SOCIOECONOMIC ANALYSIS OF FOOD SECURITY STATUS AMONG FARMING HOUSEHOLDS IN SOME SELECTED LGAs OF KANO STATE

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(SPS/11/MEX/0007)

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OCTOBER, 2015

DECLARATION

I hereby declare that this work is the product of my research efforts undertaken under the supervision of Prof.Abba Aminu and has not been presented and will not be presented anywhere for the award of a degree or certificate. All sources have been duly acknowledged.

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CERTIFICATION

This is to certify that the research work for this dissertation and subsequent write-up by Stella Thomas (SPS/11/MEX/0007) were carried out under our supervision.

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DEDICATION

This research work is dedicated to my little boy. You will always live in my heart. Words are not enough to express my heart but one thing is certain this work will not be completed without your memory.

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ABSTRACT

The study examined food security status of farming households in some selected Local Government Areas of Kano State, Nigeria. Primary data were collected from 120 respondents using multi-stage random sampling technique. The data collected were analyzed using descriptive statistics, food security index and logit regression model. The result of the analysis shows that 38.3% of the respondents were between 41-50years with mean of 50years, 63.4% had between 6-14 persons in their households. The mean household size was 12 persons. 28% of the respondent had more 30years of farming experience; the mean years of farming experience was 24 years. The incidence of food insecurity was 75%, the highest of the food insecurity was recorded among respondents aged 41-50years.The food insecurity index was 0.58 for the food insecured households and 1.79 for food secured households. The food security gap was 1.58 and 0.29 for the food insecured and secured household respectively. Logistic regression estimates shows that household size, access to extension services, years of farming experience, and access to formal education were significantly related at 10%, 5%, and 1% of significant respectively. The most important challenges mentioned by the respondents were high cost of production inputs, low investment capital and unpredictability of rain fall .It can therefore be concluded that food insecurity in the study was very high and to mitigate food insecurity cost of production inputs should be reduced, access to investment capital increased and accurate and timely information about when rainfall would be fully established for planting should be provided.

CHAPTER ONE:

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. (FAO, 2002)

Food security, sufficient, stable and safe food consumption, is the main priority of the nations to achieve healthy and strong life, the economic and social development, prosperity for the society and its constituent individuals (Buzbas, 2010).

Food insecure communities suffer from hunger and malnutrition. Better management of countries resources is necessary to prevent these problems. Therefore, indicators are to reduce hunger and food insecurity. Measurement food security at the household level is easy to evaluate of fast and are relatively inexpensive. These measurements are important because they lead to Predict the presence of food insecurity by governments and relevant organizations, to target and monitor better communities with the risk of food insecurity and to develop programs related to these issues (Hackettet al. 2008).

The idea of food security was presented for the first time at the World Food Conference in 1974 viewed solely from the perspective of having adequate availability of food on a national scale. Today, it is a condition in which all people have access at all times to enough food of an adequate nutritional quality for a healthy and active life (World Bank, 1986 as cited in Tollens, 2000). There are four dimensions to this: (i) availability of sufficient amount of food which is a function of

food production (ii) stability of supply over time which depends on the ability to preserve/store produced food and supplement available food through imports if necessary (iii) access to the available food which depends on income levels and its distribution and (iv) food utilization which encompasses procurement, ingestion and digestion all of which are dependent on nutritional quality, education and health (Tollens, 2000).

Food security exists at both the macro and micro levels. National Food Security (NFS), the macro dimension, is possession by a nation of the capacity to procure enough food through production or imports to feed its population. This is a necessary condition but not a sufficient condition for Household Food Security and Individual Food Security since food availability on a national scale does not preclude the lack of adequate access to such food by many of the inhabitants due to weak markets, poor infrastructure and information system, and inequality in resource and income distribution.

Various composite indices have since been developed to measure Food Security incorporating all the dimensions of food security. Popular among these are the Aggregate Household Food Security Index (AHFSI) by the United Nation's Food and Agricultural Organization (FAO) and the Food Security Index (FSI) of the United States Agency for International Development

(USAID)

Experts have argued that significant food and nutrition problems exist in Nigeria (Okuneye 2002, 2000; Famoriyo, 1998; Olayide, 1982). The basic aim of deregulatory policy measures in the food sub-sector was to correct this problem. Olayide (1982) conceived the food and nutrition problem in terms of food supply and demand imbalance.

Factors that constrain food supply and food demand invariably affect food security. On the supply side major factors hampering the supply of food in Nigeria are ownership of productive assets and resources which are biased against agricultural producers, nature of farm organization and technology which are crude and undeveloped, and the lack/primitive state of marketing infrastructures and mechanisms, all of which influence food output and availability. The demand for food is affected by poor growth rate/distributional structure of livelihoods, high food prices, preference structure which is largely in favor of foreign products, and various socio-cultural factors relating to poor state of nutrition education, intra household food distribution decisions, poor cooking technologies and low access to adequate health care (Tollens, 2000; Famoriyo, 1998; Norton and Alwang, 1993; Olayide, 1982)

Food security is said to exist when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. (FAO, 2005). Within this definition of food security, there are three components (Availability refers to quantity, Quality and Seasonality of the food supply in the affected area). It includes all local sources of food production including crop farming, livestock and fisheries. Access to food refers to the capacity of a household to procure sufficient food to satisfy the nutritional needs of all its members; it is measure of the household ability to acquire available food during given period through a combination of home production, stocks, purchases, barter, gifts, borrowing or food aid. The utilization component of the food security refers to the household use of food to which it has access to including food storage, processing and preparation as well as its distribution within the household. it

also involves individual ability to absorb and mobilize nutrients which can be affected by disease and malnutrition.(FAO. 2003)

Most of the world's poorest countries are in Africa and many of these face chronic poverty and food insecurity. Agriculture, of which 85-90 per cent is rain-fed in Sub-Saharan Africa, accounts for35 percent of the region's gross national product (GNP), 40 percent of exports and 70 percent of employment(World Bank, 2000). Clover (2003), Smith (2007), Babatunde *et al*. (2007), Swaminathan (2008), Oriola (2009), Fayeye and Ola(2007) are some of the works that have examined food security in developing countries. The authors argue that domestic policies in many developing countries have contributed very marginally to food security especially in Africa, and that, despite the growing global food production, hunger, malnutrition and famine are prevalent in many developing countries. From their analysis it is evident that improvement in food production in Sub Saharan Africa will boost per capita GDP, raise purchasing power and access to food. Their major conclusion is that research is needed on social, economic and new technologies that are output-driven, ecologically friendly, acceptable and affordable to the resource-poor farmers.

1.2 PROBLEM STATEMENT

Food is one of the basic necessities of life it serves as mechanism for sustenance and utilized in the right magnitude in relation to quality and quantity manifest into healthy and productive life. A substantial part of income is budgeted for food in order to meet nutritional needs. Thus, the productive capacity of human resources is a function of how well fed they. A food inadequacy regarding its quality and quantity is one of the characteristics of developing nations such as Nigeria (Omonona,2007 *et.al*)

The importance of food is also shown in the fact that it accounts for substantial part of household budget, the quality and quantity of farming household is great source of

concern to many farming families. Farmlands are frequently abandoned to the elderly for more lucrative enterprise and white collar jobs yet the income streams from the off farm activities is not enough to meet families needs. Despite increases in food production, Nigeria has had to rely on huge food importation largely because of relatively sluggish growth in per caput food production vis-a-vis population growth and high post-harvest losses which created gap between actual food production and quantity available for supply. Nigeria is a net importer of food and the food import bill as a proportion of total import has maintained an upward swing despite government's restrictive agricultural trade policy

Fluctuations in food prices worldwide are a serious cause of concern to food security in the world and Nigeria in Particular. It is a challenge that requires sustainable implementation of strategies to ensure food and livelihoods security. Therefore, it requires meticulous definition, identification of constituent parameters and verifiable and measurable indicators. The constituent parameters should essentially single out the major causal factors. Knowledge of the latter, in effect, serves as good basis for identification of perceived solutions and methodologies to guide implementation of the proposed remedial strategies.

Food security thus returned as the most important development agenda in the face of the extraordinary increase in food prices worldwide during the crisis and afterwards (Allen 2008). However, it is misleading to treat food security as independent of wider livelihood considerations. In addition to food, there are other interrelated dimensions of livelihood security such as economic, health, nutrition, education, environment, empowerment etc. It would be over optimistic to achieve the objective of food security target without attention being paid simultaneously to other dimensions of livelihoods.

Thus that requires the current socioeconomic conditions and factors which affect farming families' food security expressed for well informed interventions.

For this reasons, this research is set to answer the following research questions;

i) What are the socio-economic characteristics of the farming household in some selected LGAs of Kano state?

ii) What is the food security status of the farming household?

iii) What are the factors affecting Food Security status of the farming household in the study area?

iv) What are the food insecurity coping strategies of the farming household in the study area?

v) What are the challenges associated with food security of the farming household?

1.3 OBJECTIVES OF THE STUDY

The broad objective of the study is to analyze the food security status among farming household in some selected LGAs of Kano state .However specific objectives include the following:

i) describe the socio-economic characteristics of the farming household in the study area,

ii) examine the food security status of the farming household ,

iii) determine the factors affecting food security status of the farming household in the study area,

iv) Find out the food insecurity coping strategies adopted by the respondents; and,

v) Describe the challenges of the farming household in the study.

1.4 JUSTIFICATION TO THE STUDY

A sustainable food security and livelihoods approach has encouraged a deeper and critical reflection. This arises in particular from looking at the consequence of development efforts from a Local-level perspective, making the links from the micro-level, situated particularities of poor people's food security and livelihoods to wider-level institutional and policy framings at district, provincial, national and even international levels. Such reflections therefore put into sharp relief the importance of complex institutional and governance arrangements. The key relationships between food security.

The importance of agricultural production to the survival and livelihoods of human cannot be over-emphasized; food security and livelihoods must be an essential element of successful strategy for alleviating poverty. Food security is necessary for an active and healthy life but also relevant in economic and political space in relation to national security.

Therefore, the relationship between food security is complex and is influenced by a wide variety of factors that vary in importance across contexts and over time. Clarifying these factors, and the pathways through which they influence household livelihood and food security, would serve a number of purposes. Among them, it would help policy makers, donors and development practitioners formulate research questions, identify livelihood and food security indicators, make sense of research findings and practical experience, and improve intervention designs.

CHAPTER TWO:

LITERATURE REVIEW

2.1 THE MEANING OF FOOD SECURITY

According to the adopted definition of food security by World Food Summit (FAO, 1996), food insecurity exists when people do not have adequate physical, social or economic access to food as defined above. Food insecurity is limited or uncertain availability of nutritional adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways. In the same vein, Omonona, et al (2007), observed that food insecurity or lack of access to nutritionally adequate diet in a house hold or country can take various form. For example, chronic food insecurity occurs when there is a temporary decline in access to adequate food because of instability in food production, food prices or income shortfalls.

The agricultural sector, which in turn creates food availability and accessibility problems at the household and national levels. As the food situation in Nigeria worsened after the 1960s, a number of agricultural development institutions were launched.

