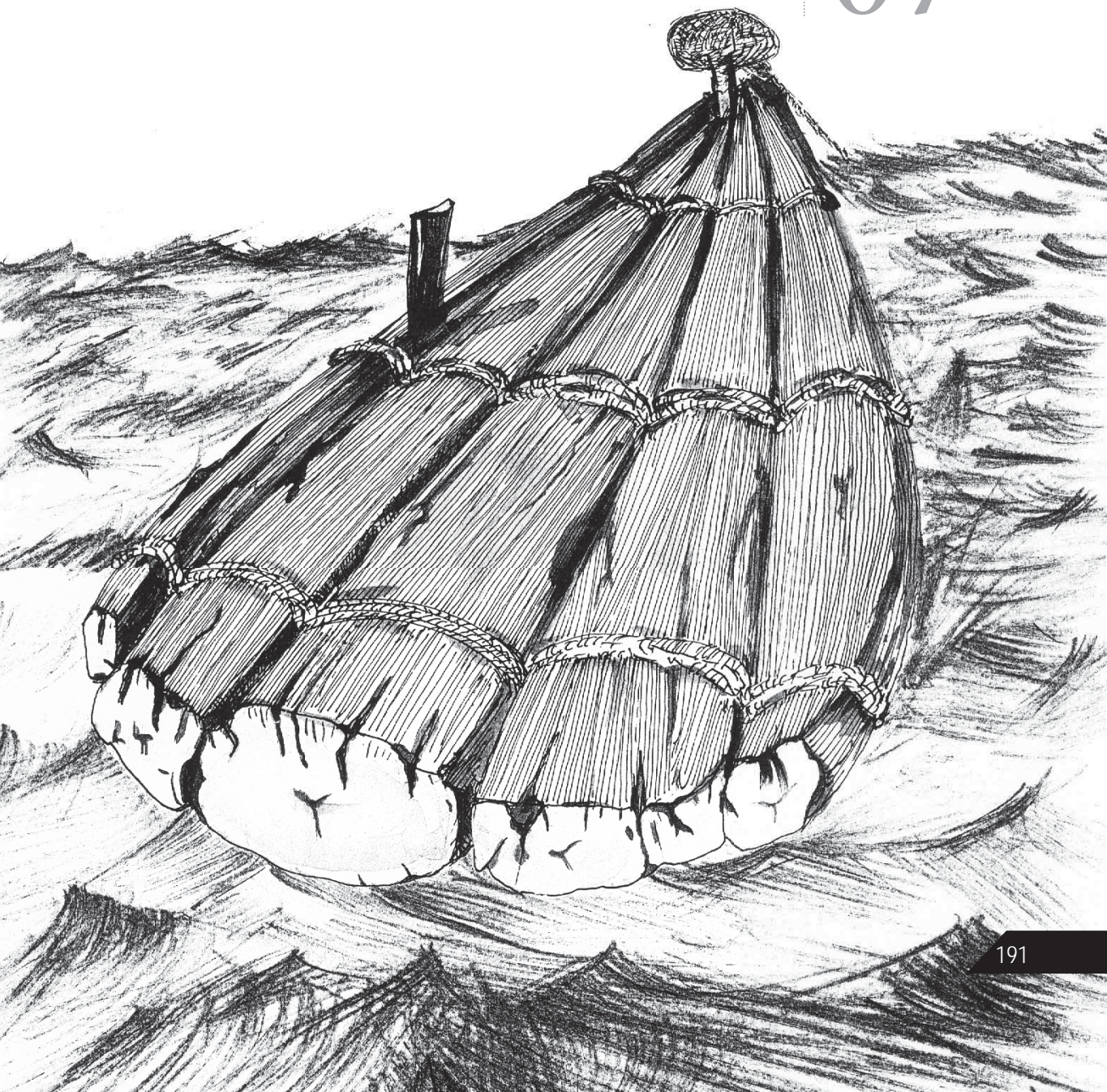


# Brackish Water Aquaculture

# 07



## Livelihood Status of Fishers in India

## Brackish Water Aquaculture

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About 75 per cent of the world production of farmed shrimp comes from Asian countries; the two leading nations being China and Thailand, closely followed by Vietnam, Indonesia, and India (Table 7.1). The remaining 25 per cent is produced in the western hemisphere, where the South-American countries (Brazil, Ecuador, Mexico) dominate. In terms of export, Thailand is by far the leading nation with a market share of more than 30 per cent, followed by China, Indonesia, and India, accounting each for about 10 per cent. Other major export nations are Vietnam, Bangladesh, and Ecuador. Thailand exports nearly all of its production, while China uses most of its shrimp in the domestic market. The only other major export nation that has a strong domestic market for farmed shrimp is Mexico.

Table 7.1: Aquaculture shrimp production by the major producer nations

Region	Country	1990	91	92	93	94	95	96	97	98	99	2000	01	02	03	04	05	06	07
Asia	China	185	220	207	88	64	78	89	96	130	152	192	267	337	687	814	892	1'080	1'265
	Thailand	115	161	185	223	264	259	238	225	250	274	309	279	264	330	360	401	501	501
	Vietnam	32	36	37	39	45	55	46	45	52	55	90	150	181	232	276	327	349	377
	Indonesia	84	116	120	117	107	121	125	127	97	121	118	129	137	168	218	266	326	315
	India	35	40	47	62	83	70	70	67	83	79	97	103	115	113	118	131	132	108
	Bangladesh	19	20	21	28	29	32	42	48	56	58	59	55	56	56	58	63	65	64
	Philippines	48	47	77	86	91	89	77	41	38	39	41	42	37	37	37	39	40	42
	Myanmar	0	0	0	0	0	1	2	2	2	5	5	6	7	19	30	49	49	48
	Taiwan	15	22	16	10	8	11	13	6	5	5	6	8	10	13	13	13	11	11
	America	Brazil	2	2	2	2	2	2	3	4	7	16	25	40	60	90	76	63	65
Ecuador		76	105	113	83	89	106	108	133	144	120	50	45	63	77	90	119	150	150
Mexico		4	5	8	12	13	16	13	17	24	29	33	48	46	46	62	90	112	114
U.S.		<1	2	2	3	2	1	1	1	2	2	2	3	4	5	5	4	3	2
Middle East	Saudi Arabia	<1	<1	<1	<1	<1	<1	<1	1	2	2	2	4	5	9	9	11	12	15
	Iran	0	0	<1	<1	<1	<1	<1	<1	1	2	4	8	6	7	9	4	6	3
Oceania	Australia	<1	<1	<1	1	2	2	2	1	1	2	3	3	4	3	4	3	4	3



### Scope for brackish water shrimp farming

Global shrimp production as well as trading values and volumes have grown significantly in the past 20 years. The major shrimp producing countries – China, Indonesia, India and Thailand have also experienced substantial increases in recent years. The main shrimp species produced worldwide is white-leg shrimp, *Litopenaeus vannamei* which has replaced the native giant black tiger shrimp, *Penaeus monodon* especially in China and Thailand.

Recently, government of India has given permission to import the species to India. In recent years, production of *P.monodon* declined mainly due to disease problems. The Better Management Practices (BMPs), when well designed and implemented can support producers to increase productivity by reducing risk of shrimp health problems as demonstrated in some farms in Andhra Pradesh by the joint MPEDA/NACA project. The latest development is organic shrimp farming which has already produced good results in some countries. The over exploitation of shrimp from coastal waters and the ever increasing demand for shrimp and shrimp products in the world market has resulted in the wide gap between the demand and supply in the international market. This has necessitated the need for exploring newer avenues for increasing shrimp production. The estimated brackish water area suitable for undertaking shrimp cultivation in India is around 11.91 lakh ha. spread over 10 states and union territories viz. West Bengal, Odisha, Andhra Pradesh, Tamil Nadu, Puducherry, Kerala, Karnataka, Goa, Maharashtra and Gujarat (Table 7.2). Of this only around 1.356 lakh ha are under shrimp farming now and hence lot of scope exists for entrepreneurs to venture into this field of activity. The following table gives the state-wise potential area available for shrimp.

Table 7.2: Potential area for shrimp farming in India

Sl. No.	State	Estimated brackish water area (ha.)
1.	West Bengal	405,000
2.	Odisha	32,600
3.	Andhra Pradesh	150,000
4.	Tamil Nadu	56,000
5.	Puducherry	800
6.	Kerala	65,000
7.	Karnataka	8,000
8.	Goa	18,500
9.	Maharashtra	80,000
10.	Gujarat	376,000
11.	Total	1191900

The potential area for shrimp farming is maximum for West Bengal followed by Gujarat and then by Andhra Pradesh. The state wise area developed, area utilised, production and productivity are given in Table 7.3.

Table 7.3: State wise details of shrimp farming: 2009-10

Sl. No.	State	Area developed (ha)	Area utilized (ha)	Production (MT)	Productivity (MT/ha/Yr)
1.	West Bengal	51,659.00	47,488.00	33,685.00	0.71
2.	Odisha	13,843.00	4,769.00	6,149.00	1.29
3.	Andhra Pradesh	58,145.20	33,754.00	39,537.00	1.17
4.	Tamil Nadu	6,109.33	2,381.49	2,702.38	1.13
5.	Kerala	15,099.39	9,544.84	1,581.00	1.07
6.	Karnataka	3,708.84	1,484.00	1,581.00	0.74
7.	Goa	867.00	272.00	319.00	1.17
8.	Maharashtra	1,329.56	650.86	1,243.79	1.91
9.	Gujarat	2,214.48	1,915.79	3,605.72	1.88
10.	Total	1,52,975.48	1,02,359.98	95,918.89	0.94

The detailed report under brackish water aquaculture for the following states namely Andhra Pradesh, Odisha, Kerala and Tamil Nadu is discussed below:

### **I. Brackish water aquaculture in Andhra Pradesh**

Andhra Pradesh contributes more than half of the country's shrimp production in India. Shrimp farming had started to expand in Kandeleru creek area since 1987-88. Availability of vast tracts of saline lands coupled with abundant quantity of wild seeds and strong export demand for shrimp were initially responsible for attracting the entrepreneurs towards shrimp farming. As a consequent hundreds of hectares of lands were brought under this venture. But the expansion was not smooth which left natural resources around the creek depleted and caused environmental degradation of creek water quality. The sector is facing regular disease problem since 1994. A considerable management and planning is needed for further development (expansion and/or intensification) of this venture.

#### **Area under culture**

The state occupies first rank in the country in coastal aquaculture. About 1.50 lakh hectares of potential brackish water area is available in the state for development of coastal aquaculture. By 1995, about 78,700 ha area was developed into ponds for shrimp culture. Due to outbreak of white spot syndrome causing virus in the year 1994 and resultant repeated crop losses during the last 16 years, much of the developed area has fallen fallow and only about 18000 ha area is now under active shrimp culture. The state contribution is about Rs. 3000 crores by way of marine product exports, which is nearly 40 per cent of these exports from India.

#### **Regularization**

As per the Coastal Aquaculture Authority Act 2005, enacted by Government of India, it is mandatory for all coastal aquaculture farms (i.e. both new and existing shrimp farms) located within area of 2 km from the High Tide Line (HTL) of the seas, rivers, creeks and back waters has to be registered with Coastal Aquaculture Authority established under the Act. As per the section 14 of the Act, if any person carries on shrimp farming without registering

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with Coastal Aquaculture Authority (CAA), he/she shall be punishable with imprisonment for a term which may extend upto three years or fine which may extend upto one lakh rupees, or with both. The provisions of Act have come into effect wef. 16-12-2005.

The Export Inspections Council of India, GOI, New Delhi under section 17 of the Export (Quality, Control and Inspection) Act 1963 (22 of 1963) has issued the notification dated 28-10-2009 to the effect that "the packages of fresh, processed, frozen or chilled and packed aquaculture fish and fishery products bear the registration number allotted by coastal Aquaculture Authority of India/ designated authorities to the farmers from which the aquaculture products are procured." The implication of the above notification is that no exporters can purchase the shrimp from unregistered farm.

### Aqua Labs

5 aqua labs are working at Kakinada, Kaikaluru, Bhimavaram, Nellore and Visakhapatnam for disease diagnosis of fish/shrimp and testing water samples etc.

### Area of study and sampling frame

Krishna district, Andhra Pradesh (Fig 7.1) was identified as the sample district and a random sample of 100 farmers was drawn in Challapalli and Nagayalankamandals to examine the trends in literacy, income and health of the shrimp farmers.



Fig 7.1: Map of Krishna district, Andhra Pradesh

## A. General Particulars

### (i) Age composition of shrimp farmers:

In Krishna district of Andhra Pradesh, the majority (65 per cent) of the shrimp farmers belonged to the middle age group of 36-55 years. This indicated a healthy trend since farmers of this group are receptive, healthy and industrious. This augurs well for the shrimp farming in Krishna district. Only 17 per cent of the shrimp farmers were in old age group. 51 per cent of the respondents in Krishna district were males and 49 per cent were females.

### (ii) Family size of shrimp farmers

In Krishna district, the average size of the shrimp farmer family was 4.78. There were 30 families that had an average size of 2-4 members, 37 families with an average size of 5-6 members and 21 families that had a size of 7-10 members.

Given the size of the families and the age groups in which the members fell, the families of the shrimp farmers in Krishna district were in the ideal age group and family composition that could derive optimum development out of shrimp farming in Krishna district.

### (iii) Age composition

In Krishna district, a total of 215 males and 206 females were in the sampled families of the 100 shrimp farmers. There were 65 boys and 61 girls who were less than 15 years of age.

## B. Literacy Status

### (i) Literacy profile

In Krishna district of Andhra Pradesh, among the 421 family members of the 100 sampled shrimp farmers, 192 members (45 per cent) were illiterate. 62 (15 per cent), 137 (33 per cent) and 30 members (7 per cent) were educated upto primary, secondary and collegiate levels respectively.

Table 7.4: Age composition of the respondent households (Number)

District	Adult (> 15 years)		Children < 15 years)		Total	
	Male	Female	Male	Female	Male	Female
Krishna	150	145	65	61	215 (51.07)	206 (48.93)

### (ii) Continuing education

No dropouts were recorded among the literate family members of the shrimp farmers in Krishna district. This may be taken as an indication that shrimp farming activity is able to generate levels of income that enables the farmer to educate his family members well.

