

## **Livelihood Security of Marine Small Scale Fisheries Households in Batticaloa District of Sri Lanka**

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**Abstract:** *The present study aims to assess the livelihood security status of marine small scale fishermen households in the Batticaloa district of Sri Lanka. Both primary and secondary information were used in the study. Primary data were collected through individual interview and key informant interviews. Livelihood security index approach was employed in the study. 370 marine small scale fishers household were selected as sample. The socio-economic status of the small-scale fishermen and their livelihood status were a vulnerable situation in the Batticaloa district. Particularly, economic security status is in highly vulnerable situation compare to others. This study confirmed that around 50 % of the sampled small-scale fishers were in livelihood insecurity situation in the Batticaloa district of Sri Lanka. Livelihood diversification is one of the ways to enhance the livelihood security of small-scale fishers. Lack of understanding about well-established patterns of livelihood and Lack of training on new fishing technology, lack of diversified livelihoods were reported by the majority of fishers in the study area. INGOs, NGOs, and concerned institutions come forward to impart training on the said issues. Relevant donor agencies can organize training on diversified livelihood activities.*

**Keywords:** *Batticaloa, small scale fishers, livelihood security, marine fishers,*

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### **I. Introduction**

The Sri Lankan small scale fisheries sector plays a vital role in its economy. It makes a significant contribution by providing the means of livelihoods of coastal communities in Sri Lanka. However, many scholars, Amarasinghe (2005), Wijyaratne&Maldeniya (2003), Lokuge&Munas (2011) argue that the fishing sector is one of the most vulnerable communities in Sri Lankan society. It is obvious that in the fishermen can earn a lot, but they face unpredictability and vulnerability of livelihood due to seasonality and the uncertainty of the catch. The fishing communities also face social exclusion associated with their livelihood and community. In this context, the small-scale fishery sector addresses various issues of less sustainable improvement of Socio-Economic conditions of fishing communities in Sri Lanka. Batticalao is one of the districts in the Eastern Province of Sri Lanka. It is located in an ecologically fragile environment and has wealthy marine resources. The livelihoods of the population in the district depend mainly upon on agriculture, fisheries and livestock. There are 172 fishing villages and 25,280 active fishermen producing 45,980 MT of fish in the district. Government policies in the past were designed at creating conditions for increasing fish production through modernization of the fishing sector in Sri Lanka. Infrastructure development, subsidies, and loan facilities were included in the projects. However, even after the government efforts, a large number of small-scale fishing families continue to be poor in Sri Lanka. This study intended to use both qualitative and quantitative approaches together to analysis livelihood security status of small-scale marine fishermen households in the Batticaloa district of Sri Lanka.

### **II. Objective Of The Study**

The main objective of the present study was to investigate the livelihood security status of marine small scale fishermen households in the Batticaloa district

### **III. Method And Martials**

#### **3.0. Study area:**

The study area is Batticaloa district in Sri Lanka. It is one of the coastal districts in the Eastern part of Sri Lanka and occupies the Central Part of the Eastern Province. Its geographical coordinates are 7° 43' 0" North, 81° 42' 0" East and it covers a land area of approximately 2633.1 Square Km. and an internal waterway of 229 square Km. The district accounts for 3.8% of the country's total land area. Majority of the population in district is engaged in agriculture for income generation while fishing occupies the second place in livelihood activities. Other occupations include industrial activities and employment in the government, corporate and private sectors. High potential development sectors are tourism development and fisheries expansion in the district.

**3.1. Data Collection**

Primary and secondary data were used in the present study. Primary data were collected through interview with a pre developed questionnaire. 370 small scale fisheries households were selected as sample in the study. Selected coastal fishing villages were included in the study

**3.2 Analytical method**

To meet the objective, five-point scale method was employed to construct livelihood security Indexes. Indicators are assumed that each indicator has equal weight to the overall household livelihood security index. Household’s livelihood security index consisted of six livelihood outcomes and were measured based on accessibility, quality, and status. Household livelihood indexes such as Economic, Education, Health, Habitat, Food and Social Security were obtained by aggregating the scores of indicators.

