Chapter 2

Review of Literature

In this chapter, we present the review of literature. First section deals with the conceptual and theoretical review of food security and nonfarm sector. In the second section, we present the empirical survey of literature on food security and nonfarm sector concerning studies related to different parts of the world. In the third section, we deal with the empirical survey of literature on food security and nonfarm sector concerning studies related to different parts of the India. In the fourth section, we present the empirical survey of literature on food security and nonfarm sector concerning studies with a focus on Assam. This is followed by a brief concluding remark.

2.1 Food Security and Non-Farm Sector: Conceptual and Theoretical Review

The concept of Food security has a long history and a sequence of definitions and paradigms. In this section we first try to conceptualize the development of various approaches to food security and then try to establish a conceptual linkage between the food security and non farm sector conceptually as these approaches got widened. One of the earliest approaches which lead the food security discussion is related to food availability.

Food availability approach: The first approach to food security that we present is the "food availability" approach, because it is certainly the oldest one and still the most influential. Although the core ideas of this approach could be traced back to the Venetian thinker Giovanni Botero (1588), it was Thomas Malthus (1789) that popularized it, and, in fact, it also known as the Malthusian approach. The approach is focused on the (dis)equilibrium between population and food: in order to maintain this equilibrium the rate of growth of food availability should be not lower than the rate of growth of population. Consequently, in this view food security is merely a matter of aggregate (per capita) food availability. In a closed economy, this depends mainly on food production andstocks, while in an open economy also food trade can play a relevant role. Until the early 1970s, this was the reference approach for the international community, both at political and academic level.

This is well reflected in the definition of food security given at the World Food Conference of 1974:

> *"Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices" (UN 1974).*

The policy implications of this approach are twofold: On the "demand side", the need to reduce the rate of growth of population–namely the fertility rate–through appropriate policies;on the "supply side", the need to boost (per capita) food production–namely agricultural production. For such purpose,the foremost policy that is generally prescribed and implemented is to increase agricultural productivity. Another main characteristic of any approach to food security is its "units of analysis." Generally speaking, the unit of analysis can range from the world, to a country, a region, down to a community, a household, or a single individual. Furthermore, from the economic point of view, the approach can focus on a single sector, on a cluster of sectors (e.g. the "food system" or "chain") or can be economy-wide. Considering these characteristics, the units of analysis generally used in the food availability approach are the country (and its food balance sheet) or the world, and the agricultural sector (its production and productivity).

The long-lasting view of food security as a problem of food availability has been partly re-visited within a more macroeconomic approach. The focus on food sector – initially only agricultural production, and also food trade later on – has been criticized by economists for being too concentrated on one single economic sector. It was gradually recognized that the economy is composed of many interdependent sectors, food security cannot be viewed as an exclusive problem of the agricultural/food sector and food accessibility issues needs to be emphasized. In this regard major shift is undertaken in basic needs approach.

Basic needs approach: In the second half of 1970s, the International Labour Organization (ILO) has proposed a new model of development; the *basic needs approach*, with the intention of incorporating also non-economic dimensions of development (ILO 1976). The advocates of the basic needs approach viewed development as a process aiming to ensure to all the people the satisfaction of their basic needs. The fulfillment of basic needs was a precondition for a "full-life", composed of material and nonmaterial elements (Stewart 1985). Although the list

presented by different authors is slightly different, in most of the cases it included food, together with shelter and clothing (Denton, 1990). As argued by Magrabi et al. (1991: 65), "Foodis a basic need – probably the most basic need of all". The discourse in development literature, according to us, has heavily affected the debate on food security, giving birth to the so-called *food first* view (Maxwell and Smith 1992; Maxwell 1996).

This approach focuses directly on whether people eat *enough* food, and contributed to make a further step in shifting the analysis from the macro level to the micro level. Food is seen as the priority (and probably the only) element of food security. This approach draws attention to short-term food security: it tells us whether households have enough food to feed all its members in a given time, or, eventually, in the past. It does not provide much information on potential food deprivations in the future.

Although basic needs approach focused on accessibility issues but it is narrowly focused on physical aspects of food accessibility. However, the most important shift from food availability at macro-level to income at micro-level (Reutlinger and Selowsky 1976; Haq 1976; Griffin and Khan 1977) was made by income approach.

Income-based approach: The approach is verisimilar to the one traditionally used to assess poverty. While poverty was conceived as a lack of enough income necessary to buy a bundle of goods to guarantee the survival (or minimum standard of living) of a person, food insecurity is implicitly assumed as a sub-category of poverty (often referred to as "food poverty"), i.e. lack of enough income necessary to buy at the given conditions the amount of food required (Sibrian et al. 2007; Sibrian 2008). In particular, the different foods are converted into calories (*characteristics* of the food): if people's calorie availability is lower than a threshold identified by international nutritionists, they are considered food insecure. The main shortcomings of the procedure are the several assumptions made to move from income to food security.

Entitlement approach: For long time the debate on hunger and famine has been heavily affected by food availability approach and to some extent food accessibility issues concerned mainly about physical aspects.. Only at the beginning of 1980s Amartya Sen' *entitlement approach* contributed to challenge this perspective and

shifted the focus from national food availability to people's economic *access* to food. "The entitlement approach concentrates on each person's entitlements to commodity bundles including food, and views starvation as resulting from a failure to be entitled to any bundle with enough food" (Sen 1981: 434). Entitlements depend on two elements: 1) the personal endowments, which are the resources a person legally owns such as house, livestock, land, and nontangible goods (Osmani 1995); 2) the set of commodities the person can have access to through trade and production, i.e. the "exchange entitlement mapping" (Sen 1981: 435).

Starting from a situation in which an individual has just enough means of subsistence, a decline of endowments can obviously lead the person to starvation. However, with the same endowments, a person can still fall into the hunger trap because of a decline in the exchange entitlement mapping; for instance, a sharp reduction of the price of the commodity that the individual produces, due to external causes, reduces its capacity to buy food. Moreover, the entitlement failure may take different forms. Given an economy in which each group, for simplicity, produces one commodity (including labor), and given a food exchange rate (commodity price/food price), any group risks to starve due to an entitlement failure either because of a reduction of food production for personal consumption or because of a fall in the food exchange rate (Sen 1981).

This approach has been primarily proposed and tested for famine analysis, but the same rationale works for regular hunger and endemic undernourishment. Using the words of Dreze and Sen:

> *If people go hungry on a regular basis all the time, or seasonally, the explanations of that have to be sought in the way the entitlement system in operation fails to give the persons involved adequate means of securing enough food. Seeing hunger as entitlement failure points to possible remedies as well as helping us to understand the forces that generate hunger and sustain it. (Dreze and Sen, 1989,p.24).*

The entitlement approach contributed to re-address the problem of hunger and famine by diminishing the role of aggregate food supply and giving more relevance to the socio-economic conditions of people.

> *"Starvation is a matter of some people not having enough food to eat and not a matter of there being not enough food to eat" (Sen, 1981,p 434).*

Therefore, it has significantly affected the notion of food security, by adding the economic access dimension. The influence of Amartya Sen's work is visible in two important food security definitions:

> *"All people at all times have both physical and economic access to the basic food they need"(FAO, 1983),* and
>
> *"Access by all people at all times to enough food for an active, healthy life" (World Bank, 1986).*

Having enough food per capita at national level is a necessary but not sufficient condition for food security. Therefore, in order to make a food security assessment we need to extend the informational basis. Variables related to people's endowments such as productive and non-productive assets, with particular emphasis on employment and non-tangible resources such as education or membership of an association, as well as information on wage, and other prices of food and non-food items should be adequately taken into account.

Furthermore, in the book "Hunger and Public Action" (1989), Dreze and Sen extend the analysis from food entitlements, i.e., the set alternative bundles of food items over which a person can have command, to broader entitlements, i.e., the set alternative bundles of commodities such as drinkable water or services such as sanitation and health care over which the person can have command. The more recent contribution outlines the need to consider access not only to food, but also to these other goods and services, which directly influence hunger and food security. The growing developments necessitates emergence of capability approach.

Capability approach: The capability approach to food security was primarily elaborated in 1989 by Jean Dreze and AmartyaSen in the pioneering book *Hunger and Public Action*. Although the authors do not make any reference to the concept of food security, they develop a general analytical framework, based both on the capability approach of Sen (1985, 1999) and his entitlement approach, for studying hunger –chronic or transitory– and all related aspects: undernourishment,

malnutrition, famines, etc. As the entitlement approach is not sufficient for a general approach to hunger issues and therefore why we need to move beyond food entitlements toward nutritional capabilities:

> *"The focus on entitlements, which is concerned with the command over commodities, has to be seen as only instrumentally important, and the concentration has to be, ultimately, on basic human capabilities" (Dreze and Sen, 1989, p 13).*

By switching the focus from "command over food" to "nutritional capabilities," this approach goes beyond the "access" dimension of food security – that is the main concern of the basic needs, entitlement approaches– and started to include also the "utilization" dimension. This is one of the most important innovations of the capability approach to food security.