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Table 7.5: Education of respondent households - Continuing and Dropout (Number)

District	Education status			
	Continuing	Primary	Secondary	Collegiate
Krishna	229 (100.00)	62 (27.07)	137 (59.83)	30 (21.90)

Figures in parenthesis indicate percentage to total (Secondary = High School + Secondary + Vocational)  
Collegiate = Collegiate + Professional

### (iii) Access to educational institutions

Vijayawada is one of the main education centers in Andhra Pradesh. NTR University of Health Sciences is located in Vijayawada. Krishna University is located in Machilipatnam. International Institute of Information Technology is present in Nuzvid. South Indian branch of school of architecture and planning is present in Vijayawada.

It boasts headquarters of numerous residential colleges and schools like Sri Chaitanya, Nalanda, Gowtham, Sri Krishnaveni, and American Medical Education for USMLE coaching which are amongst the biggest/largest of the Corporate Educational Institutes in India. District has numerous engineering colleges including Velagapudi Ramakrishna Siddhartha Engineering College, Gudlavalleru Engineering College, KLCE. Gudlavalleru Polytechnic College, Mary Stella college, Sidhartha Degree College are few of the many famous arts and science colleges in the district.

Machilipatnam, the district headquarters of Krishna, is an educational center, offering all the academic courses except Medicine. It has public (state-run) and private-run schools. The local Hindu college and allied institutions offer KG to PG level of education. There are several Telugu language and English language schools. Daita Madhusudhana Sastry, the former secretary and correspondent of the Hindu college and allied institutions was instrumental in the establishment and expansion of most of the educational institutions in Machilipatnam. Table 7.6 gives the approximate distance of the primary and high schools and colleges from the mandals that were covered under the study in Krishna district.

Table 7.6 : Access to Education (km)

District	Education status			
	Continuing	Primary	Secondary	Collegiate
Krishna	10	20	12	15

Figures in parenthesis indicate percentage to total (Secondary = High School + Secondary + Vocational)  
Collegiate = Collegiate + Professional

## C. Health profile

According to field data collected, it appears that with the eradication of small pox from India, the vaccination for small pox has been discontinued (Table 7.7). The others vaccinations include BCG, MMR, Oral polio vaccines are being given to all the children of the shrimp farmers sampled in Krishna district.



Table 7.7: Vaccination regime of infants / children (less than 15 years)

Districts	Average age of administration and incidence of discontinuation (percentage)									
	Small Pox		BCG		MMR		Polio		Others*	
	Age (Weeks)	IOD*	Age (Weeks)	IOD	Age (Weeks)	IOD	Age (Weeks)	IOD	Age (Weeks)	IOD
Krishna	Nil	Nil	6	Nil	9-12	Nil	6	Nil	9-12	50

\*Incidence of discontinuation (IOD) in per cent.

The direct positive co-relationship between education and health consciousness can be seen in Krishna district. No case of discontinuance of the vaccination regime was recorded among the sampled farmers.

### (i) Birth weight of infants:

The average birth weight of infants born to shrimp farmers was 2.75 kg in Krishna district. It was 2.50 kg for male infants and 3.0 kg for female infants. The weights compared favourably with the average weight of infants for age weight relationships according to Indian Medical Association estimates.

### (ii) Mortality of mother/infant

Details regarding infant and or mother mortality during birth were not available from the shrimp farmers of Krishna district

### (iii) Annual occurrence of diseases among shrimp farmers

Shrimp farming has often been alleged to cause skin rashes and even reproductive disorders. But contrary to what has often been reported in popular press during the late nineties, there was no significant incidence of skin or reproductive disorders among shrimp farmers in Krishna district. The frequency of occurrence is insignificant even for normal ailments such as fevers and stomach disorders (Table 7.8). It is significant to note that there are no reports of any serious ailments among shrimp farmers in Krishna district of Andhra Pradesh.

Table 7.8: Incidence of diseases among Adult (Male and Female) - Annual frequency

Sl. No.	Diseases	Krishna District	
		M	F
Common Diseases			
1.	Fever/Flu	0.45 (45)	0.43 (43)
2.	Body Aches	0.5 (50)	0.49 (49)
3.	Diarrhoea	0.07 (7)	0.02 (2)
4.	Gastro enteric disease	0.41 (41)	0.35 (35)
5.	Skin disorder	0.05 (5)	0.03 (3)
6.	Reproductive disorder	Nil	Nil

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Special Ailments			
7.	Cardiac failure	Nil	Nil
8.	TB	Nil	Nil
9.	Anemia	Nil	Nil
10.	Diabetes	Nil	Nil
11.	Blood Pressure	Nil	Nil
12.	AIDS	Nil	Nil
13.	Others*	Nil	Nil

### (iv) Disease occurrence among farmers in shrimp farming (Previous history)

On a recall basis skin diseases were not recorded among women members of shrimp farmers families in Challapalli and Nagayalan kamandals, Krishna district of Andhra Pradesh while only 7 per cent of the male members including children reported any occurrence of skin ailments. The males include boys too. None of the female members of the shrimp farmers' households reported any reproductive disorders even on a 10 year recall basis in the same district among shrimp farmers.

Table 7.9: Incidence of diseases among - Adult (Male and Female) Previous occurrence

Sl. No.	Diseases	Krishna District	
		M	F
Common Diseases			
1.	Fever/Flu	6.91	7.16
2.	Body Aches	7.41	7.5
3.	Diarrhoea	8.08	8.25
4.	Gastroenteric disease	8.16	8.25
5.	Skin disorder	7.33	Nil
6.	Reproductive disorder	Nil	Nil
7.	Cardiac failure	Nil	Nil
8.	TB	Nil	Nil
9.	Anemia	Nil	Nil
10.	Diabetes	Nil	Nil
11.	Blood Pressure	Nil	Nil
12.	AIDS	Nil	Nil
13.	Others*	Nil	Nil

(\* others include Thyroid, Sinus)

### (v) Disease occurrence among children of shrimp farmers (Previous history)

Standard birth weights, good diet and normal education have contributed to practical absence of diseases including serious ailments among the children of shrimp farmers in Challapalli and Nagayalankamandals, Krishna district.

On a recall basis practically no minor diseases were recorded among children of shrimp farmers' families in Challapalli and Nagayalan kamandals, Krishna district of Andhra Pradesh even on a 10 year recall basis.

### Access to Health care (km)

The sampled mandals of Challapalli and Nagayalankamandals, Krishna district were reasonably close to PHC at Machilipnam (within 3-6 km), however Vijayawada is having comparatively less access to hospital facilities since it is located 50 km apart. Good health care facilities were available to shrimp farmers of Krishna district.

### (vii) Problems in health management

For eliciting responses to problems to health management, among shrimp farmer respondents of Krishna district, an opinion scale of 1 to 5 was offered with 1 indicating total agreement with the statement of reason and 5 in total disagreement. Since good hospitals were accessible to the community at Vijayawada and the local PHC's were being reasonably well manned, most of the responses were towards total disagreement of the possible reasons (Table 7.10).

Table 7.10: Problems in health management

Sl. No.	Reasons	Score
1.	Difficulty in accessing the hospital due to distance	5
2.	Non availability of specialist and para medicines in health centers	5
3.	Poor infrastructure (of PHC)	4
4.	Lack of adequate effective medicines	4
5.	Problems on Cleanliness/ Sanitation	4
6.	Drinking water problem	4
7.	Work related stress	5
8.	Others	5

*Scale: 1-5 with 1 indicating total agreement and 5 indicating total disagreement  
Number of respondents who had opined on the same*

## D. Income profile

### (i) Income profile

The weekly income of respondents from various economic activities are given in Table 7.11. Incomes were derived from various enterprises like fishery, agriculture, manual labour and other businesses. The weekly average income for Krishna district amounted to Rs. 2019/- per adult.

Table 7. 11. Income profile of the respondents (Weekly Rs.)

Sl. No.	Enterprise	Income in Rs.
1.	Fishery	1153.84
2.	Labour	384.60
3.	Agriculture	384.60
4.	Business	480.760
5.	Any others	-
6.	Total	2019.23

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### (ii) Involvement of shrimp farmers in non fisheries activities

Krishna district is the heartland of shrimp farming in the country (Table 7.12). Of the 295 adults in 100 shrimp farmer families surveyed, only 62 adults were engaged in activities other than shrimp aquaculture, ie. Only 21 per cent of the total adults in shrimp farming households sampled engaged in other economic activities. This may practically be discounted in full since these activities are seasonal such as working as labour in agriculture during off season time of shrimp farming.

Table 7.12: Respondents involvement in Non-fisheries activities

Sl.No:	Non Fishing activities	Involvement (frequency)
1.	Labour	30
2.	Agriculture	18
3.	Business	05
4.	Any others	09
5.	Total	62 (21)

*Figures in parenthesis indicate percentage to total*

### (iii) Pattern of expenditure of fisher family

The total weekly expenditure of the 100 shrimp families in Challapalli and Nagayalan kamandals, Krishna district of Andhra Pradesh amounted to Rs. 23,500 ie. Rs. 235/- per shrimp farmer family per week. The weekly expenditure seems to be an understatement. The total income was expended with 0.13 per cent on food; 0.22 per cent on clothing; 0.04 per cent on fuel; 0.02 per cent on medicines; 0.53 per cent on education; 0.04 per cent on entertainment and personal 0.04 per cent on durables.

Table 7.13: Pattern of expenditure of the fishers family (Weekly Rs.)

Sl.No.	Items	Expenditure (in Rs.)
1.	Food	3,000
2.	Clothing	5,000
3.	Fuel	1,000
4.	Medical	500
5.	Education	12,000
6.	Entertainment	500
7.	Personal	500
8.	Durables	1000
9.	Total	23,500

### (iv) Savings in shrimp farming households

Coastal areas of Andhra Pradesh is one of the richest regions of agricultural India. In tune with the ground truth of the region and the district the data on savings seem to reflect the factual position. Of the 100 farmers sampled in Krishna district 30 per cent did not have any savings; 30 per cent had some savings of less than Rs.50,000; 20 per cent had savings between Rs. 50,000 and 1,00,000 and 10 per cent had savings more than Rs. 1,00,000/-. Moreover no indebtedness was recorded among sampled shrimp farmers in Krishna district

### (v) Sources of lending

Though no indebtedness was recorded in Krishna district among the sampled shrimp farmers, as far as crop loan was concerned, the primary source of funds was own funds generated within the family and followed by jewel loans. It does appear that institutional finance is not yet shrimp farming friendly. The short term loans generated through the institutional sources were also taken for minor repair works and not to support the major activity of financing the crop as such. Therefore the risk in shrimp farming is still high and the absence of insurance to accept the enterprise in full appears to be significant.

Table 7.14.: Lending organizations (Number of respondents who had availed)

Sl. No.	Sources	Percentage of respondents
1.	Banks	10
2.	Co-operative	10
3.	Private money lenders	10
4.	Friends / Relatives ( and Own)	55
5.	Jewel loans	15

### (vi) Purpose of availing loans

In Krishna district, the major purpose for which loans were availed was for meeting short term culture related expenses such as bund repair, motor replacement etc. The other items for which funds were borrowed were for house building and for conducting marriages of children.

Table 7.15: Purpose of availing loans (Percentage of respondents who had availed)

Sl. No.	Purpose	Percentage of respondents
1.	Purchase of craft/ gear and other fishing related equipments	50
2.	House construction / Land purchase	20
3.	Marriage expense	20
4.	Education	Nil
5.	Health and Social Security	Nil
6.	Any others	10

### (vii) Scope for enhancement of income and employment

Multiple scoring was used for assessment of suggestions for enhancement of income and employment. Suggestions for formalising the acceptance of shrimp farming by institutional financial agencies and for improving rural infrastructure such as roads and communications had 100 per cent response. At the same time marketing and food security through PDS system was not a problem for shrimp farmers of Krishna district essentially because shrimp farming is a high income earning activity and since it has been practised for the last two decades on a commercial scale in Krishna districts and other districts of Andhra Pradesh.



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Table 7.16: Suggestions for enhancing the income and employment generation by fishermen (percentage response)

Sl. No.	Suggestions	Percentage of respondents
1.	Arranging the institutional financial support like micro credit for fisheries, SHG, etc	100
2.	Regulation of fish marketing through institutional interventions	Nil
3.	Vocational training for fisherwomen to undertake house hold income activities during dry/ off season	Nil
4.	Regulation of PDS and supply of the basic food items and fuel(like kerosene ,LPG,etc) by the Govt. agencies	Nil
5.	Provisional of rural infrastructure for general societal / human development	100

## II. Brackish water Aquaculture of Odisha

### Samplings and Data Collection

Odisha state of India is located between the parallels of 17.49N and 22.34N latitudes and meridians of 81.27E and 87.29E longitudes. It is bounded by the Bay of Bengal on the east; Madhya Pradesh on the west and Andhra Pradesh on the south. It extends over an area of 155,707 square kms accounting about 4.87 of the total area of India. According to the 1991 census, it has a total population of 31,512,070 (3.73 per cent of the total population of India) out of which about 16,237,000 are male and 15,275,070 are female. It has 482 km stretch of coastal line.

The annual per capita fish consumption is 8.44 Kg. During 2007-08 the total fish production of the state is about 2, 25,102 MT. The marine fish production of the state during 2007-08 (up to December, 2007) is about 99553 MT. The state has vast potential for fresh water and brackish water aquaculture. It has fresh water ponds and tanks covering water area of 1,17,913 ha lakes and swamps of 1,80,000 ha, rivers and canals of 1,71,186 ha and reservoirs of 1,97,472 ha. The fishermen population of the state is about 10.84 lakhs. The economic status of the fishermen is generally below the poverty line (BPL). About 80 per cent of the state populations are fish eaters.

The brackish water aquaculture in Odisha is a popular enterprise in the coastal Odisha predominantly in Puri district. Therefore, the data collection on the brackish water aquaculture was concentrated in the Puri district. A total of 59 samples were collected in Odisha. The details of the sampling are presented below.

## Samplings and data collection

The results and discussions are presented under the following heads

- A. General particulars
- B. Literacy status
- C. Health status
- D. Income status

### A. General particulars

The general particulars of respondent's households included age, family size, family composition etc.

#### (i) Age distribution

The age distribution of respondent households is given in Table 7.17. The brackish water aquaculture sector in the state of Odisha exists mostly in the district of Puri in coastal Odisha. A total of 104 households were surveyed and it was found that majority (about 60 per cent) were in the middle age group of 36 to 55 years and rest of them were mostly at the higher ages i.e. 30.8 per cent above 56 years. The young age group people with less than 35 years were very less constituting 8.7 per cent only.

