CHAPTER 5
METHODOLOGY

5.1 BACKGROUND AND DEVELOPMENT OF THE ISSUE:

The most challenging task before the development practitioners, researchers, policy makers etc. is how to identify the food secure/ insecure people? From 1948, the year of universal declaration of human rights to till date, there has been a long- lasting debate on this issue. There exists widespread consensus that no single indicator can capture all dimensions of the concept since it is multidimensional and many new issues are coming under its purview day by day.

Maxwell and Frankenberger (1992)\(^1\) reviewed some important measures that have been used in most of the studies and identified 25 indicators and a host of other indicators. They divided all the indicators in two broad heads: “process indicators” and “outcome indicators”. The former is related to supply and access to food and the latter describe nutritional status. They suggested an alternative method called the Coping Strategy Index (CSI) for measuring short term food security at the household level. One of the important advantages of this method over the others is that it collects subjective information from the respondents. The CSI can be used to measure the impact of food aid programmes, as an early warning indicator of impending food crisis and also to check entitability of a household to get aid of food. Babatunde et al (2007)\(^2\) also used the CSI to measure the household food security status among the HIV/AIDS affected people in an Ugandan urban area. The study attempted to analyse how the HIV/AIDS affected people cope with the food shortages. In a study on farmers’ food security in northern Ghana, Quaye (2008) also used the CSI to have a look into how the

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1 Maxwell and Frankenberger (1992): op.cit. p 76
farmers cope with the food shortages since the farmers in the region cultivated only for household consumption and food was not available throughout the year.

Maharajan and Chhetri (2006) examined the household food security and its relation with socio-economic features among rural households in Nepal. They use Head Count Method, Food Insecurity Gap and Squared Food Insecurity Gap to capture the scenario of food insecurity more correctly and in a representative way. Gittelsohn et al (1998) studied food security from three different perspectives: past food supply, current food store and future food supply to meet the requirements of all households members. The researchers of the study feel that this concept of measuring household food security by using scale for the past present and future components of food security can be used as a framework for studying food security in other settings. Chung et al (1997) made distinction between “generic indicators” and “location specific indicators”. Generic indicators are universally applicable whereas the other category can be applied only locally.

Wolfe and Frongillo (2001) tried to build up an efficient tool for measuring food security at household level in developing countries and opined that the tool should go beyond to measure food availability and should include access to food and perceptions of food insecurity. They also discussed about the coping strategies method as used by Maxwell (1996) and support its validity in understanding the household food security.

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Qureshi (2007)\(^8\) developed a composite index for measurement of household food security among the foragers and farmers in Bolivian Amazon. It was called the Food Insecurity Coping Capacity Index (FICCI). The variables used in the index covers three aspects of food security viz. availability of food, accessibility to food and the quality of food consumed by the households. The index was used to determine the differences between the food secure and food insecure households.

Since first World Food Conference of 1974 (Webb et al, 2006)\(^9\) observed a remarkable conceptual development towards measuring household and individual food security in the following form:

a) A shift from using measures of food availability and utilization to measuring inadequate access.

b) A shift from a focus on “objective measures” (such as taking information regarding income, consumption expenditure, and calorie consumed, Body Mass Indices, etc.) to subjective measures.

c) A growing emphasis on “fundamental measures” in- stead of “derived” measures. Fundamental measures presuppose no others whereas proxy distal measures are based on known empirical relationships.

The International Scientific Symposium (2002), on “Measurement and Assessment of Food Deprivation and Undernutrition” advocated the following methodologies for measuring food insecurity FAO (2003a)\(^{10}\).

a) Measurement of food security through the use of household expenditure surveys.

b) Through individual food intake survey methods

c) Measurement of nutritional status from anthropometric survey data.

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d) Qualitative measures of food insecurity and hunger.

e) Innovative methods for measuring food security.

f) Food security information system using combined methods.

