Thesis

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Household Basic Food Consumption, Poverty and Vulnerability in Nigeria

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HOUSEHOLD BASIC FOOD CONSUMPTION, POVERTY AND VULNERABILITY IN NIGERIA

BY

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ABSTRACT

In Nigeria, the problems of poverty and vulnerability to poverty have remained largely unabated despite the efforts in tackling them. Previous studies on poverty and vulnerability to poverty focused on total expenditure. Household expenditure pattern reveals that food share of total expenditure averaged 66% between 1980 and 2004 and has been greater than non-food expenditure share over the years. Food expenditure share for poor households was even much higher than that for all households. There is need to focus on food consumption in poverty studies on Nigeria to enable policy makers to optimally address extreme poverty and hunger. This study, therefore, examined the incidence, determinants and vulnerability to food poverty in Nigeria.

The study used data from National Bureau of Statistics Living Standard Survey 2004. The Food-Energy-Intake (FEI) method was used to compute food poverty lines based on the food baskets common to each geo-political zone. The Foster-Greer-Thorbecke (FGT) index was used in computing food poverty incidence. A logit model with the following variables, namely education, occupation, household composition, asset ownership and access to financial assets was estimated to determine factors affecting food poverty. The magnitude of vulnerability to food poverty was estimated using the three-step Feasible Generalised Least Squares (3FGLS) procedure.

The FEI estimates showed that food poverty lines varied across zones; food poverty line was highest in South South urban (₦26, 862.36) and lowest in North East rural (₦10, 509.39). The FGT results showed that 50.23% of Nigerians were in food poverty. Food poverty incidence varied across zones and was statistically significant at 1.00%; the incidence was highest in South South zone (63.20%) and lowest in South East zone (28.34%); and it was higher in the urban sector (53.11%) than in the rural sector (47.96%). The logit results showed that absence of education (0.459) and low level of education of household heads (0.522), proportion of children in households (0.476), household size (0.148) and household heads engaged in agriculture (0.342) were positively related to food poverty. Whereas ownership of agricultural land (-0.248), tertiary education of household heads (-0.970), access to credit (-0.228) and access to regular remittances (-0.137) tended to reduce food poverty. These results were significant at 1.00%. The 3FGLS estimates show that 61.68% of Nigerians were vulnerable to food poverty; the incidence of vulnerability to food poverty varied across zones and was significant at 1.00%; the incidence was highest in South West zone (68.32%) and lowest in North East zone (50.19%); and it was more pronounced in the urban sector (64.61%) than in the rural sector (59.37%). The poor were more vulnerable to food poverty (69.6%) than the non-poor (53.7%).

There were high incidences of food poverty and vulnerability to food poverty in Nigeria; some regions were significantly worse off than others. Thus policies and programmes that will adequately increase people's access to food should be adopted and targeted transfers of subsidised basic food items should be used to sufficiently reduce vulnerability to food poverty and improve poor household's exit from poverty in Nigeria.

Key words: Household food consumption, Vulnerability to Poverty, Nigeria
Word count: 495

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DEDICATION

This work is dedicated to all genuine academics and all lovers of truth and righteousness in Nigeria.

CERTIFICATION

I certify that this work was carried out by Mr Uchechukwu Mordecai Ozughalu in the Department of Economics, University of Ibadan, under my supervision.

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INTRODUCTION

1.1 Statement of the Problem

Nigeria is richly endowed with natural resources. The country has a very large arable land and the climatic condition of the country is most suitable to agriculture. The country also has very rich forest resources and tremendous reserves of oil and gas as well as other mineral resources. The country is currently the sixth largest exporter of crude petroleum, a major cocoa exporter, one of the largest producers of bitumen, iron, steel, coal, tin ore, columbite, marble, tantalite, uranium and kaolin to mention only but a few. The bountiful flora and fauna in Nigeria create a very rich source of biodiversity that serves as a reservoir for the growth and development of the pharmaceutical industry in the country and a sustainable source of genetic materials for immensely improving the nation's food production potentials. In terms of human population, Nigeria is a great force to reckon with. The country is presently the most populous country in Africa and one of the ten most populous countries in the world (PRB, 2009). Due to the large population in Nigeria, the country has a very large domestic market which could serve as a springboard for entering export markets and thus make the country be a super economic power. Indeed, the foregoing great national assets have the potentials to pave the way for Nigeria to optimally reap the many development opportunities that come with the rapid and increasing wave of globalisation; and with prudent national economic management, such opportunities could be converted into very high per capita income, immense job opportunities as well as great reduction in poverty and vulnerability to poverty.

Unfortunately, despite these enormous material and human resources in Nigeria, the country has been wallowing in poverty. It is disheartening to note that in recent times, poverty has become pervasive in Nigeria, engulfing an overwhelming proportion of the country's population. For instance, at the commencement of the present century, it

was estimated that about seven out of every ten Nigerians lived below the poverty line[1] (Obadan, 2003; NPC, 2004). Poverty has over the years continued to devastate Nigeria and the country is currently rated as one of the poorest in the world (UNDP, 2005, 2006 and 2009; World Bank, 2009).

A related problem to the poverty situation in Nigeria is gross inadequacy in food consumption. Hunger, starvation and malnutrition are widespread in Nigeria and these are eloquently manifested in the high levels of severe and moderate underweight[2], wasting[3] and stunting[4] among children coupled with the high rates of infant and under-five mortality as well as low life expectancy at birth (FOS, 1999a; World Bank, 2001, 2006 and 2009; Maziya-Dixon et al., 2004; UNDP,2005). Inadequate food consumption contributes immensely in perpetuating the vicious cycle of poverty and thus it is a major obstacle to development.

Food insecurity in Nigeria is most preposterous given the enormous natural resource endowment and the rich agricultural heritage in the country. It could be recalled that immediately after independence and indeed in the post independence era, even until the mid-1980s, there was abundant supply of food in Nigeria and it was relatively very cheap; and the average Nigerian could easily afford to eat three square meals a day. Unfortunately, the increasing fortunes in the petroleum sector and the concomitant increase in oil wealth led to high and unprecedented rate of rural-urban migration. This robbed the subsistence agricultural activities of able hands and thus resulted in rapid decline in farming. Also, with the increasing fortunes in the petroleum sector, much and perhaps undue emphasis was placed on the sector at the expense of the agricultural sector. In fact, the agricultural sector was neglected and it became un-lucrative and associated with poverty. The foregoing made Nigeria to become lacking in food supply and this in turn made the country to resort to food importation to complement local production and meet local demand. The food crisis in Nigeria, apart from being caused

[1] This is the international poverty, which is set at US$1 a day (in purchasing power parity terms).
[2] Underweight refers to the percentage of children under 5 years that are below minus two standard deviations or minus three standard deviations from the median weight for age of the reference (healthy) population. The former is moderate underweight while the latter is severe underweight.
[3] Wasting refers to the percentage of children under 5 years whose weights for height are more than two standard deviations below the median weight of the reference (healthy) population.
[4] Stunting refers to the percentage of children under 5 years whose heights for age are more than two standard deviations below the median height of the reference (healthy) population.

by low growth rates in annual production, is also caused by the problems of inefficient storage, processing and marketing which make substantial proportions of the food crops harvested to be lost. Food prices have tremendously increased in recent years to the extent that staple food items have been getting out of the reach of an increasing proportion of the population. The decline in real incomes of the average Nigerians have made it impossible for them to afford adequate food.

It is evident that many people in Nigeria frequently join the poverty truck and the train of hungry, starved and malnourished people. A thorough examination of the official data on poverty in Nigeria (FOS, 1999a; FOS, 2004a; NBS, 2005a and 2005b) would reveal that between 1980 and 2004, while the total population grew at an average rate of less than 3 per cent per annum, the population in poverty grew at an average rate of more than 5 per cent. This suggests that the level of vulnerability to poverty in Nigeria is very high and it thus constitutes another major problem in the country. The United Nations Development Programme (UNDP) has recently classified Nigeria as one of the most vulnerable countries in the world (UNDP, 2005, 2006 and 2009). Vulnerability to poverty is a major impediment to development and it erodes human dignity. There are many stochastic processes that apparently make households to be vulnerable to poverty (Morduch, 1994); these include seasonality of agricultural production as well as adverse weather conditions such as excessive rainfall, low rainfall, soil erosion and destruction of farmland and crops by pests and animals. Others include adverse household and socio-economic characteristics such as large household size, old age, lack of assets, poor or lack of education and disadvantaged geographical location.

It is regrettable that despite the efforts made by various governments, organisations and individuals in Nigeria towards reducing the problems of inadequate food consumption, poverty and vulnerability in the country, the problems have apparently remained unabated. The foregoing therefore calls for a rejuvenated and more concerted and pragmatic effort that will effectively and efficiently tackle the problems and thus produce the desired results with regard to the reduction of the problems. Suffice it to say that detailed analyses of food poverty and vulnerability to food poverty in Nigeria are required to adequately guide the government and policy makers in the country in the

design and implementation of poverty reduction policies and programmes that will produce optimum positive results in the country.

1.2 Objectives of the Study

The overall objective of this study is to determine the extent of household basic food consumption, the composition of poverty and the degree of vulnerability to poverty in Nigeria. The specific objectives of the research include to:

(i) construct zone-specific food poverty lines and analyse food poverty profile in Nigeria;

(ii) analyse the main determinants of food poverty; and

(iii) determine the magnitude of vulnerability to food poverty.

1.3 Statement of Hypotheses

1a. Null Hypothesis: The incidence of food poverty (P_{fd0}) does not vary significantly across the various geo-political zones in Nigeria.

H_o: $P_{fd0,1}=P_{fd0,2}\text{-------}=P_{fd0,s}$ where 1,2 …s are the various geo-political zones.

1b. Alternative Hypothesis: The incidence of food poverty varies significantly across the various geo-political zones in Nigeria.

H_1: $P_{fd0,1} \neq P_{fd0,2}\text{---------} \neq P_{fd0,s}$

2a. Null Hypothesis: The depth of food poverty (P_{fd1}) does not vary significantly across the various geo-political zones in Nigeria.

H_o: $P_{fd1,1}=P_{fd1,2}\text{-------}=P_{fd1,s}$

2b. Alternative Hypothesis: The depth of food poverty varies significantly across the various geo-political zones in Nigeria.

H_1: $P_{fd1,1} \neq P_{fd1,2}\text{---------} \neq P_{fd1,s}$

3a. Null Hypothesis: The severity of food poverty (P_{fd2}) does not vary significantly across the various geo-political zones in Nigeria.

H_o: $P_{fd2,1}=P_{fd2,2}\text{-------}=P_{fd2,s}$

3b. Alternative Hypothesis: The severity of food poverty varies significantly across the various geo-political zones in Nigeria.

$H_1: P_{fd2,1} \neq P_{fd2,2} \text{---------} \neq P_{fd2,s}$

4a. Null Hypothesis: The variables being proposed as influencing food poverty do not have significant (joint) impact.

$H_o: a_1=a_2\text{----------}=a_n=0$

4b. Alternative Hypothesis: The variables being proposed as influencing food poverty have significant (joint) impact.

H_1: not all a's are zero.

5a. The magnitude of vulnerability to food poverty ($\hat{Vulfp_h}$) does not vary significantly across the various geo-political zones in Nigeria.

$H_o: \hat{Vulfp}_{h,1} = \hat{Vulfp}_{h,2} - - - - = \hat{Vulfp}_{h,s}$

5b. The magnitude of vulnerability to food poverty varies significantly across the various geo-political zones in Nigeria.

$H_1: \hat{Vulfp}_{h,1} \neq \hat{Vulfp}_{h,2} - - - - \neq \hat{Vulfp}_{h,s}$

1.4 Justification of the Study

This study is intended to reduce the knowledge gap with regard to food poverty and vulnerability to food poverty in Nigeria. The study will aid the government and policy makers in Nigeria to fashion out measures that will enable the country to meet the Millennium Development Goal of reducing extreme poverty and hunger before or by 2015 by at least 50 per cent of what they were in 1990.

It is a truism that ensuring adequate food consumption for all and sundry is crucial to any realistic, reliable and desirable poverty reduction effort. Food may be said to be the principal basic human need thus the right to adequate food consumption has been described as an admirable aspiration; it is firmly rooted in political philosophy, enshrined

in international law and repeatedly endorsed by international and local conferences[5] (Maxwell, 1997).

Inadequate food consumption is associated with hunger, starvation and malnutrition, which are basic manifestations of poverty. Thus, for a country to adequately address the problems of hunger, starvation, malnutrition, and food insecurity in general such a country needs profound knowledge and a rigorous and comprehensive analysis of food poverty. This study will therefore assist Nigerian policy makers to have a more focused and definitive method to address issues of food poverty and vulnerability to food poverty in Nigeria.

In Nigeria, most studies on poverty such as Canagarajah et al., (1997), Aigbokhan (1997 and 2000a), FOS (1999a and 1999b), Canagarajah and Thomas (2001) and Ogwumike and Aromolaran (2001) used arbitrary ratios (like one-third and/or two-thirds of mean expenditure) in defining their poverty lines thus their studies could not adequately cater for absolute poverty. Suffice it to say that mean expenditure is only suitable in the analysis of relative poverty; it is most unsuitable for absolute poverty analysis.

The limitations of the use of highly arbitrary poverty lines have led to the adoption of consumption-based methods in the construction of poverty lines. In this connection, Ogwumike (1987 and 1991) used the basic needs approach in constructing a robust poverty line and in examining the nature and extent of poverty among Nigerians. However, these studies were limited in scope and were not adequately representative of the country as samples were drawn from only three states – Borno, Imo and Oyo. Besides, the application of the term "basic needs" is highly problematic because there is no consensus on the specific consumption goods and the proportion of such goods that constitute basic needs. Basic needs vary from one society to another. Therefore to be free from the above problem of conceptualisation it is most appropriate to limit basic need consideration to food because food is universally accepted as the supreme basic human need for it is indispensable to life (Atanda, 1983; Koleoso, 1983; Falcon et al., 1987; Olayemi, 1998; Egbuna, 2001;Labhsetwar, 2003;).

[5] For instance, the right to food was enshrined in the Universal Declaration of Human Rights in 1948 and reiterated in the International Covenant on Economic, Social and Cultural Rights in 1966.

Household expenditure pattern in Nigeria reveals that food share of total expenditure averaged 66% between 1980 and 2004 and has been greater than non-food expenditure share over the years. Food expenditure share for the poor was even much higher than that for all households. In poor countries such as Nigeria, where food takes a larger share of total household expenditure and where the concern with poverty is closely related with concerns about hunger and malnutrition, it makes a lot of sense to use food and nutrition requirements to derive poverty lines as well as to focus entirely on food expenditure/consumption in poverty analysis (Deaton, 1997). Thus the analysis of food poverty may be considered as most crucial to the reduction of absolute poverty in poor countries.

Aigbokhan (2000b) used food-energy-intake approach (a variant of consumption-based methodology) to analyse poverty in Nigeria. However, the study did not address the issue of economies of scale in household consumption. Besides, the food-energy-intake approach adopted in the study does not focus on only food poverty as it made allowance for non-food expenditure. Furthermore, the study did not adequately cater for variations in food prices and compositions of food items in food baskets across the geo-political zones and across the urban and rural areas in Nigeria. Suffice it to say that the foregoing neglected issues are highly crucial in paving the way for the setting up of robust food poverty lines and food poverty estimates.

Omonona (2001) addressed the issue of household composition by using adult equivalent scales but the study did not cater for economies of scale in household consumption. Furthermore, the study was limited in coverage for it covered only a single state in Nigeria – Kogi. And the study did not adequately take account of variation in the composition of various food items in household food consumption baskets across the rural and urban sectors in the country.

Analysis of vulnerability provides additional dimension to the nature of poverty in a country and it sharpens poverty profile. Indeed analysis of vulnerability to poverty rather than current poverty is expected to provide adequate guide to forward-looking anti-poverty interventions that aim to prevent or reduce future poverty. Detailed analysis of vulnerability to food poverty is required to appropriately guide the government and policy makers in the design of relevant targeted transfers, safety nets and other poverty

reduction programmes. Few studies have looked at the issue of vulnerability to poverty in Nigeria. They include Alayande and Alayande (2004), Oni and Yusuf (2008), and Oyekale and Oyekale (2008). These studies dealt with vulnerability to general poverty and not to food poverty. The study by Adesanoye and Okunmadewa (2007) analysed vulnerability to poverty among households using a two-period panel data. But the study was based on Ibadan metropolis in Oyo state; thus it was limited in coverage and representation. None of the aforementioned studies on vulnerability to poverty in Nigeria focused on food expenditure and food poverty.

This study is motivated by the recognition of the foregoing research gaps. The study significantly contributes to knowledge by narrowing the gaps. The study uses a highly extensive and representative data set (NLSS 2004) along with zone-specific food items and prices in the analysis of food poverty and vulnerability to food poverty in Nigeria.

1.5 Scope of the Study

This study focuses on food consumption/expenditure. It deals essentially with food poverty in Nigeria.Only food items that are considered by the National Bureau of Statistics (NBS) and the Food Basket Foundation International (1995) as basic (in the Nigerian context) are used in this study.

Furthermore, the study is based on zone-specific food consumption baskets and food poverty lines; the zones being the six geo-political zones in Nigeria namely North-East, North-West, North-Central, South-East, South-West and South-South. In each zone, the urban and rural sectors are adequately catered for. Also, this study analyses the issue of vulnerability to food poverty based on a single cross-sectional data.

1.6 Organisation of the Study

Chapter one provides introduction to the study; it presents the statement of the problem, objectives of the study, statement of hypotheses, justification of the study and scope of the study. Chapter two contains the background of the study; the chapter deals with food production, population growth and food consumption in Nigeria; food and non-food expenditure shares in total household expenditure in Nigeria; trend and nature of

poverty in Nigeria as well as National Food Policy and efforts towards reducing food poverty in Nigeria; the chapter also presents poverty estimates based on food-energy-intake by the National Bureau of Statistics (NBS).

The third chapter presents a review of relevant literature; areas covered include conceptual, theoretical, methodological and empirical issues on poverty and vulnerability to poverty. Chapter four contains theoretical framework and methodology as well as sources of the data used in the research.

Chapter five contains empirical analysis; the chapter presents and analyses various results on estimates relating to food poverty and vulnerability to food poverty in Nigeria. The sixth chapter deals with the summary of major findings, policy implications of results and recommendations; the chapter also contains limitations of the study, some suggested areas for future research and conclusion.

CHAPTER 2

BACKGROUND TO THE STUDY

2.1 Food Production, Population Growth and Food Consumption in Nigeria

It was Reverend Thomas Robert Malthus who as far back as 1798 drew the attention of all and sundry in the world about the possibility of population growth outstripping the growth of food supply (Sundharam and Vaish, 1978; Bhatia, 1981). If this happens, it will bring about a detestable situation of hunger, starvation, undernutrition and food insecurity. Since Malthus published his article, food equation has been viewed in many influential and enlightened circles as a race between food supply and population growth (Mellor and Johnston, 1987). And in the developing countries of the world, the race appears to be generally in favour of population growth. In these countries, birth rates are generally very high and death rates have generally declined significantly due to great advancement in orthodox medical sciences; these countries also experience high positive net migration[6] rate.

Food production is an integral part of agricultural production. Thus improvement in food production and satisfactory performance of agricultural sector are evidently highly and positively correlated. In Nigeria, it could be recalled that in the early post independence era, in the 1960s, the agricultural sector performed very well and it was the most important sector in the nation's economy in terms of contributions to domestic production, employment and foreign exchange earnings. However, with the oil boom of the 1970s, the agricultural sector began to perform very poorly and the share of its contributions to the Nigerian economy declined significantly (Iyoha, 2002; and Ayodele and Falokun, 2003). In recent times, the agricultural sector has become synonymous with poverty and gross deprivation (FOS, 1999a and 1999b; NBS, 2005a and 2005b). This has evidently impacted adversely on food production and consumption. Indeed, the

[6] This is simply immigration minus emigration. Immigration is the number of people that enter into a country whereas emigration is the number that move out of a country.

rate of growth of agricultural production has been low on the average over the years in Nigeria and has failed to keep pace with the needs of a rapidly growing population thus resulting in a progressive increase in import bills for food (Adubi, 2004).

It is sad to observe that since independence, Nigeria has been bedevilled by rapid population growth. In 1963, the country had a total recorded population of about 55.7 million; the population was then estimated to be growing at the rate of 2.5 per cent per annum due to high fertility rate and declining mortality rate. Based on population census in 1991 and 2006, the population of Nigeria was put at 88.99million and 140.0035million respectively (NBS, 2007). As at 2006, the growth rate of the country's population was estimated to be 2.9% (CBN, 2008). The rate of food production has not been high enough to sufficiently cater for the rapidly growing population in Nigeria. Readily available statistics reveal that the growth of output in Nigeria over the years has generally lagged behind the growth of population of the country. For instance, the average annual growth rate of Nigeria's Gross Domestic Product (GDP) for the period 1980 – 1990 was estimated as 1.6 per cent and it was estimated as 2.4 per cent for the period 1990 – 1999; the corresponding population growth rates for the two periods in question were estimated as 3.0 per cent and 2.8 per cent respectively (World Bank, 2001). Since the beginning of the current century, however, the growth of real GDP in Nigeria has increased considerably over the years; the average growth rate of real GDP for the period 2000 – 2004 is estimated to be about 5.9 per cent (NBS, 2005a); this is still inadequate to cater for the rapidly growing population of about 3 per cent. Besides, the Nigerian economy has been characterised by high income inequality as measured by Gini Coefficient (World Bank, 2001, 2006 and 2009); this suggests that the considerable increase in GDP growth rate in recent times may not have been inclusive and may not have sufficiently been trickling down on the poor and the vulnerable in the country.

Now talking specifically about food, there is paucity of data with regard to the growth of food production in Nigeria. However, the scanty data available show that the growth of food production in Nigeria has, over the years, not kept pace with the growth rate of population in the country (Table 2.1). As shown in Table 2.1, while the average growth rate of food production declined from 4.8% between 1979-1981 and 1990-1992 to 2.7% between 1990-1992 and 1995-1997, population growth rate remained barely the same.

Table 2.1: Growth of Food Production and Population Growth in Nigeria (Average Annual Growth Rate in Per cent)

Era	Growth of Food Production (%)	Population Growth (%)
1979 – 1981 to 1990 – 1992	4.8	2.9
1990 – 1992 to 1995 – 1997	2.7	2.9
1995 – 1997 to 2001 – 2003	2.6	2.7

Source: FAO (2006).

Nigeria has over the years been plagued by pronounced state of food insecurity as evidently manifested, among other things, in the high rates of stunting, wasting and underweight; high rates of infant and under-five mortality; and low life expectancy at birth (see Table 2.2).

Table 2.2: Nutrition and Food Consumption Indicators in Nigeria

Characteristics	1995	1996 – 2004	2004
Stunting	37.8%	38%	38 (in 2003)
Wasting	9.5%	9%(1996-2005)	9%*
Underweight	21.3%	29%	29%
Infant Mortality (per 1,000 live births)	120	81.58 (1998-2004)	101
Under-five Mortality (per 1,000)	230	168 (in 1999)	197
Life Expectancy at Birth	53 years*	54 years (1998 – 2004)	43.4 years

Sources: World Bank (2001); FAO (2005 and 2006); FOS (1999a); CBN (2002 and 2003); NBS (2005b); UNICEF (2006 and 2007). * Preliminary estimate.

The food problem in Nigeria may have been compounded by the steady-rising food prices over the years; the consistently increasing food prices in the country over the years is captured by the composite consumer price index for food as shown in Table 2.3. As can be seen from the table, the composite consumer price index for food between 1970 and 1980 was 22.2; it rose to 100.1 in 1986 and further to 308.0 in 1990. The composite consumer price index for food continued to rise even till 2004 when it became 5,835.3. The food index has apparently moved in the same direction with the all items index (see Table 2.3). It is worthwhile to emphasise that high food prices are evidently most pronounced in recent times, particularly since the inception of the current century; this is eloquently manifested in the high rate of food price inflation that has characterised the period. As shown in Table 2.4, the food price inflation was high and double digit for most of the years between 2000 and 2004; the same is true for all items inflation.

Table 2.3: Composite Consumer Price Index for Food and all Items

Year/Period	Food Price Index	All Items Index
1970 – 1980	22.2	23.3
1981 – 1985	73.7	73.8
1986	100.1	105.4
1987	108.7	116.1
1988	195.3	181.2
1989	298.1	272.7
1990	308.0	293.2
1991	345.9	330.9
1992	506.8	478.4
1993	800.2	751.9
1994	1,174.6	1,180.7
1995	2,017.7	2,040.4
1996	2,646.7	2,638.1
1997	2,864.2	2,863.3
1998	3,044.4	3,149.2
1999	2,995.5	3,357.6
2000	3,213.8	3,590.5
2001	4,031.1	4,268.0
2002	4,497.1	4,897.0
2003	5,112.4	6,016.1
2004	5,835.3	6,636.2

Source: CBN (2004).

Table 2.4: **Inflation Rate for Food and all Items (in %)**

Category	2000	2001	2002	2003	2004
Food	-4.20	28.00	13.10	6.00	14.5
All Items	6.00	18.90	12.90	14.00	15.00

Source: NBS (2005a).

Now coming to food consumption in Nigeria, the food items consumed in the country are multifarious and they vary in composition and frequency (weight) of consumption across the geo-political zones and across the urban and rural sectors of the country. However, as shown by FOS (1996 and 2004b), the basic food items that are generally and most frequently consumed in Nigeria include the following:

(a) **Staples**: These include rice (local), rice(imported), millet, guinea-corn, bread, yam tuber, yam flour, cassava tuber, cassava flour, pap, garri, potato, cocoyam, beans, plantain and maize.

(b) **Animal Protein**: These include corn beef, fresh beef, dried beef, goat meat, guinea fowl, chicken, turkey, pork, snail, fresh fish, dried fish, shrimp, sardine, cray fish, fresh milk, egg, locust beans and mutton.

(c) **Oil and Fat**: These include palm oil, margarine, vegetable oil and planta.

(d) **Vegetables, Nuts and Fruits**: These include orange, banana, mango, cucumber, okra, bitter leaf, green leaf, lettuce, cabbage, garden egg, avocado pear, fluted pumpkin (ugu), carrot, fresh tomato, melon, onion, groundnut and pepper.

(e) **Other Foods:** These include beverages (like Bournvita, Ovaltine, tea and Milo), biscuits, tin milk, maggi, sugar, honey, custard and semovita.