Since, each of the subcomponents is measured on a different scale, it was first necessary to standardize each sub-component indicators as an index. The standardized indicators of a household were prepared using the method adopted from Human Development Index to calculate life expectation index (UNDP, 2007), and used by Sanzidur Rahman and Shaheen Akter (2010) by the following formula.

$$Z_{indj} = \frac{\text{indicator} - \text{Minimum value}}{\text{Maximum value} - \text{minimum value}} \dots \dots \dots (1)$$

In the formula (1), “Indicator” is the original value of the sub-component indicator as collected through the field survey. Minimum and maximum values of each subcomponent were obtained from a range of each indicator. For example, the first sub-component indicator of Economics Security is Annual Income per person. This indicator ranged from 12000.LKR to 210,000 LKR in the sample. These minimum and maximum values were used to standardize the indicator. From the standardized indicators, Household Livelihood Index (HLSI) were calculated by averaging the standardized indicators by Using formula (2).

$$HLSI = \frac{\sum_{j=1}^J z_{indj}}{J} \dots \dots \dots (2)$$

Where,  
 HLSI- Household Livelihood Security Index.  
 J – Number of indicators used in the Index.

Once each HLSI was constructed, then the composite overall Livelihood Security Index (LSI) for the household was constructed by using the following formula (3).

$$LSI_i = \frac{\sum_{i=1}^6 W_i \cdot HLSI_i}{\sum_{i=1}^6 W_i} \dots \dots \dots (3)$$

Where,  
 LSI - Livelihood security index  
 Wi - Weight determined by the number of indicators used each index.  
 HLSI- Household Livelihood Security Index

**IV. Results And Discussions**

**4.1. Socio Economic Characteristics**

The present study reveals that majority of the respondents (97%) were male in the study area. All respondents were reported that the female of the household are responsible for the activities such as cooking, child bearing, caring family and clothing in the family. Matthews et al. (2012) highlights that Men and women participate in almost all activities in the fisheries sector in developing countries. Women are often responsible for post-harvest activities, such as processing and trading. The present study demonstrates that female interest in small-scale fishing activities is very less in the study area. Due to the hardness of this activities mostly men involved in the fishing activities. The study also indicates that the majority of small- scale fishers were Tamils (86%). 11% of them were Muslims.

Age is an important social factor that influences individual working ability. The research examines age of respondents as a relevant socio-economic characteristic. The study reveals that most of the respondents were in the age group of 31 to 40 years (35.4%), followed by 41 to 50 years age group (30.3%). While the age group above 60 years contained the least respondents (1.4%). The study highlights that the majority of small-scale fishers falls under the age between 30-50 years.

The education always helps to obtain required skills for livelihoods which imparts knowledge about the different livelihood opportunities. The present study reveals that, Out of sampled fisheries households 13% of respondents had no education, 51.4% of respondent had primary level of education, 23.2% of respondents have completed middle level of education, 11.1% of respondents had secondary level of education and around 1% of respondents had advanced level of education. The finding also reveals that the literacy rate of the respondents is 87% in the small-scale fisheries households in the in the study area.

Family is an important basic organization in most Sri Lankan societies. Family relationship is an asset in the form of human capital. Gyekye (1998) as summarized by Zakaria (2009) highlights that the marital status either a positive or negative influence on socio economic status as marital partner contribute to each other. The analysis shows that, majority of respondents (97%) in the sample are married, while very few (1%) are separated and 1.6% of them are widows/Widower.

Family size too is an important socio-economic indicator as it heavily affects the income of the households. Family size has considerable influence on the income and expenditure of the family. Results of the present study reveals that the average family size of small-scale fisheries households in the Batticaloa district is 4. The empirical results show that out of 370 sample households 36.2% had family size up to 3 members. 53.8% of households has family size between 4-5 members and 8.6% of households had 6-7 members. Only 1% of households had more than 8 members. It was found from the research majority of the small-scale fisheries households in the Batticaloa district had average family size (4-5). It exceeds the national level of family size (3.9 in 2012). In the study area, majority of the respondents mainly involved in fishing. 88% of the respondents were involved in fishing as their primary occupation. 9% of respondents were involved fishery related services like providing equipment, fuel and food.