United States' largest food aid programme is PL480 Title II. It is managed by United States Agency for International Development (USAID) along with two partners World Food Programme (WFP) and Private Voluntary Organisations and Co-operatives. As the estimation based on poverty and nutritional status is an indirect way, so, in order to monitor and track food insecurity and hunger USAID was in need of a "low-cost" and "direct" survey based measure of food security. As a result, during World Food Summit (1996) a direct survey based measure, known as Food Insecurity and Vulnerability Information and Mapping System (FIVIMS) was developed. This direct survey-based measure was used in a growing number of countries including Bangladesh, India, Uganda, Yemen etc. (Kabbani N. 2005\textsuperscript{11}; Mark N. et. al. 2002\textsuperscript{12}).

People suffering from acute hunger are easily observable, but it is almost difficult to make estimation of people suffering from inadequate access to food due to low purchasing power. As FIVIMS could not capture the "access" component of food security, it became a challenging task before USAID to measure its impact on the "access" component of food security. As a result, Food and Nutrition Technical Assistance (FANTA) Project, funded by USAID and managed by the Academy for Educational Development finally developed Household Food Insecurity Access Scale (HFIAS). HFIAS is a direct indicator measuring access component of food security. It is an experimental scale. Later on, other two additional indicators are also adopted by FANTA, namely, Household Dietary Diversity Score (HDDS) and Months of Inadequate Household Food Provisioning (MIHFP). Standardized guidelines for the same

\textsuperscript{11} Kabbani N. (2005): "Survey results of Hunger and Food Insecurity in Yemen", Department of Economics, American University of Bairut, Bairut, Lebanon.

\textsuperscript{12} Mark N. et. al. (2002): "Comparing Household Survey BAASED Measures of Food Insecurity Across Countries: Case Study in India, Uganda, Bangladesh", Discussion Paper No 7, in Food Policy and Applies Nutrition Programme at Tufts University.
also have been developed for data collection and analysis. (www.fantaproject.com).

Since a diversified diet is good for health, so HDDS is supposed to has association with both food security and nutritional outcome. However, empirically it is found that the scope of HDDS is limited to dietary energy consumption (food security) only and not to the adequacy of consumption (nutrition security) (FAO, 2007b)\textsuperscript{13}. International Food Policy and Research Institute used Receiver Operating Characteristics (ROC) curves to determine the quality with which HDDS can be used to determine the adequacy of dietary energy availability (IFPRI 2006)\textsuperscript{14}. Ruel (2002)\textsuperscript{15} from her review of various measures of dietary diversity found that dietary diversity have positive association with nutrition adequacy, child growth, per capita consumption and energy availability etc. Labadarios \textit{et al} (2011)\textsuperscript{16} also have found similar conclusions.

Again, to test universal applicability of United State’s HFIAS several validation studies were undertaken. Studies conducted in Burkina Faso and Bangladesh, implemented by Cornell and Tufts University in collaboration with Title II implementing partners, concluded that experimental food insecurity (access) scale approach can be applied in diverse country settings in a valid and sensitive way (Frongilo A. and Nanama S, 2006)\textsuperscript{17}. However, Coates et al

\textsuperscript{13} FAO (2007b): "Literature Review of Dietary Diversity as an Indicator of Food Security" Rome.

\textsuperscript{14} IFPRI (2006): 'Review and Validation of Dietary Diversity, Food Frequency and Other Proxy Indicators of Household Food Security.' Washington, D.C.


(2006)\textsuperscript{18} found that mere translating or slightly adapting the United States food insecurity survey module cannot be applied across cultures since each culture is unique. Moreover, there exists inherent biasness among respondents of the developing countries to overstate their food insecurity status in the hope for receiving more food aid.

To know the feedback of applying United States food insecurity survey module, FANTA organized first Food Insecurity Measurement Workshop in April 4, 2004. From the original 18 questions, the workshop took 13 questions for review, and finally formed the module with 9 questions. The final module has been known as the FAST module. This workshop also felt the need for creating indicators of food security (access) from HFIAS. (Swindale A. and Bilinsky P.2006)\textsuperscript{19}

