FOOD INSECURITY FACED BY THE RURAL PEOPLE

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CERTIFICATE

This is to certify that the thesis entitled, **"FOOD INSECURITY FACED BY THE RURAL PEOPLE"** submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **Master of Science in Agricultural Extension & Information System**, embodies the result of a piece of bona fide research work carried out by **Abrar Hossain Mozumder**, Registration No. 09-03714 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

I further certify that such help or source of information, as has been availed of during the course of this investigation has duly been acknowledged.

Dated: December, 2010

Dhaka, Bangladesh

(Prof. M. Zahidul Haque)
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Dedicated to My Beloved Parents
for Their Love, Endless Support
and Encouragement

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ABSTRACT

The main objectives of this study were to determine the level of food insecurity condition exists in the study area that was faced by the rural people and to explore the relationship between food insecurity of the respondents and their selected characteristics. Besides these, attempt was also made to ascertain the problems faced by the rural people in achieving household food security. The study was conducted with randomly selected 120 rural household farm families of three villages namely, Dumuria, Lohipur and Dayapur of Chowara union under the South Sadar upazila of Comilla district. Family head of each of the farm families was treated as the respondent. Data were collected through personal interview by using an interview schedule during the period of 02 August to 15 September, 2011. Pearson's product moment correlation co-efficient (r) was computed to examine the relationship between the variables. Food insecurity faced by the rural people was the dependent variable and ten selected characteristics of the respondents constituted the independent variables of this study. The highest proportion (66.67%) of the rural farmers in this study area were found in food secure condition followed by low food insecure condition (20%), medium food insecure condition (13.33%) while none was faced high food insecure condition. Education, farm size, annual family income and daily time allocation in farm work of the respondents showed negative relationship with their household food insecurity, whereas family size and daily dietary needs of the family showed positive relationship with their food insecurity. The major problems faced by the rural people in achieving household food security were inadequate land for farming, lack of money or capital or necessary fund, inadequate training facilities, lack of knowledge on different aspects of improved farming enterprises and insufficient credit facilities.

ABBREVIATIONS

AEO - Agriculture Extension Officer

Ag. Ext. Ed. - Agricultural Extension Education

AHI - Assistant Health Inspector

BBS - Bangladesh Bureau of Statistics

BRAC - Bangladesh Rural Advancement Committee

DAE - Department of Agricultural Extension

df - Degree of Freedom

FANTA - Food And Nutrition Technical Assistance

FAO - Food and Agriculture Organization

GDP - Gross Domestic Product

HYV - High Yielding Varieties

IUS - International United Standard

Kcal – Kilo Calories

mmt - Million Metric Ton

MOA - Ministry of Agriculture

MS - Master of Science

NGO - Non Government Organization

SAAO - Sub Assistant Agriculture Officer

SPSS - Statistical Package for Social Sciences

Sq km - Square Kilometer

UAO - Upazila Agriculture Officer

UFPO - Upazila Food Program Officer

UNDP - United Nation Development Program

VGD - Vulnerable Group Feeding

WFS - World Food Summit

WHO - World Health Organization

(000) Taka - Thousand Taka

CHAPTER 1

INTRODUCTION

1.1 General background

Food insecurity remains a reality for the millions of poor people in Bangladesh, including small and marginal farmers in the rural areas. Whereas rural people purvey food for the enormous population of the country, they are mostly underprivileged by losing their rights including their right to food. Farmers' access to food is mainly obstructed due to the lack of purchasing power and several other factors including climate variability, imperfect functionality of market and gender discrimination. Farmers lack of purchasing power is associated with their missing access to the productive assets which leads to their suffering with chronic hunger (Kobir, 2007). Bangladesh is a net food importing country. The country has been faced with challenges of natural disasters and high food price in recent years. The two events have exacerbated the incidence of poverty in Bangladesh since 2007. According to a joint estimation of World Food Program (WFP) and Food and Agriculture Organization (FAO) in the year of 2009, 35 million people in Bangladesh are consuming less than 1,805 kcal per day and 7.5 million more people joined the category of people consuming less than 2,122 kcal per day in between the year of 2007 and 2008. 65 million people in the country are unable to bear the expense of their basic food basket. Food insecurity in Bangladesh is higher in rural areas than in urban areas. There is a declining trend in the food intake in rural area of Bangladesh. According to the Report of the Household Income and Expenditure Survey, average food intake in the rural area was 946.3, 898.7, 910.5 and 878.1 grams in the year of 2005, 2000, 1995-96 and 1991-92, respectively (Mannan *et al.*, 2007). A number of factors prevent poor farm families in the rural areas to acquire enough food. The factors include insufficient income level for which the poor farmers are unable to purchase the necessary foods prevailing in the market. The rural households also lack of the necessary assets or access to credit to assist them during the adversities. One of the main reasons of food insecurity among the rural poor is lack of their access to productive resources. Land oriented poverty is a crucial factor in augmenting food insecurity in the rural households. The people who do not have access to food are vulnerable due to the function of various economic, ecological, geographical and demographic factors. Among the economic factors, level of income, occupation, ownership of land etc are predominant. Different measures like income, expenditure and calories intake provide different figures regarding its incidence.

According to all measures being applied for its measurement, Bangladesh made notable progress in poverty reduction, but a large number of country's population are still below the poverty line income or below the range of food intake prescribed for maintaining a healthy life. Among the different geographical divisions of Bangladesh, Rajshahi was at the top of the line and Barisal at the bottom. Unhygienic, deprived living environments with poor access to health care and other public services exacerbate the health effects of their food insecurity. Moreover, the rural poor may frequently have a less diverse range of coping strategies to employ in the face of food insecurity than do their counterparts in urban areas of the country. While poverty is an overall denominator of this food insecurity in the country, the additional intensifiers are disability (gender, age, and physical challenge) and location (disaster proneness, access to the market, etc) as well as other aspects related to utilization (education, awareness, cultural practices, etc). Issues of governance and accountability further thwart attempts at providing targeted safety nets and price stabilization.

The food production data of BBS indicate that the country made remarkable progress in food production, especially rice, both in absolute amount and in per capita terms during the decade of 90s. In 1999-2000, a total of 25 mmt of food grains (rice and wheat) were produced, more than the requirement of its total population as a whole. Vegetable production almost doubled during the decade. The year of 1999-2000 experienced a milestone in potato production from 1240 thousand tons to 2951 thousand tons (a 2.5 fold increase), resulting in increase in per capita availability from the ever stagnating value of 30-37 g/day to 64 g/day. Along with cereals and vegetables visible achievements were also observed in the poultry and livestock sector. The 1990s was a decade of sustained increase in all kinds of animal products e.g. fish, meat, egg and milk. The per capita availability of fish increased from 20 g/day in 1991 to 34 g/day in 1999-2000 which was essentially due to increase in inland fishery. Meat production increased, superseding the rate of increase in population, so the per capita availability increased to a value of 13 g/day in 2000 from 8 g/day in 1991. Egg and milk registered similar increasing pattern, but the availability of egg remained appallingly low (4 g/day). All together, at the decade end the per capita availability of total animal food was 86 g/day, still much less than the required amount (126 g/day) (Rahman *et al.,* 2009).

Food security has been a critical issue in the recent past regime of high food prices across the globe. Only a couple of years ago, prices of staples all over the world displayed a dramatic increase. The Bangladesh food regime has undergone profound changes over the past thirty years as well documented in a number of publications (Ahmed *et al.,* 2000). Indeed the very success in achieving near food self-sufficiency, stable prices and steadily rising real wages and incomes, guided in a sense of complacency with the food security regime in the country.

Past reforms in the agricultural sector has generally been hailed as positive, serving to reduce subsidies, streamlining the public food distribution system and re-aligning market incentives to raise efficiency and growth. These were also synchronized with the opening up of markets through trade liberalization, allowing input and output imports through the private sector. In the case of Bangladesh, since the trade liberalization in the early 1990s, private sector has played an important role in stabilizing prices, particularly that of rice. During the devastating flood of 1998, the stabilizing role played by the private imports (Del *et al.*, 2003) is a prime example of this. It was mainly possible because import parity price of rice was not exorbitantly high due to availability of enough surpluses in the world rice market at that time. Urbanization generally is interpreted as an indicator of progress and development, the advantages of urban residence for many Bangladeshis seemingly are slim, with many unable to maintain or improve their standards of living or to acquire sufficient affordable food to meet their minimum nutritional requirements where rural people are much better. Changing market conditions can be expected to increase the vulnerability of these poor rural households as employment opportunities and food prices fluctuate, making it difficult for them to acquire all of the food that they require to enjoy healthy and active lives.

Food security situation in Bangladesh has improved, especially on the availability side, and further improvements on access and utilization, to be sustainable and large scale, needs renewed efforts from the government, civil society (including media) and the development partners. The hungry population of over 60 million people is larger than most other global cases the third largest poor population in any country after China and India. Records say in 1970, 70% people were under the food consumption poverty line. Today, though people are not dying, they are going hungry and becoming stunted with reduced mental and physical capacity. This is down to under half of the population. Bangladesh has definitely got more food than it had thirty years back, yet almost half of Bangladesh is still far from being food secure. The poorest people spent more on food, mainly for cereal although aggregate expenditure for cereal in the 90s declined and that for non cereal increased, due mainly to changes in price of different food items. The income inequality, which was higher in urban areas, increased at the same rate in the 90s both in rural and urban areas. In 1995-1996 the share of income of the bottom 20% of the population was only 5.71% and in the year 2000 their share declined to 4.97%. On the other hand contribution of the income of the richest (top 20%) increased from 50.8% to 55.02% during this period. Foodgrains requirement in Bangladesh has been estimated at about 32 million metric tons. Total quantity of import of food grains (rice and wheat) by public and private sectors in 2006-2007 was 2.3 million metric tons. Thus, on average, Bangladesh has an average food deficit of 1-2 million metric tons (Rahman *et al.*, 2009).

The government undertakes public sector distribution of 1.6 mmt (2006-07) food grains for subsidized food distribution among selected groups, food for works program and other targeted programs like vulnerable group feeding (VGD). As far as food utilization is concerned, Bangladesh's score on various health and social indices is not encouraging. Child and maternal malnutrition is widely prevalent. Food security, however, is larger concept. It will vary from class to class, region to region. Thus, there are periodic as well as regional food crisis in the country.

Bangladesh, occupying 32 agro ecological regions, faces normal and extreme flooding which is a by-product of climatic variations. Farmers in each agro ecological region could not produce their foods locally if the floods cease their crop adaptation processes. The consequence of crop failure is severe. Farmers loose their buying capacity as they do not have any money or any other fixed assets which help them to survive up to next cropping season. So crop failure creates chronic poverty and food insecurity. If the farmers face food insecurity for a long term then the human security comes in with question in Bangladesh. The large numbers of population eat less than adequate foods. The food insecurity is the core problem in Bangladesh and it persists severely in the rural areas. The steps for reducing food insecurity and alleviation poverty have been stated in successive plans in different programs by the government and the aid agencies but the reality is the most of people are still undernourished.

1.1.1 Causes of food insecurity

What are contributing factors to food insecurity? Firstly, natural disasters e.g. flood, cyclones, drought and water logging results in severe crop losses to the extent of 2-3 million tons per year. Secondly, lack of irrigation water, timely availability of fertilizer and pesticides. Thirdly, declining arable lands at the rate of 1% per annum coupled with depleting soil fertility and micro-nutrients. Organic matter in soil is declining because crop residues are not left to the fields. People take the entire crop residue for fodder and cooking purposes. Fourthly, intrusion of salinity damages crops and productivity in the coastal areas. During monsoon 1.7 million hectares are lost while 2.8 million hectares are lost during lean season crop cultivation by salinity imposing seasonal constraints on crop production. Fifthly, climate variability affects food production. The climate of Bangladesh is characterized by high temperature, heavy rainfall, excessive humidity and fairly marked seasonal variations. It has been estimated that almost no wheat would grow if temperature rise above 2°C. Sixthly, marketing and distributing bottlenecks lead to access problem, particularly on the part of the poorer segments of the society.

The underlying causes of national food insecurity include lack of foreign exchange to import food, unsupportive policies, lack of capacity to store and transport food where and when it is needed, and others. Main causes of household food insecurity include shortage of food in markets, isolation from markets, lack of capacity to produce food or earn income to purchase food, lack of a reliable source of potable water, sanitation, and inadequate health services. High rates of population growth and poverty also have played a part, within an already difficult environment of fragile ecosystems. Long term factors, such as the interaction between environment, high population growth, diminishing land holding size, and a lack of on farm technology have led to a significant decline in productivity. Crop yields are falling due to declining soil fertility and inefficient use of irrigation water. These trends have combined with the repeated effects of drought over the years to substantially erode the productive assets of communities and households. The lack of access to resources, employment opportunities and income result in poor purchasing power of households. Moreover, farmers also changed their land use patterns and introduced new enterprises combination along with rice production. As a result, agricultural crop land have been shifted and are being used for aquaculture such as pond fish farming, shrimp farming (brackish water aquaculture) and golda shrimp farming and to some extent, alternate rice-fish farming and alternate shrimp-rice farming. This makes the poor most vulnerable to acute food insecurity when faced with external shocks, such as harvest failure. Along with, food prices also rise, which make their vulnerability worse. More importantly, households are less able to cope with shocks because it is difficult to accumulate savings even in good years.

1.1.2 Food/Nutrition security at household level

Food availability at the aggregate level may not ensure food security at the household level due to lack of economic access to food. Lack of entitlements for households belonging to certain social groups and living in marginal lands is a major reason for household food insecurity. Identifying these groups based on their socio-economic, demographic and location characteristics would help in devising appropriate policies such as targeted food subsidies and employment generation programs. Nutrition insecurity is measured through indicators of nutrient intake such as the amount of shortfall in calorie consumption from the recommended daily allowance. At the aggregate level it is measured in terms of percentage of people consuming inadequate calories, similar to the head count measure of poverty (Braun, 1995). However, even if the household has adequate access to food it may not result in a favorable nutritional status for the household. While access to food is a prerequisite for a proper dietary intake, the household's nutritional status is determined by several other factors such as the health of the individuals and their access to health care services and to hygienic water and sanitation and housing conditions.

Therefore outcome indicators are used as alternative measures of nutrition insecurity. The measures of nutritional status of children for example are based on weight, height and age. Improvement in medical facilities in rural areas over the decades has also increased the efficiency of rural population in converting food into energy thereby reducing the quantity needed of cereal intake.

The changing dietary patterns and the diversification of consumption basket to include superior cereals, vegetables and dairy products at the aggregate level are induced by increasing incomes in the economy. Calorie intake of consumers at the bottom level of the income scale remains much below the recommended dietary allowance even while their intakes show a rising trend over the years. Thus shifting of consumer preferences away from cereals is mainly applicable to the non poor. The poor however are likely to have higher expenditure elasticities of calorie consumption there is good reason to believe that low calorie consumption by the poor indicates their poor state of well being. Declining cereal consumption would become a matter of concern if one looks at the nutritional status of the population. As much as 50 percent of children continue to be malnourished and a large percentage of adults chronically energy deficient (Radhakrishna, 2002).

1.1.3 Food security at individual level

Food insecurity can also be considered at the individual rather than the household level. Measures of poverty/nutritional deprivation are usually based on per capita expenditure or per capita consumption of food, implicitly assuming equitable distribution across the household members. Intra household distribution of food determines the nutritional status of the individual member of the household. It is not necessary that all the undernourished come from nutritionally deprived households, nor is it true that all members of nutritionally deprived households have poor nutritional status (Andrews *et al.,* 2000). Thus, if there are biases in intra household allocation of resources standard measures of poverty and welfare in general may not reflect the true welfare of the individual member of the household. Measures of food insecurity can therefore be understated if all members of the household are not treated equitably. For example women could be getting less than men or girl child getting less than the boys. Evidence of gender discrimination comes mostly from demographic data. This is reflected for example in differences in male and female child mortality rates as well as in literacy and enrollment rates. Although consumption data on individual household members is hard to find, some studies have tried to indirectly infer gender effects from the aggregate household consumption patterns. This is done mainly by examining if household consumption of say food is affected differently due to the presence of individuals of similar ages but different sex.

1.1.4 Agriculture and household food security

Agriculture also has important influence on the micro aspects of food security. Household food security is directly linked to their economic well being which in turn depends on agriculture for the majority of the rural population. At the household level food insecurity is mainly due to lack of economic access to adequate food. The poor are the worst affected by food insecurity, which is primarily of two types, transient and chronic. The longer-term problem related to malnutrition and poverty is referred to as chronic food insecurity, which is largely due to, continued lack of access to productive assets and employment. Agriculture plays an important role in tackling the problem of chronic food insecurity by providing livelihood to the poor. This is especially so in a country such as Bangladesh where the majority of the population (80%) depends on agriculture for its livelihood, and the growth in labor absorption in other sectors is extremely low. The transitory or shorter-term food insecurity is associated with instability in food production or food prices. Among other things agricultural households tend to cope with these uncertainties through crop diversification. However for marginal land holders the scope for diversification is limited.

Food insecurity arises from a lack of both national and household capacity to produce or procure adequate quantity and quality food. At the national level, food insecurity arises from inadequate production or imports of food and lack of capacity to predict, assess, or respond to food shortages. At the household level, food insecurity is closely related to asset ownership and poverty. It arises from lack of access to land or agricultural inputs needed to produce food, lack of opportunities for non-farm employment, sub-optimal health practices, lack of access to clean water and health services, poor sanitation, and lack of family and community support. Consequently, national food security is a necessary but not sufficient condition for reducing food insecurity at the household level. Household food security is both necessary and sufficient condition for resolving hunger and improving the quality of food insecure people.

1.1.5 Level of food insecurity and poverty in Bangladesh

Bangladesh is a country with scarce resources and its major challenge is to feed its huge number of population living under poverty line. The number of population living below the poverty line has increased from 51.6 million in 1991-92 to 56 million in 2005 with an annual average rate of 0.314 percent at national level. If the current trend continues, the number of population living below the poverty line might stand at 57.3 million and 59.8 million by 2013 and 2021, respectively. However, in rural areas, it might decrease to 40.2 and 38.1 million by 2013 and 2021, respectively. Whereas, in urban areas, it might witness an increased population of 17.1 and 21.7 million by 2013 and 2021, respectively living under the poverty line in urban areas.

Food expenditure, food inflation and general inflation are positively associated with poverty. An additional number of people go under the poverty line with the increase of food inflation. Food expenditure is positively associated with the number of people living below the poverty line. This indicates that the number of people living below the poverty line also increases with the increase in expenditure on food. Like general inflation, food inflation is also positively associated with the number of people living below the poverty line. As general inflation increases there is an increase in the percentage of population living below the poverty line. Similar result is also true for the food inflation. If food inflation increases, more people slide under poverty line. Bangladesh has achieved fairly on agricultural productions to check the food inflations; but total production of pulses (one of the major sources of protein), oilseeds and fruits went down during the decades. These items may be described as "casualties" of the revolution in cereal production, mainly rice. A comparison was made between per capita availability and the recommended bundle for balanced diet indicate that although the country broadly reached its self sufficiency level in cereal production but still is deficient in production of all other necessary food items to make the diet a balanced one.

The poorest people spent more on food, mainly for cereal although aggregate expenditure for cereal in the 90s declined and that for non-cereal increased, due mainly to changes in price of different food items. The income inequality, which was higher in urban areas, increased at the same rate in the 90s both in rural and urban areas. Flood is a major crisis the country has to face almost every year and the poor suffer most in disasters like flood. Flood severely affects the food habit of the poor both in quantity and quality. The poor who usually do not have stock in their house but can manage to get an alternative source of income, cut down their meals from 3 to at best 2. Lack of dry place and also fuel are the main constraints for preparation of food on a regular basis. Consumption of green vegetables declined substantially due to the inundation of vegetable plots. About a quarter of the population in Bangladesh are considered to be extreme poor. The BRAC micro study indicates that the extreme poor are those who have negligible assets beyond their home they live in, own no more than 10 decimals of land including their homestead and one third of them are the actual female headed households without any adult male income earner in their family.

It also includes households where the main male income earner is physically handicapped not able to go for regular work. More than 80 percent of them could not afford to consume more than two meals a day and a significant proportion of them had to send their school going children to sell their labor for survival. The major causes of their poverty are poverty inheritance, land redistribution due to family break up, loss of income earner, natural calamities (including flood, river erosion), morbidity and dowry payment.

1.1.6 Nature of future food insecurity

In view of continuously rising population of Bangladesh, the food demands of the country shall naturally increase. However, it is worth mentioning that future food demands would be different from today because of the factors like: a) increased proportion of older people due to age longevity; b) greater urbanization and emergence of big cities; c) changes in family composition and structure; d) changes in food consumption patterns and habits; e) prevalence of serious diseases like Cardiac, Diabetic and Hepatitis etc. and their special foods requirements; and f) rapid penetration of Super Markets and International Food Chains in developing countries. To target such future diversions in food requirements, the major focus of the planners is to incentivize the agricultural production to future needs.

1.2 Statement of the problem

The poorest people in the world are generally landless and the household production and food security is mainly related to the families land ownership. In addition to the ownership of land, food production in farming household is influenced by a complex set of variables including the education of the farm manager and his workers, the quantity and quality of technology and capital available, how this technology and capital are used, and a set of government incentives and disincentives which includes tariffs, taxes, price controls and subsidies to agricultural and purchased inputs. With the production of food prices of food, income and liquid assets of the households also determines the food security of the family. The price of food is influenced by amount of food demanded, quantity produced, the size of the population as well as the per capita income and the tastes and preferences of consumers. The income and liquid assets positions of a household is the result of complex factors, among them education of its members, its land position, its employment opportunities, altitude towards work, the cost of transportation to and from work, health and tendency to savings. Reutlinger and his colleagues maintained that the world has ample food. The growth of global food production has been faster than the unprecedented population growth of the past forty years. Yet many poor countries and hundreds of millions of poor people do not share in this abundance. They suffer from a lack of food security, caused mainly by a lack of purchasing power (Reutlinger *et al.*, 1986). From the past forty years the production of food has increased than the unprecedented population but the lack of access to food due to poor purchasing power by the many of the poor countries of the world is one of the key factors of food insecurity. They argued that food production is no longer considered important in the hunger problem, it exists. They argued food shortages result in high food prices for food, which in turn make difficult for the poor to purchase adequate food.

Livelihood is defined as adequate stocks of food and cash to meet basic needs. Security refers to secure ownership of, or access to, resources and income-earning activities, including reserves and assets to offset risk, ease shocks and meet contingencies. Sustainable refers to the maintenance or enhancement of resource productivity on a long term basis. A house hold may be enabled to gain sustainable livelihood security in many ways through ownership of land, livestock, or trees; rights to grazing, fishing, hunting or gathering; through stable employment with adequate remuneration; or through varied repertoires activities.