1% of the respondents were involved in fish trade. Income is the most important factor to understand the status of the Socio economic situation and the livelihood of the fishermen. The results of the research show that the monthly income of fisheries households were varied from 6,000/- 42,000/- Sri Lankan rupees. Average monthly income of small scale fisheries was 18,284.00 Sri Lankan Rupee (LKR). 60% of the sampled respondents earns income less than the average income in the study area. Selected sampled households were grouped in to five categories based on the level of monthly income.

## **V. Livelihood Security**

The livelihood security index are very important to determine whether the livelihood are successful in following their livelihood strategies. Six different livelihood security indices were constructed based on the prevailing condition of small scale fishermen households in the study area. The indices can be used for measuring the improvement of situation of sampled households. Livelihood indices were calculated using standardised value of indicators of the relevant variable. Each major component is made up of several indicators. The indicators chosen for this study were based on the literature review of previous researches. Each indicators was measured in a different scales. It was first necessary to standardise each indicator as an index for relevant indicator.

### **5.1. Economic Security**

Economic security is the condition of having stable income or other resources to support a standard of living now and in the future. It is the capacity to generate sufficient income to satisfy the basic needs and to maintain or increase the stability of income. Indicators like income of small scale fishers, saving, land ownership amount of productive and unproductive assets provide the insights into the economic security of the fishermen households.

Eight economic security indicators were selected in the present study such as Annual income per person, land and house ownership per person, fishing equipment per person, active population ratio, Proportion of 15-59 population, Proportion of 15-59 population in employment, per person saving and per person loan. The economic security index was calculated using standardised value of these indicator variables. Standardisation was done using their village level maximum and minimum values of the indicators. Table .1 reports the results, such as mean, index of the indicator and Economic security index, of the present study.

**Table 1.** Economic Security index

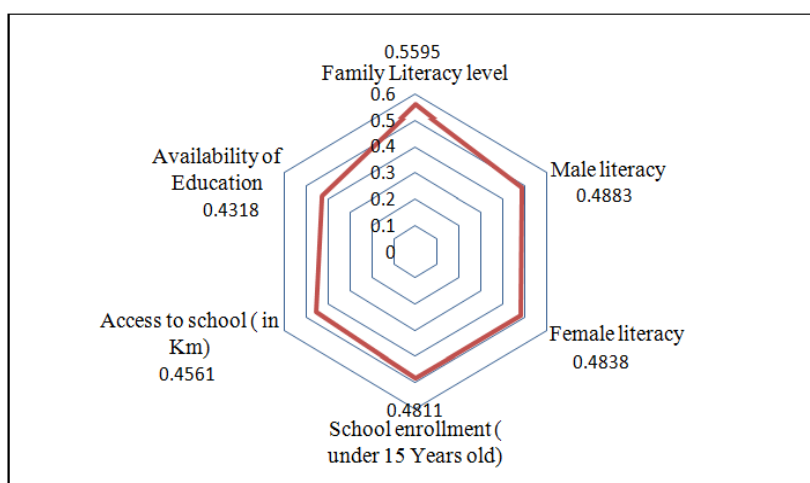
Indicators	Mean	Index	Sta. Dev.
Income / person ( Annual)	59,443	0.2396	0.16418
Land ownership / person	173,528	0.1388	0.16435
Fishing Equipment / person	27,989	0.1364	0.20667
Active population ratio	0.7697	0.3849	0.13241
Proportion of 15-59 Population	2.93	0.4883	0.18490
Proportion of 15-59 in employment	1.29	0.4288	0.16791
Per person saving ( in LKR)	10,320	0.0860	0.1282
Per person loan ( in LKR)	42,022	0.0525	0.14292
Economic Security Index		0.2444	0.1681

Source: Computed from field data, 2014

The index score of each indicator ranged from 0 to 1. Higher value of the indicators imply households are economically better off and more secured economically. The economic security index was obtained using the standardised values of those indicator variables. Economic security index of the small scale fisheries households was 0.2444 in the study area. This implies that the small scale fishing households in the Batticaloa district was economically insecure. The results confirmed that the land ownership per person and fishing equipment per person at the household level were insecure in the study area. The study also highlights that the saving per person and amount of loan per person are extremely insecure among the small scale fisheries households in the Batticaloa district of Sri Lanka. Similar findings were observed in the study conducted by Rahman and Akter (2010) in Bangladesh. Shyamalie and Sani (2011) also point out that Economic Security of women was lower in Kangra, India and NuwaraEliya, Sri Lanka.