Various household surveys conducted by the National Bureau of Statistics reveal that the poor consume mostly staples, vegetables, oil and fat. Similarly, Maziya-Dixon et al. (2004) highlighted some staple food crops and some non-staple food crops as the most frequently consumed food items in Nigeria (see Tables 2. 5 and 2. 6); this was based on a food consumption and nutrition survey conducted in the country between 2001 and 2003. The frequency of consumption of the food items varied across agroecological zones made up of Dry Savannah, Moist Savannah and Humid Forest. The Dry Savannah zone consists of the core northern states and some of the North Central states; the Moist Savannah zone consists of many of the North Central states and the South Western states; and the Humid Forest consists of states in the South South geo-political zone and many of the South Eastern states.

Table 2.5: Frequenly Consumed Staple Food Crops at the National Level, by Agroecological Zone and by Sector (%) (2003)

Staple Food Crops	National	Dry Savannah	Moist Savannah	Humid Forest	Rural	Urban
Cassava	16.5	14.3	15.7	18.7	17.0	15.5
Cowpea Grain	11.8	14.2	10.6	11.3	11.7	11.9
Groundnut	11.1	12.6	10.6	10.6	11.3	10.7
Maize	20.1	18.8	21.9	19.8	20.3	19.8
Plantain	5.9	0.5	3.7	10.5	5.7	6.9
Rice	14.9	16.3	13.1	15.2	14.8	15.3
Sorghum	6.6	11.9	9.6	1.6	6.9	5.6
Soybean	2.6	2.9	4.0	1.5	2.4	2.7
Yam	10.4	8.7	10.8	11.1	10.0	11.7

Source: Maziya-Dixon et al. (2004).

Table 2.6: Frequently Consumed Non-Staple Foods at the National Level, by Agroecological Zone and by Sector (%) (2003)

Non-Staple Foods	National	Dry Savannah	Moist Savannah	Humid Forest	Rural	Urban
Bakery Products	4.6	4.9	4.7	4.5	4.9	4.5
Banana	3.5	3.5	3.3	3.5	3.4	3.4
Beverages	4.9	3.4	4.2	6.3	4.5	5.7
Dairy Products	7.4	8.7	7.9	6.3	7.2	7.8
Fat and Oil	16.6	10.7	9.5	8.2	9.2	9.2
Fish Products	7.5	5.4	5.9	9.7	7.6	7.6
Fruits	18.3	19.9	19.4	18.1	18.9	18.9
Leafy Vegetables	13.2	10.3	14.6	14.1	13.5	12.0
Meat Products	14.0	12.6	14.1	14.8	14.7	13.5
Non-Leafy Vegetables	16.8	20.7	16.4	14.6	16.3	17.4

Source: Maziya-Dixon et al. (2004).

As can be seen from Table 2.5, the most popular staple food items are maize, cassava and rice at the national level, in the Moist Savannah and Humid Forest zones and in the rural and urban sectors. In the Dry Savannah zone, the most popular staple food items are maize, rice and cassava. Table 2.6 shows that the most popular non-staple food items include fruits, non-leafy vegetables, and fat and oil at the national level. In the Dry Savannah zone, the most popular non-staple food items are non-leafy vegetables, fruits and meat products; in the Moist Savannah zone, the most popular non-staple food items are fruits, non-leafy vegetables and leafy vegetables while in the Humid Forest zone, the most popular non-staple food items are fruits, meat products and non-leafy vegetables. In the urban and rural sectors, the most popular non-staple food items are fruits, non-leafy vegetables and meat products.

The foregoing shows that food items that are rich sources of energy, protein and other essential food nutrients are generally popular among Nigerians.

2.2 Food and Non food Expenditure Shares in Total Household Expenditure in Nigeria

The National Consumer Surveys of 1980, 1985, 1992 and 1996 conducted by the then Federal Office of Statistics of Nigeria as contained in FOS (1999a) and the Nigeria Living Standard Survey (NLSS) conducted by the National Bureau of Statistics as contained in NBS (2005a and 2005b) reveal that between 1980 and 2004, food expenditure constituted overwhelmingly greater share of household total expenditure than non-food expenditure for all the years. This is shown in Table 2.7.

Table 2.7: Food and Non-food Expenditure Shares in Total Household Expenditure in Nigeria (1980-2004).

Year	Food Expenditure Share (in %)	Non-food Expenditure Share (in %)	Total
1980	63.4	36.6	100
1985	74.1	25.9	100
1992	72.8	27.2	100
1996	63.6	36.4	100
2004	55.9	44.1	100
Average	65.96	34.04	100

Sources: FOS (1999a); NLSS Data Set and Author's Calculations.

Table 2.8 reveals that food expenditure share varies directly with poverty levels in 1985, 1992 and 1996. In 1980 and 2004, however, food expenditure share was highest in moderately poor households followed by core poor households whereas the non-poor households had the least food expenditure share. On the average, food expenditure shares between 1980 and 2004 for core poor, moderately poor and non-poor households were 71.99%, 73.396% and 63.406% respectively.

Table 2.8: Food and Non food Expenditure Shares in Total Household Expenditure in Nigeria by Poverty Levels (1980-2004)

	Core Poor		Moderately Poor		Non-poor	
Year	Food Expenditure Share (in %)	Non-food Expenditure Share (in %)	Food Expenditure Share (in %)	Non-food Expenditure Share (in %)	Food Expenditure Share (in %)	Non-food Expenditure Share (in %)
1980	64.5	35.5	72.6	27.4	62.8	37.2
1985	83.7	16.3	81.1	18.9	71.6	28.4
1992	80.0	20.0	79.3	20.7	71.8	28.2
1996	76.2	23.8	72.9	27.1	58.4	41.6
2004	55.55	44.45	61.08	38.92	52.43	47.57
Average	71.99	28.01	73.396	26.604	63.406	36.594

Sources: FOS (1999a); NLSS (2004) Data Set and Author's Calculations.

From what have been stated and shown in this sub-section, it is obvious that the food share in households' total expenditure has been far greater than non-food expenditure share over the years. This implies that Nigerians in general spend a greater proportion of their income on food and it is a connotation of massive poverty, following Engel's law.[7]

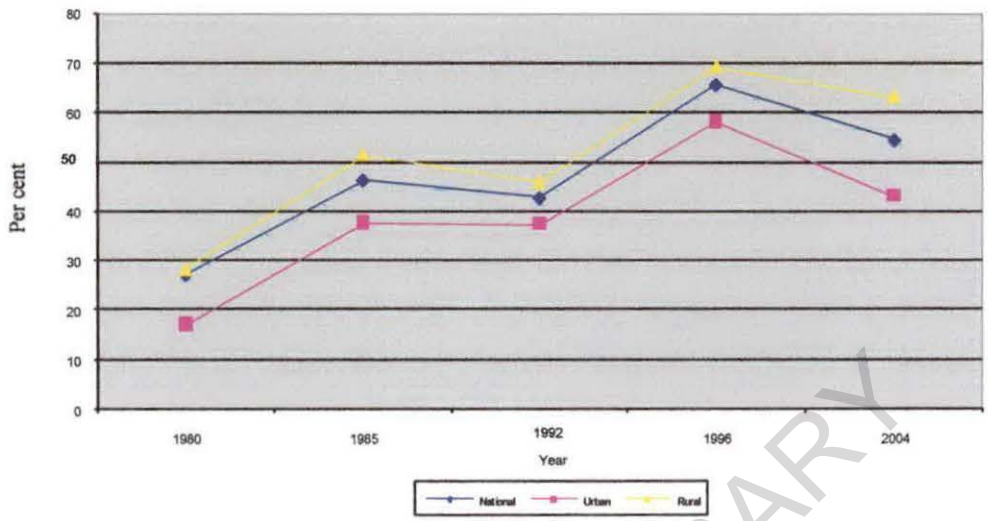
2.3 Trend and Nature of Poverty in Nigeria

The National Bureau of Statistics (NBS), formerly known as the Federal Office of Statistics (FOS), has designed a poverty profile for Nigeria for the period 1980 – 2004, based on the National Consumer Surveys of 1980, 1985, 1992 and 1996 and the Nigeria Living Standards Survey of 2004 (FOS, 1999a; NBS, 2005a and 2005b). The poverty profile is predicated on two poverty lines – the core poverty line and the moderate poverty line. The core poverty line is one-third of the (arithmetic) mean of per capita household expenditure while the moderate poverty line is two-thirds of the (arithmetic) mean of per capita household expenditure. Thus households whose expenditures are less than one-third of the mean per capita household expenditure are considered to be core poor and households whose expenditures are more than one-third but less than two-thirds of the mean per capita household expenditure are taken as moderately poor. The sum of those households in core poverty and those households in moderate poverty makes up total number of households in poverty. And when the total number of households in poverty is subtracted from the total number of households in the sample (weighted by population weights), we get the total number of households that are non-poor.

Figure 2.1 shows that poverty frequently maintained upward trend in the period 1980 – 1996, at the national level and in the urban and rural sectors. However, between 1996 and 2004, poverty at all levels declined, though rural poverty declined only marginally.

[7] This states that the proportion of total income spent on food declines as income rises. This implies that the share of food expenditure in total household expenditure should fall as households poverty levels fall, ceteris paribus.

Figure. 2.1: Trends in Poverty Levels:1980-2004(National, Urban and Rural)(in %)



Urban poverty level was always lower than national poverty level but rural poverty level was always higher than national poverty level in the period under reference. Indeed, rural poverty level was always far higher than urban poverty level throughout the years in the period under reference. This points out clearly that poverty in Nigeria has always been a rural phenomenon.

Table 2.9 shows percentage distribution of the population in poverty by core poverty and moderate poverty. As revealed in the table, moderate poverty was always higher than core poverty throughout the period under reference; both core poverty and moderate poverty maintained upward trend frequently in the period in question.

Table 2.10 shows core and moderate poverty levels by sector. As indicated in the table, in both urban and rural sectors, moderate poverty was always higher than core poverty throughout the period under reference; both core poverty and moderate poverty maintained upward trend frequently in the two sectors, in the period under reference with few exceptions. Both core poverty and moderate poverty were always higher in the rural sector than in the urban sector. This further shows that poverty in Nigeria has always been a rural phenomenon.

Table 2.11 shows trends in poverty level by zone. As shown in the table, the North East zone had the highest poverty incidence in 1985, 1992 and 2004 whereas the North West zone had the highest poverty incidence in 1980 and 1996. The South East zone had the least poverty level in 1980, 1985, 1996 and 2004 while the North West zone had the least poverty level in 1992. In general, poverty was usually most pronounced in the North East and North West Zones and usually least pronounced in the South East zone. Poverty maintained upward trend frequently in all the geo-political zones.

Table 2.9: Percentage Distribution of the Population in Poverty by Core Poverty and Moderate Poverty: 1980 – 2004

Year	Core Poor (in %)	Moderately Poor (in %)	Aggregate Poverty (in %)	Non-Poor (in %)
1980	6.2	21.0	27.2	72.8
1985	12.1	34.2	46.3	53.7
1992	13.8	28.9	42.7	57.3
1996	29.3	36.3	65.6	34.4
2004	22.0	32.4	54.4	45.6

Sources: FOS (1999a); NBS (2005a and 2005b).

Table 2.10: Core Poverty and Moderate Poverty Levels by Sector: 1980 – 2004

Year	URBAN SECTOR				RURAL SECTOR			
	Core Poor (in %)	Moderately Poor (in %)	Aggregate Poverty (in %)	Non-Poor (in %)	Core Poor (in %)	Moderately Poor (in %)	Aggregate Poverty (in %)	Non-Poor (in %)
1980	3.0	14.2	17.2	82.8	6.5	21.8	28.3	71.7
1985	7.5	30.3	37.8	62.2	14.8	36.6	51.4	48.6
1992	10.7	26.8	37.5	62.5	15.8	30.2	46.0	54.0
1996	25.2	33.0	58.2	41.8	31.1	38.2	69.3	30.7
2004	15.7	27.5	43.2	56.8	27.1	36.2	63.3	36.7

Sources: FOS (1999a); NBS (2005a and 2005b).

Table 2.11: Trends in Poverty Level by Geo-political Zones: 1980 – 2004(in %)

Geo-political Zone	1980	1985	1992	1996	2004
South South	13.2	45.7	40.8	58.2	35.1
South East	12.9	30.4	41.0	53.5	26.7
South West	13.4	38.6	43.1	60.9	43.0
North Central	32.2	50.8	46.0	64.7	67.0
North East	35.6	54.9	54.0	70.1	72.2
North West	37.7	52.1	36.5	77.2	71.2

Source: FOS (1999a); NBS (2005a and 2005b).

2.4 Poverty Estimates based on Food-Energy- Intake by the National Bureau of Statistics

The National Bureau of Statistics (NBS), using the food- energy- intake method, computed a minimum annual expenditure on food required per adult equivalence to attain 2900 kilocalories per day as ₦21,743; this is used as the food poverty line. The NBS defined extreme poverty as when a household's total annual household expenditure per adult equivalence in regionally deflated prices is less than the set food poverty line. The extreme poverty estimates based on the NBS definition are presented in Table 2.12.

As shown in Table 2.12, extreme poverty is more pronounced in the rural sector than in the urban sector; extreme poverty is highest in the North East Zone followed by the North Central Zone and the North West Zone in that order whereas it is lowest in the South East Zone. It is evident that extreme poverty is higher in the north than in the south. The extreme poverty incidence for Nigeria is 36.6%. Even though the NBS refers to the foregoing estimates as estimates of food poverty, they are, strictly speaking, estimates of extreme poverty and not of food poverty.

The NBS used a single food poverty line and it compared the poverty line with total expenditure. But this study has used geo-political zone-specific food poverty lines that have taken food consumption patterns and relative prices into consideration and it compared the food poverty lines with total food expenditures. Thus the estimates of this study are the real food poverty estimates.

Table 2.12: Extreme Poverty Estimates based on the Definition by the National Bureau of Statistics (NBS)

National/Sector/Zone	Extreme Poverty Headcount (%)
Nigeria	36.6
Sector:	
Urban	26.7
Rural	44.4
Zone:	
South East	16.7
South West	28.8
South South	32.8
North East	47.5
North West	44.1
North Central	44.4

Sources: NBS (2005a & 2005b) and Author's computations from the NBS 2003/2004 NLSS Data Set.

2.5 National Food Policy and Efforts towards Reducing Food Poverty in Nigeria

A food and nutrition policy should seek to guarantee food security by adequately addressing the issues of food supply and food demand/needs. In the words of Davies (1983), a food and nutrition policy can be seen as a coherent set of principles, objectives, priorities and decisions adopted by a state and applied by its institutions as an integral part of the state's national development plan in order to provide all the population with the amount of food and other social, cultural and economic conditions essential to adequate nutrition and dietary well-being within a given period of time. However, apart from taking into consideration the food and nutritional needs of the populace, a food and nutrition policy should, as shown by Idachaba (1983), sufficiently address the following issues, among others: framework of analysis, stakeholders' involvement, food and nutrition policy instruments, and guiding principles for food and nutrition policy.

Except the government and policy makers are guided by a powerful and comprehensive framework of analysis, the formulation and implementation of food and nutrition policy are likely to be sequential trial and error processes. There is need to include all relevant participants – particularly all categories of farmers/agriculturalists as well as nutritionists, food technologists/food experts and agricultural economists/ economists – in the formulation of food and nutrition policy. It is common knowledge that farmers who are to directly respond to public food and nutrition policy are usually excluded from the policy formulation process; and when such happens the farmers will fail to identify with the policies so formulated and the end result is usually failure of the policies to adequately and satisfactorily meet their expected objectives.

It is very important to sufficiently define policy instruments for a food and nutrition policy. It is worthy of note here that many food and nutrition policies fail either because the chosen policy instruments are inappropriate or insufficient or because the instruments employed created new serious second generation problems after or while achieving the stated objectives.

It is highly essential that formation of a national food and nutrition policy should clearly specify what the guiding principles are. Except the guiding principles are clearly specified and are reasonable and desirable, there would be many wrong policy prescriptions and poor take-offs/beginnings.

Now talking about food and nutrition policy in Nigeria, it could be recalled that in the distant past, food and nutrition related activities in the country were sectoral, uncoordinated and limited in scope. Various ministries designed policies[8] in which considerations on nutrition were addressed based on the perspectives of the respective ministerial mandate. It was in 1990 that a National Committee on Food and Nutrition (NCFN) was set up, and domiciled in the Ministry of Science and Technology, to, among other things, formulate a National Policy on Food and Nutrition and a National Food and Nutrition Action Plan. With the phasing out of the Ministry of Science and Technology in 1993, the NCFN was absorbed by the Ministry of Health. And in 1994, the NCFN and its emerging programmes/projects were relocated to the National Planning Commission (NPC) because of the NPC's unique position as the government's agency responsible for coordination and monitoring of all national policies and programmes including budgetary aspects as well as all technical assistance programmes in the country (NPC, 2001).

The broad objective of Nigeria's Food and Nutrition Policy is to adequately improve the nutritional status of all Nigerians, with particular emphasis on groups[9] considered to be most vulnerable to the shocks associated with food consumption. The specific objectives of the nation's Food and Nutrition Policy include the following: (i) establishment of a viable system for guiding and coordinating food and nutrition activities undertaken in the various sectors and at various levels of the society, from community to the national level; (ii) incorporation of food and nutrition considerations into development plans and allocation of adequate resources towards solving the problems pertaining to food and nutrition at all levels; (iii) promotion of habits and activities that will reduce the level of malnutrition and improve the nutritional status of the population; (iv) identification of sectoral roles and assignment of responsibilities for the alleviation of malnutrition; ensuring that nutrition is recognised and used as a crucial indicator for monitoring and evaluation of national development policies and programmes; and (v) promoting good indigenous food cultures and dietary habits of Nigerians for healthy living and development. Based on the desire to achieve the overall

[8] The policies included agricultural policy, industrial policy, health sector nutrition policy, mass communication policy, social development policy, science and technology policy, national policy on education, women in development policy and rural development policy.

[9] These include children, women and the elderly.

objective of adequately improving the nutritional status of vulnerable groups in Nigeria, the National Food and Nutrition Policy has the following specific objectives: improvement of food security at the household and aggregate levels to ensure that families have access to adequate (both in quantitative and qualitative terms) and safe food to fulfil nutritional requirements for healthy and active life; enhancing care-giving capacity within households with respect to child feeding and child care practices as well as addressing the care and well-being of mothers; improving the provision of human services such as healthcare, environmental sanitation, education and community development; improving the capacity within the country to address food and nutrition problems; and increasing the understanding of the problems of malnutrition in Nigeria at all levels of the society, especially with respect to its causes and possible solutions (NPC, 2001).

In recognition of the immense extent of the problems of food and nutrition in Nigeria, the following targets were set to address the problems: reduction of the level of poverty by 10 per cent by the year 2010; reduction of starvation and chronic hunger to the barest minimum through increased food intake; reduction of under-nutrition especially among children, women and the aged, and in particular severe and moderate malnutrition among under-five group by 30 per cent by the year 2010; reduction of micronutrient deficiencies, particularly Iodine Deficiency Disorders (IDD), Vitamin A Deficiency (VAD) and Iron Deficiency Anaemia (IDA) by 50 per cent of current levels by the year 2010; reducing the rate of low birth weight (2.5kg or less) to less than 10 per cent by the year 2010; reducing diet-related non-communicable diseases by 25 per cent of current level by the year 2010; improving general sanitation and hygiene, including availability of safe drinking water; and reducing the prevalence of infectious and parasitic diseases that aggravate the poor nutritional status of infants and children by 25 per cent of the current levels (NPC, 2001).

As shown by NPC (2001), multiple strategies aimed at achieving the various Food and Nutrition Policy objectives in Nigeria (as stated earlier) have been devised. These strategies include the following: strategies for improving food security in Nigeria; enhancing care-giving capacity; enhancing provision of human services; improving

capacity to address food and nutrition problems; raising awareness and understanding of the problem of malnutrition in the country.

It is obvious that the features of the National Food and Nutrition policy are in general seemingly glamorous and robust. They (the features) apparently offer hope for the enthronement of sustainable food security in Nigeria. However, it is instructive to state that sound food and nutrition policy is necessary but not sufficient to bring about obliteration of food consumption deficits and guarantee food security. It is evident that the objectives of the National Policy on Food and Nutrition have largely not been met.

Coming to efforts towards reducing food poverty, as rightly observed by Ogwumike (2001 and 2003), before the enthronement of Structural Adjustment Programme (SAP) in Nigeria in 1986, poverty reduction was not given direct attention by any development planning and management in the country; government only showed some concern for poverty alleviation indirectly. The government hitherto focused purely on economic growth perhaps with the belief that the benefits of economic growth would "trickle down" to the poor and thus significantly reduce poverty in the country. The indirect concern of government for poverty alleviation in Nigeria during the pre-SAP era was implicitly shown in the development plans of the era. Given that adequate food production/ consumption is highly correlated with poverty reduction, it is not surprising to observe that in the pre-SAP era direct and considerable attention was also not given to the various dimensions of Nigeria's food problem (Olayemi, 1998); this is partly because poverty alleviation/eradication was evidently not the direct focus of the Nigerian government in the pre-SAP era.

It is indeed worthwhile to point out here that the various development objectives in Nigeria in the pre-SAP era as eloquently encapsulated in the four National Development Plans persistently ignored explicit recognition of poverty and food production and consumption inadequacies as major aspects of the development problem in the country.

However, the programmes/schemes relating to food poverty reduction which were set up during the pre-SAP era include: Agricultural Development Programme (ADP), Agricultural Credit Guarantee Scheme (ACGS), Operation Feed the Nation (OFN), National Accelerated Food Production Plan (NAFPP) and Green Revolution (GR)

[Ogwumike, 1998 and 2001; Omale and Molem, 2003]. These programmes/schemes to some extent addressed areas related to improvement of agricultural/food production and food consumption. In spite of the shortcomings of these programmes/schemes, in general, they apparently had far reaching positive effects on enhancement of food production and consumption.

The enthronement of SAP in 1986 brought some harsh conditions upon the lives of many Nigerians. It then became necessary to design programmes/schemes that would mitigate the harsh effects of the programme. Thus the SAP era marked the beginning of conscious policy efforts by government towards poverty alleviation and reduction of food consumption deficits and food insecurity in Nigeria. Indeed, during the SAP era –1986 to 1993 – many poverty alleviation programmes/schemes as well as programmes/schemes to improve food supply and consumption were designed and implemented in Nigeria. Also during the period of guided deregulation of between 1993 and 1998 and after the period, more poverty reduction programmes as well as programmes that had direct bearing on rural development and enhancement of food production and consumption were put in place in the country by the government. Table 2.13 shows a summary of the major anti-poverty and rural development/food improvement programmes/schemes that were put in place in the SAP era and the era of guided deregulation as well as those that came up after the period of guided deregulation.

The programmes in general had varied consequences on poverty alleviation, rural development and food production. For instance, the Directorate for Food, Roads and Rural Infrastructure (DFRRI) was a radical departure from the programmes that existed before it; it recognised the complementarities associated with basic needs such as food, shelter, portable water, good roads, and so on. DFRRI had enormous positive effects on rural areas.

Table 2.13: Major Anti-poverty, Rural Development and Food Supply/ Consumption Enhancement Programmes/Schemes by the Government of Nigeria

Programme/Scheme	Year Established	Target Group	Nature of Intervention
Directorate for Food, Roads and Rural Infrastructure (DFRRI)	1986	Rural areas	Feeder roads, rural water supply and rural electrification
National Directorate of Employment	1986	Unemployed youths	Training, finance and guidance
Better Life Programme (BLP)	1987	Rural women	Self-help and rural development programmes, skill acquisition and health care
Peoples Bank of Nigeria (PBN)	1989	Underprivileged in urban and rural areas	Encouraging savings and credit facilities
Community Banks (CB)	1990	Rural residents, micro-enterprises in urban areas	Banking facilities
Family Support Programme (FSP)	1994	Families in rural areas	Healthcare delivery, child welfare, youth development, etc
Family Economic Advancement Programme (FEAP)	1997	Rural areas	Credit facilities to support the establishment of cottage industries
Universal Basic Education Programme(UBE)	1999	Children of primary and junior secondary school age	Provision of assistance to states and local governments for the purposes of uniform and qualitative basic education throughout Nigeria; provision of free, compulsory and universal basic education for every child of primary and junior secondary school age; infrastructural development; capacity development for teachers

Poverty Alleviation Programme(PAP)	2000	Unemployed people, particularly the youths	Providing training, finance and healthcare; job creation; infrastructural and industrial development
National Poverty Eradication Programme(NAPEP)	2001	Poor and neglected masses, particularly those in the rural areas	Manpower development; rural development; infrastructural development; provision of healthcare and finance; natural resource development and conservation; provision of basic needs such as food and transportation
National Economic Empowerment and Development Strategy(NEEDS)	2004	All Nigerians particularly the poor and vulnerable groups	Empowering people though provision of sound healthcare, education, conducive environment, integrated rural development, housing development, employment and youth development, safety nets, gender and geo-political balance, pension reforms etc; promoting private enterprise through sectoral strategies, privatisation and liberalisation, provision of adequate security and finance, adherence to rule of law etc; changing the way the government does its work through public sector reforms, transparency and anticorruption etc

Sources: Oladeji and Abiola (1998); FGN (2001); CBN Research Department (2003); Ogwumike (2003); NPC (2004); and Author's Compilation.

In general the aforementioned poverty reduction programmes/schemes failed to adequately produce the desired results. The major reasons for their failure include: lack of baseline data and hence poor conceptualisation of many of the programmes; ineffective targeting of the poor by a large number of the programmes/schemes which resulted in high level of leakages of the programmes' benefits to unintended beneficiaries; lack of accountability, probity and transparency which made the programmes/schemes to serve as conduit pipes for draining national resources/wealth; overlapping functions, inadequate coordination, non-sustainability of the programmes/ schemes and lack of continuity; and political and policy instability which resulted in frequent policy changes and inconsistent and poor implementation (Egware, 1997; Ogwumike, 1998 and 2003).