Dreze and Sen explain why access is not sufficient and utilization is crucial: The object, in this view, is not so much to provide a particular amount of food for each. Indeed, the relationship between food intake and nutritional achievement can vary greatly depending not only on features such as age, sex, pregnancy, metabolic rates, climatic conditions, and activities, but also access to complementary inputs (Dreze and Sen, 1989, p. 13).

In the book they cite a number of fundamental complementary inputs: health care and medical facilities; clean drinking water; sanitation; eradication of infection epidemics; basic education. However, this is not (and it could not be) an exhaustive list. The above mentioned features of the capability approach to hunger make it the one that better comprehend three dimensions – availability, access, utilization– of food security.

There are further developments that allow expanding and complementing the framework proposed by Dreze and Sen in 1989. The major is about the role of another component namely security aspects of food security which is much more than just food prices stability. This dimension is explicitly considered in the sustainable livelihood framework, especially through the concept of vulnerability.

Sustainable livelihoods approach: The Sustainable Livelihoods (SL) framework is not just an approach to food security, but is a more general approach to development and poverty. Though the concept was certainly used previously, the "emphasis on livelihood" was given in the 1980s by Chambers (1983) who, in his seminal book, introduced the basic elements of this approach, with a focus on rural development and poverty. Subsequently, the approach has been elaborated and expanded by Chambers himself and other scholars (Chambers 1987; Chambers and Conway 1992; Chambers 1995; Ellis 2000; Scoones 2005). The SL framework has many communalities with the basic needs approach and the entitlement approach. Like the former, it focuses on "gaining a living" (Chambers and Conway 1992: 5), that is "the necessities of life", rather than on human development in a broader sense – i.e. human flourishing. With the entitlement approach it shares the focus on the "means" of securing a living. The SL framework has been applied to a variety of development issues, including food security (WFP 1998; Young et al. 2001; Devereux et al. 2004; Hussein 2002). There are two distinctive features of the general SL framework that give to it some advantages in the analysis of food security over previous approaches. The first is its long-term perspective; the second is the attention to the context political, economic, physical, social, cultural, etc.

Following these approaches, it can be concluded that food security has a number of dimensions that extend beyond the production, and availability. Thus there has been a paradigmatic shift in the concept of food security, from food availability to include stability.

As the food security is about more than supply and the problem arises in the inability to acquire food from the market because of inadequate incomes and or unreliable markets, proper utilization of food and stability. So, food insecurity has primarily become a problem of low incomes and poverty, and not just inadequate food production (Gladwin et at., 2001). In such situations, income generating employment more specifically the development of non-farm activities becomes critical (Jayne, et al., 1994; McCalla, 1999).

2.2 Food Security, Non-Farm Sector: Empirical Literature

Food security was a theme of discussion even during the classical era. At that time, it was done at the micro level from the supply parameter in terms of Food Availability Deficiency (FAD). Adam Smith (1776) in his article "Digression Concerning the Com Trade and Com Laws", in Book IV of the *Wealth of Nations* theorized that famines could be caused by a real scarcity situation. Scarcities are caused by natural calamities like drought, flood and seasonal failures. Contrary to it, Ricardo (1815) proclaimed that famines could occur in situations of "supply-abundance." In subsequent years, Malthus (1798) claimed a correlation between mass starvation and an excessive population growth that outstrips available food supply. He explained the situation of famine through a direct and easily understood casual relationship. He argued that so long as food output grew faster than the population, famine could not occur. He advocated for formulating an early warning system through much emphasis on quantitative problem of population vis-a-vis food supply. Literature on food security in subsequent years focus mainly on physical dimension.

Likewise, Haswell (1953) observed that growing cash crops at the expense of subsistence crops has largely contributed to seasonal food deficiency among the Gernieri in Gambia. He also observed that illness of adults at critical times in the production process adversely affects labor efficiency and productivity, which in turn contributes to food security.

Authors like Brown et al. (1957), Harrer (1963) and Brown (1965) analysed the world food situation and prospects of increasing food availability through technological improvement in production.

World Food Conference (UN 1975) identified the risk of acute food shortages because of crop failure, natural and other disasters. The conference also analysed the risk of fluctuations in production and prices.

During 1980s another parallel thought school emerged which viewed food security from the economic accessibility point of view. Using entitlement framework (which forms the basis of "economic access to food"), Sen (1981)24 demonstrated that food insecurity could occur in the absence of any change in production. After thorough investigation of the causes of various famines (Bengal in 1943, China in 1948 and

Bangladesh in 1974) found that these famines took place when food was available in adequate quantities and in some part of the areas per capita availability of food was highest during those years when compared to the early and subsequent years. Thus, Sen's entitlement theory went beyond the narrow study of food availability. He postulated that decline in food availability was neither necessary nor sufficient condition to create hunger. Famine could occur in the absence of any change in production, if the value of people's production and work activities declined relative to the cost of staple food.

According to Entitlement and Deprivation (E & D) theory, food insecurity can also be seen as the characteristic of a person not having enough to eat. The latter could be the cause of the former, but it is not the only cause. If enough food was available and people could access the food so available there would no food insecurity. The Exchange entitlement concept implies that food insecurity at the household level is a result of inadequate demand for food.

However, with similar line to Sen, many studies focused attention on the importance of the macro-economic policies in ensuring food security of the poor due to deprivation of entitlements. Kumar (1987), Krueger et al.(1988) and Pinstrup-Andersen (1990) reviewed macro- economic policies and suggested that policies for improving food security should not be limited to direct food and agriculture related policies. Policies such as industrial protection and fiscal policies are highly relevant for prices, income and employment of the poor and thus for food security in the short and long runs.

In addition, Hussain (1990) suggested that policies ranging from economy wide macro policies to community actions should be adopted. Policies based on the more targeted actions such as food subsidies and transfers, labour intensive public work and improved supplementary feeding programmes for food security should also be considered. The concept of food security has widened over time to become multidimensional.

Rukuni et al, (1990) in a paper titled 'Alleviating Hunger in Zimbabwe: Towards a national Food Security Strategy' have identified some factors which explains the

differences in levels of food security between households. They include income, household land holdings, employment status, household productive asset endowments and household composition. He also advocated that ensuring high on-farm productivity levels and income growth is essential for food security.

Getachew (1995) concluded that households' risk of food insecurity and famines were greatly increased by long-term secular decline in resource endowment, combined with unfavorable food policy intervention. Emphasizing on subsistence farmers' food insecurity situation, he underlines that the prevailing inability of Ethiopia's small-scale agriculture to feed its population is mainly generated by the neglect of the policy and the decline in access to productive resource upon which most of the livelihood are built.

Mwangi (1995) compares farming and non-farming households in low-income neighborhoods in Nairobi and notes that, while mean consumption is well below estimated requirements in all cases, farming households are better off in terms of both energy and protein consumption, and that farmers participating in an organized urban agricultural support program are significantly better off in both categories.

Maxwell, Levin and Csete (1998) report the linkages of urban agriculture, malnutrition and food security in Kampala. When controlling for socio-economic status and other individual and household characteristics, they found that urban agriculture is positively and significantly associated with higher nutritional status in children, particularly in terms of height-for-age, and food security and that there is a significantly lower proportion of moderately to severely malnourished children in households where someone (almost always the mother or primary care-giver) is farming.

Bahiigwa (1999) presents a study on household food security in Uganda. The study determined the food security status of rural households during the period July 1997-June 1998 and also identified the main determinants of household food security. The study was conducted in 14 districts selected from the four geographical regions, covering six of the seven agro-ecological zones (farming systems) in the country. The survey was conducted during March-June 1998, but households were asked about

their food security status during two agricultural seasons: July-December 1997 and January-June 1998. The study finds that during the first period (July-December 1997), 48 percent of households in Uganda were food secure and 52% food insecure. During the second period (January-June 1998), 59 percent of households in Uganda were food secure, while 41 percent did not have enough food to feed themselves.

The study established that food security varies from one season to the next, depending mainly on the weather pattern. In general, the three main factors of household food insecurity in both periods were inadequate rainfall, pests and diseases, and excessive rain. Households indicated that to ensure household food security, they would expect three main roles of the local government: providing information through extension and seminars, improving access to credit, and supply of improved seed.

Abalu (1999) argued that agriculture is one of the main sources contributing to livelihood strategies and underpinning food security in the rural areas of southern African countries. He showed conservation strategies, food assistance, production, purchasing power and feeding livestock from crops residues as some of the ways that food security can be enhanced in communal areas. This is also follows Kirsten et al (1998) suggestion that increased agricultural production has a positive contribution to household food security and nutrition.

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The study conducted by Bonnard (2000) showed that household ability to achieve food security in urban area is derived from the household's human, material, and institutional resource bases, which are often collectively referred in the literature as "food security factors." These factors include the educational and employment status, household demographics, urban agriculture, assets, saving, formal social assistance or direct transfer, informal social networks, access to clean water and sanitation and cost of living. The study of Urban Livelihoods and Food and Nurtition Security in Greater Accra, Ghana by Maxwell (2000) indicated that household food availability is a function of food prices, household demographics and household tastes and preferences.