**5.2. Educational Security**

Educational security has been defined as the capacity of the individual to obtain or benefit from a basic education. It includes the education level of the family and access to education facilities. Six indicators such as Family Literacy level, Male literacy, Female literacy, School enrollment (under 15 Years old), Access to school (in Km) and Availability of Education were included in the Educational Security variable. The Fig:1 illustrates the results of educational security among the small scale fisheries households in the study area.



**Figure 1.** Educational Security index

Source: Computed from field data, 2014

It reveals that the mean value of the family literacy level is 3.24 implying that the family literacy level is high in the study area. The result also indicates 88% of the family members can read and write in the sampled households. It was revealed from result that literacy level scoured a lower value for women (2.41) than the male literacy (2.46) level in the study area. The mean value of number of school enrollment was 2.4. The index score of this indicators was little below the mid-point. This is meant that at least two children has school enrollment from each fishers household in the study area.

Accessibility and availability to school have higher mean values than mid-point. This is implied that the access to school and availability of educational facilities are stood in a better level. The results reveals that aggregate mean score of the educational variable in the study area took a value (2.68) above the mid-point. Educational security index also approached (0.4834) the mid-point of the index score scale of zero to one. This highlighted that the educational security was little improved in the small scale fishers' households' in the Batticaloa district.

### 5.3. Habitat Security

Shyamalie and Saini (2011) defined as the access of individuals to an adequate shelter and its related resource to ensure that they have a healthy and sanitary environment, protection from detrimental elements to enable safe and secure livelihoods. In other words, habitat security consists of housing with basic amenities. Quality of the shelter, access to safe drinking water, good sanitation facilities and acceptable environment of house were included as the indicators in the Habitat security in the study. Quality of shelter was measured with the sup indicators such as quality of floor, Quality of wall, Quality of roof and access house. Table 3 illustrates habitat security index and mean value of the sup indicators in the habitat security component.

**Table 2.** Habitat Security index

Indicators	Mean	Index	Sta. Dev.
Quality of floor	2.75	0.8743	0.32679
Quality of wall	3.81	0.9351	0.23918
Quality of roof	3.64	0.8784	0.30736
Space of house	2.40	0.3500	0.18716
Access to drinking water	3.66	0.8865	0.17957
Sanitation facilities	3.48	0.6189	0.27678
Environment of house	2.94	0.4851	0.17494
Aggregate Mean Score	3.24	-	0.54
Habitat Security Index	-	0.7183	0.23280

Source: Computed from field data, 2014

The present study has confirmed that 4.6% of the respondents do not have permanent house for their living. 94 % of them have own land and house. Most of these houses were built through many projects completed after the Tsunami.

The mean values of quality of floor of the house, quality of wall of the house and quality of roof were higher than the midpoint. Index of the indicators of quality of floor, wall and roof were 0.8743, 0.9351 and 0.8784 respectively. This is implied that these indicators were highly secure in the study area. However, the mean value of the living space of the house was 2.40 indicating that fishery households have inadequate spaces for their living. 63 % of the houses have less than three rooms. Since, the index score of the quality of house was higher than the average the quality of house stood in a good position in the small scale fishery households in the Batticaloa district of Sri Lanka.

It was noted that the mean value of the access to drinking water was 3.66 in the study area. It implies that majority of the small scale fishery household has safe drinking water facilities in the Batticaloa district. The study confirmed that the 68% of the household has own well for their drinking water facilities and only 1% of the respondent do not have drinking water facilitates among the respondents. It was further noted that index score for the accessibility of drinking water relatively higher in this research.