In 1999, at the inception of the fourth republic in Nigeria under President Olusegun Obasanjo, the government gave the impression that poverty alleviation was part of its principal objectives. The government then established the Poverty Alleviation Programme (PAP) within the framework of the 2000 national budget, which was, among other things, aimed at employment generation particularly for the youths. However, the implementation of the programme was ad-hoc in orientation with little attention paid to the policy framework; thus many Nigerians could not feel the impact of the programme (Ogwumike, 2003). This led to the phasing out and the replacement of PAP with the National Poverty Eradication Programme (NAPEP) in 2001. NAPEP was made to be responsible for the coordination and monitoring of the activities of the core poverty reduction/ eradication ministries and agencies and its broad objective[10] was to eradicate absolute poverty in Nigeria by the year 2010 (FGN, 2001; CBN Research Department, 2003; NPC, 2004). A National Poverty Eradication Council with the President as Chairman was also established. In recent times, NAPEP established many programmes such as Youth Employment Scheme (YES), Rural Infrastructure Development Scheme (RIDS), Social Welfare Services Scheme (SOWESS) and Natural Resource Development and Conservation Scheme (NRDCS). These schemes were created with several components. For example, YES was made to have Capacity Acquisition Programme

[10] The focus of NAPEP is still on provision of "strategies for the eradication of absolute poverty in Nigeria".

(CAP), Mandatory Attachment Programme (MAP) with targets set for each year (Ogwumike, 2003). It is important to state here that NAPEP was made to have some features of integrated approach to development and hence to poverty reduction/enhancement of food production. It is sad to observe, however, that poor/inadequate implementation of programmes/schemes has been a major problem plaguing NAPEP.

Other poverty reduction/agricultural development programmes/schemes established under the President Olusegun Obasanjo's democratic regime include the Universal Basic Education (UBE) which was introduced in 1999 in recognition that education is a veritable tool for poverty reduction and enhancement of food production. The programme is aimed at providing a full compulsory nine-year education from primary one to junior secondary school level three (JSS 3).

The government has over the years, particularly in recent times, tried to alleviate poverty through upward review of the emoluments of public sector workers. However, inflationary trends usually accompany such review in line with economic theory (Ogwumike, 2003). Thus such review has never sufficed to bring about adequate poverty reduction.

It is worthwhile to state here that in an attempt to bring lasting solution to the developmental problems in Nigeria – including the problems of poverty and food production and consumption inadequacies – the democratic government of President Olusegun Obasanjo designed and put in place a highly sophisticated and robust reform framework in 2004, known as National Economic Empowerment and Development Strategy (NEEDS)[11]. The core objectives of NEEDS include wealth creation, employment generation, poverty reduction and value reorientation (NPC, 2004).

It is most unfortunate that despite all the efforts made so far towards poverty alleviation and improvement in food production and consumption in Nigeria, the problems have remained largely unabated. Indeed, the problems are now threatening the survival of the country as a corporate entity.

[11] The reform framework was expected to have both state and local government area counterparts known as State Economic Empowerment and Development Strategy (SEEDS) and Local Economic Empowerment and Development Strategy (LEEDS) respectively.

CHAPTER 3

LITERATURE REVIEW

3.1 Conceptual Issues on Food Consumption/Expenditure

Food consumption is the intake of all components[12] of food or part thereof. A major concept associated with food consumption is food security. The idea of food security has predominated since the early1980s. During the darkest years of structural adjustment in many of the developing countries, within the late 1980s and the early 1990s, donors from developed countries developed enthusiasm for national food security planning partly as a proxy for poverty planning (Maxwell and Slater, 2003). As further noted by Maxwell and Slater (2003), the 1992 International Conference on Nutrition and the 1996 and 2002 World Food Summits cemented and popularised the above enthusiasm. The core concept of food security has evolved over time, but has generally been taken to include both supply and access, also safety, and, in some cases, cultural stability (Maxwell and Slater, 2003).

Indeed, many definitions of food security have been postulated in the literature; some of the major ones are contained in Table 3.1. However, food security is generally conceptualised as access by all people at all times to enough, safe and nutritious food for an active and healthy life[13] (World Bank, 1986; Reutlinger, 1987; Ukoha, 1997; Olayemi, 1998). This conceptualisation may be said to be national or aggregate food security. We can also talk of individual and household food security. An individual or household may be said to be food secure when the individual or all members of the household has/have access to adequate, safe and nutritious food at all times, for an active and healthy life.

[12] The components of food are carbohydrates, proteins, fats, vitamins, minerals and water.

[13] This is in line with the definition endorsed at the International Conference on Nutrition in 1992 (See Olayemi, 1998).

Table 3.1: Some Major Conceptualisations of Food Security

S/N	Conceptualisation
1.	Food security has to do with the presence of a basket of food that is nutritionally adequate, culturally acceptable, procured in keeping with human dignity and enduring over time.
2.	A country and people are food secure when their food system operates efficiently in such a way as to remove the fear that there will not be enough to eat.
3.	Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.
4.	Food security refers to the ability of countries, regions, households or individuals to meet target levels of food consumption on a yearly basis.

Sources: Olayemi (1998); Maxwell and Slater (2003);

The essential elements of food security include availability of food and ability to acquire it (Reutlinger, 1987). Indeed, in broad terms, food security may be said to have three components namely physical access to food, economic access to food and sustainability of access to food.

Physical access to food at the national level is captured by availability of food per capita or per adult equivalent relative to food requirements per capita or per adult equivalent. National food availability is determined principally by domestic net food supply and food import. The capacity to import food is usually a function of export earnings, foreign exchange reserves, value of essential non-food import and debt service obligations (Olayemi, 1998). Physical access to food, at the household or individual level implies food availability or food supply to the household or to the individual. It is possible to have adequate physical access to food at the national level and yet have inadequate physical access to food at the regional, household or individual level; this may be due to many factors such as poor infrastructure, inefficient food distribution and marketing systems, civil unrest and corruption. Indeed, physical access (and any other access) to food at one level does not guarantee access at any other or all other levels (Egbuna, 2001).

Economic access to food relates to the capacity to purchase or otherwise acquire food. It is associated with issues of effective demand for food. Economic access to food at the national level depends largely on the government's capacity to import food to augment domestic supply whenever the need arises; it also depends on the nation's capacity to adequately produce food locally. At the household level, economic access to food refers to household's food entitlement[14] and to such factors as household nominal income, food and non-food prices, household's own food production level and food and income transfers to the household – through gifts, subsidy, public support, and so on.

With regard to sustainability of access to food, it has to do with those food demand and supply issues that determine the ability of a nation or household or individual to enjoy stable and sustained physical and economic access to food over time (Olayemi, 1998).

[14] This refers to the ability of the household to have control over its own food sources.

It is instructive to point out here, following Olayemi (1998), that food security is not synonymous with food self-sufficiency as erroneously held in some quarters. Food self-sufficiency refers to a state of affairs in which a nation or household or individual is able to satisfy its/his/her food requirements from its/his/her own food production activities without recourse to augmentation through food import, transfers or other external supply facilities. There can be food security without food self-sufficiency if there is enough capacity to acquire additional food from external sources to adequately meet food requirements at all times for active and healthy living.

The antithesis of food security is food insecurity. Food insecurity implies lack of access, at some points in time, to adequate, safe and nutritious food for an active and healthy life. Food insecurity can be chronic or transitory. Transitory food insecurity is a temporary decline or shortage in a country's or region's or household's or individual's access to adequate, safe and nutritious food; it results mainly from instability in food production, food prices, incomes etc. – and in its worst form it produces famine[15] (World Bank, 1986; Salih, 1995). The continuation of such shortage or the persistence of insufficient diet caused by the inability to produce or acquire enough food results in chronic food insecurity (Reutlinger, 1987; Salih, 1995). Poverty is usually considered to be the root cause of chronic food insecurity. That is, chronic food insecurity is the continuous inability to command enough resources to either purchase enough food for consumption or to adequately produce one's own food (Salih, 1995).

Food insecurity results in hunger, starvation and malnutrition. Hunger may be seen as a symptom or sensation expressed as temporary craving for food; it is a strong desire or need for food. Starvation may simply be said to be prolonged hunger; it is also the state of ingesting grossly inadequate food to provide energy and other nutritional requirements for the optimal functioning of various organs of a person and for active and healthy living. Malnutrition is the term used to describe an imbalance of nutrient intake due to consumption of too much or too little of one or many nutrients (Olayide, 1983). Malnutrition is of two forms namely under-nutrition and over-nutrition. Under-nutrition results from inadequate consumption of safe and nutritious food and/or insufficient body

[15] This is a phenomenon of inadequate supply of basic food items and this may happen on seasonal/ periodic cycles when it is generally felt in an economy.

utilisation of nutrients in food. Over-nutrition refers to excess intake of food nutrients which leads to malfunctioning of the body systems/mechanisms. Suffice it to say, however, that the form of malnutrition that is associated with food insecurity is under-nutrition.

3.2 Conceptual Issues on Poverty

The conceptualisation of poverty is highly problematic. This is largely because the phenomenon affects many aspects of human condition including physical, psychological, social and even spiritual. This has made it impossible for there to be any general consensus on the definition of poverty. Indeed, a concise and universally acceptable definition of the malady has been elusive (Anyanwu, 1997; Ajakaiye and Adeyeye, 2001; Afonja and Ogwumike, 2003). In the words of Aboyade (1975), poverty, like an elephant, is more easily recognised than defined. However, for there to be any meaningful analysis of a problem with a view to finding solution to it, the problem must first be defined or conceptualised no matter how roughly this is done. Aboyade himself subscribed to the above. He asserted that it is not altogether a semantic escapism or academic obscurantism for economists to search for an objective means of identifying poverty and of separating it from its opposite phenomenon of non-poverty (Aboyade, 1975). Indeed, before we will be able to answer the question "what are the solutions to poverty?", we must, among other things, answer the question "what is poverty?". The literature is replete with multifarious conceptualisations of poverty. Various criteria have been used to conceptualise the problem.

For pedagogical convenience, it is desirable to state here that the commonest (and perhaps the most widely used) practice is to conceptualise poverty in absolute terms (Ogwumike, 1987 and 1991; Odusosa, 1997; Ajakaiye and Adeyeye, 2001; Okojie et al, 1999). In the words of Pope John Paul II[16], absolute poverty is a condition in which life is so limited by lack of food, malnutrition, illiteracy, high infant mortality and low life expectancy as to beneath any rational definition of human decency. The World Bank[17] sees absolute poverty as a condition of life degraded by diseases, deprivation and squalor,

[16] This is contained in his address to the 21st session of the Conference of the Food and Agriculture Organisation, 1981.
[17] See Olowonomi (1997).

among other things. Absolute poverty refers to gross insufficiency of income, consumption or expenditure, among other things. In general, absolute poverty refers to lack of adequate resources to afford a commodity basket[18] that guarantees the attainment/maintenance of an objective minimum standard of living (Olowononi, 1997). The above conceptualisation has some problems. It is extremely difficult to determine what to include in the so-called objective minimum. It is also extremely difficult to set minimum standards for basic necessities such as clothing and transportation which depend largely on individual tastes/preferences, cultural norms and the prevailing socio-economic conditions within a given society (Odusola, 1997; Afonja and Ogwumike, 2003). Absolute poverty has also been defined by the approximate maximum which refers to the maximum proportion of income that a family spends on certain subsistence goods and services (Afonja and Ogwumike, 2003); in line with Engel's law[19], any household or individual that spends more than the specified maximum share of its/his/her income on basic needs such as food, housing and health care is considered to be poor (Odusola, 1997; Afonja and Ogwumike, 2003). The above conceptualisation of absolute poverty is also problematic for, among other things, it is extremely difficult to objectively set the maximum share of income that should be spent on basic needs.

Despite the foregoing problems associated with absolute poverty conceptualisation it is noteworthy that conceptualising poverty in absolute terms is most appropriate for the formulation and implementation of policies/programmes that are aimed at reducing the degree of deprivation/immiseration and the number of people who suffer from such.

Poverty may also be viewed in relative terms. Relative poverty refers to the inability of certain regions, households or individuals in a society to earn adequate income or to command resources to satisfy their basic needs in line with what obtains in the better-off regions or households or what is obtained by the better-off individuals (UNDP, 1997). A major advantage of conceptualising poverty in relative terms is that it reflects changing perceptions of acceptable minimum standards of living (Odusola, 1997). Another advantage of conceptualising poverty in relative terms is that it makes

[18] This refers to collection of goods and services.
[19] This states that the proportion of income spent on food (or on basic needs) declines as income rises.

the setting up of the associated poverty line(s) relatively easy and straightforward. However, the approach has been severely criticised for being too much of a moving target. It is very difficult to reduce poverty and also virtually impossible to access the effectiveness of transfer programmes when poverty is conceptualised in relative terms; besides, the setting of relative poverty lines is highly arbitrary (Afonja and Ogwumike, 2003). Indeed, the relative poverty approach is fraught with many problems, particularly when it comes to policy implementation.

There are also material poverty and subjective poverty. Material poverty refers to lack of ownership and control of physical assets such as land, machinery and animal husbandry (UNDP, 1997). A major merit of conceptualising poverty in material terms is that it can be used to assess future poverty or the probability of a household or an individual falling into poverty resulting from inability to smoothen consumption. Also, material poverty approach is usually free from inflationary pressures. However, the approach is bedevilled with so many problems. Among other things, it is highly problematic to set poverty lines based on material poverty conceptualisation for it is extremely difficult to set minimum standards with regard to the nature, quantity and quality of assets to be owned by individuals or households in order to push them away from poverty. It is worthwhile to state here that material poverty approach is a very poor approach when it comes to accessing current poverty. Possession of assets does not always guarantee adequate expenditure or consumption required for an active and healthy life and minimum acceptable standard of living. Moreover, material poverty approach is often plagued by the problem of value because, among other things, assets suffer from depreciation and some even suffer from loss of popularity.

Subjective poverty conceptualisation, on the other hand, requires individuals – the poor inclusive – to define what they consider to be decent or minimally adequate standard of living. A major advantage of the subjective poverty approach is that it allows for the direct capturing of the feelings/perceptions of individuals concerning their welfare. However, the approach is complex and extremely difficult to apply because of the divergence in responses due to differences in individual utility functions and circumstances (Afonja and Ogwumike, 2003).

Poverty can be chronic (structural) or transient. Transient poverty may be conceptualised as the contribution of consumption variability to expected poverty over time while chronic poverty is the poverty that remains after inter-temporal variability in consumption has been smoothed out (Ravallion, 1988; Jalan and Ravallion, 1998 and 2000). Put differently, chronic poverty refers to persistent or permanent socio-economic deprivations and is linked to various factors such as limited productive resources, lack of education/skills for gainful employment and endemic socio-political and cultural factors. Chronic poverty is more related to vulnerability than transient poverty. Transient poverty is transitory or temporary and is linked to natural or man-made disasters such as wars, loss of jobs, conflagration, ill-health and flood (Job, 1998; Ajakaiye and Adeyeye, 2001).

Let us now focus on the concept of food poverty which is a major aspect of poverty. Food poverty can generally be defined as a condition of lacking the resources to acquire a nutritionally adequate diet; it has to do with whether households consume adequate food to satisfy their basic nutritional requirements; calorie norms are usually used to define nutritional adequacy (Greer and Thorbecke, 1986a and 1986b; Kyereme and Thorbecke, 1987). Food poverty can also be defined as when a household's food spending in a given period is less than the cost of a nutritionally adequate very low-cost diet (Rose and Charlton, 2002).

From the foregoing, it is obvious that poverty, no matter how it is conceptualised, implies some degree of deprivation. In recognition of the above, Aku et al. (1997) categorised poverty along five dimensions of deprivation namely: personal and physical deprivation, economic deprivation, social deprivation, cultural deprivation and political deprivation. Personal and physical deprivation is experienced in nutrition, health, literacy, educational disability and lack of self-confidence. Economic deprivation includes lack of access to properties/assets, income, and finance and means of production. A major and very common manifestation of poverty is lack of, or insufficient, access to basic necessities of life including food. Social deprivation is shown in impediments to full participation in social, political and economic life. Cultural deprivation refers to a situation when people are deprived in terms of values, beliefs, attitudes, knowledge, orientation and information; this makes them (the people) to be unable to take advantage of economic and political opportunities. Indeed, deprivation in

terms of values, beliefs, knowledge, information and attitudes make people to be unable to control their destinies. Under political deprivation, ignorance poses as a fundamental barrier to the alleviation/eradication of poverty because it complements and fuels the conditions of domination, exploitation and deprivation. Ignorance, among other things, undermines access to legal institutions. The poor lack political voice. Those that are politically deprived occupy lowly positions and are often subjected to humiliation through economic and/or physical threats.

3.3 Concept of Vulnerability to Poverty

The conceptualisation of vulnerability is also highly problematic, just like the conceptualisation of poverty. As noted by Chaudhuri and Datt (2001), Kamanou and Morduch (2002), and Hoddinoth and Quisumbing (2003), vulnerability means different things to different people; there are multifarious definitions of vulnerability and there is apparently no consensus on its conceptualisation or universally accepted definition of the phenomenon. Assessments of vulnerability are however particularly concerned with downside risks – risks that lead to decline in welfare. Although vulnerability assessments typically express welfare in terms of consumption, and the norm or benchmark as the poverty line[20], vulnerability is a sufficiently general concept that encompasses various dimensions of well-being. Vulnerability can be assessed at individual and household levels; it can also be aggregated over these units of observation (Hoddinoth and Quisumbing, 2003).

Vulnerability has been conceptualised by some researchers as having two major dimensions namely sensitivity and resilience (Oduro, 2002). Sensitivity refers to the magnitude of a household's, individual's, community's, state's or country's response to an external event while resilience is the ease and rapidity of recovery. The foregoing conceptualisation of vulnerability focuses on the response to a damaging fluctuation in well-being with little emphasis on the risk of the event happening and the factors that might expose the household, individual, community, state or country to the risk especially if it is an idiosyncratic event (Oduro, 2002).

[20] This can be set in various ways.

Given the narrowness of the foregoing conceptualisation, Alwang et al. (2001) have given a broad conceptualisation of vulnerability that includes the concepts of sensitivity and resilience. In their conceptualisation, vulnerability has four components namely risk, exposure, response and outcome. Risk has to do with the likelihood that a negative and detestable event will happen. Exposure may be viewed as the value of the assets at risk or the things that will be lost or that will be adversely affected from the realisation of an uncertain dismal or unwholesome event. Response refers to the efforts made or that can be made to mitigate and cope with risk and exposure. Response by a household or an individual, for instance, largely depends on the assets available to the household or the individual. The assets need to be highly liquid, that is, such that can be easily converted to cash at minimum cost and must not lose value in the face of the potentially poverty reducing incident (Dercon, 2000; Oduro, 2002). Response will also depend on the extent to which the household or the individual can gain access to credit as well as access to private transfers and/or public safety nets so as to be able to smooth consumption. Outcome is the end result of the effect of the damaging fluctuation and it is the interplay of risk, exposure and response (Alwang et al., 2001; Oduro, 2002).

On the basis of the foregoing conceptualisation of vulnerability based on four components, the extent of vulnerability may be said to depend on the characteristics of risk, exposure, and the ability to respond. In a similar fashion, Dercon (2000) has identified three sets of factors that determine household vulnerability to poverty namely: the options available to the household in making a living including assets, markets and activities; the risk faced by the household when making a living; and the ability to handle the risk.

Even though there is no universally accepted definition of vulnerability, as stated earlier, it is generally accepted that in conceptualising vulnerability there should be a benchmark or norm[21] (Hoddinott and Quisumbing, 2003). It has become fashionable to analyse vulnerability to poverty as a way of providing robust dimension to the nature of poverty. Vulnerability, just like poverty, has been conceptualised in the income and non-income space; thus it faces the same set of issues of welfare measurement as encountered

[21] This means that vulnerability has to be with respect to something or an adverse and detestable condition/ phenomenon.

while conceptualising poverty. However, vulnerability also carries with it the notion of a downside risk of welfare shocks that opens up additional set of issues related to the potential variability of welfare. In the literature on poverty, the issues have been highlighted in the distinction between transient and chronic poverty (Chaudhuri and Datt, 2001).

In general, household vulnerability to poverty may be conceptualised as the probability or ex-ante risk that a household will, if currently non-poor, fall below the poverty line, or if currently poor, remain in poverty (Chaudhuri, 2000; Chaudhuri and Datt, 2001; Chaudhuri et al.,2002; Chaudhuri, 2003). A household may be said to be vulnerable to poverty if it has 50 – 50 odds or worse of falling into poverty or of remaining in poverty (Pritchett et al., 2000). According to Dercon (2000), those vulnerable to poverty consists of the permanently poor; those becoming permanently poor due mainly to trend events such as erosion of their asset base; those most likely to become poor because of predictable events; and those most likely to become poor because of shocks or damaging fluctuations which impact adversely on consumption and welfare.

It is instructive to state here that concepts of poverty and vulnerability (to poverty) are intricately related but not identical. Vulnerability to poverty, as stated earlier, is an ex-ante (forward-looking) rather than an ex post concept. Poverty status can be observed at a specific period of time, given the welfare measure and the poverty threshold. But household vulnerability to poverty, on the other hand, is not directly observed rather it can only be predicted (Chaudhuri et al., 2002; Hoddinott and Quisumbing, 2003). While poverty is concerned with not having enough now, vulnerability to poverty is about having a high probability now of suffering a future shortfall in well-being.

We can therefore say that poverty and vulnerability to poverty are two sides of the same coin. The observed poverty level or status of a household (defined simply in terms of the household's observed level of consumption expenditure relative to a pre-selected poverty line) is the ex-post realisation of a random variable, the ex-ante expectation of which can be taken to be the household's level of vulnerability to poverty (Chaudhuri et al., 2002; Hoddinott and Quisumbing, 2003; Chaudhuri, 2003).

Vulnerability has been defined in terms of exposure to adverse shocks to welfare.[22] Such shocks may be classified as idiosyncratic and covariate shocks (Gunther and Harttgen, 2006). Idiosyncratic shocks are household-level or individual-level shocks such as death of breadwinner, ill-health/injury, loss of job/unemployment, adverse income fluctuation, destruction of farmland and fire disaster. Covariate shocks, on the other hand, are community-level or national-level shocks such as epidemics, civil disturbances/political instability, war, flood, earthquakes, cyclone and macroeconomic shocks such as severe balance of payments deficits and economic depression. It is important to point out here that most household surveys in developing countries were not designed to provide sufficiently detailed account of the consequences of shocks. Thus information on idiosyncratic and covariate shocks in the data sets is either completely missing or very limited. Hence, existing studies only examined either the aggregate vulnerability of households, ignoring the causes of the observed vulnerability, or only analysed the impact of selected idiosyncratic and/or covariate shocks on households' consumption, leaving out the analysis of the relative importance of different shocks on households' vulnerability; and the existing studies faced severe statistical problems (Gunther and Harttgen, 2006).

For practical purposes, a household's vulnerability to poverty has been conceptualised as the risk that the household will fall into poverty at least once within a given period of time or the likelihood that the household will experience at least one episode of poverty in the given period (Pritchett et al., 2000). Given that the future is uncertain, the magnitude of vulnerability increases with the time horizon. Thus vulnerability to poverty over the next one week will be lower than vulnerability to poverty over the next one year.

Four points, according to Pritchett et al. (2000), are worthy of note in the foregoing conceptualisation of vulnerability. First, since expenditures at time t (current period) are known, it is also known whether a household is currently in poverty or not. In the future, however, some households currently in poverty will rise out of poverty (in the next n periods) therefore the future vulnerability of the currently poor is less than 1 (in

[22] See Cunningham, W. and Maloney, W. F. 2000. Measuring vulnerability: who suffered in the 1995 Mexican crisis? Mimeo, The World Bank, Washington, D.C., cited in Chaudhuri et al. (2002).

probabilistic term). Second, the poverty line is time invariant because the household's total real expenditure is appropriately deflated so that a constant poverty line on those expenditure units represents constant level of welfare over time. Third, by conceptualising vulnerability in terms of observed expenditures, the existence and use of coping mechanisms have been incorporated. Some households may face large income variability and risk but have sufficient mechanisms to smooth over income changes and keep expenditures relatively constant (such as through savings, borrowing, informal and/or formal insurance). Thus observed expenditure vulnerability reflects both income risk and the utilisation of smoothing. Fourth, as a technical point, the conceptualisation is not the probability of at least one episode in n periods but it is a counterfactual question. The question here is: if one faces the one period ahead risk for n periods what is the likelihood of one of those periods having an episode of poverty? The more realistic problem of the evolution of poverty over time – where we take seriously the time scale of the observation of expenditures (which is usually one month) and calculate the evolution of expenditures following some dynamic process and calculate the probability of at least one month, say in 36 months being in poverty - is sufficiently more complicated.

Having highlighted various conceptualisations of vulnerability, it is important to state here that in general, there are basically three approaches adopted in the conceptualisation of vulnerability. These are Vulnerability as Expected Poverty (VEP), Vulnerability as Low Expected Utility (VEU) and Vulnerability as Uninsured Exposure to Risk (VER) (Hoddinott and Quisumbing, 2003). VEP, as shown earlier, views vulnerability in terms of the likelihood that a household will fall into or remain in poverty in the future; this conceptualisation is found in Pritchett et al. (2000), Chaudhuri (2000 and 2003), Chaudhuri et al. (2002), among other studies. Under the VEU approach, vulnerability is viewed with reference to the difference between the utility derived from some level of certainty-equivalent consumption, Z_{CE} at and above which the household would not be considered as vulnerable, and to the expected utility of consumption (Ligon and Schechter, 2002 and 2003; Hoddinott and Quisumbing, 2003). Z_{CE} is analogous to a poverty line. In the VER approach, vulnerability is seen as when shocks impose a welfare loss to the extent that there will be reduction in consumption. The ability of

shocks to impose a welfare loss and lead to decline in consumption is largely due to absence of effective and efficient risk management tools.

VER approach is similar to VEP and VEU approaches in that it is concerned with assessing welfare and welfare losses in a world where some risks are at best partially insured. It differs from VEP approach in that it is backward looking; it is an ex post assessment of the extent to which a negative shock causes a welfare loss rather than an ex ante assessment of future poverty. It also differs from VEP and VEU approaches in that it does not attempt to construct an aggregate measure of vulnerability (Hoddinott and Quisumbing, 2003).

All the three approaches share a common feature which is that they are all based on an indicator of welfare; this indicator may be consumption, income or expenditure. VEP and VEU share two further commonalities namely: they make reference to a benchmark for the welfare indicator chosen and enumerate a probability of falling below this benchmark. VEP and VEU approaches assess vulnerability at individual or household level; summing over all individuals or households gives a measure of aggregate vulnerability. The VER approach does not design probabilities instead it assesses whether observed shocks generate welfare losses; that is to say, it relates to ex post assessment of the extent to which a negative shock causes a household to deviate from expected welfare.