Thus, food security is measured with both quantitative and qualitative approaches. While qualitative survey provides depth insight into the problem, quantitative survey provides complementary breadth into this insight. While qualitative methods require less time and might better reflect the experiences of people, their reliability depends on the abilities of the ethnographers and their applicability is restricted to the population that they come from. Quantitative methods on the other hand can be applied to other populations as well and are more rigorously calculated with less interviewer bias. However it might be difficult to interpret such data if the context of the study is not known; therefore, qualitative information might still be required Haddad et al. (1997)\textsuperscript{20}. They concluded that large scale organizations such as governments or international donors might be better able to carry out quantitative or mixed-methods


\textsuperscript{20} Haddad et al. (1997): "Identifying the Food Insecure; the Application of Mixed-Method Approaches in India" ; International Food Policy Research Institute (IFPRI) Publication (Book), Washington D.C.
(quantitative and qualitative) analysis whereas a local NGO might prefer to carry out a qualitative analysis.

How to integrate both of them for drawing conclusions about food security status of a group of people? One of the main conclusions of the second food insecurity measurement workshop (2005) was the same. The debate still prevails among researchers till date. (Coats et al, 2006)\(^{21}\) found that qualitatively and qualitatively derived scales were highly correlated. (Hamilton et al 1997)\(^{22}\) also found similar results in the construction of United States food security index. However, Migotto et al, 2005\(^{23}\) did not find any association between subjective food adequacy and standard quantitative indicators. According to him, this weak correlation may be due to inherent biases in the estimation process of quantitative indicators.

In Bickel et al.'s (2000)\(^{24}\) "Guide to Measuring Household Food Security", a household food security measurement scale was developed by converting qualitative data into quantitative data. From their analysis and tests, Bickel et al. conclude that the FAST module can be applied to developing countries and that the survey questions were strongly correlated with the prevalence of food insecurity and also reflected changes in food security status over time. The authors have also concluded that ideally the FAST module should be used along with other more widely used measures of nutritional status and food production than on its own. In spite, it is a very accurate indicator of the "access dimension" of household food security.


5.2 MEASURING FOOD SECURITY IN INDIAN CONTEXT: EVOLUTION IN THE POVERTY BASED APPROACH:

In order to implement social safety nets like Public Distribution System (PDS), Government of India uses Planning Commission's estimates of number of BPL and APL population. Thus, food poverty is being treated synonymous with poverty in general. From time to time the government has been appointing various expert committees to revise the methodology adopted for defining the poverty line. "Food" being the prime need in a hierarchy of needs of human life, official poverty line, for the first time was determined on the basis of minimum food intake, or, more precisely, on the basis of minimum calorie intake. Households having "two square meal a day" by incurring expenditure of Rs.21.50 per capita per month in rural and Rs. 23.50 per capita per month in urban areas respectively on food were considered as non-poor (Dandekar and Rath 1971). This expenditure was supposed to provide 2250 kilocalories per person on the average irrespective of age, sex, body weight and activity level. (1961-62 prices). In fact, Dandekar and Rath borrowed the estimates of calorie from the given expenditure from P. V. Sukhatme's estimates, with due acknowledgement to him. Renowned statistician and former head of Statistics Division of Food and Agricultural Organisation (FAO), Sukhatme (1961, 1981, 1982) was a pioneer of measurement of poverty as well as hunger in India and abroad. State of Food Insecurity (SOFI) report for yearly calculation of number of hungry population of Food and FAO primarily depends on Sukhatme's approach.

This expenditure of Rs 21.50 per capita per month includes expenditure on noon-food items also except expenditure on health and education, because the state was supposed to provide these free of cost to the public because of its constitutional obligation. Required data was supplied by the National Sample

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Survey Organization (NSSO), from its consumer expenditure surveys. As NASSO published physical units of consumption of rice and pulses only, there was no effort to calculate other nutrients like minerals, vitamins, etc. except calories. But Sukhatme had pointed out that any person with the specified calorie intake also gets the other nutrients. Moreover, from 1974 onwards, NASSO surveys become five yearly. As such, The Planning Commission made yearly estimates of population living with poverty using the price data from the Indian Labour Bureau's consumption expenditure surveys for their cost of living price indices. Poverty line expenditure has been updated using appropriate deflators.