Chowdhury et al (2000) have conducted a study on different alternatives to improve food security in Bangladesh. They have observed that although, the country is emerging as a surplus rice producer but, the poor, who number in the millions, are unequipped to capture the gains from a rice surplus or self-sufficiency due to their inadequate purchasing power, they lack access to sufficient food and thus remain seriously underfed.

Berg and Ruben (2001) have analysed the role of non-farm income on rural farm households in Honduras. It used the national income and expenditure survey from 1993-1994. Income from non-farm wage and self employment represent 16 to 25 percent of farm household's income and was especially important for middle and higher income strata. Access to non-farm wage employment was confined to educated individuals that belong to large household. Food Security got strongly enhanced through the engagement in non-farm activities. Moreover, non-farm income enabled farmers to purchase external inputs for improving yields and labour productivity.

Gladwin et at., (2001) in a paper "The Food Security Status in Africa via Multiple Livelihood Strategies of Women Farmers" have admitted the fact that the food insecurity is primarily a problem of low household incomes and poverty, and not just inadequate food production. So, projects and programs for food insecure African farmers which aim at increasing production of subsistence crops may be ineffective. Instead, government should look for ways to improve returns to farmers' resources in a broader context, which may include expanded opportunities for non-farm microenterprises and agricultural labour.

Idrisa et al., (2001) in their study analysed food security status among farming households in Jere local government area of Borno state in north-eastern Nigeria. Primary data were collected from 120 households selected through multi-stage sampling procedure. The data were analysed using frequency, percentage, head count method, food security gap and squared food security gap. The result of analysis indicated that 45 percent of the respondents fell within the active age bracket of 40-49 years, more than half had only primary education with a high proportion engaged in farming as a primary occupation. The incidence of food insecurity was high among the age bracket of 40-49 years but the depth and severity was higher among the age group of 50 years and above. Also, households with large family size, low income level and low level of education were mostly affected by food insecurity condition. Eating once a day, allowing children to eat first and buying food on credit were among the coping strategies adopted by the respondents. Based on the result, the study recommended that: farmers be provided with informal education through extension service, improve nutritional awareness in the study area, non-farm income earning opportunities for the households and improved access to extension be generated.

Mucavele (2001) in a paper titled 'A Vulnerability and Food Security Study of Urban Maputo. Mozambique FANRPAN, Harare' suggested that the main factors that affect food security in urban Maputo, Mozambique, are poverty, low family income, low availability of general alimentation at the family level, floods, family crisis, high unemployment levels and low levels of schooling and training and the absence of a social security system to alleviate the urban shocks.

Muller et al. (2002) have conducted a study on 'The Effect of Nonfarm Activities on Household Food Security'. They have observed the positive contribution of nonfarm activities in reducing poverty and improving household food security and hence investigated the link between food security and nonfarm employment using the survey data collected from 151 randomly selected households from five villages of Worenda Gantafeshum, Eastern Tigrai, Ethiopia. They firstly examined the household decision with respect to participation in nonfarm activities using pobit model and then investigated the effect of nonfarm employment of households' food security, using Heckman selection model. The result of the study implied that nonfarm employment has a role which is significant in maintaining household food security. They advocated that rural development policy should promote nonfarm employments in attempt to address issues of food security.

Ramkrishnak et al (2002) made an assessment on food insecurity situation in North Wello Zone of Ethiopia. A food balance sheet was constructed and food security causation was examined using a binary logistic regression model. Accordingly, cereal production, educational status of the household head, fertilizer consumption, household size, land size, and livestock were found to be the most determining factors of household food security. Along with food availability and entitlement factors, the study suggested that attitudinal variables also influence food insecurity.

Wilma et al (2003) used a logistic regression model to predict seasonal household food insecurity. According to their findings, the probability of a household being seasonally food insecure decreased, when the household has a vehicle, has many types of appliances, their toilet facility is water-sealed, has more bed rooms, the mother is employed and the educational attainment of the mother is high.

Shiferaw et al (2003) and Webb et al. (1992) have identified livestock ownership, farmland size, family labour, farm implements, employment opportunities, market access, level of technology application, level of education, health status, weather conditions, crop disease, rainfall, oxen ownership and family size as major determinants of farm households' food security in Ethiopia.

Osman, (2003) has identified that access to infrastructure such as market center and roads etc. promote livelihood diversification and food security. Adequate infrastructure, especially main and feeder roads that improve access to necessary input-fertilizer, seed, pesticide chemicals and other agricultural implements are very indispensable Generally, as indicated in many literatures, inadequate infrastructures and social services development such as road, transportation, communication, electrification, education and health services and agricultural services would be major challenges to sustain the growth of agricultural production and food security.

Molano et al (2003) conducted a study to determine the socio-demographic and economic characteristics and nutritional status influencing households who are food-insecure. The study adopted the Radimer/Cornell measures of hunger and food insecurity, introducing some modifications. The items were classified into three levels, namely: (a) food insecurity of the mother/caregiver, (b) food insecurity of the child/children, and (c) food insecurity of the household. Descriptive statistics were computed for all variables to describe the characteristics of food-insecure households.

To determine the relationship between food insecurity and other variables, the odds ratio and comparison of means were done. A logistic regression model was used to predict food insecurity. He found that the probability of a household being food-insecure is increased when the child is underwieght, stunted and when household size is increased. On the other hand, the probability of a household being food-insecure is decreased when the household has a vehicle, has many types of appliances, has more bedrooms, their toilet facility is water-sealed, the educational attainment of the mother is high and the mother is employed. However, Socio-economic and household characteristics and nutritional status of the child is related to food insecurity and they can be used to predict the likelihood of the household, child and mother being food-insecure.

Dalmini (2003) has carried out a study on household food insecurity in the semi-arid areas of Zimbabwe. He has shown that there are many factors that enhance food security such as irrigation, land quality, incomes, size of household, wealth of farmers

and land size. Among these factors water has been highlighted as the most limiting factor to food security in communal areas.

But Sorensen (2003) in a paper "Need for Rural Diversification: Food-Security Policies and Non-Farm Development in Ethiopia" argued that livelihood systems based on agricultural production are not sustainable in their present form and will become even less so in the future, due to the population pressure on land. He emphasized on a regional Food Security Strategy which bases the prospects for food security less exclusively on agriculture than before and stressed the need for non-farm development. The paper argues that he development of non-farm activities is essential to secure food security.

A study by Kidane et al (2005) reported the causes of household food insecurity in Koredegaga peasant association, Oromia Zone. The study showed the determinants of households' food insecurity using a logistic regression procedure. The variables farm land size, ox ownership, fertilizer application, education level of household heads, household size, and per capita production were found to be significant predictors. The analysis of partial effects revealed that an introduction to fertilizer use and an improvement in the educational level of household head resulted in higher changes in the probably of food security. Simulations conducted on the basis of the reference category of farmers, representing food secure households, revealed that both educational levels of household heads and fertilizer applications by farmers have relatively high potential to more than double the number of food secure households.

Mwanki (2005) mentioned the main causes of food insecurity in developing countries. Some of them include: unstable social and political environments that preclude sustainable economic growth, war and civil strife, macro-economic imbalances in trade, natural resource constraints, poor human resource base, gender inequality, inadequate education, poor health, natural disasters, such as floods and locust infestation, and the absence of food governance. All these factors contribute to either insufficient national food availability or insufficient access to food by households and individuals.

A study by Haile et at. (2005) conducted in Koredegaga Peasant Association, Oromia Zone, identified that farmland size, per capita aggregate production, fertilizer application, household size, ox ownership, and educational attainment of farm households heads had a significant influence on food security. The computed partial effects at sample means using results from the logistic regression model indicated that a unit change in farmers access to fertilizer or educational level of household heads or farmer's access to land or access to family planning improve the probability of food security in the study area.

Kidane et al (2005) observed that Education has a tremendous influence on the food security status of households. Educational attainment by the household head could lead to awareness of the possible advantages of modernizing agriculture by means of technological inputs; enable them to read instructions on fertilizer packs and diversification of household incomes which, in turn, would enhance household's food supply, Socio-cultural events such as eating habit and food preference, cultural ceremonies and festivals were also seen to influence the food security by way of saving or expenditure, also directly or indirectly affects the food security situation of that particular community.

Berg and Kumbi (2006) further observed that nonfarm employment provides additional income that improve farmers' livelihood in a paper regarding the effect of nonfarm employment on households' food security in Oromia, Ethiopia. Farmers participated in nonfarm employments have shown improvements in daily food self sufficiency, housing, schooling of children and other. Further, the statistical analysis confirmed that households participate in nonfarm activities are more likely to spend for education, food, closing and health care than those who do not participate at all. In line to this, the study highlighted that nonfarm employments have positive contribution in meeting household food security. Therefore, they emphasized that rural development policy should promote nonfarm employments in attempt to address issues of food security.