Table 7.17 : Age wise details of sample respondent (Years)

Age wise distribution				
	<35	36-55	>56	Total
Frequency	9	63	32	104
Percentage	(8.7)	(60.6)	(30.8)	(100.0)

#### (ii) Male female ratio

The male female ratio was found to be highly skewed in case of the brackish water aquaculturist of Odisha. There were 294 male against 215 females among the 104 households. This is also indicative of the low level of social status of the women folk and difference in the distribution of the facilities between women and men.

Table 7.18 : Household particulars of the sample respondents-male and female)

District	Number of household	Male	Female	Total
Puri	104	294 (57.8)	215 (42.2)	509 (100)

*Figures in parenthesis indicate percentage to total*

## Livelihood Status of Fishers in India

### (iii) Family size

The family size is an important indicator of family welfare. The average size of the family of the brackish water aquaculturist of Odisha were found to be 5.0. About half of them within the size group of 5-6, 40 per cent were within the size group of 2-4 and 10 per cent were in the category of 7-10.

Table 7.19: Family size of the respondent households (Number)

	2-4	5-6	7-10	Total	Average
Number	41	52	11	104	5.0
Percentage	39.4	50.0	10.6	100.0	

### (iv) Age composition

The age composition of the respondents' households of the fishers involved in the brackish water Aquaculture of the Odisha shown similar trend comparable to other sector. There was a wide gap between the male and female at 1.4:1 ratio among the adult and 1.24:1 among the children. The adult children ratio was 2.43:1. The skewed male female ratio is a cause of concern for the community.

Table 7.20: Age composition of the respondent households (Number)

	Adult (>15 yr)		Children (<15 yr)		Total	
	Male	Female	Male	Female	Male	Female
Number	226	161	66	53	292	214
Percentage	77.40	75.23	22.60	24.77	100.00	100.00

## B. Literacy status

The literacy status of the respondent households was analyzed through the literacy level, educational status - continuing and dropouts and access to educational facilities. The illiterate indicates fisher folk without any formal education and doesn't even possess functional literacy.

Table 7.21: Literacy Profile of the respondent families (Number)

	Total	Illiterates	Literate	Primary	Secondary	College	Profes- sional	Voca- tional
Number	502	79	423	187	188	44	3	1
Percentage	100.0	15.7	84.3	44.2	44.4	10.4	0.7	0.2

### (i) Literacy status

The literacy status includes the level of education as indicated by primary, secondary and collegiate level. The primary level indicated schooling till fourth grade, secondary level

indicated by high school. The collegiate level of education was denoted by collegiate and professional education. The vocational education involved any formal education in vocational schools or college.

The fish farmers of the brackish water aquaculture of Odisha were shown relatively better level of education compared to others as only 15.7 per cent of the populace were illiterates. Among the literates about 44 per cent were in primary and the same were in the secondary level. The college level of education was prevalent among 10.4 per cent of the people. Only few members (four) attained professional/vocational qualification among the respondents' families.

### **(ii) Educational status**

The educational status needs to be studied along with the dropout rates as the drop outs were the voluntary or involuntary discontinuation of the education. The drops outs are also the indicators of the termination of the education. Among the brackishwater aquaculturist the dropout rates were as high with 77.0 which was as high as 86.7 per cent in Puri district. The dropouts indicate that most of the students discontinue their education mostly at secondary and primary level. The level of dropouts at secondary level is 42.3 per cent where as at the primary level is 30.9 per cent and rest 26.8 per cent are at the college level. In Puri more dropouts were reported at college level.

The percentages of dropouts among the members of the households involved in the brackish water aquaculture were in Puri as high as 78.7 per cent. Among them the percentage



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drop outs in the primary, secondary and collegiate level were 27.6 per cent, 52.6 per cent and 19.8 per cent, respectively. About half the dropouts at the level of secondary schools.

Table 7.22: Dropouts at different level of education

	Primary	Secondary	Collegiate	Total drop out	Total literate
Number	92	175	66	333	423
Percentage	27.6	52.6	19.8	100.0	78.7

### (iii) Access to educational institutions

Access to education is an important yardstick to measure the socio-economic well being of a society. The proximity of the educational institutions like primary school, high school, college and professional college provides a major impetus when it comes to continuing education. The higher distance to the educational institutes reduces the access to it and there is a greater chance of drop outs when the schools or colleges were distantly located. The analysis was presented to evaluate the physical access to education.

The fish farmers of the brackish water aquaculture located in the Puri district were studied for their physical access to the educational institutions. The average distance to the primary and secondary school were 0.5 and 1.3 kilometers indicated their accessibility. It is also interesting to note that the colleges were also located nearby with an average of 2.5 kilometers. But, the professional colleges were located at a distance of 24.3 kilometers which can be considered as far way in term of the physical access to such institutions.

## C. Health profile

The health status of the respondent households was studied based on the parameters like administration of vaccines, incidence of discontinuation, birth weight of infants, incidence of maternal and child mortality at the time of birth, incidence of common diseases and special ailments among adults and children. Disease management aspects like access to health care, problems in health management and suggestions to improve the health care facilities are also dealt in this session.

### (i) Vaccination regime and incidence of disease

The average age of administration of vaccination and incidence of discontinuation among infants/children among sample population is studied. The vaccination for Pox, BCG, MMR and Polio were regularly taken by all the families covered under the study. The average age at which the vaccination for pox was given to the child worked out at one year, and for polio it goes upto five years in tune with the practice prevalent and recommendation made by the local hospital and paramedics.

Table 7.23 :Vaccination regime of infants / children (less than 15 years) - Average age of administration and incidence of discontinuation

POX		BCG		MMR		Polio	
Age	IOD*	Age	IOD	Age	IOD	Age	IOD
1	6.4	1	6.4	1	11.1	Upto 5 years	0.0

\* incidence of discontinuation in per cent



The percentage of the household having children received vaccination was studied to assess the spread of the vaccination regimes to the target households. The primary reasons of discontinuation were found to be lack of knowledge and awareness about the programme.

### (ii) Birth weight of infants

Birth weights are considered as an important indicator of the health status of the mother and the families. The birth weight in comparison to the state or national average can be an important indicator to assess the maternal health status. The birth weights for the male and female in Puri were 2.1 and 2.3 kg, respectively.

### (iii) Incidence of mortality among mother/ child during birth

Maternal and child mortality at the time of birth and infant mortality had been pressing concerns over the past. The maternal mortality is an extreme case of the failure of the socio-environmental system to protect the mothers. The incidence of mortality was therefore an indicator of the health status of the mother and family. Few cases of maternal and child mortality was reported across the sample households in Puri, which include ten cases of child mortality and two incidents of maternal mortality.

### (iv) Incidence of diseases among adults

The incidence, frequency, and previous occurrence of diseases among the adult family members of the respondents across the four coastal districts are discussed in the Table 7.24. Major diseases found among the respondents were categorized under two groups, viz; common diseases and special ailments. Fever/flu, body ache, diarrhoea, gastro enteric disease, skin disorder, reproductive disorders are included in common diseases. Special ailments include diseases like cardiac failure, tuberculosis, anaemia, diabetics, blood pressure, AIDS and others. The predominant ailments reported among the fish farmers of brackish water aquaculture were fever, body ache and gastro enteric diseases as a community both in males as well as females. But in all of these cases, the numbers of persons reported as well as frequency of

Table 7.24: Incidence of diseases among Adult (Male and Female) - Annual frequency

Sl.No	Incidence of diseases- Annual frequency				
		Male		Female	
	Common disease	Frequency	Average	Frequency	Average
1.	Fever	103	1.7	96	1.7
2.	Body ache	32	2.4	13	1.9
3.	Diarrhoea	4	2.3	2	1.5
4.	Gastroenteric	36	2.0	25	1.8
5.	Skin disorder	16	1.6	6	1.8
6.	Reproductive disorder	2	1.0	0	0.0
	Special ailments				
7.	TB	2	1.0	0	0.0
8.	Cardiac failure	18	1.1	4	1.0
9	Anaemia	12	1.4	6	1.0
	Others	14	1.6	14	2.1

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occurrence were higher in males compared to females. The special ailments were not very predominant in the community.

### (v) Incidence of diseases among adult (male and female) previous occurrence

The previous table explained about the reported numbers in each ailments as well as the annual frequency. The common diseases of fever and body ache occurred 3 to 4 months back while for the diarrhoea and skin disorder it was 5-6 months.

Table 7.25: Incidence of diseases among - Adult Previous occurrence (No: of months)

Incidence of diseases- Annual frequency				
Common disease	Male		Female	
	Frequency	Average	Frequency	Average
Fever	103	3.2	96	4.1
Body ache	33	2.4	12	2.5
Diarrhoea	4	3.0	2	5.0
Gastroenteric	36	3.2	25	3.6
Skin disorder	16	3.2	6	5.0
Reproductive disorder	2	6.0	0	0.0
Special ailments				
TB	2	10.5	0	0.0
Cardiac failure	18	6.0	4	5.5
Anaemia	12	4.4	6	4.8
Others	14	4.4	14	4.2

### (vi) Incidence of diseases among children

The health status of the children were also studied to make a comparison with adults in terms of both common as well as specialized diseases. The common diseases were mostly fever, body ache, diarrhoea, gastro enteric, skin and reproductive disorder etc. Whereas the specialized diseases were TB, cardiac failure, anaemia and other diseases. Frequencies of diseases in a year across male as well as female child were studied. Across the children in the households of brackish water aquaculturist the predominant disease reported was fever. The occurrence was high in terms of both frequency and number among males and female.

Table 7.26: Incidence of diseases among Children (Male and Female) - Annual frequency

Incidence of diseases- Annual frequency				
Common disease	Male		Female	
	Frequency	Average	Frequency	Average
Fever	26	2.3	23	2.3
Body ache	1	3.0	3	1.0

Diarrhoea	2	2.5	0	0.0
Gastroenteric	0	0.0	0	0.0
Skin disorder	3	1.3	0	0.0
Reproductive disorder	0	0.0	0	0.0
Special ailments				
TB	0	0.0	0	0.0
Cardiac failure	0	0.0	0	0.0
Anaemia	0	0.0	0	0.0
Others	1	1.0	0	0.0

### (vii) Incidence of diseases among children (male and female) previous occurrence

The details of previous occurrence of diseases among children in terms of number of month is furnished in table 7.27. As discussed in the previous section, the reported cases of fever and diarrhoea were occurred 2 to 3 months back. Fever was reported 3 to 4 month back among females of respondent households.

Table 7.37: Incidence of diseases among Children - Previous occurrence (No: of months)

Common disease	Incidence of diseases- Annual frequency			
	Male		Female	
	Frequency	Average	Frequency	Average
Fever	26	2.8	23	3.7
Body ache	1	2.0	3	4.0
Diarrhoea	2	2.5	0	0.0
Gastroenteric	0	0.0	0	0.0
Skin disorder	3	4.7	0	0.0
Reproductive disorder	0	0.0	0	0.0
Special ailments	0	0.0	0	0.0
TB	0	0.0	0	0.0
Cardiac failure	0	0.0	0	0.0
Anaemia	0	0.0	0	0.0
Others	1	2.0	0	0.0

### (viii) Access to health care

The access to health care is an important indicator of the human development as the accessibility of the health care service determines the state of health of the communities. There are many parameters to measure the access to the health services but among which the physical distance is an important parameter. The physical distance is important as the poor fishing communities in most cases depend heavily on walk or cycle to have access to health care facilities. Therefore, the distance determines the access to the health care in a greater extent. In the present survey, the physical distance in term of kilo meters to the hospital was studied to assess the state of access of the fishers' communities to the health care services.

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For the fishers involved in brackish water aquaculture in Puri district the average distance to the hospital was 2.6 kilo meters.

### (ix) Problems in health management

Various problems of the health management were investigated in the survey by using open ended questions and each household were asked to identify the most important problem concerned to health management. The table 7.28. depicts the results of the survey.

The major problems in health management identified by the respondents include poor sanitation, poor financial conditions, water problems, as well as poor working conditions etc. Interestingly, no household identified the lack of medical facilities as the problems for them.

Table 7.28: Problems in health management (Frequency)

Sl. No.	Problems	Frequency
1.	Water problem	24 (23.1)
2.	Sanitation	29 (27.9)
3.	Financial problem	26 (25.0)
4.	Poor working condition	25 (24.0)
5.	Lack of medical facilities	0 (0.0)

*Figures in parenthesis indicate percentage to total*

### (x) Suggestions to improve health care

Similar to the survey on the problems, the suggestion to improve the health status was assessed using similar methodology. The fish farmers working in the brackish water aquaculture of Odisha considered availability of free medicines, appointment of knowledgeable staff and provision of water and sanitation facilities as important solution to the problems. .

Table 7.29: Suggestions to improve health care facilities (Frequency)

Sl. No	Suggestions	Frequency
1.	Sanitation facilities by govt.	10 (9.6)
2.	Free medicine by govt.	52 (50.0)
3.	Water facilities by govt.	10 (9.6)
4.	Appointment of knowledgeable staff	31 (29.8)
5.	Appointment of doctors in hospital	1 (1.0)

*Figures in parenthesis indicate percentage to total*

## D. Income profile

The income profiling of the respondent households are analyzed using income patterns, respondents involvement in non fisheries activities and expenditure pattern. In addition the indebtedness and savings were analyzed using details on savings, indebtedness, sources of lending organization, purpose of availing loan and suggestions for enhancing the income and employment generation

### (i) Income pattern

Weekly income of the fish farmers engaged in the freshwater aquaculture was assessed using the survey questionnaires. The average income of the people involved in the brackish water aquaculture was reported to be at Rs. 742 per household per week. The aquaculture constitutes about 78.4 per cent of the income followed by agriculture (14.2 per cent). The other incomes like labour, business are of minor importance for the people involved in the brackish water aquaculture.

Table 7.30: Income profile of the respondents (Weekly Rs.)

	Fisheries	Labour	Agriculture	Business	Total
Rupees	581.7	38.5	105.8	22.1	742.3
Percentage	78.4	5.2	14.2	3.0	100.0

### (ii) Involvement in non fisheries activities

The Involvement of respondent' households in non fisheries activities are illustrated in Table 7.34. The level of the involvement in other employment sector than fisheries activities was indicative of the livelihood diversity. It is generally understood that the diversified portfolio of the income is a sign of livelihood security as it reduces the seasonality and increases the adaptability to the risk and uncertainty in the livelihoods. About 31.7 per cent of the households were depending on agriculture activities as an alternative source if income.