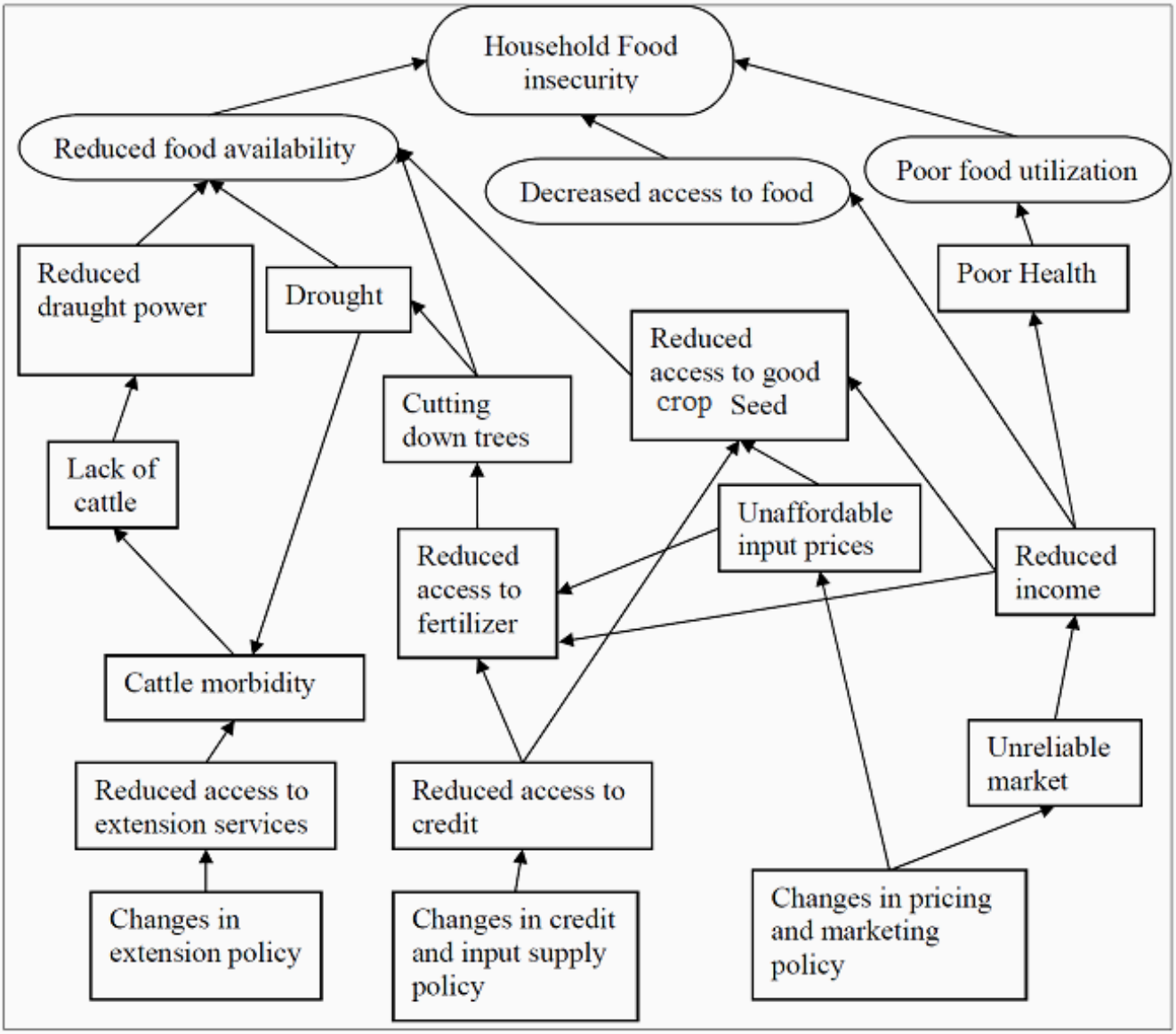

Figure 1.1: Causes of household food insecurity (Anderson *et al.*, 1994)

In most of the developing countries food insecurity which leads to famines is not for the reason of insufficient food rather to lack of access to food by poor people. For beating food insecurity, access to adequate and nutritious food is required. Access to productive resources, such as land is regarded crucial for attaining food security, through increasing access to sufficient food.

Due to increasing population, unjust market intervention, poor governance, medium and small farmers are losing their productive land and becoming landless gradually. Moreover, climate induced hazards, such as recurring floods, cyclones, river bank erosion are also contributing to the increasing landlessness. However due to landlessness and some associated factors, the small and marginal farmers in the rural areas are deprived from their access to food. Rural people lead to their insufficient purchasing power to buy adequate nutritious food for their families. The definition focuses on three distinct but inter-related elements, all three of which are essential to overcoming food insecurity:

- **Food availability**: having sufficient quantities of food from household production, other domestic output, commercial imports or food assistance. Food availability addresses the "supply side" of food security and is determined by the level of food production, stock levels and net trade (FAO and EC, 2008). Moreover, Food availability means the volume of food and its reliability. It is satisfied when there is sufficient food in the aggregate to provide the whole country with its required dietary energy supply. Thus food availability is determined by the food production or food supply on the basis of total production population of a country.

- **Food access**: having adequate resources to obtain appropriate foods for a nutritious diet, this depends on available income, distribution of income in the household and food prices. An adequate supply of food at the national or international level does not itself guarantee household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives (FAO and EC, 2008). Furthermore, Aggregate food availability does not assure food accessibility to every household because it depends on a household's capacity of food production. Basically, it includes accessibility to land or any other means of production or source of income.

- **Food utilization**: proper biological use of food, requiring a diet with sufficient energy and essential nutrients, potable water and adequate sanitation, as well as knowledge of food storage, processing, basic nutrition and child care and illness management. Utilization is commonly understood as the way the body makes the various nutrients in the food. Sufficient energy and nutrient intake by individuals is the result of good care and feeding practices, food preparation, diversity of the diet and intrahousehold distribution of food.

Thus food security is defined as availability, access, and utilization by all people at all times to enough food for an active, healthy life. Physical and economic access to food ensures an active and healthy life. Numerous studies have confirmed that there is a problem of food insecurity in Bangladesh with wide range of area to be covered and large number of people to be attended for different identified causes of food insecurity problem. Among these causal factors per capita land holding with increasing population growth, livestock availability, education, per capita income of the household from agricultural and non agriculture activities, soil fertility, under-funded agriculture are the major and commonly mentioned factors. This study will be taken to explore the link between rural people and access to food in rural Bangladesh. Finally the study will reveal the view of the rural farm families on substantive actions necessary to achieve their access to food.

Having this background in mind the study put forward the following research questions.

- What is the condition of food insecurity in rural households?
- What are the determinant factors for food insecurity in the rural families?
- What relations exist between food insecurity and the selected characteristics of the rural people?
- To what extent the problem associated with achieving household food security?

1.3 Specific objectives of the study

In order to give proper direction to the study the following specific objectives are formulated:

1. To assess the extent of the existing food insecurity among the rural households;
2. To describe following determinant factors of the respondents:
    I. Age
    II. Education
    III. Family size
    IV. Farm size
    V. Annual family income
    VI. Daily dietary needs of the family
    VII. Daily time allocation in farm works
    VIII. Credit received
    IX. Extension contact
    X. Knowledge on agriculture;
3. To explore relationships between the selected characteristics of the respondents and their food insecurity; and
4. To identify the problem associated with achieving household food security.

1.4 Justification of the study

Governments of developing countries are increasingly aware that they have major responsibilities for rural development. Rural people in Bangladesh are, in general, very poor, illiterate, and their livelihood depends on wage earnings and shifting cultivation (Uddin *et al.*, 2000). They receive the highest income from agriculture compared to other sources, but are constrained by limited cash and modern technology for higher agricultural production, which is a threat to the natural resources in the area (Farid and Mujibullah, 1990; Chowdhury *et al*., 2004). Livestock and poultry provide additional income. Their food basket contains mainly vegetables, fruits and the meat of animals. Understanding the consumption pattern, nutritional status, and household level food security of the rural households can provide evidence based information that can help the government to enrich formulation and implementation of appropriate policy measures to uplift the livelihoods of rural farm households. Food security and food insecurity are the terms used to describe whether or not all people at all time have physical and economic access to sufficient, safe and nutritious food for a healthy and active life (World Food Summit, 1996). Food security is multi-dimensional and its major components are: (a) availability of food, (b) access to food, (c) quality or nutritional adequacy of food, and (d) utilization of food. Bangladesh is at the cross-roads in its efforts to achieve food security for its people. Over the past 30 years or so, Bangladesh had made significant achievement in food grain production and food availability. The fact that national food availability is ensured does not guarantee equal regional availability and distribution of the food at the household and individual levels. Today, though people in Bangladesh are not dying of hunger, more people are becoming stunted with reduced mental and physical capacity. Food insecurity is one of the major public health problems in the country. Normal diet of Bangladeshi people is also seriously imbalanced; carbohydrates contribute nearly 74 percent to the total dietary energy and 57 percent by protein (BBS, 2003).

Bangladesh is said to be one of the poorest countries in the world. If the poverty line is taken as US$ 1, 29 percent of the populations are found to be income poor, and when poverty line is less than US$ 2, the percentage of the poor people becomes 78 (Ahmed and Ninno, 2004). People are affected by flood, river bank erosion and drought which create seasonal unemployment in the area. In Bangladesh rural households suffer from food insecurity for four months roughly from mid August to November. A study shows that people suffer a lot from poverty since mid October to mid November (Rahman and Khan, 2009). As during these months, there is seen a huge lack of agricultural work. So, poor people are often in vulnerable condition. Among the vulnerable people, members of the households that have no male earners suffer a lot.

As there is a great shortage in employment, unskilled women laborers do not get work or they have to sell their labor at a very cheap rate. Even, when governmental and non-governmental organizations provide relief, the amount is very little, and both political and gender powers matter to get that grant. As such, food security has been considered as a universal indicator of households and individuals personal well being. The consequences of hunger and malnutrition are adversely affecting the livelihood and well being of a massive number of people and inhibiting the development of many poor countries (Gebremedhin, 2000).

Based on the above situations, the present study has given much emphasis on focusing the issue of rural farm household food insecurity, especially in the poorer segment of the population like rural people who are actually subsistence farmers and forest dwellers, and vulnerable to various natural calamities. This is because under the burden of chronic poverty, this category of the population may use their natural environment in unsustainable ways, leading to further deterioration of their livelihood conditions. It is need to open new avenues for defeating food insecurity. Not enough systematic investigation on existing food insecurity faced by rural people has been under taken in the past either by private or government organizations to fulfill the needs of extension workers, researchers and the farmers. Therefore, the finding of the study are expected to be of great value of researchers, extension service provider, students and particularly planners in formulating and designing extension approach for maintaining the natural balance. It is also expected that the finding of the study will be particularly applicable to the rural poor people of South Sadar Upazila of Comilla District. The finding of the study will show a comprehensive picture as to how the rural people faces food insecurity and their management system.

1.5 Scope of the study

Food insecurity crises have been quite recurrent in rural area for decades yet no concrete measures have been taken to redress the problem. Partly less research has been conducted to get a better insight of the problem. Besides, much research in the past was limited to the climatic (natural) conditions prevailing in the rural area. However, to better understand and redress the issue, consideration has to be made of all the forces involved-social, economic, cultural and natural. Despite the impressive achievements in food grains production during the last three decades, food security at farm households and individual levels remains a major concern for the government. The lack of food or insufficient food intake can impart enormous consequences to individuals such as low faculty development, low productivity, poor health, morbidity and eventually mortality in both children and adults.

The production and availability of crop and non-crop foods to present a balanced diet and creating an environment for better utilization of land resources is a great challenge for Bangladesh. Aiming to food security cropping pattern as well as farming system has been changed by the farmers with the introduction of new technologies and better management. Therefore, understanding the interactions that exist between these forces that cause food insecurity and household coping strategies may help policymaking. Thus this research will act as a push to the government, the general public, donor organizations and other interested parties in the domain to intervene in one way or the other in seeking appropriate solutions to the problem. As indicated above, the country in general and the study area in particular have been facing food insecurity. Identifying and understanding factors that cause or influence the problem as well as its intensity at farm family level deserves rigorous empirical research where food shortage has been pronounced and has great importance for policy implications and interventions. The results of the study will provide policy related information that helps to prioritize among the many possibilities depending on the relative extent of influences of its determinants. More specifically, it will help concerned bodies in their effort to formulate policies and develop intervention mechanisms that are modified to the specific need of the study area. Furthermore, this study will attempt to make further contribution to the previous studies and can be used as a source material for further studies. Lastly, the researcher believed that the finding and recommendations of the study would be helpful in formulating extension programs for reducing risk of production, health and environment.

1.6 Limitations of the study

Considering the time and other necessary resources and also to make the study manageable and meaningful, it became essential to impose certain limitations as mention below:

1. The study was confined to a selected area *i.e.* Ward number 2 (Old Chawara union) of South Sadar upazila under the district of Comilla.
2. The study focused on food insecurity faced by the rural people.
3. There were many respondents in the study area but only selected numbers of respondents were considered for this study.
4. There were many characteristics of the rural people who face food insecurity but only ten characteristics of them were selected for the study.
5. The researcher depended on the information furnished by the respondents while interviewing.
6. All data and other information were collected with in short possible time.

1.7 Assumptions of the study

An assumption is the supposition that an apparent fact or principle is true in light of the available evidence (Goode and Hatt, 1952). The following assumptions were made by the researcher while undertaking the present study:

1. The subjects selected for the study were able to reply adequately to queries designed by the researcher.
2. The responses furnished by the respondents were valid and reliable.
3. Information given by the selected respondents was representative of the study area.
4. The researcher who acted as interviewer was well adjusted to the social and cultural environment of the study area.
5. The respondents include in the sample were competent proper responses to the items included in the interview schedule.
6. The data collected by the investigator were free from bias and prejudice.
7. The characteristics of the rural people as well as the indicator of the food insecurity were normally and independently distributed with their respective means and standard deviation.
8. The environment conditions of the rural people were more or less similar throughout the study area.
9. The findings of the study were expected to be helpful for planning and execution of various programs in connection with the rural food insecurity of the country.

1.8 Definition of the important terms

In order to avoid confusion and misunderstanding, certain terms used throughout the study are defined as follows:

Food insecurity

Food insecurity is “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (American Dietetics Association, 1998). Food insecurity refers to a lack of access to enough food. There are two kinds of food insecurity: chronic and transitory. Transitory food insecurity is a temporary decline in a household’s access to enough food. Chronic food insecurity is a continuously inadequate diet caused by the inability to acquire food.

Food security

Food security implies the fulfillment of essential food needs of the population of a country. This requires an increase in food production relative to the country's population; improvement in per capita food supplies; and controlled and stable food prices. It also implies access to enough food for an active and healthy life. At a minimum, food security includes readily available, nutritionally adequate and safe foods and the ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing or other coping strategies).

National food security

Food is available in market throughout the country from domestic production, commercial imports, or food assistance. National food insecurity includes lack of foreign exchange to import food, unsupportive policies, lack of capacity to store and transport food where and when it is needed, and others.

Household food security

All household members have affordable access at all times to the food they need for a healthy life. Household food insecurity include shortage of food in markets, isolation from markets, lack of capacity to produce food or earn income to purchase food, lack of a reliable source of potable water, sanitation, and inadequate health services.

Poverty

"Poverty is where people have unreasonably low living standards compared with others; cannot afford to buy necessities, such as a refrigerator for example; and experience real deprivation and hardship in everyday life" (McClelland and Newman, 2000). These people who lack food and shelter for minimal needs are said to be living in absolute poverty. However, poverty is also experienced in the developed world. This poverty is considered relative.

Hunger

Hunger is defined as "The uneasy or painful sensation caused by a lack of food. The recurrent and involuntary lack of access to food. Hunger, over time may produce malnutrition" (Hamilton and Swift, 1997). The uneasy or painful sensation caused by a recurrent or involuntary lack of food. Hunger is a potential, although not necessary, consequence of food insecurity. Over time, hunger can lead to malnutrition (Life Sciences Research Organization, 1990).

Nutrient

Nutrient is defined as a subsistence that is necessary for the functioning of living organisms such as carbohydrates, protein, fat, vitamins, minerals and water.

Recommended dietary allowance

RDA refers to the levels of intakes of energy and essential nutrients considered adequate to maintain health and provide reasonable levels of reserves in body tissues of nearly all healthy persons in the population. RDA for a family of five member proposed by Uddin (1986).

Constraints/Problems

Problems mean any difficult situation which requires some action to minimize the gap between "what is" and "what ought to be".

Agricultural knowledge

It refers to the extent of understanding of a respondent of rural people about different facts, information, causes and effects related to crop, livestock and fisheries.

Farming enterprises

Farming enterprises referred to the individual crops, livestock, fisheries and fruit items which are cultivated or produced by the small farmers.

Age

Age of a respondent was defined as the period of time in years from his/her birth to the time of interview.

Education

Refer to the completed years of schooling by the respondents at the time of interview.

Farm size

Farm size of a respondent refers to the area of homestead, cultivated land, fruit land, area of pond, area of poultry rearing, cattle husbandry and others land their family owned or obtained.

Family size

Family size was defined as the number of individual in the family including family head and other dependent members who lived and ate together.

Extension contact

It is referred to the respondents becoming accessible to the influence of different information media through different extension teaching methods.

Annual income

It was defined as the total earning of the respondent from agricultural, non agricultural and other sources during the previous year.

Daily dietary needs of family

The total calorie needed by all of the family members at the rate of 40 kcal per day per kg body weight.

Daily time allocation

It was used to indicate the distribution of daily time for specific works like farm work, house work, rest etc.

Assumption

An assumption is "the supposition that an apparent fact or principle is the true in light of the available evidence" (Good and Hatt, 1952).

Hypothesis

A research hypothesis is a predictive statement capable of being tested by scientific methods that related independent variables and dependent variables. As defined by Goode and Hatt (1952), "A hypothesis is a proposition which can be put to a test to determine its validity. It may seem contrary to or in accord with common sense. It may prove to be correct on incorrect. In any event, it leads to an empirical test".

Null hypothesis

A null hypothesis states that there is no relationship between the concerned variables. If a null hypothesis is rejected on the basis of a statistical test, it is assumed that there is a relationship between the concerned variables.

Variable

A general indication in statistical research characteristics that occur in a number of individuals, objects, groups etc. and that can take on various values for example the age of an individual.

Statistical test

A body of rules which help to take decision regarding acceptation or rejection of the hypothesis is defined as test. However, different descriptive and inferential statistics were included in this study. The SPSS + computer program of SAU were used to interpret data and perform the statistical analysis.

CHAPTER 2
REVIEW OF LITERATURE

The purpose of this chapter is to review the past studies and opinions of experts and social scientists having relevance to this investigation based on the major objectives of the study. Attempts have been made in this chapter to review that finding of past researches having relevance to the present study. But unfortunately, very few studies have been obtained which were directly related with food insecurity in general or which explain the factors that influence the food insecurity faced by the rural people in particular. The researcher, therefore, made exhaustive effort to review the previous research works directly or indirectly related to the present study by different researcher in home and abroad. However, many studies could be found on agricultural problem confrontation and food security research, the result of which were indirectly related to the present study, and also which focuses general behavior pattern of the farmers and their overall survive strategies. As certain fundamental and general observations on food insecurity are presented in first section to introduce some of the issues explaining the impact of food insecurity and the inherent causes for its consequence and trounce. Secondly, ten characteristics of the rural people were studied in the present study, review of research finding have been presented in ten sub-sections of another section, each dealing with findings that mostly reflect situations commonly encountered in livelihood research. At last conceptual model of the study is presented in the last sections of the study.

2.1 Concept of food insecurity

In 1974, the Food and Agriculture Organization (FAO, 1977) of the United Nations held the First World Conference on food security. During this conference it was agreed that everyone has the "undeniable right to be free from hunger and malnutrition for the development of their physical and mental faculties". In 1997, another World Food Summit of heads of states of FAO member countries was convened in Rome, Italy. The driving forces behind the convening of this conference were, first, to reaffirm their stand on the fact that each citizen has the "inalienable right to be free from hunger and malnutrition" and achieve food security for all. Second, by the fact that the number of hungry and undernourished people across the globe kept on increasing despite the commitments taken by the various heads of states to achieve food security for all (FAO, 1997). The prime objective of this plan was to reduce the number of hungry and undernourished people in the world from 800m to 400m by the year 2015 .For the past years, food insecurity has caused high morbidity and mortality of children as well as adults. The current figure for undernourished and hungry people in the world stands at 800m.

Food insecurity is “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (American Dietetics Association, 1998).

Food insecurity refers to a lack of access to enough food. There are two kinds of food insecurity: chronic and transitory. Transitory food insecurity is a temporary decline in a household’s access to enough food. Chronic food insecurity is a continuously inadequate diet caused by the inability to acquire food. It affects households that persistently lack the ability either to buy enough food or to produce their own. Hence, poverty is considered the root cause of chronic food insecurity. Famines are the worst form of transitory food insecurity. They can result from several causes: wars, floods, drought, crop failures, loss of purchasing power by groups of households, and market failures including sometimes high food prices and grain hoarding. All of these types of disruptions to food supplies can ‘trigger’ subsistence crises by threatening a population’s access to food. They are the immediate causes of famine. But these precipitating ‘triggers’ lead to famine only where particular groups of people are already vulnerable to it. The most vulnerable include: small-scale subsistence farmers, landless agricultural workers, other workers who are affected by a drop in real income in famine regions, female-headed households, children, and the elderly. Vulnerability is complex and usually implies processes rather than events.

