fishermen co-operatives and other organisations.

2.1.33. Leadership

In the present study, the term leadership is defined as the capability to mobilise fishermen to initiate action.

2.1.34. Co-operation

In the Encyclopedic Dictionary of Sociology, Sharma (1992) defined co-operation as working together towards mutually acknowledged and agreed goals. The term co-operation is used as the term of interaction in which persons or groups combine ends of objectives or goals, in the present study.

2.1.35. Conflict

In the present study, conflict between fishermen is defined as disagreements and problems and competition between the members of fishing groups or among the households or in the village. In the present study, conflict is categorised as inter-group conflict and intra-group conflict.

2.1.36. Inter-Group Conflict

Inter-group conflict refers to disagreements, hostile emotion and problems exist among the fishermen groups. In this study, inter- group conflict was noticed as catamarans with sail vs. catamaran with outboard engine and as catamaran with OBE vs mechanised boats.

2.1.37. Intra-Group Conflict

Intra -group conflict refers to the disagreements and problems that exist among members within the same group and conflict arise between the fishermen owning catamarans with outboard engine, as in the present study.

2.2. Review of Earlier Studies

Prabhakaran (1978) studied the economics of fishing and the living conditions of marine fishermen of the erstwhile Tirunelveli district. He analysed the production pattern under different methods of fishing, distribution pattern of income and also the standard of living of the fishermen families.

Blase (1982) carried out a coastal village development study in four fishing communities at Adirampattinam, Tamil Nadu, India. The study concentrated on responding to the stated needs of the fisherfolk like credit supply, provision of potable water and improving health conditions.

Mammo (1987) studied ownership, income, indebtedness and saving patterns in two fishing villages namely Udayapur and Gopalpur in Orissa coast.

The study assessed costing, spending, borrowing and saving patterns among fisher folk and also analysed the method and the purpose of savings. The study revealed that fisherfolk do want to save for short-term needs and group savings are more appropriate and helpful for lower income groups. Credit facilities and new income generating activities boost incomes and motivate higher savings.

Senthilathiban *et al.* (1987) carried out a study on the socio-economic conditions of fishing households along the coastal belt of Tirunelveli district with the objective of examining the levels and pattern of employment, income and consumption and suggested strategies like regulated fishing implementation of family planning programmes, non-formal education, employment generation during off season and improvement in the efficiency of traditional crafts, credit facility and organised marketing facilities and also the starting of fisheries development banks which are needed for improving the levels of living of marine fisherfolk.

Sathiadhas and Panikkar (1988) conducted a study on the socio-economic aspects of small- scale fishermen with emphasis on cost and earnings of traditional units along Thiruvananthapuram coast, Kerala. They analysed the socio-economic conditions of fishermen in relation to new technology and participation in development schemes. The catamarans with hooks and lines were found to be suitable for small investors.

Sathiadhas and Panikkar (1989) analysed the income distribution and expenditure pattern of fishermen-households representing catamaran owners and crew members, in two fishing villages along Chennai coast and found that diversified activities and better infrastructural facilities were necessary for better income of the fishermen -households. Suggestions for the overall development of the traditional fishermen were also presented.

Senthilathiban and Selvaraj (1989) estimated the cost of production and net income of the fishing households in the selected fishing villages of Tirunelveli district. The income from fishing was found to be highly variable, while fish catch was almost static due to traditional fishing methods. Rapid motorisation, and adequate credit and marketing facilities were suggested for improving the socio – economic status of fisherfolk.

Annamalai and Kandoran (1990) estimated the economics of motorised traditional crafts along Kerala coast. The cost and returns data for the motorised traditional crafts were analysed and more than half of the fishing trips were reported to yield gross returns inadequate even to meet the fuel cost. Introduction of engine has brought in the cash requirement for fuel for every trip and the survival of fishing units was found to depend on the financial strength of fishermen.

Senthilathiban and Selvaraj (1990) conducted a study on consumption expenditure of fishing households in the selected coastal villages of the undivided Tirunelveli district of Tamil Nadu. The household consumption expenditure per annum increased with the type of craft .The percentage of annual consumption expenditure spent on food was higher for traditional craft operators than for the vallams and mechanised boat categories.

Sathiadhas and Panikkar (1991) reported on the socio-economic conditions of traditional fishermen in Alanthalai fishing village of Thoothukudi district. The pattern of housing, status of employment, occupation, income, indebtedness and marketing problems were analysed by them and some of their suggestions included supplementary occupation, making use of available institutional credit and better infrastructural facilities to improve the economic status of traditional fishermen.

Ahilan and Selvaraj (1992) studied the levels and pattern of earnings of fisherwomen in the selected fishing villages of Chidambarnar district of Tamil Nadu. They suggested training programmes for further development of the skills of fisherwomen in non-fishing occupations.

Bailey (1994) in his study on the employment, labour productivity and income in the small-scale fisheries of South and South East Asia found that while fishing families are often considered to be among the poorest of poor, the occupational diversity possible in the tropical coastal zone provides a very flexible range of economic opportunities to help fishing families to respond well to changing circumstances.

Manohar Doss *et al. (*1997) assessed the returns from motorised traditional craft in Veraval coast, Gujarat. The study focuses on the economic performance of craft of size 12 meters or less, fitted with eight hp out-board motors. The indices of both annual rate of return on investment and internal rate of return showed that the motorised traditional fishing units off Veraval coast are economically viable.

Balasubramaniyan (1998) analysed the socio-economic aspects of fishermen households in Nagapattinam district of Tamil Nadu. He estimated the costs and returns per fishing trip, identified the socio-economic characteristics and indicated the strategies for fisheries development.

Verdujin (2000) carried out a survey to identify the basic needs of 39 coastal fishing communities of Kanyakumari district, Tamil Nadu. The survey helped in prioritizing the needs of fisherfolk communities with particular reference to basic services such as drinking water, education and health care.

Bierhuizen (2000) carried out a study on the fishing behaviour or fishing patterns of three groups of Kanyakumari fishermen viz., those who operate catamarans, vallams and mechanised boats. Many conflicts often result from an

overlapping in the fishing areas of different groups of fishermen. One group does not want another group to fish in a particular area, or boats of one group tear up nets belonging to the other group. This study unravels the nature and characteristics of resource conflicts.

Balasubramaniyan *et al.* (2001) studied the socio-economic status of fishermen in two marine fishing villages of Orissa viz., Pentakota and Belinoliasah. They measured Socio-Economic Status Index (SESI) and the mean scores of respondents in the two villages differed significantly at 1 % level. The results also revealed that the fishermen had favourable attitude towards the motorisation of fishing crafts in both the villages.

Velayudhan (2001) studied the present status of social infrastructure facilities in the coastal fishing villages of Kerala. The author opined that the lack of basic social infrastructure facilities coupled with poverty and economic exploitation have been instrumental for the general backwardness of the fisher folk community.

3. DESIGN OF THE STUDY

Designing a suitable methodology is very important for meaningful analysis of any economic problem. In this chapter, the methods adopted in the selection of the respondents, collection of data and the tools of analysis are presented.

3.1.Choice of the study area

Tirunelveli district was purposively selected for the graduate research. The entire 50 km coastal area of the district in the Gulf of Mannar contributes to 5% of the total coastal length of Tamil Nadu. This district has seven fishing villages having 2.44 % of the total fisherfolk population of the state. The major type of fishing craft found in the district is traditional catamaran fitted with outboard engine (OBE). Out of seven fishing villages in the district, Kuttapuly fishing village was purposively selected for the study. As literacy is an important criteria for livelihood studies, this fishing village was selected. It has the highest percentage of higher level literates i.e., percentage of population

with literacy levels of higher secondary, collegiate and technical education among the seven fishing villages in Tirunelveli district. The other reason for selecting this coastal village is its compactness with consequent pointedness of data sets rendering meaningful generalisations in such a single community study.

3.2. Sampling procedure

The study was restricted to owner cum operator of catamarans fitted with outboard engine in the selected fishing village. The number of fisherman-households representing the catamaran with OBE category came to 75. Hence, all the above 75 fishermen were considered as sample size of the proposed study to conduct a census survey. The fisherman households, who operate traditional catamarans (without OBE) and the crew members were excluded for the study. The survey schedule was prepared based on the objectives of the study. A separate survey schedule was used for the collection of village level data from the village panchayat. The survey schedule for household level data collection was pre-tested among the households in the village .The respondents were contacted individually and the objectives of the study were explained to them before commencing data collection to ensure their co-operation .The collected data were tabulated and analysed. The investigation was undertaken during June to July 2003.

3.3.Tools of analysis

The tools employed to analyse the data were as follows:

3.3.1.Tabular analyses

Tabular analysis was followed to analyse the general characteristics of the respondent-households, the pattern of fish landings, month-wise number of fishing trips, occupational status of fisherfolk, details of capital investment, levels and pattern of employment, estimation of fish catch, levels of gross income from fishing, levels and pattern of income per fisherwoman, levels and pattern of gross income and net income per household and per fishing trip, consumption expenditure, levels of cohesiveness in fishing occupation , awareness about resource management and opinion on occupational shift .For each parameter

statistical measures such as mean, standard deviation, range, co-efficient of variation and percentages were worked out , wherever necessary.

Chi-square test was applied to test the opinion of the selected fisherman-respondents towards the measures for the management of fisheries resources. The fisheries management measures include implementation of closed seasons, control of fishing effort and the regulation of mesh sizes. Three types of responses viz., in favour of, in different to and opposed to were received and tested. The fisheries development measures include avoidance of capture of broodstock and under sized fishes, providing artificial habitats like Fish Aggregating Devices (FADs) and protecting coral reef resources and mangroves. Two types of responses viz., agreeand disagree were obtained from the fisherman-respondents. Both the measures were tested for null hypothesis using Chi-square test. The formula used was $\chi^2 = \sum \frac{(O-E)^{2.}}{E}$

First, the observed and expected frequencies were calculated and then the Chi-square value was estimated which was finally tested for its significance.

Kendall coefficient of concordance (W) was calculated to interjudge the reliability and the association among the eight sets of ranked variables relating to constraints to fishing occupation. The eight constraints considered were:

1. Presence of rocks in the near shore area.
2. Inter group conflict between catamarans and mechanised boats.
3. Absence of cold storage facilities in the fish landing center.
4. Absence of kerosene bunk run by the Fisheries Department / State Government.
5. Sea erosion problem during rainy season.
6. Absence of concrete auction hall.
7. Absence of spare parts / service facility for OBE.
8. Non-availability of loans with subsidy facility to purchase OBE.

To compute W, the following formula was used.

$$W = \frac{\sum_{i=1}^{N} (R_i - \bar{R})^2}{N(N^2-1)/12}$$

Where,

N – number of variables being ranked
R_i – average of the ranks of assigned to the i^{th} object
$\bar{R}$ – average of the ranks assigned across all objects.

The significance of the concordance can be tested using the formula $\chi^2 = K(N-1)W$. It is hypothesised that the respondents are homogenous with regard to the variables considered.

4. DESCRIPTION OF THE STUDY AREA

In this chapter, a brief discussion on the marine fishing scenario and the socio-economic aspects of fisherfolk population in Kuttapuly fishing village of Tirunelveli district, Tamil Nadu state is presented.

Tirunelveli district is one of the 13 maritime districts of Tamil Nadu and is bounded by Virudhunagar district in the north, Thoothukkudi district in the east, Kerala state in the west, Kanyakumari district in the south. There is one major fish landing centre and seven minor fish landing centres in the district. It has seven fishing villages along the coast, of which, Kuttapuly fishing village was selected for the present study. The location of the study village is given in figure 1.

