

## CHAPTER III

### RESEARCH METHODS

In this study, households were treated as the basic and single economic unit of analysis throughout the study. A Household here is defined as groups of individuals residing together, pull all or most of the income and resources, and basically shares the same economic benefit from their livelihoods. The sample characteristics were examined from the data for whole households which were randomly selected in this study. Primary data along with secondary data were utilized during analysis.

Livelihood system in the rural areas is complex and intertwined among many farm and non-farm components. The seasonality in livelihood and lack of all types of resource ownership has therefore led each household to adjust their livelihood strategies to meet the household welfare. Relative contribution of different farm and non-farm livelihoods components aggregates to the whole livelihood system of rural poor population. Therefore, the present study has been designed with the concept of assessing economic security using the context of livelihood approach. Basically household welfare or livelihood system could be analyzed through qualitative and quantitative measures.

#### **3.1 Conceptual framework**

The following conceptual framework (Figure 3.1) describes how the study was set up to assess the economic security of studied rural populace using livelihood approach. The overall objective of this study is economic security assessment of studied samples. It is achieved by adapting different ideas or methodologies derived

from livelihood framework first presented by the U.K. Department for International Development (2000). Among the components of this conceptual framework, the first main component taken into account is different livelihood strategies adopted by those studied samples. They were identified under six main categories, which were crop production, livestock production, farm wage employment, non-farm wage employment, self employment and other non-specified. In this study, their importance of contribution (by each livelihood strategies) to the studied samples would be measured in terms of income and number of households carrying out those strategies. Diversity index would be derived for each household by including the every type of strategies in terms of their income contribution to the household.

The second main component of the conceptual framework is livelihood assets. They were evaluated under five main portions. Those are human, physical, natural, social and financial assets. These assets and vulnerability context influence the households which make them differentiate into different types. Two main household types were identified: partially commercialized and subsistence. Moreover, the inter-linkages among the different components of conceptual framework also examined.

Those are i) assets distribution among different livelihood strategies types ii) assets distribution between gender, and iii) relationship between livelihood strategies and final household types.

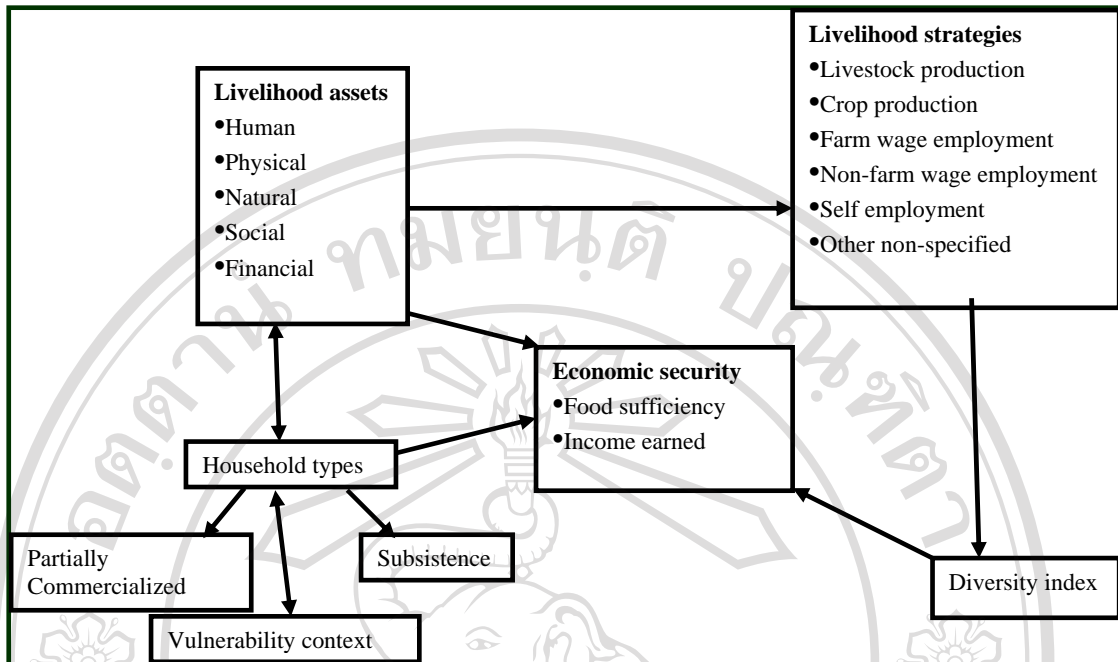


Figure 3.1 A conceptual framework for household livelihood/welfare/economic security analysis

### 3.2 Selection of study area

This study was carried out one of the rural divisional secretariat division of Ampara district Eastern Sri Lanka particularly on tamil ethnic. Divisional secretariat office in this area is the main government administrative unit responsible for handling all matters to this area people.