Vulnerability can also be viewed as variability. Under this approach, a household is considered to be more vulnerable if standard deviation of consumption/expenditure or income changes is high. In practice, the standard deviation can be estimated with two-period panel data or even cross-section data under strong assumption that all households have the same distribution of consumption/expenditure (Jha and Dang, 2010). However, this approach is apparently not as sophisticated as the other three approaches.

It is apparent from all the various conceptualisations of vulnerability that the phenomenon belongs to the realm of poverty dynamics; it is concerned with movement in and out of poverty.

3.4 Theoretical Issues relating to Food Consumption and Expenditure

Standard consumption theories show a positive relationship between consumption/expenditure and income. Keynes propounded a fundamental psychological law of consumption which forms the basis of his consumption theory. He stated inter alia as follows: "the fundamental psychological law upon which we are entitled to depend with great confidence both a priori from our knowledge of human nature and from the detailed facts of experience, is that men are disposed as a rule and on the average to increase their consumption as their income increases but not by as much as the increase in their income" (Jhingan, 2001b). As further pointed out by Jhingan (2001b), the law has three related propositions. First, when current disposable income increases, consumption expenditure- of which food consumption expenditure is a major component- also increases but by a smaller amount. This is largely due to the thrifty behaviour and savings propensity that are inherent in human beings. Second, the increase in current disposable income will be shared between consumption (including food consumption) expenditure and savings. This follows from the first proposition because when the entire increased income is not spent on consumption, it implies that the remainder is saved and/or invested. Thus consumption, savings and investment tend to move together with changes in current disposable income. Third, increase in current disposable income always leads to increase in both consumption and savings. This implies that increased current disposable income is unlikely to lead either to a fall in consumption or in savings at any given time. In general, the Keynesian absolute income theory states that consumption expenditure (including food consumption expenditure) is positively related to current disposable income and that the marginal propensity to consume is less than unity (Dernburg and McDougall, 1980; Jhingan, 2001b). The marginal propensity to consume, which is the ratio of the change in consumption to the change in income, is expected to be constant over time or at least in the short-run. The average propensity to consume, which is the ratio of consumption expenditure to a given level of income, is expected to decline as income increases; this is because the proportion of income spent on consumption usually decreases as income increases. The Keynesian consumption theory implies that household food consumption expenditure, which is a major aspect of household total consumption expenditure, is directly determined by current household

disposable income and household marginal propensity to consume. In general, the Keynesian consumption theory classified the determinants of consumption expenditure into two namely: subjective and objective factors. The subjective factors are psychological in nature and endogenous or internal to the economic system; they are unlikely to undergo a material change over a short period of time except in abnormal or revolutionary circumstances and they are largely non-quantifiable (Agba, 1994; Jhingan, 2001b). The objective factors, on the other hand, are exogenous or external to the economic system; they may undergo rapid changes over time and may cause upward and downward shifts in the consumption function (Agba, 1994; Jhingan, 2001b). The Keynesian consumption theory identified some six subjective determinants of consumption but these have since been refined and expanded; the factors now include enjoyment, short-sightedness, generosity, miscalculation, ostentation, extravagance, social pressure and consumer expectations (Agba, 1994). Consumption expenditure, including food consumption expenditure, is said to be carried out in order to satisfy consumers' desires for enjoyment. Food consumption expenditure will therefore vary directly with consumers' tastes and preferences for enjoyment. On short-sightedness, people in paid employment are said to have high tendency to maintain high level of consumption and they often disregard the fact that the job may be lost. Thus food consumption expenditure is a function of nature of employment. The more people take to employments that are associated with short-sightedness (such as paid public sector employment) the more will be the magnitude of food consumption expenditure. On generosity, people's consumption expenditure could be predicated on the extent of their generosity. Thus the higher the degree of generosity of consumers the higher will be their food (and other) consumption expenditure for the purpose of sharing with neighbours and friends. Coming to miscalculation, consumers' consumption expenditure could be based on the assurance or confidence that they will remain in paid employment for a long time. Therefore, food consumption expenditure is a function of the assurance and the level of confidence that paid-employed consumers have that they will remain in such employment for a long time. Coming to ostentation, consumption expenditure on basic needs such as food is a function of ostentation. The higher the proportion of income spent on ostentatious commodities the lower will be the proportion of income

spent on food and other basic needs, and vice-versa. On extravagance, when consumers are generally extravagant, their food consumption and other expenditures will be high. But when they are thrifty their food consumption expenditure will not be so high relative to their income. Social pressure is also said to be a major determinant of consumption expenditure. When a society extols high/conspicuous consumption, individuals/ households in the society will tend to allocate high proportions of their incomes to consumption; also when people belong to a social group they try their best to maintain the consumption habits of the group so as not to drop out of it (Agba, 1994). The foregoing implies that food consumption expenditure is a function of the social groups and societies people belong and the premium placed on such consumption expenditure vis-à-vis other consumption expenditures by the groups and societies. Consumer expectations are also known to play a key role in consumer expenditure decision.

Objective determinants of consumption expenditure include changes in the level of income, changes in the disposable income, changes in the distribution of income, consumers' credit facilities and interest rates, personal wealth, the stock of durable consumer goods and the general price level (Dernburg and McDougal, 1980; Agba, 1994; Jhingan, 2001b). With respect to changes in the level of income - with tastes, social conditions, production techniques and income distribution remaining the same - a household's consumption expenditure is a function of the additions or deductions from its income. An addition to the household's income will bring about an increase in food consumption expenditure and expenditure on other normal goods, ceteris paribus; the converse will be the case for a deduction from the household's income. Coming to changes in disposable income, consumption expenditure depends on net (disposable) income rather than gross earned income. Consumption expenditure is planned in line with net income, after making provisions for all taxes and other deductions. When taxes and other deductions are reduced, a household will increase its food consumption and other expenditures even if the gross income is not increased; the converse will be the case when taxes and other deductions are increased. With respect to changes in the distribution of income, it is noteworthy that low income earners in general have high marginal propensity to consume and high income earners in general have low marginal propensity to consume, especially with respect to food consumption expenditure.

Therefore, if there is a change in income distribution in favour of low income earners, food consumption expenditure will tend to increase, all other things being equal; the opposite will be the case if income distribution changes in favour of high income earners. Another major determinant of consumption expenditure is the availability of credit facilities in banks and other financial institutions as well as the availability of hire-purchase services and low interest rates. When the above conditions hold, food consumption and other expenditures will be high, other things being equal. With regard to personal wealth, there is a positive relationship between the level and value of personal wealth and food consumption and other expenditures. Coming to the stock of durable goods, the possession of a stock of durable goods has a dual effect on consumption expenditure. The possession of a large stock of consumer durable goods like cars, television sets, refrigerators and computers implies that the owners will not have need for them in the near future and this will reduce their (the consumers') consumption expenditure on the goods as they (the goods) will not be replaced immediately; also, there are some expenditures that naturally accompany the use of these durable goods such as repairs, purchase of fuel, electricity bills and regular servicing (Agba, 1994). The foregoing has implications for food expenditure and other expenditures. With regard to the general price level, food consumption expenditure and other expenditures are functions of general price level. During inflation, fixed income earners will not be able to increase rather they will tend to reduce their food expenditure as well as other expenditures, all other things being equal; the converse will be the case when there is a fall in the general price level.

Other determinants of consumption expenditure include windfall gains and losses, financial policies of business organisations and attitude towards savings (Jhingan, 2001b). With respect to windfall gains or losses, unexpected changes in the stock market bringing about gains or losses tend to increase or reduce consumption expenditure. When there are unexpected gains, food consumption expenditure and other expenditures will tend to increase; the reverse will be the case when there are unexpected losses. Coming to financial policies of business organisations, financial policies of business organisations with regard to income retention, dividend payments and reinvestments tend to affect consumption expenditure in many ways (Jhingan, 2001b). For instance, if business

organisations keep money in the form of reserves, dividend payments to shareholders will be less and will reduce the income of the shareholders and their food consumption expenditure and other expenditures will be adversely affected. Attitude to savings also affect consumption expenditure. If people save more than they consume now it will imply that current food consumption and other expenditures will be low but future food consumption and other expenditures are most likely to be high. It is important to state here that household demographic characteristics such as age, sex and family size also affect food consumption expenditure and other expenditures of households negatively or positively (Dernburg and Mcdougall, 1980).

Other theories of consumption expenditure have been postulated; these theories make radical departures from the Keynesian absolute income theory that posits that consumption expenditure is largely dependent on current disposable income and on marginal propensity to consume current disposable income. The theories include the relative income theory,[23] the permanent income theory[24] and the life cycle theory[25]. The relative income theory states that household consumption behaviour is interdependent and not independent. According to the theory, there is a tendency in human beings to strive constantly to attain a higher level of consumption and to emulate the consumption patterns of their better-off neighbours and even to surpass them[26] (the neighbours). The relative income theory suggests that the level and pattern of the food consumption expenditure and other expenditures of a household is determined by the consumption level and pattern of the households with which it lives or of those with whom it wishes to keep up. The theory also says that once a household/individual reaches a particular income level and quality of life the household/individual will become reluctant to adopt a lower level of consumption/expenditure during a recession/or decline in economic fortunes; it will do everything possible to maintain the status quo[27] (Jhingan, 2001b;

[23] This was postulated by Duesenberry, J. S. 1949. *Income, saving and the theory of consumer behaviour*. Harvard: Cambridge Mass; See Dernburg and McDougall (1980).

[24] This was postulated by Friendman, M. 1955. *A theory of the consumption function*. New York: National Bureau of Economic Research Inc; See Dernburg and McDougall (1980).

[25] This was postulated by Modigliani, F and Ando, A. 1963. The 'life cycle' hypothesis of saving: aggregate implications and tests. *American Economic Review* 53: 55-84; See Dornburg and McDougall (1980).

[26] This is called the demonstration effect.

[27] This is called the ratchet effect.

Dwivedi, 2001). The permanent income theory is based on the belief that people/households take account of future income and consumption expenditure possibilities when planning current consumption expenditure. The theory categorises income into two namely: permanent income and transitory income; it also categorises consumption into two viz: permanent consumption and transitory consumption (Dwivedi, 2001). Permanent income is the return on households' human and non-human wealth and it is influenced by many factors such as education/skills, investment and personal traits; permanent consumption is that consumption which is regarded as normal by households and is predictable (Agba, 1994; Dwivedi, 2001). The transitory components are completely unpredictable. They are therefore completely uncorrelated with the other variables and their expected value is zero. Based on the foregoing, the permanent income theory posits that the true consumption/income relationship lies between permanent income and permanent consumption as follows:

$$PCON_t=\lambda(PY)_t \quad \text{----------3.1}$$

where $PCON_t$ and $(PY)_t$ are permanent consumption and permanent income at time t respectively; and λ is the marginal propensity to consume permanent income and may vary with the rate of interest as well as other variables (Dernburg and McDougall, 1980). Thus food consumption expenditure may be said to depend largely on permanent income. It is instructive to state here that the permanent income theory is based on household utility maximising behaviour.

The life-cycle theory is similar to the permanent income theory and it is also based on household utility maximising behaviour. The theory considers saving and dissaving as responses which arise in order to stabilise consumption over a life time. Young individuals/households will tend to dissave because they tend to have lower incomes. As they grow older, their incomes tend to rise, thus they tend to increase their savings so as to pay off past debts and to accumulate adequate assets for retirement. And when retirement comes, incomes tend to fall and savings will tend to be negative again (Dernburg, 1985). The theory therefore posits that households' consumption expenditure depends on various sources which are categorised into current income, the present value of future human resources and accumulated assets (Agba, 1994).

The foregoing theories of consumption expenditure (of which food consumption expenditure is a major subset) have severe limitations for each of them treats only a few determinants of consumption (including food consumption) expenditure. However, when they are taken together, they imply that household food consumption expenditure and other expenditures are influenced by a large and complicated set of factors which are virtually interrelated. These factors include social, demographic, economic, political and environmental factors such as age, sex, household size, location, various categories of income, asset ownership, access to credit facilities, access to regular remittances, employment, education, political conditions, human relationships, social pressure and religious affiliations.

As implied earlier, food consumption is inversely related with poverty. Those that are poor spend less on food (and other consumption goods) in absolute terms than the non-poor; thus the poor are said to be food insecure; indeed, the poor often lack adequate means to secure access to sufficient food (Ukoha, 1997; Egbuna, 2001). Inadequate food consumption is truly a manifestation of poverty. The analysis of food consumption deficits and analysis of poverty do overlap. It is worthwhile to state however, that though the poor spend less on food than the non-poor in absolute terms, the proportion of income spent on food by the poor is in general higher than that spent by the non-poor; this is in line with Engel's law which states that the proportion of income spend on food (and other basic needs) declines as income rises (Deaton and Case, 1987;Odusola, 1997; FOS, 1999a).

3.5 Strategies for Poverty Alleviation and Improving Food Consumption/ Expenditure

In the literature it has been recognised that there are two broad categories of strategies for poverty alleviation/eradication namely economic growth and non-economic growth strategies (Obadan, 1997; Ajakaiye and Adeyeye, 2001; Olayemi, 2003; Omale and Molen, 2003). A country's economic growth may be conceptualised as a long term rise in capacity to supply increasingly diverse economic goods to its population; this growing capacity is based on advancing technology and the institutional and ideological

adjustments that it demands[28] (Todaro, 1994). The Gross National Product (GNP) and the Gross Domestic Product (GDP) are apparently most celebrated in the measurement of economic growth. They could be used in nominal, real, nominal per capita or real per capita terms. When an economy is characterised by stable price level then it may be appropriate to use either nominal GNP or GDP to capture the economy's economic growth. Real GNP or GDP (or GNP or GDP at constant prices) is used to cater for inflation. And per capita nominal/real GNP or GDP is used to take care of population growth. In a nutshell, economic growth refers to increase in the aggregate output of an economy. Increases in the output of major sectors of the economy such as agricultural, manufacturing, mining and quarrying, building and construction and crude petroleum sectors will, all other things being equal, bring about significant growth to the economy. It is instructive to state here that growth in output could arise from an increase in the use of inputs or improvement in technology. For instance, growth in agricultural sector's share of GDP can be due to increase in inputs such as farmlands, fertilizers, labour, capital and sophisticated technology; it can also be due to intensive use of existing farmlands or the extensive cultivation of existing lands. Also, growth in industrial activities could result from increase in the use of factors of production and technological changes.

Economic growth approach is based primarily on the assumption that economic deprivation is the root of all poverty and that non-economic causes of poverty are only secondary (and perhaps ephemeral), arising from the primary causes (Olayemi, 2003). The approach is also predicated on the implicit assumption that there is equitable distribution of income and wealth, and that the benefits of economic growth would sufficiently "trickle down" on the poor and thus significantly alleviate poverty.

Under the economic growth approach, attention is focused on macroeconomic and microeconomic policies and programmes that would bring about rapid and sustainable growth to the economy as measured primarily by rates of growth in per capita real GDP or per capita national income, rates of growth in sectoral indices of production, rate of employment, consumer price stability, and so on (Olayemi, 2003). Major

[28] This is based on Simon Kuznets' 1971 noble lecture on "Modern Economic Growth: Findings and Reflections", delivered in Stockholm, Sweden, December and published in the American Economic Review, 63, September, 1973.

macroeconomic policies that are crucial in this regard include fiscal (budgetary and tax), monetary (money supply and credit), foreign exchange (exchange rate), trade (import and export) and wages and incomes policies. On the other hand, major microeconomic (or sectoral) policies involve incentive pricing, input subsidy, development and transfer of technology, credit supply, efficient commodity marketing and distribution, industrialisation, employment generation, and so on (Olayemi, 2003). As observed by Obadan (1997), economic growth is regarded as crucial and the driving force to poverty alleviation/obliteration for it would generate income earning opportunities/create jobs for the poor and thus enable them to utilise their most abundant asset which is labour; and it will generate additional revenues/resources for the government to use in executing policies/programmes/projects that are designed to subdue poverty. There is apparently some agreement among development economists and growth analysts that policies/programmes which contribute to economic growth by improving the allocative efficiency of resource use (for instance by reducing distortions in relative prices, exchange rates and trade) may help the poor (Obadan, 1997; Ajakaiye and Adeyeye, 2001). Indeed, as pointed out by Todaro and Smith (2003), policies/programmes that are focused on poverty reduction/eradication need to be consistent with economic growth and there are at least five reasons for this. First, widespread poverty creates conditions in which the poor will lack access to credit, will be unable to finance their children's education thus perpetuating poor human capital development, and in the absence of physical or monetary investment opportunities they (the poor) will have many children as a source of old age financial security thus heightening population pressure; these factors impact adversely on economic growth rate. Second, unlike the historical experience of the now developed countries, the rich in contemporary poor countries are generally not known for frugality or desire to save and invest substantial proportions of their incomes in their local economies rather they shift their savings and investments to foreign economies in form of capital flight; such action impede the economic growth of the local economies. Third, the low incomes and low levels of living of the poor - which are manifested in poor health, nutrition and education - can significantly reduce their economic productivity and thereby lead directly and/or indirectly to a slower-growing or a stagnating or a declining economy. Thus strategies that are aimed at raising the

incomes and levels of living of the poor would, all other things being equal, contribute not only to their material well-being but also to the productivity and income of the economy as a whole. Fourth, increasing the income levels of the poor would, ceteris paribus, stimulate an overall increase in the demand for locally produced necessity products like food and clothing. Increasing demand for locally produced commodities provides a great stimulus for local production, local employment, and local investment; such demand thus creates the appropriate conditions for rapid economic growth and a broader popular participation in that growth. Fifth, a reduction of mass poverty could stimulate healthy economic expansion by acting as a powerful material and psychological incentive to widespread public participation in the growth/development process. Conversely, substantial absolute poverty and wide income disparities can act as powerful material and psychological disincentives to economic progress.

It is apparent that there could be a two-way causal relationship between absolute poverty and economic growth. Significant absolute poverty especially mass poverty could slow economic growth or retard economic progress. And slow economic growth or retarded economic progress could heighten and perpetuate absolute poverty. Therefore, poverty reduction and growth promoting objectives could follow a consistent path. As declared by World Bank (1990), with appropriate policies, the poor can participate in economic growth and significantly contribute to it, and when they do, rapid declines in poverty are consistent with sustained economic growth.

There are however, a number of problems with the economic growth approach. First, although economic growth is necessary for poverty reduction/obliteration, it is not sufficient in itself to bring about this for it alone cannot overcome all the crucial factors that contribute to poverty. Although, in general, policies that pave the way for rapid economic growth facilitate poverty reduction, there are some types of growth that apparently do not help the poor. For instance, capital-intensive or skill-intensive industrialisation and commercialisation projects can impede reduction in poverty among the unskilled and assetless poor (Obadan, 1997). Second, in many developing countries poverty has remained unabated despite the high growth rates in these countries thus raising doubts about the reliability of the "trickle-down effect" that is said to accompany economic growth (Canagarajah et al., 1997; Ajakaiye and Adeyeye, 2001). Third, the

benefits of economic growth have often concentrated among few sections of the society (the sections containing the rich and the non-poor) at the expense of the larger sections (the sections containing the poor). In countries with high levels of income/wealth inequality, the benefits of economic growth are most unlikely to "trickle-down" on the poor. The non-participation of some proportion of the poor, especially the vulnerable groups, in the growth process and their inability to share in the benefits of growth tend to reduce the efficacy of economic growth in poverty reduction. Fourth, the economic growth approach is essentially a market-based strategy; there is need to evolve complementary strategies to take care of those that fall through the cracks of the market (Obadan,1997; Ajakaiye and Adeyeye, 2001). Fifth, economic policy reforms can contribute to economic growth but they can also work to the disadvantage of the poor. Indeed, some economic reforms particularly those associated with stabilisation programmes can plague the poor (Obadan, 1997). For instance, the experience of Structural Adjustment Programme (SAP) in Nigeria has shown clearly that economic policy reforms that are geared towards inducing economic growth can have adverse consequences on the poor (Nwosu and Adeyeye, 1989 and CBN/NISER, 1992). This is why as noted by Ajakaiye and Adeyeye (2001), in many African countries that have undergone economic reforms there was subsequently the implementation of such reforms with "human face". The structure of the human face component of growth-inducing reforms is usually associated with human capital development, social services, safety nets, and so on. These represent the necessary complement to economic growth approach that can benefit the poor on sustainable basis.

The non-economic growth approaches to poverty alleviation/eradication, on the other hand, are varied and they focus on various dimensions and causes of poverty. The most prominent non-economic growth approaches include human capital development approach, basic needs approach, rural development strategy, provision of access to resources, provision of basic social services, reliance on local self-governing institutions, employment and public works programmes and the use of targeted transfers/safety nets (Obadan, 1997; Ajakaiye and Adeyeye, 2001; Olayemi, 2003). Human capital development approach involves making significant investment in people's education, nutrition and health. Education provides the requisite skills and abilities for optimum

productivity and employment. Sound health and adequate nutrition also pave the way for optimum productivity and functioning of labour. Basic needs approach tries to reduce poverty by directly providing items considered as basic human needs for the poor – such as food, water, housing, education, healthcare, sanitation and transportation (Jhingan, 2001a and 2001b; Ogwumike, 1987 and 1991). The basic needs approach is most likely to have direct positive impact on the vulnerable groups among the poor who could not benefit from the gains of economic growth. Rural development strategy involves the provision of basic infrastructural facilities/social facilities and social welfare as well as the acceleration of economic growth in the rural areas. The rural development strategy is based on the recognition of the rural dimension of poverty or that poverty is usually a rural phenomenon. The provision of access to resources strategy has to do with equitable distribution of physical assets (like land) and means of production such as credit, technological inputs and information. When the poor have access to these resources they (the poor) are empowered and are able to expand their production opportunities and efficiency while their access to the market ultimately enhances their economic and social well being (Ajakaiye and Adeyeye, 2001).. Provision of basic social services approach has to do with improving access of the poor to education, nutrition, healthcare, sanitation, communication and other social services so as to enable them (the poor) to take full advantage of opportunities; the approach involves, among other things, strengthening of relevant institutions for the provision of social services and targeted programmes (Obadan, 1997; Ajakaiye and Adeyeye, 2001). The strategy of reliance on local self-governing institutions depends on community level institutions for the provision of informal framework for the coordination of the design and implementation of projects like water management, environmental protection, erosion control, regulation of the use of forests and grazing land as well as the provision of other local public goods (Obadan, 1997). As further pointed out by Obadan (1997), the strategy of reliance on local self-governing institutions is geared towards moving away from the harshness of market processes implied in the economic growth strategy and the state paternalism entailed in massive public intervention to directly improve the health, education, nutrition and economic and social status of the poor. The approach of employment and public works programmes involves the provision of gainful employment opportunities particularly

through public works programmes. Public works programmes that bring about growth in the economy and pave the way for sustainable poverty reduction include those designed to provide social equipment, health facilities, schools, drinking water and sewage facilities as well as smaller projects in irrigation and provision of adequate infrastructure (Ajakaiye and Adeyeye, 2001). Safety nets/targeted transfers strategy has to do with measures put in place to increase the standard of living of the poor, particularly the most vulnerable groups among the poor like the physically disabled, the aged and children. Safety nets/targeted transfers include cash transfers, food stamps, subsidised food distribution, low cost housing, subsidised education and agricultural production, school lunches, adequate facilities for primary and secondary education (including adequate financial inducements for children, who would otherwise have been employed, to attend school), public works schemes and severance pay and re-training of laid-off public servants (Obadan, 1997; Ajakaiye and Adeyeye, 2001).

It is worthwhile to state here that the various poverty reduction/elimination strategies do overlap. However, suffice it to say that it is as a result of the limitations of economic growth approach that led to the establishment of the non-economic growth approaches. There is no guarantee that the benefits of economic growth would "trickle-down" automatically on the poor. The success of economic growth approach depends, among other things, on the nature of growth (whether it is broad-based or not, capital-intensive or labour-intensive) and the extent of inequality in the distribution of income/wealth.

It is important to state here that the non-economic growth strategies have some limitations. A major limitation of the strategies is that they are easily or often plagued by poor targeting. When they are not well targeted at the poor, the powerful non-poor could hijack and enjoy the benefits from the strategies and prevent the benefits from getting to the poor whom they (the benefits) are meant for. And when there is widespread corruption, especially among government officials and public servants, the strategies are bound to fail.

Strategies for improving food consumption/expenditure overlap with many of the poverty reduction/eradication strategies. Specifically, strategies for improving food consumption/expenditure include those of boosting agricultural/food production, ensuring

environmental stability/sustainability, checking the rate of population growth and reducing the rate of inflation (Ukoha, 1997; Egbuna, 2001).

3.6 Theories of Poverty and Vulnerability to Poverty

It is regrettable to observe that despite the pervasiveness of poverty and the economic importance of the phenomenon, economists have not been able to formulate an integrated body of knowledge to tackle important issues relating to the problem (Edozien, 1975). Though many economists like Adam Smith, Karl Marx, A. C. Pigou and Alfred Marshall focused on various aspects of underdevelopment and economics have many theories of underdevelopment, there is still no very sophisticated and robust direct theory of poverty in economics. However, what appears like a direct theory of poverty in economics is the vicious circle theory. The vicious circle theory implies that poverty breeds poverty, occurs through time and transmits its effects from one generation to another (Haralambos and Heald, 2001; Jhingan, 2001a and 2001b). The theory posits that the various conditions of the poor combine to make them (the poor) remain in poverty; the poor are so entrapped in the web of poverty that there is little or no chance of escape. It is instructive to point out here that the vicious cycle theory has both demand and supply sides. The demand side shows that low productivity leads to low income and low income brings about low demand; low demand leads to low investment and low investment leads to capital deficiency which in turn brings about low productivity. On the supply side of the cycle, low productivity leads to low income and low income leads to low saving which in turn leads to low investment; low investment brings about capital deficiency and this in turn brings about low productivity. Another dimension of the vicious cycle theory links market imperfections and underdeveloped human and natural resources. Development of a country's natural resources is a function of the productive capacity of the people in the country. If the people are backward and illiterate, and lacking in technical skill, knowledge and entrepreneurial ability, then the natural resources will tend to remain unutilised, or be underutilised or even be wrongly utilised; on the other hand, people are economically backward in a country due to underdeveloped natural resources (Jhingan, 2001b). It is worthy of note that underdeveloped human and natural resources pave the way for gross market imperfections.