4.1. General characteristics

The demographic features of the district and the selected fishing village of Kuttapuly are presented in Table 1.

Table 1. Demographic features of the study area

Fishing village/ District	**No. of households**	**Population**		**Total**
		Male	**Female**	
Kuttapuly	867	1,845 (49.54)	1,879 (50.46)	3,724(100.00)
Tirunelveli district	4,406	10,481(50.80)	10,152 (49.20)	20,633(100.00)

(Figures in parentheses indicate percentages)

source: Marine Fisherfolk Census 2000,Tamil Nadu Fisheries Department, Chennai.

The fisherfolk population in the district as reported in the year 2000 was 20,633, with 10,481 fishermen and 10,152 fisherwomen. The total number of fishermen households in the district was 4,406 with the total number of fishing households of 867 in Kuttapuly. The total population in the selected fishing village of Kuttapuly was 3,724 with 49.54% male and 50.46% and female population.

The details of the labour force in the study area according to the age composition of population are presented in Table 2.

Table 2. Details of labour force in the selected fishing village

(in numbers)

Fishing village/ District	**Age groups (in years)**					**Total**
	Below 5	**6 – 17**	**18 – 40**	**41 – 65**	**above 65**	

Kuttapuly	316 (8.49)	955 (25.64)	1,659 (44.55)	689 (18.50)	105 (2.82)	3,724 (100.00
Tirunelveli district	2,191 (10.84)	5,051 (24.99)	8,862 (43.85)	3,569 (17.66)	537 (2.66)	20,210 (100.00)

(Figures in parentheses indicate percentages)

source: Marine Fisherfolk Census 2000,Tamil Nadu Fisheries Department, Chennai.

It could be seen from the table that the number of persons in the age group of 18-40, 41-65 and above 65 are 1,659, 689 and 105, respectively. The people in the age group of 18 to 65, who are accounting for 63.05%, form the labour force of the fishing village. But in Tirunelveli district, the people in the age group of 18 to 65,who are representing 61.51%, form the labour force.

4.2.Fishing seasons

The prevailing fishing seasons and the corresponding fish landings in the study area are furnished in Table 3.

Table 3.Seasonality of fish landings in the study area

Period(s)	**Season**	**Intensity of fish landings**	*Fish species group(s)*
June – August	Moderate	Medium	Shrimps and Lobsters
September – March	Peak	High	*Clupeids,Sciaenids,Engraulids, Scombrids,Lethrinids, Chirocentrids,Strombids, Lactariids, Nemipterids,Carangids, Leoganthids*
April-May	Lean	Very low	Scombrids, Carangids, Clupeids

4.3. Fish production

The craft-wise fish production for the year 1999-2000 in the district is furnished in Table 4.

Table 4.Craft-wise marine fish production in Tirunelveli District

(Qty. in tonnes)

Craft Category	**Tirunelveli district**	**Tamil Nadu**
Mechanised	-	1,99,567 (53.37)
Non-mechanised	305 (5.00)	1,12,055 (29.97)
Motorised	6,231(95.00)	60,063 (16.06)
Others	-	2,241 (0.60)
Total	6,536 (100.00)	3,73,926 (100.00)

(Figures in parentheses indicate percentages)

source: Endeavours and Achievements, 2000 -2001,State Fisheries Department,Chennai.

The percentage contribution of fish landings from motorised crafts in Tamil Nadu is 16.06, while it accounts for 95% in Tirunelveli district. This showed the predominant presence of motorised catamarans fitted with outboard engine in the district.

The traditional fishing craft "catamaran" is predominantly used in the district. A catamaran is a keel less craft made by lashing three or five lightweight logs together, which are square at one end and curved into a rough cone at the other. The conical end rises slightly above the level of the craft and forms the stern of the catamaran (Thirumiliu, *et al.* 1995). The preferred type of wood used for catamaran is from the tree *Melia dubia*. Other species of wood commonly used are *Albizzia stipulate, Bombax insigne* and *Canarium euphyllum*. The catamarans are also fitted with outboard engines. According to Marine Fisheries Population Census Statistics (2000), Tirunelveli district has a total of

1,414 fishing crafts, of which are 1,358 catamarans, 19 are FRP boats and 37 *vallams* (plank-built).

The types of fishing gears used in the district are gill nets, shore seines and long lines. Gill nets are net walls kept more or less vertical by floats on the head rope and mostly by weights on the foot rope to catch pelagic as well as mid-water fishes (Andres Von Brandt, 1984). The gill nets vary in length and mesh size and are locally called as *Ayala Valai, Chala Valai,Vaval Valai,Thirrukkai Valai* and *Paru Valai* , which are commonly used by artisanal fishermen.

Shore seines are surrounding nets in which, one of the net is shot from a fixed point, a certain area is surrounded and the other end of gear is returned to the starting point, after which, the gear is thus hauled .The nets form pocket or bag in the middle to collect the fish. Long line is a gear, in which , a long line (main line) to which shorter (branch lines) lines with baited hooks are attached (Asmund and Svein, 1996). In the study area, mostly catamarans made up of *Albizzia stipulate* are used and among the various fishing gears, gill nets are widely used.

4.4. Employment Pattern

The employment pattern of fisherfolk in the study area is given in Table 5. The table 5 shows that in Kuttapuly fishing village, 818 fishermen have fishing as primary occupation and 21 fishermen and 104 fisherwomen are engaged in fresh fish trade. In the study area, the percentage of employed males in fishing is 77.76 and in fresh fish trade is 2.00 and the percentage of employed females in fresh fish trade is 49.06 .In Tirunelveli district, the percentage of male persons involved in fishing is 85.95 and in fresh fish trade representing 1.03 and the percentage of employed females in fresh fish trade is 19.70.

Table 5. Employment pattern of fisherfolk in the selected fishing village

(in numbers)

Fishing village	Fishing		Fresh fish trade		Dry fish trade		Employed in Govt.		Private sector		others		Total	
	FM	FW	FM	FW	FM	FW	FM	FW	FM	FW	FM	FW	FM	FW
Kuttapuly	818 (77.76)	-	21 (2.00)	104 (49.06)	- -	- -	30 (2.85)	25 (11.79)	72 (6.84)	21 (9.90)	111 (10.55)	62 (29.25)	1,052 100.00	212 100.00
Tirunelveli district	4,587 (85.95)	--	55 (1.03)	156 (19.70)	3 (0.06)	27 (3.41)	61 (1.14)	70 (8.84)	237 (4.44)	100 (12.62)	394 (7.38)	439 (55.43)	5,337 (100)	792 (100)

FM : Fishermen

FW : Fisherwomen

(Figures in parentheses indicate percentages)

source: Marine Fisherfolk Census 2000,Tamil Nadu Fisheries Department, Chennai

The various types of fishing gears operated in the district are furnished in Table.6

Table 6. Types of fishing gears in the selected fishing village

(in numbers)

Types of gears	*Kuttapuly*	**Tirunelveli District**
Gill net	1,928 (100.00)	21,062(73.55)
Boat seine	-	276 (0.96)
Long lines	-	5,910 (20.64)
Others	-	1,388 (4.85)
Total	**1,928 (100.00)**	**28636 (100.00)**

(Figures in parentheses indicate percentages)

source: Endeavours and Achievements, State Fisheries Department, 2000-2001

In Tirunelveli district, the percentage of gill nets and long lines accounted for 94.19% whereas, in the selected fishing village, the percentage of operation of gill nets alone was 100%.

4.5. Educational status

The educational status of fisherfolk in the study area is presented in Table 7.

Table 7. Educational status of fisherfolk in the selected fishing village

(in numbers)

Fishing village	No. of literates						No. of illiterates	Grand Total
	Primary	**High school**	**H.Sc.**	Technical	College	Total **literates**		
Kuttapuly	1,106 (29.70)	1,310 (35.18)	250 (6.71)	195 (5.24)	116 (3.11)	2,977 (79.94)	747 (20.06)	3,724 (100.00)
Tirunelveli District	10,225 (56.75)	3,416 (18.96)	1,144 (6.35)	573 (3.18)	689 (3.82)	16,047 (89.06)	1,972 (10.94)	18,019 (100.00)

(Figures in parentheses indicate percentages)

source : Marine Fisherfolk Census 2000,Tamil Nadu Fisheries Department, Chennai.

It could be seen from the above table that the percentages of literates and illiterates in the study area are 79.94 and 20.06, respectively. The percentage of population with the level of schooling upto 10th standard is high (35.18%) followed by schooling upto 5th standard (29.10%). The percentage of population with the level of schooling of upto 12th standard is 6.71 and the college level and technical literacy is below 10 percent. But in Tirunelveli district, the percentages of literates and illiterates are 89.06 and 10.94, respectively.

The various types of houses located in the fishing village are presented in Table 8.

Table 8. Nature of housing facilities in the selected fishing village

Fishing **village**	**Pattern of houses**				**Total**
	Terraced	**Tiled**	**Thatched**	**Free housing scheme of the Government**	
Kuttapuly	401 (46.25)	245 (28.26)	114 (13.15)	107 (12.34)	867 (100.00)
Tirunelveli district	1,628(37.76)	741 (17.18)	978 (22.68)	965 (22.38)	4,312(100.00)

(Figures in parentheses indicate percentages)

source: Marine Fisherfolk Census 2000,Tamil Nadu Fisheries Department, Chennai

The development of any area basically depends on the availability of good infrastructure facilities. The fishermen live in four types of houses in the fishing village. Out of total houses present in Kuttapuly, the percentage of terraced houses is high (46.25 %), followed by tiled (28.26%) and thatched (13.15%) houses. The houses constructed and given to fishermen by State Government through free housing scheme constitute 12.34%.

4.6.Fishing Infrastructure

Two net mending halls are available in the fishing village. The catamarans are kept on open beaches and there is no berthing facility. The fish catch is auctioned on the sandy beaches due to the absence of an auction hall. The village has a private Fibre glass Reinforced Plastic (FRP) boat building and repair yard. But service facilities and spare parts shop for catamarans and engines are absent. Kerosene bunks are not there; but private people sell kerosene at a high price. Cold storage facilities and cyclone shelters are not available.

4.7.General Infrastructure

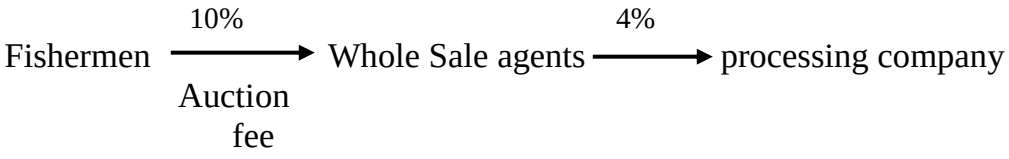
The village has two kindergarten and two primary schools and a higher secondary school with hostel facilities for boys and girls. Drinking water facilities are available through public taps, but water scarcity in summer is a big problem. The village has one Primary Health Centre (PHC) and a small private hospital. The fishing village has communication facilities like post office, public telephone and public television. But there is no public radio facility. It has two public libraries. One community hall is present in this village. The village has transport facilities to nearby towns at regular intervals of bus services. Electricity is made available. Very few do not access to electricity connection due to poverty. There are no public convenience facilities. There is neither recreation facility nor a cinema theatre in the near vicinity.