### 3.3 Sampling technique

Given the noticed differences among different households' resource entitlements, to justify the rural poor populations' livelihood characteristics proportional stratified random sampling technique was administered in order to get representation of each household. During data analysis, sample stratification was used to characterize the selected samples on the basis of poverty measures of economic security assessment.

### 3.4 Sample size determination

From each sampling stratum, the required sample households were randomly selected. The sample size distribution by each stratum is presented in Table 3.1. Hundred households were selected. To represent each division of the whole study area, this sample size was stratified among those divisions using the proportional stratified random sampling method.

Table 3.1 Sample size distribution by division

G.N Division	Number of families receiving samurdhi aid	%	Sample size
Karaitivu-01	117	7.34	7
Karaitivu-02	39	2.45	2
Karaitivu-03	113	7.08	7
Karaitivu-04	113	7.08	7
Karaitivu-05	62	3.89	4
Karaitivu-06	88	5.52	6
Karaitivu-07	125	7.84	8
Karaitivu-08	200	12.54	13
Karaitivu-09	171	10.72	11
Karaitivu-10	85	5.33	5
Karaitivu-11	169	10.60	11
Karaitivu-12	313	19.62	20
Total	1595	100	100

(Source: computed from the data source available at Divisional secretariat office, Karaitivu, 2006)

### 3.5 Data collection

To obtain necessary information for qualitative and quantitative analysis, data were gathered both from primary and secondary sources. Primary data were collected combining household survey and key informant interviews. Primary data were

collected in the conventional local terms and units and later converted into standard terms and units. Relevant secondary information were collected both from published and unpublished documents of concerned government organizations at village level, district level and from the careful observation of study area.

### **3.5.1 Household survey**

Hundred households (100) were interviewed. Both structured and semi-structured questionnaires were administered to collect detailed household information from the sampled household. Due to the nature of study, enumeration was strictly done with the household head who is responsible for overall household management. Questionnaire was exclusively designed in order to acquire all necessary data on household's demography, resources, production, consumption etc. Since the rural poor households generally do not keep records, information collected was based on respondents' memory recall.

### **3.5.2 Key informant survey**

Knowledgeable persons (who the persons carrying out institutional support to the study population) involved with sample study population, were selected as key informants in order to obtain overall information of the study area. Five key informants (including in-charge Sarmurdhi programme officer and Grama Niladari) were interviewed. Information on economic/employment activities, resource availability, infrastructure development, institutional support, household livelihood strategies etc were obtained through key informant survey using the checklist.

### **3.6 Economic security assessment**

Economic security assessment is the one main objective of the study. It was examined under two major analysis portions. They were i) to characterize the

economic security (poverty) situation and followed by ii) to develop models to represent economic security. The methods used to achieve these objectives are explained below.

### **3.6.1 Economic security situations**

To analyze economic security situation, livelihood resource profile to represent and characterize the asset status, people's vignettes on risk factors surrounding their livelihood strategies and coping strategies, the relationships between each components (for example, final household types and primary livelihood strategies), gender differences in terms of livelihood strategies and assets holdings were examined. Gini coefficient was used to see distribution of income among the poor household samples. Households were differentiated using cluster analysis.

Households were differentiated into two groups based on selected income security line. The income security line used here is the official poverty line<sup>1</sup> of Sri Lanka. If the households were above or at this line, then they were considered as income sufficient. If they were below this line, they were considered as income insufficient.

Cluster analysis was used to identify the nature of commercialization and subsistence among households. Frequency analysis was used to examine distribution of shocks faced by households, different attributes of coping strategies etc. More over food sufficiency score, rice purchasing habit, agricultural production status also examined to propose a better project to this study area.

---

<sup>1</sup> The national official poverty line used here is defined as 24.63 US Dollar or 2,611 LKR/person/month for year 2008 January. This study was carried out in year 2007. There is no defined figure found to this year suitable for this study area. Therefore the recent and nearly released value of 2008, January national official line was used. National official line is the minimum expenditure to fulfill the basic needs Dollar/person/month.