Political economists and radical sociologists/psychologists have postulated some theories of poverty. These theories include the necessity theory, the individual attributes theory, the natural circumstantial theories and the power theory (Akeredolu-Ale, 1975; Tella, 1997). The necessity theory has three variants. The first attributes poverty to the inequality caused by the functionality of the institution of division of labour; through division of labour and specialisation, some people find themselves performing low paying and poorly valued tasks and this tends to put such people in the web of poverty. The second is the capitalist entrepreneurial version which states that the crude exploitation of workers by means of low wages and poor conditions of service allows for a possible rise in savings and the aggressive entrepreneurship at the upper end of the society that gave momentum to the industrial revolution in the developed countries; the resultant inequality in income could pave the way for prevalence of poverty at the lower end of the society where the majority of the people live (Tella, 1997). The third variant – called the evolutionist variant – posits that gross poverty and inequality act as eliminators of those who are least fit thus performing an evolutionary function (Akeredolu-Ale, 1975).

The individual attributes theory says that people's location in a society's hierarchy of income/wealth is determined by their aptitudes, motivations and abilities. Therefore, poor people could be said to be the architects of their own misfortunes. The natural circumstantial theories have in general identified some variables as determinants of poverty. These variables include geographical location and natural endowment of the environment in which people live, unemployment, physical and mental disabilities and old age. The power theory states that the structure of political power in a society determines the extent and distribution of poverty among the population; the ruling class, constituted by a few, establishes and legitimises an exploitative property system through which it determines the allocation of opportunities, incomes and wealth - relying on the use of state power, including the use of oppressive state agents such as the police and the army (Akeredolu-Ale, 1975; Tella, 1997). How effectively this exploitative ruling class is able to entrench its agenda depends to a large extent on the revolutionary consciousness of the subject/oppressed class and their (the subject/oppressed class) organisational capacity to resist exploitation and their ability to overthrow an oppressive

property system (Akeredolu-Ale, 1975). The power theory suggests that political powerlessness can breed and perpetuate poverty.

In contemporary literature, many theories of poverty are found. However, five of these are apparently most prominent. They are individual deficiencies theory; culture theory; economic, political and social distortions/discrimination theory; geographical disparities theory; and cumulative and cyclical interdependencies theory (Bradshaw, 2006). These theories have some similarities with the ones highlighted earlier.

The individual deficiencies theory is a large and multifaceted set of explanations that focus on the individuals as responsible for their poverty situation. Economic/social deficiency (such as poor education/skills, lack of competitiveness, production activities that have low demand and poor access to finance and credit facilities), physical deficiency (such as physical disabilities and lack of physical energy), political deficiency (such as lack of political voice and political powerlessness), spiritual deficiency (such as moral bankruptcy and loss of favour with God Almighty) and natural deficiency (such as adverse hereditary factors, poor environmental conditions and poor family background) can make people to be in poverty. The neo-classical economic theory reinforces the individual deficiencies theory of poverty. The core premise of this dominant paradigm for the study of the conditions leading to poverty is that individuals seek to maximise their own well-being by making choices and investments, subject to some constraints (Sundharan and Vaish, 1978; Henderson and Quandt, 1980; Bhatia, 1981). When people choose short-term and low pay-off returns and when they have low investment and productive capacity, economic theory holds such people largely responsible for their choices and weaknesses which are most likely to result to poverty.

The culture theory of poverty posits that poverty is created by the transmission over generations of a set of negative/adverse beliefs, values and skills that are socially generated but individually held. Such beliefs, values and skills make the people to be parochial, unproductive and uncompetitive; and the end result is poverty. The economic, political and social distortions/discrimination theory posits that poverty is caused principally by weak economic, social and political systems which go with distortions/discrimination and cause people to have grossly limited opportunities and resources with which to have adequate income and well-being. Economic, social and

political backwardness can be a source of frustration for people with high level of training and education and can bring about massive brain drain. And when such happens the society is bound to continue to wallow in poverty. Geographical disparities theory posits that geographical areas/regions that have grossly limited economic, social and political opportunities and infrastructural facilities relative to other areas/regions will experience pervasive poverty and such poverty will tend to perpetuate. Such disadvantaged geographical areas/regions are bound to experience massive brain drain and high degree of emigration of their productive people and high degree of immigration of unproductive people; and this will make poverty to continue to grip the areas/regions.

The cumulative and cyclical interdependencies theory looks at individuals and their communities as caught in a spiral of opportunities and problems, and that once problems dominate they close other opportunities and create a cumulative set of problems that make any effective response virtually impossible. The theory also looks at individual situations and community resources as mutually dependent; for example, with a faltering economy that creates individuals who lack resources to participate in the economy, economic survival will be even harder for the economy since people will be paying fewer taxes (Bradshaw, 2006). It is instructive to point out here that the cumulative and cyclical interdependencies theory of poverty has its foundation in the work of Mydral (1957) who developed a theory of "interlocking circular interdependence within a process of cumulative causation" that helps to explain economic development and underdevelopment. Mydral (1957) pointed out that personal and community well-being are closely linked in a collection and force of negative consequences, and that closure of a factory (or business firm) or other crisis in a community can lead to a myriad of personal and community problems including migration of people from the community. Thus the interdependence of factors creating poverty actually accelerates once a cycle of decline is started (Bradshaw, 2006).

Though each of the foregoing theories of poverty highlights only limited aspects of the phenomenon, however, when all are taken together, they show that poverty is multidimensional/multifaceted. As stated earlier, poverty affects various aspects of human condition.

Given that poverty and vulnerability to poverty are two sides of the same coin, it is apparent that the various theories of poverty highlighted in this subsection have some bearings on vulnerability to poverty. However, a theory that has direct bearing on vulnerability is the microeconomic theory of risk and uncertainty(the expected utility theory). Risk refers to when an outcome may or may not occur but the probability of its occurring is known or at least knowable; uncertainty, on the other hand, refers to when an outcome may or may not occur and the probability of its occurring is not known or it is not obvious that its probability can be meaningfully defined (Takayama, 1993; Sloman, 1997). The expected utility theory states, among other things, that the expected utility of risk averse individuals/households falls as the variability of consumption rises, holding all other things equal (Kamanou and Morduch, 2002). The theory is concerned with how households/individuals make choices to maximise their utility and welfare under conditions characterised by risks and uncertainties. The theory allows the integration of consumption variability in a natural way. If the utility functions and expected consumption patterns of individuals/households are known, then poverty/vulnerability could be analysed in terms of certainty-equivalent consumption (the level of consumption which, if unvarying, would yield an equivalent level of expected utility of a household's actual [higher mean more variable]consumption levels) (Kamanou and Morduch, 2002). The expected utility theory is most relevant in the analysis of vulnerability for it caters for risks and uncertainties which are crucial features of vulnerability.

3.7 Measurement Issues on Food Consumption and Expenditure

Food insecurity and food consumption/expenditure deficits are often considered to be mainly economic problems thus economic approaches are usually used in analysing them. There are many variables that can serve as indicators of food security in the measurement and analysis of the problem of food insecurity and food consumption/ expenditure deficits. These include net food availability per capita, per capita calorie and/or protein intake, percentage of the population or of households with energy intake that is below the national average requirement; percentage of children that are underweight, stunting and wasting (as may be determined from anthropometric studies); food gap which may be measured as the percentage shortfall in the actual average energy

intake relative to the average energy requirement, coefficient of variation in daily energy supply per capita and index of food price inflation (World Bank, 1991b; Ukoha, 1997; Olayemi, 1998). For indicators that are expressed in per capita terms it has become fashionable to rather express them in per adult equivalence terms. Recent literature on analysis of household welfare is replete with the advocacy to always cater for variation in household size and composition in the analysis of various aspects of household well-being such as household food consumption/expenditure and household income and consumption poverty. A major way of addressing the issue of variation in household size and composition is through the use of adult equivalence scales (Ravallion, 1992; Deaton, 1997; Dercon and Krishnan, 1998; White and Masset, 2003).

In general, as observed by Egbuna (2001), the factors that affect food security or food consumption/expenditure deficits include various government policies, socio-political environment, population dynamics and pressure, agricultural development, national infrastructure and environmental stability. It is important to note here that poverty is a major cause of household food consumption/expenditure deficits and food insecurity. When households do not command enough economic resources for a minimum acceptable standard of living they will also be unable to purchase adequate food items that will enable them (the households) to meet their minimum nutritional requirements; thus they will experience food consumption/expenditure deficits and food insecurity.

Net food availability per capita is one of the commonest measures of national food security status and it is defined as follows:

$$NFAC_t = (QY_t + FM_t + DNFS_t - TQF_t - FX_t - QPHF_t)\frac{1}{n} \qquad \text{------ 3.2}$$

Where: $NFAC_t$ is net food availability per capita (in grain equivalence) in year t; QY_t is domestic output of food in year t; FM_t is quality of food imported in year t; $DNFS_t$ is change in national food stock carry-over in year t; TQF_t is total quantity of food required as inputs and for non-food industrial use in year t; FX_t is quality of food exported in year t; and $QPHF_t$ is quantity of post-harvest loss in year t; n is population size.

It is important to point out here that the above specification has some shortcomings. Food availability alone is not a sufficient measure of food security or food

consumption/expenditure adequacy for it does not take economic access to food into consideration. It has been proposed in the literature that an index based on spatial price differentials and corrected for inflation can be used for monitoring the adequacy of food supply over time and over space in a country; in this connection, food prices in a normal base period are used as bench-mark and based on the bench-mark, assessment of changes in spatial and secular price differences in subsequent periods can be made (Sharma, 1992; Olayemi, 1998). As pointed out by Olayemi (1998), the above approach is not significantly different from using an index of food price inflation to monitor national food security status. However, the problem with the use of food price inflation index is that a change in price differential may arise from market imperfection rather than food supply and/or food demand per se.

At the household level, food security and food consumption/expenditure adequacy can be measured directly by actual dietary intake of all household members or household food expenditure, using standard household expenditure and income surveys; the degree of household food security depends, among other things, on the minimal nutritional requirements of individuals with the assumption that all households within each expenditure/income stratum have the same entitlements to food (Chen and Kates, 1994; Salih, 1995). However, such a measure tends to ignore non-economic factors such as storage facilities, transport networks, weather conditions, health status, level of sanitation, forms of food rationing and other entitlement programmes (Salih, 1995). It is instructive to state here that food indicators obtained from household surveys can only be regarded as measures of existing situation during the survey period and do not capture changes in socio-economic and demographic variables in the absence of panel or longitudinal data. The level and changes in these variables must be updated continuously to monitor food security and food consumption/expenditure adequacy (Braun et al., 1992; Salih, 1995).

Due to the inadequacy of single variables as indicators of food security and food consumption/expenditure adequacy status, attempts have been made to construct composite food security indices. For instance, Sharma (1992) has proposed that such indices should be constructed using the following variables: per capita food supply; national income per capita; index of income distribution which may be measured by Gini

coefficient computed from a frequency distribution of national income or, as a proxy, the percentage of national income received by the lowest 40 per cent of the population; deviation of food production from trend; and index of food prices. It is important to note here that the foregoing variables do not cater for actual food consumption/expenditure by households. Actual food consumption/expenditure may be regarded as the principal indicator of food security or food insecurity. Food may be super abundant in supply and yet some households will not have the economic resources to purchase and consume adequate food items; also food price inflation may be very low and yet some households will not be able to purchase and consume adequate food. Furthermore, national income per capita, index of income distribution and deviation of food production from trend are not robust indicators of food security and food consumption/expenditure adequacy.

The Food and Agriculture Organisation(FAO) has gone ahead to develop a sophisticated index for capturing food security and food consumption adequacy. The FAO index is called Aggregate Household Food Security Index (AHFSI) and it is similar to the aggregate poverty index proposed by Sen (1976) but reflects the extension by Bigman (1993). The index is given as (see Olayemi, 1998):

$$AHFSI = [H\,[G + (1 - G) + \tfrac{1}{2}\,\delta[1 - H\,[G + (1 - G)\,I]\,]\,100 \quad \text{---------- 3.3}$$

Where H is proportion of undernourished people (or households) in the population; G is food gap, measured as the proportion of the shortfall of average daily energy intake by the undernourished from the average national energy requirement; I is a measure of inequality in the distribution of food gap, represented by Gini Coefficient obtained from the assumed distribution of per capita food consumption; δ is coefficient of variation in energy supply. It is important to note that each component variable of AHFSI is itself an endogenous variable determined by a set of exogenous variables that encompass physical access to food, economic access to food and stability-of-access factors. Data limitations may make it impossible to cater for some of the variables contained in the AHFSI.

Food consumption/expenditure deficit at the household level may be viewed as when a household is unable to command or have food consumption/expenditure that will meet recommended dietary requirements. The dietary requirements are usually measured in terms of energy/calorie. The foregoing measurement is analogous to food poverty measurement.

3.8 Measurement Issues on Poverty

In the analysis of poverty it is customary to begin by choosing an indicator of well-being. This may be based on consumption/expenditure or income (Ravallion, 1996). Thereafter, a cut-off point, called the poverty line will be set. This is a measure of minimum acceptable standard of living or welfare and it separates the poor from the non-poor (Anyanwu, 1997). It is worthwhile to point out here that in welfare economics, the starting point for the measurement of economic welfare or well-being is the utility function which implies that the consumption of goods and services raises welfare; it is assumed that each individual or household possesses the same utility function for if this were not so it would be impossible or even meaningless to compare welfare among people or households (Glewwe and Van der Gaag, 1988). Indeed, in the characterisation of welfare in economics, a utility function is defined over consumption of various commodities such that the function reproduces consumer preferences over alternative consumption bundles; based on this approach, the poverty line can be interpreted as a point on the consumer's (or household's) expenditure function, given the minimum cost to the consumer (or household) of attaining a given level of utility at the prevailing prices and for a given household characteristics (Ravallion, 1998). Ravallion (1998) went on to illustrate how the above works as follows. Let us consider a household with characteristics w (a vector) consuming a bundle of commodities in quantities y (also a vector). It is assumed that the household's preferences over all the affordable consumption bundles can be represented by a utility function u (y, w) which assigns a single number to each possible y, given w. The consumer's expenditure function is e (p, w, u) which is the minimum cost to a household with characteristics w of a level of utility u when facing the price vector p. (When evaluated at the actual utility level, e(p, w, u) is simply the actual total expenditure on consumption, x = py, for a utility maximising household). Let u_z denote the reference utility level needed to escape poverty. The poverty line (z) is then given as:

$$z = e(p, w, u_z) \text{ -------- ------- } 3.4$$

The foregoing implies that the poverty line is the minimum cost of the poverty level of utility at prevailing prices and household characteristics. This tells us how to

move from poverty in terms of utility to poverty in terms of money; however, it does not tell us how to define the poverty level of utility.

Poverty lines can possess the attributes of specificity (or relevance) and comparability (or consistency). Specificity (or relevance) of a poverty line across space at a particular time implies that the poverty line reflects the specific characters of a region under study. It is held in many quarters that a poverty line should take into account various aspects of human condition in a region such as life pattern, culture, social condition, and norms prevailing in the region (Asra and Santo-Francisco, 2001). Inter-temporal specificity (or relevance) of a poverty line, which is similar to spatial specificity, implies that the poverty line reflects the specific conditions/characteristics of a particular region/area at a given time; it is popularly held that the derivation of poverty lines across time should consider changes in the life pattern, culture, social conditions, and norms prevailing in different years (Wodon, 1997; Asra and Santos-Francisco, 2001; Thorbecke, 2004). Consistency (or comparability) of poverty lines, on the other hand, refers to when poverty lines indicate the same standard of living (Wodon, 1997; Asra and Santos-Francisco, 2001). As pointed out by Asra and Santos-Francisco (2001), some kind of standardisation needs to be undertaken to ensure strict comparability. When money metric measures are used, they should be adjusted adequately for price differentials so that they maintain a fixed real value that will make valid spatial and even inter-temporal comparisons of absolute poverty rates. In other words, to enable comparison, poverty lines based on money metric measures should be fixed in terms of standard of living across the entire domain of the poverty comparison. Indeed, comparability (or consistency) requires that in measuring the absolute poverty in a country, the poverty line constructed for the purpose should have the same value across all groups or regions, and over time (Asra and Santos-Francisco, 2001).

The construction of a poverty line is relatively subjective and depends to a large extent on individual researchers' preferences and dispositions. However, the literature reveals that there are basically four approaches used in the setting of poverty lines namely: Direct Calorie Intake (DCI) method, Food-Energy-Intake (FEI) approach, Cost-of-Basic Needs (CBN) approach and Arbitrary-Choice-of-Index (ACI) method (Onah, 1996; Ravallion, 1998; Asra and Santos-Francisco, 2001). In the DCI method, poor

households are defined as those households with per capita or per adult equivalent energy intake less than a given standard per capita or per adult equivalent energy requirement, measured in calorie. The DCI method is simple to apply and it has the attribute of consistency in the sense that it reflects the same nutrient intake. However, the method measures under-nutrition and not poverty for poverty entails deprivation in other aspects of welfare apart from calorie intake. The ACI method involves the determination of poverty lines by arbitrary means, without formal or well-defined basis. This is less scientific and more subjective than the other three methods and it is most likely to contain a wider margin of error than the other methods. However, it is most useful in setting poverty lines that can be used for international comparisons such as the US $1 and US $2 a day poverty lines[29] (in constant purchasing power parity prices). It is worthwhile to observe here that sometimes, all the relevant data for constructing a highly scientific and robust poverty line may not be available, and even when such data are available, a researcher may wish to avoid the methodological issues/complexities associated with designing such a poverty line. Under the above circumstances, the researcher may then adopt the ACI approach (Onah, 1996). Apart from the international poverty lines (of US $1 and US $2 a day), other popular arbitrarily determined poverty lines include one-third and two-thirds of mean household income or expenditure. The CBN approach uses various items considered as basic needs thus it is predicated on very broad conceptualisation of poverty (Blackwood and Lynch, 1994). At the operational level, the CBN approach involves the specification of minimum requirements for both food and non-food items and then calculating the amount of income or expenditure required to purchase them at current prices (Kanbur, 1987; Onah, 1996). The implementation of the CBN method usually involves three steps namely: defining a bundle of food items that meet a defined required daily nutrient (usually calorie) intake; estimating the cost of the food bundle; and computing an allowance for non-food items or computing the cost of chosen non-food items and adding it to the estimated cost of the food bundle to form a Basic-Needs poverty line (Asra and Santos-Francisco, 2001). The CBN approach is highly problematic in application for, among other things, there is no consensus on what constitute basic needs and even if we know all the things that make up basic needs it will

[29] These are core and moderate poverty lines respectively.

be impossible to apply all of them. Besides, some items of basic needs such as freedom and education are not quantitatively measurable. Indeed, the setting of basic needs poverty lines involves very high degree of arbitrariness with regard to the computation of the non-food component of such poverty lines. Furthermore, the CBN approach pre-imposes a researcher's or bureaucrat's subjective notion of what constitutes a palatable but inexpensive diet (Onah, 1996) and prices cannot be objectively attached to, or reliably imputed for, many of the basic needs items such as clean environment, freedom, security and education. The FEI approach involves the setting of a poverty line based on the cost (at current prices) of obtaining minimum nutritional intake (Job, 1998). The nutritional intake is based on energy requirements measured in calories. To determine household food energy requirements it has in recent times, as noted earlier, become customary to take into consideration household size and composition. Thus, as also noted earlier, the use of equivalence scales and estimation of economies of scale in consumption have become fashionable in the analysis of household consumption and expenditure. Though these involve some degrees of arbitrariness they however help to minimise the problems that arise when they are not accounted for (Griffen, 2000; White and Masset, 2003). Economies of scale in household consumption are usually higher for durable goods such as television set and refrigerator than non-durable goods such as food (White and Masset, 2003).

Given information on prices and energy conversion factors for different food items, a poverty line based on food-energy-intake approach can be constructed. Alternatively, if given information on food expenditure variable and calorie consumption for each individual or household it is possible to estimate the cost of acquiring a given number of calories (Greer and Thorbecke, 1986a and 1986b; Onah, 1996; Asra and Santos-Francisco, 2001). This is done using the following regression model.

$$\ln V_j = \alpha + \sigma C_j + \mu \qquad \text{----------3.5}$$

Where V_j is food expenditure and C_j is calorie consumption for household j (both in per adult equivalence or in per capita terms; α is the constant term and σ is the coefficient of C_j; μ is the random error term. The poverty line (Z_f) that comes from

equation 3.5 gives the cost of obtaining a calorie recommended dietary allowance (L). The poverty line is given as follows:

$$Z_f = e^{(\hat{\alpha}+\hat{\sigma}L)} \qquad \text{---------- 3.6}$$

Where $\hat{\alpha}$ and $\hat{\sigma}$ are the parameter estimates of equation 3.5(obtained using ordinary least squares estimator).

This method is conceptually and computationally simple; it does not need a very large sample and does not pre-impose a researcher's or bureaucrat's subjective notion of what constitutes a palatable but inexpressive diet (Greer and Thorbecke, 1986a and 1986b). However, the method automatically makes allowance for non-food expenditure thus the method does not produce a strict food poverty line.

In the absence of information on calorie consumption of individuals or households, least-cost approach based on linear programming technique can be used in constructing poverty lines in the spirit of the food-energy-intake method. The least-cost approach based on linear programming technique is one of the most popular and robust approaches in solving diet problems/setting palatable least-cost diets and in setting food poverty lines; the approach has been applied in many cases with tremendous success(Stigler, 1945; Smith, 1959; Ogwumike, 1987 and 1991; Soden and Fletcher, 1992; Fletcher, Soden and Zinober, 1994; World Bank, 1995; Kakwani, 2001 and 2003; Bidani et al., 2001; Bellu, 2005). The advantages of using linear programming technique in setting food poverty lines, as observed by Ogwumike(1987 and 1991), include: (a) the nutritional constraints in terms of calories and even other measures of nutritional contents in food can easily be built into the model; (b) the consumption patterns and customs of the zones/regions of interest can also be built into the model; and (c) the techniques ensures that the cost of the diet arrived at is at the minimum cost given the various constraints in (a) and (b) above. Another advantage of using linear programming approach in setting food poverty lines is that such poverty lines are indeed strict food poverty lines for they do not automatically contain allowance for non-food expenditure.

In general, poverty lines based on the FEI method guarantee consistency for, on the average, people at the poverty line will have the same food energy intake relative to requirements (Ravallion, 1998). However, Ravallion (1998) has argued that the FEI method will lead to inconsistent poverty lines in terms of command over basic

consumption goods across space. Relationship between food-energy-intake and income or expenditure levels at which the required intake is met moves with factors other than cost of living differences. Rather than being consistent, estimated poverty lines based on the FEI method are more like revealed preferences of households that are relative to the different market conditions where they operate; it is known that apart from prices, other factors such as tastes, activity level, availability of substitutes and publicly provided goods all come in when expenditure levels are being estimated at which a particular level of need is met (Asra and Santos-Francisco, 2001).

It is instructive to state here that setting food energy requirements in the FEI approach is a very difficult step. Requirements vary across individuals/households and over time for a given individual/household. Therefore, assumptions must be made about activity levels which determine energy requirements beyond those needed to maintain the human body's metabolic rate at rest (Ravallion, 1998).

Despite the shortcomings of the FEI method, it has been described as the best in poverty analysis (Bekaert, 1991). Among other things, the FEI has the advantage of specificity reflecting better than all other methods the actual food consumption behaviour of individuals/households around the calorific threshold, given their tastes, preferences and relative prices (Thorbecke, 2004); it is very simple to define what is food poverty and thus what constitutes a food poverty line; its data requirements are less than those required for basic needs poverty line; food expenditure data are generally among the most accurate components of household expenditure collected by household budget surveys and the results can be verified based on objective standard of psychological signs of malnutrition (Greer and Thorbecke, 1986a and 1986b; Onah, 1996). Besides all the above, the use of food and nutrition requirements in the derivation of poverty lines, as stated earlier, is most appropriate in developing/poor countries where food expenditure takes a larger share than other components of household expenditure and where the concern about poverty and low quality of life is closely associated with concerns about undernutrition (Deaton, 1997).

After a poverty line has been set up, the next line of action will be to measure poverty. There are some axioms that a good and desirable poverty line must satisfy. These include monotonicity, transfer and focus axioms (Sen, 1976; Anyanwu, 1997).

The monotonicity axiom states that given other things, a reduction in income (or consumption/expenditure) of a person that is below the poverty line must increase the poverty measure. The transfer axiom states that given other things, a pure transfer of income (or consumption/expenditure) from a person who is below the poverty line to anyone that is richer must increase the poverty measure. The focus axiom requires that the poverty measure be dependent only on the incomes (or consumptions/expenditures) of the poor, thus the incomes (or consumptions/expenditures) of the non-poor and any changes therein are irrelevant.

The literature is loaded with many poverty measures. These include the Headcount measure, the Poverty Gap measure, the Sen Index, and the Foster-Greer-Thorbecke (FGT) Index (Srinivasan, 2000). The Headcount ratio (or the Incidence of Poverty) is the simplest and commonest poverty measure. It is simply the ratio of the number of poor individuals/households to the total number of individuals/households in the population, i.e,

$$H = P_0 = \frac{r_p}{n} \quad \text{---------- 3.7}$$

Where H and P_0 represent Headcount ratio/Poverty Incidence; r_p is number of people/ households below the poverty line; and n is total number of people/households in the population. The Headcount ratio is very useful in tracking changes in the percentage of the population living in poverty. However, the Headcount index does not cater for the depth and severity of poverty; it fails to show the extent of immiseration associated with poverty and it implies that the income distribution of the poor is homogenous. For instance, if a poor individual/household becomes poorer it will not register in the index since this does not change the number of those in poverty. The Headcount index does not examine the degree of income/wealth inequality among the poor; indeed, it is insensitive to the distribution of income/wealth among the poor. It does not indicate how poor the poor are and it is evident that not all the poor are equally poor.