The likelihood of Nigerians to have economic access to food can quickly be measured from what is happening to employment and income. Unemployment and underemployment rate have been quite high and have not improved significantly over the years. Meanwhile, the per capita income has been declining progressively, making Nigerians not to have economic access to food on continuous basis. Progressive increase in population without corresponding increase in food output seem to have worsened the food security in Nigeria (Omonona et al, 2007.

2.2 FOOD AVAILABILITY

Climate variability directly affects agricultural production, as agriculture is inherently sensitive to climate conditions and is one of the most vulnerable sectors to the risks and impacts of global climate change (Parry et al., 1999). Many factors impact the type of policies implemented at a national level (such as domestic politics, redistribution of land/wealth, exchange rates, and trade issues, etc.). Climate variability should be factored into these policies, as these policies can impact the availability of staple foods, for example, by providing incentives to grow crops appropriate for the climate conditions. In the case study sites, the two major forms of agricultural production are arable and pastoral farming. Because of the limited amount and uneven distribution of rainfall in time and geographic scope at the study sites, rainfall represents the most limiting factor for agricultural and livestock production. Its consequences are well known to local populations: the drying out of water sources, scarcity of grazing land, shortage of dairy products, and loss of wild plants for gathering, migration of grazers, bad harvests, and livestock losses, among others. For instance, it has been estimated by the World Bank that around 10% of the population of Sub-Saharan Africa is primarily dependent on their animals, whereas another 58% depend on varying degrees of their livestock (Arnell et al., 2002; Devereux and Edwards, 2004).

Increasing population pressures interacting with declining rainfall and reduced pasture has already begun to impact the livestock sector negatively. Rangeland condition is directly affected by the climate and in turn, directly affects the quality and quantity of small and large stock and associated livelihood activities (Ziervogel, et al, 2006). Production of food and other agricultural commodities may keep pace with aggregate demand, but there are likely to be significant changes in

local cropping patterns and farming practice. About 50 percent of total crop production comes from forest and mountain ecosystems, including all tree crops, while crops cultivated on open, arable flat land account for only 13 percent of annual global crop production. Production from both rainfall and irrigated agriculture in dry land ecosystems accounts for approximately 25 percent, and rice produced in coastal ecosystems for about 12 percent (Millennium Ecosystem Assessment, 2005). Furthermore, the ―greenhouse fertilization effect will produce local beneficial effects where higher levels of atmospheric CO2 stimulate plant growth. This is expected to occur primarily in temperate zones, with yields expected to increase by 10 to 25 percent for crops with a lower rate of photosynthetic efficiency (C3 crops), and by 0 to 10 percent for those with a higher rate of photosynthetic efficiency (C4 crops), assuming that CO2 levels in the atmosphere reach 550 parts per million (IPCC, 2007); these effects are not likely to influence projections of world food supply, however mature forests are also not expected to be affected, although the growth of young trees stands will be enhanced (Tubiello, et al,2007 and Norby et al, 2005). The impacts of mean temperature increase will be experienced differently, depending on location (Leff, Ramankutty and Foley, 2004). For example, moderate warming (increases of 1 to 3 ºC in mean temperature) is expected to benefit crop and pasture yields in temperate regions, while in tropical and seasonally dry regions, it is likely to have negative impacts, particularly for cereal crops. Warming of more than 3 ºC is expected to have negative effects on production in all regions (IPCC, 2007). The supply of meat and other livestock products will be influenced by crop production trends, as feed crops account for roughly 25 percent of the world‘s cropland. For climate variables such as rainfall, soil moisture, temperature and radiation, crops have thresholds beyond which growth and yield are compromised (Porter and Semenov,

2005). On the other hand, cereals and fruit tree yields can be damaged by a few days of temperatures above or below a certain threshold (Wheeler *et al.,* 2000). In the European heat wave of 2003, when temperatures were 6 ºC above long-term means, crop yields dropped significantly, such as by 36 percent for maize in Italy, and by 25 percent for fruit and 30 percent for forage in France (IPCC, 2007). Increased intensity and frequency of storms, altered hydrological cycles, and precipitation variance also have long-term implications on the viability of current world agro ecosystems and future food availability.

2.3 FOOD ACCESSIBILITY

Food accessibility refers to a situation whereby food is allocated through markets and non-market distribution mechanisms. Factors that determine whether people will have access to sufficient food through markets are considered to include income-generating capacity, amount of remuneration received for products and goods sold or labour and services rendered, and the ratio of the cost of a minimum daily food basket to the average daily income Non-market mechanisms on the other hand, include production for the farmer‘s own consumption, food preparation and allocation practices within the household, and public or charitable food distribution schemes. For rural people who produce a substantial part of their own food, climate change impacts on food production may reduce availability to the point that allocation choices have to be made within the household. A family might reduce the daily amount of food consumed equally among all household members, or allocate food preferentially to certain members, often the able-bodied male adults, who are assumed to need it the most to stay fit and continue working to maintain the family. Non-farming low-income rural and urban households whose incomes fall below the poverty line because of climate change impacts will face similar choices. Urbanization is

increasing rapidly worldwide, and a growing proportion of the expanding urban population is poor (Ruel *et al.,* 1998). Allocation issues resulting from climate change are therefore likely to become more and more significant in urban areas over time. Urban agriculture has a limited ability to contribute to the welfare of poor people in developing countries because the bulk of their staple food requirements still need to be transported from rural areas to the Urban Centers (Ellis and Sumberg, 1998). If climate change creates other more urgent claims on public resources, support for food distribution schemes may decline, with consequent increases in the incidence of food insecurity, hunger and famine related deaths.

2.4 FOOD AFFORDABILITY

In many countries, the ratio of the cost of a minimum daily food basket to the average daily income is used as a measure of poverty (World Bank Poverty Net, 2008). When this ratio falls below a certain threshold, it signifies that food is affordable and people are not impoverished; when it exceeds the established threshold, food is not affordable and people are having difficulty obtaining enough to eat. This criterion is an indicator of chronic poverty, and can also be used to determine when people have fallen into temporary food insecurity, owing to reduced food supply and increased prices, to a sudden fall in household income or to both. The incomes of all farming households depend on what they obtain from selling some or all of their crops and animals each year. Commercial farmers are usually protected by insurance, but small-scale farmers in developing countries are not, and their incomes can decline sharply if there is a market glut, or if their own crops fail and they have nothing to sell when prices are high. Most food is not produced by individual households but acquired through buying, trading and borrowing (Du Toit and Ziervogel, 2004). Climate impacts on income-earning opportunities can affect the ability to buy food, and a

change in climate or climate extremes may affect the availability of certain food products, which may influence their price. High prices may make certain foods unaffordable and can have an impact on individuals‘ nutrition and health. Changes in the demand for seasonal agricultural labour, caused by changes in production practices in response to climate change, can affect income-generating capacity positively or negatively. Mechanization may decrease the need for seasonal labour in many places, and labour demands are often reduced when crops fail, mostly owing to such factors as drought, flood, frost or pest outbreaks, which can be influenced by climate. Local food prices in most parts of the world are strongly influenced by global market conditions, but there may be short-term fluctuations linked to variation in national yields, which are influenced by climate, among other factors. An increase in food prices has a real income effect, with low-income households often suffering most, as they tend to devote larger shares of their incomes to food than higher-income households do (Thomsen and Metz, 1998). When they cannot afford food, households adjust by eating less of their preferred foods or reducing total quantities consumed as food prices increase. Given the growing number of people who depend on the market for their food supply, food prices are critical to consumers‘ food security and must be watched. Food often travels very long distances (Pretty *et al.,* 2005), and this has implications for costs. Increasing fuel costs could lead to more expensive food and increased food insecurity. The growing market for biofuels is expected to have implications for food security, because crops grown as feedstock for liquid biofuels can replace food crops, which then have to be sourced elsewhere, at higher cost.

2.5 FOOD PREFERENCE

Food preferences determine the kinds of food households will attempt to obtain. Changing climatic conditions may affect both the physical and the economic availability of certain preferred food items, which might make it impossible to meet some preferences. Changes in availability and relative prices for major food items may result in people either changing their food basket, or spending a greater percentage of their income on food when prices of preferred food items increase In southern Africa, for example, many households eat maize as the staple crop, but when there is less rainfall, sorghum fares better, and people could consume more of it. Many people prefer maize to sorghum, however, so continue to plant maize despite poor yields, and would rather buy maize than eat sorghum, when necessary. The extent to which food preferences change in response to changes in the relative prices of grain-fed beef compared with other sources of animal protein will be an important determinant of food security in the medium term. Increased prices for grain-fed beef are foreseeable, because of the increasing competition for land for intensive feed grain production, the increasing scarcity of water and rising fuel costs (FAO, 2007). If preferences shift to other sources of animal protein, the livestock sector‘s demands on resources that are likely to be under stress as a consequence of climate change may be contained. If not, continued growth in demand for grain-fed beef, from wealthier segments of the world‘s population, could trigger across-the-board increases in food prices, which would have serious adverse impacts on food security for urban and rural poor.

2.6 FOOD UTILIZATION AND NUTRITIONAL VALUE

Food insecurity is usually associated with malnutrition, because the diets of people who are unable to satisfy all of their food needs usually contain a high proportion of staple foods and lack the variety needed to satisfy nutritional requirements. Declines in the availability of wild foods, and limits on small-scale horticultural production due to scarcity of water or labour resulting from climate change could affect nutritional status adversely. In general, however, the main impact of climate change on nutrition is likely to be felt indirectly, through its effects on income and capacity to purchase a diversity of foods. The physiological utilization of foods consumed also affects nutritional status, and this – in turn – is affected by illness (World Bank Poverty Net, 2008). Climate change will cause new patterns of pests and diseases to emerge, affecting plants, animals and humans, and posing new risks for food security, food safety and human health. Increased incidence of water-borne diseases in flood-prone areas, changes in vectors for climate-responsive pests and diseases, and emergence of new diseases could affect both the food chain and people‘s physiological capacity to obtain necessary nutrients from the foods consumed. Malaria in particular is expected to change its distribution as a result of climate change (IPCC, 2007). In coastal areas, more people may be exposed to vector- and water-borne diseases through flooding linked to sea-level rise. Health risks can also be linked to changes in diseases from either increased or decreased precipitation, lowering people‘s capacity to utilize food effectively or often resulting in the need for improved nutritional intake (IPCC, 2007). Where vector changes for pests and diseases can be predicted, varieties and breeds that are resistant to the likely new arrivals can be introduced as an adaptive measure. A recent upsurge in the appearance of new viruses may also be climate-related, although this link is not certain. Viruses such as avian flu, ebola, HIV/AIDS and SARS have various implications for food security, including risk to the livelihoods of

small-scale poultry operations in the case of avian flu, and the extra nutritional requirements of affected people in the case of HIV-AIDS (FAO, 2008). The social and cultural values of foods consumed will also be affected by the availability and affordability of food. The social values of foods are important determinants of food preferences, with foods that are accorded high value being preferred, and those accorded low value being avoided. In many traditional cultures, feasts involving the preparation of specific foods mark important seasonal occasions, rites of passage and celebratory events. Food safety may be compromised in various ways. Increasing temperature may cause food quality to deteriorate, unless there is increased investment in cooling and refrigeration equipment or more reliance on rapid processing of perishable foods to extend their shelf-life. Decreased water availability has implications for food processing and preparation practices, particularly in the subtropics, where a switch to dry processing and cooking methods may be required. Changes in land use, driven by changes in precipitation or increased temperatures, will alter how people spend their time. In some areas, children might have to prepare food, while parents work in the field, increasing the risk that good hygiene practices may not be followed.