Isgut et at., (2006) in a article on the role of locational factors in the determination of rural non-farm employment possibilities in rural Honduras have emphasized that

while rural non-farm jobs are predominantly located close to urban areas, rural non-farm self-employment jobs are geographically dispersed around the country, depending on local motors such as a profitable agricultural activity, an important road, or a tourist attraction. In all, the importance of rural non-farm income for rural households suggested that the rural non-farm sector should be considered when designing policies to improve the capabilities and livehood of the rural Honduran.

Keshav (2006) shows that commonly used indicators of food security at the regional and national level or community level is often poor predictors of household food security. The study also made comparison among households based on depth and severity of food insecurity and found that socio-economic factors are the main determinants of food insecurity. The study concluded that both depth and severity of food insecurity are higher in occupational castes, small farms and less livestock holders, laborers, and households having minimum expense.

Omotesho et al., (2006) carried out a study to identify the determinants of food security among rural households in Kwara State. Data used for this study was collected from a total of one hundred and sixty five rural farming households using a three-stage random sampling technique. The main tools of analysis for this study include descriptive statistics and logistic regression model. The study showed that about one third of the rural farming households sampled were food insecure and that farm size of the households, gross farm income, total nonfarm income and household size are the significant determinants of rural household food security in the study area. The study stressed on the need to assist farming households in the study area to diversify their sources of income in order to be able to meet their minimum food requirement especially during the off-season.

Reis, Mauricio (2006) investigated the relationship between food insecurity and child health in Brazil using nationally representative data from the Brazilian 2006 DHS. Food insecurity seems to be related not only to nutritional outcomes, but also to children's health indicators. The results also indicate that the relationship between household income and health still remains significant when controlling for food insecurity, despite the reduction in the child health income gradient.

Umeh et al. (2006) in a paper entitled ‘The Determinants and Measurement of Food Insecurity in Nigeria: Some Empirical Policy Guide’ have analysed the food security measures in Borno State, Nigeria. A multi-stage sampling technique was applied on 1,200 households. Cost-of Calories (COC) method and Logit model are used as analytical techniques for the study. Based on the recommended daily energy levels of 2,250 kcal, food insecurity line (s) for the households is taken. Over 58% of the sample households emerged as food insecure. Major determinants of this food insecurity factors are, household size, gender, educational level, farm size and type of household farm enterprise. He advocated that priority should be given by the Government in providing improved access to education, credit facility and agricultural extension services to rural households.

Alem Shumiye (2007) in a paper titled 'Determinats of Food Insecurity in Rural Households in Tehuludere Woreda, South Wello Zone of the Amhara Region' has identified the factors that influence household food insecurity in Tehuludere Woreda, South Wello Zone. The study used primary and secondary sources of data. In gathering the primary data, a stratified random sampling method is used. Except post-harvest information, all predictor variables were obtained from the primary data. The period of the study was from November 2005 to November 2006. A household food balance food model was adopted and the recommended daily calorie requirement was used to determine the household food security status. Household food insecurity causation was then examined using logistic regression model.

The descriptive analysis of the study revealed that only 30.8 percent of the sample households were food secured. The food insecure households (69.2 percent) felt short of the recommended calorie requirement by 37 percent while food secure households exceeded the recommended calorie requirement by 44 percent. Using the forward step wise (likehood ratio) method, seven out of ten predictor variables were selected as major determinants of household food insecurity. These predictor variables had significant joint and separate influence in explaining the variation in the outcome variable. Model diagnostic tests of the multivariate logistic regression model show the adequacy of the fitted model. The study revealed that non-participation in off-farm activities, having large family size (larger than the sample mean), low annual

production or yield (less than the sample mean annual yield), small farm size (smaller than the sample mean farm size), dependency attitude on food aid, poor wealth status (less than the sample mean Tropical Livestock Unit) and insecure land tenure perception as positive and significant factors that contributed to high food insecurity.

Analysis of the marginal effects of significant discrete predictor variables showed that, holding other variables constant, a shift to participation in off-farm activities decreases the probability of household food insecurity by 66 percent. Holding other variables constant, a shift to smaller family size (smaller than the sample mean family size) decreases the probability of food insecurity of 63 percent. A shift to high yield (larger than the sample mean) and large farm size (larger than the mean farm land size) decreases the probability of household food insecurity by 39 percent and 42 percent, respectively. Holding other variables constant, a shift from dependency attitude to self-reliance decreases the probability of food insecurity by 25 percent. A shift to good wealth status (larger than the sample mean TLU) and an improvement in land tenure security decreases the probability of household food insecurity by 38 percent and 31 percent, respectively.

Sikwela et al (2008) while examining the Determinants of Household Food Security in Semi-Arid Areas of Zimbabwe have investigated the determinants of household food security using a logistic regression model. The model was initially fitted with thirteen variables, selected from factors identified by previous researchers that affect food security in communal areas. The findings of this study highlight a positive and significant relationship between access to irrigation, fertilizer application, cattle ownership, per capita aggregate production to household food security. Household size and farm size have a negative and significant relationship on household food security. This study shows the effectiveness of irrigated farming over dry land farming through increased agricultural production, crop diversification and higher incomes.

Accordingly Owusu and Abdulai (2009) in their study have examined the impacts of nonfarm work on farm household income and food security status in Northern Ghana. A propensity score matching model was employed for their study purpose which

accounts for self-selection bias. Results of the propensity score matching showed that non-farm work exerts a positive and statistically significant effect on households' income and hence on food security status. Moreover, the estimates revealed that participation of males in non-farm work contributed better food security status of households compared to their female counterparts. Further, they observed that non-farm work also helps in smoothing incomes, which in turn smoothens consumption over long periods of time. They were also convinced by the fact that development of non-farm activities actually complements the effort to develop agriculture, since activities in the former depend directly or indirectly on the latter.

Nord, Mark (2009) in a study on 'Food Insecurity in Households with Children' found that job opportunities, wage rates, and work supports (such as earned-income tax credits, child care subsidies, and supplemental nutrition assistance available to working households) are likely to be key determinants of food insecurity in low-income households with children. Thus, employment opportunities and wage rates for less skilled or less educated workers are found to be particularly important factors affecting the food security.

Gebrehiwot (2009) has conducted a study on the determinants of food security among the rural households of the Tigray National Regional State. The study was based on the 2004/2005 Household Income, Consumption and Expenditure Survey (HICES) and Welfare Monitoring Survey (WMS) which were conducted by Central Satistical Agency (CSA). To analyze the data descriptive statistics, bivariate and multivariate analyses were used. The descriptive results revealed that about 42 percent of the households were found to be food insecure while 57 percent were food secure. The bivariate analysis was performed to investigate the effect of each predictor variable on the household food security status.

Moreover, a univariate ANOVA of each predictor variables against the household food security was performed to identify the variables that have significant contribution to the discrimination of the two household groups. Accordingly, distance to input sources, farmland size, TLU, number of oxen, household size were found to be the major discriminating variables. This was further supported by multivariate

discriminate function analysis applied to sampled farm households. The importance of the contribution of factors in discriminating the two household groups were ranked by the discriminate function. As a result, distance to input source was ranked first followed by household size, farmland size, livestock ownership, number of oxen, use of fertilizer, gender and educational level of the household head.

Faridi and Wadood (2010) investigated the determinants of household food security situation in Bangladesh. They have used Logistic regression model to estimate the determinants of food security at the household level. Logistic regression is used to find the log-odds ratio of food security with the dependent variable acting as the dummy for the food security indicator. In the regression, sex of household head has not been found to be a statistically significant factor. Age of the household head has not seem to have practically and statistically strong significant impact on food security, whereas education of household head is highly statistically significant though the impact seems to be quite marginal. Regression results show that food security is also highly sensitive to rice price changes. Comparison of different occupational groups was also studied with the findings that wage earners, both daily wage and salary wage earners, are worse off in terms of food security status compared to self-employed-both in agriculture and non-agricultural sector.

Zerai and Gebreegziabher (2011) in their study have examined the effect of Nonfarm Income on household food security in Eastern Tigri, Ethiopia using the survey data collected from 151 randomly selected households from six villages of Woreda Gantafeshum, Eastern Tigrai, Ethiopia. For ascertaining the effect of Nonfarm Income on Household Food Security the Heckman selection model (two stage) is used. They have examined the household decision with respect to participation in nonfarm employment using Probit model. Their study has shown that land size, age, family size, special skill, electricity, credit, distance to the nearest market and access to irrigation are the most influencing variables in determining farmers to participate in nonfarm activities. Further they have examined the effect of nonfarm employment on households' food security. Their study also indicated that nonfarm employment provides additional income that enables farmers to spend more on their basic needs include: food, education, closing and health care. More importantly, the result of the

study implied that nonfarm employment has a role which is significant in maintain household food security.

Asogwa and Umeh (2012) also investigated food insecurity determinants among rural household in Nigeria using farm-level data collected on 220 rural farm households from Benue State. Data were analysed using Tobit regression model. The study revealed that a unit increase in the number of household members working in non-farm sector generated the highest fall in household food insecurity among the respondents. They also advocated that policy should be directed towards encouraging and creating non-farm jobs for rural households as this would help to reduce food insecurity among the respondents.