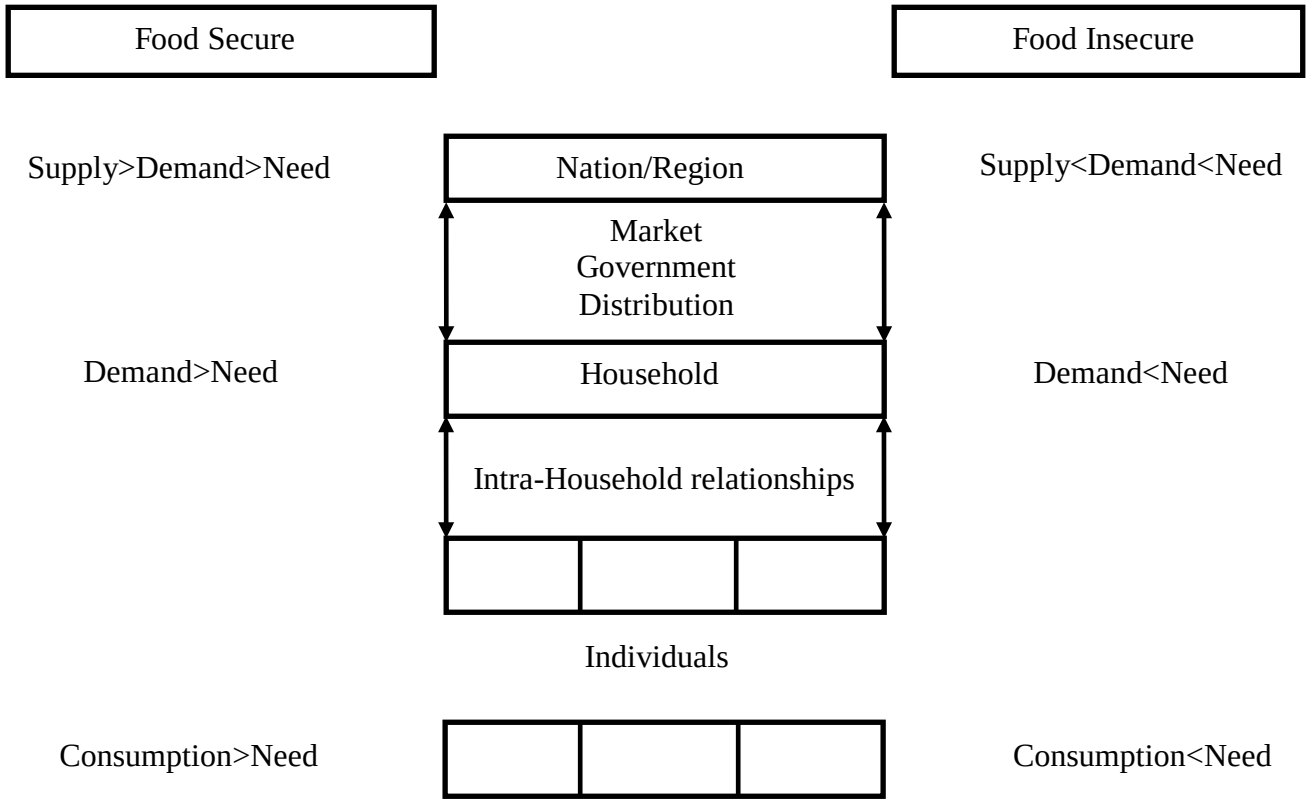

Figure 2.1: Different levels of food security and major analysis approach (Thomson *et al.*, 1997)

It is believed that people who frequently do not have enough to eat according to accepted cultural norms created a crisis. It was then expanded to include lack of secure provisions at the household and individual level. Food insecurity concern may be due to either inadequate physical availability of food supplies, poor access among the population, or inadequate utilization of food (Habicht *et al*., 2004). Chronic food insecurity troubles households that persistently lack the ability to either buy food or produce their own. Structural factors contributing to chronic food insecurity include poverty, the fragile natural resource base, weak institutions and unhelpful or inconsistent government policies. On the other hand, transitory food insecurity is a temporary decline in household access to food due to crop failure, seasonal scarcities, temporary illness or unemployment, instability in food prices, production, household income or combination of these factors. Finally, the cyclical type of food insecurity is caused by seasonality (Osmani, 2001). In general, a household can be said to be food secure only if it has protection against all kinds of insecurity. Feeling of deprivation is the result of not having access to food and food insecurity at the individual level. Whereas at the household level; it results in uncertainty in the acquisition of food and problems associated in managing adequate and nutritious food for the family. The landless farmers and their families suffer from acute food crisis, the impacts of which vary at individual and household level leading to food insecurity in various dimensions (Table 2.1).

Table 2.1: Dimensions of food insecurity of farmers

	Individual level	**Household level**
Quantitative	Inadequate intake	Depleted food supply
Qualitative	Nutritional insufficiency	Unsuitable food
Psychological	Lack of choice, feeling of deprivation	Insecurity about the adequacy and sustainable of food supply
Social	Disruptions in the usual eating pattern and departure from social norms	Problems associated with food supply management and acquisition

Source: Tarasuk, 2001

Food insecurity may be experienced at the household and individual levels. Household level food insecurity exists when household food stores are depleted, when the food available in the household is unsafe or of low quality, when there is anxiety about how long the food supplies will last, or when the household food is acquired in a socially unacceptable way, such as through charity, begging, or stealing. Individual level food insecurity exists when there is uncertain or limited ability to acquire, through conventional food sources, food which has adequate nutrients or which provides sufficient energy, or when an individual feels deprived or has restricted food choices. Food insecurity exists while one or more concerns are present.

2.2 Literature related to food insecurity

Andrews *et al*. (2000) stated that, at some time during the previous year they were uncertain of having, or unable to acquire, adequate food sufficient to meet basic needs at all times due to inadequate household resources for food.

Khadka (1990) found that food insecurity in South Asia is strongly linked with poverty and hunger. Therefore the eradication of poverty and hunger and the achievement of regional food security would enable the poorer section of the population to buy enough food through the generation of employment opportunities and the redistribution of income and assets.

Badiane (1988) stated that food insecurity, aside from an inability to consume the desired amount of food at the individual level, can also exist in the form of excessive costs incurred by the economy to ensure food availability.

Bryceson (1990) found that food insecurity, "the inadequacy of the quantity and quality of food consumption, as well as the irregularity over time," can lead to the contraction and ineffectiveness of the institutions that might serve as positive spurs to the enhancement of food production and distribution.

Cathie and Dick (1987) in their study found that food insecurity can be refined to consider both its long term and short term aspects. Long term food insecurity or chronic insecurity is defined in terms of the persistent existence of malnutrition and the associated lack of development and growth in low income developing economies or regions of those economies. The inability to attain food security in the short term, or transitory food insecurity, is defined as a temporary decline in a household's or region's or nation's access to food.

Chisholm and Tyers (1982) stated that food insecurity in this sense is ultimately a problem that stems from real income fluctuations that affect the ability of people to command adequate food through legal means.

Corbett (1988) found that food insecurity of many families in Africa is seen as problems in obtaining stable and adequate access to food. Such food insecurity varies from the recurrent and predictable food deficits to more severe entitlement failures, which arise from a mix of socio economic, environmental and political factors and which at their worst may lead to famine.

Economic Commission for Africa (1991) found that essential elements of food security include adequate levels of food production, stabilization of food supplies and guarantee of food availability for all. For the ECA, food insecurity in Africa is mainly due to low levels of production.

FAD (1991) stated that food insecurity is a situation in which the individuals of a society have neither the physical nor the economic access to the nourishment they need. In Some cases, there is not enough food at the time and location required to fulfill the needs of all members of the community, whether it be a nation, a region, a village or a household. This dimension constitutes the problem of the physical availability of food supplies. On the other hand, in order to provide physical access to food, it is necessary to have an efficient distribution system, including processing, storage, transportation and marketing to ensure the dispatch of food products within a specific country in the desired time.

Green and Kirkpatrick (1981) stated that food security problem has two principal dimensions: long term and short term. Problems of long term food insecurity are reflected in the increasing gap between the consumption needs and production capacities of the developing countries. Irrespective of the long-run trend in per capita food consumption, however, variability in per capita consumption is per se a significant cause of food security. Short-run insecurity in food supplies has two main sources: domestic food production and foreign exchange availability.

Green and Kirkpatrick (1982) found that aim to expand current concept of food insecurity beyond the long term trend of increasing food imports by developing countries, and short term insecurity caused by fluctuations in annual supply. Conventional estimates tend to suppose that insecurity can be identified with actual short-term variation in food consumption. In general, it is also believed that the principal source of food insecurity arises from variations in domestic food production. Their argument places greater weight on the manner in which a country responds to periodic shortfalls in food supplies. Food insecurity may be concealed by a country's willingness to sacrifice other imports to maintain consumption levels. In short, the relations between food production and consumption cannot be analyzed in isolation from the balance of payments position; it may be a misleading assumption to identify food insecurity with food consumption variability.

Hopkins (1986) found that Food insecurity arises at various systems levels; household, national and international and does so because of a unit's insufficient adaptive capacity. Households, the state, or the international system are unable to adjust patterns of food related activities with a minimum of financial cost or dietary loss. Ultimately, food insecurity is a national level problem. It occurs in countries that experience variations in production or inadequate production to meet consumption needs. In such situations, household level actions, at least in the short run, put pressures on national governments which in turn frequently turn to international markets, either for commercial or concessional food imports.

Jonsson and Toole (1991) identified adequate household food security as one of three conditions necessary for good nutrition. They argue that any assessment of the three conditions must include an investigation into the resources used to ensure their fulfillment. This permits food secure households to be differentiated by the share of total resources used to achieve food access. The higher the share the more vulnerable the household is to becoming food insecure.

Kennes (1990) stated that food security can most simply be defined as the absence of hunger and malnutrition. For this to be possible, households, villages or countries must have enough resources to produce or otherwise obtain food. This condition is necessary, but not sufficient because the resources must also be used well. It is useful to subdivide food insecurity problems into transitory and chronic. Transitory food insecurity refers to a temporary decline in household's food intake resulting from instability in food production, food prices or income. In its extreme form it can mean famine, a situation where a sizeable population group lacks the resources for even a minimum subsistence diet. Chronic food insecurity occurs when households on a more permanent basis lack the resources to acquire enough food for a healthy and active life, while they are not directly threatened by starvation. It is worthwhile to further subdivide chronic food insecurity into a lack of overall food quantity, normally measured in energy, i.e. calorie intake and insufficiencies at the level of particular nutrients. In most cases, the satisfaction of overall calorie needs implies that the needs for specific nutrients are covered as well. However, if the diet lacks variety, the intake of specific nutrients, such as iron, iodine and vitamins is often not guaranteed. This type of food insecurity does not necessarily result from lack of resources or income; it can be the consequence of a lack of information or nutritional knowledge.

Khadka (1991) found that food insecurity is defined as lack of access by members of society and nations to enough food throughout the year to live healthily. This is a situation caused either by inadequate food availability i.e. lack of adequate supply or by inadequate entitlements i.e. lack of effective demand, or both.

Life Sciences Research Organization, Federation of American Societies for Experimental Biology (1990) stated that, exists whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable food in socially acceptable ways is limited or uncertain.

Maxwell and Simon (1989) stated that the three dimensions of food security (poverty, vulnerability and malnutrition) can be depicted as overlapping circles. Transitory food security will be concentrated in the overlap between poverty and vulnerability, whereas chronic food insecurity will be concentrated in the area of overlap between the three.

Maxwell *et al.* (1990) suggested that they lay insufficient emphasis on subjective perceptions of food insecurity. In addition, they find a unidimensional distinction between chronic and transitory food insecurity inadequate, since it deals only with the periodicity or incidence of food insecurity. Another dimension has to be introduced to describe the intensity or severity of episodes of food insecurity. A simple classification of none, mild and severe is used to illustrate the point.

Mellor (1987) found that identifies chronic long term food insecurity as a problem of aggregate food supply, and short term transitory food insecurity as the result of fluctuations in annual food supply.

Mellor (1988) stated that food insecurity is the inability of poor countries, poor families and poor individuals to purchase sufficient quantities of food from existing supplies. Improving food security requires both increasing the purchasing power of the poor and boosting overall food production. Developing countries can develop a two-pronged strategy to promote food security. In the long run, efforts must be made to increase the purchasing power of the poor by raising the overall level of food production in the Third World. Increased food supplies and purchasing power must be inextricably linked to elements of any long-term food security efforts. In the short run, redistributing food supplies from the developed to the developing world is likely to be the best way to meet the more immediate food security needs of the poor.

Mellor (1990) stated that in the late 1980s, food insecurity was defined as "the inability of poor countries, poor families and poor individuals to purchase sufficient quantities of food from existing supplies." The present food security situation is recognized as being much more complex and linked to acute structural imbalances. The promotion of food security requires: i) increasing the purchasing power of the poor, and ii) raising the overall level of food production in the Third World. In the developing world, agricultural production must be stimulated through cost decreasing technological change. Food transfers from the structurally food deficient nations must be achieved through mechanisms which boost the purchasing power of the poor, while also increasing the incentives to raise agricultural and food production over the long run.

Mlambo (1988) found that food security has a chronic as well as transitory dimension. Chronic food insecurity is a problem which affects households that chronically lack sufficient purchasing power. Transitory food insecurity on the other hand, is a problem that concerns fluctuations in household income food consumption and the unavailability of food at national as well as village level.

Phillips (1991) stated that there are a number of commonly recognized features of food security. One, food insecurity is a problem ultimately faced by individuals, although food security is commonly defined in terms of household or nation. Two, household and national level food insecurity is generally seen as result of lack of actual food supplies or lack of access to acquire food supplies. Three, it is commonly agreed that incidence of food insecurity differ in both frequency and intensity. The frequency of food insecurity is often defined as transitory, chronic or seasonal in nature. The intensity of food insecurity is often defined as a lack of overall food quantity or insufficiencies of particular nutrients. Food insecurity is recognized as a result of man-made and natural phenomenon and is increasingly being recognized as a dynamic concept that affects all segments of the population equally.

Phillips and Taylor (1990) stated that a state of food insecurity exists when members of a household have an inadequate diet, during part or all of the year, or face the possibility of having an inadequate diet in the future. States of food insecurity may be defined in terms of types of food insecurity (e.g. temporary, cyclical, chronic), levels of food insecurity (e.g. dietary intake as a percentage of an acceptable standard), or a combination of both. Food insecurity results from an unfavorable balance between risk and insurance.

Reardon and Matlon (1989) found that food insecurity in a farm household as the consumption of less than 80 percent of what the World Health Organization (WHO) considers to be an average required daily caloric intake of 2,850 kilocalories (Kcals) for a moderately active adult equivalent. This then includes households that consume less than 2,280 Kcals per adult equivalent (AE) per day. We define a household to have chronic food insecurity when consumption during two or more seasons is inadequate, particularly if consumption is deficient during the cropping season. Households that are chronically food insecure constitute the highest-risk group and for policy purposes might be considered a primary target group for aid.

Reutlinger (1977) stated that the probability of food grain consumption in developing countries falling below a desired level due to a fixed upper limit on the food import bill they can afford and an unfavorable combination of poor harvests and world food grain prices.

Reutlinger (1987) stated that food insecurity is the lack of access to sufficient food and can be either chronic or transitory. Chronic food insecurity is a continuously inadequate diet resulting from the lack of resources to produce or acquire food. Transitory food insecurity, however, is a temporary decline in a household's access to enough food. It results from instability in food production and prices or in household incomes. The worst form of transitory food insecurity is famine.

Rukuni and Bernsten (1988) stated that food insecurity has both short run and long run dimensions. Short run food insecurity results from intra and inter-seasonal shortfalls in food supplies and effective demand for food. Long run food insecurity arises from a persistent failure of the economy to assure stable, long term growth in food supplies especially for nutritionally at risk groups as population increases and consumer demands change as a consequence of income growth and urbanization.

Swift and Gray (1989) found that an analysis is made of food insecurity according to three inter-relating components: production, exchange and assets, emphasizing the recent recognition of the role of assets in determining food security. A distinction is drawn between "chronic" and "acute" food insecurity.

Taylor (1991) stated that food insecurity is a state that exists when members of a household have an inadequate diet, during part or all of the year, or face the possibility of having an inadequate diet in the future.

Tullis and Hollist (1986) stated that food insecurity is domestic and international vulnerability to shifts in food and agricultural production and exchange practices; the insecurity that could result from international food shortfall or boycott. Some governments found that "cheap food" seemed less desirable than secure food and the political tranquility that such security implied.

United Nations (1990) stated that the distinction between chronic and transitory states of food insecurity is necessary to keep in mind. The latter may be triggered by seasonal fluctuations in food availability, food prices or incomes, which themselves may result in seasonal fluctuations in individual nutritional status. While not as serious as chronic food insecurity, it is nevertheless important, particularly as it may precipitate the chronic condition.

Valdes and Konandreas (1981) found that food insecurity in developing countries is the uncertain ability to finance needed imports to meet immediate targets for consumption levels. There are two main causes of food insecurity: shortfalls in domestic production and sudden fluctuations in the prices of food imports and national food or non food exports.

World Bank (1986) stated that there are two kinds of food insecurity: chronic and transitory. Chronic food insecurity is a continuously inadequate diet caused by the inability to acquire food. It affects households that persistently lack the ability either to buy enough food or to produce their own. Transitory food insecurity is a temporary decline in a household's access to enough food. It results from instability in food prices, food production, or household incomes and in its worst form it produces famine.

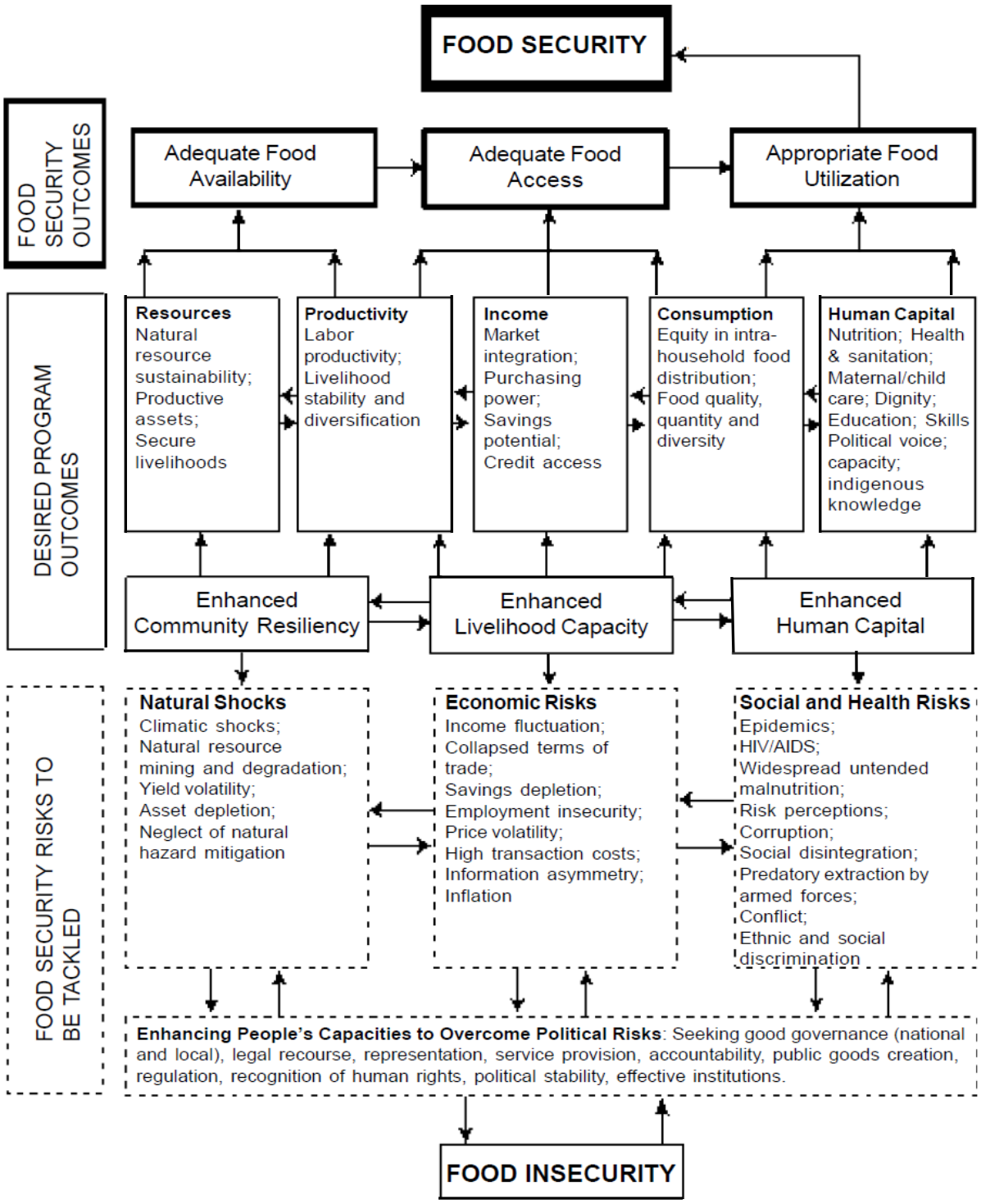

Figure 2.2: A diagram for understanding food insecurity (Patrick and Beatrice, 2003)

2.3 Potential consequences of food insecurity

Food insecurity is considered to be a characteristic of an individual's diet. It is, therefore, a core indicator of nutritional state rather than just a risk factor for a poor diet. The potential consequences of food insecurity are poor health status and poor quality of life. Food insecurity may affect health and quality of life outcomes directly or indirectly. In the latter case, for example, food insecurity can lead to physiological symptoms of suboptimal nutritional status. Food insecurity, however, does not necessarily result in malnutrition or under nutrition.