There are many petty shops in the village and the big shops are located in nearby towns. The nearest grocery shops are located at a distance of 3-4 km. There is no facility for Internet Café and the nearest center is at Nagercoil. Fishermen co-operative society and Non-Governmental Organisations (NGOs) like Tuticorin Multipurpose Social Service Society (TMSSS) and Shelf Help Groups (SHGs) are present in this village. A fisherwoman co-operative society is absent. It has a strong village panchayat. It looks after the village activities and settles the disputes and conflicts among different groups. The conflicts between the two village fishermen are solved in the presence of a committee

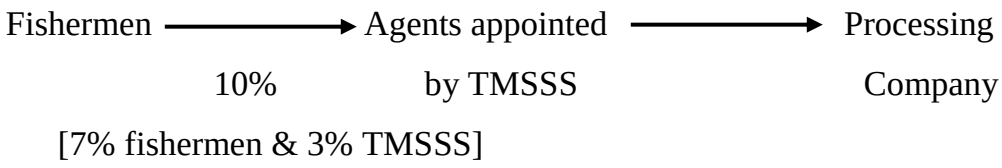
consisting of police personnel and officials from revenue department and representatives from the village panchayat. The Parish Priest is the head of this committee.

4.8.Method of fish sale in fish landing centre

In this village, fishing is done in a single fishing trip. The auctioning of fish catch is completed before 10 a.m. every day. There is no storage facility for unsold fish. The catch is auctioned on the sandy beaches. The auctioning is done by two ways i.e. one is by wholesale agents and other is by the agents appointed by TMSSS.



If the auctioning is done by wholesale agents means, the fishermen get the sale amount minus auction fee at the rate of 10% of the total value of the fish catch. In turn, the wholesale agents get 4% commission from the processing company.



In the second way, the auction fee of 10% is charged and the remaining money is given to fishermen. From the auction fee, 7% is added to fishermen savings and 1.5% is used for TMSSS management activities and remaining 1.5% is used for staff salary.

The fishing village has panchayat welfare schemes for house pipeline, street light and rural library. The government welfare schemes like ‘Ballwadi’ for school children, childcare schemes and free housing schemes are also in operation in this village. The department of fisheries operates the Saving cum relief fund scheme to fisherfolk.

Sea erosion is a serious problem in this village. It is thought to be due to the sand digging operations in the area .No coral reef destruction is reported in this village. Similarly, there is turtle fishing . There is no problem of bar mouth closure; but the entry of fishing crafts experience difficulties due to the presence of rocks in the inshore area. Beach sanitation is said to be satisfactory.

The felt-needs of the fisherfolk in the selected fishing village include the provision of institutional credit for fishing and construction of, auction hall, ice plant, cold storage, cyclone shelters and clearance of rocks in the inshore waters, (which affect the free entry of fishing crafts into sea) starting of kerosene bunks and creation of pastime facilities in the fishing village.

Most of the fishermen in the village belong to the religion Christian and fall under the Most Backward Community. They are very religious and have a church, which is situated at the center of the village .The toll fee is collected in the village at the rate of Rs.20/-, Rs.5/- and Rs.1/- respectively for a mini van, bicycle with one box and women retailers. If catamarans from other villages come and sell their fish catch in this village, an amount of 10% of the auction value is to be given to church as fee. This fee is locally called “Kovil Mahamai”. A special fee of Rs.100/- per family is collected for church festivals. The church festival is celebrated for a period of ten days during February every year.If fishermen from another village are stranded at Kuttapuly due to adverse weather or engine failure, the local fisherfolk receive and help them. If they want to fish from Kuttapuly on a regular basis, they can do so after getting consent from the village committee.Fisherwomen SHG’s are

gaining importance in the context of community development. At present, SHG's avail micro finance from banks and fulfill their household needs. There is vast scope for increasing household income if their effort is diversified in income generating activities in fishery related and non-fishing activities.

5. RESULTS AND DISCUSSION

In this Chapter, the results of the study carried out with a sample of 75 fisherman-respondents owning catamarans with outboard engine from the selected fishing village of Kuttapuly in Tirunelveli district are presented. The calculated values in this chapter were rounded off to the nearest rupee.

5.1.Demographic features

The general characteristics of the respondent-households belonging to the Kuttapuly fishing village of Tirunelveli district are presented in Table 9. The overall mean size of household in absolute units was 5.60.

Table 9. General characteristics of respondent-households in Kuttapuly fishing village

Sl.No.	*General Characteristics*	Units
1	Average size of household in absolute units	5.60
2	Average number of persons in a household i) Male ii) Female	 2.92 2.68
3	Total number of persons i) Male ii) Female	420 219 (52.14%) 201 (47.86%)
4	Number of earners	124
5	Number of dependents	296
6	Earner-Dependent ratio	1:2.38
7	Size of labour force	304
8	Number of children	102
9	Number of persons who could not do any work	14

The average number of male persons in a household was 2.92 and in the case of female members, it was 2.68. The total number of individuals in the selected households was 420. The total number of males in the respondent-households was 219 (52.14%). The total number of females in the respondent-households was 201 accounting for 47.86%. The number of earners was 124 and the number of dependents was 296. The earner-dependent ratio was estimated as 1:2.38. The size of labour force in the respondent-households was 304 members and the number of children in the respondent-households was 102. The number of persons, who could not do any work was estimated as 14.

5.2. Pattern of fish landings

The pattern of fish landings during different fishing seasons in the study area is given in Table 10. The fishing in the study area was categorised into three seasons based on fish groups and quantity of landings. During the periods of June to August, the fishing season was considered as moderate and the major fish groups landed in this period were shrimps and lobsters. During the periods of September to March, the season was considered as peak and the major fish groups landed were *Clupeids, Lethrinids, Sciaenids, Chirocentrids, Scombrids, Engraulids Strombids and Lactariids, Nemipterids, Carangids,* and *Leognathids*. During the months of April and May, *Scombrids*, *Carangids* and *Clupeids* were captured in small quantities. The fishing season was considered as lean because of low fish landings.

Table 10. Pattern of fish landings in three fishing seasons

Season	**Major fish groups landed**
Moderate (June – August)	Shrimps and Lobsters
Peak (September – March)	*Engraulids, Clupeids, Scombrids, Lethrinids, Sciaenids , Chirocentrids, Strombids, Nemipterids, Carangids, Leognathids*
Lean (April – May)	*Scombrids, Carangids, Clupeids*

The month-wise number of fishing trips performed by the fisherman per annum is furnished in Table 11. It could be seen from the table that the length of the moderate season lasted for 3 months (June-August) and the total number of fishing trips performed during the season was 60. The peak fishing season in the study area lasted for 7 months (September-March) and the total number of fishing trips covered under peak season was 154. The length period of lean season was 2 months (April-May) and the total number of fishing trips during lean season was 30. Therefore, the mean total number of fishing trips performed per fisherman-respondent per annum was 244. Senthil Kumar (2001) recorded 269 fishing trips per fisherman-respondent per annum in the fishing villages of Ovari and Idinthakarai in Tirunelveli district, whereas, in the present study it was worked out as 244 trips. The low levels of employment in fishing occupation in the study area might be influenced mainly by inclement weather including days of heavy downpour. The respondents generally do not venture into the sea due to bad weather, sickness, local festivals, craft and gear maintenance and on all Sundays in a year.

5.3. Occupational status

The occupational status of selected fisherman-respondent households is furnished in Table12. The fisherman-respondents in the selected fishing village had employment opportunities in fishing activities, fishery related activities and non-fishing activities. About 124 persons were totally involved in different occupations. The percentage of fishermen having fishing as primary occupation was about 90.32 and no fisherwomen were involved in fishing occupation. The participation of fisherman in fishery related and non-fishing activities was nil and alternatively, the fisherwomen took part in fishery related and non-fishing activities. The percentages of fisherwomen involved in fishery related and non-fishing activities were calculated as 4.03 and 5.65, respectively.

Table 11. Month-wise number of fishing trips performed by fisherman-respondents

Fishing Season	Month	Length of season in months	Number of fishing trips	Total number of fishing trips per season
Moderate	June 2002 July 2002 August 2002	3	18 20 22	60
Peak	September 2002 October 2002 November 2002 December 2002 January 2003 February 2003 March 2003	7	23 25 23 22 24 21 17	154
Lean	April 2003 May 2003	2	16 14	30
Total		**12**	**244**	**244**

Table 12. Occupational status of fisherman -respondent households

Type of employment	*Fishermen*	Fisherwomen	Total
Fishing activities	112	--	112 (90.32)
Fishery-related activities	--	5	5 (4.03)
Non-fishing activities	--	7	7 (5.65)
Total	**112 (90.32)**	**12 (9.68)**	**124 (100.00)**

(Figures in parentheses indicate percentages)

5.4. Capital investment

The Table 13 represents the details of capital investment of respondent-households. The mean capital investment per respondent on catamaran was Rs.16,180 with the co-efficient of variation (C.V) of 25.84%. The values ranged between Rs.17,000 and Rs.25,000 per fisherman-respondent. The present value of catamaran was about Rs.10,000 with a C.V of 40.37%. All the fisherman- respondents possess pre-owned catamarans in the study area and the mean economic life of catamarans was estimated as seven years.

Table 13. Details of capital investment per fisherman- respondent

Items of capital	Number of the item	*Original Cost(Rs.)*	Present Value(Rs.)	Economic Life in Years
Catamaran	1	16180 ± 4181 17,000 – 25,000 25.84	9999.21 ± 4037.41 5000 –15,000 40.37	7
Outboard engine	1	21473.30 ± 7046.9 15,000 – 28,000 32.81	14053.25 ± 4653.06 8000 – 23,000 33.11	7
Fishing gears	4	30906.66 ± 8698 25,000 –55,000 28.14	13761 ± 4637.8 6000 – 24,000 33.70	3

(The values in first, second and third rows indicate mean and S.D, range and C.V, respectively)

Like that of fishing crafts, all the fishermen possessed pre-owned outboard engines. The mean value of outboard engine was calculated as Rs.21,473 with a C.V of 32.81%. The values ranged from Rs.15,000 to Rs.28,000 per respondent-household. The present value of outboard engine was estimated as Rs.14,053 with the co-efficient of variation of 33.11%. The mean economic life of outboard engine was estimated as seven years.

All the fisherman-respondents possessed an average of four gill nets. The mean value of gears was estimated as Rs. 30,907 with the co-efficient of variation of 28.14%. The values of gill nets varied from Rs.25,000 to Rs.55,000. The present mean value of gill nets was estimated as Rs.13,761. The mean values of gears ranged from Rs.6,000 to 24,000, with the co-efficient of variation of 33.70%. The mean economic life of the fishing gears was 3 years.

5.5. Level and Pattern of Employment

The levels and pattern of employment of fisherman-respondents are given in Table 14. The overall mean days of employment in fishing per annum was estimated as 244 days with the co-efficient of variation of 19.47%. The mean level of employment varied for fishing from 208 days to 279 days per annum per respondent. The mean levels of employment in fishing during moderate, peak, and lean seasons were estimated as 60 days, 154 days and 30 days

respectively. The overall mean levels of employment in fishery related activities were estimated as 233 days with the C.V of 22.82%. The mean levels of employment ranged from 225 days to 240 days. The mean levels of employment for fishery related activities during moderate, peak, and lean seasons were estimated as 55, 151, 27 days. The fisherwomen were involved in fishery related activities like fresh fish and dry fish retail trade. The overall mean levels of employment for non-fishing activities were estimated as 307 days with the co-efficient of variation of 1.84%. The mean levels of employment for non-fishing activities per annum varied from 300 to 316 days per fisherwoman respondent. The fisherwomen involved in non-fishing activities like running a tiffin center, petty shop keeping and also working in ready made shops.