Gunersen and Garasky (2012) found that households with greater financial management abilities are less likely to be food insecure. They have opined that improving households' financial management skills has the potential to reduce food insecurity in the United States.

Gebre (2012) in a paper entitled Determinants of Food Insecurity among Households in Addis Abaha City, Ethiopia has observed that even though there is long-held belief that urban populations are better off, or even favoured than rural populations, the recent food and financial crises have highlighted the problem of urban food insecurity in developing countries. Hence, the overall objective of this study was to examine the determinants of food insecurity among urban households in Addis Ababa city.

To do so, both descriptive statistics and econometric analysis were employed. Descriptive statistics used Foster, Greer and Thorbeck distributional measure of food insecurity while econometric analysis used binary logistic regression model to analyze the data of a set of socio-economic variables as explanatory variables and food insecurity as independent variable. Their study shows that in the study area the proportion of people who are unable to fulfill their food energy requirement in the year 2006/07 is 58 percent. The percentage of food consumption needed to bring the entire food insecure population to the poverty line is 20 percent with 95 percent confidence interval of 17.65 percent to 22 percent. While the percentage of relative

deficiency among food insecure population is 9.4 percent with “95 confidence interval” of 8 percent to 10 percent.

The result of the logistic regression model indicated that six out of ten variables namely household size, age of household head, household head education, asset possession, access to credit service, and access to employment were found to be statistically significant as determinants of household food insecurity in the study area. Household size and asset possession were significant at less than one percent probability level while access to credit service, age of household head and access to employment were significant at less than 5 percent probability level. In addition, the household head education was significant at 10 percent probability level. Household size and age of household head were found to be positively related with probability of being insecure where as access to credit service, asset possession, household head education and access to employment were negatively related with probability of being food insecure. While, he has emphasized that efforts should be made to improve income earning capacity of households, their education level with particular focus on vocational training, reduce household size with a view to reducing their dependency ratio and access of credit to the needy and trained people needs to be provided with proper targeting criterion.

The study by Olayemi (2012) investigated effects of family size on household food security in Osun state, Nigeria. Multistage sampling technique was employed to select 110 respondents for the study. The data were subjected to descriptive and Tobit regression analysis. Among the determinants of food security status of respondents in the study area he observed that for every unit increase in years of formal education, farm size, monthly income, there is likelihood increase in household food security. However, family size has an inverse relationship indicating that as family size decreases household food security increases. Emphasized coping strategies include borrowing money, relying on less preferred and less expensive food. The study recommended that government and non government agency should intensify effort on importance of family planning and advocate small family size in rural areas.

Steven et al (2012) have analyzed the determinants of rural household food security in Punjab, Pakistan. The study aimed at examining the food security trends in Pakistan in general and the household level of food security and its key determinants in the rural areas of Punjab Province in particular. Both secondary and primary data were used. The food security status of households was calculated using the calorie intake method and the logistic regression was used for identifying the socio-economic factors affecting food security. They found that monthly income, livestock assets, joint family system and education levels have positive impact on rural household food security. On the other hand greater household heads age and family size have negative impacts on household food security. They suggested that income generating opportunities needs to be created along with improvements in secondary and technical education systems and family planning programs to alleviate food insecurity in the study region.

Suleyman et al (2013) have examined the Food Security Status of Farming Households in the Forest Belt of the Central Region of Ghana. A multistage sampling technique was used to select the respondents that were interviewed. The households were selected from eight communities in two districts. Food consumption data of 851 individuals in 120 households were used for the analysis. The study reveals that the majority of the farming households were found to be food insecure. Further, the Binary Logit Model results reveal that an increase in household's income having access to credit as well as increase in the quantity of own farm production improve the food security status of farming households in the Forest Belt of the Central Region of Ghana. However, holding all other factors constant, increases in non-working member of households worsens the food security status of farming households.

Ishdorj Ariun (2013) have analyzed the Determinants of Household Food Insecurity in Mexico. The data used in this study come from The Socioeconomic Conditions Module of the National Household Income and Expenditure Survey in the third quarter of 2010. In this study he used the ordered Probit model, along with nationally representative data and a newly developed food security scale of Mexico. The analysis was conducted for the general (total) population first and then for subpopulation group of rural lower-income households. He found that households

with younger, less-educated household heads were more likely to suffer food insecurity. Other groups that were found to be vulnerable in terms of food insecurity include: households headed by a single, window or divorced mother, households with disabled family members, households with strong indigenous background, rural households, low income families, non-agricultural households with kids. Other variables that were included in the model but are not statistically significant are: age of household head, gender of household head, household receiving benefits from educational cash transfer programs, and type of household. He has opined that Education may be important to food security not only because it is usually correlated with income, but also because it may have a positive impact on how the resources in the household are managed.

Myhoyi et al (2014) in a paper entitled 'Determinants of Household Food Security in Murehwa District, Zimbabwe' examined the determinants of household food security in agricultural regions which receive normal to above normal annual rainfall. A logistic regression procedure was employed on household socio-economic cross-sectional data collected in 2010 (November and December) of the ten variables fitted in the model; household size, farmland size, farmland quality, climatic adaptation and livestock ownership were found to be significant. Marginal effects showed that households that practiced conservation agriculture, had good quality land and those owning bigger farmland and livestock were more likely to be food secure than their counterparts. However, bigger households were likely to be more food insecure than smaller ones. The results confirm the significance of both agro-climatic and socio-economic factors in determining household food security status. They have prescribed that improving access to higher quality farmland through some redistributive land reforms; introduction of livestock restocking programmes at the household level, and encouraging the adoption of farming methods that curb the effects of climate change, can indeed improve the food security status of households.

2.3 Food Security, Non-Farm Sector in India: Empirical Literature

In the Indian context, food security has improved, both at the national and the household levels. India can legitimately take pride in the fact that in spite of a history

of famines and 16 to 18 million people being added to its already huge population, it has developed the capacity to ensure that no household is again required to face famines, widespread hunger and starvation. The food, at least of cereals, availability is thus, quite comfortable, even though poor households may have achieved this security at a certain social cost, like many children going to work rather than to schools. Moreover, aggregate availability of food grains per person as provided by the public distribution system (PDS) as a social safety net is not enough to ensure the ability to acquire food grains revealed by the NSSO data. So, a nutritionally balanced diet is still a far cry for millions of poor families, their present income levels are too low to register their demands. So the mere presence of food in the economy, or in the market, does not entitle a person to consume it.

In the later part of the 20th century and the starting of the 21st century there emerged the concept of nonfarm sector which is seen by the policymakers as an alternative option in realizing various development goals.

The significance of non farm sector has been highlighted in the works of Tandon (1990). Tandon in his study has shown that excessive pressure of population on the agricultural land creates the problem of disguised unemployment problem. In order to earn their livelihood the unemployed persons join in the non farm sector.

Authors like Jha (1992) and Ray (1994) in their study have shown that the growth of the labour intensive RNFS is seen as the solution to the problem of rural unemployment. Inter sectoral linkages between the farm sector and RNFS are expected to generate the growth.

Laha, Sumita (1996) in her study "Impact of Rural to Urban Migration: A Case Study in the Dinajpur District of West Bengal" has shown that in order to earn their livelihood a section of the rural poor migrates from the rural to urban areas. In this migration process from rural to urban center males occupy a predominant role than females. Due to social and family considerations the females could not migrate to the urban centers. In the rural areas and in the poor families women have come forward to engage them in to different productive activities in order to supplement income to their family. They join either in the farm sector or the non farm sector. In fact the

home based non farm activities are providing the job facilities to the rural poor women in the study area.

A study on social institutions and structural transformation of the non-farm economy conducted by Jayaraj D. (1997) confirmed that there was growth of rural non-agricultural employment. RNFS also boosts rural industrialization and entrepreneurial culture.

Rao (2000) expressed that rural non-farm sector in India has witnessed a steady expansion during the last two decades. The workforces in rural areas are gradually shifting from low productive agricultural jobs of various types partly in rural areas themselves and partly in urban area. Nearly one fourth of rural male and about one-sixth of rural female workers were engaged in different types of non-agricultural activities. The mode of employment is also undergoing significant changes.

Monmohan (2001) and Bhatia (2004) in their separate studies have described the growing significance of the non farm sector in the rural economy of India. They compared the data relating to workforce participation in the Non farm sector and comment that during the later part of the 20th century and starting of the 21st century this sector occupies a very significant role in rural diversification and expansion of the job facilities in the rural areas both for men and women labour.

Dev, Mahendra S (2001) in his study said that non farm sector plays a vital role in poverty alleviation and promotion of livelihoods. An increase in rural non farm employment is one of the main factors responsible for the reduction in poverty in the 1980s. His study was also based on the NSSO data. He provided some statistics regarding the workforce participation rate in the non farm sector. From his study we get that it has been showing an increasing trend regarding employment generation.

Suresh (2003) in his study has shown the significance of nonfarm activity during the off agricultural season. It means that nature- based agriculture is responsible for the growth of nonfarm activity. Technological change and infrastructural improvement in the rural sector are responsible for the growth of the non farm sector in the villages.