2.7 FOOD SYSTEM STABILITY

Many crops have annual cycles, and yields fluctuate with climate variability, particularly rainfall and temperature. Maintaining the continuity of food supply when production is seasonal is therefore challenging. Droughts and floods are a particular threat to food stability and could bring about both chronic and transitory food insecurity. Both are expected to become more frequent, more intense and less predictable as a consequence of climate change. In rural areas that depend on rainfall for agricultural production, changes in the amount and timing of rainfall within the

season and an increase in weather variability are likely to aggravate the precariousness of local food systems.

2.8 STABILITY OF ACCESS

As already noted, the affordability of food is determined by the relationship between household income and the cost of a typical food basket. Global food markets may exhibit greater price volatility, jeopardizing the stability of returns to farmers and the access to purchased food of both farming and non-farming poor people. *Food emergencies*: Increasing instability of supply, attributable to the consequences of climate change, will most likely lead to increases in the frequency and magnitude of food emergencies with which the global food system is ill-equipped to cope. Climate change might exacerbate conflict in numerous ways, although links between climate change and conflict should be presented with care. Increasing incidence of drought may force people to migrate from one area to another, giving rise to conflict over access to resources in the receiving area. Resource scarcity can also trigger conflict and could be driven by global environmental change. Grain reserves are used in emergency-prone areas to compensate for crop losses and support food relief programmes for displaced people and refugees. Higher temperatures and humidity associated with climate change may require increased expenditure to preserve stored grain, which will limit countries‘ ability to maintain reserves of sufficient size to respond adequately to large-scale natural or human-incurred disasters.

2.9 COST OF FOOD AND FOOD PRICES IN NIGERIA

Okuneye (2001) observes that output of food crops have been erratic in Nigeria for quite some time and it is expected therefore that the cost of production of agricultural products would rise with an attendant increase in the cost of food. According to him, the implication of this is that the sector has suffered particularly

with the phasing out of World Bank loans and counterpart funding from the Federal Government to the Agricultural Development Programmes (ADPs). Arising from this, food prices have continued to rise. The resultant effects of these are the problems of malnutrition, household food insecurity and restricted access to nutritious and sufficient food, culminating in greater effects of poverty on many Nigerians.

Low market stocks and high demand within and outside Nigeria and pushing the prices of major staple foods higher, threatening food security in Nigeria. Unless significant measures are taken by the government and its partners to support farming, particularly off-season farming, high-level of food security as well as high rates of malnutrition are likely to emerge. (USAID Report, 2007). According to the report, prices of maize, millet and sorghum are now above their four-year averages. The increase in prices of these three stable cereals limit poor household's food access. The report stressed that a further low market stocks and high demand from households and neighbouring countries are likely to result in further price increase in near future. Accordingly, this will further limit food access for poor households especially in northern Nigeria. Poor household access in Nigeria is increasingly constrained by steadily rising food prices.

Since economic development involves improvement in the growth of output, fair and adequate distribution of the value of output/income, institutional development, the supply and sustenance of basic necessities of life (pipe-borne water, food, good health, education, etc) at reasonable prices would significantly contribute to the alleviation and eventual eradication of poverty.

Ogwumike (2001) observes that most of the poverty alleviation strategies adopted in Nigeria were well focused on rural areas and on the agricultural sector.

This is because poverty in Nigeria is largely a rural phenomenon with agriculture accounting for the highest incidence over the years. Besides, poverty reduction depends to a large extent on the agricultural sector, because the sector not only provides food for consumption as well as materials for manufacturing activities, it is the main employer of labour especially in the rural areas.

2.10 FOOD SECURITY AND POVERTY ALLEVIATION

Poverty reduction vis-a-vis food security requires the adoption of a holistic approach involving both the government (all tiers) and the civil society for it to achieve a sustainable reduction in poverty incidence. Sustainable poverty reduction strategy should not focus narrowly on social welfare measures; rather asset redistribution and creation of incentive structures that can enhance the rate and pattern of economic growth should be seen as essential components (Ogwumike, 2001).

A number of researchers (Aluko 1975; Olayije and Essang 1975; Abubakar 1975 and Ogwumike 2001), suggested that the following could be possible way out of poverty as well as achieving food security:

(b) increasing the supply of essential commodities through the lowering of custom duties, applying government subsidies, improvement of port facilities and cheapening of means of distribution;

(c) raising the product price of cash crops and ploughing oil money into the farms by government subsidizing costs of fertilizers, farm implements, etc.

2.11 FOOD PRICES AND HOUSEHOLD INCOME:

One of the main thrusts of the macroeconomic deregulation programme in Nigeria was the radical adjustment of agricultural pricing policy. The fixing of commodity prices through commodity boards was dropped and agricultural produce prices became determined by market forces. This along with rapid inflation resulting from the massive devaluation of the Naira had the immediate impact of huge increase in nominal prices of agricultural and food products even though increase in real prices was much less (Adubi, 1996). Food prices have been growing in Nigeria since the 1970s, however the rate of growth in prices became much more pronounced from the late 1980s when the nation's economy became deregulated. The Food Price Index in 1995 was about 2000% of the 1985 price, a period of just about 9 years and the 2005 Food Price Index was almost 7000% of the 1985 price. Rising food prices, ceteris paribus, implies that consumers' ability to access available food supplies will be reduced unless greater increases are recorded in income and/or income is redistributed in favour of the poor (Adubi, 1996).

2.12 FOOD UTILIZATION:

Food is utilized: At the household level, sufficient and varied food needs to be prepared safely so that people can grow and develop normally, meet their energy needs and avoid disease.

Olayemi (2002) describes food security as a phenomenon relating to individuals. It is the nutritional status of the individual household member that is the ultimate focus, and the risk of the adequate status not being achieved or becoming undermined. Household food security is the application of this concept to the family level, with individuals within household as the focus of concern.

Food security implies access to and ingestion of adequate amount of good quality food (Tollens, 2000). Adequacy of food intake is generally considered in terms of some minimal recommended level of food (usually energy intake but also protein, fat and the micronutrients) per caput per period. Table 6 below shows the nutritional indices of food consumption in Nigeria for selected periods between 1970 - 1996. Two important deductions are inherent from Table 6. The first is that the food consumption status of Nigerians which was on the decline since the 1970 was positively affected by the deregulation of the economy in the immediate deregulation period. Per caput calorie intake improved, from 1680.4 kcal just before deregulation, to 2023.6 in the 1985-89 periods before declining to 1955.5 in the 1995-96 periods. The second deduction is that despite the improvements recorded in food consumption after deregulation, the nutritional status of Nigerians remains poor even after deregulation. In relation to daily minimum requirement, deficits were recorded in food consumption throughout the whole of the period under review. The nutritional problems facing Nigerians was recently captured in a national survey on food security (FOS, 2003).

2.13 CLIMATE CHANGE AND CHALLENGES OF FOOD SECURITY AND AGRICULTURAL PRODUCTIVITY

According to the Intergovernmental Panel on Climate Change (IPCC, 2007). Agriculture is particularly vulnerable to climate change. Projections to 2050 suggest both an increase in global mean temperatures and increased weather variability, with implications for the type and distribution of agricultural production worldwide (Shaw et al, 2007). Climate change worsens the living conditions for many who are already vulnerable, particularly in developing countries because of the lack of assets and adequate insurance coverage. Climate change impacts the four key dimensions of

food security – availability, stability, access, and utilization. Availability of agricultural products is affected by climate change directly through its impacts on crop yields, crop pests and diseases, and soil fertility and water-holding properties. It is also affected by climate change indirectly through its impacts on economic growth, income distribution, and agricultural demand. In addition, stability of crop yields and food supplies is negatively affected by variable weather conditions. Physical, economic, and social access to food would is affected negatively by climate change as agricultural production declines, food prices rise, and purchasing power decreases. Last but not least, climate change poses threats to food utilization through effects on human health and the spread of diseases in geographical areas which were previously not affected. By 2080, agricultural output in developing countries may decline by 20 percent due to climate change, while output in industrial countries is expected to decrease by 6 percent. Also due to climate change, yields in developing countries could further decrease by 15 percent on average by 2080 (FAO, 2008). According to the United Nations Joint Press Kit for Bali Climate Change Conference, 2007, the following impact and projections were stated with specific focus to SSA,

i. **Climate change will increase hunger and malnutrition:** Climate change will worsen the living conditions of farmers, fishers and forest-dependent people who are already vulnerable and food insecure. Hunger and malnutrition will increase. Rural communities dependent on agriculture in a fragile environment will face an immediate risk of increased crop failure and loss of livestock. Mostly at risk are people living along coasts, in floodplains, mountains, dry lands, and the arctic. In general, poor people will be at risk of food insecurity due to loss of assets and lack of adequate insurance coverage.

ii. **Climate change will particularly affect vulnerable people and food systems:** More frequent and more intense, extreme weather will have adverse immediate impacts on food production, food distribution infrastructure, on livelihood assets and opportunities in both rural and urban areas. Changes in mean temperatures and rainfall, increasing weather variability and rising sea levels will affect the suitability of land for different types of crops and pasture, the health and productivity of forests, the incidence of pests and diseases, biodiversity and ecosystems

Loss of arable land is likely due to increased aridity, groundwater depletion and the rise in sea level.

iii. **Agriculture contributes to climate change:** Greenhouse gas emissions from the food and agriculture sector contribute over 30 percent of the current annual total emissions (deforestation 17, 4 percent, agriculture 13, 5 percent).

iv. **Sustainable forest management:** Around 13 million hectares of forests are annually being lost due to deforestation, according to FAO. Reducing forest degradation and deforestation helps to protect water and soil resources as well as biodiversity and it contributes to the reduction of greenhouse gas emissions. Climate change will also affect the health of forests through an increase of forest fires and pests and diseases. Without economic or other incentives and political will, it will be difficult to stop deforestation and forest degradation.

v. **Fishing and aquaculture are threatened by climate change:** Climate change is having an impact on oceans, seas, lakes and rivers and on the animals and plants that are found in them. Climate change will affect about 200 million people and their families worldwide who live by fishing and aquaculture. Some fish resources will become less abundant while important species may move to other areas where they are less available to the fishers. This will make it harder for many fishing

communities to continue to make a living from fish or to provide fish for feeding their families. Coastal communities may also be displaced by rising sea levels and will be forced to find new places to live and new ways to earn a living.

vi. **New patterns of pests and diseases will emerge:** Humans, plants, livestock and fish will be exposed to new pests and diseases that flourish only at specific temperatures and humidity. This will pose new risks for food security, food safety and human health.