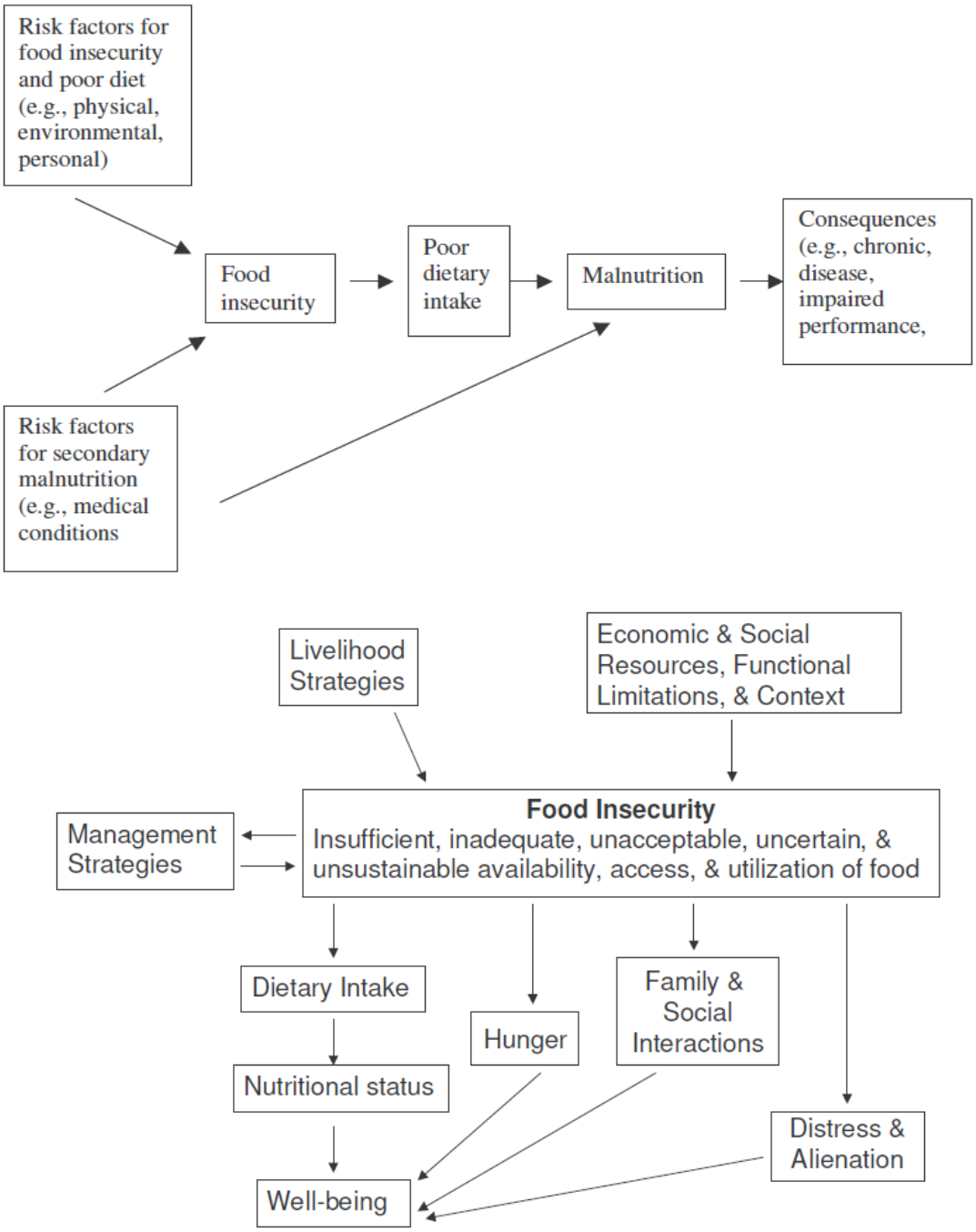

Figure 2.3: Potential consequences of food insecurity (Jorgensen and Domelen, 1999)

An individual, for example, may not have access to nutritionally adequate and personally acceptable foods through conventional food sources such as grocery stores, but may still satisfy his or her energy and nutrient requirements by relying on other food sources that are less socially acceptable such as food banks. Negative health and quality of life outcomes may result from food insecurity even if clinical signs of malnutrition are not present or evident. Individuals experiencing food insecurity, however, are likely to have a higher risk of sub-optimal energy and nutrient intake if they are unable to acquire adequate nutrients and food which provides sufficient energy.

2.4 Literature related to relationship between selected characteristics of the rural people and food insecurity faced by them

2.4.1 Age

Alam *et al.* (2008) in their study entitled "Involvement of farmers in BAUEC adult education activities in the Sadar upazila of Mymensingh district" showed that the age has significant relationship with their adult education.

Basak (1997) in his study entitled "Impact of BRAC Rural Development Activities as Perceived by the Participating Women" showed that the age of the rural women under BRAC had no significant relationship with their impact of involvement in BRAC Rural Development activities.

Bhuiyan (2002) in his study found a positive and significant relationship between age of the farmers and their constraint in banana cultivation. Similar finding were obtained by Haque (1995) and Rahman (1996) in their respective study.

Hossain (1985) in a study on landless laborers in Bhabakhali union of Mymensingh district found that there was no relationship between age of the landless laborers and their problem confrontation. Similar findings were obtained by Rahman (1995), Ali (1999), Rashid (1999), Pramanik (2001), Salam (2003) and Halim (2003) in their respective studies.

Hossain (1990) found that age did not show and significant relationship with production of crop.

Islam (1996) conducted a study on farmers' use of indigenous technical knowledge (ITK) in the context of sustainable agricultural development. He found that age of the farmers had significant negative relationship with their extent or use of ITK.

Mansur (1989) found that age of the farmers had no significant relationship with the feeds and feeding problem confrontation.

Rashid (2003) found that age of the rural youth had significant negative relationship with problem confrontation in selected agricultural production activities.

Roy (1997) studied on the factors associated with the extent of adoption of integrated pest management practices by the Boro rice growers in Sadar thana of Magura district and found that age and farm size could not keep significant impact on the adoption of IPM practices.

Sarkar (1996) observed that there was no significant relationship between age and adoption of improved potato cultivation practices. Karim and Mahboob (1986), Singh (1990) and many others observed similar findings.

2.4.2 Education

Alam (1997) observed that the level of education of the farmer had a positive and significant relationship with the use of improved farm practices.

Alam *et al.* (2008) in their study entitled "Involvement of farmers in BAUEC adult education activities in the Sadar upazila of Mymensingh district" showed that the education has negative relationship with their adult education.

ESCAP (1997) stated that small farmers deal with agricultural production and natural resources management with poor or no education, within a global context that is marked by changing techniques and technologies including those relevant to sustainable agriculture and information.

Haque (1995) in his study on problem confrontation by farmers of Mohila Bittaheen Samabaya Samittee working under the Bangladesh Rural Development Board found a significant negative relationship between education of members and their problem confrontation. Similar finding were obtained by Mansur (1989), Rahman (1995), Rahman (1996), Faroque (1997), Ahmed (2002), Hossain (2002), Bhuiyan (2002) and Salam (2003) in their respective studies.

Hasan (2005) in his study found that there was no relationship between education of the farmers and their problem confrontation in crop production activities.

Hoque (2001) in his study entitled "Environmental awareness and problem confrontation of the FFS farmers in practicing IPM" showed that the literacy has significant negative relationship with their problem confrontation in practicing IPM.

Rahman (1986) in his study found that education had significant and positive relationship with the adoption of improved farm practices.

Sarker (1997) found that the level of education of the farmers had a positive and significant relationship with the adoption of improved potato cultivation practices.

Ullah (1995) found a positive and significant relationship between family education and group members' effectiveness in respect of adoption of livestock and green revolution technology.

2.4.3 Family size

Alam (2007) in his study entitled "Impact of Food Security Project on Crop Production" showed that the family size of the rural people had no significant relationship with their crop production after involvement with food security project.

Alam *et al.* (2008) in their study entitled "Involvement of farmers in BAUEC adult education activities in the Sadar upazila of Mymensingh district" showed that the family size has positive significant relationship with their adult education.

Begum (1998) found that family size had no significant relationship with their poverty alleviation owing to involvement in ASA activities.

Bhuiyan (2006) found that family size had no significant relationship with their effectiveness of result demonstration in adoption of BRRI Dhan 28/29.

Hoque (2001) in his study entitled "Environmental awareness and problem confrontation of the FFS farmers in practicing IPM" showed that the family size has insignificant relationship with their problem confrontation in practicing IPM.

Kobir (2007) in his study entitled "Contribution of farming enterprises of the small farmers towards household food security" showed that the family size of the small farmers had strong negatively significant relationship with their farming enterprises towards the household food security.

Mannan and Miah (2007) in their study entitled "Present status of fruit cultivation and problems confronted by the farmers at Dighullia upazila of Khulna district" showed that the family size has negative trend of relationship with their problem confrontation.

Mondal (2000) in her study entitled "Women in rice post harvest activities and the training needs in Kaliganj upazila of Lalmonirhat district under RDRS" showed that the family size has positive trend of relationship with post harvest activities and the training.

Rahman (2007) in his study entitled "Food Security through Homestead Vegetable Production in the Smallholder Agricultural Improvement Project Area" showed that the family size of the rural farmers had no significant relationship with their average per day per family vegetable consumption.

Saha (2001) found that family size had no significant relationship with their Knowledge of pineapple cultivation.

2.4.4 Farm size

Aktar (2000) found that there was a positive and significant relationship between the farm size of the rural poor and their decision making role in the family with regard to development activities.

Alam (1997) studied the use of improved farm practices in rice cultivation by the farmers. The findings of the study showed that the farm size had a significant relationship with their use of improved farm practices in rice cultivation.

David *et al.* (2000*)* concluded that work with smallholders, but accept that most innovation, investment and commercialization will come from only that (possibly very small) portion with more land and capital than the average. Some claim that these farmers will then create enough jobs locally, through hiring labor and spending on local goods and services, to boost the welfare of other farm households.

Hasan (2005) in his study found that there was no relationship between farm size of the farmers and their problem confrontation in crop production activities.

Hoque (2001) in their study entitled "Environmental awareness and problem confrontation of the FFS farmers in practicing IPM" showed that the farm size has significant relationship with their problem confrontation in practicing IPM.

Karmakar (2004) observed statistically insignificant relationship between farm size and their constraints in adopting aquaculture technologies.

Mannan and Miah (2007) in their study entitled "Present status of fruit cultivation and problems confronted by the farmers at Dighullia upazila of Khulna district" showed that the land size has negative trend of relationship with their problem confrontation.

Muttalab (1995) in his study observed that farm size of the farmers had a positive relationship with the adoption of improved potato farmers and showed positive and significant effect.

Rahman (1995) found that farm size of the farmers had a significant negative relationship with their problem confrontation in cotton cultivation. Similar finding were obtained by Islam (1987), Mansur (1989), Rahman (1996), Faroque (1997) and Halim (2003) in their respective studies.

Rahman (1995) found that farm size of the farmers was negatively related with their constraints. Alam *et al.* (2000) found similar result in their study.

Sarker (2002) found that there was a positive and significant relationship between the farm size and their knowledge on BRRI dhan-29.

2.4.5 Annual family income

Braun (1995) highlighted the fact that cash crops contribute only a portion of household food security and household income. He also stated that diversification of farming enterprises reduces risk and maximize food security and household income.

FAO (1995) reported that the lack of adequate incomes and purchasing power of large parts of the population is expected to slow down world agricultural growth.

Hirschman (1958) found that changes in a small holder output mixes typically affect the overall level of rural employment and which ultimately affects the household food security.

Hossain (1999) found a positive significant relationship between family income and effectiveness of agricultural activities.

Hussen (2001) found that the annual income had positive significant relationship with their adoption of modern sugarcane cultivation practices.

Karim (1996) found in his study that annual family income of the farmers had a negative significant relationship on their problem confrontation in Kakrol cultivation.

Kobir (2007) in his study entitled "Contribution of farming enterprises of the small farmers towards household food security" showed that the family annual income of the small farmers had negatively significant relationship with their farming enterprises towards the household food security.

Mansur (1989) in his found that the relationship between income of the farmers and their problem confrontation in feeds and feeding cattle was significant but show a negative trend.

Quisumbing *et al.* (1995) cited that household food security depends on both the level of household income and who earns it.

Rahman (1995) found in his study that annual family income of the farmers had a significant negative effect on their problem confrontation in pineapple cultivation.

Rahman (2007) in his study entitled "Food Security through Homestead Vegetable Production in the Smallholder Agricultural Improvement Project Area" showed that the family annual income of the rural farmers had strongly positive significant relationship with their average per day per family vegetable consumption.

Saad (2000) stated that ability to emphasis on income from both farm production and nonfarm enterprises as an indispensable factor in determining economic access to food.

2.4.6 Daily dietary needs of the family

Blumberg *et al.* (1999) stated that the more severe levels of food insecurity at which child hunger is generally observed, and cannot, therefore, identify households where child hunger has been experienced and reported.

Dourojeanni (1978) showed that inhabitants consumed 135.6 g of fish per day (60%) out of a total animal meat consumption of 221.7 g a day per capita.

FAO (1997) reported that forests and farm trees contribute to the quality of rural people's diets indirectly, by providing a habitat for wild animals and fish, providing livestock fodder, a supply of medicines and fuel wood for food processing.

FAO/WHO (2003) reported that cereals largely rice are the main food of Bangladesh. Nearly two-thirds of the daily diet consists of rice, some vegetables, a little amount of pulse and a small quantity of fish, if and when available milk, milk product and meat are consumed only occasionally and in very small amount.

Hopkins (1986) stated that Households, the state, or the international system are unable to adjust patterns of food-related activities with a minimum of financial cost or dietary loss.

Jahan and Hossain (1998) found that traditional dietary habits often do not meet good nutritional requirement, with a preference for polished rice and leafy vegetables of poor nutritional quality. The author also found that cultural norms dictate a better diet for males over females with the male head of the household getting the best meal portion.

Jenny and Egal (2001) found that when people have insufficient food to meet their minimum energy and nutrient needs, they are not able to enjoy a normal and healthy life. Infants with low birth weight (less than 2.5 kg) caused, *inter alia*, by maternal development and poor pregnancy outcomes later in life.

Kennes (1990) found in his study that food insecurity does not necessarily result from lack of resources or income; it can be the consequence of a lack of information on nutritional knowledge.

Kobir (2007) in his study entitled "Contribution of farming enterprises of the small farmers towards household food security" showed that the daily dietary needs of the family had negatively significant relationship with their farming enterprises towards the household food security.

Phillips and Taylor (1990) stated A state of food insecurity exists when members of a household have an inadequate diet, during part or all of the year, or face the possibility of having an inadequate diet in the future.

Popkin and Bisgrave (1998) found that malnutrition exhibits spatial variation in low income countries. Urban children were found to have lower calorie, but higher protein consumption than rural children.

Smil (1994) found that individual requirements for children are made on the basis of their age and sex to yield "adult equivalent". Basic requirements to meet food needs range from 1,885 to 2,500 kilocalories.

Truscott (1986) stated that seeds and nuts generally provide calories, oil and protein to the diet. A state of food insecurity exists when members of a household have an inadequate diet for part or all of the year or face the possibility of an inadequate diet in the future.

US Agency for International Development (1992) found that food security is when all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and health life.

2.4.7 Daily time allocation in farm works

Calon (1990) found that Food security depends on the availability of cash which will enable a household to purchase staple food and basic factors of production such as land and farm activities and time allocation to market work was determined by individual, household, market and community constraints.

Dulayapach (1990) found that farm women's working hours in agricultural fields total 2,250 hours per year, while men contribute 2,250 hours a year in the field alone. Yet in seeking farm credit and information, farm women has less opportunity. The Table 2.1 showed that time allocation for north eastern farm women per day.

Table 2.2: Daily Time Allocation for Farm Women in North-East Thailand

Activities	**Hours**
Sleeping	8.2
Housework	3.5
Farm work	8.7
Resting	1.8
Social activities	1.8

Gittinger, Chernick, Hosenstein and Saiter (1999) stated that Food insecurity arises from variation in the amount of food provided by the work and wealth of the household. The level of food consumption can vary because of shock in work, in production or in assets.

Kobir (2007) in his study entitled "Contribution of farming enterprises of the small farmers towards household food security" showed that the daily time allocation in farm works by the family members had insignificant relationship with their farming enterprises towards the household food security.

Kumar and Hotchkiss (1988) demonstrated that with deforestation, women increased their time spent on collecting fuelwood and decreased their time spent on farm work. This result may, however, be biased as the variable representing deforestation, time spent collecting fuelwood, is endogenous.

Mondal (2000) in her study entitled "Women in rice post harvest activities and the training needs in Kaliganj upazila of Lalmonirhat district under RDRS" showed that the daily time allocation has positive trend of relationship with post harvest activities and the training.

World Bank (1989) found that efficient allocation of available food among household members and optimal physiological utilization by individual household members of nutrients contained in the food. These factors, in turn, have an impact on nutritional status and, hence, on the capacity of household members to work and so provide food.

2.4.8 Credit received

Ellis (2000) reasons that financial capital refers to savings, loans and credits whilst social capital take account of social relations and networks such as co-operatives and farmer associations. The rural households also lack the necessary assets or access to credit to assist them during the adversities.

FAO (1994) reported that the direct consequences of small farmers lack of access to land and membership in rural organizations is their lack of access to credit. Land is usually required as collateral for loans, on the one hand, and, on the other, credit schemes are often channeled through rural organizations to their members.

Khan (2006) in his study indicates that credit received has a great influence for socio-economic development of the beneficiaries. As there was an existence of small to medium credit received was the higher proportion of the respondents there is a scope to increase income.

Kobir (2007) in his study entitled "Contribution of farming enterprises of the small farmers towards household food security" showed that the credit received by the farmers had insignificant relationship with their farming enterprises towards the household food security.

Mondal (2000) in her study entitled "Women in rice post harvest activities and the training needs in Kaliganj upazila of Lalmonirhat district under RDRS" showed that the credit received has negative trend of relationship with post harvest activities and the training.

Rahman (1996) found that credit availability had a positive role in the participation of women in income earning activities.

Sarkar (2002) stated that women with more credit had more income than those with less credit. Credits received by some of the members were high because two or more persons joined the group from the same family in order to receive more credit.

Teller *et al.* (1991) stated that Availability and access are keys to household food security; viable procurement requires different types of access to assets, credit, non-farm income, social networks of shared food.

2.4.9 Extension contact

Alam (2007) in his study entitled "Impact of Food Security Project on Crop Production" showed that the extension contact of the rural people had strongly positive significant relationship with their crop production after involvement with food security project.

Ali (1978) found that contact and non contact farmers differed significantly in respect of their extension contact. He observed that extension contact of the contact and non contact farmers had significant contribution towards their agricultural knowledge.

Anon. (1994) presented an evaluation study of investment in pond development for piciculture under two island fisheries scheme supported by the Indian's National Bank for rural development. The study revealed that extension services were significantly related to encourage to adoption of a complete package of practices for fish culture.

Aurangozeb (2002) observed that there was significant relationship between contact with extension media and adoption of integrated homestead farming technologies.

Biswas (2003) reported that extension contact of the rural women had positive and significant relationship with their accessibility of family decision making.

Hasan (2005) in his study found that there was no relationship between extension contact of the farmers and their problem confrontation in crop production activities.

Kobir (2007) in his study entitled "Contribution of farming enterprises of the small farmers towards household food security" showed that the exposure of farming information of the family members had insignificant relationship with their farming enterprises towards the household food security.

Rahman (1995) in his study conducted that extension contact of the farmer had significant negative relationship with their problem confrontation. Similar findings were obtained by Rahman (1996), Faroque (1997), Pramanik (2001), Hossain (2002), Bhuiyan (2002), Ahmed (2002), Salam (2003) and Halim (2003) their respective studies.

Rahman (1995) studied farmers' knowledge on improved practices on potato cultivation by the farmers of Kajipur thana of Sirajgong district. The study indicated a significant relationship between extension contact and knowledge of improved practices on potato cultivation.

Rahman (2007) in his study entitled "Food Security through Homestead Vegetable Production in the Smallholder Agricultural Improvement Project Area" showed that the extension contact of the rural farmers had insignificant relationship with their average per day per family vegetable consumption.

Rahman (2008) in his study entitled "Agricultural problem confrontation by charland farmers of Jamuna River" showed that the extension contact of the farmers had negative significant relationship with their problem confrontation.

Suryanarayana *et al.* (1990) observed that extension media contact had a positive significant relationship with the effectiveness of contact farmers in influencing adoption behavior of other farmers.

2.4.10 Knowledge on agriculture

Alam *et al.* (2008) in their study entitled "Involvement of farmers in BAUEC adult education activities in the Sadar upazila of Mymensingh district" showed that the knowledge on agriculture has negative significant relationship with their adult education.

Ali (1999) revealed that knowledge of the rural youth had significant positive relationship with their anticipated problem confrontation in self employment by taking selected income generating activities.

Eicher and John (1990) stated that increasing attention has been paid to household food security because of the growing knowledge about food production will not ensure that all families will be able to secure their food needs.

Hoque (2001) in his study entitled "Environmental awareness and problem confrontation of the FFS farmers in practicing IPM" showed that the knowledge on agriculture has significant negative relationship with their problem confrontation in practicing IPM.

Mansur (1989) found in his study that there was a substantial significant negative relationship between knowledge in feeds and feeding cattles of the farmer and their problem confrontation in feeds and feeding. Similar finding were obtained by Sarker (1983), Rahman (1996), Hossain (2002) and Ahmad (2002) in their respective studies.

Mansur (1989) found in his study that there was a substantial significant negative relationship between knowledge in feeds and feeding cattle of the farmers and their problem confrontation in feed and feeding.

Raha (1989) in a study on poultry problem confrontation reported that the relationship between poultry knowledge and poultry problem confrontation was negative. He reported from his study that farmers' knowledge in irrigation of modern Boro rice had no significant relationship with their irrigation problem confrontation. Anwar (1994), Karim (1996), Ali (1999), Rashid (1975), Ismail (2001), Salam (2003) and Rashid (2003) found similar finding in their respective studies.

Rahman (2008) in his study entitled "Agricultural problem confrontation by charland farmers of Jamuna River" showed that the knowledge on agriculture of the farmers had negative significant relationship with their problem confrontation.

2.5 Conceptual framework of the study

It is evident from the past studies that every occurrence or phenomenon is the outcome of a number of variables, which may or may not be interdependent or interrelated with each other. In other words, no single variable can contribute wholly to a phenomenon. Variables together are the cause effect and thus, there is cause-effect relationship everywhere in the universe.

The conceptual framework of Rosenberg and Hovland (1960) was kept in mind while framing the structural arrangement for the dependent and independent variables of the study. The hypothesis of a research while constructed properly contains at least two important elements i.e. a dependent variable and independent variables. A dependent variable is that factor which appears, disappears or varies as the research introduces, removes or varies the independent variables (Townsend, 1953). Here, food insecurity faced by the rural people has been selected as dependent variable and the characteristics of the rural people were considered as the independent variables. It is not possible to deal with all characteristics in a single study. It was therefore, necessary to limit the characteristics, which include age, education, family size, farm size, annual family income, daily dietary needs of the family, daily time allocation in farm works, credit received, knowledge on agriculture and extension contact is independent variables. In view about discussion and prime findings of review of literature, the researcher constructed a conceptual framework of the study which is self explanatory and is presented in figure 2.4.