### a. Gini index

Gini coefficient is defined as a ratio with values between 0 and 1. It is derived from a Lorenz curve in which a situation can be compared with perfect equality line. A low Gini coefficient indicates more equal income distribution, while a high gini coefficient indicates more unequal distribution. 0 corresponds to perfect equality (everyone having exactly the same income) and 1 corresponds to perfect inequality (where one person has all the income, while everyone else has zero income). The gini coefficient requires that no one have a negative net income or wealth. Worldwide, gini coefficients<sup>2</sup> range from approximately 0.232 in Denmark to 0.707 in Namibia although not every country has been assessed. Here the same principle was applied to the studied sample.

To calculate the gini index the following formula adopted from Deaton (1997).

$$G = \frac{N+1}{N-1} - \frac{2}{N(N-1)u} \left( \sum_{i=1}^n P_i X_i \right)$$

$u$  = mean income of the population,

$P_i$  = the income rank  $P$  of person  $i$ , with income  $X$ ,

such that the richest person receives a rank of 1 and the poorest a rank of  $N$ .

Gini-coefficient is a measure of equality of income distribution. Here it is used to assess the income distribution among studied sample is equally distributed or not equally distributed. The measure impresses the equity of economic development (John, 2000) for a balanced society.

---

<sup>2</sup> Gini co-efficient and gini index are the same terms simultaneously used in this study.

### **b. Income security line**

Here an attempt was made to compare the household income adjusted for household size with official poverty line. The purpose was to differentiate the income marginal group using this basic social welfare measure of official poverty line.

Basic idea of income security was the official poverty line is determined at the point where per capita household basic need is equal to official poverty line (Kakwani, 2007). In case, all income firstly used for the purpose of household's essential needs,

$$\text{Ratio of income security (\%)} = \left( \frac{Y / N}{X} \right) 100$$

Y= Total household income /month

N= Household size

X= National official poverty line (for January, 2008: 2811 LKR/person/month).

If the ratio is <100%, those households are income insecure (otherwise considered as income secure).

### **c. Frequency analysis**

Frequencies were set for multiple responses under each indicators of evaluation to find out the existing pattern of surveyed sample such that income security vs insecurity, food sufficiency vs insufficiency, adoption and non adoption of coping strategies, shocks at household level, social participation, inter-linkages among primary occupational groups and household types etc.



#### **d. Cluster analysis**

To find out the household types based on the selected parameters: borrowing capacity, money value of job related equipments, and seasonality in working pattern (by natural grouping) cluster analysis was used.

Natural grouping (the SPSS programme itself allowed to determine the number of clusters (groups) during the process of two step cluster) was carried out to identify the subsistence and commercialization nature of households based on the selected parameters of money value of job related equipments, borrowing capacity and seasonality in employment. These parameters better explain productive nature of households than any other. The resulted groups were descriptively termed in relation to each other and included in the following regression analysis portion.

#### **e. Income diversity index**

Households tend to diversify their income earning activities to maximize the utility of their endowments and to overcome the effects of seasonality in employment. Diversification becomes most important for resource less wage earners in a rural poor society to sustain the life. To address this issue, Income diversity index was calculated for each household using the formula adopted by Roberto and Corinne, (2003). Diversity index was calculated among the different sources of income earning activities which were crop production, livestock production, farm wage employment, nonfarm wage employment, self employment and other non-specified.

Income diversity index was derived for each household using the following formula (Roberto and Corinne, 2003).

$$D = 1 / \sum_{i=1}^n p_i^2$$

$D$  = diversity index,  $p_i$  = income share derived from activity  $i$  in the  $n$  portfolio of economic activities.

Diversity index included as a covariant (independent variable) in the following regression analysis.

### 3.6.2 Economic security model

#### a. Regression models

Multiple regression and binary logistic regression models were adopted in this study to find out determinants of economic security. These two models differ in the nature of dependent variables. In the case of continuous scale dependent variable, multiple regression model is used. In the case of a categorical dependent variable, binary logistic regression model is used. In this study both of them were applied according to the following situation:

$$Y = f(X_i)$$

$Y$  = economic security defined as

a) Household's income earned (Sri Lankan Rupee/household/month)

b) food sufficiency ( binary response variable)

c) income sufficiency ( binary response variable)

$X_i = (X_1, X_2, \dots, X_n)$  = relevant independent variables

$X_1, X_2, \dots, X_n$  represented by following real variables in each model.