It is observed from the table 3 that the mean value of the sanitation facilities of sampled households was 3.48 in the study area. This tells us that the majority of the respondent households have sanitation facilities in their house. Index score of the sanitation facility was also higher for small scale fisher households in the Batticaloa district of Sri Lanka.

Aggregated mean score of all indicators in the habitat security was 3.24 and the habitat security index was 0.7183. It should be noted that both values gained the value above the mid-point. This indicated less vulnerability to the habitat security of the small scale fishery households in the Batticaloa district. However, small percentage of respondents needs housing facilities for their batter living.

### 5.4. Food Security

FAO (2003) defined the food security as “A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Household food security has been defined as “sufficient food consumption by all people at all times for a healthy and productive life” (Thompson and Metz, 1997). Based on the literature review four indicators, such as food frequency, food diversity, quality of food and income sources for food, have been included to investigate food security status in the present study. Table 3 shows the food security of the respondents.

**Table 3.** Food Security Index

Indicators	Mean	Index	Sta. Dev.
Food frequency (No of meals & short eats per day)	4.59	0.7959	0.31812
Food diversity (No of food items consumed per day)	3.22	0.4081	0.19353
Quality of Foods	2.73	0.4331	0.20599
Income source for food	3.24	0.4144	0.27223
Aggregate Mean Score	3.45	-	0.79
Food Security Index	-	0.5129	0.13556

Source: Computed from field data, 2014

However, it can be noticed that the composite index of the food security scored a value of 0.5129 reflecting that small scale fishers' households were in a batter position in terms of food security. Aggregate mean score of food security was 3.45. It also highlights that food security had a relatively better position among the respondent in the present research.

### 5.5. Health Security

The definition of health security is the capacity of individuals to identify, prevent and manage significant risks to their health. This index might include mother and child care services, and work & sickness. In the present research, six indicators such as frequency of mother care services, Frequency of child care services, Availability of health care services, Number of days unable to work due to sickness in the last month, Reproductive health care services and Access to health care services, were used to measure the health security of small scale fishers in the study area. Table 4 shows the composite index of the health security of small scale fishers households in the Batticaloa district.

**Table 4.** Health Security index

Indicators	Mean	Index	Sta. Dev.
Frequency of mother care services	3.70	0.6750	0.31172
Frequency of child care services	3.42	0.6135	0.28445
Availability of health care services	3.48	0.4928	0.32572
Number of days unable to work due to sickness in the last month	2.75	0.4385	0.38135
Reproductive health care services	4.66	0.9142	0.19278
Access to health care services	2.89	0.4730	0.32240
Aggregate Mean Score	3.48	-	0.68
Health Security Index	-	0.6012	0.16145

Source: Computed from field data, 2014

The composite index of the health security scored a higher value in the present study. It was noted that there existed considerable access to primary health care centers and basic hospitals. The average distance to a health care services was found to be 2.8 Km. the present study confirmed that the health security was significantly higher for small scale fishers households in Batticaloa district of Sri Lanka. This might be due to the better investment on health sector at the national level of Sri Lanka. Jeba Mary and Karthikeyan (2013) pointed out similar findings among SHG women entrepreneurs in India. However, Shyamalie and Sani (2011) also pointed out that health Security of women was lower in Kangra, India and NuwaraEliya, Sri Lanka.

### 5.6. Social Security

The social security refers to the capacity of the individuals to maintain and participated in the social networks that enable them to pursue sustainable livelihood by reducing risks, accessing resources and information. Table 5 illustrates the selected indicators and scores obtained for the social security of small scale fishers households in the Batticaloa district.