Table 14. Levels and pattern of employment of earners

(in days)

Season	**Fishermen**		**Fisherwomen**	
	Fishing activities	**Fishery related activities**	**Fishery related activities**	**Non – fishing Activities**
Moderate	60.14 ± 22.47 44 – 76 37.36	-	54.60 ± 3.07 50 – 58 5.60	306.50 ± 5.65 300 – 316 1.84
Peak	153.77 ± 11.39 140 – 167 7.40	-	150.80 ± 3.76 145 – 155 2.49	
Lean	30.00 ± 18.65 20 – 39 62.16	-	27.20 ±1.72 25 – 30 6.30	
Overall	243.91 ± 47.50 208 – 279 19.47	-	232.60 ± 53.08 225 – 240 22.82	306.50 ± 5.65 300 – 316 1.84

(The values in first, second and third rows indicate mean and S.D, range and C.V, respectively).

5.6.Estimation of Fish Catch

The quantity of fish catch landed during the different seasons in the selected fishing village is presented in Table 15. The overall total mean fish catch per annum per respondent was calculated as 3,945 kg with the co-efficient of variation of 17.92%. The mean total fish catch varied from 2,668 kg to 5,234 kg per annum. The overall mean total fish catch per fishing trip was estimated as 15

kg with the co-efficient of variation of 45.36%. The mean total fish catch per fishing trip was ranged from 3 to 30 kg per respondent. The mean total fish catch for the moderate, peak and lean seasons in the fishing village was found as 304 kg, 3,863 kg and 127 kg, respectively. The mean total fish catch per fishing trip during moderate, peak, lean seasons were found to be 5 kg, 18 kg and 4 kg, respectively. Sathiadhas and Panikkar (1991) worked out the annual mean fish catch was 4,999 kg and the average catch per fishing trip was 18 kg from the catamarans fitted with outboard engine along Madras coast. Senthilkumar (2001) worked out the mean overall fish catch per trip ranged from 11.48 to 37 kg with a mean fish catch of 22.98 kg. The low landings per fishing trip in the selected fishing village said to be due to the low standing stock in the coastal waters of the study area and might be also due to the fishing methods operated in the region.

Table 15. Estimation of fish catch for the three fishing seasons

(in Kg)

Fishing Season	Number of fishing trips in the season	Mean fish catch per fishing trip in kg	Total fish catch for the season
Moderate	60.14± 22.47 44 – 76 37.36	5.03 ± 1.21 3.50 – 8.00 24.19	303.96 ± 71.78 196 – 455.0 23.61
Peak	153.77 ± 11.39 140 –167 7.40	18.36 ± 5.03 15.00 – 26.43 19.85	3862.89 ± 743.07 2190 – 4800 19.24
Lean	30.00 ± 18.65 20 – 39 62.16	4.38±0.68 3.00- 5.50 15.58	127.06 ± 28.46 69 – 187 22.39
Overall	243.91 ± 47.50 208 – 279 19.47	14.74 ± 5.23 3.00 – 30.00 45.36	3945.38 ± 770.42 2668.50 – 5234.00 17.92

(The values in first, second and third rows indicate mean and S.D, range and C.V, respectively)

5.7. Estimation of Gross Income

The estimated level of gross income from fishing per respondent is presented in Table 16. For moderate, peak and lean seasons, the corresponding mean auction price per kg was Rs.180, Rs.24 and Rs.30, respectively. The high unit value realisation for the moderate season was mainly due to the shrimp and lobster catch. The computed gross income from fishing per trip for the moderate, peak and lean fishing seasons were Rs.905, Rs.441 and Rs.131,

respectively. Similarly, the gross income estimated from fishing for the moderate, peak and lean fishing seasons was Rs.54,324, Rs.67,859 and Rs.3,942, respectively (fig.2). The overall mean annual income from fishing per fisherman -respondent was estimated as Rs.1, 26,125. The income from fishing for the entire lean season was very low compared to the other fishing seasons. It could be inferred that the fisherman- respondents need to involve themselves in non-fishing subsidiary occupations to augment their income during lean fishing season.

Table 16. Estimation of levels of gross income from fishing

(Rs. per fisherman)

Fishing Season	Mean fish catch per fishing trip in kg	Mean auction price in Rs. per kg	Gross income per fishing trip in Rs.	Number of average fishing trips in the season	Gross income from fishing
Moderate	5.03	180	905.40	60	54,324 .00
Peak	18.36	24	440.64	154	67,858.56
Lean	4.38	30	131.40	30	3,942.00
Over all	14.74		516.90	244	1,26,124.56

The levels and pattern of income of fisherwoman in the selected respondent households from fishery related and non-fishing activities are given in Table 17. The mean annual income from fishery related activities per fisherwoman-respondent (mean values for 5 fisherwoman- respondents) was Rs.8,804, which was redistributed as Rs.1,620, Rs.6,644 and Rs.540 for moderate, peak and lean fishing seasons, respectively. The mean income for peak fishing season was comparatively high compared to other two fishing seasons. The mean annual income from non-fishing activities (mean values for 7 fisherwoman - respondents) worked out to Rs.9,180/-. These values were again computed for 75 selected fisherman households, since, it is required to estimate mean annual gross income per fisherman-respondent households. The values, thus estimated, for fishery related and non-fishing activities per annum was Rs.587 and Rs.857, respectively.

Table 17. Levels and pattern of income per fisherwoman-respondent

(in Rs. per capita/ annum)

Type of activities	**Mean level of employ-ment in days**	**Mean income earned per day in Rs.**	**Total income for the season per earner**	**Total income for the season per respondent household**
Fishery related activities				
Moderate	54	30	1,620 (0-2,140)	108
Peak	151	44	6,644 (0-7,435)	443
Lean	27	20	540 (0 – 845)	36
Total			**8,804 (0 –9,820)**	**587* (0 – 9,426)**
Non-fishing activities	306	30	9,180 (0-10,840)	857* (0-10,420)

(Figures in parentheses indicate range values.)
*Estimated per fisherman -respondent household.

The gender-wise gross income earned per respondent-household per annum is furnished in Table 18. It could be inferred from the table that the mean annual gross income from fishing per respondent was calculated as Rs1,26,125, which varied from Rs.88,405 to Rs.1,40,267. On the other hand, the fisherwomen in the respondent-households earned income from fishery related and non-fishing activities and the mean annual gross income earned per fisherwoman among the respondent-household was calculated as Rs.1,444, which was distributed as Rs.587 and Rs.857 for fishery related and non-fishing activities, respectively. The mean annual gross income per fisherwoman for fishery related activities varied from Rs.0 to Rs.9,426 and for non-fishing activities it ranged from Rs.0 to Rs.10,420 respectively. The mean annual gross income per respondent-household through all income sources was computed as Rs.1,27,568 per annum.

Table 18. Estimation of gross income of respondent- households

(in Rs. per house hold per annum)

Source of Income	*Fishermen*	**Fisherwomen**	**Total Household Income**
Fishing	1,26,124 (88405 – 1,40,267)	-	1,26,124 [98.87]
Fishery – related	-	587* (0 – 9426)	587 [0.46]
Non-fishing	-	857*(0 –10420)	857 [0.67]

Total	**1,26,124 [98.87]**	**1444 [1.13]**	**1,27,568 [100.0]**

(Figures in curved parentheses indicate range)
(Figures in rectangular parentheses indicate percentages)
* Values estimated per respondent household

5.8.Estimation of Costs

The items of fixed cost per fishing trip are furnished in Table 19. The Table showed that depreciation on craft, engine, gears, and interest on capital investment, repairs and maintenance were included under fixed costs of fishing. The overall mean total fixed cost per fishing trip was worked out to Rs.72. The cost towards repairs and maintenance was the single largest item of fixed cost accounting for 28.48% followed by interest on capital investment registering a percentage of 25.84. The percentage attributed for the depreciation of craft and the outboard engine were 8.13 and 11.43, respectively. The depreciation on fishing gears was high compared to the fishing craft and the outboard engine, accounting for 26.12%. Senthilkumar (2001) worked out fixed cost per fishing trip, for the catamarans with OBE in the selected fishing villages of Tirunelveli district, amounting to Rs. 217. The estimated values for interest on capital investment and the depreciation for the craft were Rs.85 and Rs.19, respectively. In the present study, the estimated values for depreciation on craft and the interest on capital investment were comparatively low owing to the fact that most of the fisherman-respondents in the study area possessed pre-owned catamaran and outboard engine.

Table 19. Items of fixed cost per fishing trip

Sl. No.	*Items*	**Amount(Rs)**
1.	Depreciation on craft	5.85 (8.13)
2.	Depreciation on outboard engine	8.23 (11.43)
3.	Depreciation on fishing gears	18.80 (26.12)
4.	Interest on capital investment	18.60 (25.84)
5.	Repairs and maintenance	20.50 (28.48)
	Total fixed cost	**71.98 (100.00)**

(Figures in parentheses indicate percentages)

The item-wise variable costs per fishing trip for the three seasons of the study area are furnished in Table 20. The variable cost per fishing trip in the study area consists of three components; namely, cost of fuel oil, crewshare and marketing expenses. The mean total variable cost per fishing trip during moderate fishing season was estimated as Rs. 437, out of which, money spent

towards crewshare was high accounting for 53.55% followed by fuel expenses (25.74 %). The marketing expenses were found to be 20.71%. The mean total variable cost per trip for the peak season was estimated as Rs.227. The money spent towards crewshare stands first registering 47% followed by cost of fuel oil accounting for 33.63%. The cost of fuel oil was high in moderate to peak seasons, because, the catamarans go for distant places to catch shrimps and fishes .The mean variable cost per fishing trip was comparatively low during lean season amounting for Rs.131 per trip. The higher percentage share on fuel oil was due to the fact that the catamarans go for distant and new fishing grounds due to less availability of fish catch in inshore waters. The mean total fixed cost per fishing trip was uniformly found to be Rs.72. The mean total cost per fishing trip was amounting to Rs. 509 per trip during moderate fishing season, followed by Rs.299 during peak season. The estimated value for lean season was Rs.203.

Table 20. Total variable cost per fishing trip

(Rs per fishing trip)

Items	*Fishing Seasons*					
	Moderate		**Peak**		**Lean**	
Fuel oil	112.50	(25.74)	76.40	(33.63)	62.70	(48.05)
Crewshare	234.00	(53.55)	106.80	(47.00)	54.60	(41.84)
Marketing expenses	90.50	(20.71)	44.00	(19.37)	13.20	(10.11)
Total Variable Cost	437.00 [85.86]	100.00)	227.20 [75.94]	(100.00)	130.50 [64.45]	(100.00)
Total Fixed Cost	71.98 [14.14]		71.98 [24.06]		71.98 [35.55]	
Total Cost	508.98 [100.00]		299.18 [100.00]		202.48 [100.00]	

(Figures in parentheses indicate percentages)

5.9. Estimation of Net Income

The seasonwise net income per fishing trip is furnished in Table 21. The gross income per fishing trip for moderate, peak and lean fishing seasons was estimated as Rs.905, Rs.441 and Rs.131, respectively. The corresponding total variable cost per fishing trips were computed as Rs.437, Rs.227 and Rs.131, respectively. The mean total fixed cost per fishing trip was uniformly

calculated as Rs.72. The mean total cost per fishing trip for moderate, peak and lean fishing seasons were calculated as Rs.509, Rs.299 and Rs.203, respectively. The net income per fishing trip on total variable cost was estimated as Rs.468 , Rs.213 and Rs.0.98 for moderate, peak and lean fishing seasons, respectively. A low net income of below Rs.1.00 per fishing trip has been estimated for lean fishing season. The net income per fishing trip on total cost was computed as Rs.396, Rs.141 for moderate and peak seasons. The net income on TC was found to be negative for lean fishing season.