Obviously, climate change is no longer a problem to be faced in the future; it is a reality that is seriously affecting the Earth already, especially challenging agricultural productivity and food security in developed and developing economies of the world and thus requires urgent attention. Shah et al (2007) have argued that disruptions or declines in global and local food supplies due to climate change can be avoided through more efficient irrigation and watershed management, improved land cultivation and livestock management and the development of crop varieties and breeds that are adapted to changing climatic conditions. Plant and animal biodiversity increases resilience to changing environmental conditions and stress (drought, salinity, flooding). Land use for livestock production, including grazing land and cropland dedicated to the production of feed, represents approximately 70 percent of all agricultural land in the world (UNDP, 2007).

Climate change and energy: critical implications for food security Climate change and energy are two major factors redefining the world food equation and having an enormous impact on the food security of poor people. Climate change is now not only a better-understood scientific fact, but also a phenomenon which has already affected global temperatures, regional weather patterns, and physical and biological systems.

Attributed directly or indirectly to human activity, climate change puts additional pressure on already over-exploited natural resources. It negatively affects crop yields, stability of food supplies, and the ability of people to access and utilize food in many parts of the developing world. Although rich countries are responsible for most greenhouse gas emissions (GHGs) the impact of climate change is expected to be most severe in developing countries and on poor people. Low-income communities depend directly on agriculture, forestry, fisheries, aquaculture, and climate-sensitive resources. They also have inadequate complementary services, such as health, education, and insurance services. Bryant et al (2000) stated that the risks climate change poses on food security are particularly pressing at a time of high oil prices, at levels surpassing $130 a barrel in May 2008 (IFAD, 2008). High fuel prices make agricultural production more expensive by raising the cost of fertilizers, irrigation, and transportation. With high oil prices, calls for increased energy efficiency, and government biofuel subsidies, agriculture-based energy production has surged. Farmers have switched massively to production of crops for ethanol and biodiesel. The increased level and volatility of agricultural prices is negatively impacting the purchasing power and the food security of the poor (von Braun, 2007). Food security depends on availability of food, access to food, and utilization of food (FAO, 2000). Food availability refers to the existence of food stocks for consumption. Household food access is the ability to acquire sufficient quality and quantities of food to meet all household members‘ nutritional requirements. Access to food is determined by physical and financial resources, as well as by social and political factors. Three facets of the food system need to be met in order for food security to be realized. Each of these facets can be impacted by climate variability, and these impacts are:

2.14 THREATS OF CLIMATE CHANGE FOR DEVELOPING COUNTRIES AND FOOD INSECURE PEOPLE

Emissions of GHGs between 2000 and 2006 have increased on average by 3.1 percent per annum, compared to 1.1 percent in the previous decade, and are likely to continue to grow rapidly in view of high economic growth and lack of effective mitigation strategies (Garnaut Climate Change Review 2008). There is high confidence that natural systems are affected by changes in climate, especially by rising temperatures (IPCC 2007). The effects of climate change are heterogeneous and region-specific. Some positive effects of climate change such as CO2 fertilization of plants could contribute to increasing food production and security. Climate change could lead to increased water stress, decreased biodiversity, damaged ecosystems, rising sea levels, and potentially, to social conflict due to increased competition over limited natural resources. Small-holder agriculture, pastoralist, forestry, and fisheries and aquaculture are among the systems most at risk (FAO 2008). The threats of climate change are more severe in developing countries, partially due to geography. Many low-income countries are located in tropical and subtropical regions, which are particularly vulnerable to rising temperatures, and in semi-desert zones, which are threatened by decreasing water availability. By 2080, agricultural output in developing countries may decline by 20 percent due to climate change, while output in industrial countries is expected to decrease by 6 percent (Cline, 2007). Also due to climate change, yields in developing countries could further decrease by 15 percent on average by 2080 (Fischer et al. 2005). Taking into account the effects of climate change, the number of undernourished people in Sub-Saharan Africa may triple between 1990 and 2080. Climate change shocks also erode the long-term opportunities for human development and could exacerbate inequalities within countries (UNDP 2007). Climate change

impacts the four key dimensions of food security – availability, stability, access, and utilization (e.g. Schmidhuber and Tubiello 2007). Availability of agricultural products is affected by climate change directly through its impacts on crop yields, crop pests and diseases, and soil fertility and water-holding properties. It is also affected by climate change indirectly through its impacts on economic growth, income distribution, and agricultural demand (Schmidhuber and Tubiello 2007). In addition, stability of crop yields and food supplies is negatively affected by variable weather conditions. Physical, economic, and social access to food would is affected negatively by climate change as agricultural production declines, food prices rise, and purchasing power decreases. Last by not least, climate change poses threats to food utilization through effects on human health and the spread of diseases in geographical areas which were previously not affected.Current responses to climate-change threats—particularly those affecting agriculture in developing countries and hence, the majority of the rural poor—underestimate the gravity of the situation. The existing climate risk management options can have substantial benefits for some cropping systems if climate change is moderate, but will not be efficient if climate change is severe (Howden et al. 2007). Poor and food-insecure people have often failed to receive the benefits of current climate change science. The ability of the poor to take advantage of climate change mitigation and adaptation technologies is also linked to their education, cultural practices, skills, and access to financial assets, as well as to the existence of supporting institutions and the relevance and applicability of technologies to their particular needs. It is important to maximize small farmers‘ knowledge, which is often marginalized by large-scale efforts to promote agricultural production. Small farmers are often at a disadvantage due to economies of scale.

Horizontal cooperation schemes and scale-neutral technologies are some of the ways to overcome these barriers for small farmers.

2.15 MEASUREMENT OF FOOD SECURITY

There are two major methods that are widely used to measure food security although both are subject to measurement problems. The first method involves estimation of gross household production and purchases over a period of time. Estimate growth and depletion of food stocks held over that period. The second method is to undertake a twenty -four hour recalls of food consumption for individual members of a household and analyze each type of food mentioned for its calorific content. This method gives data for one aspect of food security. Food consumption estimates.

However, it has several drawbacks such as memory lapses, observer bias, respondent fatigue, a short and possibly unrepresentative recall period and high data collection costs. Further, the two methods do not capture important aspects of food security in relation to vulnerability, access and suitability. The two methods only capture elements of sufficiency none of them has been used to monitor food security include food balance sheets, rainfall and marketing data and even anthropometrical measurements (Maxwell & Frankenberger, 1992). They have noted a variety of indirect indicators that can be used as predictors for food security at the household level. These include; asset ownership, household size, and dependency ratio.

Their discussion was based on single indictors and they suggest that combining the indicators could improve specificity. They however do not say how widely different indicators could be combined. The first food security measurement and research conference was held in 1994 in USA. The aim was to synthesize the direction of food security measurement and develop a consensus on the content. The second food security measurement and research priorities. Consequently in the year 2000, a first

attempt to measure household food security was done by the United States department of agriculture (USDA).They used a standard six-item subset of indicators to capture two thresholds of identifiable household food security. The measurement that they described was only concerned with food insecurity and hunger when household in the United States. Their measurement technique however cannot be used in developing country like Kenya because of several differences in the structure of wages, livelihood set-ups among others. Food insecurity indicators are also likely to vary very widely between a developed livelihood set-up like USA and in a developing country like Kenya.

A traditional approach to measuring food security has been limited by the fact that food consumption figures are only used or only one indicator or a proxy of food security is used. USDA, for instance, uses the 18 item scale that basically captures 4 scenarios of a household's food security.

These include food budget and supply inadequacy, inadequate quality, reduced intake and consequences of reduced intake.FAO,1999 proposes the six item scale that only captures the food eaten in household and whether the household can afford.

However the scale developed by FAO,1999 cannot be used to measure the severe levels of food insecurity especially where hunger is experienced in high-risk groups of developing countries. Maxwell, 1992 measured food security using coping strategies only as an indicator. The above efforts to measure food security have been able account for all aspects of food security as outlined above and there is no consensus to date among social scientists on how food insecurity should be measured and whatever is used for a food security survey is just a matter of convention. Other lessons learned from measurements of other social phenomena such as poverty and childhood development are available. Official poverty line has been used to measure a constant

level of purchasing power or constant living standard. Much more recent work on measurement of poverty using fuzzy sets in Switzerland shows that the use of several poverty indicators helps in giving a more complete picture of poverty than the sole use of a few indicators developed national food insecurity prevalence. The specific scaling procedure that was used in a Rasch model, which is a form of non-linear factor analysis that fits within the general family item response theory models. The model is widespread in educational testing where the underlying premise is that the probability of affirming a question increases with the household underlying level of food insecurity and falls as the severity of the condition measured by the particular item goes up.

2.16 FOOD CONSUMPTION IN DEVELOPING COUNTRIES

Broad trends in food production and prices indicate a decline in the share of people who do not have access to adequate food levels. However, the aggregate figure masks variation in food security among regions, countries, and income groups within countries. The food security position of low-income countries is evaluated by projecting the gaps between food consumption (domestic production, plus commercial imports, minus non-food use) and consumption targets through the next decade. The targets are: 1) maintaining per capita food consumption at 1996-98 levels (also referred to as status quo), and 2) meeting minimum recommended nutritional requirements (USDA, 1999)

In 1999, the food gap to maintain per capita consumption at 1996-98 levels in 67 low-income developing countries is estimated at nearly 13 million tons, about 2 million tons more than estimated for 1998. Around 400,000 tons of the increase arose from adding a new country, North Korea, to the analysis this year. The gap to meet minimum nutritional requirements is estimated to be higher at 15 million tons.

Despite the increase in the gap, the share of people who do not have access to adequate food levels is projected to decline from 34 percent in 1999 to 32 percent in 2009. The 67 countries in the study either have been or may become food aid recipients. In the projections, however, the availability of food aid is excluded. Therefore, depending upon future food aid availabilities, some or all of the projected food gaps can be eliminated. (USDA, 1999)

During the next decade, the food gaps with respect to both consumption targets are projected to widen. The gap to maintain per capita consumption increases 37 percent to 17.4 million tons in 2009, while the nutritional gap expands 54 percent to more than 23 million tons. Food consumption is projected to fall short of the nutritional requirement in 30 countries, while 45 countries are expected to face a decline in per capita consumption in 2009. Unequal purchasing power exacerbates food insecurity in the 67 countries. As would be expected, the estimated results show food consumption in the lowest income quintile to be much lower than that of the highest income quintile. For example, food consumption by people in the lowest income quintile in the Latin American countries—the region with the most skewed income distribution—is estimated to equal only 79 percent of the minimum nutritional requirement in 1999, compared with 126 percent in the highest income quintile. For the 67 countries as a whole, the "distribution gap" (the amount of food needed to raise consumption of each income group to the minimum nutritional requirement) is projected to widen 17 percent over the next decade and exceed 33 million tons in 2009. The growth of this gap surpasses the growth in the number of people becoming food insecure. In fact, the number of people failing to meet nutritional requirements is projected to grow less than 13 percent to nearly 1 billion by 2009. This implies that

the distribution- related problems will intensify more than they will spread. (USDA, 1999)

Sub-Saharan Africa is projected to account for about 50 percent of the food gap to maintain consumption and 70 percent of the nutritional gap of the 67 countries in 2009. Despite significant growth in the region's agricultural production, the relatively high population growth and limited financial resources that constrain imports will lead to declining per capita consumption. (USDA, 1999)

The distribution gap, which incorporates the impact of skewed income distribution, is projected to be 33 percent higher than Sub-Saharan Africa's average national nutritional gap. Based on the estimated distribution gap, the number of people who fail to meet their nutritional requirement is projected to jump 40 percent over the next decade to 438 million in 2009. This means that 60 percent of the region's population will be food insecure. (USDA, 1999)

Afghanistan, Bangladesh, and North Korea account for all of the nutritional food gaps in the Asian region. The number of people who cannot meet their nutritional requirements is projected to decline 19 percent through 2009.Per capita food consumption in the Latin American and Caribbean countries is expected to stagnate over the next decade. The projected distribution gap for the region is more than two times the average national nutritional gap in 2009.