The Poverty Gap ratio or the Income Gap (or shortfall) ratio is the difference between the poverty line and the mean income of the poor, expressed as a ratio of the poverty line; the result is the average depth of poverty or the poor's degree of immiseration (World Bank, 1993a; Anyanwu, 1997). Therefore, the average income shortfall, I, measures the amount of money it would take to raise the income (or

consumption/expenditure) of the average poor person/household up to the poverty line. If x_a is the average income (or consumption/expenditure) of the poor and z is the poverty line then a measure of the depth of poverty, the Income Gap ratio (I) is given as:

$$I = \frac{z - x_a}{z} \text{ ---------- } 3.8$$

If we take the product of H and I we would incorporate both the number of the poor and the depth of their poverty. If we call this product P_1, then P_1 index will be given as follows:

$$P_1 = HI = \frac{r_p}{n}\left[\frac{z - x_a}{z}\right] \text{ ----------3.9}$$

The P_1 index is an improvement of P_0. However, it is only sensitive to the average poor person but it fails to cater for concern for the poorest of the poor. That is, it only gives a good indication of the depth of poverty but it is not sensitive to the distribution of the standard of living indicator among the poor, and hence does not capture the severity of poverty (Anyanwu, 1997).

The Sen Index (SI) reflects not only the number of the poor but also the degree of immiseration and the distribution of income/wealth among the poor. The index is able to achieve the above by incorporating the Headcount index, the Income Gap and the Gini Coefficient. The index is given as follows (Sen, 1976):

$$SI = H\left[I_p + (1 - I_p)G_{pr}\right] \text{ ----------3.10}$$

where $I_p = \left[\sum_{i=1}^{r_p} \frac{z - x_{ai}}{r_{pz}}\right]$ ----------3.11

where I_p is the average income (or consumption/expenditure) shortfall as a percentage of the poverty line; x_{ai} is the income (or consumption/expenditure) of the i^{th} poor household/individual; z is the poverty line; r_{pz} is the number of households/individuals with incomes (or consumptions/expenditures) less than z; $H = \frac{r_p}{n}$ is the Headcount ratio; G_{pr} is the Gini coefficient among the poor ($0 \leq G_{pr} \leq 1$).

The Sen index is an increasing function of the Headcount index, the Income shortfall and the Gini Coefficient. The index satisfies the major axioms for a desirable poverty measure. However, a major demerit of the index is that it is more responsive to improvements in the Headcount than it is to reductions in the Income Gap or to

improvements in the distribution of income among the poor. Thus the index implies that the best way to reduce poverty is to help the least needy first and the neediest last. This is repugnant to equity and good conscience.

The Foster-Greer-Thorbecke (FGT) index contains the Headcount index and the Poverty Gap index and provides a distributionally sensitive measure through the choice of a "poverty aversion" parameter, α (Foster et al., 1984; Anyanwu 1997). The FGT (P_α) index is given as:

$$P_\alpha = \frac{1}{N}\sum_{i=1}^{rp}\left[\frac{z - x_{ai}}{z}\right]^\alpha \text{ ----------3.12}$$

Where $\alpha \geq 0$; N is total number of households/individuals in the population; z is the poverty line; x_{ai} is the income (or consumption/expenditure) of the i^{th} poor household/ individual; rp is the number of households/individuals below the poverty line; α is the poverty aversion parameter; and $\left[\frac{z - x_{ai}}{z}\right]$ is the poverty gap ratio..

The poverty aversion parameter α may be set at 0, 1 and 2. When α is set at 0, the index reduces to the Headcount ratio; when α is set at 1, the index reduces to the Poverty Gap index; and when α is set at 2 the index becomes a measure for the severity of poverty for it gives higher weight to poorer households/individuals and it is sensitive to the distribution of income (or consumption/expenditure) among the poor.

The FGT index is apparently the most popular/most widely used poverty measure because apart from satisfying the major axioms for a desirable poverty measure it has an added advantage of being additively decomposable among population subgroups. Thus the overall poverty (Pα) can be expressed as the sum of group measures weighted by the population share of each group (Foster, Greer and Thorbecke, 1984; Aigbokhan, 1997). The decomposition may be given as follows:

$$P_\alpha = \sum K_j P_{\alpha j} \text{ ----------3.13}$$

Where j = 1, 2, 3 … m groups; K_j is the population share of each group; and $P_{\alpha j}$ is the poverty measure of each group. Based on 3.13, the contribution of each group, CONj, to overall poverty is calculated as follows:

$$CON_j = \frac{K_j P_{\alpha j}}{P_\alpha} \text{ ---------- 3.14}$$

It is important to state here that a major shortcoming of the FGT index is that it does not, like many other measures of poverty, cater for non-quantifiable aspects of human welfare. Nevertheless, it is evident that the advantages of the index outweigh its shortcomings.

Money-metric measures of poverty are usually preferred to non-money-metric measures. This is because money-metric measures are less subjective and more scientific than non-money-metric measures. Besides, money-metric measures cover economic deprivation and this is regarded as the principal dimension of poverty.

It is instructive to point out here that to adequately cater for variations in prices, needs, tastes and preferences, there is need to construct region-specific poverty lines. Region-specific poverty lines have become popular in recent times and they have been used in many cases with huge success (see Wodon, 1999; Okurut et al., 2002; Mogstad et al.,2005 and 2007; and Zelinsky, 2007). Indeed, poverty analyses based on region-specific poverty lines have proved to be highly robust. Wodon (1999) used area/sector-specific poverty lines in the analysis of poverty in Bangladesh and found that poverty profiles are sensitive to changes in methods and disaggregation in setting poverty lines. The study found the use of area/sector-specific poverty lines to be highly desirable. Similar results are found in Okurut et al. (2002) for Uganda; Mogstag et al. (2005 and 2007) for Norway and Zelinsky (2007) for Slovak republic.

3.9 Methodological Issues on Vulnerability to Poverty

There are many measures of vulnerability – both quantitative and qualitative. However, the quantitative measures are usually preferred to the qualitative methods because the former are apparently more scientific and sophisticated as well as less subjective than the latter. As shown earlier, there are three principal approaches for the quantitative assessment of vulnerability namely Vulnerability as Expected Poverty (VEP), Vulnerability as Low Expected Utility (VEU) and Vulnerability as Uninsured Exposure to Risk (VER). But all of them share a common feature namely that they all construct a model that predicts the probability of attaining a given level of welfare.

With regard to VEP, Chaudhuri (2000 and 2003), Chaudhuri et al. (2002) and Christiaensen and Subbarao (2004) provide instances where vulnerability is

conceptualised as the probability that a household will fall into or remain in poverty in the future; they define welfare in terms of consumption so that the vulnerability level of a household h at time t (given as V_{ht}) is the probability that the household's level of consumption at time t+1 (stated as $C_{h,t+1}$) will be below the consumption poverty line (given as Z). The above is stated symbolically thus:

$$V_{ht} = P_r\ (C_{h,t+1} \leq Z) \qquad \text{--------}\ 3.15$$

The time horizon used could be extended as done in Pritchett et al. (2000) for since the future is uncertain, the degree of vulnerability rises with the length of the time horizon. Therefore, the vulnerability of household h for n periods [denoted as R(.) for "risk"] is the probability of observing at least one episode of poverty (in the popular notion that real current consumption expenditure, C_h, is less than the poverty line) for n periods, which is one minus the probability of no episodes of poverty. This is expressed as:

$$R_h\ (n, Z) = 1 - [(1 - P\ (C_{h,t+1}) < Z) \ldots, (1 - P\ (C_{h,t+n}) < Z)] \quad \text{---------}3.16$$

Given the above conceptualisation and using I(.) to denote an indicator function which equals to 1 if the condition is true and zero otherwise, Pritchett et al. (2000) conceptualised a household as vulnerable if the risk in n periods is greater than a threshold probability level p; this is expressed symbolically as follows:

$$V_{ht}\ (p, n, Z) = I\ [R_{ht}\ (n, Z) > p] \quad \text{----------} \qquad 3.17$$

The foregoing measures of vulnerability do not explicitly take account of the depth of expected poverty even though they are easy to operationalise. Also, though 3.15 and 3.17 are defined for individual households, they can be aggregated over N households. To do so we state as follows:

$$VEP_t = \left(\tfrac{1}{N}\right) \sum_h^N \sum_s^S p_s . I[C_{h,t+1} = Z] . [(\frac{Z - C_{h,t+1}}{Z})]^{\alpha} \quad \text{----------}\ 3.18$$

(Hoddinott and Quisumbing, 2003).

Where $\sum_s^S p_s$ is the sum of the probability of all possible "states of the world", s is a given state of the world in period t+1; and α, as in Foster et al. (1984) poverty index, is the welfare weight attached to the gap between the benchmark and the welfare measure.

Kamanou and Morduch (2002) have put forward a related measure, expressing vulnerability as expected changes in poverty rather than expected poverty per se. They

conceptualise vulnerability in a population as the difference between the expected value of a poverty measure in the future and its current value. As in equation 3.18, they attach weights to the deviations between the welfare measure and its benchmark. Defining welfare in terms of consumption, their aggregate measure can be written as:

$$E(P_{\alpha t+1}) - (P_{\alpha t}) = \frac{1}{N}\sum_{i=1}^{G_{t+1}}\sum_{s}^{S} P_r(s, y_{it+1})\left[\frac{z - y_{it+1}}{z}\right]^{\alpha} - \frac{1}{N}\sum_{i=1}^{G_t}\left[\frac{z - y_{it}}{z}\right]^{\alpha} \quad \text{----------3.19}$$

Where E is the expectation operator; s is a given state of the world for which the joint probability distribution with y_{t+1} is P_r (s, y); G_t and G_{t+1} are the numbers of poor households in the current and future periods respectively; and y_{it} and y_{it+1} denote current and future consumptions of household i respectively. It is assumed that the true distribution of possible outcomes in the next period for households (y_{it+1}) could be known. The practical implementation of this approach is made difficult by the fact that the joint distribution of s and y_{it+1} is not known. Indeed, the "states of the world" might be latent variables with an unknown distribution. There is therefore need to make up for the unknown joint distribution Pr(s, y) by generating a distribution of possible future outcomes for households, based on their observed characteristics and the observed consumption fluctuations of similar households. Put differently, the bootstrap technique allows us to construct several versions of possible future data by re-sampling the original data; the expected value is thus estimated by the mean of the bootstrap estimate of $P_{\alpha t+1}$ (Kamanou and Morduch, 2002).

The measures of vulnerability under the VEP approach have many advantages. Among other things, they produce a number analogous to a measure of the incidence or severity of poverty – there are occasions when such number becomes very useful; they can be implemented using a single round of cross-sectional data – thus the data needs associated with VEP approach are less demanding than the approaches that require panel or longitudinal data.

With regard to the VEU approach, Ligon and Schechter (2002 and 2003) provide a measure using the approach. They conceptualise vulnerability with reference to the difference between the utility derived from some level of certainty-equivalent consumption, Z_{CE} at and above which the household would not be considered as

vulnerable, and the expected utility of consumption; Z_{CE} is analogues to a poverty line in the literature on poverty measurement. The above may be written as:

$$V_h = U_i (Z_{CE}) - EU_h (C_h) \quad \text{----------} \quad 3.20$$

Where U_h is a weakly concave, strictly increasing function.

To better understand the balance between poverty and risk in the measure of vulnerability, equation 3.20 can be decomposed into distinct components reflecting poverty and risk respectively as follows:

$$V_h = U_h [(Z_{CE}) - U_h (EC_h)] + [U_h (EC_h) - EU_h (C_h)] \quad \text{---------} \quad 3.21$$

The first bracketed term is a measure of poverty; it is the difference in utility at Z_{CE} compared to household h's expected utility at C; it involves no random variable, it is simply the difference between a concave function evaluated at the poverty line and at household h's expected consumption expenditure. The concavity of U_h implies that as EC_h approaches the poverty line, an additional unit of expected consumption has diminishing marginal value in reducing poverty (Ligon and Schechter, 2002 and 2003). The second term measures the risk faced by household h. It can be further decomposed into covariate or aggregate risk and idiosyncratic risk. Let $E(C_h|x_t)$ denote the expected value of consumption, conditional on a vector of covariate or aggregate variables, x_t. Then we can decompose the risk household h faces into a term expressing the aggregate or covariate risk the household faces and a term expressing the idiosyncratic risk the household faces. Putting all together we have:

$$\begin{aligned} V_h = {} & [U_h (Z_{CE}) - U_h (EC_h)] && \text{Poverty} \\ & + \{U_h (EC_h) - EU_h [E(C_h|x_t)]\} && \text{Covariate or aggregate risk} \\ & + EU_h [E(C_h|x_t)] - EU_h (C_h)\} && \text{Idiosyncratic risk} \end{aligned} \quad 3.22$$

Although Ligon and Schechter (2002 and 2003) did not do this explicitly, by summing over all households, one can form an estimate of aggregate vulnerability as follows:

$$VEU = \frac{1}{N} \sum_h^N [U_h(Z_{CE}) - U_h(EC_h)] + [U_h(EC_h) - EU_h\{EC_h \mid x_t)\}] + [(EU_h\{EC_h \mid x_t\}) - EU_h(C_h)] \text{------} \quad 3.23$$

{Hoddinoth and Quisumbing, 2003).

The VEU approach has a number of advantages. These include the following: the approach can be used to know if vulnerability largely reflects low asset levels,

unfavourable settings or poor returns to assets (all of which are captured in the poverty term) or if vulnerability reflects shocks and the inability to cope with shocks, either covariate or idiosyncratic; it is a highly scientific and sophisticated approach. The disadvantages of the approach include that it may be difficult to operationalise in practice and it requires panel or longitudinal data which are usually difficult to get and such data are absent in many developing countries.

Now coming to the VER approach, it has to do with assessing welfare losses in a world where some risks are at best partially insured; it is an ex post assessment of the extent to which negative shocks cause welfare losses. Let us assume a household h residing in town v at time t; let us define $\Delta \ln C_{htv}$ as the change in logarithm of consumption or the growth rate in total consumption per capita of household h, in period t (i.e. between round t and round t-1), and let $S(i)_{tv}$ denote covariate shocks, and let $S(i)_{htv}$ denote idiosyncratic shocks. Furthermore, let D_v be a set of binary variables identifying each community separately, and let X be a vector of household's or household head's characteristics. Then denoting λ,β, δ and γ as vectors of parameters to be estimated and $\Delta\varepsilon_{hvt}$ is a household-specific error term capturing changes in the unobservable components of household preferences, we have:

$$\Delta \ln C_{htv} = \sum_i \lambda_i S(i)_{tv} + \sum_i \beta_i S(i)_{htv} + \sum_m \delta_v (D_v) + \gamma X_{hv} + \Delta\varepsilon_{htv} \text{ ---------3.24}$$

The estimated value of λ and β in 3.24 identify the impacts of covariate $[S(i)_{tv}]$ and idiosyncratic $[S(i)_{htv}]$ shocks. These estimated coefficients provide estimates of the magnitudes of these impacts, net of the mitigating roles played by private coping strategies and public responses; by quantifying the impacts of these shocks the VER approach identifies which risks would be an appropriate focus of policy. Tesliuc and Lindert (2002) with a single cross-sectional survey adopted this approach. In their model, the level of logarithm of consumption is determined by covariate $[S(i)_{tv}]$ and idiosyncratic $[S(i)_{htv}]$ shocks as well as fixed household characteristics such as location of the household, age, sex and educational level of the household head; this is expressed as follows:

$$\ln C_{htv} = \alpha + \sum_i \lambda_i S(i)_{tv} + \sum_i \beta_i S(i)_{htv} + \delta X_{htv} + \varepsilon_{htv} \text{ ---------- 3.25}$$

Tesliuc and Lindert (2002) noted that a household not affected by any shocks would have predicted consumption ($\ln C_{NS, htv}$) of:

$$\ln C_{NS,htv} = \alpha + \delta X_{htv} + \varepsilon_{htv} \quad \text{---------- 3.26}$$

This implies that the impact of shocks is the difference between equations 3.25 and 3.26.

A variant of equation 3.24 involves replacing $\sum_i \lambda_i S(i)_{tv}$ and $\sum_i \beta_i S(i)_{htv}$ with $\Delta\left(\overline{\ln y_{vt}}\right)$ - the growth rate in average community income - and $\Delta \ln y_{hvt}$ -the growth rate of household income respectively; these variables can be thought of as the summation of all covariate and idiosyncratic shocks respectively and then we have as follows:

$$\Delta \ln C_{htv} = \alpha + \beta \Delta \ln y_{hvt} + \gamma \Delta\left(\overline{\ln y_{vt}}\right) + \delta X_{hvt} + \Delta \varepsilon_{hvt} \quad \text{---------- 3.27}$$

[Hoddinott and Quisumbing, 2003).

The VER approach is a sophisticated approach but it can be operationalised easily. However, it has some draw backs. These include that no welfare weights are attached to changes in consumption among different households and this makes the approach to be restrictive; and the approach assumes that positive and negative shocks have symmetrical effects.

In general, assessment of vulnerability and the distinction between transient and chronic poverty usually require longitudinal/panel data set containing cross sectional data sets conducted at various dates, on the same sample frame and for the same households. Kamanou and Morduch (2002), for instance, used a panel data to estimate vulnerability for *Côte* d'Ivoire. The study applied a general framework that combined Monte Carlo and Bootstrap statistical techniques. The study found that there was considerable vulnerability in the cities outside of Abidjan (the capital city). But Gibson (2001) used a less extensive panel for a study of Papua, New Guinea. The study found, among other things, that the chronic and transient components of headcount poverty were roughly equal while three-quarters of the mean poverty gap were transient. However, Chaudhuri (2000 and 2003), Chaudhuri and Datt (2001), Chaudhuri et al. (2002) and Tesliuc and Lindert (2002) have demonstrated that it is possible to assess household vulnerability to poverty from a single cross-sectional data. This is based on some simplying assumptions as well as an iterative process using the Feasible Generalised Least Squares (FGLS)

regression technique proposed by Amemiya (1977). Suffice it to say that in less developed countries such as Nigeria where panel/longitudinal data are usually non-existent, the above methodology is indispensable in the quantitative assessment of vulnerability to poverty. The methodology has been applied with success in some countries such as Philippines, Indonesia and even Nigeria. For instance, Chaudhuri and Datt (2001) applied the methodology in estimating vulnerability to poverty for the Philippines. The study found that vulnerability incidence was significantly higher than poverty incidence. While 25% of the Philippine population was observed to be poor (in 1997) it was estimated that 40% of the population was vulnerable to poverty. As further example, Chaudhuri et al. (2002) applied the methodology in estimating vulnerability to poverty in Indonesia. The study found that while 23% of the population was poor, 45% of the population was vulnerable to poverty.

3.10 Determinants of Poverty

Both theoretical and empirical literatures reveal that the determinants of poverty are multifarious. However, the major determinants of poverty include demographic, social, economic and environmental variables such as household size and composition, number of persons or adult equivalents per room, employment status and nature of employment, educational attainment, household type (monogamous, polygamous, divorced, separated etc), asset ownership/income, migration, ratio of food expenditure to total expenditure, access to socio-economic facilities and engagement in agricultural activities (Allen and Thompson, 1990; Hassan and Babu, 1991; Coulombe and Mckay, 1996; Aigbokhan, 2000a; Omonona, 2001; Serumaga-Zake and Naude, 2002; Rodriguez, 2002; Okurut et al., 2002; Mukherjee and Benson, 2003; Anyanwu, 2005; Mok et al., 2007; and Yusuf et al., 2008).

Allen and Thompson (1990) applied logistic regression technique to analyse rural poverty among racial and ethnic minorities in the United States of America. Hassan and Babu (1991) used logistic regression technique to analyse determinants of rural poverty in Sudan. Coulombe and Mckay (1996) employed ordinary multiple regression technique (using ordinary least squares estimation method) to analyse determinants of poverty in Mauritania. Aigbokhan (2000a) used ordinary multiple

regression technique (employing ordinary least squares estimation method) to analyse determinants of regional poverty in Nigeria. Omonona (2001) used Tobit regression model to analyse correlates of poverty among rural farming households in Kogi state, Nigeria. Serumaga-Zake and Naude (2002) used probit regression models to analyse determinants of rural and urban household poverty in the North West province of South Africa. Rodriguez (2002) applied logistic regression technique in analysing determinants of poverty in Mexico. Okurut et al. (2002) used logistic regression technique to analyse determinants of regional poverty in Uganda. Mukherjee and Benson (2003) employed ordinary multiple regression technique (using ordinary least squares estimation method) to analyse determinants of poverty in Malawi. Anyanwu (2005) used logistic regression technique to analyse determinants of rural poverty in Nigeria. Mok et al. (2007) used logistic regression technique to analyse determinants of urban household poverty in Malaysia. Yusuf et al. (2008) used logistic regression technique to analyse determinants of poverty among urban farmers in Ibadan metropolis, in Nigeria.

The foregoing shows that the methods applied in the analysis of determinants of poverty include logistic regression technique, ordinary multiple regression technique, probit regression model and Tobit regression model. However, the logistic regression technique appears to be more popular than the rest techniques.

The literature is replete with evidences that there is a direct relationship between poverty and household size. Larger households have more poverty incidences than smaller households (Allen and Thompson, 1990; Coulombe and Mckay, 1996; FOS, 1999a; Aigbokhan, 2000a and Omonona, 2001). Similarly, there is a direct relationship between number of persons or adult equivalents per room and poverty (Omonona, 2001). Ownership of assets such as housing unit and agricultural land as well as access to regular remittances and credit are inversely related to poverty; they reduce the probability of falling or remaining in poverty (Coulombe and Mckay, 1996; Omonona, 2001; Mukherjee and Benson, 2003). Education increases the stock of human capital which ultimately increases labour productivity and wages; thus high level of education for household heads reduce poverty incidence whereas low or absence of education for household heads is associated with high poverty

incidence(FOS, 1999a; Aigbokhan, 2000a; Omonona, 2001; Anyanwu, 2005). Proportion of working members in the household is inversely related to poverty whereas ratio of food expenditure to total expenditure is directly related to poverty (Omonona, 2001). But for food poverty, ratio of food expenditure to total expenditure is expected to be inversely related to this aspect of poverty. Proportion of household members that are between 0 and 15 years, and proportion of household members that are more than 60 years are directly related to poverty; indeed, high child dependency and old age dependency ratios tend to aggravate the incidence of poverty (Coulombe and Mckay, 1996; Omonona, 2001).

Nature of employment of household head, household type, sex of household head, proportion of females in the household and migration may be directly or inversely related to poverty (Allen and Thompson, 1990; Coulombe and Mckay, 1996; Aigbokhan, 2000a; Mukherjee and Benson, 2003; Anyanwu, 2005; Mok et al., 2007). Employment status of household head affects poverty incidence. On the average, households whose heads are students, unemployed, retired or inactive are expected to be plagued by high level of poverty.

3.11 Empirical Literature relating to Poverty and Vulnerability to Poverty in Nigeria

As noted earlier, studies relating to poverty in Nigeria are relatively scanty. The most prominent ones include Ogwumike (1987, 1991 and 2001), Ogwumike and Aromolaran (2001), Onah (1996), FOS (1999a and 1999b), Aigbokhan (1997, 2000a and 2000b), Canagarajah et al. (1997), Canagarajah and Thomas (2001), Ajakaiye and Adeyeye (2001), Omonona (2001), Anyanwu (2005), and Yusuf et al. (2008). Ogwumike (1987 and 1991) examined the nature and extent of poverty among the Nigerian masses, using the basic needs method, linear programming technique, multivariate probit analytical method and descriptive statistics. The major findings of the studies include the following: basic needs fulfillment varies among socio-economic groups in Nigeria; as much as 57.14 per cent of households in Nigeria do not earn sufficient income to meet their food, shelter, clothing, education and transportation needs; peasants and the office workers are the most deprived and traders and teachers have the least incidence of

poverty; the most important factors influencing basic needs fulfilment in Nigeria include asset ownership by households, family size, nature of employment, level of education of household head, and the availability of at least one additional working member in each household.

The studies are a major departure from the use of arbitrary-choice-of-index approach in poverty analysis in Nigeria; they (the studies) used highly scientific and robust methodologies in the assessment/analysis of poverty in Nigeria. However, the studies were limited in scope for they covered only three states in Nigeria namely Borno, Imo and Oyo States. For there to be adequate representativeness, there is need to sufficiently cater for all the geo-political zones because households vary significantly across geo-political zones with respect to basic needs fulfilment. And the studies did not take account of economies of scale in household consumption.

Onah (1996), FOS (1999a, 1999b), Aigbokhan (1997 and 2000a), Canagarajah et al. (1997), Canagarajah and Thomas (2001), Ajakaiye and Adeyeye (2001) and Ogwumike (2001) found, among other things, that poverty in Nigeria is a rural phenomenon, tends to increase over time, is inversely related with education and directly related with old age and household size; and poverty alleviation have focused more on basic needs and rural development approaches. The studies also found that poverty is more pronounced in the northern states than in the southern states. FOS (1999a and 1999b) found that poverty increased almost throughout between 1980 and 1996 and that households whose heads are in agriculture usually have the highest incidence of poverty. The FOS studies also show that poverty has become pervasive in Nigeria, engulfing an overwhelming proportion of the country's population; this is supported by some other subsequent studies such as Ajakaiye and Adeyeye (2001) and Ogwumike and Aromolaran (2001). The study by Canagarajah and Thomas (2001) shows that the benefits of growth are not equally shared in Nigeria over the years. The lowest quintile of the country's population has always had a highly pronounced lower income than the highest decile of the population and the Gini coefficient has been very high; and all these show that there has been gross inequality in the distribution of income/wealth in Nigeria. Virtually all the foregoing studies used arbitrary-choice-of-index approach in setting their poverty lines. As stated earlier, the use of arbitrary-choice-of-index method is highly

subjective and lacks acceptable objectivity. The studies in general used one-third and/or two-thirds of household mean expenditure in setting their poverty lines. The mean is a very poor average when it comes to assessment of human welfare for it is highly influenced by extreme values. Thus poverty lines based on mean income or expenditure are most likely to lead to understatement or over statement of the incidence, depth and severity of poverty. It is instructive to note that virtually all the foregoing studies based their analyses on the National Consumer Surveys of 1980, 1985, 1992 and 1996.

Anyanwu (2005) found that the major determinants of rural poverty in Nigeria include household size, gender of household head, some occupations of household heads and some educational levels of household heads.