Table 21. Estimation of season-wise net income per fishing trip

(in Rs. per fishing trip)

Items	**Fishing Seasons**		
	Moderate	**Peak**	**Lean**
Gross Income	905.40	440.64	131.40
TFC	71.98	71.98	71.98
TVC	437.00	227.20	130.50
Total Cost	508.98	299.18	202.48
Net Income on TVC	468.40	213.44	0.98
Net Income on TC	396.42	141.46	-71.08

The season-wise net income from fishing was presented in Table 22. The gross income from fishing per annum (including all the three seasons) per fisherman-respondent was computed as Rs.1,26,125, out of which, the gross income estimated for moderate, peak and lean fishing seasons was Rs.54,324, Rs.67,859 and Rs.3,942 respectively. The mean total cost of fishing per annum was Rs.82,687, which was distributed as Rs.30,539, Rs.46,074 and Rs.6,074 for moderate, peak and lean seasons. The net income on total cost per annum was computed as Rs.43,437 and the corresponding net income per annum for moderate and peak seasons was Rs.23,785 and Rs.21,785, respectively. A negative (Rs.-2,132) net income on total cost per annum was estimated (fig.2a). The net income on TVC per annum was computed as Rs.61,001 and the corresponding net income for moderate, peak and lean fishing seasons was Rs.28,104, Rs.32,870 and Rs.27, respectively (fig 2b).

Table 22. Estimation of seasonwise net income

(in Rs.)

Items	**Fishing Seasons**			**Rupees Per annum**
	Moderate	**Peak**	**Lean**	
Gross Income	54,324.00	67,858.56	3,942.00	1,26,124.56
TFC	4,318.80	11,084.92	2,159.40	17,563.12
TVC	26,220.00	34,988.80	3,915.00	65,123.80

Total Cost	30,538.80	46,073.72	6,074.40	82,686.92
Net Income on TVC	28,104.00	32,869.76	27.00	61,000.76
Net Income on TC	23,785.20	21,784.84	-2,132.40	43,437.44

The mean annual net income per respondent household is given in Table 23. The mean annual household gross income from all sources per fisherman-respondent was computed as Rs.1,27,568, out of which, the total income per annum from fishing, fishery related and non-fishing activities were estimated as Rs.1,26,125, Rs.587 and Rs.857, accounting for 98.87%, 0.46%and 0.67%, respectively. The mean annual total cost per respondent-household was worked out to Rs.82,687, which include 21.24% for total fixed cost and 78.76 % for total variable cost per annum. The computed mean annual net income per household on total variable cost was Rs.62,444 and on total cost, it was Rs.44,881 respectively.

Table23. Estimation of net income of respondent-households.

(in Rs.per household per annum)

Source of Income	**Amount**	
Fishing	1,26,124.00	(98.87)
Fishery – related activities	587.00	(0.46)
Non-fishing activities	857.00	(0.67)
Total Gross Income	1,27,568.00	(100.00)
Total Fixed Cost	17,563.12	(21.24)
Total Variable Cost	65,123.80	(78.76)
Total Cost	82,686.92	(100.00)
Household Net Income on TVC	62,444.20	
Household Net Income on TC	44,881.08	

(Figures in parentheses indicate percentages to total)

5.10. Consumption Expenditure

The overall mean levels and pattern of consumption expenditure of fisherman-respondents in the study area is furnished in Table 24. The overall mean total annual consumption expenditure per fisherman-household was estimated as Rs.56,693. The overall mean annual expenditure on food per fisherman-respondent per annum was Rs.35,790 registering 63.13%. This was followed by the expenditure towards social and religious functions accounting for 9.34%. The mean annual expenditure towards clothing and household durables worked out to 7.60% and 7.57%, respectively. The fisherman-respondents spent about 3.66% of the total annual consumption expenditure towards health. This was followed by the consumption expenditure towards education and

transport representing 2.57% and 2.34%, respectively. The money spent towards miscellaneous expenses and recreation was minimum accounting for 2.23% and 1.53%, respectively (fig.3).

Senthilathiban (1990) worked out the consumption expenditure on food items for catamaran operators along undivided Tirunelveli district of Tamil Nadu as 62.55%. Balasubramaniyan (1998) worked out the expenditure on food items in motorised catamarans category along Nagapattinam district as 40.50 %. In the present study, the expenditure on food items was 63.13%. This variation might be due to low income of fisherfolk.

Table 24. Levels and pattern of consumption expenditure of fisherman-respondents (in Rs.per annum)

Item	**Annual expenditure per household**	
Food	35,790.33	(63.13)
Clothing	4,306.66	(7.60)
Household durables	4,290.00	(7.57)
Education	1,458.13	(2.57)
Health	2,077.33	(3.66)
Transport	1,326.66	(2.34)
Social and Religious	5,313.13	(9.37)
Recreation	864.00	(1.53)
Miscellaneous	1,266.66	(2.23)
Total	**56,692.90**	**(100.00)**

(Figures in parentheses indicate percentages to total)

5.11.Method of Disposal of fishes

The method of disposal of fish catch in the study area is furnished in Table 25. It could be inferred from the Table that the fin fishes were kept in different lots and the method of disposal of catch was by open auction, in which, the retailers and exporters participate. During open auction, the highest bidder would take fish catch from the fishermen. The middlemen, who conducts the auction and also advance money to the fishermen, charges commission at the rate of 10% of total auction value of fish catch of a particular fisherman-respondent. The shrimps, squids and lobsters were auctioned by following sealed tender method. The commission agents of various shrimp processing companies quoted their rate based on the counts per kilogram. The company, which quoted the highest price depending on the counts of shrimps per kilogram, would take the lot. The exporters of processing companies from the Thoothukkudi, Tirunelveli and Kanyakumari districts took part in the purchase.

Table 25. Method of disposal of fish catch landed at Kuttapuly

Fish Groups	Method of sale	Type of buyers	Origin of buyers
Fin fishes	Open auction	Retailers/ Exporters	Buyers from nearby towns and Kerala state.
Shrimps	Sealed tender	Exporters	Buyers from Thoothukkudi Kanyakumari and Tirunelveli districts.
Lobster , Squids and Cuttle fishes	Sealed tender	Exporters	Buyers from Thoothukkudi, Kanyakumari and Tirunelveli districts.

5.12. Cohesiveness in fishing

The level of cohesiveness of fisherman-respondents with reference to select aspects is furnished in Table 26. It could be seen from the Table that all the fisherman- respondents (100%) followed some basic conditions with reference to fishing operations. They told that they would not enter into the fishing areas of nearby fishing villages and expect similar self-regulation by the fishermen of other fishing villages or other fishing craft categories. All the respondents usually go for fishing around 2 a.m. in the morning and return to shore before 9 a.m. As far as fishing methods are concerned, they use bigger mesh size gill nets for fishing and no explosive fishing was carried out in the study area. With regard to fisheries resource management issues, the respondents had great concern about the steady decline in fish catch per fishing trip. About 66.67% of the selected fisherman- respondents supported the fisheries resource conservation and management programmes; but on the other hand, they opined that they could not follow fishing regulations like closed seasons, because, they were not ready for losing income from fishing, which was essentially required to meet out basic household expenditure. They also expressed that they had no other alternative source of income except fishing. About 20% of the fisherman-respondents totally opposed the actions under fisheries resource conservation and management. The percentage of fishermen, who neither oppose nor support the resource management issues was 13.33. All the fisherman-respondents support the method of actions taken by the village committees of the respective villages along with police personnel to settle the inter-group conflicts between different fishing craft categories of same or nearby fishing villages. The action of resolving intra-group conflict within the village by the village committee was supported by 86.67% of the respondents. About 70 fisherman-respondents showed interest in the participation of health

care campaigns like free eye camp, polio camp and free medical camp, which accounts for 93.33%.

Table 26. Levels of cohesiveness of fishermen with regard to select aspects

Items	No. of fishermen reporting		
	Support	Oppose	No idea
Fishing operations	75 (100.00)	- -	- -
Fishing methods	75 (100.00)	- -	- -
Resource management	50 (66.67)	15 (20)	10 (13.33)
Inter-group conflict management	65 (86.67)	10 (13.33)	- -
Intra-group conflict management	75 (100.00)	- -	- -
Participation in health care campaigns	70 (93.33)	5 (6.67)	- -

(Figures in parentheses indicate percentages to total)

The details of participation of the respondents in the village level organisation are furnished in Table 27. It could be understood from the Table that about 74.67% of the fisherman-respondents served as members in the village fisherman co-operatives and also they felt that the personal participation in the co-operatives was useful and beneficial to them. The percentage of non-member respondents of the co-operative societies was 25.33%, because of the opinion that the organisation was not helpful to them. The members of the co-operative societies used to participate in the monthly meetings regularly. They got benefits like savings cum relief scheme of the state government through fishermen co-operatives. The number of fisherman –respondents, who served as members in the Tuticorin Multipurpose Social Service Society (TMSSS) was 47 accounting for 62.67% and the corresponding percentage of non-members in TMSSS was 37.33%. The fishermen members of TMSSS used to participate in weekly meetings. The members of TMSSS felt that the organisation served as an intermediary in the marketing of fish catch and the

other schemes operated by TMSSS like savings and loans were extremely beneficial to the fishermen.

There were three women Self Help Groups (SHGs) in the fishing village. Among the 75 selected fisherman-respondent families, about 44 fisherwomen (which accounts for 58.67%) served as members of the women self help groups of the fishing village, about 31 fisherwomen did not serve as members in SHGs, representing 41.33%. The SHG's conducted weekly meetings among themselves and they operated mainly savings scheme.

Table 27. Participation of respondent-households in co-operatives, NGOs and SHGs

Type of organization	**As office bearer**	**As member**	**As non-member**	**Frequency of Participation in meetings**	**Type of benefits**
Co-operative Society	-	56 (74.67)	19 (25.33)	Monthly	Savings
Women SHGs	-	44 (58.67)	31 (41.33)	Weekly	Savings
T.M.S.S.S	-	47 (62.67)	28 (37.33)	Weekly	Savings and Loans

(Figures in parentheses indicate percentages)

5.13. Awareness on Fisheries Resource Management Issues

The extent of awareness of fisheries resource management issues by the fisherman-respondents is presented in Table 28. Some fisheries resources management issues include conservation of endangered fish species, decline in volume of fish catch and size reduction, capture of brood stock and small-sized fishes, pollution and sanitation measures in the coastal zones. About 70 fisherman- respondents (93.33%) were well aware of the fact that endangered fish species groups should not be captured and followed while fishing. About 5 fisherman- respondents (6.67%) opined that they were not aiming to capture any endangered fish varieties; but when they got any endangered fish varieties; they did not release them into the sea and used to bring them to the landing centre for sale. All the 75 fisherman- respondents felt that there was a gradual decline in fish catch and also size reduction in the study area over the past ten years.

About 20 fisherman-respondents (26.67%) were unaware of the consequences that the capture of broodstock and small-sized fishes, would result in the decline of total fish catch. The remaining 55 fisherman-respondents (73.33%) gave their opinion that the capture of broodstock and small-sized fishes was wrong; but they did not follow the same. They gave the reason that, whatever, comes out of gill netting, they would take them irrespective of broodstock or small-sized fishes. Moreover, they told that they did not know the nature of fishes caught, when they got entangled in the gill nets. They came to know only after the gill nets are hauled out.

The percentage of fisherman-respondents, who do not know that the discharge of domestic and industrial effluents would pollute the coastal eco-system and the sanitary conditions in the fishing village and the fish landing center is essential for healthy living was 66.67. In contrary, about 33.33% of the fisherman-respondents opined that they knew all about broodstock management, pollution and sanitation aspects in coastal zone, but in general they do not follow.