A study conducted by Jayasheela et al, (2003) found that non-farm activity has been immensely helpful for the villagers as it not only provided employment but also good income all the year and checked migration to a large extent.

According to Bhaumik (2007) analysed the growth rates of farm and non-farm employment. He found that, at the all India level, the growth rate of non-farm employment was high in the post reforms period when the growth rate of farm employment was low. Further he found both in the pre and post reforms period, most of the states that enjoyed high growth rates of non-farm employment also suffered from low growth rates of farm employment. Consequently the rank correlation coefficient between ranks of growth rates of farm and non-farm employment turned out to be negative in both the periods. This means that the rural workers flocked in the non-farm sector for employment whenever the prospects of farm employment dwindled, in the present phase of agrarian crisis in India.

The literature also highlighted the fact that enhancement and diversification of livelihood options in favour of nonfarm aspects definitely raise the income and food security of the people.

Chadha G.K. (1994) conducted an employment and poverty household surveys across three States of differing levels of development: Bihar considered a backward region; Andhra Pradesh, and agriculturally developed region and Uttar Pradesh, a State with both developed agricultural and non-agricultural sectors. He expressed that a quickly growing and productive agricultural economy is able to promote well developed non-agricultural activity within the village itself. As the economy is developing, the proportion of non-farm income increases among the poor households and hence increases the food security status.

Jemol Unni (1996) expressed that older men specialize in agricultural activities and better educated men specialize in non-agricultural employment in the selected 30 villages of Gujarat. High population densities and proximity to rural towns (markets) also foster such specialization. Many more women engage in casual and part-time work, particularly concentrated in the agricultural labour sector. RNF sector may be

particularly important for woman by drawing them away from poorly remunerated agricultural work and hence can improve their accessibility to food.

Atul Mishra (1996) revealed that the employment in the RNFE was high in States where green revolution (Punjab and Haryana-26 percent) or land reform (Kerala and Bengal-26 per cent) had taken place. But it was low in the States where neither green revolution nor land reform had taken place (Bihar 11 per cent). However, regions of green revolution or land reform together contributed less than 25 percent of the cultivable areas.

Swaminathan (1996) suggested some strategies to achieve food security maintaining the existing growth in agricultural production to ensure sustainable availability of food, sustaining productivity and reserve base over the period but keeping the economic cost at minimum, ensuring adequacy of household income for providing entitlement to food to vulnerable groups in the society. So there occurs a concentration on providing economic access to food. George (1999) while analysing food security situation in India found that economic access to food could be achieved through a mix of employment and income policies for farm sector. He reiterated that the strategy for reducing poverty and enhanced food security should be based on agricultural development. Based on the consumption pattern, he indicated that about half of the rural consumers and about two third of urban consumers had nutritionally inadequate food consumption levels. Even the ability to buy may not guarantee food security, unless there is an efficient distribution system.

Similarly, Nagaiya, D. (1999) reported that States which have shown relatively fast growth in employment in the RNFS were generally the ones which also recorded a relatively better growth of agriculture.

Iyampillai S. and Jayakumar N. (2000) revealed that the relationship between caste hierarchy and the land holding status among the rural households in Trichirappalli District. There was Domination of SC households in casual (Non Farm Employment) NFE including construction activities and the domination of Non-SC households in the regular NFE including govt. jobs, self employment and business. Only 18 percent of the sample households were living below the poverty line earning less than Rs.

11,000 at 1997 prices. Households taking part in NFE earned roughly about 40 percent of their income from NFE.

Metha G.S (2002) examined to the structure, growth, development potentials and the kinds of problems existing in the properly functioning of various non-farm activities in the State of Uttaranchal of India. The study highlighted that nearly one-third of the non-farm activities were traditional by nature and were established over three generations ago. The family members of the non-farm households motivated 42 percent of the entrepreneurs for establishing non-farm activities. And around 23 percent of the entrepreneurs were motivated by their friends and relatives and remaining only 3.04 percent of the entrepreneurs have decided to establish concerned non-farm activities after motivating them by the Government. Non- farm activity was found to be a very profitable occupation in the rural areas. The margin of all non-farm activities together was estimated to be around 42 percent.

Ravi and Ramachandra Reddy (2006) attempted to understand the socio - economic characteristics and status of poverty and food security among the tribal households with a special reference to Jenukurba tribe to Heggada Devanakot (H. D. Kote) in South India. The study is based on primary data collected from 180 Jenukuruba tribal households, living in and around that protected forests covered by the 'Rajiv Gandhi National Park' in Karnataka, South India.

The study revealed that these tribals live in abject poverty, virtually devoid of any productive resources and exposure to education. The tribal households, on an average, earned cash income of rupees 7,873 per annum, which was far below the poverty line. They lived on hand to month existence. The average income spent on food by the tribal households was rupees 3,537 per family per annum. In terms of calorie intake, food consumption, in general, was limited to a mere 1,072 kcal per capita per day, which was far below the minimum consumption needs. In order to make up the calorie deficit the tribals depend heavily on edible forest products to sustain themselves. The Sen's index estimated has a value of 0.47, which in other words, reveals the poverty gap implying that income of the tribals should be increased by 47 per cent to entirely alleviate the tribals from poverty line and hence improve the food

security situation. He also reiterated the fact that non farm income has dire implications in raising income.

Navadkar and Yadav (2006) observe that India has definitely made rapid strides in food grain production, which has made the country self-sufficient in food requirement. However, the increasing population and the opening of agriculture to import competition due to WTO regime necessitate new policy initiatives. This is especially so because the growth rate of agricultural production has decelerated in the 1990s. The paper examines the status of food and nutritional security in India. It is noted that though India has definitely made a lot of progress in agriculture, we cannot possibly say that India has attained food security because there are almost 350 million people who do not fall in the category of being adequately fed or nourished.

The net per capita income has been almost stagnant and therefore rural poverty has not been contained. There is a vicious circle of population increase, rural poverty and agriculture unsustainability. The Government can break this vicious circle by formulating and executing appropriate policies thereby increasing food and nutritional security. The future food security programme should have a broad objective of increased agricultural production and enhanced access to food through a participatory approach by the local people.

Pathania and Vashis (2006) analyzed the availability and requirement of food grains and to suggest ways and means for improving the food security in the State of Himachal Pradesh. The study is based on secondary data collected from the State Government publications and different published sources. The findings of the study have clearly brought out that population in Himachal Pradesh increased by 76 per cent over the years. The reduction in poverty has resulted in spurt in the demand for food grins as well as quality food. The large and medium holdings dwindled while the small and marginal holdings increased over the years resulting in higher human labour pressure on agriculture. This trend calls for not only reduction of the increased population dependent on agriculture to lift it from subsistence level but also to withdraw population from agriculture by opening up alternative employment opportunities. The State is also faced with the challenge to reduce the poverty and

accelerate sustainable development to ensure food security at local, individual and household level. Food security policy must, therefore, be evolved in totality as a basic element of a social security policy together with nutritional security.

Archana Sinha (2006) said that with an estimated population of more than 1.2 billion, India is the most populous country in the region of South-East Asia. In the recent past, the country has made considerable progress on social and economic fronts, as indicated by improvements in indicators such as life expectancy, infant mortality rate and maternal mortality rate, under-five mortality and literacy rate. However, improvement in nutritional status of the poorer section of the society has lagged behind. The population of India doubled between 1960 and 1992, but the impressive food grain production nearly kept pace with population growth, and therefore, the per capita availability did not decline. While it is estimated that per capita cereal availability within India is adequate, national level surveys still show that 40 per cent of the population in India consume less than 80 per cent of the energy required. Low purchasing power, limited access to food, and individual household food insecurity are the major constraints. The development policies of the government have turned the country from a position of net importer of food grains to the state of marginally surplus one. Food security and malnutrition continued to be the main problems among the consumers of low expenditure quartile group more so in the state with backward or slowly growing agriculture, like in Bihar, Orissa, Andhra Pradesh and Tamil Nadu. The task of providing minimum level of nutrition to the people is primarily that of adequate production and access to it, which in turn depends upon an appropriate distribution of incomes and productive resources. The study provides several suggestions to improve the food security situation of the rural poor.

Chengappa and Karumbaiah (2006) analyzed the economics of different farming systems and its impact on income and nutrition with an emphasis on finding out the gap in nutritional adequacy. For this study, a total of 100 farmers were selected at random from the Bangalore rural district representing eastern dry zone of Karnataka. The results indicated that irrespective of the size of holding, farmers adopted diversified farming systems involving high value commodities, which in turn helped them to realize higher net returns. Access to groundwater irrigation and institutional

source of credit facilitated the farming system diversified to high value commodities. Food grains constituted nearly 40 per cent of the total expenditure incurred on food which decreased as the farming system diversified to high value commodities.

The per capita consumption of milk was much below the recommended level even though milk production was an important component of the diversified farming system. The farmers preferred to sell milk to realize cash income so as to meet their routine expenditure. The farmers following diversified farming systems have shown higher diversity in their consumption pattern and vice versa. The status of nutrient intake assessed through a dietary survey following 7 days recall method indicated that the nutrient deficiency was higher with households following the farming system involving only crops.