Table 7.31: Respondents involvement in Non-fisheries activities

	Labour	Agriculture	Business	Total
Frequency	15	33	5	104
Percentage	14.4	31.7	4.8	100.0

### (iii) Expenditure patterns

The expenditure is considered to be the most important indicators of the income and poverty as the income data alone are often unreliable. The expenditure pattern not only shows the net expenditure but also the qualitative information of the expenditure across various heads. The important expenditure heads of a family including food, clothing, fuel, education, medical expenses, entertainment, durables, personal etc were studied. The fish farmers of brackish water aquaculture were spending about 60.0 per cent for food followed by personal (9.2 per cent) medical (6.9 per cent) and clothing's (6.4 per cent) together constitute about 82.3 per cent. The personal expenses were primarily for the consumption of liquors, tobacco and other intoxicants.



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Table 7.32: Pattern of expenditure of the fisher families (Weekly Rs.)

	Food	Clothing	Fuel	Medical	Education	Entertainment	Personal	Durable	Total
Rupees	383.5	40.9	22.7	44.3	34.7	37.6	58.6	17.1	639.3
percentage	60.0	6.4	3.5	6.9	5.4	5.9	9.2	2.7	100.0

### (iv) Indebtedness and Savings

The indebtedness and loan details are important to understand the level of distress within the household of the fish farmers and fishers involved in the fisheries and aquaculture. The frequency occurrence of the loans were studied and presented in table 7.33. Most of the brackish water aquaculturists were taken loan. About one third of the fish farmers were taken loan of varying amount viz., <1000, 1000-10000, 10000-50000. Only a few were taken higher amount of loan (>50000).

Table 7.33 : Loan details of respondent households

	<1000	1000-10000	10000-50000	50000-100000	>100000	Total
Frequency	28	28	30	3	1	90
Percentage	31.1	31.1	33.3	3.3	1.1	100.0

The number of person having loan is an indicator of the financial independence of the community as higher percentage of the loan would be indicating the loan dependency. Similarly, the actual amount of the loan per household was indicative of the community dependence. The loan amount was indicative of the actual level of dependence to the credit. The loan per loaning household shows the individual household dependence where as the per household indicates the community financial health. Among the brackish water aquaculturists of Odisha, most of them (86.5 per cent) were involved in the loan of any amount. The average loan amount was Rs. 4566.7 and per household it was estimated to be Rs. 3951.9. These amounts were used mostly for consumption as well as operational expenses for aquaculture.

### (v) Source of lendings

There were many sources of the lending viz., banks, private moneylenders, friends, self-help group, private company, cooperative society and cooperative bank. These sources were diverse with differential institutional arrangement in supply of the credit to the fishers. The private money lenders and friends were the informal sources where as others were the formal sources in the credit supply. The table 7.34 presents the percentage distribution of the loans across the sources. The fish farmers of brackish water aquaculture of Odisha were taken loan primarily from banks, cooperative Society and cooperative bank in the order of importance. Other sources were less important as sources of credit.

Table 7.34: Sources of lending (Number of respondents who had availed)

	Bank	Private money lenders	Friends	Self Help Group	Cooperative society	Cooperative bank
Frequency	27	3	3	3	17	9
Percentage	43.5	4.8	4.8	4.8	27.4	14.5

### (vi) Purpose of loan

In the preceding sections the amount as well as sources of the credits was studied. It was found that the fish farmers and fishers were mostly taken smaller amounts of the credit. The Table 7.35 presents the purpose of the credit across various uses distributed in percentages. The most prioritized purpose of the loan was business, agriculture and construction of houses for the brackish water aquaculturists of Odisha.

Table 7.35: Purpose of availing loans (Number of respondents who had availed)

Sl.No.	Purpose	Frequency
1.	Construction of house	8 (13.8)
2.	Agriculture	15 (25.9)
3.	Digging and repair of pond	0 (0.00)
4.	Health management	2 (3.4)
5.	Fishing equipment	0 (0.00)
6.	Business	34 (57.9)

*Figures in parenthesis indicate percentage to total*

### (vii) Suggestions to improve indebtedness

The survey sought open ended suggestions from the respondent about the options to reduce the loan burden. The suggestions are presented in Table 7.36 as percentage response to the various options. The government support, freeing of interest were the two major suggestion followed by the loan weaver as options to reduce the loan burden of brackish water aquaculturists.

Table 7.36: Suggestions to reduce the loan burdens of fish farmers.

Sl.No.	Purpose	Frequency
1.	Loan weaver	11 (18.6)
2.	Interest free loan	19 (32.2)
3.	Provide government loan	2 (3.2)
4.	More loan by bank	1 (1.7)
5.	Government support	26 (44.1)

*Figures in parenthesis indicate percentage to total*

## III. Brackish water aquaculture - Kerala

Brackish water aquaculture contributes significantly to the Indian sea food export, mainly through production of shrimp and scampi. Among the coastal districts in Kerala, four districts namely Alapuzha, Ernakulam, Thrissur and Kollam are contributing significantly to the brackish water aquaculture production from the state and are selected for the study. The assessment of literacy, health and income status of the fish farmers in these four districts are presented below:-

## A. General particulars

### (i) Age

The analysis of the age group of the respondents indicated that the maximum proportions of them are in the age group of 36-55 years (58per cent of the total) (Table 7.37). Among the four districts also, the highest share of respondents fall under the age group of 36-55 years (48 per cent in Alappuzha, 35.82per cent in Ernakulam, 55per cent in Kollam and 65per cent in Thrissur). This indicated that the potential (or receptive or experienced) age group range of 36-55 years dominates the age group composition, which can be considered ideal for introducing any new concepts in the field.

Table 7.37: Age wise details of the sample respondents (Years)

Sl. No	Districts	<35	36-55	>56	Total
1.	Alappuzha	8 (32.00)	12 (48.00)	5 (20.00)	25 (100.00)
2.	Ernakulam	2 (5.71)	22 (35.82)	11 (31.42)	35 (100.00)
3.	Kollam	2 (10.00)	11 (55.00)	7 (35.00)	20 (100.00)
4.	Thrissur	1 (5.00)	13 (65.00)	6 (30.00)	20 (100.00)
5.	Total	13 (13.00)	58 (58.00)	29 (29.00)	100 (100.00)

*Figures in parenthesis indicate percentage to total*

### (ii) Family composition

In the sample households, are of 433 members, 227 were male (52.42per cent), and 206 (47.57per cent) – Table 7.38.

Except in Thrissur, the populations of male members were higher than that of female members in the other three districts. In Thrissur district, the number of female in the respondents' household shared 52.94 per cent of the total number of respondents against the share of 47.05per cent of male respondents.

Table 7.38: Household particulars of the sample respondents –male and female (Number)

Sl.No.	Districts	Households	Male	Female	Total
1.	Alappuzha	25	59 (56.19)	46 (43.80)	105 (100.00)
2.	Ernakulam	35	80 (51.61)	75 (48.38)	155 (100.00)
3.	Kollam	20	48 (54.54)	40 (45.45)	88 (100.00)
4.	Thrissur	20	40 (47.05)	45 (52.94)	85 (100.00)
5.	Total	100	227 (52.42)	206 (47.57)	433 (100.00)

*Figures in parenthesis indicate percentage to total*

### (iii) Family size

The average family size of the respondents' household is 4.33, marginally lower than the national fishers' households family size of 4.5 (CMFRI, 2006) (Table 7.39). This indicated the comparatively successful implementation of the small family norms of the state government. Kerala model of population is widely recognized by the other States.

The maximum proportion of the households is under the family size group of 2-4 (66per cent). In all the four districts, the proportion of households under this family size group is the highest. Only 27per cent of the respondents had a bigger family size group of 5-6. This can be due to the fact that, presently most of the size families are under nuclear family type and very little proportion lives as joint family.

Table 7.39: Family size of the respondent households (Number)

Sl No.	Districts	Family Size					Total	Average
		1	2-4	5-6	7-10	>10		
1.	Alappuzha	-	17 (68.00)	8 (32.00)	-	-	25 (100.00)	4.20
2.	Ernakulam	-	21 (60.00)	12 (34.28)	1 (2.85)	1 (2.85)	35 (100.00)	4.42
3.	Kollam	1 (5.00)	13 (65.00)	2 (10.00)	4 (20.00)	-	20 (100.00)	4.40
4.	Thrissur	-	15 (75.00)	5 (25.00)	-	-	20 (100.00)	4.25
5.	Total	1 (10.00)	66 (66.00)	27 (27.00)	5 (5.00)	1 (1.00)	100 (100.00)	4.33

Figures in parenthesis indicate percentage to total

#### (iv) Age composition

The analysis of the age composition of the respondent households indicated that, in adult group (more than 15 years) male members were marginally higher than the female members both in relative terms and in terms of percentage composition, while it was reverse in case of children (Table 7.40).

Table 7.40: Age composition of the respondent households (Number)

Sl No.	Districts	Adult (> 15 years)		Children < 15 years)		Total	
		Male	Female	Male	Female	Male	Female
1.	Alappuzha	47 (79.66)	37 (80.43)	12 (20.33)	9 (19.56)	59 (100.00)	46 (100.00)
2.	Ernakulam	71 (88.75)	63 (84.00)	9 (11.25)	12 (16.00)	80 (100.00)	75 (100.00)
3.	Kollam	43 (89.58)	35 (87.50)	5 (10.41)	5 (12.50)	48 (100.00)	40 (100.00)
4.	Thrissur	35 (87.50)	41 (91.11)	5 (12.50)	4 (8.88)	40 (100.00)	45 (100.00)
5.	Total	196 (86.34)	176 (85.43)	31 (13.65)	30 (14.56)	227 (100.00)	206 (100.00)

Figures in parenthesis indicate percentage to total

#### Adult- children Ratio:-

- Alappuzha - Adult - 84 (80per cent), Children - 21 (20per cent)
- Ernakulam - Adult - 134 (86.45per cent), Children - 21 (13.54per cent)
- Kollam - Adult - 78 (88.63per cent), Children - 10 (11.36per cent)
- Thrissur - Adult - 76 (89.41per cent), Children - 9 (10.58per cent)

### B. Educational Status

#### (i) Literacy profile

Kerala is the state with highest literacy rate. Literacy is an important indicator of an individual's development. The overall literacy rate was 95.15 per cent which is higher than the

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literacy level of the state (2001 census). The high rate of literacy is being due to the effective implementation of the education development programmes in the state. (Table 7.41).

Among the literates, the maximum proportion of family members, 75.24 per cent was educated up to secondary level, followed by primary level (12.69 per cent) and collegiate level (12.13 per cent).

Table 7.41. : Literacy profile of the respondent families (Number)

Sl. No.	Districts	Total	Illiterate	Literate	Primary Level	Secondary Level	Collegiate Level
1.	Alappuzha	105	1	103	5 (4.85)	85 (82.52)	13 (12.62)
2.	Ernakulam	155	5	146	21 (14.38)	108 (73.97)	17 (11.64)
3.	Kollam	88	1	83	15 (18.07)	57 (68.67)	11 (13.25)
4.	Thrissur	85	5	80	11 (13.75)	60 (75.00)	9 (11.25)
5.	Total	433	12	412	52 (12.69)	310 (75.24)	50 (12.13)

Figures in parenthesis indicate percentage to total literate population

(Secondary Level = High School + Secondary + Vocational, Collegiate Level = Collegiate + Professional)

### (ii) Educational status

Among the family members of the household, 109 members are continuing studies, while 317 members dropped out at different stages (Table 7.42). Out of those who dropped out, 40 (12.61 per cent) dropped out at primary level, 257 (81 per cent), at secondary level and 20 (6.30 per cent), at college level. The high rate of drop outs is a matter of serious concern, which needs proper attention.

Table 7.42: Education of respondent households - Continuing and Dropout (Number)

Sl.No.	Districts	Continuing	Drop outs			Total
			Primary	Secondary	Collegiate	
1.	Alappuzha	30	2 (2.70)	69 (93.24)	3 (4.05)	74 (100.00)
2.	Ernakulam	32	18 (15.12)	94 (78.99)	7 (5.88)	119 (100.00)
3.	Kollam	24	10 (16.12)	46 (74.19)	6 (9.67)	62 (100.00)
4.	Thrissur	23	10 (16.12)	48 (77.41)	4 (6.45)	62 (100.00)
5.	Total	109	40 (12.61)	257 (81.00)	20 (6.30)	317 (100.00)

Figures in parenthesis indicate percentage to total

### (iii) Access to education

The access to education was measured or evaluated by calculating the distance of the educational institutions from the respondents house (Table 7.43). It is seen from the table that a member should travel an average distance of 1.16 km to get primary education; about 2.78 km to get high school education; 12.58 km for college education and 11.86 km for professional college studies.

The analysis indicated that,. Alappuzha district is comparatively better placed than the other three districts in providing educational facilities to the fishers' household.

Table 7.43: Access to education (km)

Sl. No.	Districts	Primary School	High School	College	Professional College
1.	Alappuzha	1.06	1.30	5.12	8.16
2.	Ernakulam	1.47	2.28	15.25	12.87
3.	Kollam	1.15	5.10	23.90	16.05
4.	Thrissur	0.97	2.47	6.07	10.37
5.	Average	1.16	2.78	12.58	11.86

### C. Health profile

The vaccination regime indicated that the children in all the sample districts have been administered the vaccines at the prescribed age limit and the percentage of discontinuance is zero. (Table 7.44) This indicated the effective functioning of public health facilities in the districts.

Government of India takes adequate steps to maintain and improve child health. The children of the fisher's household were vaccinated as per schedule and there is no rate of discontinuance.