The number of people who cannot meet their nutritional requirement is projected to increase 32 percent between 1999 and 2009. The region's food import dependency is projected to rise to 47 percent by 2009, indicating that foreign exchange availability to support food imports will be crucial to the food security of Latin America and the Caribbean over the long term Per capita food consumption in North Africa, on average, is projected to remain above nutritional requirements during the next decade.

However, a relatively small food gap to maintain base per capita consumption levels is projected, primarily in Algeria and to a lesser extent in Egypt Of the five New Independent States included in the study, only Tajikistan is projected to be vulnerable to food insecurity in the long term. Consumption in the other four countries is projected to rise, assuming continued peace.

2.17 DEFINITION OF VARIABLE UNDER STUDY

The model used the various household resources as the factors influencing food security status and their anticipated effects on household's poverty Status are presented here: Among the potential factor(s) influencing households' food security.

The age of a household head (X_1): as other demographic factor, was also tested for any association with poverty status. The assumption here was the higher the age of the head, the better the food security status as there may be more options of making food available from both agricultural and non-farm opportunities. According to the theoretical as well as empirical evidences in the previous works in developing countries subsistence agricultural production with limited participation in non-agricultural activities, large household size exert more pressure on consumption than the labour it contributes to production. The per capita food availability declines as family size increases due to population growth. Hence, large family size is more likely related to being food insecure in a household

Household size ((X_2): is one factor expected to have influence on food security status of a household. According to the theoretical as well as empirical evidences in the previous works in developing countries like Nigeria, subsistence agricultural production with limited participation in non-agricultural activities, large household size exert more pressure on consumption than the labour it contributes to production.

The per capita food availability declines as family size increases due to population growth. Hence, large family size is more likely related to food insecured.

Farm size (X_3): is the total farm land cultivated by the farm household measured in hectare. The larger the farm size, the higher the production level. It is, thus, expected that households with larger farm size are more likely to be non poor than those with smaller farm size. The expected effect on poverty Status is positive.

Contact with extension agent(X_4): This refers to weather the respondents have access to extension services. The contact with the extension services could grantee access to better farming technologies which in return improve production and income of the farmers. The influence of the contact on food security status is expected to be positive.

Years of farming experience ((X_5): This refers to the number of years spent in farming. This is expected to have positive influence on food security status of the farming household because as the years of farming experience increase there should be specialization in farming as an occupation.

Annual farm income (X_6): refers to the sum total of the earnings of the household in a year from agricultural activity. The income is expected to boost household's food production and also access to more quantity and quality food. The expected effect of this variable on poverty status is positive.

Access to educational (X_7): Educational attainment by the household head could lead to awareness of the possible advantages of modernizing agriculture by means of technological inputs; enable diversification of household incomes which, in turn, would enhance households' food supply

2.18 SOCIOECONMIC FACTORS AFFECTING FOOD SECURITY

Age

Mannaf (2012) Stated the older the household head, the lower the probability that the household would be food secure. A unit increase in the age of household head will reduce the probability of household to be food secure .This could be attributed to the fact that the productivity of old household head will decline as they get old thereby has impact on their food security status. This was also in consonance with Babatunde et al.(2007) who claimed that increase in age decreases food security.

Household size

According to Mannaf (2012) increase in household size will reduce the probability of household to be food secure increase in household size would lead to decrease in the food security status of the household. This is because increase in the member of household means more people are eating from the same resources, hence, the household members may not be able to take enough food when compared to a situation with smaller household size, thus increasing the probability of the household to be food insecure. The is in line with the findings of Babatunde et al.(2007), Seid (2007) and Oluyole et al., (2009).

Farm size

Farm size is the total area of land cultivated to food and cash crop by households, measured in hectares. Positive relationship has been established between farm size and improvement in households' income and food security (FAO et al., 2005;). The larger the farm size of the household, the higher the expected level of food production. It is, therefore, expected of a household with a larger farm size to be more

food secure than a household with a smaller farm size, all things being equal. Hence the expected effect on food security is positive.

Farm income

Though there are longer term nutritional benefits in the introduction of additional sources of income high levels of malnutrition have been observed where cash cropping has been suddenly introduced. The reason for this seems to be the pressure for the use of limited time generated by cash incentives at the expense of time spent on food crop production and for care and feeding of the child.FAO (1981)

Thus although increased income has a positive effect on household food intake, it does not always result in improved nutritional status (FAO , 2008). Account has to be taken of the factors that mitigate the expected effect of increased income on access to food and on any subsequent nutritional benefits if food security projects will have the intended effects. Income generating food security programmes must also pay attention to nutrition education, targeting women, provide seasonal buffer mechanisms like seasonal credit or saving schemes, and also deal with the most prevalent health problems if they are to have the intended effect of improving nutritional status.

Farming experience

This refers to the number of years household head has engaged in farming. All things being equal, an experienced household head is expected to have more insight and ability to diversify his or her production to minimize risk of food shortage. An experienced farmer is also expected to have adequate knowledge in pest and disease management as well as good knowledge of weather. Research findings revealed a positive relationship between farming experience and food security status (e.g.,

Feleke et al.,2003, Oluyoleet al.,2009). The expected effect of this variable on food security is, therefore, positive.

Level of education

Education is a social capital which is expected to have positive influence on household food security. According to Shaikh (2007), the educated individuals have capacity to process and apply the information passed on to them. Lower educational levels impede access to better job opportunities in the labour market, and hamper more profitable entrepreneurship (FAO, 2012). An increase in female education not only increase their returns but also has the potential of reducing the fertility level of women, improve their productivity as well as contribute positively to the national growth (Herzeet al.,1991).The expected effect of this variable on food security is positive.

CHAPTER THREE:

METHODOLOGY

3.1 THE STUDY AREA

This study was carried out in Kano State, which is situated in the Sudan Savannah agro- ecological zone of Nigeria between latitudes 13^0 N in the North and 11^0 N in the South and longitudes 8^0E in the West and 10^0E in the East. The state is bordered to the west and Northwest by Katsina State, to the East of Northeast by Jigawa State, to the south by Bauchi State and to the southwest by Kaduna state (KNSG, 2006).

The 2006 population census estimates Kano State population at 9,383,683. Using the annual growth rate of 3.3% the projected population of Kano state by year 2015 could be 12,326,280. The major tribes are Hausa and Fulani ethnic groups but other ethnic groups inhabiting the state include almost all major and minor tribes in Nigeria. Other Nationals from different continents of the world are also found in Kano. Increase in populations is put at 7 percent per annum (KNSG, 2006).

In the rural area many inhabitants are either farmers, pastoralists; sedentary or nomadic, or agro-pastoralists, combining livestock-rearing and crop production where condition allow. The settled life style of pastoralists in the state thus made it possible for them to be involved in other economic activities which they could not have possibly taken up while in migration. Such economic activities are as crop and small ruminant livestock production, marketing of farm and livestock products, provision farm labor etc. serve to improve the economic condition and standard of living of the pastoralists' households.

The climate of the study area is tropical dry climate with a mono modal rainfall distribution averaging 600mm per annum with most rains occurring between May and

September. Air humidity is high during the wet season and very low during the dry season, thus make the state free from tsetse fly, hence conducive for livestock production. Average temperature is 29^0 c with minimum temperature occurring from November to February and highest temperature occurring in March and April.

Natural vegetation of the state is savannah type, although this has given way to culture vegetation. Most of the area of is contained within the Sudan savannah. The trees are up to 20 meters high while the grasses are up to a meter. Some of the trees such as Baobab and Acacia develop spreading canopies, thereby providing both enabling environment and feeds for livestock production.

The state is divided into 44 Local Governments Areas and is agriculturally classified into three Agricultural Development Programme (ADP) zones by Kano State Agricultural and Rural Development Authority (KNARDA, 1995). These are zones I, zone II and zone III with their respective Local Government Areas (LGAs).

Zone I: Rano, Tudunwada, Doguwa, Bebeji, Kiru, Garunmallam, Kura, Kumbotso, Madobi, Gwarzo, Karaye, Rogo, Kibiya and Bunkure.

Zone II: Danbatta, Bich, Bagwai, Shanono, Tsanyawa, Kunchi, Kabo, Rimingado, Tofa, DawakinTofa, Makoda, Minjibir and Ungogo.

Zone III: Gaya, Ajingi, Wudil, Albasu, Garko, Takai, Sumaila, Dawakin Kudu, Warawa, Gezawa, Gabasawa, Kano municipal,Gwale, Tarauni, Dala, Fagge and Nassarawa.

3.2 SAMPLING TECHNIQUE

A multistage random sampling technique was used for data collection for the study area because of homogenous nature of farmers in the state. The first stage simple

random selection of two (2) zones from three administrative zones of Agricultural development programme (ADP) out of the three (3) agricultural zones in the state. For this reason Zone I and Zone II was selected. The second stage involved simple random selection of two (2) LGAs from list of number of LGAs from each of the two selected agricultural zones by balloting system of random selection. The selected LGAs were Bunkure and Rano in zone I, Makoda and Kunchi in Zone II. A total of four (4) LGA were selected. Third stage involved simple random selection of two (2) villages from a list of villages from each of the four (4) LGAs selected. A total of eight (8) villages were selected for the study.

Fourth stage involved proportionate simple random selection of 10% of farmer groups from each of the eight (8) selected villages. A total of twenty four (24) farmer groups of twenty five members (25) each was selected. The last stage involved proportionate random selection of 20% of the members of each of the farmer group. A total of 120 respondents were selected for the study.