Aigbokhan (2000b) used the Food-Energy-Intake method in investigating the changes in the profile of poverty, welfare and inequality in Nigeria. The study found, among other things, that poverty, inequality and polarization in distribution increased significantly during the period[30] covered by the study; consistent with the findings of other studies, the study found that poverty is more pronounced among households with male heads than households with female heads; poverty in Nigeria is a rural phenomenon and poverty is generally more pronounced in the northern geo-political zones than in the southern geo-political zones; the study also found that there was positive real economic growth throughout the period of the study yet poverty in general worsened thus implying that the benefits of growth do not reach the poor in Nigeria. Like virtually all other studies in Nigeria, Aigbokhan (2000b) failed to adequately address the issues of household composition and economies of scale in household consumption. Also, the study did not sufficiently cater for variations in household consumption/expenditure, tastes and preferences as well as prices across the geo-political zones of Nigeria. Omonona (2001) addressed the issue of household composition by using adult equivalent scales but the study did not cater for economies of scale in household consumption. Furthermore, the study is limited in coverage for it covered only a single state in the country – Kogi State – and thus is not representative of the country. However, the study provided some insights on the correlates of poverty in Nigeria. The major findings of the study include: there is high level of income/wealth inequality in Nigeria; poverty is

[30] The study covered a 12-year period.

highly pronounced among farming households; food expenditure pattern in Nigeria obeys the Engel's law; the higher the household size, adult and child dependency ratios, ratio of food expenditure to total expenditure, family labour, distance to farm and the market, distance to water source and distance to health clinic, the lower is the expenditure per adult equivalence and hence the higher the levels of poverty; the higher the level of education of household head, number of working members in household, extent of commercialisation, farm size, farm income, agricultural credit and number of rooms available per person, the higher is the per adult equivalent expenditure and hence the lower the levels of poverty.

None of the various studies reviewed rigorously and adequately considered and analysed the issue of vulnerability to poverty (particularly to food poverty) or the issue of poverty dynamics in Nigeria. However, Ogwumike and Aromolaran (2001) examined poverty dynamics in some details. The study found, among other things, that widows (especially those without adult children), orphans, the physically handicapped and migrants are among the most at risk and most insecure groups. The study was based mainly on the National Consumer Surveys of 1980, 1985, 1992 and 1996. However, the study did not specifically examine the issue of vulnerability to poverty. Furthermore, as with other studies, the study did not cater for variations in food consumption/expenditure, food tastes, food preferences and food prices across the geo-political zones in Nigeria as well as variation in household composition; also, the study did not address the issue of economies of scale in household consumption.

It is important to state here that Alayande and Alayande (2004), employing Chaudhuri's methodology, examined the problem of vulnerability to poverty in Nigeria in some details and found, among other things, that the country is plagued with high level of vulnerability. However, the study dealt with vulnerability to general poverty and not to food poverty.

Also, Oyekale and Oyekale (2008), using Chaudhuri's methodology, analysed vulnerability to poverty in Nigeria using the Nigeria Living Standard Survey (NLSS)[31]

[31] The NLSS data set is indeed a highly comprehensive, representative and robust data set and is adequately suitable for poverty and vulnerability analyses. The data set contains relevant poverty, food consumption/expenditure and vulnerability variables.

data set but the study was not on vulnerability to food poverty rather it was on vulnerability to general poverty. Other studies on vulnerability to poverty in Nigeria include Oni and Yusuf(2008) and Adesanoye and Okunmadewa(2007). Oni and Yusuf(2008), using Chaudhuri's methodology, analysed vulnerability to general poverty only with respect to rural households; they did not consider vulnerability to poverty among urban households and they did not analyse vulnerability to food poverty. Adesanoye and Okunmadewa(2007) analysed households' vulnerability to poverty using a two-period panel data. However, the study is grossly limited in coverage for it is based on only Ibadan metropolis in Oyo state; thus it is not representative of the country; also, the study, like the other studies on vulnerability to poverty in Nigeria, is based on vulnerability to general poverty and not on vulnerability to food poverty.

Suffice it to say that vulnerability to food poverty is a crucial aspect of vulnerability for, among other things, food poverty may be said to be the root of all poverty.

Unlike the studies reviewed this study uses comprehensively designed and robust geo-political zone-specific poverty lines that adequately cater for variations in household tastes, preferences, needs and prices among various zones in Nigeria. Suffice it to say that the use of such zone-specific poverty lines makes poverty and vulnerability to poverty analyses to be highly robust.

The foregoing research gaps need to be closed or at least narrowed so as to provide a powerful framework that will sufficiently guide government and policy makers in the formulation and implementation of policies and programmes that will adequately reduce poverty and vulnerability to poverty in Nigeria.

CHAPTER 4

THEORETICAL FRAMEWORK AND METHODOLOGY

4.1 Theoretical Framework

A combination of revealed preference theory, consumer utility maximisation theory and its associated dual problem of cost minimisation, as well as the microeconomic theory of risk and uncertainty (i.e expected utility theory) provide the theoretical foundation for this study. The theory of revealed preference states that choice reveals preference. The theory analyses consumer's preference for a combination of goods on the basis of observed consumer behaviour in the market. Drawing from this theory we have adopted the strong axiom of revealed preference (SARP) for this study. It is assumed that the preferences of consumers for various food items are stable over the period for which their choice behavior is being observed. It is further assumed that the underlying preferences are strictly convex. In other words, at each budget, every consumer will demand a unique bundle.

The SARP is presented as follows:

Let (φ_1, φ_2 .... φ_n) be a bundle of food items purchased at prices (P_1, P_2 .... P_n) respectively and let (Y_1, Y_2 .... Y_m) be other bundle of food items purchased at prices (d_1, d_2 .... d_m) respectively. Further to the above, let household disposable income be HYds and this can be spent on food items and non-food items.[32] Also let household expenditure on non-food items be Exnfit; therefore, household expenditure on food items is HYds - Exnfit.

Based on the foregoing, if (φ_1, φ_2 .... φ_n) is actually bought and it satisfies the budget constraint with equality as follows:

$$P_1 \varphi_1 + P_2 \varphi_2 .... + P_n \varphi_n = HYds - Exnfit \quad --------4.1$$

[32] The amount saved is included here because money income is broadly defined to include savings and time deposits in various forms/sources. There is some utility derived from holding money in form of savings; therefore, the amount saved can be considered as part of non-food expenditure to derive such utility.

and the other bundle (Y_1, Y_2 .... Y_m) follows the relation below:

$d_1 Y_1 + d_2 Y_2 .... + d_m Y_m \leq HYds - Exnfit$ --------4.2

we say that (φ_1, φ_2 .... φ_n) is revealed preferred to (Y_1, Y_2 .... Y_m) and the following inequality is satisfied.

$P_1 \varphi_1 + P_2 \varphi_2 .... + P_n \varphi_n > d_1 Y_1 + d_2 Y_2 .... + d_m Y_m$ ------4.3

and

$d_1 Y_1 + d_2 Y_2 .... + d_m Y_m \geq P_1 \varphi_1 + P_2 \varphi_2 .... + P_n \varphi_n$ -------4.4

Put differently, SARP states that if (φ_1, φ_2 .... φ_n) is revealed preferred to (Y_1, Y_2.... Y_m) (either directly or indirectly) and (φ_1, φ_2 .... φ_n) is different from (Y_1, Y_2 .... Y_m), then (Y_1, Y_2 .... Y_m) cannot be directly or indirectly revealed preferred to (φ_1, φ_2 .... φ_n). Indeed, once (φ_1, φ_2 .... φ_n) is chosen, it implies that it is directly or indirectly revealed preferred to all other bundles.

The SARP is based on consumer/household utility maximisation behavior. (Henderson and Quandt, 1980; Varian, 1990 and 1992). The utility maximisation theory assumes that individuals are rational beings. Preferences over all available consumer goods are given by the household utility function U(Fdn, Nnfdn, k)[33], where Fdn is a vector of quantities of various food items consumed by the household; Nnfdn is a vector of quantities of various non-food commodities consumed by the household and k is a vector of demographic variables (i.e. household structure or characteristics). The household is said to maximise its utility with respect to Fdn and Nnfdn subject to a budget constraint. The above may be stated as follows:

$Max_{Fdn, Nnfdn}$ U(Fdn, Nnfdn, k) ------4.5

s.t. $HYds = P^T(Fdn) + y^T (Nnfdn)$

Where P^T is the transpose of a price vector for quantities of various food items; y^T is the transpose of a price vector for quantities of various non-food items.

Equation 4.5 can be validated by invoking the life-cycle hypothesis and a two-stage budgeting argument. Standard life-cycle model is based on the assumption that the household maximises an inter-temporal additive utility function under a life time budget constraint. On the other hand, a two-stage budgeting process operates as

[33] This is an ordinal utility function and for analytical convenience as well for ease in treatment the function can be normalised by choosing a specific functional form.

follows: in the first stage of the process, the household derives total (non-durable) consumption at time t_i by allocating life time income to different periods; in the second stage of the process, the household allocates household expenditure within a period to different consumer goods (food and non-food items). Based on the revealed preference theoretical construct, we take it that the food expenditures of households reveal the households' preferences for the various food items and this apparent behavior is used to analyse food poverty in Nigeria.

Both the revealed preference theory and the utility maximisation theory are predicated on cost minimisation. It is taken that as consumers aim to maximise utility they aim to do this at minimum cost. Thus consumers' actual food purchases are taken to reveal their utility maximisation and cost minimisation behaviour. A household cost minimisation problem with respect to food expenditure may be stated as follows:

Minimise $\sum_{i=1}^{n} P_i Q_i$ ---------- 4.5a

Subject to:

$\sum_{i=1}^{z} \lambda_i Q_i \geq R$ ---------- 4.5b

$\lambda_i Q_i \geq \beta_i R$ ---------- 4.5c

$Q_i > 0$ ---------- 4. 5d

Where: Q_i is a vector of food items; P_i is a vector of prices of the food items; λ_i is a vector of the amounts of calories per units of the respective food items; R is the given energy requirement for a given period of time; β_i is a vector of relative weights attached to the food items.

We use the vulnerability as expected poverty (VEP) approach in our analysis of vulnerability to food poverty. The approach is commonly used while dealing with a single cross sectional (survey) data (Dercon, 2000; Chandhuri et al., 2002; Oni and Yusuf, 2008; and Oyekale and Oyekale, 2008). The starting point for the VEP framework is to consider the vulnerability of a particular household h at time t (V_{ht}) as the probability that the household will be food poor at time t + 1:

$V_{ht} = P_r (fc_{h,t+1} \leq Z_f)$ - ---------- 4.6

Where: $fc_{h,\ t+1}$ is the household's per capita or per adult equivalent food consumption level at time t+1 and Z_f is the appropriate food poverty line. It is instructive to note at this point that a household's level of vulnerability at time t is defined in terms of the household's food consumption/expenditure prospects at time t+1. In a situation where only cross sectional data are available, deriving a food consumption/expenditure prediction model is in general considered as follows:

$fc_{ht} = f(X_h, I_h, \beta_t, \alpha_h, \varepsilon_{ht})$ ---------- 4.7

Where: X_h is a vector of observable household characteristics; I_h is a vector of observable risk management instruments; β_t is a vector of parameters describing the state of the economy at time t; α_h are unobserved but fixed household characteristics; and ε_{ht} are stochastic errors. To derive the vulnerability measure at the household level, we substitute equation 4. 7 into equation 4. 6 and this gives:

$V_{ht} = P_r [(X_h, I_h, \beta_{t+1}, \alpha_h, \varepsilon_{ht+1}) \leq Z_f | X_h, I_h, \beta_t, \alpha_h, \varepsilon_{ht})$ -------- 4.8

The above expression shows clearly that a household's vulnerability level derives from the stochastic properties of the inter-temporal food consumption stream it faces and these in turn depend on a number of household characteristics and environment factors. As a matter of fact, equation 4. 8 states the estimated probability of being food poor using the prediction model (equation 4.6), based on information available in period t but including (possibly predicted) information about β_{t+1} and ε_{ht+1}. The crucial elements in this specification are β_{t+1} and ε_{ht+1}. Both variables are indexed by t and thus include information about the evolving state of the aggregate economy (constant across households) and aggregate shocks. Typically (as shown in Chaudhuri et al., 2002) there is no information on β_{t+1} within the data and so it is ignored; similarly, no time dependence of errors and shocks ε_{ht+1} is allowed for. In a nutshell, the risk and the vulnerability to food poverty are only idiosyncratic; no aggregate shocks are allowed for. Equation 4.7 can be further linearised, although allowing for heteroscedasticity determined by X_h (dropping any distinction with I_h); technically, this is stated as follows:

$\ln fc_h = X_h\alpha + e_h$ with $e_h \sim N(O, X_h\theta)$ ---------- 4.9

Where: α and θ are coefficients to be estimated; ln is operator for natural logarithm; and e_h is stochastic error term. The model can be estimated using feasible generalized least squares (FGLS) technique.

Drawing from the useful characteristics of this linear model and from the normality assumption of the errors and defining ϕ as the standard normal distribution, household vulnerability to food poverty is estimated as follows

$$\hat{V}_h = \hat{P}_r(\ln fc_h < Z_f \mid X_h) = \phi\left[\frac{\ln Z_f - X_h\hat{\beta}_{fgls}}{\sqrt{X_h\hat{\theta}_{fgls}}}\right] \text{ ---------- } 4.10$$

In general, the microeconomic theory of risk and uncertainty (i.e. the theory of expected utility) provides the theoretical underpinning for the analysis of vulnerability to food poverty in Nigeria. The theory of expected utility says, among other things, that the expected utility of risk averse individuals falls as the variability of consumption rises, holding other things constant. Indeed, the expected utility theory postulates that the utility of an agent facing uncertainty is calculated by considering utility in each possible state and constructing a weighted average. The weights are the agent's estimate of the probability of each state. The expected utility is thus an expectation in terms of probability theory. In fact, the expected utility of an option is a probability weighted average of the utilities of the possible consequences of the option.

Let Ω be an option and let r_1, r_2---------r_n be mutually exclusive and exhaustive possible states of the world that are causally independent of Ω and determine the consequences of Ω. And for each state r_i let $P(r_i)$ be the probability of r_i and let $U(c[\Omega, r_i])$ be the utility of the consequences of Ω given r_i. Then the expected utility of Ω ($EU\Omega$) is given as:

$$EU\Omega = \sum P(r_i)U(c[\Omega, r_i]) \text{ ----------} 4.11$$

It is assumed that households always take action to maximise expected utility. This assumption can be clearly stated by characterising expected utility property. The utility function $U: Q \to \Re$ has the expected utility property if for every $q \in Q$ the following equality holds:

$$U(q)= \sum_{i=1}^{n} P_i U(a_i) \qquad \text{----------4.12}$$

Where $(P_1 \circ a_1, P_2 \circ a_2, ------ P_n \circ a_n)$ is the simple gamble induced by q.

Therefore, to say that U has the expected utility property is to say that it assigns effective probability to each gamble the expected value of the utilities that might result. The effective probability that q yields utility $U(a_i)$ is simply the effective probability that it yields outcome a_i, namely, P_i. It is instructive to point out here that if U has the expected utility property and if $q_s = (P_1 \circ a_1, P_2 \circ a_2, ------ P_n \circ a_n)$ is a simple gamble, then because the simple gamble induced by q_s is q_s itself we must have:

$$U(P_1 \circ a_1, P_2 \circ a_2, ------ P_n \circ a_n) = \sum_{i=1}^{n} P_i U(a_i) \quad \forall \text{ probability vectors}$$

$(P_1,P_2,.....P_n)$ ------4.13

Consequently, the function U is completely determined on all Q by the values it assumes on the finite set of outcomes, $A=(a_1, a_2, -----a_n)$

If a household's preferences are represented by a utility function with the expected utility property, and if that household always chooses its most preferred alternative available, then the household will choose one gamble over another if and only if the expected utility of the one exceeds that of the other. And such a household is said to be expected utility maximiser.

4.2 Methodology

A least-cost approach is used in constructing zone-specific food poverty lines. Our least-cost approach draws heavily from the seminal work of Stigler (1945). First, a list of commonly consumed[34] food items is prepared for each zone. Thereafter, fifteen cheapest food items[35] are selected from the list. The consumption of these food items are considered to be adequate in addressing hunger, starvation and even malnutrition, which are basic manifestations of poverty. The food items are indeed very rich in calories.[36]

[34] This is based on the items' weights which reflect the frequency of their consumption.
[35] These are food items that give the highest amounts of calories per naira.
[36] A calorie is a unit of measurement for energy. In most fields, it has been replaced by joule, the SI unit of energy. However, the kilocalorie or calorie remains in common use for the amount of food energy. The

Indeed, calorie requirements are popularly considered as the most important requirements in food consumption (Greer and Thorbecke, 1986a and 1986b; Joshi, 2002).

A linear programming technique is used to determine the least-cost food expenditure for each of the zones using the selected food items, their prices and calorie requirement of 2900 kilocalories per adult equivalence per day. The 2900 kilocalories per adult equivalence per day is the recommendation from the World Health Organization (WHO), and it has been adopted by the National Bureau of Statistics (NBS). Thus it may be regarded as the official calorie recommended dietary allowance for Nigeria.

Our linear programming model is presented as follows:

Minimise: $\sum_{i=1}^{15} c_i X_i$ ---------- 4.14

Subject to:

$\sum_{i=1}^{15} e_i X_i \geq R$ ----------4.15

$e_i X_i \geq a_i R$ ----------4.16

$X_i > 0$ ----------4.17

Where: X_i is a vector various food items; c_i is a vector of the unit costs (i.e. prices per kilogramme) of the respective food items; a_i is a vector of the relative weights attached to the various food items. e_i is a vector of the calories per units of the respective food items (i.e. calories per kilogramme); and R is the energy requirement for a representative household - here we are using 2900 kilocalories per day for an adult equivalent which gives 10,991 kilocalories per day for a representative household of 3.79 adult equivalents. The composition of our representative household as presented in Table 4.1 is equivalent to the mean Food and Agriculture Organisation (FAO) adult equivalents of 3.79 and the mean household size of 5 members as reflected in the NLSS 2004.

It is worthwhile to state here that a household, in the context of this study, refers to a group of people living and eating together in a dwelling unit or its equivalent, sharing a common housekeeping arrangement and acknowledging the authority of a simple head

small calorie or gram calorie approximates the energy needed to increase the temperature of 1 gram of water by 1°C. This is about 4.184 joules. The large calorie or kilogram calorie approximates the energy needed to increase the temperature of 1kg of water by 1°C. This is about 4.184 kilojoules and exactly 1000 small calories.

of household regardless of whether the head is living with the other household members or not. This is the definition given by the National Bureau of Statistics.

The TORA software is used to solve our linear programming model and to generate least-cost food expenditure for the representative household, in each of the zones. In order to take account of wastages during domestic preparation of food and plate waste, we multiplied the least-cost food expenditure for our representative household in each of the zones by a factor of 1.1 following common practice in the literature that food wastages in general account for about 10% of total energy per household (Ogwumike, 1987 and 1991; Pekcan et al, 2006).

Table 4.1: Composition of the Representative Household used in the Study

Category	Food and Agriculture Organization (FAO) Adult Equivalent
1 male adult (father) [above 20 years old]	1.00
1 female adult (mother) [above 20 years old]	0.73
1 male child of between 1 – 3years old	0.45
1 female child of between 10 – 12 years old	0.78
1 female child of between 13 – 15 years old	0.83
Total number of adult equivalents in the Household	**3.79**

Source: Author's Design based on NLSS 2004 and NBS (2005b).
Note: The number of persons in the household = 5, made up of 2 parents and 3 children.

Our zone-specific food poverty lines are calculated by estimating least-cost food expenditures per adult equivalence adjusted for economies of scale in household food consumption (Vj) using our representative household. This is given as follows:

$$Vj = \frac{TFE_{j.i,RH}}{(TAE_{RH})^{1+E}} \quad \text{----------4.18}$$

$$TAE_{RH} = \sum_{X=1}^{n} \lambda_{X,RH} \quad \text{----------4.19}$$

Where: $TFE_{j.i,RH}$ is total annual least-cost food expenditure in zone j sector i, using the representative household (RH), multiplied by a factor of 1.1 to cater for food wastages during domestic preparation and plate waste; the zones are the six geo-political zones while the sectors are the urban and rural sectors; TAE_{RH} is total number of adult equivalents in the representative household; $\lambda_{X,RH}$ is adult equivalent for individual X in the representative household; and E is the economies of scale coefficient. As stated earlier, food is not a durable good therefore the economies of scale in household food consumption is expected to be low. White and Masset (2003) have observed that empirical estimates of E are generally in the range of 0.15 – 0.3. For this study we have taken the lower limit of 0.15.

The foregoing methodology of constructing food poverty lines is considered robust since it paves the way for specificity and consistency of poverty lines. Indeed, the poverty lines are constructed in such a way that they reflect the food consumption patterns of the various zones. Further, the poverty lines reflect the same standard of living since they are based on the commonly consumed cheapest food items and on the same calorie threshold of 2900kilocalories per adult equivalence per day. It is assumed, among other things, that households in any given zone are relatively homogeneous with respect to food tastes, preferences and needs, and that they (i.e. households) face uniform prices. In setting the zone-specific food poverty lines, adequate consideration is given to variations in food consumption/expenditure and food prices across the various zones. This is in line with the principle of pragmatism.

In this study, food poverty is defined as when a household's total annual food expenditure per adult equivalence in current local prices (i.e 2004 prices) in a particular

zone is less than the food poverty line for the zone. The food poverty line in each zone is the total annual household least-cost food expenditure per adult equivalence (in 2004 prices) (that meets the energy requirement of 2,900 kilocalories per adult equivalence per day), after catering for food wastages during domestic preparation and plate waste as well as economies in household food consumption.

The FGT index is used in estimating the incidence, depth and severity of food poverty in each of the geo-political zones of Nigeria and in the country as a whole, using the constructed zone-specific food poverty lines. The adopted index (P_{fd}) is specified as follows:

$$P_{fd} = \frac{1}{n}\sum_{g=1}^{w}\left[\frac{Z_f - \delta_g}{Z_f}\right]^{fd} \quad \text{---------- 4.20}$$

Where: δ_g is the food expenditure of the gth poor household; Z_f is a zone-specific food poverty line; w is the number of households below the food poverty line; n is the total number of households in the sample; fd is set at 0,1 and 2 to measure food poverty incidence, depth and severity respectively. As stated earlier, the FGT index, apart from satisfying the major axioms for a desirable poverty measure, has an added merit of being addictively decomposable across population sub-groups.

It is important to note that after getting the incidence, depth and severity of food poverty in each geo-political zone by urban and rural, the data are pooled to get aggregate food poverty incidence, depth and severity for the zones, for urban and rural sectors and for the country as a whole. Similar procedure is adopted in the estimation of vulnerability to food poverty in Nigeria as well as in estimating the determinants of food poverty for the country as a whole.

It is instructive to state here that population weights are included in the analyses of the study in order to avoid biased estimates (Magee et al., 1998; Green, 2003).

To address the second objective of the study which is to analyse the main determinants of food poverty, we have employed the logit model. Our logit model is specified as follows:

$$L_i = \ln\left(\frac{U_i}{1-U_i}\right) = a_0 + a_i^T A_i + \varepsilon_i \quad \text{---------- 4.21}$$

Where: L_i is the logit (i.e. the natural logarithm of the odds ratio); a_0 is a constant; A_i is a vector of explanatory variables; a_i^T is the transpose of the vector of the respective parameters associated with A_i; ε_i is the random error term; $U_i = 1$ if household is food poor and $U_i = 0$ if household is not food poor, therefore, the ratio $\left(\frac{U_i}{1-U_i}\right)$ is simply the odds ratio in favour of being in food poverty. The logit procedure is a maximum likelihood estimator of a_i and a_0 given the non-linear probability distribution of the random error, ε_i. Given its mathematical convenience and ready availability of computer programs for its operation, the logit model is generally preferred to its rivals such as Probit model (Gujarati and Porter, 2009). The logit model can be applied as a simple approximation to other probability models (Cramer, 1991). The logit model is known to produce statistically sound results. By allowing for the transformation of a dichotomous dependent variable to a continuous variable ranging from $-\infty$ to $+\infty$, the problem of out of range estimates is avoided (Green, 2003;Gujarati and Porter, 2009). The logit model is known to produce results that can be easily interpreted and the method is simple to analyse; in economics applications, it even permits interpretations in utility terms (Cramer, 1991). Furthermore, the logit model gives parameter estimates that are asymptotically efficient, consistent and normal and the analogue of the regression t-test can be applied. Indeed, the logit model is one of the most popular binary response models used in empirical analysis (Horowitz and Savin, 2001).

The logit model for this study is specified explicitly as follows:

$$L_i = \ln\left(\frac{U_i}{1-U_i}\right) = a_0 + a_1SHH + a_2OHU + a_3NAR + a_4AHH + a_5HS + a_6OAL$$
$$+ a_7MH\ a_8EHHa + a_9EHHb + a_{10}EHHd + a_{11}EHHe + a_{12}EHHf$$
$$+ a_{13}RFETE + a_{14}HTa + a_{15}HTb + a_{16}HTc + a_{17}HTd$$
$$+ a_{18}OCCHb + a_{19}OCCHc + a_{20}OCCHd + a_{21}OCCHe$$
$$+ a_{22}OCCHf + a_{23}OCCHg + a_{24}PFH + a_{25}POM + a_{26}ARRM$$
$$+ a_{27}AC + a_{28}PWM + a_{29}PCM + \varepsilon_i \quad \text{---------- 4.21a.}$$

EHHc, HTe and OCCHa are used as base categories.

The variables are defined as[37]:

SHH = Sex of household head (male = 1, female = 0).

OHU = Ownership of housing unit (yes = 1, 0 otherwise).

NAR = Number of adult equivalents per room.

AHH = Age of household head.

HS = Household size.

OAL = Household ownership of agricultural land (yes = 1, 0 otherwise).

MH = Migration (yes = 1, 0 otherwise).

EHHa = Education of household head with respect to no education (yes =1, 0 otherwise).

EHHb = Education of household head with respect to elementary education (yes = 1, 0 otherwise).

EHHc = Education of household head with respect to primary education (yes = 1, 0 otherwise).

EHHd = Education of household head with respect to secondary education (yes = 1, 0 otherwise).

EHHe = Education of household head with respect to tertiary education (yes = 1, 0 otherwise).

EHHf = Education of household head with respect to the category called "others" (yes = 1, 0 otherwise).

RFETE = Ratio of food expenditure of total expenditure (in %).

HTa = Household type with respect to monogamous marriage (1 if household head is in monogamous marriage and 0 if otherwise).

HTb = Household type with respect to polygamous marriage (1 if household head is in polygamous marriage and 0 if otherwise).

HTc = Household type with respect to widowhood (1 if household head is widowed and 0 if otherwise).

HTd = Household type with respect to never married (1 if household head is never married and 0 if otherwise).