Table 28. Awareness of fisherman-respondents on resource management issues

Resource management issues	No .of respondents reporting that they					
	Know and Follow		Do not know		Know but do not follow	
Conservative on endangered species	70	(93.33)	-	-	5	(6.67)
Decline in fish catch and size reduction	75	(100)	-	-	-	-
Capture of broodstock and small-sized fishes	-	-	20	(26.67)	55	(73.33)
Pollution and sanitation	-	-	50	(66.67)	25	(33.33)

(Figures in parentheses indicate percentages)

The opinion on occupational shift of selected fisherman-respondents is presented in Table 29. Among the selected 75 fisherman-respondents, 36 respondents representing 48.00% had positive attitude towards fishing occupation.

Among the 36 respondents, who have positive attitude towards fishing, 33 persons (91.67%) wished to continue fishing as primary occupation and 3 persons (8.33%) reported that they wanted their children to shift to other occupation from fishing. Among the total selected fisherman- respondents, 39 respondents (52.00%) had conservative attitude towards fishing profession (35.90 %) while 23 fishermen (58.97%) did not decide their future, 2 persons (5.13%) wanted to change their profession.

Table 29. Opinion on occupational shift of fisherman- respondents

Attitude	**Type of Shift**	**No. of respondents**
Positive 36 (48.00)	Continue in the present fishing occupation	33 (91.67)
	Want their children to shift to other occupation	3 (8.33)
	Total	**36 (100.00)**
Conservative 39 (52.00)	Willing to shift their present fishing occupation	14 (35.90)
	Want their children to shift to other occupation	2 (5.13)
	Undecided	23 (58.97)
75 (100.00)	**Total**	**39 (100.00)**

(Figures in parentheses indicate percentages)

Chi- Square test was applied to test the opinion of the reference group towards the management of fisheries resources. The fisheries management measures considered were implementation of closed seasons, control of fishing effort and regulation of mesh sizes. Three types of responses viz., in favour of; in different to; and opposed to; were recorded in the realm of fisheries management measures. The null hypothesis postulates that there is no direct relationship between the implementation of fisheries management measures and the sustainability of fisheries resources in the coastal zones of the study area. The

responses of the selected fishermen for the fisheries management measures are given below:

Sl. No.	**Fisheries management measures**	**in favour of**	**in different to**	**opposed to**	**Total**
1	Implementation of closed seasons	2 (8.39)	4 (3.40)	11 (5.21)	17
2	Control of fishing effort	13 (12.83)	8 (5.20)	5 (7.97)	26
3	Regulation of mesh sizes	22 (15.79)	3 (6.40)	7 (9.81)	32
		37	15	23	75

(The figures in parentheses are the expected frequencies)

Applying the χ^2 test,

O	*E*	O-E	**(O-E)2**	**(O-E)2** / *E*
2	8.39	-6.39	40.83	4.8665
13	12.83	0.17	0.029	0.0023
22	15.79	6.21	38.56	2.4421
4	3.40	0.60	0.36	0.1059
8	5.20	2.80	7.84	1.5076
3	6.40	-3.40	11.56	1.8063
11	5.21	5.79	33.52	6.4346
5	7.97	-2.97	8.82	1.1067
7	9.81	-2.81	7.90	0.8049

$$\chi^2 = \frac{\sum (O - E)^2}{E} = 19.0769$$

df = (r-1) (c-1)

= (3-1) (3-1) = 2 x 2 = 4

For df = 4, $\chi^2_{.05} = 14.9$

$$\chi^2_{.01} = 13.3$$

The calculated value of χ^2 is greater than the table value and hence, the null hypothesis is rejected. Therefore, it is concluded that the fisheries management measures, if implemented, will help in a long way to the sustainable nature of fisheries resources in the coastal zones of the study area.

Chi- Square test was applied to find out the acceptance of the fisherman-respondents towards the measures drawn for fisheries development. The fisheries development measures included were avoidance of capture of brood stock and under-sized fishes, providing artificial habitats like FADs and protecting coral reef resources and mangroves. Two types of responses viz., agree and disagree were obtained. The null hypothesis postulates that the introductions of fisheries development measures are not playing any pivotal role in the overall fisheries development. The responses of the fisherman -respondents are given below:

Sl. No.	Fisheries development measures	Agree	**Disagree**	**Total**
1	Avoidance of capture of broodstock and under sized fishes	3 (13.67)	22 (11.33)	25
2	Providing artificial habitats like FADs	8(6.01)	3(4.99)	11
3	Protecting Coralreef resources and mangroves	30 (21.32)	9 (17.68)	39
		41	34	75

(The figures in parentheses indicate expected frequencies.)

Applying the χ^2 test,

(O-E)2	**E**	**O-E**	**(O-E)2**	$\frac{\textbf{(O-E)2}}{\textbf{E}}$
3	13.67	-10.67	113.85	8.3284
8	6.01	1.99	3.96	0.6589
30	21.32	8.68	75.34	3.5334
22	11.33	10.67	113.85	10.0484

3	4.99	-1.99	3.96	0.7936
9	17.68	-8.68	75.34	4.2614
				27.6241

$$\chi^2 = \frac{\sum (O - E)^2}{E} = 27.6241$$

$$df = (r-1)(c-1) = 2$$

For df = 2 $\chi^2_{.05} = 5.99$

$\chi^2_{.01} = 9.21$

The calculated χ^2 value is greater than the table value and hence, the null hypothesis is rejected. Therefore, it is concluded that the fisheries development measures, if implemented, would play an important role in the overall fisheries development of the selected coastal area.

Kendall-coefficient of concordance (W) was calculated to interjudge the consensus among the fisherman-respondents in ranking the eight constraints affecting fishing occupation .The eight constraints reported were presence of rocks in the near shore area, inter group conflict between the catamaran fishermen and mechanised boat fishermen, absence of cold storage facilities in the fish landing centre, absence of kerosene bunk, sea erosion during rainy season, absence of concrete auction hall, absence of spare parts /service centre for OBE and non-availability of loans with subsidy to purchase OBE. The selected fisherman- respondents were asked to rank the eight constraints affecting the fishing occupation according to the order of severity. The null hypothesis formulated was that the rankings given by the fisherman-respondents were unrelated to each other and there is no consensus among the respondents concerning the constraints were presented in the Table.30

$$\text{Kendal coefficient of concordance (W)} = \frac{\sum (Ri - \bar{R})^2}{N(N^2 - 1)/12}$$

$$= \frac{6.739}{8(8^2 - 1)/12}$$

$$= \frac{6.739}{}$$

$$= \frac{}{8(64 - 1) / 12}$$

$$= \frac{6.739}{42}$$

$$= 0.1604$$

Determining the significance of W by applying Chi-square test,

$$\chi^2 = K (N-1) W$$

$$= 75(8 - 1)\ 0.1604$$

$$= 75 \text{ X } 7 \text{ X } 0.1604$$

$$= 84.21$$

Referring to the critical values of Chi-square Table with df =N –1=7,the calculated χ^2 value at 1% level and hence the null hypothesis is rejected .It could be concluded with considerable confidence that the respondents ratings are highly related to each other and there is good consensus among the fisherman-respondents concerning the constraints affecting fishing occupation in the study area.

Table. 30 Ranking of constraints to fishing Occupation as reported by fisherman-respondents

Item	Presence of rocks	Inter group conflict	Absence of cold storage	Absence of Kerosene bunk	Sea erosion problem	Absence of auction hall	Lack of spare parts/Service facility	Non-availability of loans with subsidy to purchase OBE
R_I	267	261	380	235	448	391	324	320
$\bar{R}_i$	3.56	3.48	5.06	3.13	5.97	5.21	4.32	4.27
$\bar{R}$	4.375	4.375	4.375	4.375	4.375	4.375	4.375	4.375
$\bar{R}_i - \bar{R}$	- 0.815	-0.895	0.685	-1.245	1.595	0.835	-0.055	-0.105
$(\bar{R}_i - \bar{R})^2$	0.664	0.801	0.469	1.550	2.544	0.697	0.003025	0.0110

$\sum (R_i - \bar{R})^2 = 6.739$

6. SUMMARY AND CONCLUSION

The present study was conducted to analyse the livelihood of fisherfolk families in the Kuttapuly fishing village of Tirunelveli district, Tamilnadu. The specific objectives of the study include the livelihood status of fishing families in the realm of human resource, employment, income and levels of living; to analyse the socio-economics of methods of fishing, fish landings and fish sale; and to assess the levels of cohesiveness in terms of social control, particularly with regard to access to resource use and in fish marketing and rural development.

Tirunelveli district has seven fishing villages, out of which, Kuttapuly fishing village was purposively selected for the study. As literacy is one of the important criteria for livelihood studies, this fishing village was selected. It has the highest percentage of higher-level literates i.e., percentage of population with literacy levels of higher secondary, collegiate and technical education among the seven fishing villages in Tirunelveli district. The other reason for selecting this coastal village is its compactness with consequent pointedness of data sets rendering meaningful generalisations in such a single community study .The study was restricted to owner cum operator of catamarans fitted with outboard engine in the selected fishing village. The number of fishermen representing the catamaran with OBE category was 75. Hence, all the above 75 fishermen were considered as sample size of the proposed study to conduct a census survey. The fisherman households, who operate traditional catamarans (without OBE) and the crew members were excluded from the study.

The overall mean size of household in absolute unit was 5.60. The average number of male persons was 2.92 and in the case of female members, it was 2.68. The earner dependent ratio was estimated as 1:2.38. The fishing activity in the study area was categorised into moderate, peak and lean seasons based on quantity of fish groups landed.

The time periods of June to August was known as moderate season. Similarly, the time periods of September to March was known as peak season and April to May was referred as lean season. Major fish groups landed in the study area are Shrimps, Lobsters, *Clupeids, Lethrinids, Sciaenids, Chirocentrids, Scombrids, Engraulids, Strombids, Nemipterids, Leognathids,* and *Lactariids.*

The total number of fishing trips performed during moderate, peak and lean fishing seasons were 60 trips, 154 trips and 30 trips, respectively. The length period of moderate, peak and lean fishing seasons were 3 months, 7 months and 2 months, respectively. The mean total number of fishing trips performed by a fisherman-respondent per annum was 244.

The percentage of fishermen, who have fishing as primary occupation was about 90.32 and the percentage of fisherwomen involved in fishery related and non-fishing activities were estimated as 4.03 and 5.65, respectively. All the selected fishermen possessed pre-owned fishing craft and outboard engine. The mean capital investment per respondent on catamaran was Rs.16,180 and the values ranged between Rs.17,000 and Rs. 25,000 per fisherman- respondent. The mean value of outboard engine was Rs.21,473 and it ranged from Rs.15,000 to Rs.28,000 per respondent household. The mean economic life of craft and engine was seven years. The mean value of gears was estimated as Rs.30,907 and it varied from Rs.25,000 to Rs.55,000. The mean economic life of fishing gears was 3 years.

The overall mean days of employment in fishing per annum were estimated as 244 days and it ranged from 208 days to 279 days per annum per respondent. The overall mean level of employment for fisherwomen in fishery-related activities was estimated as 233 days and it ranged from 225 days to 240 days. The overall mean level of employment

for fisherwomen in non-fishing activities was estimated as 307 days and it varied from 300 days to 316 days per annum.

The overall mean total fish catch per fishing trip was estimated as 15 kg and it ranged from 3 to 30 kg per respondent per fishing trip. The mean total fish catch per fishing trip during moderate, peak, lean seasons were found to be 5 kg, 18 kg, and 4 kg, respectively. The computed gross income from fishing per fishing trip for moderate, peak and lean fishing seasons were Rs.905, Rs.440 and Rs.131, respectively.