Table 7.44: Vaccination regime of infants / children (less than 15 years)  
Average age of administration and incidence of discontinuation (percentage)

Sl. No.	Districts	Pox		BCG		MMR		Polio	
		Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)	Age	IOD (per cent)
1.	Alappuzha	1.00	0.00	0.10	0.00	1.00	0.00	4.50	0.00
2.	Ernakulam	0.80	0.00	0.25	0.00	1.50	0.00	3.28	0.00
3.	Kollam	-	0.00	0.23	0.00	0.97	0.00	4.11	0.00
4.	Thrissur	-	0.00	-	0.00	-	0.00	5.00	0.00
5.	Average	0.70	0.00	0.14	0.00	0.86	0.00	4.22	0.00

Normally Polio administration continues till the age of 5 years

Figures in percentage indicate Incidence of discontinuation (IOD)

#### (i) Birth weight of the infants

The average birth weight of the infant was 2.94 kg (Table 7.45). The average birth weight of the male child is (2.95 kg) was marginally higher than the female child (2.93 kg). (Table 7.48) A similar trend was observed in three districts except Kollam where the birth weight of female child (3.16 kg) was higher than that of the male child (2.56 kg). However the average birth weight of the child was 2.94 kg, which was lower than the states/national average

Table 7.45. Birth weight of infants (kg)

Sl.No.	Districts	Weight (kg)		
		Male	Female	Total
1.	Alappuzha	3.63	3.33	3.48
2.	Ernakulam	2.83	2.72	2.77
3.	Kollam	2.56	3.16	2.86
4.	Thrissur	2.68	2.53	2.60
5.	Average	2.95	2.93	2.94

**(ii) Incidence of mortality among mother/ child during birth**

There has been no incidence of mortality of mother or child during the birth in the sample households in all the districts except for a case of one death in Ernakulam, which is due to premature delivery (Table 7.46). This can be due to the different health schemes of the state governments and the committed execution of the schemes. The Government of India has launched a new scheme during 2009 called Navajata Shishu Suraksha Karyakram, to reduce the IMR by providing training to health care providers. (The Hindu, 8.11.09, Kochi Edn, AartiDhar, p. 10).

Table 7.46: Incidence of maternal and child mortality

Sl. No:	Districts	No. of delivery	Maternal mortality		Child mortality		Total
			Number	Reason	Number	Reason	
1.	Alappuzha	-	Nil	Nil	Nil	Nil	Nil
2.	Ernakulam	5	Nil	Nil	1	Premature delivery	1
3.	Kollam	2	Nil	Nil	Nil	Nil	Nil
4.	Thrissur	-	Nil	Nil	Nil	Nil	Nil
5.	Total	7	Nil	Nil	1	Nil	1

**(iii) Incidence of disease among adults**

Fever and flue has been the common disease that had affected the adult (male and female) fisher households with an annual frequency of more than one. (Table 7.47). Male members of the family were affected by fever and flue more times than the female members. Body ache was the next disease that affected the population both male and female.

Under the special ailments, cardiac failure was one of the major disease that affected the population with one incident. There is no significant difference among the four districts in the incidence of special ailments.

Table 7.47: Incidence of diseases among Adult (Male and Female) - Annual frequency

Sl. No:	Diseases	Districts									
		Alappuzha		Ernakulam		Kollam		Thrissur		Total	
		M	F	M	F	M	F	M	F	M	F
Common Diseases											
1.	Fever/Flu	3.48 (25)	2.12 (25)	2.53 (13)	1.33 (9)	3.10 (10)	3.61 (13)	1.66 (18)	1.35 (14)	2.69 (66)	2.10 (61)
2.	Body Aches	1.86 (23)	1.78 (23)	2.60 (5)	1.20 (5)	Nil	9.00 (2)	1.20 (10)	1.00 (9)	1.41 (38)	3.24 (39)
3.	Diarrhoea	1.00 (2)	1.00 (2)	1.33 (3)	Nil	Nil	Nil	1.00 (2)	1.00 (4)	0.83 (7)	0.50 (9)
4.	Gastroenteric disease	2.04 (23)	1.47 (23)	1.00 (1)	Nil	Nil	Nil	1.00 (2)	Nil	1.01 (26)	0.36 (23)
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil



6.	Reproductive disorder	Nil	Nil	Nil	1.00 (1)	4.00 (3)	6.50 (2)	Nil	Nil	1.00 (3)	1.87 (3)
Special Ailments											
7.	Cardiac failure	1.00 (1)	Nil	1.00 (1)	Nil	Nil	Nil	1.00 (1)	1.00 (1)	0.75 (3)	0.25 (1)
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	2.00 (1)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.50 (1)

Figures in parenthesis indicate the number of incidence in families,  
(\* others include Thyroid, Sinus)

#### (iv) Incidence of disease among adult male and female previous occurrence

Among the common diseases the previous occurrence was high in case of fever and flue which had occurred 1.85 and 1.58 months earlier. (Table 7.48). In case of males body pain had a previous occurrence of 1.79 months and the female got body pain more frequently than males at 0.99 months. Diarrhoea is the most frequently affected disease which has recurred in a period of 1.06 months among male and 0.56 months among female respondents. Among the four districts, the fishers of Ernakulam and Thrissur were more frequently affected by the common ailments than fishers of the other two districts

In case of special ailments, cardiac failure was the important disease that had recurred within a period of 3.75 months. The fishers of Alapuzha and Thrissur had the recurrence of cardiac failure.

Table 7.48: Incidence of diseases among adults (Male and Female)  
Previous occurrence (No: of months)

Sl. No:	Diseases	Districts									
		Alappuzha		Ernakulam		Kollam		Thrissur		Total	
		M	F	M	F	M	F	M	F	M	F
Common Diseases											
1.	Fever/Flu	2.08	1.64	1.23	1.33	3.00	2.38	1.11	1.00	1.85	1.58
2.	Body Aches	1.86	1.39	1.80	1.20	Nil	1.00	1.40	1.33	1.79	0.99
3.	Diarrhoea	1.00	1.00	2.75	Nil	Nil	Nil	1.50	1.25	1.06	0.56
4.	Gastroenteric disease	1.60	1.26	5.00	Nil	Nil	Nil	2.50	1.00	2.27	0.56
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6.	Reproductive disorder	Nil	Nil	Nil	6.00	3.00	1.00	Nil	Nil	0.75	1.75

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Special Ailments											
7.	Cardiac failure	8.00	Nil	4.00	Nil	Nil	Nil	3.00	1.00	3.75	0.25
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	2.00	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.50

(\* Others include Thyroid, Sinus)

### (v) Incidences of diseases among children

The annual frequency of diseases occurring in male and female children is presented in Table 7.49. It is seen from the table that, fever/flu, body aches and diarrhoea are the common ailments that affect the children in the two districts. The frequency of fever among male and female children was the highest in Kollam (7.57 times and 2.75 per year) than other three districts. A total of 72 children were affected by fever /flu. The other ailments like diarrhoea and body ache was found to affect the children in comparatively a lesser frequency.

Table 7.49: Incidence of diseases among children (Male and Female) - Annual frequency

Sl. No:	Diseases	Districts									
		Alappuzha		Ernakulam		Kollam		Thrissur		Total	
		M	F	M	F	M	F	M	F	M	F
Common Diseases											
1.	Fever/Flu	2.50 (10)	2.22 (9)	1.57 (7)	1.00 (2)	7.57 (7)	2.75 (4)	1.52 (17)	1.06 (16)	3.29 (41)	1.75 (31)
2.	Body Aches	Nil	Nil	Nil	1.00 (1)	Nil	Nil	1.00 (3)	1.00 (2)	0.25 (3)	0.50 (3)
3.	Diarrhoea	2.15 (8)	1.66 (9)	Nil	Nil	10.00 (2)	Nil	1.33 (3)	1.00 (2)	3.37 (13)	0.66 (11)
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil	1.00 (1)	1.00 (3)	0.25 (1)	0.25 (3)
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Special Ailments											
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Figures in parenthesis indicate the number of incidence in families,

(\* Others include Thyroid, Sinus)

**(vi) Incidence of disease among children: previous occurrence**

Apart from the frequency of occurrence of ailments, their immediate previous occurrence was also recorded and presented in Table 7.50. It is seen from the table that, fever & flu occurred on an average of 1.42 months ago among male children and 1.91 months ago among female children in the selected centres.

The recurrence of other common ailments like body aches and diarrhoea one month and gastro-enteric disorder (1.0 month earlier in males & 1.33 months ago in female) were noticed in Thrissur district.

Table 7.50: Incidence of diseases among Children (Male and Female) - Previous occurrence (No: of months)

Sl. No:	Diseases	Districts									
		Alappuzha		Ernakulam		Kollam		Thrissur		Total	
		M	F	M	F	M	F	M	F	M	F
<b>Common Diseases</b>											
1.	Fever/Flu	1.40	1.66	1.14	2.00	1.85	2.25	1.29	1.75	1.42	1.91
2.	Body Aches	Nil	Nil	Nil	3.00	Nil	Nil	1.00	1.00	0.25	1.00
3.	Diarrhoea	1.75	1.38	Nil	Nil	Nil	Nil	1.00	1.50	0.68	0.72
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil	1.00	1.33	0.25	0.33
5.	Skin disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
<b>Special Ailments</b>											
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

(\* Others include Thyroid, Sinus)

**(vii) Access to health care**

Access to health care is an important component of disease management, which decides the time within which medical care is available to the patient. The average distance of the primary health centre (PHC) is 2.43 and hospital is 7.48 km in the study area (Table 7.51). However the hospitals are comparatively far off than the PHC in all the four selected districts. The maximum distance for the nearest hospital was in Kollam district (16.67km) and the minimum distance was in Ernakulam (3.04 km).

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Table 7.51: Access to health care (km)

Sl. No.	Districts	Primary Health Centre	Hospital
1.	Alappuzha	2.64	6.12
2.	Ernakulam	1.26	3.04
3.	Kollam	1.75	16.67
4.	Thrissur	4.10	4.10
5.	Average	2.43	7.48

### (viii) Problems in health management

The respondent's opinion on problems of health management was analyzed. It was found that drinking water problems (33 per cent of the respondents), difficulty in accessing the hospital due to distance (30 per cent), poor infrastructure (29 per cent), non availability of specialist and para medicines in health centres (28 per cent) and problem on cleanliness sanitation (20 per cent) were cited as the serious problems in health management by the respondents. (Table 7.52). It is thus concluded that the basic requirements of good, potable drinking water, hygienic sanitation facilities and minimum medical facilities are still required in the study area.

Table 7.52: Problems in health management

Sl. No.	Problems	Districts				Total
		Alappuzha	Ernakulam	Kollam	Thrissur	
1.	Difficulty in accessing the hospital due to distance	3				3
2.	Non availability of specialist and para medicines in health centers		8	17	3	28
3.	Poor infrastructure		2	15	12	29
4.	Lack of adequate effective medicines		2		2	4
5.	Problems on Cleanliness/ Sanitation	12			8	20
6.	Drinking water problem	23			10	33

### (ix) Suggestions to improve health care facilities

Providing good quality drinking water (20% of total respondents) and increasing the number of doctors/specialists (20%) have been cited as the important suggestion for good health care by highest number of respondents (Table 7.53). Constructing modern hospital with all infrastructure and health care facilities (18%) and making available sufficient life saving medicines (15%) were ranked third and fourth suggestions for improvement of health care.

Table 7.53 : Suggestions to improve health care facilities (Frequency)

Sl. No.	Suggestions	Districts				Total
		Alappuzha	Ernakulam	Kollam	Thrissur	
1.	Increase the number of doctors/specialists	3 (12.00)	2 (5.71)	15 (75.00)		20 (20.00)
2.	Make quarters facility for doctors so that they are available 24 x 7	5 (20.00)	2 (5.71)			7 (7.00)
3.	Make available sufficient medicines for all diseases with free of cost		5 (14.28)		10 (50.00)	15 (15.00)
4.	Construct the modern hospital with all infrastructure and health care facilities.		8 (22.85)		10 (50.00)	18 (18.00)
5.	Provide ambulance for emergency (especially during delivery accidents, etc.)					
6.	Need good drinking water facility	20 (80.00)				20 (20.00)

Figures in parenthesis indicate percentage to total respondents

## D. Income profile

### (i) Income and expenditure pattern

The average weekly income per household worked out to Rs. 1284.50 out of which 58.55per cent (Rs.752.09) is from fisheries followed by business – 16.34per cent (Rs. 210) and other services – 10.41per cent (Rs.134.12) (Table 7.54). The income from agriculture was Rs.95.56 (7.43per cent) and labour wages were Rs.92.67 (7.41per cent). Fisheries are the major source of income, which accounted for more than 50per cent of the total income in all the districts except at Kollam, wherein its share was 21.52 per cent.). The analysis of income pattern indicated that the dependency on fisheries is higher in all the districts but the other sources also provided a substantial support so that a lean income in fisheries is compensated by the income from other sources.

Table 7.54 : Income profile of the respondents (Weekly Rs.)

Sl. No.	Districts	Districts					Total
		Fishery	Labour	Agriculture	Business	Any others	
1.	Alappuzha	1214.00 (63.42)		84.00 (9.61)	310.00 (16.91)	306.00 (15.98)	1914.00 (100.00)
2.	Ernakulam	807.62 (71.02)	195.71 (17.21)	78.25 (6.88)		55.48 (4.87)	1137.08 (100.00)
3.	Kollam	301.75 (21.52)	175.00 (12.84)	220.00 (15.69)	530.00 (37.80)	175.00 (12.48)	1401.75 (100.00)
4.	Thrissur	685.00 (100.00)					685.00 (100.00)
5.	Total	752.09 (58.55)	92.67 (7.21)	95.56 (7.43)	210.00 (16.34)	134.12 (10.41)	1284.50 (100.00)

Figures in parenthesis indicate percentage to total

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### (ii) Employment in non-fisheries activities

The employment of respondents in non fishery activities was higher in Alapuzha (21 persons: 84per cent of total respondents involved in non fishery activities) and Kollam (17 persons, 85per cent). (Table 7.55)

Table 7.55: Respondents involvement in non-fisheries activities

Sl. No.	Districts	Districts				Total
		Labour	Agriculture	Business	Any others	
1.	Alappuzha		7 (28.00)	3 (12.00)	11 (44.00)	21 (84.00)
2.	Ernakulam	4 (11.42)	3 (8.57)		2 (5.71)	9 (25.71)
3.	Kollam	4 (20.00)	5 (25.00)	7 (35.00)	1 (5.00)	17 (85.00)
4.	Thrissur					
5.	Total	8 (8.00)	15 (15.00)	10 (10.00)	14 (14.00)	47 (47.00)

Figures in parenthesis indicate percentage to total

### (iii) Expenditure pattern

The analysis of the expenditure pattern revealed that, food is the major source of expenditure of the fishers' household accounting for 50.72 per cent of the total expenses followed by education (13.67per cent), fuel (7.87per cent), medicines (7.21per cent) and clothing (6.66per cent) (Table 7.56). In all the four districts the percentage of income spent on food accounted for the maximum share of their respective total expenditures. This confirms Engels' law of standard of living which says that the percentage of income spent on food is the highest in low income groups and the per cent share declines as the income increases – through the actual amount spent on food increases.