In early 1970s, there generated a rich and extensive literature on poverty and its measurement. The "Task Force on Projections of Minimum Needs and Effective Consumption Demand", Perspective Planning Division, GoI (1979)\(^{29}\), bought together at one place the results of some of these studies and redefined the poverty line. The Planning Commission used the methodology formulated by the Task Force to estimate incidence of poverty. The Task Force defined the poverty line as the per-capita expenditure level at which the average per-capita, per day calorie intake was 2435 calories in rural area and 2095 calories for urban areas. The Task Force used the age- sex-activity specific calorie allowances recommended by the Nutrition Expert Group (1968) to estimate the average daily per capita requirements for rural and urban areas. The calorie norms were rounded off to 2400 calories per capita per day for rural areas and 2100 calories per capita per day for urban areas for the sake of simplicity.

After initiation of economic reform in 1991, Planning Commission appointed another expert committee in 1993 under the chairmanship of D T Lakdawala. The committee accepted the NSS consumer expenditure survey of 1973-74 as the base for the calculations. Based on the observed consumer behaviour in 1973-74, it was estimated that, on an average, consumer expenditure of Rs.49.09 per capita per month was associated with a calorie intake of 2400 per capita per day in rural areas and Rs.56.64 per capita per month with a calorie

intake of 2100 per day in urban areas. Thus, the concept of poverty line retained the same 'norm' of calorie requirement which focuses on the purchasing power needed to meet the specific calorie intake standard with some margin for non-food consumption needs. Moreover the calorie norms relate to an average for the reference group and not the minimum required for biological existence, given that there is a considerable variation in calorie requirement of individuals depending on their workload, age, sex and activity status.


\textsuperscript{31} Gol (2002): op.cit.
\textsuperscript{33} Deaton and Dreze (2009): op.cit.
\textsuperscript{36} Meenakshi and Viswanathan (2005):op.cit.
Contrary to this, most of the studies have found that along with poverty decline, there is reported decline in per capita intake of calorie for both rural and urban India. Proportionate decline is more for the rich than that of the poor. As per official estimates, rural poverty for the country as a whole declined from 45.61 per cent in 1983 to 28.30 percent and urban poverty declined from 42.15 per cent to 25.70 percent between 1983 and 2004-05. During this period, average calorie intake per capita declined from 2221 to 2047 and from 2089 to 2020 kcal in the rural and urban sectors respectively. As regards calorie deprivation, its extent increased from 69 to 85 percent in rural India and from 60 to 65 percent in urban India. However, there have seen slight increase in calorie intake in the country as a whole between 2004-05 and 2009-11, still it is far below than the intake level of 1983. Moreover, rural-urban gap in terms of food deprivation has increased after economic reform for the country as a whole (Kumar et al. 2008, Kumar et al. 2012).

A disaggregated analysis of calorie intake by deciles group has shown that incidence of calorie deficiency has increased in both rural and urban sectors. This is because of the fact that calorie intakes of the richer deciles groups have declined and those of the poor, though increased, still fall below the conventional normative minimum (Suryanarayana 2008). The rich now a days has gone for changing consumption patterns in favour of non-calorie food and non-food items at the expense of calorie intake (Majumdar 2005, Radhadhakrishna and Ravi (1992), Murty (1999), Suryanarayana (2008) opined that the observed

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decline in cereal consumption and calorie intake for the poor also need not necessarily indicate worsening food security situation, because final outcome indicators such as anthropometric measures does not support the view. On the contrary, Maxwell and Smith (1992)\textsuperscript{53} opined that anthropometry is not a reliable indicator of (changing) food security status because these this indicator depends more on nutrition security rather than food security, Again, these indicators depends more on past level of food consumption, not the present one. Besides these, Dreze and Sen (1989)\textsuperscript{54} advocated that the reported decline in calorie intake may also indicate entitlement failure. Or, it may be a part of coping strategy for the poor and vulnerable confronting disruption in food entitlement Watts (1983)\textsuperscript{55}.