The overall mean total fixed cost per fishing trip was worked out to Rs.72. Repairs and maintenance was the single largest item of fixed cost accounting for 28.48 % followed by interest on capital investment registering a percentage of 25.84. The percentage attributed for the depreciation of craft and the outboard engine was 8.13 and 11.43, respectively. The mean total variable cost per fishing trip during moderate, peak, and lean seasons was Rs.437, Rs.227 and Rs.131 respectively. The total cost per fishing trip for moderate, peak and lean fishing seasons, was Rs.509, Rs.299 and Rs.202, respectively.

The season-wise net income per fishing trip on TVC was estimated as Rs.468, Rs.213 and Rs.0.98, for moderate, peak and lean fishing seasons, respectively. A low net income of below Rs.1 per fishing trip during lean season was observed. The season-wise net income per fishing trip on TC was computed as Rs.396, Rs.141 for moderate and peak seasons. The net income on TC was found to be negative for lean season.

The season-wise mean total fish catch for moderate, peak and lean seasons was 304 kg, 3863 kg and 127 kg, respectively. The gross income estimated from fishing for moderate, peak and lean fishing seasons was Rs.54,324 Rs.67,859 and Rs.3,942, respectively. The mean total fixed cost for moderate, peak and lean seasons was Rs.4,319, Rs.11,085 and Rs.2,159. The mean total variable cost for moderate, peak and lean seasons was Rs.26,220, Rs.34,989 and Rs.3,915, respectively. The net income on TVC for

moderate, peak and lean season was Rs.28,104, Rs.32,870 and Rs.27, respectively. The net income on TC for moderate and peak seasons was Rs.23,785 and Rs.21,785. A negative net income (-Rs.2,132) on total cost for lean season was estimated.

The overall total mean fish catch per annum per respondent was calculated as 3,945 kg and it varied from 2,668 kg to 5,234 kg. The mean total fixed cost for fishing per annum came to Rs.17,563 and the mean total variable cost of fishing per annum was Rs.65,124. The mean total cost per annum was Rs.82,687.

The overall mean annual income from fishing per fisherman- respondent was estimated as Rs.1,26,125. The mean annual income from fishery-related activities per respondent household per annum was Rs.587 and it ranged from Rs.0 to Rs.9,426. The mean annual income from non-fishing activities per respondent household was Rs.857 and it ranged from Rs.0 to Rs.10,240. The mean annual gross income per respondent household through all income sources was computed as Rs.1,27,568 per annum. The mean annual net income per respondent household on TVC was Rs.62,444 and on TC, it was Rs.44,881.

The overall mean consumption expenditure per fisherman household was estimated as Rs.56,693 per annum. The percentage of expenditure on food items (63.13%) was the highest and the lowest percentage of expenditure of 1.52% was recorded for recreation. The expenditure next to food items was for the social and religious functions accounting for 9.37%.

The method of disposal of finfish catches was done by open auction in which the retailers and exporters participate. The shrimps, squids, and lobsters were disposed of by

sealed tender method. The exporters of processing companies from Thoothukkudi, Tirunelveli and Kanyakumari districts took part in the purchase.

The level of cohesiveness with reference to fishing operations in the village was 100%. About 66.67% of the selected fisherman-respondents supported the fisheries resource conservation and management programmes. About 20% of the fisherman-respondents totally opposed the actions considered under fisheries resource conservation and management. The percentage of fishermen who neither oppose nor support the resource management issues came to 13.33. All the fishermen supported the method of action taken by the village committee for settling the inter-group conflicts. The action of resolving intra-group conflicts with in the village by the village committee was supported by 86.67% of the respondents.

About 74.67% of the fisherman-respondents served as members in the fishermen co-operatives. About 62.67% of the respondents served as members in Tuticorin Multipurpose Social Service Society. The percentage of participation of fisherwomen in Self Help Groups was 58.67 and 41.33% of the fisherwomen were not the members in the SHGs.

About 93.33% of the fisherman-respondents were well aware of the restrictions with regard to the capture of endangered fish species. All the 75 fisherman-respondents felt that there was a decline in fish catch and also size reduction in the study area over the past ten years.

About 26.67% of the respondents were unaware of the fact that the capture of broodstock and small–sized fishes would be detrimental to fishery resources and about 73.33% of the respondents were aware of this, but they did not follow the same. The percentage of respondents, who had not realised the fact that sanitary conditions in the

fishing village and in the fish landing centre was essential for healthy living, came to 66.67%. But, on the other hand about 33.33% of the respondents though knew the importance, did not follow it.

Among the selected 75 respondents, 36 respondents representing 48.00%, had positive attitude towards fishing occupation and 39 respondents representing 52.00% had conservative attitude towards fishing. Among the 39 conservative respondents, 58.97% of fisherman- respondents were undecided about their future plans, whereas, about 35.90% of the respondents were willing to shift to other occupation, but had not initiated any move and about 5.13% of fisherman- respondents wanted their children to have an occupational shift.

Chi-square test was applied to test the opinion of the reference group towards the management of fisheries resources. The fisheries management measures included were the implementation of closed seasons, control of fishing effort and regulation of mesh sizes. Three types of responses viz., in favour of, in different to and opposed to were recorded. The calculated χ^2 value is greater than the table value at p=0.01 level and it could be concluded that the fisheries management measures if implemented, would help in a long way for the sustainability of fisheries resources in the coastal zones of the study area.

Chi-square test was also applied to find out the acceptance of the fisherman-respondents towards the measures drawn for fisheries development. The fisheries development measures included were avoidance of capture of broodstock and undersized fishes, providing artificial habitats like FADs and protecting coral reef resources and mangroves. The calculated value χ^2 (27.6241) is greater than the table value at P = 0.01 level. Therefore, it is concluded that the fisheries development measures, if implemented, would play an important role in the overall fisheries development of the selected coastal area.

Kendall coefficient of concordance (W) was calculated to interjudge the consensus among the fisherman-respondents in ranking the eight constraints affecting fishing occupation. The Kendall co-efficient (W) value obtained was 0.1604. Determining the significance of W by applying chi-square test, the calculated χ^2 value was highly significant at 1% level and hence the null hypothesis was rejected. It could be concluded with considerable confidence that the respondents ratings are highly related to each other and there is good consensus among the fisherman- respondents concerning the constraints affecting fishing occupation in the study area.

6.1. Conclusions

Based on the results of the study, the following conclusions could be drawn.

1. The mean size of fisherman household was above (5.60) the family welfare norms of the Government of India.

2. The earner-dependent ratio was estimated as 1:2.38.

3. The major fish groups landed in the study area were Shrimps, Lobsters, *Clupeids*, *Lethrinids*, *Sciaenids*, *Nemipterids*, *Leognathids* and *Lactariids* during the three classified fishing seasons.

4. The total number of fishing trips performed by a fisherman- respondent per annum was 244.

5. Among the selected households, the percentage of fishermen having fishing, as primary occupation was about 90.32 and the percentage of fisherwomen involved in fishery–related and non- fishing activities were calculated as 4.03 and 5.65, respectively.

6. All the fishermen possessed pre-owned fishing craft and outboard engine. The mean capital investment per respondent on catamaran was Rs.16,180 and the mean present

value of catamaran was Rs.10,000. The mean value of outboard engine was Rs.21,473 and the mean present value of outboard engine was Rs.14,053. The mean economic life of craft and gear was estimated as seven years. The mean value of gillnets possessed per fisherman- respondent was Rs.30,907 and the mean present value was Rs.13,761. The economic life of the gill nets was three years.

7. The overall mean days of employment in fishing per annum was 244 days and in the case of fishery-related and non-fishing activities, it came to 233 and 307 days per annum, respectively.

8. The overall mean total fish catch per fishing trip was calculated as 15 kg and the overall total mean fish catch per annum per respondent came to 3945 kg from fishing .The mean total fish catch for moderate, peak and lean fishing seasons were estimated as 304 kg, 3862 kg and127 kg, respectively.

9. The overall mean gross income per fishing trip came to Rs.516. Alternatively, it came to Rs.905, Rs.440 and Rs. 131 for moderate, peak and lean seasons.

10. The mean total fixed cost for moderate, peak and lean season per trip was worked out to Rs.72.The mean total variable cost per fishing trip during moderate, peak and lean seasons was Rs.437, Rs.227 and Rs.131, respectively. The mean total cost per fishing trip during moderate, peak and lean seasons was Rs.509 Rs.299 and Rs.202, respectively.

11. The net income per fishing trip on TVC was estimated as Rs.468, Rs.213 and Rs.1 for the moderate, peak and Lean seasons. The net income per fishing trip on TC came to Rs.396, Rs.141 for moderate and peak seasons and the net income on TC was negative for the lean season.

12. The mean total gross income from fishing for moderate, peak and lean seasons was Rs.54,324, Rs.67,859 and Rs.3,942, respectively. The mean total fixed cost for

moderate, peak and lean seasons was found to be Rs.4,319, Rs.11,085 and Rs.2,159. The mean total variable cost for moderate, peak, and lean seasons was calculated as Rs.26,220, Rs.34,989 and Rs.3,915. The corresponding mean total cost was estimated as Rs.30,539, Rs.46,074 and Rs.6,074.

13. The net income on TVC for moderate, peak and lean season was estimated as Rs.28,104, Rs.32,870 and Rs.27. The corresponding net income on TC for moderate and peak was estimated as Rs.23,785, Rs.21,785. A negative net income on total cost for lean season (-Rs.2,132) was estimated.

14. The overall mean annual income from fishing per fisherman- respondent was Rs.1,26,125. The mean annual income from non-fishing activities per respondent household was Rs.857and from fishery-related activities, it was Rs.587. The mean annual gross income per respondent household through all income sources was computed as Rs.1,27,568

15. The mean total fixed cost from fishing per annum came to Rs. 17,563.The mean total variable cost and mean total cost from fishing per annum was worked out to Rs. 65,124 and Rs.82,687 .

16. The mean annual net income per respondent household on TVC was Rs. 62,444 and on total cost, it was Rs. 44,881.

17. The overall mean annual consumption expenditure per fisherman household was estimated as Rs.56, 693. The expenditure towards food was accounted for 63.13% of the total consumption expenditure.

18. The method of disposal of fin fishes was done by open auction and shrimps and lobsters by sealed tender method.

19. About 66.67% of the respondents supported the fisheries resource conservation and management programmes and 20.00% of the respondents totally opposed the actions

under fisheries resource conservation and management .The percentage of fishermen who neither oppose nor support the resource management issues came to 13.33%.

20. All the respondents supported the action taken by the village committee constituted for settling the inter-group conflict. The action of resolving intra-group conflict within village by the village committee was supported by 86.67% of the respondents.
21. Among the total selected respondents, about 74.67% were members in fisherman co-operatives and 62.67% in TMSSS and 58.67% of the fisherwomen in SHGs.

22. Majority of the fisherman- respondents were aware of the restrictions with regard to the capture of endangered fish species, broodstock fishes and under sized fishes.

23. The percentage of fisherman- respondents who had positive and conservative attitude towards fishing occupation came to 48.00 and 52.00, respectively.

24. The fisherman- respondents were of the opinion that the implementation of fisheries management measures would help for the sustainability of fisheries resources. It could be ascertained with the rankings of the constraints to fishing occupation by the respondents that there was good consensus among the fisherman-respondents concerning the constraints affecting fishing occupation in the study area.