Table 1: Proportion of sample frame, Sample size and location

Selected Zones	Selected LGAs	Villages	Farmers group	10%of farmer group	No of farmers from each group	20% of the sampling frame
Zone I: Rano	**Rano**	**Bunkure** **Gwamma**	40 30	4 3	100 75	20 15
	Bunkure	**Rurum** **Munture**	30 20	3 2	75 50	15 10
Zone iii: Danbatta	**Makoda**	**Welari** **Maitsidau**	30 30	3 3	75 75	15 15
	Kunchi	**Shuwaki** **Sodawa**	30 30	3 3	75 75	15 15
TOTAL	4	**8**	**240**	**24**	**600**	**240**

Source: Preliminary Survey, 2014

3.3 DATA COLLECTION

Data for the study was collected from primary sources. The primary data was collected with the aid of questionnaires which were administered to the selected farmers. The data were collected by the research with the assistance of trained enumerators. Data collected include information on the socioeconomic characteristic of the respondents such as age, sex, educational status, marital status, household size, years of experience, and main occupation. Pattern of food consumption, food production, and other sources of food, such as beans, sorghum, rice, millet and maize.

3.4 ANALYTICAL TOOLS

The analytical tools used for achieving the objectives of the study were descriptive statistics, and the Logit regression model. Descriptive such as mean, range (minimum and maximum) , and standard deviation were used.

3.4.1 Descriptive statistics

Descriptive statistics were used to analyze data obtained to achieve objective one (1), objective two (2), objective four (4) and Objective five (5). Descriptive statistics such as frequency distribution and percentages, measures of central tendency such as mean and standard error were employed in describing the socioeconomic characteristics of the respondents, food security status, food insecurity coping strategies and identifying challenges of farming household in Kano state.

3.4.2 Logit regression model

Logit regression analysis was used to analyze factors influencing food security status among farming household in Kano state. The model was specified as follows:

The Logit model was used to achieve objective (3), the model is specified as:

$$S_i = \alpha + \beta X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + U \quad \text{..... (i)}$$

Where:

S_i = Food Security Status (1= yes, 0= otherwise)

X_1 = Age of the Head of the Household (number of years)

X_2 = Household size(number)

X_3= Farm size (ha)

X_4 = Access to extension service (Yes = 1, 0 =otherwise)

X_5 = Years of farming experience (number of years)

X_6 = On- farm Income (Naira).

X_7= Access to formal Education (Yes = 1 , 0 =otherwise)

α = constant term

U = Error term

Food Security Line

Estimating Food Security Index: To establish food security status of farming households in the study area, the study constructed Food Security Index (*Z i*) and determined the food security status of each household based on the food security line using the Recommended Daily Calorie Required approach as used by Babatunde*et al.,* (2007).Households whose Daily Calorie Intake were equal or higher than Recommended Daily Calorie was considered food secured while households whose Daily Calorie Intake is below the Recommended Daily Calorie Required would be considered food insecured households. The Food Security Index is given as:

Z i= Yi/R ……..(ii)

Where : *Z i* represents Food Security Index of ith household, Yi is Actual Daily Calorie Intake of ith households and R is the Recommended Daily Calorie Requirement of i^{th} household. To obtain Per Capita Daily Calorie Intake; daily calorie intake of each household was divided byits' household size. Households' Per Capita Daily Calorie Requirement was obtained by dividing the households' Daily Calorie Requirement by household size.

To determine the Daily Recommended Calorie Requirement or food needs of each farming household, the FAO and IFPRI (2000) standard of 2,900 kcal was used. The households' composition or daily food requirement (Daily Calorie Requirement) was estimated by first of all categorizing members of each household into different age

group based on the fact that different age groups have different calorie requirements. The daily energy (calorie) requirements of various compositions of the households were converted into adult equivalent using the equivalent scales as shown in

Table 2: Energy (calorie) requirements of various composition of household

Age Category(Years)	Average Allowance per day	Equivalent Scale
Children (<6)	1150	0.4
Children (6-18)	2250	0.7
Adults(>18)	2900	1

Source: FAO Stat (2000)

Total household composition or calorie requirement was obtained by multiplying the total number of adult in each households by the recommended calorie requirement of 2,900kcal (i.e Total Number of adult*2900kcal). The total food requirements for children were converted to adult equivalent. This was done by multiplying the total number of children below the age of six (6) years in each household by Recommended Daily Calorie Requirement of 2900kcal and conversion factor of 0.4.

The total number of children between the ages of 6 to 18 years in each household was also multiplied by Recommended Daily Calorie Requirement of 2,900kcal and a conversion factor of 0.7 to obtain their adult equivalent. The total Daily Calorie Requirement for each household was obtained by summing up the requirement for the three age groups estimated above. The procedure was repeated for Recommended Daily Calorie Requirement of 2,900 kcal (FAO 2000).

Households' Daily Food Consumption (Daily Calorie Intake) was obtained from household own food production and purchases to supplement own food production. The data on actual food consumed (maize, rice, Sorghum, Beans and Millet) by each

household per week was obtained and converted into kilogram. The energy content of 1kg of each foodstuff was obtained from literature as showed in

Table 3: Energy content of 1kg of each food stuff

Food Crop	Calorie/Kg	Milling Ratio
Maize	3,590	0.85
Rice	3,640	0.65
Sorghum	1190	
Millet	2891	
Beans	3340	

Source: FAO Stat (2000)

The total quantity of each food (in kilogram) consumed was then multiplied by the energy content. This procedure was repeated for rice and maize. However, due to processing and grinding losses, the quantity of maize consumed per week was multiplied by the energy content (3950kcal) and the milling ratio of 0.85. The total kilocalories of maize, Sorghum, rice, Millet and Beans consumed by each household was summed up and divided by 7 (days in a week) to obtain Actual Daily Calorie Intakes.

Head count method was used to achieve part of objective two (2) measure food security status and is expressed as:

FII = (FIH/TH) X 100…… (i)

Where

FII = Food Insecurity Index

FIH = Number of Food Insecure Households

TH = Total Households under study

Food Insecurity Gap measures the depth of food insecurity and is expressed as:

FIGi= (TCRi–TCCi)/TCRiX100/1…….. (ii)

Where:

FIGi =Food Insecurity Gap of ith food insecure household

TCRi = Total Calorie Requirement for ith food insecure household

TCCi = Total Calorie Consumption by ith food insecure household

Hence, the total food insecurity gap is expressed as:

TFIG = {(TCRi – TCCI)/TCRi}/FIH

CHAPTER FOUR:

RESULTS AND DISCUSSION

4.1 SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENTS

Socio-economic characteristics are combination of social and economic features of the respondents. It is the total measure of the respondents' work experience and economic level. The socio-economic variables measured in this study includes age, household size, years of farming experience, farm income, gender marital status, primary occupation, level of education and land tenure system. Table 1 presents the socio-economic characteristics of the respondent.

Table 4a: Socioeconomic Characteristic of the Respondents

Socioeconomic characteristics	Frequency	Percentage	Mean	Standard Deviation
Age				
21-30years	3	2.5	50.42	9.427
31-40years	17	14.2		
41-50years	46	38.3		
51-60years	38	31.7		
61-70years	16	13.3		
Total	**120**	**100.0**		
Household size				
2-5 persons	6	5.0	12.37	6.425
6-9 persons	38	31.7		
10-14 persons	38	31.7		
15-19 persons	27	22.5		
20-24persons	5	4.2		
25-29 persons	3	2.5		
30-34 persons	2	1.7		
above 34 persons	1	.8		
Total	**120**	**100**		
Years of Farming Experience				
5-10 years	11	9.2	24.16	12.184
11-15years	30	25.0		
16-20 years	17	14.2		
21-25 years	10	8.3		
26-30 years	18	15.0		
above 30 years	34	28.3		
Total	**120**	**100.0**		
Farm Income				
30000-90000	62	51.7	167566.66	164243.810
90001-150000	12	10.0		
150001-210000	12	10.0		
210001-270000	9	7.5		
270001-330000	6	5.0		
330001-390000	2	1.7		
390001-450000	10	8.3		
450000 and above	7	5.8		
Total	**120**	**100.0**		

Source: Survey Data, 2014

4.1.1 Age

The results for the age distribution of the respondents as presented in table 4a showed that 38.3% were within 41-50 years age group, 31.7% were within 51-50 year's age group. The results further shows that only 14.2% were within 31-40 years age group. The mean age of the respondents was 50 years. This implies that most of the respondents were in their less productive stage considering life expectancy in the country which was placed at 50 years. This may likely affect their ability to produce enough food for their household. This result differs with finding of Shida, 2006 that 53.4% of farming household in Kano was within 25-44 years age group. This may not be unconnected with urban migration of most young people to cities in search of white colar jobs. This will have serious implication on food security of the affected communities.

4.1.2 Household size

The results for household Size distribution shows that 31.7% were having 6-9 persons per household and 10-14 persons per household respectively. 22.5% had 15-19 persons, 4.2% had 20-24 persons and 5% had 2-5 persons. The mean household size of the respondents was 12 persons. It can be deduced that 63.4% of the respondents had 6 – 14 persons per household. This implies that large quantity of food was required by the respondents to feed their household as the dependency ratio was relatively high. This findings corresponds with what Shida (2006) reported, stating that majority of the farming household group were 6-10 members in the State.

4.1.3 Years of farming experience

The distribution of respondents according to their years of farming experience as indicated by Table 4a showed that 25% had 11-15 years farming experience, 14.2% had 16-20 years, 15% had 26-30 years of farming experience and 28.3% had more

than 30 years of farming experience. The farming experience is the knowledge of farming gained over time through exposure to farming activities expressed in years. This implies that majority (53%) had between 11-30 years of exposure to farming activities which could have exposed them to the skills and knowledge of their chosen profession.

4.1.4 Farm income distribution

The results for income distribution presented in Table 4a, shows that annual farm income accruing to the respondents. The results revealed that 51.7% earned N30,000 - N90,000 per annum from farming, 10% had earned N90,001 - N150,000 and N150,001- N270,000 respectively. This results further shows that only 8.3% earned 390,001 - 450,000. Hence 7.5% earned 210,001 - 270,000. This implies that majority of the respondents were low-income earners considering the magnitude of their total annual income from farming which was their major occupation and that might have affected their food security status. The implication of this is that most households were not able to raise enough income from on-farm activities. Ali(1994) state that the African resource poor have common characteristics of facing the most sever difficulties in relation to production of food and access to food market which make them most vulnerable to food security crisis.

Table 4b: Socioeconomic Characteristic of the Respondents

Socioeconomic characteristics	Frequency	Percentage
Male	112	93.3
Female	8	6.7
Total	120	100.0
Marital Status of the respondents		
Married	118	98.3
Divorced	1	.8
Widow	1	.8
Total	120	100.0
Primary occupation		
Crop production	103	85.8
Livestock production	11	9.2
Poultry	2	1.7
Food processing & Vending	4	3.3
Total	120	100.0
Level of Education		
None	11	9.2
Adult Education	6	5.0
Qur'anic	36	30.0
Primary	32	26.7
Secondary	22	18.3
Tertiary	13	10.8
Total	120	100.0
Land Tenure system		
Inheritance	87	72.5
Leasing	4	3.3
Purchasing	15	12.5
Renting	14	11.7
Total	**120**	**100.0**

Source: Survey Data, 2014

4.1.5. Gender

The distribution of the respondents according to gender as presented in table 4b shows that 93.3% of the respondents were male with only 6.7% female respondents. This might not be unconnected with the fact that most household are headed by male and female are involved in domestic work.