The expert committee for measuring incidence of poverty chaired by S.D. Tandulkar made a departure from the calorie norm approach in defining poverty line. Because of privatization of education and health, the new committee adopted household expenditures on these two heads exclusively with expenditures on food and non-food items. Moreover it also made allowances for rent also. Based on 61\textsuperscript{st} round NSSO consumer expenditure survey (2004-05), the committee re-calculated incidence of rural poverty as 41.8 percent instead of 28.3 percent as estimated by Planning Commission earlier. The committee calculated poverty line consumer expenditure for all the states separately. The report fixed poverty line expenditure for rural and urban India as a whole as Rs.446.68 and Rs.578.84 respectively for 2004-05. Finally, Planning Commission of Government of India accepted the report.

\textsuperscript{51} Murty (1999): “Foodgrains Demand in India to2020 –A Comment”, Economic and Political Weekly, 14 November, pp.2943-44.
\textsuperscript{52} M.H.Suryanarayana (2008): op.cit.
\textsuperscript{53} Maxwell and Smith (1992): op.cit.
\textsuperscript{54} Dreze and Sen (1989): op.cit.
The High Level Committee (HLC) on Long Term Grain Policy (GoI, 2002)\textsuperscript{56} has found that more than 70 percent of the population had a per capita energy intake less than 2100 calorie (kcal) per day for some years since 1993-94. The HLC also found that the bottom 80 per cent of the rural and the bottom 40 per cent of the urban households respectively spend more than 60 per cent of their total expenditures on food. However, the estimates of consumption poverty were only 37.37 per cent for rural Indian and 32.36 per cent for urban India in 1993-904. The HLC observed that the magnitude of food insecurity by the calorie intake / food share criterion was more than the incidence of poverty in India. Moreover, according to Suryanarayanan and Silva (2007)\textsuperscript{57} the first four Monthly Per Capita Expenditure Classes (MPCE) of 61\textsuperscript{st} round of NSSO survey account for the poorest thirty per cent of the population and more than half of the households in these MPCE classes do not have the Antyodaya or BPL ration cards. In fact, according to their estimates in rural India, even the richest percentile class includes households possessing the Antyodaya or the BPL ration cards: Nearly one (0.8) percent have the Antyodaya card and about 11% have the BPL card. In urban India also, at least one-hundredth of the richest five per cent have the BPL card. In other words, majority of the households with Antyodaya or BPL ration cards are APL.

Recently, in response to the querry of the Supreme Court of India, Government of India submitted the revised criterion of poverty line at Rs. 965.00 per month (Rs 32 per day) for urban area and Rs. 781.00 per month (Rs 26 per day). This revised criterion has been fixed on the basis of new parameters taken by Tandulkar Committee report and also the estimates of MPCE prepared by 66\textsuperscript{th} round of National Sample Survey conducted by NSSO in 2009-10. Again, due to steep hike in prices of essential commodities during 2009 and 2011, this new criterion has been treated as unrealistic. Following this, a serious controversy arises throughout the country regarding the newly defined poverty line. Finally, Planning Commission on October 3, 2011 was compelled to announced that a

\textsuperscript{56} GoI (2002): op.cit.

new methodology will be worked out to redefine the poverty line. The commission also stated that an expert committee will be appointed to ensure that the new methodology is consistent with the provisions of the Food Security Bill 2011. Moreover, the current weakness in identification of households under BPL will also be corrected by determining eligibility for the period category under a new scientific Socio-Economic and caste-Economic Census conducted in the country.

It is clear from the fore going observation that “poverty in general” and “food poverty” are treated synonymously in India. In fact, expert committee chaired by D. T. Lakdawala tried to de-link between the two. But because of methodological inconvenience at that time they remained concentrated on the calorie norm. Khasnobis et al. (2007) observed that food insecurity or hunger is as much a cause as an effect of poverty. They also concluded that the former receives less attention than the later both in terms of research and policy. Estimate of population with food poverty /food insecurity is therefore obviously required for implementing social safety nets like PDS. Otherwise there will be huge wastage of public money. Will the proposed National Food Security Bill 2011 embrace the actual food insecure population?