The following constraints to fishing occupation were identified:

1. Absence of concrete auction hall in the fishing village.

2. Inadequate availability of kerosene at subsidised rate.

3. Gear damage due to indiscriminate trawling by the fishermen of other fishing villages.

4. Presence of rocks in the near shore area.

5. Non-availability of spares parts for OBE, in the village or near by towns.

6. Non-availability of loans to purchase OBE with subsidy facility.

7. Defunct state of fishermen co-operative society in the fishing village.

8. Absence of cold storage facilities in the fish landing centre.

Constraints in the Society:

1. Sea erosion during rainy season.

2. Drinking water scarcity during summer.

3. High level of school dropouts by male children.

4. The habit of alcoholism among fisherfolk.

5. Prevalence of dowry for women in the fishing families at the time of marriage.

6. Discharge of domestic wastes into sea and dumping of household wastes in the streets.

7. Open beach defecation.

6.2. Policy Implications

1. Family planning programmes may be effectively implemented in the study area.

2. Information on new fishing grounds and fish aggregating places may be, provided to local fishermen daily by State Fisheries Department through radio, television and other mass media.

3. Training programmes may be conducted to fisherwomen in the preparation of value added fishery by-products which would augment their family income.

4. Fishing craft, gears and engine may be provided to fishermen at the subsidised cost by the Government.

5. Awareness should be created on sanitation in landing centre, auction hall and in the streets of the fishing village.
6. Training programmes may be organised on hygienic handling of fishes in the landing centre and about maintaining fish quality by the technical personnel of State Fisheries Colleges and the State Fisheries Department.

7. Infrastructural facilities like auction hall, cold storage facilities and transport have to be made available to fisherfolk through the welfare schemes of the State Government.

8. Non-formal adult education programmes may be organised.

9. Awareness has to be created among the fisherfolk with regard to the loan repayment in credit institutions through NGOs and voluntary organisations. This would facilitate the inflow of production credit to fisherfolk by credit institutions.

10. Actions have to be initiated to create awareness about the importance of fisheries resource management issues through NGOs and voluntary organisations.

11. Installation of kerosene bunk by the State Fisheries Department would help to reduce the rising production cost of fishing occupation.

12. Fisherfolk welfare schemes of the Government and its usefulness to fishermen may be broadcast through mass communication media like television and radio and by distribution of pamphlets.

13. Construction of a public lavatory would help to maintain cleaner beach.

7. BIBLIOGRAPHY

Adiv Reddy, 1971. Extension Education. Sree Lakshmi press, p.171.

Ahilan, B., and P. Selvaraj, 1992**.** Levels and pattern of earnings of fisherwomen in Chidambaranar district of Tamil Nadu, *Fishing chimes*, **12(7)**:pp.31-34.

Ali, 1996. Marine fisheries economics and development in India. MD publication Pvt. Ltd., New Delhi, p.2-3.

Andres Von Brandt, 1984. Fish catching methods of the world. Fishing news books Ltd., England, p.355.

Annamalai, V., and M**.**K**.** Kandoran, 1990. Economics of motorised traditional craft, *Fishery technology*, **27 (1):** pp.5-12.

Anonymous, 2001. Endeavours and Achievements, State Fisheries Department, Tamil Nadu, pp.1-20.

Anonymous, 2000. Marine Fisherfolk Census 2000, State Fisheries Department, Tamil Nadu, pp.1-7.

Anonymous, 2002. Role of fisheries co-operatives and fishermen welfare schemes, *Tamil Nadu journal of co-operation*, pp.20-23.

Asmund Bjordal and Svein Lokkeborg. 1996. Long Lining. Fishing news books Ltd., England, p.1.

Bach George, 1980. Macro-economic analysis and application. U.S.A., Prentice Hall Inc., p.15.

Baily, C., 1994.Employment**,** labour productivity and income in small-scale fisheries of South and Southeast Asia, FAO-indo-pacific-fisheries-comm., - Bangkok-Thailand **No.8:** pp.24-25.

Balasubramaniam**,** Bankey Bihari and Braj Mohan, 2001**.** Socio-economic status of marine fishermen in two fishing villages of Orissa**,** *Fishery technology***, 38 (1)**: pp**.**51-55.

Balasupramaniyan, P**.,** 1998. Prospects of rural development in the selected coastal fishing villages of Nagapattinam district, Tamil Nadu, *unpublished M.F.Sc thesis*, Fisheries college and research institute, Thoothukkudi, pp. 64-70.

Bierhuizen, (2000). Fishing patterns and intensity in Kanyakumari district, India, *Bay of Bengal programme /MM/2*, pp.1-41.

Blase, 1982. Coastal village development in four fishing communities of Adirampattinam, Tamil Nadu, India, *Bay of Bengal programme*/*working paper* **No.19**: p.1-17.

Daniel Viswasam Samuel, 1986. An economic analysis of mechanise and artisanal fishing in Tirunelveli district, *unpublished M.Sc. (Ag) thesis,* Tamil Nadu Agricultural University, Coimbatore, p: 120.

Erich Goode, 1988. Sociology. Prentice-Hall. New Jersey, p**.**56.

Friedman, 1970. A theory of consumption function. Oxford and IBH publishing house, Bombay, p.11.

Gurusamy, S., 1987. Role of women in decision-making process of dry land farming, unpublished M.Sc., (Ag.) thesis, Department of Agricultural Economics, Tamilnadu, Agricultural University, Madurai, p.15.

Johan Kurien, 1981. Socio-economic conditions of the traditional fishermen, in "Role of small-scale fisheries and coastal aquaculture in integrated rural development," *CMFRI bulletin***;** 30-A, pp. 12-30.

Juntrarashote, K., and S. Dasosukho, 1986. Small-scale fisheries: The target group handbook for fishery extension workers in Southeast Asia, SEAFDEC, Thailand: pp.12-29.

Kalavathy, M.H., and V.Tietze 1984. Artisanal marine fisheries in Orissa: "A techno demographic study,'' *Bay of Bengal programme newsletter,* p. 4.

Kuppuswamy, 1973. Elements of social psychology. Vikas publishing house Pvt. Ltd., London, p.56.

Manohar Doss, V.Annamalai, Pravin Puthra and M.K Kandoran**,** 1997**.** Returns from motorised traditional craft in Veraval coast, *Fishery technology* **34 (2)**: 35–39.

Mammo, 1987. Study on income, indebtedness and savings among fisherfolk of Orissa, India, *Bay of Bengal programme/working paper* **No: 55**: 1-21.

Panikkar and Alagaraja ,1981. Socio-economic status of fisherman community of Calicut area, *Marine fisheries information service T and E series,* **No.33***: 2*-12.

Prabhakaran, J., 1978. A study on the economic conditions of marine fishermen of Tirunelveli district, *unpublished M.Sc. (Ag.) thesis*, Tamil Nadu Agricultural University, Coimbatore, p: 122.

Puhazhendhi, 1980. An enquiry in to the levels of living and wages of farm labourers in Nilgris district, Research report /Ag.Econ. /3/80/ Centre for agricultural and rural development studies, T.N.A.U., Coimbatore, p.3.

Rajakumar, M.,1990**.** Socio-economic conditions of fishing labour households in Pudukkottai district, *unpublished M.F.Sc. thesis*, Fisheries college and research institute, Thoothukudi, pp**.** 22-26.

Ray, G.L., 1991. Extension communication and management. Naya Prokash, Calcutta, p.40.

Ray, G.L., and Sagar Mondal, 1999. Research methods in social sciences and extension education. Naya Prokash publication, Calcutta, p.275.

Roger Waud, 1980. Macro-economics of developing countries. Tata McGraw, Prentice Hall Inc., p.15.

Ronald, A., Maine and Richard Coutts, 2000. Linking the code of conduct and sustainable livelihoods, *Bay of Bengal news*, pp.24-27.

Sathiadhas, R., and Venkataraman, 1981. Impact of mechanised fishing on the socio-economic condition Sathikulangara, Neendakara, Kerala, M*arine fisheries information service, T and E series,* **No.29**: 1-5.

Sathiadhas**,** R**.,** and K**.**K**.**P**.** Panikkar**,** 1988**.** Socio-economics of small-scale fishermen with emphasis on costs and earnings traditional fishing units along Trivandrum coast**,** Kerala-A case study**,** *Seafood export journal,* **20(11)**: 35-36.

Sathiadhas, R.,and K.K.P. Panikkar, 1991**.** Socio-economics of traditional fishermen in Tirunelveli coast of Tamil Nadu, *Journal of marine biological association of India*, **33(1&2):** pp.175-181.

Sebastian Mathew, 2000**.** Applying the code of conduct for responsible fisheries to the management and development of marine small-scale fisheries in India**,** *report on the*

national workshop on the code of conduct for responsible fisheries. Bay of Bengal programme: pp.57-72.

Senthilathiban, R**.,** 1985**.** An economic analysis of employment, income and consumption of fishermen households in Tirunelveli district, *unpublished M.F.Sc. thesis*, Fisheries college and research institute, Thoothukkudi: pp**.**31-32**.**

Senthilathiban, R., and P.Selvaraj and Jayaraman, 1987. Strategies for improving the levels of living of marine fisherfolk in Tirunelveli district Tamil Nadu, *Fishing chimes*, **7 (4):** 43- 44.

Senthilathiban, R., and P.Selvaraj, 1989. Economics of marine capture fisheries in Tirunelveli district of Tamil Nadu, *Fishing chimes*, **9(5)**: pp.52-53.

Senthilathiban**,** R., and P**.** Selvaraj**,** 1990**.** Consumption expenditure of fishing households in Tirunelveli district of Tamil Nadu**,** *Fishing chimes* **Vol. (5)** pp.23-25.

Senthilathiban, R**.,** 1994**.** Production and economic aspects of marine capture fisheries in the mechanised sector at Tuticorin*, unpublished Ph.D. thesis***,** Fisheries college and research institute**,** Thoothukkudi: pp.176-178**.**

Senthilkumar, K**.,** 2001**.** A comparative static economic analysis of marine fisheries in Tirunelveli district of Tamil Nadu**,** *unpublished M.F.Sc. thesis*, Fisheries college and research institute**,** Thoothukkudi: p**.**65-68**.**

SujathKumar, 1988. Adoption behaviour of traditional fishermen and trawler owners – A comparative analysis, *unpublished M.F.Sc. thesis*, Department of fisheries extension, Tamilnadu Agricultural University, Coimbatore,p.5.

Sharma, B.B.,1992. Encyclopaedic dictionary of sociology. Anmol publications, New Delhi , **Vol.1** :164 & 195.

Theodore Panayotou, Thanwa Jitsanguan and Kamphol Adulavidhaya, 1985**.** Cost structure and profitability of the Thai coastal fishery. In: small-scale fisheries in Asia**:** Socio-economic analysis and policy, International development and research centre, Canada, **229 :** 163-174**.**

Thirumilu, P., P.K. Mahadevan Pillai and K.S. Krishnan, 1995. Specification of different artisanal and mechanised fishing craft employed in marine fisheries along Tamil Nadu coast, *Marine fisheries information service T* & E series No.114, CMFRI, Cochin, pp.8-12.

Velayudhan, 2001. Social infrastructure facilities in coastal fishing villages of Kerala: present status, *Fishing chimes* **21 (1):** pp. 65-68.

Verdjujin, 2000. Basic needs of 39 coastal fishing communities in Kanyakumari district, Tamilnadu, India, *Bay of Bengal programme/ MM/1*, pp.1-11.

Yamamoto, 1982. Socio-economic status, living conditions of the marine fishing household in Paknam Pran Bure, Thailand, Bangkok: SEAFDEC.