4.1.6. Marital status

The distribution of respondents based on marital status as indicated in table 4b shows that 98.3% of the respondents were married, 0.8% were divorced and 0.8% were widowed. This finding is in agreement with findings of Shinda (2010), that majority (92.8%) of farming household in Kano were married. This can be attributed to the socio-cultural belief of the people in the area. This implies that, family size would likely be very high with demands in terms of food requirements and other socio-economic needs of the family

4.1.7. Primary occupation

The distribution of the respondents based on their primary occupation which is agriculture shows that 85.8% were crop famers, 18.4% were engaged in livestock production, 1.7% were engaged in poultry production, 3.3% food processing and vending. This finding is in agreement with position of FAO (1997) that major source of income farming household in Kano State was mainly crop production (64%). This implies there is a very low diversification in economic activity even within agricultural sector of the economy of the study area. The industry not in operation also contributed to low diversification in economic activity.

4.1.8 Level of education

According to Chutter 2009; Education is very important in every aspect of life and it plays a fundamental role towards agricultural development because it enhances easy assimilation, awareness and productivity for innovation of agricultural practices.

Table 4b present educational status of the respondents. The analysis revealed that 9.2% had no education at all, 5% had adult education, 30% had Qu'ranic education, 26% had primary education, 18.3% and 10.8% had earned tertiary education. This

implies that a lot of the respondents were having Qu'ranic education only. The low level of education could affect ability of the farmers to better organize the farming activities and also access to better farming technologies which could have serious negative implication on their food security status.

4.1.9 Land tenure system

The result for system of farmland acquisition shows that 72.5% acquired their farmland through inheritance, 12.5% acquired theirs through purchase, 11.7% acquired through rental and 3.3% through leasing. This shows that the major source of farmland is through inheritance which characterized by fragmentation of farmlands into small pieces which might not be enough for farming household to provide enough food. The fragmentation of the land could not allow mechanization and commercialization of farming operation in the area. This agrees with position of Kakwagh*, et, al,* 2011) that inheritance as a source of land ownership in farming communities continues to play an important role. This finding is also in agreement of FAO (1997) that the main source of farmland was through inheritance.

Table 5: Food Security Status of Farming Household

Food Security status	**Frequency**	**Percentage**	**Food Security Gap**
Food Insecured	90	75.0	0.29
Food Secured	30	25.0	0.58
Total	**120**	**100.0**	

Source: Survey Data, 2014

4.2 FOOD SECURITY STATUS OF FARMING HOUSEHOLD.

The food security status of the farming household in the area is presented in table 5. The results shows that majority (75%) of the farming household were food insecured. This implies that the study area is potentially food insecured since the number of insecured household (90) is greater than the secured household (30). The food security incidence reported in this study was higher than 60% that was reported by

FAO (1997) and 65% reported by Ohida (2010). This could be related to increased in population and decease in quantity/quality of food production because the active group prefer white collar job in the city. Another reason for the high incident of food insecurity in the study area could be attributed to poor extension services as such information accessibility on quality inputs and technology is very poor.

The mean food security index of the food secured household was 1.79 and 0.58 for the food insecured household. The food insecurity gap of secured household was 0.29 and 0.58 for food secured household. This implies that food insecured household consumed 29% less than their daily caloric requirements whereas food secured household consumed 58% in excess of their daily calorie requirements. Both situations could be balanced with proper information on food security gap.

4.3 Years Of Farming Experience By Food Security Incidence

Table 6: Distribution of Years of Farming Experience by Food Security Status of Farming Household

Years of Farming Experience	Food Security Status of Farming Household		Total
	Food Insecured	Food Secured	
5-10 years	3(3.3%)	8(26.7%)	11(9.2%)
11-15years	17(18.9%)	13(43.3%)	30(25.0%)
16-20 years	15(16.7%)	2(6.7%)	17(14.2%)
21-25 years	8(8.9%)	2(6.7%)	10(8.3%)
26-30 years	15(16.7%)	3(10.0%)	18(15.0%)
above 30 years	32(35.6%)	2(6.7%)	34(28.3%)
Total	**90**	**30**	**120**

Source: Survey Data, 2014: figures in parenthesis represent percentages

Table 6 presents relationship between food security incidence and years of farming of the respondents. The results indicates that 3.3% of the respondents with 5-10years of farming experience were food insecured, 26.7% of the respondents within this group were found to be food secured, 18.9% and 43.3% of the respondents who had 11-

15yers of farming experience were food inscured and food secured respectively. The most affected group were respondents with 11-15 years of farming. This implies that more experienced farmers are not likely to be food insecured. This put emphasis on the importance of specialization, as years of farming experience increases the possibility of the household to be food insecured decreases.

4.4 Distribution of Marital Status by Food Security Status of Farming Household

Table 7: Marital Status by Food Security Status of Farming Household

Marital Status	Food Security Status of Farming Household		
	Food Insecured	Food Secured	Total
Married	88(97.8%)	30(100.0%)	118(98.3%)
Divorced	1(1.1%)	0(.0%)	(1).8%
Widow	1(1.1%)	0(.0%)	1(.8%)
	90(100.0%)	30(100.0%)	120(100.0%)

Figures in parenthesis represents percentages

Source: Survey Data, 2014

The result in table 7 shows that 97.8% of the married households were food insecured, 1.1% of divorced and 1.1% widow. This implies that majority of married were food insecured. This may not be unconnected with number of dependency, the marriage are expected to have children thus so much food would be required.

4.5 Distribution of Food security by age of the respondents
Table 8: Food security by age of the respondents

Age	Food Security Status of Farming Household		Total
	Food Insecured	Food Secured	
21-30years	1(1.1%)	2(6.7%)	3(2.5%)
31-40years	13(14.4%)	4(13.3%)	1714.2%)
41-50years	31(34.4%)	15(50.0%)	46(38.3%)
51-60years	31(34.4%)	7(23.3%)	38(31.7%)
61-70years	14(15.6%)	2(6.7%)	16(13.3%)
	90(100.0%)	30(100.0%)	120

Figures in parenthesis represents percentages

Source: Survey Data, 2014

Table 8 presents distribution of the respondents based on age distribution against food security incidence. The result shows that 50% of the respondents aged 41-50 years were food secured, 34.4% of the same age group were food insecured, 23.3% of the same aged group were food secured. This implies that high incidence of food insecurity was recorded among respondents aged 41-50 years. This finding is similar to what was reported by Idris (2008), and FAO (2004) that the age bracket 40-49 years fall under potential food insecurity group with less than 50% of calorie deficiency. This may be attributed to the fact that the adult may leave their food for the younger ones due to insufficiency. Also since the adult are in the working of the household they could be very busy as such skipping meals as a copping strategy.

4.6 Food Insecurity coping strategies

Table 9: Distribution of Food Insecurity of Copping Strategy

Coping Strategy	***Frequency**	***Percentage**	**Rank**
Skipping meal	6*	6	6th
Reduction in quality of meals	52*	43.4	3rd
supplementary feeding	54*	45	2nd
consumption of less preferred food	46*	38.4	4th
borrowing from friends	24*	20.0	5th
sales of some assets	58*	48.4	1st
Total	n>120	>100.0	

*Multiple responses

Source: Survey Data, 2014

Table 9 presents the food insecurity coping strategy adopted by the respondents. The results revealed that sales of the some assets ranked first (48.4%) as measures of mitigation against food insecurity. Household most often sells their most liquid assets such as livestock to purchase food. Supplementary feeding followed with 45% of the respondents adopting it as measures to cushion the effect of food insecurity. Others measures adopted by the respondents include consumption of les preferred food (35.4%), reduction in quality of meals (43.4%).

This finding agrees with findings of Ohida (2010) who reported that most frequently used mechanism of cushioning food security was sales of tangible liquid assets in the state in study of food security and poverty in Kano State.

This implies that the immediate coping strategy adopted is the disposal of the most liquid asset to procure food for the household. This result is different from what was reported by Babatunde et al , 2007 who studied Factors Influencing Food Security Status of Farming House in North Central Nigeria, where he stated that the practice food insecurity coping strategy was eating less preferred food. Whereas Idris, 2008 in Study of Food security among Farming Household in Jere Local Government Area of Borno State, North Eastern Nigeria shows that the most common coping strategy was eating once. This further proved that there are no specific measures adopted by people against food security in northern Nigeria.

4.7 Logit Regression Analysis

Table 10: Regression Estimates for Socioeconomic Factors Influencing Food Security Status

Variables	Coefficient	Standard Error	T-Value	Significance
Age Years	-.041	.035	.239	**NS**
Household size	-.156	.065	.016	*
Farm size	.270	.302	.372	**NS**
Access extension	-3.721	1.183	.002	**
Farming experience	-.112	.043	.010	***
Farm income	.000	.000	.293	**NS**
Access to formal education	.140	.058	.015	**
Constant	5.748	2.281	.012	**NS**

Source: Survey Data, 2014

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1 % level , NS= Not Significant

The analysis of logistic regression estimates shows that four(4) out of the seven(7) independent variables included in the model were significant in explaining the variation of food security status of the farming household in the study area.

The significant variables include household size, access to extension services, years of farming experience and access to formal education.

The household size was significant at 10 ($P<0.1$) but negatively related to food security incidence of the households. This is expected as an increase in the number of non-working member of household decreases the probability of the household being food secured increases. This implies that as the household size increases, the probability of the food security status of the household decreases. This findings agrees with findings of Babatunde *et al* , 2007 that as the household size gets large, the probability of food security increases.

The access to extension service was significant at 5% ($P<0.05$) but negatively related to the food security incidence. This implies that the probability of the household food security decrease as access to extension increases as better access to extension services exposes the farmers to better farming technologies, better inputs usages like quality seed and fertilizer, better information and new technologies thereby improving their productivity and increase food availability and access.

The years of farming experience was significant at 1% ($P<0.01$) with negative coefficient of -0.112. This implies that the odds of household to be food insecured decreases by 11/2% (-0.112) as the years of farming experience of the respondents increases. This is as expected experience increases specialization by the farmers which in turn improve production and reduces level of loss that might incurred in production thereby declining the probability of being food insecured.

The access to formal education was significant at 5% (P<0.05) with positive coefficient of 0.014. This implies that as the household members gained additional year of formal education, the probability of household to be food secured increases by 0.014.This is as expected increase additional year of formal education would have exposed the household members skills and knowledge on best to organize farming. This findings is line with was reported by Babatunde et al, 2007 that households with an educated head are more likely to be food secured than one with uneducated head.