$X_i$  = (Education of household head, Age of household head, Young is to adult ratio, Household type (dummy), Diversity index, Sex of household (dummy))

### b. Specification of the models

This section presents econometric models designed to analyze the relationship between economic security (the dependent variable) and some predetermined resources and demographic variables. The co-efficients of each individual variable obtained from regression analysis was then used to interpret the relative contribution of each variable in economic security (Table 3.2).

The models were specified as:

#### a) Multiple regression model:

$$Y = (b_0 + b_1 * Hh\_edu + b_2 * Hh\_age + b_3 * YA\_ratio + b_4 * Divty\_index + b_5 * Hh\_type + b_6 * Hh\_sex)$$

Where,

$Y$  = Log of household income

$b_0$  = constant

$b_1, b_2, b_n$  = Co-efficient of estimation

$Hh\_edu$  = Education of household head

$Hh\_age$  = Age of Household head

$YA\_ratio$  = Young is to adult ratio

$Divty\_index$  = Diversity index

$Hh\_type$  = Household type (dummy, 1= partially commercialized, 0= subsistence)

$Hh\_sex$  = Sex of household head (dummy, 1= male headed, 0= female headed)

b) Binary logistic regression model: (dependent variable subjective based)

Where,

$$\log(p/1-p) = (b_1 * Hh\_edu + b_2 * Hh\_age + b_3 * YA\_ratio + b_4 * Hh\_type + b_5 * Divty\_index + b_6 * Hh\_sex)$$

- p is the probability of having food sufficiency
- 1-p is the probability of not having food sufficiency

c) Binary logistic regression model: (dependent variable objective based)

$$\log(p/1-p) = (b_1 * Hh\_edu + b_2 * Hh\_age + b_3 * YA\_ratio + b_4 * Hh\_type + b_5 * Divty\_index + b_6 * Hh\_sex)$$

- p is the probability of having income sufficiency (1)
- 1-p is the probability of not having income sufficiency (0)

Table 3.2 specifies definition of the variables and hypothesized relationships.

In case a), family income was calculated per month basis from the annual income data of each household head

In case b), food sufficiency was assessed using food sufficiency scores. Four level of response for each month of the year 2007(1= Access to enough and all kind

of food, 2= Access to enough but not all kind of food, 3= sometimes not enough to eat, 4= often not enough to eat) was collected. A household was considered food

sufficient if household either response level 1 or 2 in the respective months. The

summation of these scores were used as proxies of food sufficiency levels of the households. The summated scores were categorized under 1 and 0 responses. If a

household had score of 24 or less it is, considered as being food sufficient and was

given the code of 1 (food sufficient) and the score more than 24 were coded as 0 (food

insufficient). Generally food sufficiency includes three major dimensions which were availability, adequacy and accessibility (Lacy and Busch, 1986). Food sufficiency is a basic measure of economic hardship as well could be measured at household level for a sub-population. In this study, household's head perception was used to assess the food sufficiency, based on the structured questionnaire. The adequacy refers to differing nutritional needs of various segments of the population. It is always conceptualized in terms of balanced diet. The dimension of accessibility encompasses transportation, marketing as well the means by which all the foods are acquired. The latter two dimensions are quite complicated and difficult to measure or gather all kinds of information. The study therefore adopt only food sufficiency concept for the purpose of its analysis.

In case c), if the households meet official poverty line given the code of 1 and who fall below official line given the code of zero.

Three separate equations were evaluated, one using log of family income as the dependent variable and the other using food sufficiency and income sufficiency (binary response variables) as the dependent variables.

Table 3.2 Details of independent variable related to dependent variable at household level

Name of variables description	Definition of variable	Hypothesized relationship with economic security
Hh_edu	Years of schooling	Positive
Hh_age	Years	Positive or negative
YA_ratio	Ratio ( 18 years is the cut point)	Negative
Hh_type	Dummy ( 1=Partially commercialized 1, 0=Subsistence)	Positive
Divty_index	Score	Positive or negative
Hh_sex	Dummy ( 1=male headed, 0=female headed)	Positive

Data collected using various methods were compiled, variable quantified and classified. After checking the consistence, data analysis was done using Excel and SPSS software. Both inferential and descriptive statistical methods were employed to analyze the data. Descriptive statistics like mean, frequencies, indices, and graphs and charts are used to present the results. Variance, mean differences, regression and correlation analysis were used as inferential statistics.