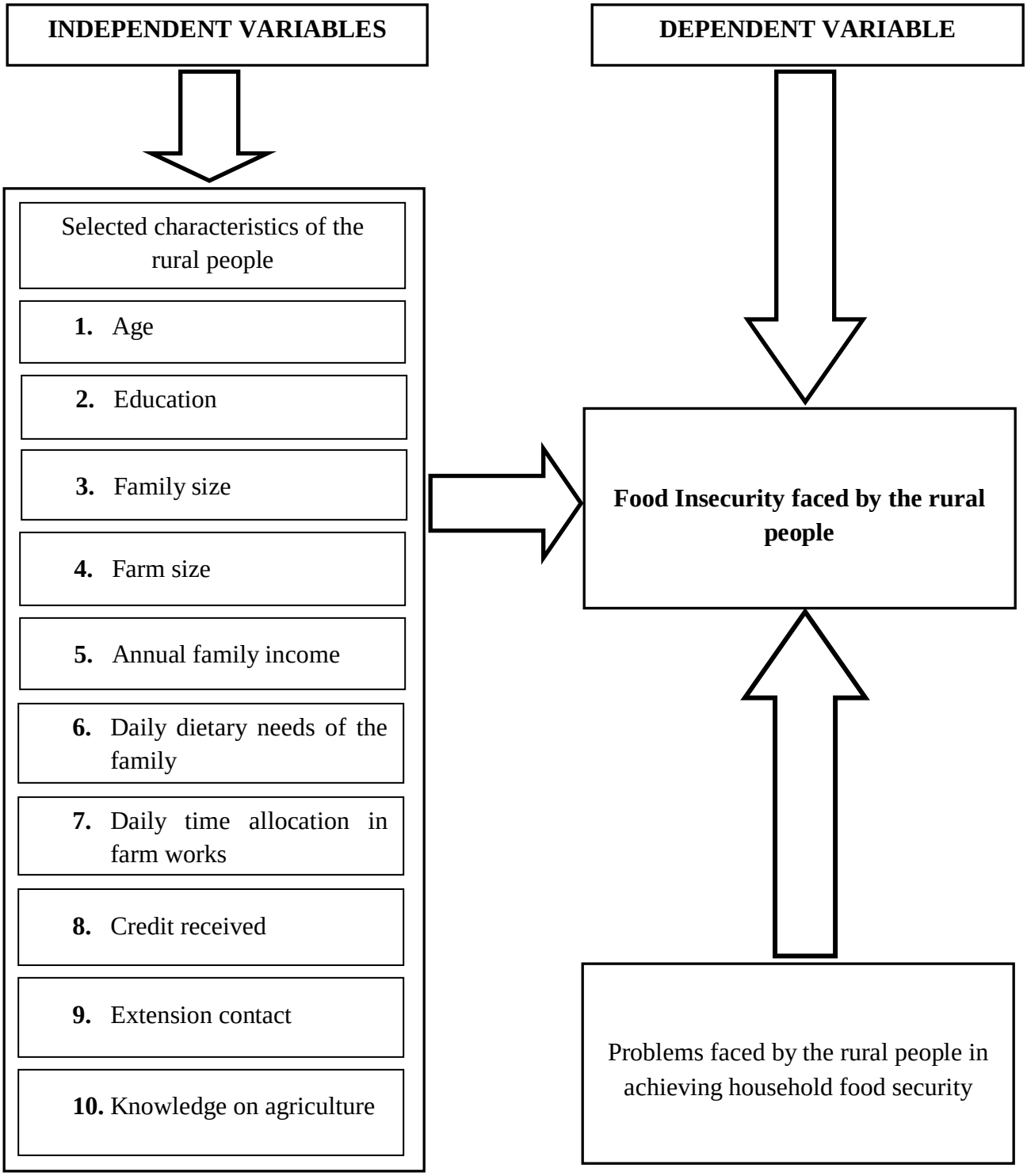

Figure 2.4: Conceptual Framework of the Study

CHAPTER 3

METHODOLOGY

Methodology plays an important role in a scientific research. So, to fulfill the objectives of the study, a researcher should be very careful in formulating methods and procedures in conducting the research. Methodological issues followed in conducting the study have been presented in this chapter. Those issues are the foundations on which the research process rests upon. The methods and operational procedures followed in conducting the study e.g. selection of study area, sampling procedures, instrumentation, categorization of variables, collection of data, measurement of the variables and statistical treatments. This chapter spells out the methods used and a chronological description of the methodology followed in conducting this research work has been presented in this chapter.

3.1 Research design

A research design is detailed plan of investigation. It is the blueprint of the detailed procedure of testing the hypothesis and analysis of the obtained data. The research design followed in this study was *ex-post facto*, because of uncontrollable and non-manipulating variables. This study is descriptive and diagnostic research design. A descriptive research design is used for fact findings with adequate interpretation. Diagnostic research design, on the other hand, is concerned with testing the hypothesis for specifying and interpreting the relationship of variables.

3.2 Locale of the study

South Sadar upazila of Comilla district was selected purposely as the locale of the study. The study area was located in Chowara union of South Sadar upazila situated in 10 kilometers to the south-east corner of Comilla district. Three villages namely, Dumuria, Lohipur and Dayapur of Chowara union under South Sadar upazila were selected randomly. Agriculture was the major occupation in the study area and the area has well accessibility through road and railways. This area has one main river Gumti went by the side of this upazila. The soil of this area is silty loam textured capable of producing three crops per year. Generally, flood water does not overflow this area. This area made the soil of this area fertile and suitable for paddy, jute, spices, sugarcane, turmeric, pulses and vegetables etc. However, South Sadar upazila consists of nine wards among which ward number two (Chowara union) has comparatively more number of farmers. Besides, local communication system in this union is satisfactory. Considering the above facts, time and budget, the present study was conducted in Chowara union.

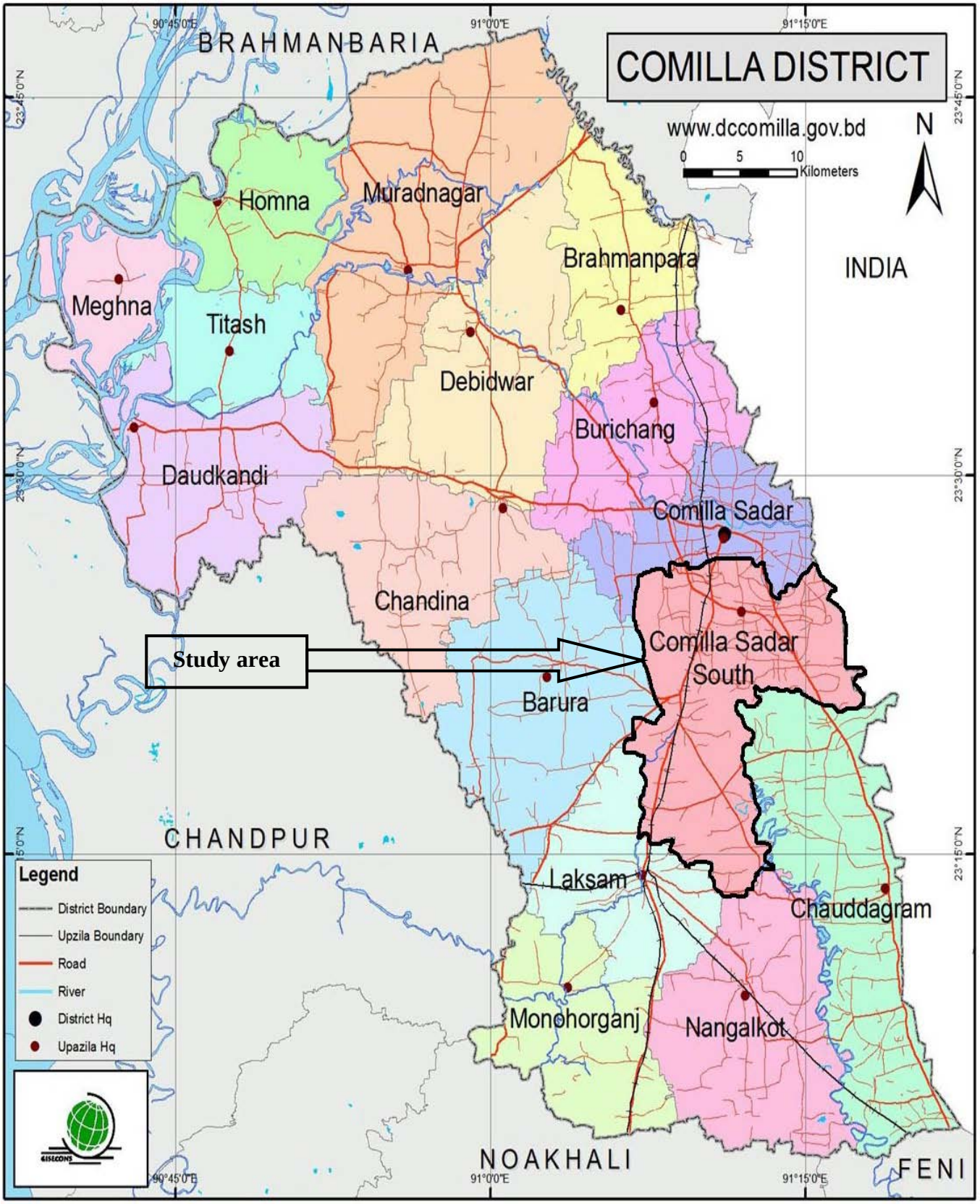

Figure 3.1: The map of Comilla district showing Sadar South upazila where study area highlighted

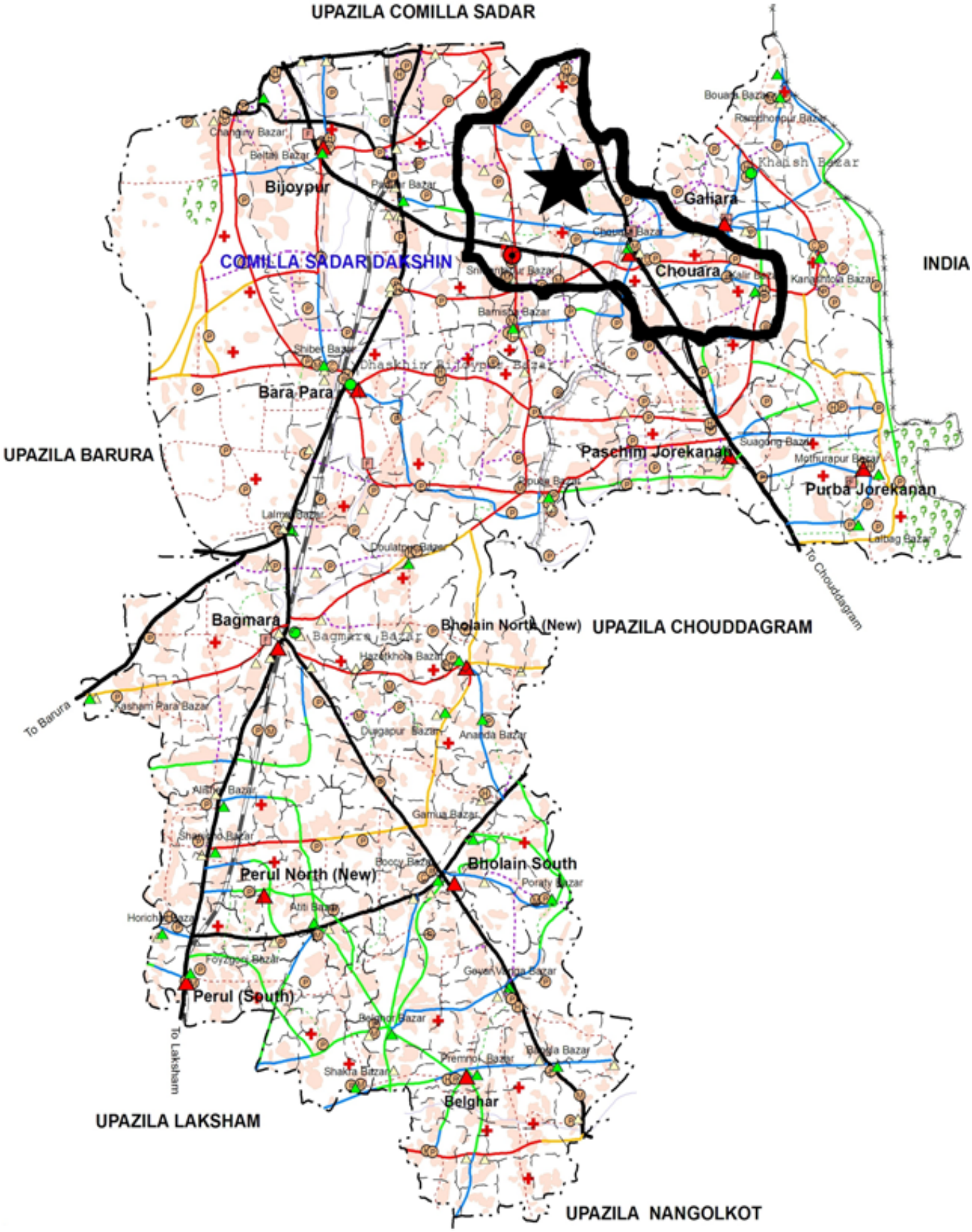

Figure 3.2: Map of Sadar South upazila showing study area (Chowara union)

3.3 Unit of analysis

The unit of analysis of the study was the people who faced food insecurity in rural area.

3.4 Population and sample

People who permanently reside in the selected villages constituted the active population of this study. As all population of the study area cannot measure, head of the farm families of Chowara union was the population of the present study. However, representative sample from the population were taken for collection of data following random sampling technique. The ward No. 2 consists of seven villages among which three villages namely Dumuria, Lohipur and Dayapur were randomly selected. One farmer (who mainly operated the farming activities of the family) from each of the farm families was considered as the respondent. An updated list of all farm family heads of the selected villages was prepared with the help of SAAO and local leader (Matobbor). The list comprised of a total 603 farm families in the study area. These rural families constituted the population of this study. Twenty percent of the farm families of these villages were randomly selected as representative sample by using a Table of Random Numbers (Kerlinger, 1973). Thus, 120 farm family head constituted the sample of the study. Further fifteen respondent farmers were selected randomly from the population except the sample included in the reserved list, which were interviewed when the respondent in the original sample list were not available at the time of interview. A detailed structure of population and sample has been presented in the Table 3.1.

Table 3.1: Distribution of population and sample of the selected villages

Village	**Population (Families)**	**Sample size**	**Reserved list**
Dumuria	201	41	5
Lohipur	164	33	4
Dayapur	238	46	6
Total	603	120	15

3.5 Variables and their measurement techniques

In a descriptive social research, selection and measurement of the variable is an important task. A variable is any characteristics which can assume varying or different values is successive individuals cases (Ezekiel and Fox, 1959). An organized research usually contains at least two identical elements i.e. Independent and dependent variable. An independent variable is the factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A dependent variable is the factor, which appears, disappears or varies as the experimenter introduces, removes or varies the independent variables (Townsend, 1953). According to the relevance of the research area, the researcher selected 10 characteristics of the respondents as the independent variables (e.g. age, education, family size, farm size, annual family income, daily dietary needs of the family, daily time allocation in farm works, credit received, knowledge on agriculture and extension contact). On the other hand food insecurity faced by the rural people was the only dependent variable. The following sections contain procedures of measurement of dependent and independent variables of the study.

3.5.1 Measurement of independent variables

The independent variables of the study were age, education, family size, farm size, annual family income, daily dietary needs of the family, daily time allocation in farm works, credit received, knowledge on agriculture and extension contact. The procedure followed in measuring the independent variables have been discussed in the subsequent sections.

3.5.1.1 Age

Age of the respondents was measured in terms of actual years from their birth to the time of interview, which was found on the basis of verbal response of the rural people (Azad, 2003). A score of one (1) was assigned for each year of one's age. This variable appears in item number one (1) in the interview schedule as presented in Appendix-1. Based on the available information cited by the respondents, they were classified into three categories.

Categories	Years
Young age	≤ 30
Middle age	31 to 50
Old age	51 and above

3.5.1.2 Education

Education was measured by assigning score against successful years of schooling by a respondent. One score was given for passing each level in an educational institution (Amin, 2004). For example if a respondent passed the final examination of class five or equivalent examination, his education score was given five (5). Each illiterate respondent was given a score of zero (0). A person not knowing reading or writing but being able to sign only was given a score of 0.5. This variable appears in item number two (2) in the interview schedule as presented in Appendix-1. Based on the available information cited by the respondents, they were classified into five categories.

Categories	Education (Year of schooling)
Illiterate	0
Can sign only	0.5
Primary education	1 to 5
Secondary education	6 to 10
Above secondary	> 10

3.5.1.3 Family size

The family size was measured by the total number of members in the family of a respondent. The family members included family head and other dependent members like husband/wife, brother and sister, parents, children etc. who lived and ate together. The total number of family members was considered as his family size score. If a respondent had five members in his/her family, his/her family size score was given as five (5) (Khan, 2004). This variable appears in item number three (3) in the interview schedule as presented in Appendix-1. Respondents were classified into three categories on the basis of their family size.

Categories	Family members
Small family	≤ 4
Medium family	5 to 6
Large Family	More than 6

3.5.1.4 Farm size

Farm size of a respondent referred to the total area of land on which his family carried out farming operation, the area being in terms of full benefit to the family. The term refers to the cultivated area either owned by the respondent or cultivated on share cropping, lease or taking from other including homestead area. It was measured in hectares for each respondent using the following formula (Khan, 2004):

$$FS = A + B + \frac{1}{2}(C + D) + E$$

Where, FS = Farm size

A = Homestead area including garden and pond

B = Own land under own cultivation

C = Land taken from others as borga

D = Land given to other as borga

E = Land taken from others on lease

The data was first recorded in terms of local measurement unit i.e. kani or decimal and then converted into hectare. The total area, thus, obtained is considered as his farm size score (assigning a score of one for each hectare of land). This variable appears in item number four (4) in the interview schedule as presented in Appendix-1. Based on their total farm size, the respondents were classified into five categories.

Categories	Area (hectare)
Landless	≤ 0.02
Marginal farmer	0.03 to 0.20
Small farmer	0.21 to 1.00
Medium farmer	1.01 to 2.50
Large farmer	More than 2.50

3.5.1.5 Annual family income

Annual income referred to the total financial return of a household from farm (Crops, livestock, poultry and fish) and nonfarm sources (business, job, remittance and others) in one year. It was expressed in Taka. In measuring this variable, total earning in Taka of a respondent was converted into score. A score of one was given for every 1000 Taka (Waheduzzaman, 2004). This variable appears in item number five (5) in the interview schedule as presented in Appendix-1. Based on their annual income, respondents were classified into following three categories.

Categories	Range (‘000’ Tk.)
Low income	Up to 50
Medium income	51 to 100
High income	Above 100

3.5.1.6 Daily dietary needs of the family

A daily dietary need of the family was measured on the basis of the body weight of the family members. It was assumed that forty (40) calories of energy needed per kilogram body weight per day (Kleiner, 2006). First of all body weights of the family members were approximated individually. Dietary needs of the family per day were then calculated from the total body weights of all the family members at the rate of forty calorie per day per kilogram body weight. Finally, one unit score was given for every thousand of kilocalories energy. This variable was selected in order to facilitate the determination of household food insecurity faced by the respondents of that area. This variable appears in item number six (6) in the interview schedule as presented in Appendix-1. Based on the available information cited by the respondents, they were classified into three categories.

Categories	Kilocalories ('000' Kcal)
Low dietary need	< 8
Medium dietary need	8 to 12
High dietary need	> 12

3.5.1.7 Daily time allocation in farm works

Daily time allocation referred to how much time is spent per day by the small farmers in farm activities and it was expressed in terms of hour per day. Besides, attempt was made to know the time allocation in nonfarm activities, like household work, social activities, rest, sleep and others (Dulayapach, 1990). This variable appears in item number seven (7) in the interview schedule as presented in Appendix-1. Based on the available information cited by the respondents, they were classified into three categories.

Categories	Hours per day
Low	≤ 4
Medium	5 to 7
High	> 7

3.5.1.8 Credit received

Credit received of a respondent was measured in terms of the amount of money received by his family members as loan from different sources. A score of one was given for each thousand Taka (Akter, 2003). This variable appears in item number eight (8) in the interview schedule as presented in Appendix-1. Respondent were classified into three categories on the basis of their credit received according to Kobir (2007).

Categories	Range (× 1000 Tk.)
Small credit received	≤ 20
Medium credit received	21 to 40
Large credit received	More than 40

3.5.1.9 Extension contact

It was defined as one's extent of exposure to different communication media related to farming activities. Extension media contact of a respondent was measured by computing extension media contact score on the basis of their nature of contact with eighteen extension media by taking seven individual, four group and seven mass media. Each respondent was asked to indicate his nature of contact with four alternative responses, like frequently, occasionally, rarely and not at all basis to each of the eighteen media and score of three, two, one and zero were assigned for those alternative responses, respectively (Hasan, 2006). These four options for each medium were defined specially to each medium considering the situation, rationality and result of pre-test. Logical frequencies were assigned for each of the four alternative nature of contact as follows:

Types of Media	Name of Information Media	Extent of Contact			
		Frequently (3)	Occasionally (2)	Rarely (1)	Not at all (0)
Personal Contact	Friends/relatives	5 or more times/week	3-4 times/week	1-2 times/week	0 time/week
	Extension agents (SAAO/FMO)	4 or more times/month	1-3 times/month	3 times/year	0 times/year
	Extension officials (AEO/AAO/UAO)	At least 1 time/month	At least 1 time/two month	1-4 times/year	0 times/year
	BADC officials/UFPO	At least 1 time/month	At least 1 time/two month	1-5 times/year	0 times/year
	NGO personnel/AHI/UMO	4 or more times/month	1-3 times/month	At least 1 time/year	0 times/year
	Input dealers	4 or more times/month	1-2 times/month	At least 1 time/year	0 times/year
	Model farmer	5 or more times/week	3-4 times/week	1-2 times/week	0 time/week
Group Contact	Demonstrations	2-3 times/year	1 time/year	1 time/life	0 time/life
	Field days	3 or more times/year	1-2 times/year	1 time/year	0 time/year
	Training days	5 or more times/year	2-3 times/year	1 time/year	0 time/year
	Group meetings	3 or more times/year	1-2 times/year	1 time/year	0 time/year

Types of Media	Name of Information Media	Extent of Contact			
		Frequently (3)	Occasionally (2)	Rarely (1)	Not at all (0)
Mass Contact	Radio	4-7 days/week	1-3 days/week	1-3 days/month	0 days/month
	Television	3-5 days/week	1-2 days/week	1-2 days/month	0 days/month
	Newspaper	5 or more times/week	3-4 times/week	1-2 times/week	0 time/week
	Leaf lets or booklet	5 or more times/year	3-4 times/year	1-2 times/year	0 time/year
	Reading agricultural books	4 or more times/year	2-3 times/year	1 times/year	0 time/year
	Agricultural fair	1 time/year	1 time/ 2 year	1 time/ 3 year	0 time/life
	Audio-visual aids	3 or more times/year	1-2 times/year	1 time/year	0 time/year

Extension media contact of the respondent was measured by adding the scores of eighteen selected extension media. Thus extension media contact score of a respondent could range from 0 to 54, where zero indicated no extension media contact and fifty four indicated highest level of extension media contact. This variable appears in item number nine (9) in the interview schedule as presented in Appendix-1. Respondent were classified into following three categories according to their contact with extension media.