4.8 Challenges of Farming Household

Table 11: Distribution of Challenges of Farming Household

Challenges	*Frequency	*Percentage	Rank
Rainfall	17*	14.16	6th
Limited access to quality seeds	20*	16.66	5th
Flooding	8*	6.66	7th
Low investment capital	62*	51.66	2nd
Limited access to farmland	18*	15.00	4th
Unpredictability Rainfall	49*	40.8	3rd
High cost of production inputs	97*	80.8	1st
Total	**n>120**	**>100**	

*Multiple responses

Source: Survey Data, 2014

Table 11 presents challenges experience by farming household in the study area. The three most

Important challenges mentioned by the respondents were high cost of production inputs (80.8%) low investment capital (51.66%) and unpredictability

The high cost of production is serious problem because of most the farmers in the study area were resource poor farmers and could not afford right quantity of production inputs such as fertilizers and improved that could grantee high productivity. The use of inappropriate dose of production input particularly fertilizers

could jeopardize production effort thereby exposing the farmers to vulnerability of to food insecurity.

The low investment capital (51.66%) is challenge because of the were subsistence operators. This leaves with very little savings thereby limiting their ability to invest in basic technologies that could boost their productive capacity and food security status.

The problem of unpredictability of rainfall (40.8%) is Farmers find it difficult to identify when rainfall will fully established for them to plant. This situation often leads loss of values such as seeds and labor due abrupt cessation of rainfall.

Other challenges were limited access to farmland (15%), limited access to quality seeds (16.66%) and flooding (6.66).

This implies that the cost of production would be very in the study area with likely consequences on food prices. For the unpredictability of rainfall; farmers find it difficult to establish when rainfall will be fully established which most often results in loss of their seeds due dry spelt experience between period of temporary rainfall and fully established rainfall.

The implication for low investment capital is that it hinders the ability of the farmers to purchase the right quantity of production inputs such as fertilizers and agrochemicals. This often the ability of the farmers to attain optimum productivity.

CHAPTER FIVE:

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY

The study examined food security status among farming households in Kano State. Analysis of the results shows that 38.3% of the respondents were between 41-50yers of age, the results for household size distribution indicates that 31.7% had between 10-14persons in their household. The average household size was 12 people. 25% of the respondents had 11-15years of farming experience. The average years of farming experience was 24 years. Analysis of on-farm shows that 51.7% of the respondents earned between N30, 000-N90, 000 annually from farming related activities. The result for gender shows that 93.3% of the respondents were males whereas only 6.7% were female.

The result also shows that 98.3% of the respondents were married. On level of education, the shows that 30% had adult education, 26.7% Qur'anic education. The major source of farm land to most of the respondents as inheritance (72.5%) which is mostly associated fragmentation of farm land. Analysis of food security of the farming household shows that 75% of the respondents were food insecured. The food insecurity coping strategy adopted by most of the respondents were sales of some assets, supplementary feeding and reducing quality of meals.

The regression analysis shows that four (4) of seven variables included in the model were significantly related to food security status of the farming household. They include household size, access to extension services, years of farming experience, and access to formal education.

The three most important challenges of the farming household were high cost of production inputs, low investment capital, and unpredictability of rainfall.

5.2 CONCLUSION

Most of the respondents were within their productive age for economic engagement, however there is little diversification of economic activities by most of the respondents. This there means there is prospects for sustaining farming in the study area use age and youthful exuberant of the respondents.

The household size of most of the respondents was relatively very large with serious implication on food security status of the farming household. Larger of autonomous consumers without commiserate contribution to production would predispose households to food security situation.

The on-farm income of the farmers was grossly inadequate for most of the farming households, the amount generated could not grantee food security considering family size kept by most of the respondents.

Most of the respondents were married, this may not unconnected with socio-cultural beliefs of the people of the area that marriage signifies sense of responsibility. The main source of farm land majority of the respondent was through inheritance associated with the fragmentation of farm lands into smaller plots which might not be sufficient for food production and farm land could not be used for mechanized farming.

The most widely practice measure of food insecurity aversion measure was sales of most liquid assets such as livestock to purchase food. This practice is forcing the respondents to dispose their most cherish assets and hinders their means of savings.

Majority of the respondents were food insecured, this could lead to malnutrition and serious affect productivity of the farming households. Food insecurity increases vulnerability of households to very serious health crisis with attended consequences on food production.

The three most important to challenges of farming household were high cost of production inputs, unpredictability of rainfall and low investment capital.

5.3 RECOMMENDATIONS

Based on the findings of the study the following recommendations were made

1. Realistic policies and programs with a bottom top approach should be design to reduce production cost through easy accessibility of quality imputes such as seeds and fertilizer at an affordable price by necessary institutions.

2. Microfinance banks should provide easy capital accessibility consistent with farming communities settings to provide farmers with investment capital both in cash and kind.

3. The farmers should be educated on importance of off-farm production jobs like fishing cattle rearing etc. within the farming communities in order to diversify sources of income to the farming households in the study area thereby supporting income from crop production through ADP and other related institutions.

4. ADP in the study area should be involve in more innovative extension services as it has serious effect on food security status of the farming household and also provide timely information about the rainfall pattern.

5. Creation of awareness of formal education is very importance through advertisement and sensitization approaches considering its influence on food security status among the farming household the study area.

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APPENDIX I

Department of Agricultural Economics & Extension
Faculty of Agriculture
Bayero University, Kano

Dear Respondent,

Introduction Letter

I am a Post-graduate student of Center for Dryland Agriculture (CDA), Bayero University Kano, undertaking an academic research titled ***Socioeconomic Analysis of food Security Status among Farming Household in Kano State, Nigeria*** and I am in need of information from you to accomplish the research objectives. The research work is strictly for academic purposes and information gathered from it will be treated with utmost confidentiality and for no other purpose than stated.

Your favorable cooperation will be highly appreciated.

Yours faithfully,

Stella Thomas

SPS/11/MEX/00007

Socioeconomic Parameters

Name (Optional)……..

Town/Village……...

LGA……

1. What is your age in years?.....

2. What is your age group: a) 20 years ( ) b) 21-30years ( ) c) 31-40years ( ) d) 41-50 ( ) e) 51-60 ( ) f) 60 ( )

2. What is your gender? Male ☐ Female ☐
3. What is your marital status? i)Single ☐ ii)Married ☐ iii) Divorced ☐ 4) widow ☐

4. What is the total size of your household?

   ……

5. Children under 6 years ……Children 6-18 years ……. Adult (>18) ….....

6. Which of the following represent your household size group?

   a)2-5( ) b)5-10( ) c) 10-15( ) d)15-20 ( ) e) 20( )

7. What is your main occupation?

S/n	Occupation	Tick
1.	Crop production	
2.	Livestock	
3.	Fisheries	
4.	Poultry	
5.	Food processing & Vending	
6.	Non farm	

8. What is your level of education?

i) Never been to school ☐ ii) Vocational School ☐ iii) Islamic ☐ school iv) Primary school ☐ v) Secondary school ☐ vi) Tertiary level ☐

9. How many years do you spend in school?.....

10. What is the size of your farmland in hectares?.....

11. How do you acquire your land ? i) Inheritance ( ) ii) Leasing ( ) iii) Purchasing ( ) Renting ( )

12. Do you have access to extension service?

    a) Yes ☐ b) No. ☐

13. What are your years of farming experience?

    ……

14. How much of your total annual income farm income?

……

Food Availability

Estimates quantity of rain fed crops produced, consumed and sold

S/n	Crop	Produced	Consumed	Sold
1.	Sorghum			
2.	Millet			
3.	Cowpea			
4.	Rice			
5.	Maize			

Estimates number of livestock owned

S/n	Livestock	Number own
1.	Cattle	
2.	Sheep	
3.	Goat	
4.	Poultry	
5.	Camel	
6.	Donkeys	
7.	Horses	

Estimate Quantity of animal products produced, consumed and sold

S/n	Animal Product	Quantity produced	Quantity Consumed	Quantity sold
1.	Milk			
2.	Eggs			
3.	Guinea fowl			
4.	Chicken			
5.	Quails			

1. How many times per day does your family actually eat?
   a) Once daily ( ) b) Two times daily ( ) c) Three times daily ( )

2. When your family eats, do they satisfy their hunger? Yes ( ) No ( )

3. If yes, between now and the next harvest in October, how many month will your family have enough to satisfy their hunger?

   a) 2months ( ) b) 2-3 months( ) c) 3-4months d) 4months ( )

4. If no how did your family satisfy its hunger after last harvest?

a) 2 square meal per day ( ) b) 1 square meal per day ( ) c) Skipping meal ( )

5. What crop produce do you consume most often?

i) Rice ☐ ☐ ii) Beans ☐ iii) Sorghum ☐ iv) Millet ☐
v) Maize

6. What is the quantity of the cereals produce do you consumed most often in your household?

a) 0.25 Mud ☐ b) 0.5 Mud ☐ c) 1Mud ☐

d) others, specify……

7. Estimates Quantity of food intake of household per day

S/N	Crop	Qty Consumed in Mudu	Qty Consumed in Kg	Equivalent Calorie in take
1.	Sorghum			
2.	Millet			
3.	Cowpea			
4.	Rice			
5.	Maize			

*1 Mudu = 2.00Kg

8. What are you sources of food?

S/n	**Source**	**Tick as appropriate**
1.	Crop production	
2.	Livestock	
3.	Fisheries	
4.	Wild collected foods	
5.		

Access to food (Affordability)

1. Do you access food at affordable price throughout the year?
   a) Yes b) No
2. If no, how often do food price fluctuations occur?
   a) Very long period b) Long Period c) Seldom
3. What is your source of food?

a) Own production ( ) b) barter () c) gifts () d) borrowing ( ) e) Food aid ( )

Food Utilization

Food Procurement

	Quantity (bags) of 100kg		
S/N	**Crop**	**Quantity**	**Frequency**
1.	Sorghum		
2.	Millet		
3.	Cowpea		
4.	Rice		
5.	Maize		

Method and Pattern of food processing

S/N	**Crop**	**Method of processing**	**Method of preservation**
1.	Sorghum		
2.	Millet		
3.	Cowpea		
4.	Rice		

5.	Maize		
6.			
7.			

Key: 1=Dry, 2=Thrashing, 3=winnowing, 4=Dehusking, 5=Grinding, 6=Pounding, 7=Boiling

1. Which category of food source do you usually consume in your household?
   a) Carbohydrate only b) Carbohydrate and Animal Protein c) Carbohydrate and Plants Protein d) Oil foods e) Carbohydrates and Vegetables

Food insecurity coping Strategies

1. What are the Food insecurity coping strategies do you adopt?
   i) Skipping meal ☐
   iii) Reduction in quality of meals ☐
   iv) Supplementary feeding ☐
   v)Consumption of less preferred food ☐
   vi) Borrowing from friends ☐
   vii) Sales of some Assets ☐
2. What other off-farm income generating activities do you engage in ?
   i) Trading ☐ ii) Handcraft ☐ iii) Dry season farming ☐
   iv) Hunting ☐ v) Fishing ☐

Challenges of Smallholder Sesame Farmers

1. What are challenges do you face in farming?

i) Rainfall variation ☐
ii) Limited Access to quality seeds ☐
iii) Flooding ☐
iv) low investment capital ☐
v) Inadequate Farm land ☐
vi) Unpredictability rainfall ☐
vii) High cost of production inputs ☐
viii) Others,

Specify…….....