5.3 DATA SOURCES

The study is based on both secondary and primary data. The main sources of secondary data are the publications of government agencies such as National Sample Survey Office, Government of India, Office of the Census of India, Directorates of Food and Civil Supplies, Agriculture and the Economics and Statistics, Government of Assam and Government of India. Besides, considerable amount of unpublished statistics have been gathered from office of agriculture, Kamrup district; office of Development Blocks of Dimoria, Rani and Hajo; office of co-operative societies located in three blocks.

The area of the study is the state of Assam. The micro level analysis is mainly based on primary data collected by carrying out field survey in Kamrup (rural) district of Assam -the only rural district of the state. The samples have

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been selected through a process of mixed sampling. As per 2001 census, there are 17 community development blocks in the district. These 17 blocks are grouped into 3 groups, depending on the density of population. One block from the high density group, one block from the low density group and one from the medium density group has been selected the study. The selected blocks are: Dimoria, Rani, and Hajo. After this, 4 villages from each block have been taken for household survey. The villages are selected after grouping the same into 3 groups; in ascending order of population. One village from the first and third group, and two from the middle have been selected accordingly. The four villages surveyed in Dimoria Block are Helagog, Murkata, Topaloli and Maloibari and In the Rani Block, surveyed four villages are Sikarhati, Rajapanichanda, Batabari, and Nalgaon, while it was Kalitakuchi, Saktibari, Makhania and Ketekibari for Hajo. The Dimoria block has been coded as Block 1, while it is Block 2 and Block 3 for Hajo and Rani respectively. Lastly, a number of representative families, 5 to 10 percent (depending upon the population of the villages) of total households are selected randomly from each village. A total of 358 households have been surveyed; out of which 116 households are from Dimoria block, 139 are from Hajo block and 103 are from Rani block. Thus, the survey unit is household and head of the family has been taken as respondent. The respondents are interviewed using a structured questionnaire. Data collection has been done during second half of 2011.
5.4 METHODS:

After scrutinizing various methods used in other studies, the present study makes use of the following two indicators for assessing the level of food security of the surveyed households:

a) Per Consumer unit Calorie Intake (PCCI)
b) Household Dietary Diversity Score (HDDS)

In order to calculate PCCI, data on actual acquisition of food has been taken from the sample households. Survey has been conducted as per the guideline prepared by Smith and Subandoro (2007) of International Food Policy Research Institute. However, instead of considering data on both food intake and acquisition of food, for items such as grains, the survey takes data on food acquisition by the household. Because, these types of food are not perishable and as such, households stock these items for future consumption. Thus, there exists a "random error" at the household level for a particular point of time because amount of food acquired is not equal to amount of food consumed. But, mean household calorie consumption should theoretically be the same as household calorie availability. So, for rice the staple food, data collection is done on food acquisition. For items other than grains, data on actual amount of intake of has been taken during the reference period. A 7-day reference period, as per guideline has been taken for the survey. Usual 7 methods as per guideline have been followed for collecting data.

However, in contrast to the guideline, which advocates to take data on both intake of food and amount of expenditure incurred in it, the present study takes data on quantity of consumption, and not that of expenditure on food. The researcher gives justification for this as:

1) The study is not a vulnerability analysis and as such its aim is not to identify food insecure households on the basis of a threshold expenditure

60 ibid, p 9.
on food, given the prices of the same. It wants to give an aggregate estimate of food security of the surveyed households.

2) During survey it was found that there exists local price variation for the same food item and as such there is no uniformity.


Again, mere “calorie” has given stress because of the fact that other nutrients will absorb into the body, only when there is certain minimum amount of calorie intake. “The focus on dietary energy in assessing food insufficiency or deprivation is justified from two perspectives. First, a minimum amount of dietary energy intake is essential for body weight maintenance and work performance. Second, increased dietary energy, if derived from normal staple foods, brings with it more protein and other nutrients as well, while raising intakes of the latter nutrients without ensuring a minimum level of dietary energy is unlikely to be of much benefit in terms of improving nutritional status. Nevertheless, by focusing on dietary energy intake, the measure is attempting to capture those whose food consumption level is insufficient for body weight maintenance and work performance.” (Naiken 2002)\footnote{Naiken (2002): \textit{FAO methodology for estimating the prevalence of undernourishment}; Keynote Paper Food and Agricultural Organisation Rome.}