**Table 5.** Social Security Index

Indicators	Mean	Index	Sta. Dev.
Community Participation	2.52	0.3791	0.44027
Participation in the planning process of the community organization	2.96	0.4899	0.34882
Access to support from the community organization	3.10	0.5250	0.28373
Access to support from friends/ neighborhood	3.09	0.5216	0.25411
Aggregated Mean Score	2.91	-	0.27
Social Security Index	-	0.4789	0.24686

Source: Computed from field data, 2014

### 5.7. Overall Livelihood Security Index

Overall livelihood security index includes six livelihood security domains such as economic security, educational security, Habitat security, Food Security, Health security and social security. The composite overall Livelihood Security Index (LSI) for the household was constructed by using the following formula (4).

$$LSI_i = \frac{\sum_{i=1}^6 W_i \cdot HLSI_i}{\sum_{i=1}^6 W_i} \dots\dots\dots(4)$$



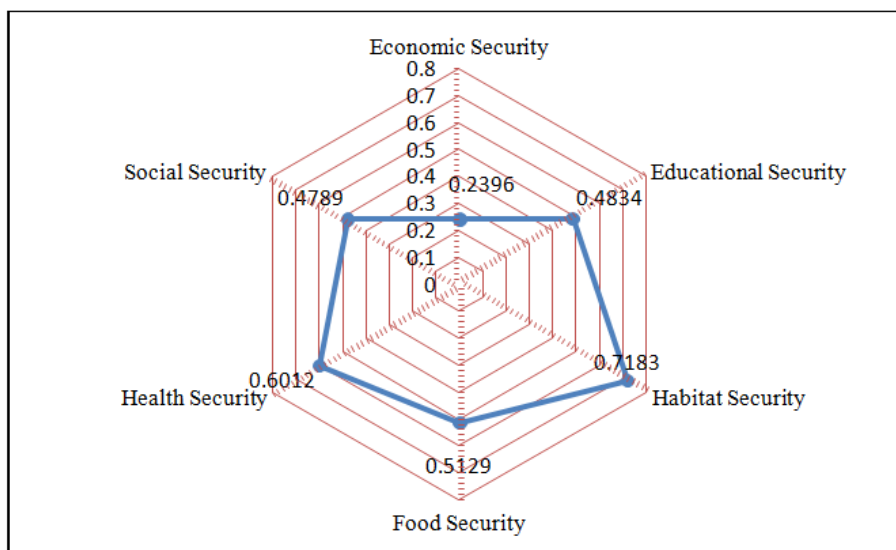
In the present research, the overall livelihood security index of small scale fishers households was 0.4977. This confirmed that around 50 % of the sampled small scale fishers were in livelihood insecurity status in the Batticaloa district of Sri Lanka.

**Table 6.** Overall Livelihood Security

Security index	HLSI	Wi	LSI
Economic Security	0.2396	8	1.9168
Educational Security	0.4834	6	2.9004
Habitat Security	0.7183	7	5.0281
Food Security	0.5129	4	2.0516
Health Security	0.6012	6	3.6072
Social Security	0.4789	4	1.9156
Total		35	17.4197
Overall Livelihood Security Index			0.4977

Source: Computed from field data, 2014.

The results of all the six major components are summarized in Fig:2. The livelihood security index spider diagram ranges between 0 and 0.8. It shows the significant difference among the six livelihood indices. Economic security of small scale fishers in the study are stood in a comparatively very lower position. Educational and Social security scored relatively same value and moderate level. Habitat Security, Food Security and Health security scored a higher value and confirmed a higher level of security. Among these livelihood security index habitat security was indicated best level in the study area.



**Figure 2.** Livelihood Security Status

Source: Computed from field data, 2014

## VI. Conclusion And Recommendations

The study was set out to explore the livelihood security of small-scale fisher's households in the Batticaloa district of Sri Lanka. The socio-economic status of the small-scale fishers and their livelihood status were a vulnerable situation in the Batticaloa district. Particularly, economic security status is in highly vulnerable situation compare to others. This study confirmed that around 50 % of the sampled small-scale fishers were in livelihood insecurity situation in the Batticaloa district of Sri Lanka.

Livelihood diversification is one of the ways to enhance the livelihood security of small-scale fishers. Lack of understanding about well-established patterns of livelihood and Lack of training on new fishing technology, lack of diversified livelihoods were reported by the majority of fishers in the study area. INGOs, NGOs, and concerned institutions come forward to impart training on the said issues. Relevant donor agencies can organize training on diversified livelihood activities.

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