Thilagavathi and Chandrasekaran (2006) analysed the influence of agriculture in ensuring food security in rural households and to examine the household consumption behaviour and the coping strategies for ensuring better household food security at the micro level in resource degraded areas. Paramakudi and Vilathikulam taluks of Ramanathapuram and Tuticorin districts of Southern Tamil Nadu have been purposively selected for the study and the data were collected from 160 affected and 80 non-affected sample households from the selected two districts during the year 2003-04. Simultaneous equation model was used to assess the determinants of household income, consumption and activity diversification. The results revealed that, the sample farmers allocate, on an average 65 to 70 per cent of their cropped area to cereal and pulse crops from which they get the maximum proportion of intake of calories and protein.

As far as income is concerned, 24.60 per cent and 36.82 per cent of the total income was earned through crop production in affected and non-affected households. But in sample farm families, more than 57 per cent of the total family income was generated through non-farm activities. Non-farm sources provided more employment opportunities to the sample households which are in the affected category whereas in the non sample farms this was only 36.86 per cent while on-farm employment constituted 54.10 per cent in non-affected farm families. Per capita monthly total

expenditure on food for the adult units in farm categories revealed that the amount allocation was high in non affected farm categories compared to the affected farm category but the difference was meagre. Per capita monthly total consumption expenditure for the adult units in farm categories indicated that the amount allocation was higher in affected farm category when compared to non-affected farm category. The significant and relatively larger influence of activity diversification, household income and family consumption units on family consumption expenditure implied that the consumption expenditure was largely influence by the magnitude of income and income generating activities rather than the demand side variables such as number of dependents or family consumption units. The number of earners, differences in the wage rate between different activities in trade and service sector, acted as pull factors of the family members to diversity their activities in the sample households.

Varghese and Azad Mordia (2006) made an attempt to assess the inter-state disparities of indicators directly related to food security in relation to the overall composite indices of rural development in these states. Keeping in view the aspects of physical availability and economic access of food security, those states with relatively higher per capita food grain production, less inter year variability in production, higher growth in food grain production, low growth in population and having lower share of below poverty line (BPL) population could be considered as less vulnerable to food security. The compound growth rates of food grains during the new economic regime (1991-2004) in different states revealed that the growth rate of food grain production has been higher than population growth in states like Bihar, Haryana, Meghalaya, Nagaland Rajasthan and West Bengal. However, the inter-state variation in per capita food grain production ranging from 0.02 tons in Kerala to 0.98 tons in Punjab reveals the existing regional disparities in the local access to food security. In 18 out of 28 states, the per capita production is less than the national average of 0.20 tones/person in a normal year.

While the inter-state variability within a year in the per capita production remained very high during the recent past, the inter-year variability within the states in per capita production has been high for states like Gujarat, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan Sikkim and

Tamil Nadu. The high interyear consistency as evidenced by the low coefficient of variation in per capita production of food grains in states like Assam, Goa, Haryana, Himachal Pradesh, Meghalaya, Punjab, Tripura, Uttar Pradesh and West Bengal revealed that the production of food grains in these states has been growing keeping pace with the population growth.

The share of BPL population is more than the national average in states like Arunachal Pradesh, Assam, Bihar, Madhya Pradesh, Meghalaya, Nagaland, Orissa, Sikkim, Tripura, Uttar Pradesh, West Bengal and Manipur. The states such as Punjab, Goa, Tamil Nadu, Andhra Pradesh, Kerala, Karnataka, Maharashtra and Haryana stood as the top eight states in terms of overall development. The states at the bottom of development level included Jharkhand, Bihar, Uttar Pradesh, Rajasthan, Nagaland, Jammu and Kashmir, Meghalaya and Orissa. In terms of food security indices the top states are Punjab, Haryana, West Bengal, Himachal Pradesh, Andhra Pradesh, Goa, Uttar Pradesh, Tripura and bottom states are Sikkim, Orissa, Maharashtra, Bihar, Jharkhand, Tamil Nadu, Kerala, Madhya Pradesh and Jammu and Kashmir. The rank correlation between overall development indices and food security indices turned out to be in significant for Indian states.

Parshuram Samal (2006) analyzed changes in consumption pattern of the consumers of Orissa taking into consideration six quinquennial round data between 1972-73 and 1999-2000. Data were analyzed by rural and urban areas and also by income groups. To investigate into the response of the poor to food price changes, the demand elasticity for various income groups were computed and analyzed. In rural areas, the proportion spent on food decreased from 75 to 66 per cent and in urban area from 65 to 56 per cent during 1972-73 to 1999-2000. The expenditure share on rice was reduced by 16 per cent in rural and 8 per cent in urban areas. The food groups with marginal increase in expenditure share were pulses, milk, vegetables, meat-fish-eggs and “other” food groups in both areas. Rice is the dominant cereal among all the energy producing foods, which accounted for more than 85 and 80 per cent in rural and urban areas respectively. But, the consumption of rice has decreased significantly over the years in the two non-poor groups in rural areas and highest income group in

urban areas. However, the very poor group has increased their rice consumption in both rural and urban areas, thus improving their calorie intake.

It was observed from the demand elasticity matrix of rice that in most of the cases, the own and cross prices elasticity declined as income increased, which indicates that low income households were more responsive to food price changes than high income households. The curvature in the slushy substitution elasticity matrix for rice was found to be statistically significant, which implies that poor substitute more flexibly than the rich. Desegregation by commodity and income class is essential because the poor respond very differently to changes in prices of commodities than the rich.

A village level study of food security conditions in rural Bihar conducted by Veena Kurmi and R.K.P. Singh, (2006). They found that the farmers do not consume but prefer to sell to get money to meet other household requirements. Moreover, the consumption level of nutritious food like leafy vegetables, oils and fats, fish and meat was still much lower, mainly due to poor purchasing power of households in rural areas where the females are more deprived.

Khatkar (2007) examined the status of consumption pattern in relation to food security in arid regions of Haryana and Rajasthan. Based on the data collected from a simple of 200 respondents drawn from two selected districts from each state, it was observed that consumption of cereals in both the categories of irrigated and un irrigated farms is less than the recommended level, viz., 520 gm/per capita/day but it is more than the national availability of 428 gm/per capita/day. The actual consumption of cereals in the study area is 430 and 450 gm/per capita/day in irrigated farms of Hanumangarh and Jaisalmer districts respectively, while is 468 gm/per capita/day and 577 gm /per capita/day in unirrigated farms. The consumption of cereals in unirrigated farms is more than the irrigated farms, which is an indicator of prosperity because income and consumption of cereals have negative relationship.

In the case of pulses per capita consumption in all the farms viz., irrigated and unirrigated is less than the recommended quantity. The recommended quantity of consumption of pulses is 50 gm/capita/day while in this study it ranged from 12 gm/capita/day in Jaisalmer (Unirrigated) to 0.26 gm in Hanumangarh (Unirrigated). It

does not show any relationship with irrigation. The consumption of coarse cereals and pulses was found to be higher on unirrigated farms owing to more production of these commodities on such farms and that of fine cereals, vegetables and fruits were found higher on irrigated farms due to higher income on the latter category of farms. The pulses consumption was lower than the ICMR recommended level, while the consumption of sugar and gur was found on a higher side. Energy and iron intake was found to be lower in Bhiwani district while the calcium and phosphorus intake was found on a higher side.

The protein intake was also found higher in Sirsa district and it was found almost at recommended level in Bhiwani district. Thus, the lower consumption of coarse cereals and pulses also indicates nutritive imbalance in the diet in the study areas as coarse cereals and pulses are growth mainly in the arid regions. Keeping lower productivity of major crops in the study areas, there is a need to improve the productivity through suitable technology development and gearing up the extension activities for meeting the food security. The income level also needs to be improved through providing off-farm employment opportunities to such a large vulnerable section of the population residing in the challenged areas.

Sati (2010) while searching for the traditional farming system and sustainability issues in the Garhwal Himalaya found that the farming system is peculiar, which is based upon the century old practices. But the economic viability of these crops are insufficient even to meet the food requirements of the populace. He also observed that an exodus of population emigrates for other profitable alternative means of income. He also argued that by enhancement and diversification of livelihood options, other than traditional pattern can definitely raise the income and food security of the rural people.

The literature on food security, non farm sector in India highlight that the state is faced with the challenge to reduce the poverty and accelerate sustainable development through ensuring food security at local, individual and household level. This calls for not only reduction of the increased population dependent on agriculture to lift it from subsistence level but also to withdraw population from agriculture by opening up

alternative employment opportunities. Nonfarm activity was found to be a very profitable occupation during the later part of the 20th century and starting of the 21st century and have significant role in rural diversification. The nonfarm activity has been immensely helpful in providing income all the year. Enhanced income often leads to an increased level of food security.