Table 7.56 :Pattern of expenditure of the fisher family (Weekly)

Sl. No.	Districts	Items								Total
		Food	Clothing	Fuel	Medical	Educa- tion	Enter- tainment	Per- sonal	Dura- bles	
1.	Alappuzha	796.00 (52.99)	60.20 (4.01)	42.32 (2.82)	66.40 (4.42)	84.00 (5.59)	16.00 (1.07)	287.00 (19.11)	150.20 (9.99)	1502.12 (100.00)
2.	Ernakulam	393.42 (38.97)	125.28 (12.41)	153.47 (15.20)	81.00 (8.02)	181.54 (17.98)	24.40 (2.41)	16.71 (1.65)	33.62 (3.33)	1009.47 (100.00)
3.	Kollam	650.00 (52.93)	64.00 (5.21)	68.25 (5.55)	148.20 (12.06)	297.50 (24.22)				1227.95 (100.00)
4.	Thrissur	258.75 (65.25)	26.12 (6.58)	61.75 (15.57)	2.75 (0.69)	2.50 (0.63)	0.75 (0.18)	32.00 (8.07)	11.87 (2.99)	396.50 (100.00)
5.	Average	524.54 (50.72)	68.90 (6.66)	81.44 (7.87)	74.58 (7.21)	141.39 (13.67)	10.28 (0.99)	83.29 (8.05)	48.92 (4.73)	1034.00 (100.00)

Figures in parenthesis indicate percentage to total

### (iv) Indebtedness and savings

The analysis of the saving pattern indicated that, 59 per cent of the respondents had no savings, 40 per cent had savings less than 50,000 and one per cent between 50,000 and one lakh (Table 7.57).

Table 7.57: Savings details of respondent households

Sl. No.	Districts	Frequency of respondents having Savings			Total
		Nil	< 50 k	50-100 k	
1.	Alappuzha	1 (5.00)	24 (95.00)		25 (100.00)
2.	Ernakulam	29 (82.85)	5 (14.28)	1 (2.85)	35 (100.00)
3.	Kollam	9 (45.00)	11 (55.00)		20 (100.00)
4.	Thrissur	20 (10.00)			20 (100.00)
5.	Total	59 (59.00)	40 (40.00)	1 (1.00)	100 (100.00)

The average indebtedness per person worked out to Rs. 85,677.67 and the average amount repaid worked out at Rs.17, 697.12 (Table 7.58). The number of persons indebted was the highest in Ernakulam – 27 persons (77.14 per cent of total respondents).

Table 7.58: Indebtedness of the sample respondents

Sl. No.	Districts	Indebtedness		
		Number of persons	Average Amount per person	Average Amount repaid
1.	Alappuzha	22 (88.00)	43500.00	10875.00
2.	Ernakulam	27 (77.14)	150085.71	19418.51
3.	Kollam	13 (65.00)	123800.00	34185.00
4.	Thrissur	19 (9.50)	25325.00	6310.00
5.	Total	81 (81.00)	85677.67	17697.12

Figures in parenthesis indicate percentage to total

### (v) Sources of lending

Among the different sources of advancing loans, co-operatives contributed to the maximum share of loan advanced (61 per cent), followed by banks (17 per cent) and private money lenders (3 per cent) (Table 7.59). It is important to note here that the cooperatives had taken the highest share breaking the hypothesis that private money lenders had the highest share in the non-institutional source of lending to fishers.

Table 7.59: Sources of lending (Number of respondents who had availed)

Sl. No.	Sources	Districts				
		Alappuzha	Ernakulam	Kollam	Thrissur	Total
1.	Banks	9 (36.00)	1 (2.85)	7 (35.00)	-	17 (17.00)
2.	Co-operative	10 (40.00)	26 (74.28)	6 (30.00)	19 (95.00)	61 (61.00)
3.	Private money lenders	3 (12.00)	-	-	-	3 (3.00)

Figures in parenthesis indicate percentage to total

### (vi) Purpose of availing loans

The respondents availed loans for both fishing and personal purposes. The maximum share of 34 per cent of the respondents availed loans for house construction / Land purchase, followed by respondents, who availed loan for purchase of craft and gears and other fishery related equipments (29 per cent) (Table 7.60). This was followed by the loans availed for



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performing the marriage of their wards (15 per cent) and for education of their children (3 per cent). Among the four districts the percentage of respondents who availed loans for house construction was high in Alapuzha district (56 per cent) and for fishing purpose it was high in Thrissur district (30 per cent).

Table 7.60: Purpose of availing loans (Number of respondents who had availed\*)

Sl. No.	Purpose	Districts				Total
		Alappuzha	Ernakulam	Kollam	Thrissur	
1.	Purchase of craft/ gear and other fishing related equipments	5 (20.00)	13 (37.14)	5 (25.00)	6 (30.00)	29 (29.00)
2.	House construction / Land purchase	14 (56.00)	9 (25.71)	4 (20.00)	7 (35.00)	34 (34.00)
3.	Marriage expense	1 (4.00)	5 (14.25)	3 (15.00)	6 (30.00)	15 (15.00)
4.	Education	2 (8.00)			1 (5.00)	3 (3.00)
5.	Health and Social Security					
6.	Any others				1 (5.00)	1 (1.00)

Figures in parenthesis indicate percentage to total

\*There can be multiple purposes too

### (vii) Suggestions for enhancing income and employment generation by fishermen

Respondent fishermen of Kerala were having the opinion that arranging institutional credit through micro finance and SHGs will be an important option to enhance the income and employment among the fisherfolk.

## IV. Brackish water Aquaculture - Tamil Nadu

The results and discussions are presented under the following heads

- A. General particulars
- B. Literacy status
- C. Health status
- D. Income status

The general particulars of respondent's households included age, family size, family composition etc.

- A. General particulars

### (i) Age distribution

The age distribution of respondent households are given in Table 7.61

Table 7.61: Age distribution of the sample respondents (years)

Sl.No.	Districts	<35	36-55	>56	Total
1.	Karaikkal	7 (23.33)	22 (73.33)	1 (3.33)	30 (100.00)
2.	Nagapattinam	18 (24.00)	46 (31.33)	11 (14.66)	75 (100.00)
3.	Total	25 (23.80)	68 (64.76)	12 (11.42)	105 (100.00)

Figures in parenthesis indicate percentage to total

Fishing continues to be an activity mostly done by fisherfolk in the age group of 36-55 which constitutes about 65 per cent of the respondents. The distribution also indicated the representation of young (age less than 35) constituting to 23 per cent. The fisherfolk with age more than 56 was found to be 12 per cent and was represented least. The shrinkage of old age fisherfolk representation indicates the growing complexities of the fishing operation.

The age wise distribution did not show any significant difference across the urban and rural districts selected. However the rural district of Nagapattinam indicated young fisherfolk representing 47.05 per cent of the sample respondents which properly indicates the same as a remunerative livelihood option. It may be also seen that the percentage of younger people involved in active fishing was found to be comparatively less in Karaikkal, on account of available alternative avocations.

### (ii) Family composition

The family composition of the respondents is indicated in Table 7.62. It is seen from the table that the males outnumber the females (54 per cent). The male-female ratio was found to be 1.22:1.00 for the total households.

Table 7.62: Family composition of the respondent households –Male and Female (Number)

Sl.No.	Districts	Households	Male	Female	Total
1.	Karaikkal	30 (24.00)	69 (55.20)	56 (44.80)	125 (100.00)
2.	Nagapattinam	75 (26.50)	156 (55.12)	127 (44.87)	283 (100.00)
3.	Total	105 (25.11)	225 (53.82)	183 (43.77)	418 (100.00)

*Figures in parenthesis indicate percentage to total*

### (iii) Family size

Family sizes of the respondent households are given in Table 7.63. The small family norm is mostly adopted by the fisher households of Tamil Nadu. The average size of family in Tamil Nadu worked out to be 3.96 ranging from 3.77 in Nagapattinam to 4.16 in Karaikkal district. It is interesting to note that 76 percentages of fisher households in Tamil Nadu is housing 2-4 members and hardly 1 per cent of households are having more than 7 members in the family. There exists no difference in the family size across the both districts which indicate the popularization of the small family norms across the state.

Table 7.63: Family size of the respondent households (number)

Sl. No.	Districts	Family Size				Total	Average family size
		1	2-4	5-6	7-10		
1.	Karaikkal		21 (70.00)	8 (26.66)	1 (3.33)	30 (100.00)	4.16
2.	Nagapattinam	1 (1.33)	59 (78.66)	15 (20.00)		75 (100.00)	3.77
3.	Total	1 (0.95)	80 (76.19)	23 (21.90)	1 (0.95)	105 (100.00)	3.96

*Figures in parenthesis indicate percentage to total*

### (iv) Age composition

The classification of fisher population as adults (above 15 years) and children (less than 15 years) are given in Table 7.64.

The male – female ratio of the adult group (>15 years) was found to be 1.27:1.00 whereas the same for the children (<15 years) was found to be 1.05:1.00. In all other categories males outnumber the females perhaps justifying the common notion preference of males to females in the coastal areas. It is also significant to note that that the younger generation of children is almost represented mostly by males over female. The child to adult ratio was found to be 1: 4.1 for the total sample whereas for the karaikkal district it was found to be 1:1.90 and that for Nagapattinam districts it was found to be 1:6.65. The results clearly indicate that the number of children in Nagapattinam outnumber the Karaikkal district children and changing paradigms of family size in different districts.

Table 7.64: Age composition of the respondent households (Number)

Sl. No.	Districts	Adult (> 15 years)		Children < 15 years)		Total	
		Male	Female	Male	Female	Male	Female
1.	Karaikkal	47 (68.11)	35 (62.50)	22 (31.88)	21 (37.50)	69 (100.00)	56 (100.00)
2.	Nagapattinam	137 (87.82)	109 (85.82)	19 (12.18)	18 (14.17)	156 (100.00)	127 (100.00)
3.	Total	184 (81.77)	144 (78.68)	41 (18.22)	39 (21.32)	225 (100.00)	183 (100.00)

*Figures in parenthesis indicate percentage to total*

## B. Literacy status

The literacy status of the respondent households was analyzed through the literacy level, educational status – continuing and dropouts and access to educational facilities. The illiterate indicates fisherfolk without any formal education and doesn't even possess functional literacy.

### (i) Literacy status

The literacy status includes the level of education as indicated by primary, secondary and collegiate. The primary level indicated schooling till fourth grade, secondary level indicated by high school, secondary and vocational education. The collegiate level of education was denoted by collegiate and professional education.

The general literacy rate of Tamil Nadu as a whole was 73.52 per cent (Census-2001) against the literacy rate of 64.64 per cent among the fisherfolk. The results indicate that among the literates 26 per cent have primary level of education, 61 per cent have secondary level of education and hardly 13 per cent have collegiate level of education. The person with primary education was more in Karaikkal than in Nagapattinam districts. The overall literacy rate for the total samples was found to be 69.13 per cent much lesser than the average state literacy rate.

The literacy rate for the both districts (Karaikkal and Nagapattinam) was found to be 96 per cent and 95 per cent. The results indicate that the literacy does not seem to be skewed toward the districts among fisher population. Also the literacy indicates higher level when compared to the state and sector average.

Table 7.65: Literacy status of respondent household (Number)

Sl. No.	Districts	Total	Illiterate	Literate	Primary Level	Secondary Level	Collegiate Level
1.	Karaikkal	125	-	120	40 (33.33)	76 (63.33)	4 (3.33)
2.	Nagapattinam	283	12	269	36 (13.38)	199 (73.97)	34 (12.63)
3.	Total	418	12	289	76 (26.29)	175 (60.55)	38 (13.14)

Figures in parenthesis indicate percentage to total

### (ii) Educational profile

The information on education of the respondents in terms of continuing and discontinuance of education would provide the scope of employment, opportunities, possible migration, and alternative avocation of the sample households. Thus continuing and dropout ratios were calculated among the respondent households across the both districts.

The dropouts were more at secondary level of education with 82 per cent ranging from to 76 per cent in Karaikkal to 84 per cent at Nagapattinam (Table 7.66) The dropout at primary level of education was about 12 per cent ranging from 23 per cent at Karaikkal to 8 per cent at Nagapattinam. The dropout at collegiate level is 7 per cent at Nagapattinam districts. The people indicated as continuing are students which form about 25 per cent of the total family members. The Continuing to Dropout ratio which indicates a parameter on increasing education was found to be 53.84 per cent for Karaikkal districts and 28 per cent for Nagapattinam districts. Alternative source of livelihood, possibility of seeking employment in fisheries enterprises, scope of labour can be the reasons for the increasing dropouts among the urban districts

Table 7.66: Educational status of respondent households - Continuing and Dropout (Number)

Sl. No.	Districts	Continuing	Drop outs			
			Primary	Secondary	Collegiate	Total
1.	Karaikkal	42	18 (23.07)	60 (76.92)	-	78 (100.00)
2.	Nagapattinam	61	18 (8.25)	185 (84.86)	15 (6.88)	218 (100.00)
3.	Total	103	36 (12.16)	245 (82.77)	15 (5.06)	296 (100.00)

Figures in parenthesis indicate percentage to total

### (iii) Access to educational institutions

Access to education is an important yardstick to measure the socio-economic well being of a society. The proximity of the educational institutions like primary school, high school, college and professional college provides a major impetus when it comes to continuing education. That was something the fisherfolk were said to be denied earlier which was disproved by this analysis.

The access to education was analyzed by finding the distance to nearby educational institutions. The average distance from fishing villages to nearby primary, high school, college and professional institution are given in Table 7.67. As a whole the average distance to a primary school is 1.27 km, high school 2.60 km, college is 5.97 km and professional institution 14.13 km from fishing villages in Tamil Nadu. The average distance to primary school ranges

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from 0.81 km in Karaikkal to 1.74 km for Nagapattinam. The distance for high schools ranges from 1.95 km for Karaikkal district to 3.25 km for Nagapattinam. With regards to colleges average distance ranges from 4.30 km for Karaikkal district to 7.64 km for Nagapattinam. The average distance for professional institution ranges from 3 to 24 kms among different districts. The results very clearly indicate the reasons for growing literacy among the fisherfolk. Thus the analyses clearly indicate that the improved or increased access to educational facilities has helped to increase the literacy level of the fisherfolk.

Table 7.67: Access to education (Distance in km)

Sl. No.	Districts	Distance to nearby educational institution ( in km)			
		Primary School	High School	College	Professional College
1.	Karaikkal	0.81	1.95	4.30	3.83
2.	Nagapattinam	1.74	3.25	7.64	24.42
3.	Total	1.27	2.60	5.97	14.13

### (C) Health status

The average life expectancy of people in the state is worked out at 65.5 years ranging from 62.8 years for male to 68.2 years for female.