Household Dietary Diversity Score (HDDS) is a simple sum score of the number of food items consumed by members of a household over a recall period. The recall period usually ranges from one day to one week. To calculate HDDS, first of all, the number of different “food items” that are usually consumed are calculated. The food groups should reflect a quality diet; that is, the group should...
contain all the nutritionally required elements. In the guideline of Food and Nutrition Technical Assistance Project (FANTA), 12 food items are included to calculate the HDDS. However, for present analysis, as per consumer expenditure survey of National Sample Survey Organisation (NSSO) of India, food items have been classified into 8 major groups as: Group 1: cereals; Group 2: pulses; Group 3: vegetables and fruits; Group 4: milk and milk products; Group 5: Egg-meat fish; Group 6: roots and tubers; Group 7: fats and oil-seeds; Group 8: miscellaneous.

After selecting the food groups, data has been collected by asking the respondent a series of “yes” or “no” type questions. Thus the respondents are asked whether a particular group of food is consumed or not within a stipulated recall period. A score 1 is given for each positive response and 0 is given for each negative response. According to the guideline, the data has been collected from the person who is responsible for food preparation. The questions refer to the households as a whole, not any single member of the household.

5.5 ANALYSIS OF DATA:

Data thus collected and were processed and tabulated and then analysed as per objectives of the study using appropriate statistical and econometric tools. Data analysis as per the objectives of the study has been done in the following way.

Objective 1:

For assessing the level of food security of the surveyed households, at first, per consumer unit per day calorie intake (PCCI) has been calculated for each household, based on average nutritive value of Indian foods. (Gopalan. et al 2000)63. Consumer unit in the household has been calculated as per surveys of NSSO of India (NSS Report No. 513)64. Calculated PCCI, thus obtained, has been compared with the 2731 kilocalories (kcls); that is, with recommended calorie intake of an adult man doing moderate activity by Indian Council of Medical

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63 Gopalan et al. (2000): op.cit.
64 NSSO : (Report No. 513,p 13.
Research (NIN 2009). Of course, final assessment of food security/insecurity status of a household has made by comparing with 2700 kilocalories (kcls); leaving 31 calories for the sake of comparison with the NSSO estimates. Households with intake above the recommended level have been taken as food secure and food insecure otherwise. Accordingly, incidence of food security/insecurity has been calculated as the number and percentage of households out of the total surveyed households with PCCI above/below the recommended level.

Again, for assessing level of food security in terms of diet quality, HDDS score variable has been computed for each household by summing up all the responses. From this score, an index is calculated for each household. Accordingly, households are classified as “food secure” with index greater than or equal to 0.5. The other group is termed as “food insecure” with index less than 0.5. Index calculated from HDDS of the surveyed households with different sections of the society has been compared.

Objective-2

For identifying the factors affecting the level of food security, a linear regression analysis has run. Index calculated from the PCCI of the households has been taken as the dependent variable. Various socio economic characteristics of the sample households are taken as explanatory variables. Based on available literature, the present study identified following factors bearing on households’ level of food security:

a) Per Capita Monthly Income (PCMI)
b) Size of Land Holding (SLH)c) Size of the Household (SHH)d) Years of Schooling (YOS)e) Age of the Household Head (AHH)f) Percentage of rice consumption from own cultivated source (PEROWN)

Again four dummy variables considered are:

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g) Being/Not being a beneficiary of Public Distribution System (PDSB: “1” for beneficiary and “0” otherwise)

h) Household head is a wage earner or not (DUWAGE: “1” for yes or “0” for no)

i) Household head is a farmer or not (OFI: “1” for having and “0” for not having)

j) Household belong to SC or ST community (SCST: “1” for yes and “0” otherwise)

k) Family type (FT: “1” for nuclear and “0” otherwise)

Objective-3

For analyzing the functioning of PDS in the study area, following indicators have been used:

1. PDS coverage among sample households.

2. A comparison of the level of food security within beneficiaries themselves.

3. Targeting.

Moreover, comments from the beneficiaries as well as FPS holders also have been taken regarding the associated issues of PDS.