Categories	Range
Low contact	Up to 18
Medium contact	19 to 36
High contact	Above 36

3.5.1.10 Knowledge on agriculture

Agricultural knowledge of a respondent was measured by asking him 26 questions related to different components of agriculture e.g. different crop varieties, livestock, fisheries, pests, pesticides, fertilizer etc. It was measured assigning weightage two (2) for each question (Rahman, 2008). So, the total assigned scores for all the questions became fifty two. The score was given according to response at the time of interview. Answering a question correctly an individual could obtain full score. While for wrong answer or no answer he obtained zero (0) score. Partial score was assigned for partially correct answer. Thus, the agricultural knowledge score of a respondent could range from zero (0) to fifty two (52), where zero indicates no knowledge and fifty two indicates highest knowledge. This variable appears in item number ten (10) in the interview schedule as presented in Appendix-1. Based on the available information cited by the respondents, they were classified into three categories.

Categories	Range
Low agricultural knowledge	Up to 20
Medium agricultural knowledge	21 to 36
High agricultural knowledge	Above 36

3.5.2 Measurement of dependent variable

As stated earlier, the dependent variable of this study was 'food insecurity faced by the rural people'. Household food insecurity expressed the economic, physical and social limited accessibility, unavailability and non sustainability of the dietary needs of the individual of rural families (FAO, 2002). Five point rating scale was used to determine food insecurity faced by the rural people. Food insecurity faced by the rural people was measured by asking their opinion on fifteen selected questions. For each question score of four (4), three (3), two (2), one (1) and zero (0) was assigned to indicate extent of food insecurity as 'Mostly', 'Often', 'Sometimes', 'Rarely' and 'Never', respectively (FANTA, 2005). These five options for each question were defined specially to each difficulty considering the situation, rationally and result of pre-test. For each of the question associated with household food insecurity was determined by summing-up the scores obtained by himself for the fifteen (15) concerned questions, while the overall food insecurity of a respondent was computed by adding together the score. The possible range of food insecurity score could be zero (0) to sixty (60), a total score of zero (0) indicated household food security strongly sustains while a score of sixty (60) indicated highest difficulties with household food insecurity. Weight was assigned for all food insecurity questions in the following manner:

Food insecurity condition	Weighting system
Mostly	4
Often	3
Sometimes	2
Rarely	1
Never	0

This variable appears in item number eleven (11) in the interview schedule as presented in Appendix-1. Respondent were classified into four categories on the basis of food insecurity they faced.

Categories	Range
Highly food insecure	≥ 46
Moderately food insecure	31 to 45
Low food insecure	15 to 30
Food secure	< 15

3.6 Measurement of problem confrontation

Problem faced by the rural people in achieving household food security were measured by asking their opinion on 14 selected problems. A Four point rating scale was used for computing the problem score of the respondent. Problem confrontation faced by the rural people in achieving household food security was measured by asking their opinion on fourteen selected problems. For each problem score of three (3), two (2), one (1) and zero (0) was assigned to indicate extent of problem as 'severe', 'medium', 'low' and 'not at all', respectively (Kobir, 2007). For each of the problem confrontation in achieving household food security was determined by summing-up scores obtained by respondent for the fourteen (14) concerned problems, while the overall problem confrontation of a respondent was computed by adding together the score. The possible range of food insecurity score could be zero (0) to forty two (42), a total score of zero (0) indicated no problems in respect of the achievement of household food security while a score of forty two (42) indicated highest difficulties with achieving household food security.

To ascertain the comparison among the problems of respondent, index for each item along with rank order Problem Facing Index (PFI) was computed using the following formula which was used by Afique (2006).

$$PFI = (P_h \times 3) + (P_m \times 2) + (P_l \times 1) + (P_n \times 0)$$

Where, PFI = Problem facing index

P_h = Number of respondents having severe problem

P_m = Number of respondents having medium problem

P_l = Number of respondents having low problem

P_n = Number of respondents having no problem at all

Problem Facing Index (PFI) related to difficulties with achieving household food security could range from 0 to 360, 0 indicating no problem and 360 very high problem with the particular problem. However, attempts were also made to seek out the suggestions from the respondents to overcome the problem identified. This variable appears in item number twelve (12) in the interview schedule as presented in Appendix-1. Respondent were classified into three categories on the basis of problem confrontation in achieving household food insecurity.

Categories	**Range**
Severe problem confrontation	More than 28
Medium problem confrontation	15 to 28
Low problem confrontation	≤14

3.7 Statement of the hypothesis

A research hypothesis is a predictive statement capable of being tested by scientific methods that related independent variables and dependent variables. As defined by Goode and Hatt (1952), "A hypothesis is a proposition which can be put to a test to determine its validity. It may seem contrary to or in accord with common sense. It may prove to be correct or incorrect. In any event, it leads to an empirical test". Each of the research hypotheses was converted into null form for the purpose of statistical test. A null hypothesis states that there is no relationship between the concerned variables. If a null hypothesis is rejected on the basis of a statistical test, it is assumed that there is a relationship between the concerned variables. In order to guide relevant data collection, analysis and interpretation of data, hypothesis was formulated. Hypothesis helps to explore the existing food insecurity among the rural households (dependent variable) and examine the relationships between the selected characteristics of the respondents (independent variable), while the selected characteristics include: age, education, family size, farm size, annual family income, daily dietary needs of the family, daily time allocation in farm works, credit received, knowledge on agriculture and extension contact. However, for statistical test, such null hypothesis was-

H_0: There is no relationship between the selected characteristics of the rural people and their household food insecurity.

3.8 Instrument for collection of data

In order to collect reliable and valid information from the respondents, an interview schedule was prepared for collection of data from respondents keeping the objectives of the study in mind. The schedule was prepared in Bangla for clear understanding of the respondents. The Bengali version of interview schedule was used to collect data. The question and statements contained in the schedule were simple, direct and easily understandable by the rural people. Simple and direct question, different scales, closed and open form statements and questions were included in the interview schedule to obtain necessary information. The draft interview schedule was prepared in accordance with the objective of the study. The interview schedule was pre-tested with 12 respondents of the rural people in the study area during 10 to 14 July, 2011. Appropriate scales were also developed to operationalize the reasons to questions.

The draft interview schedule was pretested in actual field situation before finalizing it for collection of data. The pre-test was helpful to identify inappropriate questions and statements in the draft schedule. Necessary addition, alternation and adjustments were made in the schedule on the basis of the experience of the pretest. The interview schedule was then cyclostyled in its final form for the collection of data. The interview schedule was then printed in its final form. An English version of the interview schedule has been shown in Appendix-1.

3.9 Data collection

Data were collected personally by the researcher himself through personal interview schedule from the sampled farm families of the selected villages. Before starting collection of data; the researcher met the respective Upazila Agriculture Officer (UAO), Agriculture Extension Officer (AEO), Upazila Food Program Officer (UFPO), Assistant Health Inspector (AHI) and the concerned SAAOs. The researchers also discussed the objectives of the present study with the respondents and above mentioned officers and request them to provide actual information. A rapport was established with the rural people so that they feel easy to answer the question. The researcher took all possible care to establish rapport with the respondents so that they would not feel any indecision while starting the interview. Very good cooperation was obtained from the field extension workers and the local leaders. No serious difficulty was faced by the researcher during the collection of data. The interviews were made individually in the houses of respondents. Questions were asked in different ways so that the respondents could easily understand the questions. Whenever a respondent faced difficulty in understanding any questions, care was taken to explain the same clearly with a view to enabling him to answer it properly.

Before going to the respondent's home for interviewing they were informed verbally to ensure their availability at home as per schedule date and time. In case of failure to collect information from the respondents due to their other business, revisit was made with prior to appointments. If any respondent failed to understand any question, the researcher took great care to explain the issue. If the respondents could not clear about what was wanted to know then supplementary questions were asked for further clarification. The researcher received full cooperation from the respondents during the time of interview. Data were collected during 02 August to 15 September, 2011.

3.10 Compilation of data

After completion of field survey data recorded in the interview schedules were coded, compiled, tabulated and analyzed in accordance with the objectives of the study. In this process, all the responses in the interview schedule were given numerical coded values. Local units were converted into standard units and qualitative data were converted into quantitative ones by means of suitable scoring whenever necessary. All the collected data were checked and cross checked before transplanting to the master sheets. To facilitate tabulation, the collected data were properly coded and transferred from interview schedule to a master sheet. Tabulation and cross tabulation was done on the basis of categorization developed by the researcher.

3.11 Categorization of the respondents

It was necessary to develop suitable categories to determine the food insecurity of the rural people in selected aspects. For the purpose, the respondents were classified into categories on the basis of obtained scores of food insecurity faced by them.

Categories were also developed for describing each of the selected characteristics of the rural people. Nature of the data and mode of the categorization prevailing on the social system guided the researcher in developing categories in respect of selected characteristics.

3.12 Statistical analysis

Data collected from the respondents were analyzed and interpreted in accordance with the objectives of the study. The analysis of data was performed using statistical treatment with SPSS (Statistical Package for Social Sciences) computer program. Statistical measures as number, range, mean, standard deviation and rank order were used in describing the variables whenever applicable. In order to explore the relationship between the food insecurity faced by the rural people and their selected characteristics, Pearson's Product Moment Correlation Co-efficient (r) was used (Ray and Mondal, 2004).

Throughout the study, five percent (0.05) level of significance was used as the basis for rejecting any null hypothesis. If the computed value of (r) was equal to or greater than the table value of (r) at the designated level of significance for the relevant degree of freedom, the null hypothesis was rejected and it was concluded that there was significant relationship between the concerned variable.

Whenever the computed value of (r) was found to be smaller than the tabulated value of (r) at the designated level of significance for the relevant degrees of freedom, the null hypothesis could not be rejected. Hence, it was concluded that there was no relationship between the concerned variables.

CHAPTER 4

RESULTS AND DISCUSSION

The findings of the study and their interpretation have been presented in this chapter. These are presented in four sections according to the objective of the study. The first section deals with the selected characteristics of the respondents, while the second section deals with the food insecurity faced by them. The third section deals with relationship between the selected characteristics of the respondent and food insecurity faced by them, while the fourth section deals with the problem confrontation associated with achieving household food security.

4.1 Socio-demographic profile of the respondent

Behavior of an individual is determined to a large extent by his personal characteristics. There were various characteristics of the rural people that might have consequence to face household food insecurity. But in this study, ten characteristics of them were selected as independent variables, which included their age, education, family size, farm size, annual family income, daily dietary needs of the family, daily time allocation in farm works, credit received, knowledge on agriculture and extension contact. The purpose of this section is to gain understanding on ten characteristics of the respondent. The salient features of the different characteristics of the respondents have been presented in table 4.1. These characteristics were discussed under the following sub-headings.

Table 4.1: Salient features of the selected characteristics of the sample rural people

Characteristics (measuring unit)	Range		Mean	SD
	Possible	Observed		
Age (year)	-	27-69	47.43	12.18
Education (years of schooling)	0-12	0-12	7.20	3.79
Family size (member)	-	3-9	5.8	1.49
Farm size (ha)	-	0.17-7.35	1.79	1.06
Annual family income (‘000’ Tk.)	-	49-155	88.29	22.55
Daily dietary needs of the family (‘000’ kcal)	-	5.4-18.4	10.95	2.78
Daily time allocation in farm work (hour per day)	-	3-9	6.87	1.37
Credit received (‘000’ Tk.)	-	0-50	18.63	15.31
Extension contact (Score)	0-54	5-42	26.07	10.48
Knowledge on agriculture (Score)	0-52	16-46	30.33	9.16

Note: SD = Standard Deviation

4.1.1 Age

Age of the respondents ranged from 27 to 69 years with a mean of 47.43 years and standard deviation of 12.18. However, based on their age the respondents were classified into three categories as young, middle-aged and old. Information contained in table 4.2 reveal that 46.66 percent of the respondents were middle-aged, 40 percent were old and the rest 13.33 percent were young.

Table 4.2: Distribution of the respondents according to their age

Category	No. of respondents	Percentage
Young age (≤30)	16	13.33
Middle-aged (31-50)	56	46.66
Old (>50)	48	40
Total	120	100

Age is one of the most imperative factors pertaining to one's livelihood. It should be mentioned here that less than half of the respondents were in middle-aged category. This seems logical because heads of the farm families were selected as respondent. With the increase in age they find few alternatives for livelihood except farming activities in parents' farm thus become committed in agricultural activities. It was observed in the study area that most of the young people did not get the authority of controlling the family rather the middle-aged people were as the family heads. This lead to understanding that household food insecurity would reflected more by the middle-aged group in the present study. Therefore, extension agencies should pay a clear attention to the middle-aged farmers for overcome the food insecurity.

4.1.2 Education

The level of education of the respondents ranged from 0 to 13, the average being 7.20 with a standard deviation of 3.79. According to national standard of classification, among the respondents, 2.5 percent were illiterate, 6.67 percent can sign only, 28.33 percent had education at primary level, 45 percent had education at secondary level and 17.5 percent had education above secondary level. Data presented in table 4.3 indicated that above half of the respondent (62.5%) of the study area secured at least secondary level of education.

Table 4.3: Distribution of the respondents according to their education

Category	No. of respondents	Percentage
Illiterate (0)	3	2.5
Can sign only (0.5)	8	6.67
Primary education (1-5)	34	28.33
Secondary education (6-10)	54	45
Above secondary (>10)	21	17.5
Total	120	100

It was interesting that, 90.83 percent of the respondents were literate. It was logical because education generally negatively correlated with food insecurity (Kobir, 2007), as study area prevail food secure condition. So, it can be concluded that in the study area the education of the people was relatively higher compared to typical rural area in Bangladesh because there are many educational institution in the study area and many educated people live in the study area. It is also very near the side of the town and communication facilities are good. Education is a desirable quality of an individual because, this determined communication behavior. More particularly, it allows one to have access to the print media. Education helps individual respondents to become conscious of their environment and develop rational insight into many matters of farming activities. Education broadens outlook of the people and leads them to explore new ideas to solve various problems. This study assumed that rural people having higher education were more progressive and innovative than those of illiterate and they could adopt numerous steps to secure their household food security. The DAE and other related NGO extension agencies can launch non-formal educational program related to agricultural extension activities and also innovative types of programs considering educational background of the rural people.

4.1.3 Family size

The number of family members of the respondents ranged from 3 to 9. The mean was 5.8 with the standard deviation 1.49. Based on the family size score, the respondents were classified into three categories according to Ali (2004). Computed data indicate that 20 percent of the respondents had small family size, 49.17 percent of them had medium family size and 30.83 percent had large family size. Findings reveal that about half of the rural farmers had medium family size (Table 4.4).

Table 4.4: Distribution of the respondents according to their family size

Category	No. of respondents	Percentage
Small family (≤4)	24	20
Medium family (5-6)	59	49.17
Large family (>6)	37	30.83
Total	120	100

Findings reveled that more than half of the respondents had small and medium family size. The average family size of Bangladesh is 5.6 (Anon., 2002) while average family size of the study area were little higher than the national figure shows a good sign of population control. It is a general trend in Bangladesh that family size of the people is being decreased day by day. The small sized family generally receptive to new idea or technology to meet up family need. The findings also indicate that small family can attain household food security more easily than the large families, as large families may act as a barrier to food and nutritional security for respondents' family.

4.1.4 Farm size

Farm size of the respondents ranged from 0.17 to 7.35 ha having an average of 1.79 ha and standard deviation 1.06. On the basis of the farm size of the respondents, they were classified into five categories as presented in table 4.5.

Table 4.5: Distribution of the respondents according to their farm size

Category	No. of respondents	Percentage
Landless (≤0.02 ha)	0	0
Marginal (0.03-0.20 ha)	2	1.67
Small (0.21-1.00 ha)	19	15.83
Medium (1.01-2.5 ha)	84	70
Large (> 2.5)	15	12.5
Total	120	100

Data presented in table 4.5 indicate that 70 percent of the respondents had medium farm size, while 15.83 had percent small farm, 12.5 percent large farm, 1.67 percent marginal farm and 0 percent landless farmers. Data also revealed that majority (82.5%) of the respondents' has large to medium farm size whereas 17.5 percent of the respondents were marginal and small farmers' categories. The farm size is highly associated with achieving household food security. It contributes to gross and net income. Most of the population of Bangladesh resides in the rural areas and large majority of them have small income from small operational land. Many of these young's do not get salaried jobs and come back to farming activities in rural area without sufficient skill and knowledge. This trend is pushing the young respondents to the hardship of achieving food sovereignty to the household level. Therefore government extension agencies and NGO' should pay attention to take steps for marginal and small farm holders on the priority basis. The extension agencies will not able to give them land but can easily train them up for modern agriculture by teaching them new agricultural technology suitable for rural farmers.

4.1.5 Annual family income

The observed ranged of the annual family income of the respondents varied from 49 to 155 thousand taka with a mean of 88.29 thousand taka and standard deviation of 22.55 (Table 4.1). On the basis of annual family income, the respondents were categorized into three classes namely low, medium and high income categories. The highest proportion of the respondents (77.5%) had medium annual family income while 19.17 and 3.33 percent of them had high and low annual family income, respectively. Findings reveal that the most (96.67%) of the respondents had medium to high annual family income indicating the present status of the rural people (Table 4.6).

Table 4.6: Distribution of the respondents according to their annual family income

Category	No. of respondents	Percentage
Low (≤50)	4	3.33
Medium (51-100)	93	77.5
High (>100)	23	19.17
Total	120	100

Almost in every handout and survey revealed that low income group of people mostly reside in rural areas. New avenues of income could not be provided for the rural people except agriculture sector. But for attaining food security developing new income avenues, traditional farming will be sufficient to raise income. They operate mainly subsistence type of enterprises in the farms, so their annual family income remains medium. High income might be due to the fact that the respondents of the study area were not engaged in agricultural work only, they earn from other sources such as services, business etc. because the study area is near to the town and also a smooth high way connection facilities with capital for higher income. Hence, farmer's extension program must include modern agricultural technology and provide credit facilities for low income group.

4.1.6 Daily dietary needs of the family

The level of daily dietary needs of the family of the respondents ranged from 5.4 to 18.4 thousands Kcal. The mean was 10.95 thousand kcal and standard deviation being 2.78 (Table 4.1). On the basis of daily dietary needs of the family, the respondents were categorized into three classes namely low, medium and high dietary needs respondents. According to the observed value of the daily dietary needs of the family among the rural respondent, majority (57.5%) needed medium amount of calories, 32.5 percent needed high amount and the rest 10 percent needed low amount of calories (Table 4.7).

Table 4.7: Distribution of the respondents according to their daily dietary needs of the family

Category	No. of respondents	Percentage
Low (<8)	12	10
Medium (8-12)	69	57.5
High (>12)	39	32.5
Total	120	100

Daily dietary needs of the family were measured based on the body weights of the family members of the respondents. The respondents having large family members needed comparatively higher amount of calories than that of the small family size. Dietary needs of the family are definitely affected by the age of the family members because body weight is increased up to a certain limit of age. In addition, dietary needs of the family are definitely affected by the daily time allocation in farm works because with the increase of work hour requirement of dietary needs will be rises in equivalently.

4.1.7 Daily time allocation in farm works

Daily time allocation in farm works by the respondents ranged from 3 to 9 hours per day. The average and standard deviation of the time spent in farm works were 6.87 and 1.37 hours per day, respectively (Table 4.1). On the basis of daily time allocation in farm works, the respondents were categorized into three classes' namely low, medium and high time allocation in farm works. The observed data showed that the most of the respondents (60%) spent five to seven hours a day in farm works, while 35 and 5 percent of them allocated high and short time for farm works, respectively (Table 4.8).

Table 4.8: Distribution of the respondents according to their daily time allocation in farm work

Category	**No. of respondents**	**Percentage**
Low (≤4)	6	5
Medium (5-7)	72	60
High (>7)	42	35
Total	120	100

The daily time allocation in farm work of an individual is a significant factor in many phases. It is one of the most vital factors to continuing one's livelihood. This lead to understanding that household food security would reflected more by the high time allocation in farm works in the present study. The finding also point out that high working hour can reach household food security more easily than the low working hour respondent, as low working hour may performs as a barrier to food and nutritional security for respondents family. The source of the family income and earning of the rural people was mainly their own farms. When they want to fulfill family requirement from their farming land they had to work hard for longer period in their farms. On an average 8.76 hours were spent in sleeping by the respondents, 6.87 hours in farm works. They get a short period of time (0.69 hours) in a day for different social activities.

Table 4.9: Average time allocation in farm and other works

Activities	**Average time allocation (hours per day)**
Farm work	6.87
House work	2.34
Social activities	0.69
Resting	2.13
Sleeping	8.76
Others	3.21
Total	24

4.1.8 Credit received

The score of credit received by the respondents ranged from 0 to 50 thousand taka with a mean of 18.63 thousand taka and standard deviation 15.31 (Table 4.1). On the basis of credit received, the respondents were categorized into three categories namely low, medium and high credit received group. Data furnished in the table 4.10 indicate that the highest proportion (60.83%) of the respondents had low credit received while 28.33 percent had medium credit received and rest 10.83 percent of them had high credit received (Table 4.10).

Table 4.10: Distribution of the respondents according to their credit received

Category	No. of respondents	Percentage
Low (≤20)	73	60.83
Medium (21-40)	34	28.33
High (>40)	13	10.83
Total	120	100

Rural people mainly get credit facilities from different non-government organizations like Grameen Bank, Bangladesh Rural Advancement Committee (BRAC), Association for Social Advancement (ASA), local NGO etc. which are engaged in micro credit programs. In the present study, it is found that most of the respondents had less affiliation with these organizations and this is why their amount of credit received was low. High standard deviation of the credit received score indicates that the scores of the credit received were highly fluctuated. Only 13 person received credit which is more than 45 thousand taka. This maximum value of the observed range accelerated the mean value as taka 18.63 thousand. In fact, most of the respondents got credit less than this mean value.

4.1.9 Extension contact

The observed score of extension contact of the respondents ranged from 5 to 42 percent against a possible range of 0 to 54. The average score of the respondents was 26.07 with a standard deviation 10.48 (Table 4.1). The respondents were classified into three categories on the basis of their exposure to farming information through communication exposure scores namely low, medium and high extension contact and distribution of the three categories of the farmers shows that the highest proportion (66.67%) of the respondents had medium extension contact as compared to 17.5 percent of them having less extension contact and 15.83 percent fell in high extension contact (Table 4.11).