The health status of the respondent households was studied based on the parameters like administration of vaccines, incidence of discontinuation, birth weight of infants, incidence of maternal and child mortality at the time of birth, incidence of common diseases and special ailments among adults and children. Disease management aspects like access to health care, problems in health management and suggestions to improve the health care facilities are also dealt in this session.

#### (i) Vaccination regime of infants / children (less than 15 years)

The average age of administration of vaccination and incidence of discontinuation among infants/ children with age less than 15 years in the selected coastal districts of Tamil Nadu is furnished in Table 7.68. The vaccination for Pox, BCG, MMR and Polio were regularly taken by all the families covered under the study. The average age at which the vaccination for pox was given to the child worked out at 1.05 years ranging from 1.00 years at Nagapattinam to 1.10 years at Karikkal. The BCG was administered at 10.65 years ranging from 0.43years

Table 7.68: Vaccination regime of infants / children (less than 15 years) –  
Average Age of administration and incidence of discontinuation

Sl. No.	Districts	Average age of administration and incidence of discontinuation (percentage)							
		Pox		BCG		MMR		Polio	
		Age	IOD* (%)	Age	IOD (%)	Age	IOD (%)	Age	IOD (%)
1.	Karaikkal	1.10	0	0.88	0	1.00	0	2.59	0
2.	Nagapattinam	1.00	0	0.43	0	-	0	4.36	0
3.	Average	1.05	0	0.65	0	0.50	0	3.32	0

*Normally polio administration continues till the age of 5 years*

*\*Figures in percentage indicate incidence of discontinuation (IOD)*

at Nagapattinam to 0.88 years at Karikkal. The average age for administering MMR was 0.50 years which varies from 0 years at Nagapattinam to 1.00 years at Karikkal. Polio vaccine was administered at the age of 3.32 years varying from 2.59 at Karikkal to 4.36 at Nagapattinam. The vaccination regime of infants/children wide taken that the results on regime in continued as per the recommendation of ICMR.

The traditional beliefs and lack of awareness about the availability of vaccines, lack of time to access the vaccination, lack of sufficient doses of vaccine at the locality and poor reliability on vaccines provided by government agencies were listed as the reasons for discontinuation of vaccination in the questionnaire. However in Tamil Nadu no cases of discontinuation of vaccination among the infants of fisherfolk were reported in the study area.

### **(ii) Birth weight of infants**

The birth weight of infants in fisher households at selected districts is given in Table 7.69. The average birth weight of males was 2.91 kg and female was 2.75 kg. The average weight of male infants ranges from 3.014 kg at Karaikkal to 2.69 kg at Nagapattinam and female infants ranges from 2.91 kg at Karaikkal to 2.60 kg at Nagapattinam. This is in conformity with the average birth weight of a male and female child in Tamil Nadu (Census-2001).

Table 7.69: Birth weight of infants (kg)

Sl. No.	Districts	Weight (kg)		
		Male	Female	Total
1.	Karaikkal	3.14	2.91	3.02
2.	Nagapattinam	2.69	2.60	2.64
3.	Average	2.91	2.75	2.83

### **(iii) Incidence of mortality among mother/ child during birth**

Maternal and child mortality at the time of birth and infant mortality had been pressing concerns over the past. The incidence of mortality was and it was found that these exists no incidence of maternal mortality across all selected respondent fisherfolk. One case of infant mortality was reported. Generally in Tamil Nadu, adequate care is being taken now to reduce the incidence of maternal and infant mortality which was recognized by a Central report.

### **(iv) Incidence of diseases among adults**

The incidence, frequency, and previous occurrence of diseases among the adult family members of the respondents across the four coastal districts are discussed in the Table 7.70.

Major diseases found among the respondents were categorized under two groups, viz; common diseases and special ailments. Fever/flu, body ache, diarrhoea, gastro enteric disease, skin disorder, reproductive disorders are included in common diseases. Special ailments include diseases like cardiac failure, tuberculosis, anemia, diabetics, blood pressure, AIDS and others.

The important common diseases found among respondents across the two districts of Tamil Nadu were fever, body ache, diarrhoea and skin disorder in which more number of family members (160) irrespective of their gender differences affected by fever/flu.

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Table 7.70. Incidence of diseases among Adult (Male and Female) - Annual frequency

Sl. No.	Diseases	Districts					
		Karaikkal		Nagapattinam		Total	
		M	F	M	F	M	F
Common Diseases							
1.	Fever/Flu	1.05 (30)	1.34 (29)	1.28 (21)	Nil	1.16 (51)	0.67 (29)
2.	Body Aches	1.00 (8)	1.08 (12)	Nil	Nil	0.50 (8)	0.54 (12)
3.	Diarrhoea	1.10 (30)	1.31 (29)	Nil	Nil	0.55 (30)	0.6 (29)
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil
5.	Skin disorder	1.00 (1)	Nil	2.70 (34)	Nil	0.50 (1)	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil
Special Ailments							
7.	Cardiac failure	Nil	Nil	1.00 (1)	Nil	0.50 (1)	Nil
8.	TB	Nil	Nil	1.00 (3)	Nil	0.50 (3)	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	1.00 (1)	1.00 (1)	1.00 (1)	Nil	0.50 (1)	Nil

Figures in parenthesis indicate the number of incidence in families,  
(\* others include Thyroid, Sinus)

However body ache was found to be more among females with an average frequency of 0.54 times per year and 8 male and 12 female family members of the respondents were affected by body ache last year.

Diarrhoea was found commonly among male members than females and 30 male and 29 female family members were affected by diarrhoea last year. Skin disorder also was found more among male family members of the total respondents than females

The district wise distribution of common diseases indicated that occurrence of common diseases like fever, body ache, diarrhoea, skin disorder, and reproductive disorder etc were found high in Karaikkal district in terms of both frequency and number of incidence.

Reported cases of special ailments found among the families of respondents across the two districts encompass cardiac failure, TB, etc. However TB was found more among male family members of the total respondents across the districts. There was not even a single member with special ailments or life style diseases like Anemia, diabetics, blood pressure, and AIDS were seen among the respondent families in Tamil Nadu.

It is quite interesting to note that the respondent households were not affected with life style diseases. The occurrence of diarrhoea and skin diseases can be added to lack of hygienic and coastal population.



**(v) Incidence of diseases among adult (male and female) previous occurrence**

The previous occurrence of diseases among adults (male and female) based on the number of months is discussed in Table 7.71.

In continuation with the above table, the major diseases found within the study area of Tamil Nadu district under the title of common diseases were fever/flu, body ache, diarrhoea, gastro enteric disease, skin disorder, reproductive disorder etc. The most common diseases found among the respondent families were fever and body ache. On an average most recent occurrence of fever/flu was found among male members of the respondent families was 1.95 months and it was 0.91 months among female members. In the case of body ache the previous occurrence was found in 2.31 months in males and 1.25 months ago in females. Occurrence of diarrhoea and skin disorder was seen among male members only in the last quarter of the year. However its occurrence among female members was found 0.87 months and 0.80 months back respectively.

The most common special ailments found among the respondents were cardiac failure, TB and anemia etc. Previous occurrence of cardiac failure and TB among the male members was found in the last quarter of the year, whereas in the case of females it was found in last month. Incidents of anemia found in last month in the case of both male and female respondents.

Table 7.71: Incidence of diseases among adult (Male and Female)  
Previous occurrence (Number of months)

Sl. No.	Diseases	Districts					
		Karaikkal		Nagapattinam		Total	
		M	F	M	F	M	F
<b>Common Diseases</b>							
1.	Fever/Flu	1.86	1.82	2.04	Nil	1.95	0.91
2.	Body Aches	2.62	2.50	2.00	Nil	2.31	1.25
3.	Diarrhoea	1.60	1.75	Nil	Nil	0.80	0.87
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil
5.	Skin disorder	4.00	Nil	1.91	Nil	1.95	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil
<b>Special Ailments</b>							
7.	Cardiac failure	Nil	Nil	12.00	Nil	6.00	Nil
8.	TB	Nil	Nil	8.00	Nil	4.00	Nil
9.	Anemia	Nil	Nil	Nil	Nil	Nil	Nil
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	2.00	2.00	2.00	Nil	2.00	1.00

(\* Others include Thyroid, Sinus)

**(vi) Incidence of diseases among children (Male and Female) - Annual frequency**

The annual frequency on the incidence of diseases among children (Male and Female) is furnished in Table 7.72.

Major diseases found among the children in the study area were fever/flu, body ache, diarrhoea, gastroenteric disease, skin disorder etc in which fever was the most popular disease found among the children and it was distributed across all the sample districts on Tamil Nadu. The average frequency of fever among male children was 2.88 times per year and a total of 15 male children were affected by fever across the two districts last year. In the case of female children a total number of 17 were affected by fever with an average annual frequency of 1.15 times per year.

Incidence of diarrhoea was also high among the children with a total frequency of 1.07 times per year among the male children and 0.50 times per year among female children. It was found that occurrence of common diseases like fever, body ache, and diarrhoea were high in Karaikkal both in the case of adults and children.

Occurrence of special ailments among the children was found to be very low compared with that of common diseases. Only anemia were reported among the children of respondent families across the sample districts Tamil Nadu. In the case of anemia only one female were affected with a frequency of 0.50 times in a year across the two districts of Tamil Nadu.

Table 7.72: Incidence of diseases among children (Male and Female) - Annual frequency

Sl. No.	Diseases	Districts					
		Karaikkal		Nagapattinam		Total	
		M	F	M	F	M	F
<b>Common Diseases</b>							
1.	Fever/Flu	2.41 (12)	1.31 (16)	3.30 (3)	1.00 (1)	2.88 (15)	1.15 (17)
2.	Body Aches	1.00 (2)	Nil	Nil	Nil	0.50 (2)	Nil
3.	Diarrhoea	2.15 (13)	1.00 (17)	Nil	Nil	1.07 (13)	0.50 (17)
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil
5.	Skin disorder	1.00 (1)	Nil	Nil	Nil	0.50 (1)	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil
<b>Special Ailments</b>							
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	1.00 (1)	Nil	Nil	Nil	0.50 (1)
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	Nil	Nil	Nil	Nil	Nil

Figures in parenthesis indicate the number of incidence in families, (\*others include Thyroid, Sinus)

**(vii) Incidence of diseases among children -Previous occurrence**

The previous occurrence of diseases among children based on the number of months is discussed in Table 7.73.

In continuation with the above table, the major diseases found among the children of the respondent families within the study area include common diseases like fever/flu, body ache, diarrhoea, gastroenteric disease, skin disorder etc. The most common diseases found among children of the respondent families were fever and diarrhoea. On an average last occurrence of fever/flu found among the male children of the respondent families was 1.45 months ago and it was 1.62 months back in the case of female children. In the case of diarrhoea the previous occurrence was found in 1.46 months ago in male children and 0.85 months ago in female children. Occurrence of body ache among the children of respondent families was found in 1.25 month back in the case of males. Skin disorder was also found among the males respondent families with the occurrence of 1.50 month back.

The most common special ailments found among children of respondent families is anemia. Incidence of anemia was reported in female children.

Table 7.73: Incidence of diseases among children (Male and Female) -  
Previous occurrence (No: of months)

Sl. No.	Diseases	Districts					
		Karaikkal		Nagapattinam		Total	
		M	F	M	F	M	F
<b>Common Diseases</b>							
1.	Fever/Flu	2.16	2.75	0.75	0.50	1.45	1.62
2.	Body Aches	2.50	Nil	Nil	Nil	1.25	Nil
3.	Diarrhoea	2.92	1.70	Nil	Nil	1.46	0.85
4.	Gastroenteric disease	Nil	Nil	Nil	Nil	Nil	Nil
5.	Skin disorder	3.00	Nil	Nil	Nil	1.50	Nil
6.	Reproductive disorder	Nil	Nil	Nil	Nil	Nil	Nil
<b>Special Ailments</b>							
7.	Cardiac failure	Nil	Nil	Nil	Nil	Nil	Nil
8.	TB	Nil	Nil	Nil	Nil	Nil	Nil
9.	Anemia	Nil	2.00	Nil	Nil	Nil	1.00
10.	Diabetes	Nil	Nil	Nil	Nil	Nil	Nil
11.	Blood Pressure	Nil	Nil	Nil	Nil	Nil	Nil
12.	AIDS	Nil	Nil	Nil	Nil	Nil	Nil
13.	Others*	Nil	Nil	Nil	Nil	Nil	Nil

(\* Others include Thyroid, Sinus)

**(viii) Access to health care**

The access to health care is also an important parameter which determines the continued health of the fisherfolk. Often the distance leads to the non treatment or its delay. The access to health care was measured using the distance required to avail the same. (Table

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7.74). The results indicate that there exists considerable access to the primary health centre and hospital. On an average the primary health centre was available at a distance of 2.10 km and the hospital at 12.70 km. Karaikkal districts indicated the proximity of the primary health centre and hospital at a distance of 1.40 and 4.20 km respectively.

Table 7.74: Access to health care (km)

Sl. No.	Districts	Primary Health Centre	Hospital
1.	Karaikkal	1.40	4.20
2.	Nagapattinam	2.81	21.20
3.	Total	2.10	12.70

(\* Others include Thyroid, Sinus)

### (ix) Problems in health management

The major problems underwent in health management was analyzed based on the opinion of the sample respondents. The major reasons cited by the respondents are indicated in Table 7.75. The major reasons suggested include difficulty in accessing the hospital due to distance, non availability of specialist and para medicines in health centers, poor infrastructure, lack of adequate effective medicines, problems on cleanliness/ sanitation, drinking water problem and work related stress.

Work related stress was the major problem as perceived by the respondent's households (38.09 per cent). 23.80 per cent of the respondents opined on the poor infrastructure, 16.19 per cent for drinking water problem and 19.04 has the difficulty in accessing the hospital due to distance.