2.4 Food Security, Non-Farm Sector in Assam: Empirical Literature

In Assam various studies have studies have highlighted the fact that the non farm sector has got enough potential in pursuing various development goals. Increase in non agricultural employment based on local strengths and resources through multiple livelihood opportunities harness the inherent strengths of rural economics. In that process the rural industrial sector got developed through using the large national resource base and labour force in the plains. The addition of value to products produced locally increases employment and income generating opportunities. The major rural nonfarm activities include handicrafts and handlooms, bamboo based activities and processing of dairy product, poultry, fish and other livestock and agro and horticultural products.

Earlier studies have portrayed the importance of non farm sector in realizing various development goals in Assam. Gogoi (1993) was of the view that the livelihood diversification in terms of nonfarm activities yields two types of direct linkages between agricultural and non agricultural sectors, namely, the backward linkage and the forward linkage. Linkage implies that a sector is linked with the other sector, which supplied inputs to it and also which uses its output as their own inputs. Forward linkage of agriculture implies flow of agricultural output to industry as inputs and backward linkage indicates flow of non agricultural output to agriculture as inputs. These linkages helps in the development of farm sector and hence the economy of Assam.

National Development Council (1994) its report observed that agriculture and other land based activities will not be able to provide employment to all rural workers at adequate levels of income in the long run. A strategy encouraging shift of labour out

of agricultural is particularly important in the states having more than two thirds of their workforce in agriculture. Available evidence suggests that the share of non farm sector in rural employment has been increasing in recent years and that it is due to the growth of productive unemployment opportunities in this sector.

Barooah (2001) also opined that due to high growth of population; the pressure for employment generation in Assam is very high. But, due to sluggish growth in Assam's economy, there has been stagnancy in the development of the organized sector of the state. Therefore, employment generation in organized sector of the state has been declining. Thus in order to utilize the unemployed labour informal sector has to be developed.

NABARD (2000-2001) states that there are several direct and indirect benefits accruing to the economy from the development of non farm sector. Nonfarm activities rely largely on local financial and unexploited natural resources and contribute significantly to reduce rural urban income differences. Industrialization in rural areas could provide inputs for agricultural sector, increase its productivity and add value to agricultural produce through localized processing and turn generate surpluses for investment in agricultural, non agricultural and several social sectors. Further, most of the industries in rural areas are environment friendly.

As non farm sector has great significance on the Assam's economy, so various studies have been undertaken from time to time to unveil various potentialities of non farm sector in realizing development goals.

A survey of the Rural Non Farm Sector in Kamrup district found that majority of the non-farm enterprises in the district were new i.e. post 1990 and have come up in response to growing demand for products and services. It was noted that that the role of formal training in starting new enterprises has been very limited. Paucity of capital and poor transport were found to be the most important constraints in the expansion of units. An interesting observation made in the report was that of a positive correlation between the scale of operations and mortality of the manufacturing firms. As long as the firms are catering to the local demand and remain small, the risk of closing down

is low. But once they graduate to the next segment of catering to the outside market, the risk of mortality of enterprises increases markedly (Raghaviah, 2000).

Panda (2004) observed that the rural economy of Assam has experienced a continuous sectoral shift in favour of nonfarm employment during the period 1971-91. During this period the share of rural industrial sector employment has experienced a modest increase has happened in the non household industrial sector.

According to Chakravorty, B.K. (2006), RNFS has been rapidly emerging as the major source of employment in Nalbari district. The RNFS activities are diverse in nature. They encompass both traditional and nontraditional activities. However, the extent of diversity is related to size of the rural market. In his study he has shown that large majority of the units are economically successful. The recent growth of RNFS in Nalbari is included largely by push factors. In other words, the growth of RNFS is more of a distress phenomenon that a positive event. The growth of RNFS has contributed a significant share of income generation in the rural areas.

According to Sharma, R. (2007), the decline of employment elasticity in agricultural sector accompanied by rapid population growth in Sonitpur district, the rural nonfarm micro enterprise sector has emerged as a significance source of livelihoods for the rural population in the district. He has shown that many of the rural nonfarm micro enterprises in the Sonitpur district have developed mainly due to push factors. The sector as a whole contributes substantially to the generation of income and employment in the rural area. The emergence and expansion of micro enterprises in the district is strongly embedded with agricultural sector. A large majority of the RNFS have higher forward or backward linkages with the farm sector. Therefore, the emergence and expansion of RNFS cannot be get treated as replacement or substitution of farm sector.

Panda (2012) in one of his studies has examines the growth, composition and determinant of the nonfarm employment in the north-eastern states. He used the NSSO data of different rounds and revealed that the share of rural nonfarm employment has increased from 18.54 per cent in 1981 to 35 per cent in 2009-10. Share of the rural nonfarm employment in the northeastern states is higher than the

national level. He collected the data from five districts in Assam and Meghalaya. From his study it is clear to us that the participation of the households in nonfarm activity is significantly influenced by household income from agriculture, access to credit, household poverty and distance from nearest urban center. He came to the conclusion the both developments as well as distress factors are responsible for the growth of the rural nonfarm employment especially in Assam.

Goswami and Bhattacharyya (2014) in a paper on 'Rural Non-Farm Employment in Assam: A Gender-Based Analysis' explores the rural labour market in Assam. The Work Participation Rates (WPR) for males has increased during the period 1993-94 to 2009-10, whereas the same for females has been fluctuating around a lower level of 15 to 20 per cent. Thus, unemployment rates for females have been higher than males. A sector-wise distribution of workers shows that the proportion of males employed in the farm sector has been declining in favour of the Non-Farm Sector (NFS), while the females are more concentrated in the farm sector. Thus, females stand in a more disadvantageous situation in the rural labour market as indicated by their low WPR, higher unemployment rates and low level of diversification into NFS. However, gender equality is necessary for growth. This is more so with regard to education and employment.

India has introduced the concept of inclusive growth in the Eleventh Five Year Plan. Inclusive growth ensures opportunities for all sections of the population, with a special emphasis on the poor, particularly women and young people, who are most likely to be marginalised. A rapidly growing population in India has not only increased the size of the rural labour force but has also led to fragmentation of land holdings. Thus, this sector alone cannot create additional employment opportunities, even in high growth agriculture states of India. This has led to the growth of a vibrant non-farm sector. The study comes up with the suggestion that the NFS, with its greater potential of employment generation, can not only solve the unemployment problem, but can also lead to the increased access of women to resources and employment opportunities.

Mech (2015) in the paper 'Growth and Composition of Rural Non-Farm Employment in Assam: A Post Reform Scenario' provides a glimpse of the overall changes in the scenario of rural non-farm employment in Assam and in India was discussed. The sector-wise composition revealed that majority of the rural workers are engaged in farm sector but its contribution to GSDP is less in comparison to its participation. Among the non-farm sub-sectors, two sectors namely community, social and personal service sector and trade, hotels and restaurant sector accounts highest share of rural employment in Assam. At national level, construction and manufacturing sector occupies a majority share. The overall employment elasticity in both Assam and all-India average was negative in the latter period 2004-05 to 2011-12. In case of various non-farm sectors, employment elasticity recorded a positive growth except in case of mining and quarrying, electricity, water, gas etc which accounted a negative trend. Also he concludes that for inclusive and progressive growth of the rural economy emphasis needs to be laid in the non-farm sector which has turned to be an emerging sector in case of employment generation.

But, human society is now confronted with non-traditional security challenges. Maintaining human security is the main concern of all the governments. Food security is one of the significant aspects of human security discourse. The issue of food security is occupying a significant place in the discussion of post-independent political developments in India. The Government of India, at the post–independent period had adopted several measures to ensure food security for the people of India, but could not achieve much success in this regard.

Being a significant part of homeland India, Assam also comes under the prevailing food insecurity dilemma of India. Although Assam has experienced positive growth rates in area, production and yield and extensive measures are adopted to remove poverty from Assam and to ensure food security, expected results could not be achieved. The operation of the PDS suffered from a number of flaws. Leakages due to corruption have led to diversion of food grains to the open market and not all the poor benefited. The implementation of Mid Day Meals Scheme was also unable to bring the expected results. The corruption in the implementation of MGNREGA in the official level created major dissatisfaction among the agrarian sections. As

government programmes has not been able to provide desired results and people are still lagging behind as far as provisions for economic access to food is concerned so in such circumstances as various researches have emphasized the role of non farm sector in enhancing income of the people becomes vital.

Remarks

The above studies have revealed different dimensions of food security, factors influencing the food security, level of non-farm employment, growth impact and importance of non-farm sector factors influencing the growth of non farm sector. Although there are studies which try to establish some form of indirect relationship between food security and non-farm sector, However there is dearth of studies which primarily focuses on establishing a direct relationship between food security and non-farm sector along with a detailed account of food security encompassing all four dimensions of food security namely food availability, accessibility, food utilization and stability. However, it emerges from the literature review that so far no attempt has been made for ascertaining the relationship between food security and non-farm sector in Assam.

Therefore, a detailed and in-depth analysis of food security encompassing all four dimensions of food security namely food availability, accessibility, food utilization and stability and also examination of the relationship between food security and non-farm sector is essential. In what follows in the subsequent chapters, an attempt has been made towards filling this gap.