Table 4.11: Distribution of the respondents according to their extension contact

Category	No. of respondents	Percentage
Less (≤18)	21	17.5
Medium (19-36)	80	66.67
High (>36)	19	15.83
Total	120	100

From this table, it might be concluded that majority of the respondents had medium extension contact. It could be concluded that extension agent or media of the study area were available to the respondents. The finding were interesting but logical because in general the farmers in the rural areas of Bangladesh are less cosmopolite in nature and less exposed to different information sources. Finding revealed that 17.5 percent of the respondents had low extension contact which demands for strengthening and improving the communication strategy. Low extension contact might be the reason that some respondent may think that they have enough knowledge about production technology. Extension contact pertains to ones contact with multifarious sources of farming knowledge and information. This results in cognitive change of the users with an eventual change in behavior and also in skill. They receive information from their neighbors, relatives and workmates etc.

4.1.10 Knowledge on agriculture

Agricultural knowledge scores of the respondents ranged from 16 to 46 against possible score of 0 to 52. The average score and standard deviation were 30.33 and 9.16, respectively. Based on the agricultural knowledge scores, the respondents were classified into three categories, namely low knowledge, medium knowledge and high knowledge (Table 4.12).

Table 4.12: Distribution of the respondents according to their knowledge on agriculture

Category	No. of respondents	Percentage
Low (≤20)	32	26.67
Medium (21-36)	60	50
High (>36)	28	23.33
Total	120	100

Data presented in the table 4.12 revealed that 50 percent of the respondents had medium agricultural knowledge, 26.67 percent had low knowledge and 23.33 percent had good knowledge. Thus, an overwhelming majority (50%) of the respondents had medium knowledge. This lead to understanding that household food insecurity would reflected more by the low knowledge on agriculture group in the present study. Knowledge on agriculture of the respondents is definitely affected by the education of the respondents because education helps to enhance the eagerness to be acquainted with new variety or technology. In addition, knowledge on agriculture of the respondent is definitely affected by the extension contact because with the increase of the communication exposure new thing can be taught. Knowledge on agriculture is very important aspects for ensuring food insecurity. Farmers lives on farming. Hence, they must required skill and modern knowledge to bring more yield and profit to ensure food security. But in the study area, the level of knowledge of the respondents in modern agricultural activities has been far below the expectation.

The situation has been such that these respondents have been very neglected by the extension agencies most often and do not get opportunity to gain modern knowledge. To overcome this alarming situation these must special type of extension program involving people as soon as possible to offer farmer new agricultural knowledge and skill to make modern farmers.

4.2 Food insecurity faced by the rural people

As stated earlier, the dependent variable of this study was 'food insecurity faced by the rural people'. Direct survey measures level of food insecurity through a series of questions designed to identify whether household members experienced reductions in the quantity or quality of food over a specific period of time as a result of their lack of access to food or resources to obtain food. The food insecurity faced by the respondents has been given in table 4.13 which ranged from 2 to 38 against possible score of 0 to 60. The mean score was 13.53 and standard deviation being 9.92 (Table 4.13). On the basis of food insecurity condition of the rural people, the respondents were categorized into four classes namely food insecure, low food insecure, moderately food insecure and highly food insecure respondent. According to the observed value of food insecurity of the respondents in the rural area, majority (66.67%) of the respondent positioned in the food secure condition, 20 percent to be found in the low food insecure condition, 13.33 percent were in moderately food insecure condition and no one found faced highly food insecure condition.

Table 4.13: Food insecurity faced by the respondents

Range (%)		Respondents			Mean	SD
Possible	Observed	Category	No.	%		
0-60	2-38	Highly food insecure (≥46)	0	0	13.53	9.92
		Moderately food insecure (31-45)	16	13.33		
		Low food insecure (15-30)	24	20		
		Food secure (<15)	80	66.67		

Food insecurity faced by the rural people was the main focus of this study. In this study, food insecurity referred to extent of problem faced by the rural people in fifteen selected aspects. Thus vast majority (86.67%) of the respondent opined that they faced least food insecure condition in the study area. Food insecurity state is low because of some characteristics of the respondents such as education, farm size, annual family income and daily time allocation in farm work were found to be higher and family size and daily dietary need of the respondents found lower than any other area of Bangladesh. In addition, they had more knowledge in agriculture. They contact with various media and get more information about new agricultural technologies and crop varieties as a result they faced least food insecurity condition in the locality.

4.3 Relationships between the selected characteristics of the respondents and food insecurity faced by them

This section deals with the relationship of the ten selected characteristics of the respondents and the food insecurity faced by them. The selected characteristics constituted the independent variable and the dependent variable was the food insecurity faced by the rural people. Pearson's Product Moment Coefficient of Correlation (r) was computed in order to explore the relationships between the selected characteristics of the respondents and the food insecurity faced by them. The coefficient of correlation (r) was used to test the null hypothesis regarding the relationship between two concerned variables. The null hypothesis was formulated as H_0: There is no relationship between the selected characteristics of the respondents and the food insecurity faced by them. Five percent level of probability was used as the basis for rejection of a null hypothesis. The computed values of 'r' were compared with relevant tabulated values for 118 degrees of freedom at the designated level of probability in order to determine whether the relationships between the concerned variable were significant or not. The summary of the results of the correlation analysis has been presented in table 4.14 showing the relationship between ten selected characteristics of the respondents and food insecurity faced by them. However, the correlation matrix of the dependent and independent variables for the rural people has been presented in Appendix-2.

Table 4.14: Relationships between dependent and independent variables

Characteristics of the rural people	**'r' value (d.f 118)**
Age	-0.139 ^{NS}
Education	-0.213*
Family size	0.333**
Farm size	-0.412**
Annual family income	-0.513**
Daily dietary needs of the family	0.219*
Daily time allocation in farm work	-0.183*
Credit received	0.139 ^{NS}
Extension contact	-0.119 ^{NS}
Knowledge on agriculture	-0.167 ^{NS}

** Significant at 1% level of probability

* Significant at the 5% level of probability

^{NS} = Non significant

4.3.1 Age and food insecurity

The relationship between age of the respondents and food insecurity faced by them was measured by testing the following null hypothesis; “There is no relationship between the age of the respondents and food insecurity faced by them”. Following observation were made regarding the relationship between two variables under consideration. The relationship showed a negative trend and the correlation coefficient between age of the respondents and the food insecurity faced by them was -0.139 (Table 4.14). Based on the computed ‘r’ value the relationship between age and the food insecurity faced by the rural people was non-significant. Hence, the concerned null hypothesis could not be rejected. Thus, it could be said that age of the respondents could not significantly influence their household food insecurity state from their farming activities. Eventually, the effect of age on the food safety was not important as contradictory influences of the related variables.

Most of the respondents were in middle-aged category and the standard deviation was tiny in respect of mean value. Moreover, age was negatively correlated with education, credit received and knowledge on agriculture (Appendix-2). The former one variable influenced negatively on the food insecurity faced by the rural people but the later two variables have insignificant relationship. The computed ‘r’ value implies that age and food insecurity was independent to each other.

4.3.2 Education and food insecurity

The relationship between education of the respondents and food insecurity faced by the rural people was measured by testing the following null hypothesis; “There is no relationship between the education of the respondents and food insecurity faced by them”. Following observation were made regarding the relationship between two variables under consideration. The relationship showed a negative trend and the correlation coefficient between education of the rural people and the food insecurity faced by them was -0.213 as shown in table 4.14. Computed ‘r’ value notified the negatively significant relationship between education and food insecurity faced by the rural people. So, the concerned null hypothesis could be rejected. It could be said that education of the respondents significantly influences their household food insecurity condition.

The majority of the respondents had primary level of education to secondary level of education. In the present study area people were more educated that’s why they ensure their household food security. With the increase of the education people are more aware for their balance food and they can make sure their livelihood and they are able to avoid household food insecurity. Education helps an individual to read different written materials, which in turn helps him to strengthen his knowledge on food and nutrition. Awareness of a respondent increased through education and training.

Therefore, the relationship between these two variables was significant. This meant that rural people having more the education were likely to have lesser food insecurity condition.

4.3.3 Family size and food insecurity

The relationship between family size of the respondents and food insecurity faced by them was measured by testing the following null hypothesis; “There is no relationship between the family size of the respondents and food insecurity faced by them”. Following observation were made regarding the relationship between two variables under consideration. The relationship showed a positive trend and the correlation coefficient between family size of the rural people and the food insecurity faced by them was 0.333 as shown in table 4.14. Based on the computed ‘r’ value the relationship between family size and food insecurity faced by the rural people was positively significant. Hence, the concerned null hypothesis could not be rejected. Thus, it could be depicted that family size of the respondents greatly influenced their household food insecurity condition.

Amount of calorie needed by the family increases with the increase of the number of family members. Household food insecurity status of the respondents, of course, increased with the increase of family requirements. Therefore, it seems to be logical that household food insecurity was decreased with the decreased of family size. This finding implies that rural people having large family size had higher level of food insecurity in rural area.

4.3.4 Farm size and food insecurity

The relationship between farm size of the respondents and food insecurity faced by them was measured by testing the following null hypothesis; “There is no relationship between the farm size of the respondents and food insecurity faced by them”. Following observation were made regarding the relationship between two variables under consideration. The relationship showed a negative trend and the correlation coefficient between farm size of the respondents and the food insecurity faced by them was -0.412 as shown in table 4.14. Based on the computed ‘r’ value the relationship between farm size and the food insecurity faced by the rural people was negatively significant. Hence, the concerned null hypothesis could be rejected. Thus, it could be concluded that farm size of the respondents was an important indicator for the assessment of household food insecurity.

Household food insecurity has a direct relationship with the farm size. Small land for farming create problem for farmers in adopting different farming practices. Greater land areas obviously facilitated to practice more number and quantity of farming enterprises. Therefore, as the farm size of the respondent increased, the household food insecurity decreased. This implies that farmers with large farm size had lower level of food insecurity than those of the respondents with smaller farm size.

4.3.5 Annual family income and food insecurity

The relationship between annual family income of the respondents and food insecurity faced by them was measured by testing the following null hypothesis; “There is no relationship between the annual family income of the respondents and food insecurity faced by them”. Following observation were made regarding the relationship between two variables under consideration. The relationship showed a negative trend and the correlation coefficient between annual family income of the rural people and the food insecurity faced by them was -0.513 as shown in table 4.14. Computed ‘r’ value points toward the significant negative relationship between annual family income and the food insecurity faced by the rural people. So, the concerned null hypothesis could be rejected. It could be concluded that annual family income of the respondents was an important indicator for the assessment of the household food insecurity.

Higher annual family income of the rural families makes them more courageous to adopt diversified farming technology and farming enterprises. Moreover, they can meet up the family needs at the expense of their income. High annual income makes them to use additional money on food and daily necessities. Hence, the relationship between annual family income and the household food insecurity became significantly negative. This finding implies that rural people having higher family income had higher level of food security in rural area.

4.3.6 Daily dietary needs of the family and food insecurity

The relationship between daily dietary needs of the family and food insecurity faced by them was measured by testing the following null hypothesis; “There is no relationship between the daily dietary needs of the family and food insecurity faced by them”. Following observation were made regarding the relationship between two variables under consideration. The relationship showed a positive trend and the correlation coefficient between daily dietary needs of the family and the food insecurity faced by the respondents was 0.219 (Table 4.14). Computed ‘r’ value points toward the significant positive relationship between daily dietary needs of the family and the food insecurity faced by the rural people. So, the concerned null hypothesis could be rejected. It could be concluded that daily dietary needs of the family of the respondents was an important indicator for the assessment household food insecurity.

Household food insecurity has a direct relationship with the daily dietary needs of the family. Amount of dietary required of the respondent raises with the increase of the number of family members. Household food insecurity status of the respondents, certainly, increased with the increase of family daily dietary needs.

Therefore, as the daily dietary needs of the family increased, the household food insecurity considerably increased. This research finding implies that rural people having higher daily dietary need had higher level of food insecurity in study area.

4.3.7 Daily time allocation in farm work and food insecurity

The relationship between daily time allocation in farm work and food insecurity faced by them was measured by testing the following null hypothesis; "There is no relationship between the daily time allocation in farm work and food insecurity faced by the respondents". Following observation were made regarding the relationship between two variables under consideration. The relationship showed a negative trend and the correlation coefficient between daily time allocation in farm work and the food insecurity faced by the respondents was -0.183 (Table 4.14). Based on the computed 'r' value the relationship between daily time allocation in farm work and the food insecurity faced by the rural people was significant. So, the concerned null hypothesis could be rejected. It could be concluded that daily time allocation in farm work of the respondents could considerably influenced their household food insecurity status.

Generally, farmers work in the field also in the household to maintain farming activities irrespective of family requirements. In this study researcher found that food insecurity status varies along with working hours of the respondents. Higher the time allocation in farm works higher the income in terms of daily wage of the labor per hour. Therefore, as the daily time allocation in farm work increased, the household food insecurity considerably decreased. This research finding implies that rural people doing higher farm work had higher level of food security in study area.

4.3.8 Credit received and food insecurity

The relationship between credit received and food insecurity faced by the respondents was measured by testing the following null hypothesis; "There is no relationship between the credit received and food insecurity faced by the respondents". Following observation were made regarding the relationship between two variables under consideration. The relationship showed a positive trend and the correlation coefficient between credit received and the food insecurity faced by the respondents was 0.139 (Table 4.14). Computed 'r' value points toward the insignificant positive relationship between credit received and the food insecurity faced by the rural people. So, the concerned null hypothesis could not be rejected. It could be concluded that credit received of the respondents could not considerably influence their household food insecurity condition or achieving food security.

Usually, respondents take credit from the non government organizations irrespective to their requirement. Nearly all of them take more or less equal credit for this purpose. Most of the respondents received very low amount of credit from different non government organizations. It is interesting that they use this money for mainly some other purposes like business, purchasing household necessities, marriage ceremony of daughters or sons etc. They did not get sufficient credit as a result they could not spend the credit money for the desired purposes. More over credit received boost the food insecurity status as a consequence of beneficiary got forced to payment the loan that's why correlation appeared positive. Eventually, the effect of credit received on the food insecurity condition was not important as contradictory influences of the related variables. Therefore, the relationship between these two variables remained uncorrelated, so as to credit received of the respondent was not a considerable factor in food insecurity. This research finding implies that the credit received did not influence the food insecurity condition of the rural people in the present study area.

4.3.9 Extension contact and food insecurity

The relationship between extension contact and food insecurity faced by the respondents was measured by testing the following null hypothesis; "There is no relationship between the extension contact and food insecurity faced by the respondents". Following observation were made regarding the relationship between two variables under consideration. The relationship showed a negative trend and the correlation coefficient between extension contact and the food insecurity faced by the respondents was -0.119 (Table 4.14). Computed 'r' value points toward the insignificant negative relationship between extension contact and the food insecurity faced by the rural people. So, the concerned null hypothesis could not be rejected. It could be concluded that extension contact of the respondents could not considerably influence their household food insecurity condition or achieving food security.

Due to lack of high extension contact they were unknown to modern varieties of crops, livestock, fisheries and fruits. The people with lower extension contact were likely to have higher level of food insecurity status. Most of the respondents were exposed to farming information to a medium level. They mainly receive their necessary information from neighbors, relatives etc. As they maintained contact with different information sources related to achieving household food security below the expected level, intensity of extension contact did not noticeably control the food insecurity circumstance. Therefore, the relationship between these two variables remained uncorrelated. In conclusion, the effect of extension contact on the food insecurity condition was not important as differing influences of the related variables. These facts might be the reasons that extension contact could not change food insecurity status of the rural people.

4.3.10 Knowledge on agriculture and food insecurity

The relationship between knowledge on agriculture and food insecurity faced by the respondents was measured by testing the following null hypothesis; “There is no relationship between the knowledge on agriculture and food insecurity faced by the rural people”. Following observation were made regarding the relationship between two variables under consideration. The relationship showed a negative trend and the correlation coefficient between knowledge on agriculture and the food insecurity faced by the respondents was -0.167 (Table 4.14). Computed ‘r’ value points toward the insignificant negative relationship between knowledge on agriculture and the food insecurity faced by the rural people. So, the concerned null hypothesis could not be rejected. It could be concluded that knowledge on agriculture of the respondents could not considerably influence their household food insecurity condition or achieving food security.

Due to lack of high knowledge on agriculture they were unknown to modern varieties of crops, livestock, fisheries and fruits. Lack of high technical knowledge they cannot buy higher quality seed, control insect or pest and preserve food for future. The people with lower knowledge on agriculture were likely to have higher level of food insecurity status. But in the study area majority of the people has low to medium level of knowledge on agriculture that implies most of the respondents have similar knowledge. Differentiation between food secure with food insecure respondents in knowledge on agriculture is very low. Therefore, the relationship between these two variables remained uncorrelated. In conclusion, the effect of knowledge on agriculture on the food insecurity condition was not important as differing influences of the related variables. These facts might be the reasons that knowledge on agriculture could not change food insecurity status of the rural people. That indicate knowledge on agriculture of the respondent was not an important factor in food insecurity.

4.4 Problem faced by the respondents

The purpose of this section was to find out the problem faced by the respondents in achieving household food security. Respondent were asked to mention the problems they faced. Problem faced by the respondents in achieving household food security were identified and also determine its extent as severe, medium, low and not at all. The observed score of the problems faced by the respondents in achieving household food security ranged from 13 to 30 against a possible of 0 to 42. Data presented in table 4.15 show that mean and standard deviation of this score was 18.38 and 4.06, respectively. Among the respondents, majority (64.17%) of them faced medium level, 28.33 percent of them faced low level and 7.5 percent faced severe level of problems in achieving household food security.

Table 4.15: Problem faced by respondents in achieving household food security

Range of score		Respondents			Mean	SD
Possible	Observed	Category	No.	%		
0-42	13-30	Low (≤14)	34	28.33	18.38	4.06
		Medium (15-28)	77	64.17		
		Severe (>28)	9	7.5		
Total			120	100		

The range and standard deviation of the scores were small. This means that almost all of the respondents faced similar problems to similar extent. This was might be due to the similar socio-economic background of the respondents.

The extent of problems faced by the respondents in achieving household food security in terms of Problem Facing Index (PFI) along with their rank order based on the PFI values have been presented in table 4.16. Data furnished in the table indicate that the problem which ranked first was ‘inadequate land for farming’ followed by second ranked ‘lack of money or capital’ and third ranked ‘inadequate training facilities’. ‘Non-cooperation of family members’ was the least important problem among those faced by the respondents in achieving household food security.

Table 4.16: Ranking of problems according to descending order

Sl. No.	Problems	PFI	Rank Order
1	Inadequate land for farming	286	1
2	Lack of money or capital or necessary fund	240	2
3	Inadequate training facilities	228	3
4	Lack of knowledge of different aspects of farming enterprises	188	4
5	Insufficient credit	182	5
6	Shortage of irrigation water in dry season	173	6
7	Lack of storage/processing facilities	172	7
8	Insect and pest attack	155	8
9	Paucity of time	141	9
10	Lack of contact with communication media	129	10
11	Social and religious restriction	119	11
12	Flood or cyclone	73	12
13	Lack of cooperative activities	67	13
14	Non cooperation of family members	53	14

Inadequate land for farming was the most crucial problem faced by the respondents in achieving household food security. It is a real condition of the study area. In this study, food insecurity faced by the respondents referred to extent of problem faced by the respondents in achieving household food security in fourteen selected aspects. On the other hand, most of the people has not adequate capital or fund to invest in their farming activities for the satisfying their purposes. Respondents did not get sufficient training opportunities to know how to operate different farming activities in a rational way. They had lack of contact with communication media. So they were unknown to modern varieties of crops, livestock, fisheries and fruits. They also did not get sufficient credit according to their need. As a result they could not spend the credit money for the desired purposes. Also they had lack of time to perform different farming activities and knowledge about different aspects of farming activities to attain household food security. Other problems of the respondents of the study area were lack of shortage of irrigation water in dry season, lack of storage and processing facilities, insect and pest attack, food or cyclone, social and religious activities, non cooperation of family members and lack of cooperative activities in conducting farm activities. For these reason, they could neither get training on different farming activities nor contact with communication media. Thus, the problems were complex and intermingled with one another.

4.5 Suggested solution of the problems

Finally, the respondents were requested to state special opinion on how these problems could be overcome. The suggestions for the resolution of the problems prepared by the respondents have been given below:

- Farmers should be given the opportunity to acquire loans at low interest rates and create off-farm activities for themselves to improve their revenues and purchasing power, thereby reducing food insecurity and poverty.
- Pricing and marketing reforms should be reviewed. Market prices for food crops need to be stabilized so that the farmer is sure to sell his surplus at a profitable price. This will motivate them to diversify and intensify food crop production.
- Public infrastructure such as well equipped hospitals, schools and markets should be established. Health care centers should incorporate into syllabus specially on childcare, better nutrition and sanitation methods. Through this morbidity and mortality due to malnutrition, under nutrition and poor sanitation conditions could reduce.
- Family planning methods that could attempt to reduce population growth to acceptable levels that can conveniently allow for sufficient and efficient resource allocation and utilization by all.

- Redefining government strategy regarding property tenure so that sharecroppers who in fact cultivate can make choice concerning farming activities and obtain equal part of benefits from the crops.
- Increased need based training facilities for increasing awareness, management ability and operational ability for practicing diversified farming activities in achieving their household food security may be arranged.
- Community member should have opportunity to be involved in project formulation and implementation.
- Increased credit availability according to demand of the small famers.
- Arranging motivational campaign using group and mass media to inspire family members to cooperate each other as well as to minimize social and religious restriction and increase personal interest.
- Government should acquire several policies for road construction and some other private association that will facilitate to communication and transports.
- Granaries should be established for storage and better conservation of food crops.

CHAPTER 5
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This chapter deals with the summary, conclusions and recommendations of the study. The major findings of the study have been summarized in the following sections.

5.1.1 General background

Food insecurity remains a reality for the millions of poor of Bangladesh, including small and marginal farmers in the rural areas. Whereas rural people purvey food for the enormous population of the country, they are mostly underprivileged by losing their rights including their right to food. Food security is defined as availability, access, and utilization by all people at all times to enough food for an active, healthy life. Physical and economic access to food ensures an active and healthy life.

The underlying causes of national food insecurity include lack of foreign exchange to import food, unsupportive policies, lack of capacity to store and transport food where and when it is needed, and others. Main causes of household food insecurity include shortage of food in markets, isolation from markets, lack of capacity to produce food or earn income to purchase food, lack of a reliable source of potable water, sanitation, and inadequate health services. High rates of population growth and poverty also have played a part, within an already difficult environment of fragile ecosystems. The lack of access to resources, employment opportunities and income result in poor purchasing power of households. Moreover, farmers also changed their land use patterns and introduced new enterprises combination along with rice production. As a result, agricultural crop land have been shifted and are being used for aquaculture such as pond fish farming, shrimp farming and golda shrimp farming.