Table 7.75 : Problems in health management (Frequency)

Sl. No.	Problems	Districts		
		Karaikkal	Nagapattinam	Total
1.	Difficulty in accessing the hospital due to distance	-	20 (26.66)	20 (19.04)
2.	Non availability of specialist and paramedicines in health centers	8 (26.66)	-	8 (7.61)
3.	Poor infrastructure	15 (50.00)	10 (13.33)	25 (23.80)
4.	Lack of adequate effective medicines	6 (20.00)	-	6 (5.71)
5.	Problems on Cleanliness/ Sanitation	8 (26.66)	8 (10.66)	16 (15.23)
6.	Drinking water problem	5 (16.66)	12 (16.00)	17 (16.19)
7.	Work related stress	-	40 (53.33)	40 (38.09)
8.	Others	-	-	-

Figures in parenthesis indicate percentage to total respondents  
Number of respondents who had opined on the same

### (x) Suggestions to improve healthcare facilities

The respondent households opined on the different suggestions for improving the health care facilities and the details are furnished in Table 7.76. The major suggestions from

the respondents of Karaikkal and Nagapattinam includes; increasing the number of doctors/specialists, construction of quarters facility for doctors so that they are available 24 x 7, providing available sufficient medicines for all diseases with free of cost, construction of the modern hospital with all infrastructure and healthcare facilities, provision of ambulance for emergency (especially during delivery accidents, etc.) and providing good drinking water facility.

Table 7.76: Suggestions to improve health care facilities (Frequency)

Sl. No.	Suggestions	Districts		
		Karaikkal	Nagapattinam	Total
1.	Increase the number of doctors/specialists	12 (40.00)	13 (17.33)	25 (23.80)
2.	Make quarters facility for doctors so that they are available 24 x 7	8 (26.66)	7 (9.33)	15 (14.28)
3.	Make available sufficient medicines for all diseases with free of cost	19 (63.33)	2 (2.66)	21 (20.00)
4.	Construct the modern hospital with all infrastructure and health care facilities.	2 (2.66)	2 (2.66)	4 (3.80)
5.	Provide ambulance for emergency (especially during delivery accidents, etc.)	-	-	-
6.	Need good drinking water facility	9 (30.00)	22 (29.33)	31 (29.52)

Figures in parenthesis indicate percentage to total respondents  
Number of respondents who had opined on the same

## D. Income status

The income profiling of the respondent households are analyzed using income patterns, respondents involvement in non fisheries activities and expenditure pattern. In addition the indebtedness and savings were analyzed using details on savings, indebtedness, sources of lending organization, purpose of availing loan and suggestions for enhancing the income and employment generation

### (i) Income pattern

The income pattern of the respondent household were analyzed using the weekly income across the two coastal districts of Tamil Nadu including Nagapattinam and karaikkal are discussed in the Table 7.77.

Table 7.77: Income status of the respondents (Monthly Rs)

Sl. No.	Districts	Enterprise					Total
		Fishery	Labour	Agriculture	Business	Any others	
1.	Karaikkal	5675.20 (94.19)	183.32 (3.04)	66.64 (1.10)	-	100.00 (1.65)	6025.00 (100.00)
2.	Nagapattinam	5796.84 (38.27)	4172.16 (27.54)	1153.96 (7.61)	1654.00 (10.92)	2368.92 (15.64)	15145.90 (100.00)
3.	Total	8327.68 (60.15)	2177.72 (15.73)	610.32 (4.40)	827.00 (5.97)	1901.16 (13.73)	13844.00 (100.00)

Figures in parenthesis indicate percentage to total

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The major income sources of the respondent households comprised of income from fishery, business, agriculture, labour services, and other service sectors. The highest weekly average income generated by the total respondents across the two districts was through fisheries sector with an average amount of ₹ 8327.68 (60.15 per cent of the total income) followed by income from labour sector at ₹ 2177.72(15.73%), and other service sector at ₹ 1901.16 (13.73%)

The district wise weekly income status of the respondents indicated that Nagapattinam district had all sources of income which includes fisheries sector (38.27%), Labour (27.54%), Agriculture (7.61%) etc which was contributing an average weekly income of ₹ 15145.90. In Karaikkal district the average income shared by fisheries sector, labour and other service sectors was 94.19 and 3.04 and 1.65 per cent respectively.

### (ii) Involvement in non fisheries activities

The Involvement of respondent' households in non fisheries activities are illustrated in the Table 7.78.

The analysis on the respondent' households involvement in the non fisheries activities indicated that 44 per cent of the total respondents were involved in non-fisheries activities, which provided an additional source of income. The major non fishing activities involved by respondents were business, labour, and other service sectors with a contribution of 17.33, 50 and 36 per cent respectively. The total number of respondents involved in business was 35 per cent in Nagapattinam district. In Nagapattinam 87 per cent of the respondents involved in labour activities which might be due to the higher wage rate prevailing in the state. It was found that there was not even a single respondent involved in business activities in the Karaikkal district. The result clearly indicated the existence and practice of alternative avocation do exist holds good in the selected respondent households.

Table 7.78: Respondents involvement in non-fisheries activities

Sl. No.	Districts	Labour	Agriculture	Business	Any others	Total
1.	Karaikkal	4 (13.33)	1 (3.33)	-	1 (3.33)	6 (0.53)
2.	Nagapattinam	65 (86.66)	38 (50.66)	26 (34.66)	52 (69.33)	181(96.79)
3.	Total	69 (49.99)	39 (26.99)	26 (17.33)	53 (36.33)	187(100.00)

*Figures in parenthesis indicate percentage to total*

### (iii) Pattern of expenditure

The major household expenses measured include expenditure on food, clothing, fuel, medical, education, entertainment, personals and durables. The result of the pattern of weekly expenditure is represented in Table 7.79.

The average weekly expenditure pattern of the 140 households worked out that on an average ₹ 4530.92 was incurred on the households with ₹ 1936.88 (42.74 per cent) on food and ₹ 384.76 (8.49 per cent) on medical. The least expenditure was ₹ 259.04 (5.71 per cent) for entertainments..

Table 7.79: Expenditure pattern of the fisher family (Monthly Rs.)

Sl. No.	Districts	Items								Total
		Food	Cloth- ing	Fuel	Medi- cal	Edu- cation	Enter- tainment	Per- sonal	Dura- bles	
1.	Karaikkal	2266.64 (71.50)	161.20 (5.08)	221.72 (6.99)	111.20 (3.50)	107.60 (3.39)	-	133.32 (4.20)	168.24 (5.30)	3170.00 (100.00)
2.	Nagapattinam	1607.12 (27.27)	769.32 (130.5)	534.72 (9.07)	658.36 (11.17)	609.64 (10.34)	518.12 (8.79)	578.40 (9.81)	616.08 (10.45)	5891.88 (100.00)
3.	Total	1936.88 (42.74)	465.24 (10.26)	378.20 (8.34)	384.76 (8.49)	358.60 (7.91)	259.04 (5.71)	355.88 (7.85)	392.16 (8.65)	4530.92 (100.00)

Figures in parenthesis indicate percentage to total

The total expenditure pattern of the selected districts indicates that the highest household expenditure was noticed in Nagapattinam with an average amount of ` 5891.88 and the least in Karaikkal districts ` 3.170.00. In Nagapattinam fisherfolks spent more on education purpose with an average amount of ` 609.64(10.34 per cent) than karaikkal district.

The fisherfolk of Karaikkal district spent 71.50 % for food, 5.08% for clothing and 5.30 percentage respectively on personal expenditure. In Nagapattinam the least expenditure was incurred on fuel and entertainment at 9.07 and 8.79 per cent respectively. The medical expense was also high in Nagapattinam which is ` 658.36 (11.17 per cent) when compared with other selected coastal districts.

The results table clearly spelt out that the expenditure incurred on food contribute the most of the family expenditure. Education, Entertainment and Social Security measures hold increasing proposition in the family expenditure across the selected coastal districts.

#### (iv) Indebtedness and Savings

The indebtedness and savings of the respondent households are indicted in Table 7.80.

Table 7.80: Savings details of respondent households

Sl. No.	Districts	Frequency of respondents having Savings				Total
		Nil	< 50 k	50-100.00k	>100.00K	
1.	Karaikkal	30 (100.00)	-	-	-	30 (100.00)
2.	Nagapattinam	1 (1.33)	63 (84.00)	9 (12.00)	2 (2.66)	75 (100.00)
3.	Total	31 (29.52)	63 (60.00)	9 (8.57)	2 (1.90)	105 (100.00)

Figures in parenthesis indicate percentage to total

The saving details of the respondent's household indicated that 29.52 per cent of the respondents have no savings. 60 per cent of the respondent households possessed a saving of less than ` 50000. It is significant to note that 95 per cent of the households which had savings were from Nagapattinam district. Lack of savings or dis savings related to the need for indebtedness for the sustenance of the livelihoods. The average savings of a Nagapattinam household was found to be ` 935000. The plight of respondent households from Karaikkal is well understood where none of them possess savings.



**(v) Indebtedness**

The lack of savings and the need for the sustenance of the livelihood often lead to indebtedness. The pattern of indebtedness of respondent households across the two coastal districts of Tamil Nadu is discussed in Table 7.81.

The results indicated that the average amount of indebtedness per person was ₹ 71,066.66 in which the highest average amount of indebtedness was recorded in Nagapattinam district with ₹ 129800.

On an average 14.81 per cent of the availed loans was repaid .The analysis of repayment of the availed indebtedness indicated that the respondents households in Karaikkal repaid 16.18 per cent of the loans availed whereas the least repayment was found in Nagapattinam 14.68 per cent respectively.

Table 7.81: Indebtedness of the respondents households

Sl. No.	Districts	Number of persons	Average Amount per person	Average Amount repaid
1.	Karaikkal	7 (23.33)	12333.33	1996.66 (16.18)
2.	Nagapattinam	60 (80.00)	129800.00	19063.20 (14.68)
3.	Total	67 (63.08)	71066.66	10529.93 (14.81)

*Figures in parenthesis indicate percentage to total*

**(vi) Sources of lending**

The indebtedness often results in availing loans from the different institutions. The major sources of lending organizations include banks, co-operatives, private money lenders, friends/relatives and jewel loans. The details of the sources of money lending as availed by the respondent households is furnished in Table 7.82.

A total of 86 respondents had availed loans for various purposes. It was found that private money lenders constituted the major source of lending organizations with more than 24.76 of the respondent household availing credit. Banks provided credit to 35 respondents and constituted more than 20 per cent of the sample respondents.

Table 7.82. Sources of lending

Sl. No.	Sources	Districts		
		Karaikkal	Nagapattinam	Total
1.	Banks	-	21 (28.00)	21 (20.00)
2.	Co-operative	1 (3.33)	13 (17.33)	14 (13.33)
3.	Private money lenders	5 (16.66)	21 (28.00)	26 (24.76)
4.	Friends / Relatives	-	-	-
5.	Jewel loans	1 (3.33)	5 (6.66)	6 (5.71)
6.	Others	7 (23.33)	-	7 (6.66)

*Figures in parenthesis indicate percentage to total*

Cooperatives provided 13.33 per cent loan to the respondents where as jewel loans lesser significance as a lending organization has with hardly 5 per cent of the respondents availing loan. It was important to note that in Karaikkal and Nagapattinam the respondent's household exhibited dependency towards private money lender.

The analysis indicate that the non institutional credit still holds good among the fishers in Tamil Nadu .It was found that the highest number of respondents (24.76 per cent) was depending on private money lenders for borrowing money in emergency situation.

**(vii) Purpose of availing loans**

The details on the purpose of availing loans and number of loans availed by the respondent households are indicated in Table 7.83.

The major purposes for which loans were availed include purchase of craft/gear and other fishing related equipments, house construction/land purchase, marriage expenses., education and health and social security etc.

The purpose of house construction and land purchase was the major reason for availing loans. It was found that of the 85 respondents who availed loans, more than 23.8 per cent was availed for the purpose of purchase of craft/gears and other fishing related equipments, 22.85 per cent for the marriage expense,6.66 per cent for house construction and land purchase found importance among the respondent households.

In Nagapattinam district of Tamil Nadu the major chunk of loans were attributed towards purchase of craft/gear and other fishing related equipments (32%) followed by house construction and land purchase (30.66%). In Karaikkal district 10 per cent of the respondent's availed loans for house construction and land purchase followed by 3.33 per cent towards purchase of craft/gear and other fishing related equipments.

**(xxv) Suggestions to enhance the income and employment generation**

The percentage response of the respondents' suggestions for enhancing the income and employment generation by fishermen is indicated in Table 7.83.

Table 7.83 Purpose of availing loans (Number of respondents who had availed)

Sl. No.	Purpose	Districts		
		Karaikkal	Nagapattinam	Total
1.	Purchase of craft/ gear and other fishing related equipments	1 (3.33)	24 (32.00)	25 (23.80)
2.	House construction / Land purchase	3 (10.00)	4 (5.33)	7 (6.66)
3.	Marriage expense	1 (3.33)	23 (30.66)	24 (22.85)
4.	Education	-	5 (6.66)	5 (4.76)
5.	Health and Social Security	1 (3.33)	4 (5.33)	5 (4.76)
6.	Any others	1 (3.33)	-	1 (0.95)

*Figures in parenthesis indicate percentage to total*

## Livelihood Status of Fishers in India

The major suggestions perceived by the households included arranging the institutional financial support like micro credit for fisher folk; SHG, etc, regulation of fish marketing through institutional interventions; vocational training for fisherwomen to undertake household income activities during dry/off season; regulation of PDS and supply of the basic food items and fuel (like kerosene, LPG, etc) by the Govt. agencies and provision of rural infrastructure for general societal/human development.

The percentage response of the respondents indicated that 45.71 per cent of the respondents felt that arranging the institutional financial support like micro credit for fisheries, SHG, etc can provide a major impetus in enhancing the income. There were no suggestions on Vocational training for fisherwomen to undertake household income activities during dry/off season, regulation of PDS and supply of the basic food items and fuel (like kerosene, LPG, etc) by the Govt. agencies and provision of rural infrastructure for general societal / human development found a meek response among the respondents in both the districts.

Table 7.85. Suggestions for enhance the income and employment generation by fishermen (Percentage response)

Sl. No.	Suggestions	Districts		
		Karaikkal	Nagapattinam	Total
1.	Arranging the institutional financial support like micro credit for fisheries, SHG, etc	3 (10.00)	45 (60.00)	48 (45.71)
2.	Regulation of fish marketing through institutional interventions	-	-	-
3.	Vocational training for fisherwomen to undertake house hold income activities during dry/ off season	2 (6.66)	1 (1.33)	3 (2.85)
4.	Regulation of PDS and supply of the basic food items and fuel (like kerosene ,LPG,etc) by the Govt. agencies	-	-	-
5.	Provisional of rural infrastructure for general societal / human development	-	-	-

*Figures in parenthesis indicate percentage to total*