Numerous studies have confirmed that there is a problem of food insecurity in Bangladesh with wide range of area to be covered and large number of people to be attended for different identified causes of food insecurity problem. But unfortunately, there have been practically no study in Bangladesh to verify empirically the food insecurity condition in the rural area. Although, the food insecurity faced by the rural people is popularly viewed, these are largely based on theoretic formulations rather than facts. To have an understanding of the food insecurity condition in the rural area from research point of view along with its theoretic framework this study was undertaken. Therefore, the finding of the study are expected to be of great value of researchers, extension service provider, students and particularly planners in formulating and designing extension approach for maintaining the natural balance.

5.1.2 Specific objectives of the study

1. To assess the extent of the existing food insecurity among the rural households;
2. To describe following determinant factors of the respondents:
    I. Age
    II. Education
    III. Family size
    IV. Farm size
    V. Annual family income
    VI. Daily dietary needs of the family
    VII. Daily time allocation in farm works
    VIII. Credit received
    IX. Extension contact
    X. Knowledge on agriculture;
3. To explore relationships between the selected characteristics of the respondents and their food insecurity; and
4. To identify the problem associated with achieving household food security.

5.1.3 Methodology

Methodology plays an important role in a scientific research. It is the blueprint of the detailed procedure of testing the hypothesis and analysis of the obtained data. South Sadar upazila of Comilla district were selected purposely as the locale of the study. Rural people of Dumuria, Lohipur and Dayapur villages under Chowara union were the population of this study. The total numbers of farm families of these selected villages were 603. About twenty percent of the farm families were randomly selected as represented sample. Thus, 120 farm family head constitute the sample size of the study.

An interview schedule was developed for collection of data in accordance with the objectives of the study. According to the relevant research area, the researcher selects ten characteristics of the rural people as the independent variables. Before finalization of the schedule, necessary corrections and modification were made on the basis of pre testing result. Data were collected during 02 August to 15 September, 2011. Collected data was than analyzed and interpreted in accordance with the objectives of the study. Statistical measures such as number and percentage distribution, range and average have been done to describe the food insecurity faced by the respondents. In order to explore the relationship between the respondents view about food insecurity and their selected characteristics, Person's Product Moment Correlation Co-efficient (r) was used to analyze the study. Throughout the study, five percent (0.05) level of significance was used as the basis for rejecting any null hypothesis.

5.1.4 Results and discussion

The study was concerned with respondents' opinion regarding food insecurity. Finding in this respect are presented below.

5.1.4.1 Characteristics profile of the respondents

Findings in respect of the ten selected characteristics of the respondents are summarized below:

Age: About 46.66 percent of the respondents were middle-aged, 40 percent were old and the rest 13.33 percent were young.

Education: Among the respondents, 2.5 percent were illiterate, 6.67 percent can sign only, 28.33 percent had education at primary level, 45 percent had education at secondary level and 17.5 percent had education above secondary level. Above half of the respondents (62.5%) of the study area secured secondary level of education.

Family size: Twenty percent of the respondents had small family size, 49.17 percent of them had medium family size and 30.83 percent had large family size.

Farm size: About 70 percent of the respondents had medium farm size, while 15.83 percent had small farm, 12.5 percent large farm, 1.67 Percent marginal farm and 0 percent landless respondents. Data also revealed that majority (82.5%) of the respondents large to medium farm size where as 17.5 percent of the respondents were marginal and small farmers.

Annual family income: The highest proportion of the respondents (77.5%) had medium annual family income while 19.17 and 3.33 percent of them had high and low annual family income, respectively. Finding reveal that most (96.67%) of the respondents had medium to high annual family income indicating the present status of the rural people.

Daily dietary needs of the family: According to the observed value of the daily dietary needs of the family among the rural respondent, majority (57.5%) needed medium amount of calories, 32.5 percent needed high amount and the rest 10 percent needed low amount of calories.

Daily time allocation in farm works: Most of the respondents (60%) spent five to seven hours a day in farm works, while 35 and 5 percent of them allocated high and short time for farm works, respectively. On an average 8.76 hours were spent in sleeping by the respondents, 6.87 hours in farm works. They get a short period of the time (0.69 hours) in a day for different social activities.

Credit received: The highest proportion (60.83%) of the respondents had low credit received while 28.33 percent had medium credit received and rest 10.83 percent of them had high credit received. Only thirteen person received credit which is more than 45 thousand taka. This maximum value of the observed range accelerated the mean value as taka 18.63 thousand. In fact, most of the respondents got credit less than this mean value.

Extension contact: The highest proportion (66.67%) of the respondents had medium extension contact as compared to 17.5 percent of the respondents having less extension contact and 15.83 percent fell in high extension contact.

Knowledge on agriculture: About 50 percent of the respondents had medium agricultural knowledge, 26.67 percent had low knowledge and 23.33 percent had good knowledge. Thus, an overwhelming majority (50%) of the people had medium knowledge.

5.1.4.2 Food insecurity faced by the rural people

As stated earlier, the dependent variable of this study was 'food insecurity faced by the rural people'. Food insecurity faced by the respondents' scores ranged from 2 to 38 against possible score of 0 to 60. The mean score was 13.53 and standard deviation being 9.92. On the basis of food insecurity condition of the rural people, the respondents were categorized into four classes namely food insecure, low food insecure, moderately food insecure and highly food insecure respondent. According to the observed value of food insecurity of the respondents in the rural area, majority (66.67%) of the respondent positioned in the food secure condition, 20 percent to be found in the low food insecure condition, 13.33 percent were in moderately food insecure condition and no one found faced highly food insecure condition. Thus vast majority (86.67%) of the respondent opined that they faced least food insecure condition in the study area.

5.1.4.3 Relationships between independent variables and food insecurity faced by the rural people

Ten null hypotheses were tested to explore the relationship of the selected characteristics of the respondents with the food insecurity. Among ten characteristics of the respondents, family size and daily dietary needs of the family were positively correlated with the food insecurity faced by the rural people. But education, farm size, annual family income and daily time allocation in farm work of the respondents showed negative relationship in this regard. The rest of the characteristics *viz.* age, credit received, extension contact and knowledge on agriculture of the respondents remained uncorrelated with the food insecurity faced by them.

5.1.4.4 Problem faced by the rural people in achieving household food security

Problem Faced Indices (PFI) of the respondents on fourteen items of problem faced in achieving household food security scored ranged from 53 to 286 against the possible score were 0 to 360. The problems faced by the respondents in achieving household food security from their farming activities according to rank order were inadequate land for farming, Lack of money or capital or necessary fund, Inadequate training facilities, Lack of knowledge of different aspects of farming enterprises, Insufficient credit, Shortage of irrigation water in dry season, Lack of storage/processing facilities, Insect and pest attack, Paucity of time, Lack of contact with communication media, Social and religious restriction, Flood or cyclone, Lack of cooperative activities and Non cooperation of family members. The observed score of the problems faced by the respondents in achieving household food security ranged from 13 to 30 against a possible of 0 to 42. Mean and standard deviation of this score was 18.38 and 4.06, respectively. Among the respondents, majority (64.17%) of them faced medium level, 28.33 percent of them faced low level and 7.5 percent faced severe level of problems in achieving household food security. The range and standard deviation of the scores were small. This means that almost all of the respondents faced similar problems to similar extent. This was might be due to the similar socio-economic background of the respondents.

5.2 Conclusions

Findings of the study and their logical interpretations in the light of other relevant facts prompted the researcher to draw the following conclusions:

- Findings indicate that the highest proportion of the respondents (86.67%) faced least food insecure condition in the study area. Food insecurity state is low because of some characteristics of the respondents such as education, farm size, annual family income and daily time allocation in farm work were found to be higher and family size and daily dietary need of the respondents found lower than any other area of Bangladesh. So food insecurity situation is not much severe in the study area.
- Among the selected characteristics of the respondents family size and daily dietary needs of the family had positive relationship with the food insecurity faced by the respondents. In addition, family size and family dietary needs are directly related. Moreover, average family size of the respondents was 5.8 which are more than the expectation. So, there was greater scope to maintain food security status through controlling the family size. Therefore, small family size is desirable to attain household food security status.

- Education, farm size, annual family income and daily time allocation in farm work were negatively correlated with the food insecurity faced by them. Larger farm size lead to earn higher annual income. The literacy of the farmers is an important factor. Education is a desirable quality of an individual because, this determined communication behavior. Education helps individual respondents to become conscious of their farming activities and they could adopt numerous steps to secure their household food security. The daily time allocation in farm work of an individual is a significant factor because it continuing one's livelihood. High working hour can reaches household food security more easily than the low working hour respondent, as low working hour may performs as a barrier to food and nutritional security for respondent's family. Eventually, education, farm size, family income and daily time allocation in farm work were important indicators to sustain food security condition in household.
- Lack of high extension contact modern varieties of crops, livestock, fisheries and fruits are unknown to them. The people with lower extension contact were likely to have higher level of food insecurity status. Though extension contact showed negative insignificant relationship with the food insecurity faced by the rural people concern authority should give emphasis on it to diminish food insecurity state at the study area.
- Most of the people faced medium level of different problems in achieving household food security. Minimum level of problem is always expected to achieve desirable outputs.
- Farmers should be given the opportunity to acquire loans at low interest rates and pricing and marketing reforms should be reviewed. Market prices for food crops need to be stabilized so that the farmer is sure to sell his surplus at a profitable price. Public infrastructure such as well equipped hospitals, schools and markets should be established.

5.3 Recommendations

5.3.1 Recommendations for policy implications

Based on the findings and conclusions of the study, the following recommendations could be made:

- Findings of the study indicate that inadequate land was the highest problem of the respondents in achieving household food security and maximum of them cultivate in a share basis. As extension agencies will not able to give them land but can easily train them up for modern agriculture by teaching them new agricultural technology suitable for rural farmers and land tenure policy should be reformed by the government act and properly monitored in order to promote the decision making capacity and benefits from the sharecropping, leased and mortgaged farms by the rural people.

- Findings of the study also indicate lack of capital and insufficient credit is an obstacle in achieving food security. Therefore, farmers should be given the opportunity to acquire loans at low interest rates and create off-farm activities for themselves to improve on their revenues and purchasing power, thereby reducing food insecurity and poverty.
- The unsatisfied dietary needs of the family members should be fulfilled in order to have healthy manpower. Government should take initiatives to overcome the rural household food insecurity by providing aid to poor and unemployed rural people.
- Family size should be kept under control as small as possible through long term family planning for the small farmers. It would minimize the daily dietary needs of the family and household food security would ultimately be increased.
- Farmers with good agricultural knowledge want to use improved agricultural practice for agricultural production. For this purpose the concern authority like extension services should facilitate the effective measures and providing improved agricultural technologies.
- Extension organizations including Department of Agriculture Extension (DAE) have to conduct more training programs for the rural people's especially illiterate and small farmers who have comparatively small farm size to increase the production of their farms. DAE should also conduct result demonstration as a method of motivation.
- Emphasis should be given to take necessary steps by the concerned GOs and NGOs to overcome the problems in achieving household food security as far as possible. If these problems are removed, there is a greater scope of creating more positive impact on livelihood and easy to achieving household food security in the study area.
- Government and non government organizations should improve guidance facilities according to need of the rural people for increasing their knowledge, management skill and operational ability for practicing diversified farming in achieving their household food security. Solution to the identified problems of the respondents in beating household food insecurity from their farming practices should be provided.

5.3.2 Recommendations for further study

The researcher conducted a small piece of study which could not make available all information for the proper understanding of the food insecurity faced by the rural people. Therefore, the following recommendations could be made for further research works:

- The present study was conducted in one union namely Chawara of South Sadar upazila of Comilla district. Similar studies may be conducted in other parts of the country to generalize the findings.

- The study was undertaken to explore the relationships of only ten selected characteristics of the rural people and food insecurity. Therefore, it could be recommended that further studies should be conducted with other independent and dependent variables.
- The present study was exclusively confined to determine the food insecurity faced by the rural people. Further studies should be conducted to determine various aspects of food insecurity of the rural people. Balanced nutritional requirements of the family should also be emphasized.
- On the basis of the characteristics pattern of Bangladesh and its rural population more researches should be conducted to investigate the food insecurity faced by the rural household and also identifying factors influencing the food insecurity.
- Research should be undertaken particularly to identify the further problems in achieving household food security of the rural people and to explore their potentialities to overcome the problems.
- In addition to food insecurity in the rural areas, people also faced other problem like social, economic, housing, sanitation etc. These entire problems affect the routine of the rural people. There is a need for undertaking research on the various problems faced by the rural people which affect their living status.
- Similar study may also be replicated in future for studying any change of pattern regarding food insecurity condition in the study area.
- In the present study age, credit received, extension contact and knowledge on agriculture had no significant relationship with food insecurity faced by them. In these connections, further verification is necessary.

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APPENDIX-1

English Version of the Interview Schedule
Department of Agricultural Extension & Information System
Sher-e-Bangla Agricultural University
Dhaka-1207

AN INTERVIEW SCHEDULE FOR THE STUDY "FOOD INSECURITY FACED BY THE RURAL PEOPLE"

Date: ……. **Respondent No**. …..…..…….

Name of the respondent:

Village : Ward :

Upazila : District :

Please answer the following questions:

1. **Age**

   How old are you? ..... Years.

2. **Level of Education**

   Please mention your level of education

   a) Cannot read and write ……
   b) Can sign only ……..
   c) Attended up to …….. Class/passed
   d) Did not go to school but can read and write which would be equivalent to class……..

3. **Family Size**

   How many members are there in your family? …… members.

4. **Farm Size**

   Please mention the area of your land according to use.

Sl. No.	Types of Land Use	Area of Land	
		In local unit	In Hectare
A	Homestead area including garden and pond		
B	Own land under own cultivation		
C	Land taken from others as borga		
D	Land given to other as borga		
E	Land taken from others on lease		
Total farm size = A+B+1/2(C+D)+E			

5. Annual Family Income

Please mention your annual family income from the following sources.

Income Sources	**Income in '000' Tk.**
A. Farm sources	
B. Non-farm sources I. Business II. Job III. Remittance IV. Others	
Total	

6. Daily Dietary Needs of the Family

Sl. No.	Family Member	Approx. body wt. (Ib)	Calorie needed @ 40 cal/day/kg body wt. (Kcal)
1	Farmer (Respondent)		
2	Spouse		
3			
4			
5			
6			
7			
8			
9			
10			
Total			

7. Daily Time Allocation in Farm and Other Works

How much time do you spend in the following activities?

Sl. No.	**Activities**	**Time Spent (hour/day)**
1	Farm work	
2	Household work	
3	Social activities	
4	Resting	
5	Sleeping	
6	Others	

8. Credit Received

Did you receive any credit from any sources? ..... Yes/No

If yes, please mention the sources of receiving credit and the amount of credit received.

Sl. No.	Sources of Credit	Amount of Credit (Tk.)
1	NGOs	
2	Banks	
3	Money lenders	
4	Friends	
5	Neighbors	
6	Relatives	
7	Others	

9. Extension Contact

Please indicate how often you use these extension media:

Types of Media	Name of Information Media	Extent of Contact			
		Frequently (3)	Occasionally (2)	Rarely (1)	Not at all (0)
Personal Contact	Friends/relatives				
	Extension agents (SAAO/FMO)				
	Extension officials (AEO/AAO/UAO)				
	BADC officials/UFPO				
	NGO personnel/AHI/UMO				
	Input dealers				
	Model farmer				
Group Contact	Demonstrations				
	Field days				
	Training days				
	Group meetings				
Mass Contact	Radio				
	Television				
	Newspaper				
	Leaf lets or booklet				
	Reading agricultural books				
	Agricultural fair				
	Audio-visual aids				

10. Knowledge on Agriculture

Please answer the following questions:

a. Crops, Vegetables and Fruits related:

Sl. No.	Questions	Total Marks	Marks Obtained
1	Name two varieties of rice which can be cultivated after recession of flood water.	(2)	
2	Name two HYV rice of Boro season.	(2)	
3	Name two modern varieties of potato.	(2)	
4	What kind of insect infest rice field?	(2)	
5	Name two insecticides.	(2)	
6	Mention the fertilizer doses for potato cultivation.	(2)	
7	Name two oil seed crop of this area.	(2)	
8	Name two varieties of maize.	(2)	
9	Name two fruits that are suitable for cultivation in this area.	(2)	
10	Name two vitamin 'C' enriched fruits.	(2)	

b. Livestock related:

1	Name two improved breeds of poultry.	(2)	
2	How many days it takes to make broiler ready for marketing?	(2)	
3	Name two improve breeds of duck.	(2)	
4	Name two diseases of duck.	(2)	
5	Name two breeds of goats.	(2)	
6	Name two diseases of goats.	(2)	
7	Mention some cattle feed.	(2)	

c. Fisheries related:

1	Which is the most appropriate month of releasing fish in the pond in this area?	(2)	
2	What is the appropriate month of catching fish from pond or cannel?	(2)	
3	Name two predator species of fish.	(2)	
4	Name two major diseases of fish.	(2)	
5	Mention two demerits of current net in use.	(2)	
6	Mention the name of two rapid growing fish.	(2)	
7	Name two fishing equipments.	(2)	
8	Mention two kind of fishing nets.	(2)	
9	Name two species of fishes that are more profitable.	(2)	
Total		52	

11. Household Food Insecurity

Food insecurity questions	Extent of food insecurity				
	Mostly (4)	Often (3)	Sometimes (2)	Rarely (1)	Never (0)
Did you worry that your household would not have enough food?	20 days per month	10 days per month	4-9 days per month	1-3 days per month	
Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	20 days per month	10 days per month	4-9 days per month	1-3 days per month	
Did you or any household member eat just a few kinds of food day after day due to a lack of resources?	20 days per month	10 days per month	4-9 days per month	1-3 days per month	
Did you or any household member eat food that you preferred not to eat because of a lack of resources to obtain other types of food?	20 days per month	10 days per month	4-9 days per month	1-3 days per month	
Did you or any other household member eat fewer meals in a day because there was not enough food?	20 days per month	10 days per month	4-9 days per month	1-3 days per month	
Did you or any household member go to sleep at night hungry because there was not enough food?	20 days per month	10 days per month	4-9 days per month	1-3 days per month	
Did you or any household member go a whole day without eating anything because there was not enough food?	20 days per month	10 days per month	4-9 days per month	1-3 days per month	
Did you rely on only a few kinds of low cost food to feed your children because of a lack of resources to obtain other types of food?	20 days per month	10 days per month	4-9 days per month	1-3 days per month	
How often in the last month did your family eat meat or big fish as part of an ordinary meal?	1-2 days per month	3-10 days per month	11-15 days per month	16-25 days per month	Everyday
In the last month, how often did you have to eat wheat (or another grain) although you wanted to eat rice?	Everyday	15-20 days per month	5-14 days per month	1-4 days per month	
In the last month how often did food stored in your home run out and there was no money to buy more that day?	4-5 days per week	10-12 days per month	6-9 days per month	4-5 days per month	
In the last month how often did you worry about where food would come from?	Everyday	15-20 days per month	5-14 days per month	1-4 days per month	
In the last month how often did you have to borrow food from relatives or neighbors to make a meal?	4-5 days per week	10-12 days per month	6-9 days per month	4-5 days per month	
In the last month how often did you have to use money that you needed to use for another purpose to buy food?	More than 5 times per month	3-5 times per month	Twice per month	Once per month	
In the last month how often did you have to sell or mortgage your own things in order to get food?	More than 4 times	3-4 times per month	Twice per month	Once per month	

12. Problem Faced by the Rural People in Achieving Household Food Security

Please mention the problems you face in achieving household food security.

Sl. No.	Problems	Extent of Problems			
		Not at all (0)	Low (1)	Medium (2)	High (3)
1	Lack of knowledge of different aspects of farming enterprises				
2	Lack of contact with communication media				
3	Insufficient credit				
4	Social and religious restriction				
5	Non cooperation of family members				
6	Lack of cooperative activities				
7	Lack of money or capital or necessary fund				
8	Inadequate training facilities				
9	Paucity of time				
10	Inadequate land for farming				
11	Flood or cyclone				
12	Insect or pest attack				
13	Lack of storage/processing facilities				
14	Shortage of irrigation water in dry season				

13. Give Your Suggestions to Overcome These Problems

I. ……

II. ……....

III. ……

IV. ……

V. ……

Thank you for your kind cooperation.

……..

Signature of the interviewer Date: …….

APPENDIX-2: Correlation matrix showing the interrelationship among the dependent and independent variables

Characteristics of the rural people	Age	Education	Family size	Farm size	Annual family income	Daily dietary needs of the family	Daily time allocation in farm works	Credit received	Extension contact	Knowledge on agriculture	Food insecurity faced by the rural people
Age	1	-0.414**	-0.084	0.092	-0.057	0.035	-0.076	-0.365**	-0.318**	0.123	-0.139
Education	-0.414**	1	-0.212*	-0.063	0.238**	-0.235**	0.194*	0.070	0.135	-0.200*	-0.213*
Family size	-0.084	-0.212*	1	0.037	-0.163	0.780**	0.086	0.010	-0.102	0.128	0.333**
Farm size	0.092	-0.063	0.037	1	0.321**	0.013	0.192*	-0.040	0.266**	0.108	-0.412**
Annual family income	-0.057	0.238**	-0.163	0.321**	1	-0.120	0.245**	0.203*	0.124	-0.444**	-0.513**
Daily dietary needs of the family	0.035	-0.235**	0.780**	0.013	-0.120	1	-0.042	-0.057	-0.111	0.334**	0.219*
Daily time allocation in farm works	-0.076	0.194*	0.086	0.192*	0.245**	-0.042	1	0.309**	0.014	-0.263**	-0.183*
Credit received	-0.365**	0.070	0.010	-0.040	0.203*	-0.057	0.309**	1	0.165	-0.372**	0.139
Extension contact	0.123	-0.200*	0.128	0.108	-0.444**	0.334**	-0.263**	-0.372**	1	0.153	-0.119
Knowledge on agriculture	-0.318**	0.135	-0.102	0.266**	0.124	-0.111	0.014	0.165	0.153	1	-0.167
Food insecurity faced by the rural people	-0.139	-0.213*	0.333**	-0.412**	-0.513**	0.219*	-0.183*	0.139	-0.167	-0.119	1

** Significance at the 1% level of probability
* Significance at the 5% level of probability
NS = Correlation is not significant

Table value of r at 0.05 = 0.180 and 0.01 = 0.234
with 118 degrees of freedom