[37] See Appendix D for clarifications of some of the variables

HTe = Household type with respect to informal union, divorced or separated (1 if household head is in informal union, or divorced or separated with spouse and 0 if otherwise).

OCCHa = Occupation of household head with respect to student, retired, unemployed or inactive group (yes = 1, 0 otherwise).

OCCHb = Occupation of household head with respect to professional or technical group (yes = 1, 0 otherwise).

OCCHc = Occupation of household head with respect to administration and clerical group (yes = 1, 0 otherwise).

OCCHd = Occupation of household head with respect to sales, services and related group (yes = 1, 0 otherwise).

OCCHe = Occupation of household head with respect to agriculture or forestry group (yes = 1, 0 otherwise).

OCCHf = Occupation of household head with respect to production, transport, manufacturing and processing group (yes = 1, 0 otherwise).

OCCHg = Occupation of household head with respect to the category called "others" (yes = 1, 0 otherwise).

PFH = Proportion of females in the household.

POM = Proportion of household members that are more than 60 years old.

ARRM = Access to regular remittances (yes = 1, 0 otherwise).

AC = Access to credit (yes = 1, 0 otherwise).

PWM = Proportion of working members in the household.

PCM = Proportion of household members that are between 0 and 15years old.

The priori expectations are as follows:

a_2, a_6, a_9, a_{10}, a_{11}, a_{12}, a_{13}, a_{18}, a_{26}, a_{27} and $a_{28} < 0$; a_0, a_3, a_5, a_8, a_{25} and $a_{29} > 0$; a_1, a_4, a_7, a_{14}, a_{15}, a_{16}, a_{17}, a_{19}, a_{20}, a_{21}, a_{22}, a_{23} and $a_{24} <$ or > 0.

Our methodology for achieving our third objective, which is estimating household vulnerability to food poverty, is drawn from Chaudhuri (2000), Chaudhuri and Datt (2001), Chaudhuri et al. (2002), Tesliuc and Lindert (2002) and Chaudhuri (2003). The vulnerability level of a household h at time t, as stated earlier, is conceptualised as the probability that the household will find itself to be food consumption poor at time t + 1.

The level and variability of a household's future food consumption depend on many factors. These include its wealth/assets, its current income, its life time prospects or expectations about future income, the uncertainty it faces regarding its future income and its ability to smooth food consumption in the event of various shocks including income shocks. Each of these will, in turn, depend on a variety of household characteristics - those that are observable and possibly some that are not - as well as a number of characteristics of the aggregate environment (socio-political, macroeconomic and microeconomic) in which the household finds itself.

To estimate vulnerability to food poverty from a single cross –sectional (survey) data, we have to make some fairly stringent assumptions regarding the stochastic process generating food consumption. We should start by assuming that the stochastic process generating the food consumption of a household, h is given by:

$$\ln fc_h = \beta G_h + E_h \quad \text{---------- 4.22}$$

Where: fc_h is household annual food consumption expenditure, ln stands for natural logarithm; G_h stands for a bundle of observable household characteristics including some special shock dummy and trend variables shown as follows: SHH, OHU, ASW, NAR, CSD, AHH, HS, OAL, QF, MH, EHHa, EHHb, EHHc, EHHd, EHHe, TOFA, MRMA, MFM, RFETE, HTa, HTb, HTc, HTd, OCCHa, OCCHb, OCCHc, OCCHd, OCCHe, OCCHf, MSL, PFH, POM, PII, ARRM, AC, PWM, LWA, LWBE and PCM. The variables are as defined previously except for the following:

ASW = Access to source of water in terms of distance to water source (yes = 1, 0 otherwise).

CSD = Household consumption of safe drinking water (yes = 1, 0 otherwise).

QF = Quality of fuel used by household for cooking (1 for high quality and 0 otherwise).

TOFA = Quality of toilet facility (1 for high quality and 0 otherwise).

MRMA = Main roofing material (1 for high quality and 0 otherwise).

MFM = Main flooring material (1 for high quality and 0 otherwise).

MSL = Main source of lighting (1 for high quality and 0 otherwise).

PII = Prevalence of illness or injury.

LWA = Loss of welfare due to lack of access to agricultural inputs (yes = 1, 0 otherwise)

LWBE = Loss of welfare due to poor business and/or economic condition (yes = 1,0 otherwise).

β is a vector of parameters and E_h is a mean-zero disturbance term that captures idiosyncratic factors (shocks) that contribute to different per adult equivalent food consumption levels for households that are otherwise observationally equivalent. It is assumed that idiosyncratic shocks to food consumption are identically and independently distributed over time for each household and that the structure of the economy is relatively stable over time. These assumptions are necessary to facilitate the estimation of household vulnerability to food poverty from a single cross-sectional data.

Furthermore, we assume that the variance of E_h is given by:

$\Phi^2_{E,h}=\omega G_h$ ---------- 4.23

We estimate β and ω in 4.22 and 4.23 respectively using a three-step Feasible Generalized Least Squares (FGLS) procedure suggested by Amemiya (1977). First we estimate 4.22 using the Ordinary Least Squares (OLS) procedure. Next we use the estimated residuals from the equation 4.22 to estimate equation 4.24

$\hat{E}^2_{OLS,h}= \omega G_h+r_h$, using OLS ----------4.24

Where r_h is the random error term.

The predictions from this equation are used to transform the equation as follows:

$$\frac{\hat{E}^2_{OLS,h}}{\hat{\omega} G_{h,OLS}} =\omega(\frac{G_h}{\hat{\omega} G_{h,OLS}})+\frac{r_h}{\hat{\omega} G_{h,OLS}} \quad \text{---------- 4.25}$$

The transformed equation is estimated using OLS to obtain an asymptotically efficient FGLS estimate, $\hat{\omega}_{FGLS}$. Note that $G_h \hat{\omega}_{FGLS}$ is a consistent estimate of $\Phi^2_{E,h}$, the variance of the idiosyncratic component of household food consumption.

The estimates $\hat{\Phi}_{E,h} = \sqrt{G_h \hat{\omega}_{FGLS}}$ ----------4.26 are then used to transform equation 4.22 as follows:

$$\frac{\ln fc_h}{\hat{\Phi}_{E,h}} =\beta(\frac{G_h}{\hat{\Phi}_{E,h}})+\frac{E_h}{\hat{\Phi}_{E,h}} \quad \text{----------} \quad 4.27$$

Then the third stage is to estimate equation 4.27. The result yields a consistent and asymptotically efficient FGLS estimate of β. The standard error of the estimated

coefficient, $\hat{\beta}_{FGLS}$, can be obtained by dividing the reported standard error by the standard error of the regression.

Using the estimates $\hat{\beta}$ and $\hat{\omega}$ that are obtained through the FGLS method we are able to directly estimate expected log of food consumption:

$\hat{E}x\ [\ln fc_h|G_h] = \hat{\beta}\, G_h$ ---------- 4.28; and the variance of log of food consumption:

$\hat{V}\ [\ln fc_h|G_h] = \hat{\Phi}^2_{E,h} = \hat{\omega}\, G_h$ ---------- 4.29 for each household, h. By assuming that food consumption is log-normally distributed, we are able to use these estimates to form an estimate of the probability that a household with the characteristics G_h will be food poor at a future date, that is to estimate the household's vulnerability level. Letting ¥(.) denote the cumulative density of the standard normal distribution, the estimated probability is given as:

$$\hat{Vul}fp_h = \hat{P}_r\,(\ln fc_h < \ln Z_f | G_h) = ¥\left(\frac{\ln Z_f - \hat{\beta}\, G_h}{\sqrt{\hat{\omega}\, G_h}}\right) \text{---------- 4.30}$$

Even though the foregoing is evidently not able to capture the impact of inter-temporal or aggregate shocks but it provides reliable estimates of household vulnerability to food poverty from a single cross-sectional data.

Next, we have to differentiate between those who are vulnerable to food poverty and those who are not. This involves choosing a level of vulnerability to food poverty as the threshold such that a household is considered as vulnerable to food poverty if its vulnerability level is greater than or equal to it. In this study we have chosen a vulnerability to food poverty threshold of 0.5. Thus any household whose estimated probability level of falling into food poverty is greater than or equal to 0.5 (or 50%) is said to be vulnerable to food poverty. The vulnerability threshold of 0.5 has been used by previous studies by Alayande and Alayande, 2004; Albert et al., 2007; Oni and Yusuf, 2008. The threshold is consistent with the conceptualisation of vulnerability by Pritchett et al. (2000) that a household is considered to be vulnerable to poverty if it has 50 – 50 odds or worse of falling into poverty. Indeed, as noted by Chaudhuri and Datt (2001) and Chaudhuri et al. (2002), the focal quality of the vulnerability to poverty threshold of 0.5 is suggested by the fact that a household whose vulnerability to poverty level exceeds (or

is equal to) 0.5 is more likely than not to end up being poor and thus can be considered as highly vulnerable to poverty.

4.3 Sources of Data

The main data set for this study – the Nigeria Living Standard Survey (NLSS) 2004 data set is obtained from the National Bureau of Statistics (NBS). The NLSS data set contains data on all the variables used in our analyses of food poverty and vulnerability to food poverty. Some other data used in the introduction and background of the study were obtained from the Food and Agriculture Organization (FAO), the World Bank, Central Bank of Nigeria, United Nations Children's Education Fund (UNICEF), and Maziya – Dixon et al. (2004) of the International Institute of Tropical Agriculture (IITA), Ibadan, as well as the National Bureau of Statistics.

CHAPTER 5

EMPIRICAL ANALYSIS

5.1 Food Consumption Baskets and Food Poverty Lines for Various Zones in Nigeria

5.1.1 Food Consumption Baskets for Various Zones in Nigeria

Tables 5.1 to 5.6 show the cheapest food items consumed in the various zones in Nigeria. The food items are included in the baskets because they are found to be among the most common food items consumed in the areas as indicated by their weights. And they are the cheapest as shown by their calories per naira. The tables generally reveal that there are variations in food preferences/food tastes and prices across the various zones in Nigeria. The frequencies of consumption as reflected in the various weights vary. Therefore, to design robust zonal food poverty lines it is necessary to adequately cater for these variations.

Table 5.1 shows that the first of the cheapest food items (in terms of calorie per naira) consumed in South East Urban is Beans Ball (Akara) followed by Moin Moin(Beans Cake), Groundnut (Shelled) and Gari (Yellow) respectively; the last of the cheapest food items consumed in the area is Sweet Potato. The table further indicates that the first of the cheapest food item consumed in South East Rural is Akpu/Fufu followed by Gari (White), Maize Grain (White) and Coconut respectively; the last of the cheapest food items consumed in the area is Melonseed (Shelled).

Table 5.2 indicates that the first of the cheapest food items consumed in South West Urban is Akpu/Fufu followed by Maize Grain (White), Sorghum (Guinea Corn) and Moin Moin respectively; the last of the cheapest food items consumed in the area is Yam Tuber. The table also indicates that the first of the cheapest food items consumed in South West Rural is Gari (White) followed by Akpu/Fufu, Maize Grain (White) and Sorghum (Guinea Corn) respectively; the last of the cheapest food items consumed in the region is Rice (Agric).

Table 5.3 shows that the first of the cheapest food items consumed in South South Urban is Maize Grain (White) followed by Akpu/Fufu, Beans Ball (Akara) and Gari (White) respectively; the last of the cheapest food items consumed in the area is Yam Tuber. The table also reveals that the first of the cheapest food items consumed in South South Rural is Plantain Flour followed by Akpu/Fufu, Moin Moin and Groundnut (Shelled) respectively; the last of the cheapest food items consumed in the territory is Melonseed (Shelled).

Table 5.4 shows that the first of the cheapest food items consumed in North East Urban is Millet (Jero or Maiwa) followed by Sorghum (Guinea Corn), Maize Grain (White) and Maize Paste (White) (Ogi/Akamu) respectively; the last of the cheapest food item consumed in the area is vegetable oil. The table further reveals that the first of the cheapest food items consumed in North East Rural is Sorghum (Guinea Corn) followed by Millet (Jero or Maiwa), Maize Grain (White) and Moin Moin respectively; the last of the cheapest food items consumed in the area is Vegetable Oil.

Table 5.5 indicates that the first of the cheapest food items consumed in North West Urban is Sorghum (Guinea Corn) followed by Millet (Jero or Maiwa), Maize Grain (White) and Groundnut (Shelled) respectively; the last of the cheapest food items consumed in the area is Sweat Potato. The table also indicates that the first of the cheapest food items consumed in North West Rural is Akpu/Fufu followed by Millet (Jero or Maiwa), Sorghum (Guinea Corn) and Maize Grain (White) respectively; the last of the cheapest food items consumed in the territory is Eko(Agidi/Kafa).

Table 5.6 shows that the first of the cheapest food items consumed in North Central Urban is Sorghum (Guinea Corn) followed by Maize Grain (White), Millet (Jero or Maiwa) and Groundnut (Shelled) respectively; the last of the cheapest food items consumed in the region is Melonseed (Shelled). The table also shows that the first of the cheapest food items consumed in North Central Rural is Maize Grain (White) followed by Sorghum (Guinea Corn), Millet (Jero or Maiwa) and Gari (White) respectively; the last of the cheapest food items consumed in the area is Melonseed (Shelled).

Table 5.1: Cheapest Food Items Consumed in South East Urban and Rural

S/N	FOOD ITEMS	WEIGHT	RELATIVE SHARE	CALORIE (PER KG)	PRICE (PER KG)	CALORIE PER NAIRA
URBAN						
1.	Beans Ball(Akara)	3.38	0.0183	6060	64.22	94.36
2.	Moin Moin	5.36	0.0291	6120	71.35	85.77
3.	Groundnut(Shelled)	29.64	0.1607	5950	70.86	83.97
4.	Gari(Yellow)	25.02	0.1357	3840	47.45	80.93
5.	Akpu/Fufu (Uncooked)	7.86	0.0426	3370	46.50	72.47
6.	Maize Paste(White) (Ogi/Akamu)	0.98	0.0053	4140	63.36	65.34
7.	Sorghum(Guinea Corn)	1.83	0.0099	3420	57.36	59.62
8.	Coconut Without Top(Fibrous Shell)	20.11	0.1091	3880	80.47	48.22
9.	Rice(Agric)	25.02	0.1357	3570	89.28	39.99
10.	Palm Oil	4.86	0.0264	8750	227.55	38.45
11.	Cassava Tuber	29.03	0.1574	1490	41.43	35.96
12.	Melon Seed(Shelled)	20.12	0.1091	5180	148.67	34.84
13.	Cabin Biscuits	1.95	0.0106	3670	106.19	34.56
14.	Yam Flour	3.99	0.0216	3350	100.88	33.21
15.	Sweet Potato	5.26	0.0285	1210	37.63	32.16
		184.41	1			
RURAL						
1.	Akpu/Fufu(Uncooked)	7.92	0.0267	3370	30.00	112.33
2.	Gari(White)	81.72	0.2755	3510	39.40	89.09
3.	Maize Grain(White)	26.13	0.0881	3570	48.10	74.22
4.	Coconut Without Top(Fibrous Shell)	12.03	0.0406	3880	54.99	70.56
5.	Sorghum(Guinea Corn)	3.05	0.0103	3420	49.94	68.48
6.	Yam Flour	6.39	0.0215	3350	50.00	67.00
7.	Moin Moin	5.48	0.0185	6120	91.99	66.53
8.	Beans Ball(Akara)	23.18	0.0782	6060	102.51	59.12
9.	Groundnut(Shelled)	12.03	0.0406	5950	119.48	49.80
10.	Rice(Local)	40.33	0.1360	3640	79.64	45.71
11.	Palm Oil	24.6	0.0829	8750	200.42	43.66
12.	Cassava Tuber	18.66	0.0629	1490	38.10	39.11
13.	Sweet Potato	2.74	0.0092	1210	37.38	32.37
14.	Sugar(in Cube)(St.Louis)	5.05	0.0170	3870	143.90	26.89
15.	Melon Seed(Shelled)	27.27	0.0919	5180	210.55	24.60
		296.58	1			

Source: Computed by the Author based on information from the National Bureau of Statistics (NBS) and various Food Composition Tables as well as 2004 prices.

Table 5.2: Cheapest Food Items Consumed in South West Urban and Rural

S/N	FOOD ITEMS	WEIGHT	RELATIVE SHARE	CALORIE (PER KG)	PRICE (PER KG)	CALORIE PER NAIRA
URBAN						
1.	Akpu/Fufu(Uncooked)	29.85	0.0620	3370	15.61	215.89
2.	Maize Grain(White)	27.34	0.0568	3570	35.43	100.76
3..	Sorghum(Guinea Corn)	2.06	0.0043	3420	37.12	92.13
4.	Moin Moin	8.88	0.0185	6120	66.56	91.95
5.	Gari(White)	70.54	0.1466	3510	38.90	90.23
6.	Beans Ball(Akara)	13.18	0.0274	6060	79.01	76.70
7.	Maize Paste(White) (Ogi/Akamu)	13.05	0.0271	4140	60.58	68.34
8.	Coconut Without Top(Fibrous Shell)	6.11	0.0127	3880	58.34	66.51
9.	Groundnut(Shelled)	6.85	0.0142	5950	112.41	52.93
10.	Sweet Potato	4.8	0.0100	1210	25.14	48.13
11.	Yam Flour	84.79	0.1762	3350	72.16	46.42
12.	Rice(Agric)	17.28	0.0359	3570	83.38	42.82
13.	Eko(Agidi/Kafa)	101.18	0.2102	1400	33.11	42.28
14.	Palm Oil	12.76	0.0265	8750	208.37	41.99
15.	Yam Tuber	82.59	0.1716	1120	40.32	27.78
		481.26	1			
RURAL						
1.	Gari(White)	37.16	0.0958	3510	34.99	100.31
2.	Akpu/Fufu(Uncooked)	25.22	0.0651	3370	34.37	98.05
3.	Maize Grain(White)	40.38	0.1042	3570	37.47	95.28
4.	Sorghum(Guinea Corn)	55.51	0.1432	3420	37.65	90.84
5.	Cassava Tuber	22.79	0.0588	1490	17.18	86.73
6.	Maize Paste(White)(Ogi/Akamu)	9.37	0.0242	4140	48.79	84.85
7.	Millet(Jero or Maiwa)	57.36	0.1479	3410	40.42	84.36
8.	Moin Moin	8.93	0.0230	6120	72.88	83.97
9.	Beans Ball(Akara)	8.29	0.0214	6060	84.70	71.55
10.	Coconut Without Top(Fibrous Shell)	7.07	0.0182	3880	60.56	64.07
11.	Groundnut(Shelled)	5.98	0.0154	5950	115.26	51.62
12.	Yam Flour	28.04	0.0723	3350	70.05	47.82
13.	Sweet Potato	14.47	0.0373	1210	28.15	42.98
14.	Palm Oil	16.09	0.0415	8750	224.14	39.04
15.	Rice(Agric)	51.04	0.1316	3570	93.82	38.05
		387.7	1			

Source: Computed by the Author based on information from the National Bureau of Statistics (NBS) and various Food Composition Tables as well as 2004 prices.

Table 5.3: Cheapest Food Items Consumed in South South Urban and Rural

S/N	FOOD ITEMS	WEIGHT	RELATIVE SHARE	CALORIE (PER KG)	PRICE (PER KG)	CALORIE PER NAIRA
URBAN						
1.	Maize Grain(White)	10.61	0.0384	3570	49.21	72.55
2.	Akpu/Fufu(Uncooked)	0.92	0.0033	3370	47.11	71.53
3.	Beans Ball(Akara)	2.82	0.0102	6060	93.06	65.12
4.	Gari(White)	107.82	0.3903	3510	55.49	63.25
5.	Coconut Without Top(Fibrous Shell)	2.97	0.0108	3880	62.07	62.51
6.	Groundnut(Shelled)	2.97	0.0108	5950	107.26	55.47
7.	Cassava Tuber	3.9	0.0141	1490	34.63	43.03
8.	Palm Oil	22.47	0.0813	8750	211.03	41.46
9.	Rice(Agric)	40.46	0.1465	3570	93.44	38.21
10.	Cabin Biscuits	6.07	0.0220	3670	118.69	30.92
11.	Sugar(in Cube)(St.Louis)	4.67	0.0169	3870	151.58	25.53
12.	Eko(Agidi/Kafa)	6.79	0.0246	1400	68.66	20.39
13.	Melon Seed(Shelled)	6.05	0.0219	5180	254.48	20.36
14.	Small Dried Fish	11.51	0.0417	3620	180.84	20.02
15.	Yam Tuber	46.23	0.1673	1120	60.04	18.65
		276.26	1			
RURAL						
1.	Plantain Flour	2.6	0.0066	3400	29.25	116.24
2.	Akpu/Fufu(Uncooked)	89.81	0.2270	3370	43.71	77.10
3.	Moin Moin	2.6	0.0066	6120	80.47	76.05
4.	Groundnut(Shelled)	6.03	0.0152	5950	80.19	74.20
5.	Beans Ball(Akara)	2.86	0.0072	6060	87.93	68.92
6.	Gari(White)	87.37	0.2209	3510	51.94	67.58
7.	Maize Grain(White)	3.77	0.0095	3570	57.93	61.63
8.	Coconut Without Top (Fibrous Shell)	5.62	0.0142	3880	68.01	57.05
9.	Cassava Tuber	38	0.0961	1490	33.46	44.53
10.	Rice(Agric)	36.23	0.0916	3570	86.09	41.47
11.	Palm Oil	18.19	0.0460	8750	217.85	40.17
12.	Eko(Agidi/Kafa)	2.87	0.0073	1400	57.20	24.48
13.	Sweet Potato	5.38	0.0136	1210	55.48	21.81
14.	Yam Tuber	80.3	0.2030	1120	54.97	20.37
15.	Melon Seed(Shelled)	13.96	0.0353	5180	255.74	20.25
		395.59	1			

Source: Computed by the Author based on information from the National Bureau of Statistics (NBS) and various Food Composition Tables as well as 2004 prices.

Table 5.4: Cheapest Food Items Consumed in North East Urban and Rural

S/N	FOOD ITEMS	WEIGHT	RELATIVE SHARE	CALORIE (PER KG)	PRICE (PER KG)	CALORIE PER NAIRA
URBAN						
1.	Millet(Jero or Maiwa)	60.4	0.1241	3410	28.35	120.28
2.	Sorghum(Guinea Corn)	16.72	0.0344	3420	29.41	116.29
3.	Maize Grain(White)	174.19	0.3579	3570	31.27	114.17
4.	Maize Paste (White)(Ogi/Akamu)	1.67	0.0034	4140	48.41	85.52
5.	Groundnut(Shelled)	37.39	0.0768	5950	74.73	79.62
6.	Beans Ball(Akara)	5.34	0.0110	6060	79.51	76.22
7.	Gari(White)	8.65	0.0178	3510	46.68	75.19
8.	Cassava Tuber	3.63	0.0075	1490	28.27	52.71
9.	Coconut Without Top(Fibrous Shell)	37.37	0.0768	3880	77.84	49.85
10.	Rice(Agric)	85.59	0.1759	3570	82.40	43.33
11.	Sweet Potato	1.66	0.0034	1210	29.36	41.21
12.	Palm Oil	31.01	0.0637	8750	225.88	38.74
13.	Sugar(in Cube)(St. Louis)	5.61	0.0115	3870	113.31	34.15
14.	Eko(Agidi/Kafa)	14.67	0.0301	1400	44.64	31.36
15.	Vegetable Oil	2.76	0.0057	8840	292.52	30.22
		486.66	1			
RURAL						
1.	Sorghum(Guinea Corn)	164.78	0.2988	3420	25.48	134.22
2.	Millet(Jero or Maiwa)	188.87	0.3425	3410	27.33	124.77
3.	Maize Grain(White)	91.5	0.1659	3570	29.17	122.39
4.	Moin Moin	0.42	0.0008	6120	73.60	83.15
5.	Gari(White)	6.74	0.0122	3510	47.81	73.42
6.	Beans Ball(Akara)	5.67	0.0103	6060	87.90	68.94
7.	Groundnut(Shelled)	3.84	0.0070	5950	91.23	65.22
8.	Coconut Without Top(Fibrous Shell)	3.99	0.0072	3880	59.58	65.12
9.	Sweet Potato	3.34	0.0061	1210	23.34	51.84
10.	Cassava Tuber	5.28	0.0096	1490	29.76	50.07
11.	Rice(Agric)	47.63	0.0864	3570	90.17	39.59
12.	Cocoyam	0.57	0.0010	1020	27.36	37.28
13.	Palm Oil	12.58	0.0228	8750	251.65	34.77
14.	Eko(Agidi/Kafa)	14.45	0.0262	1400	44.69	31.33
15.	Vegetable Oil	1.84	0.0033	8840	302.83	29.19
		551.5	1			

Source: Computed by the Author based on information from the National Bureau of Statistics (NBS) and various Food Composition Tables as well as 2004 prices.

Table 5.5: Cheapest Food Items Consumed in North West Urban and Rural

S/N	FOOD ITEMS	WEIGHT	RELATIVE SHARE	CALORIE (PER KG)	PRICE (PER KG)	CALORIE PER NAIRA
URBAN						
1.	Sorghum(Guinea Corn)	41.87	0.1163	3420	27.42	124.73
2.	Millet(Jero or Maiwa)	24.41	0.0678	3410	29.44	115.83
3.	Maize Grain(White)	56.92	0.1582	3570	31.41	113.66
4.	Groundnut(Shelled)	7.18	0.0200	5950	65.63	90.66
5.	Maize Paste (White)(Ogi/Akamu)	7.63	0.0212	4140	47.79	86.63
6.	Gari(White)	8.03	0.0223	3510	43.33	81.01
7.	Beans Ball(Akara)	35.77	0.0994	6060	107.13	56.57
8.	Yam Flour	1.48	0.0041	3350	65.19	51.39
9.	Coconut Without Top(Fibrous Shell)	19.22	0.0534	3880	77.04	50.36
10.	Rice(Agric)	109.81	0.3051	3570	79.20	45.08
11.	Palm Oil	21.78	0.0605	8750	219.78	39.81
12.	Eko(Agidi/Kafa)	15.67	0.0435	1400	39.71	35.26
13.	Cassava Tuber	5.62	0.0156	1490	45.84	32.50
14.	Vegetable Oil	1.18	0.0033	8840	273.83	32.28
15.	Sweet Potato	3.3	0.0092	1210	38.28	31.61
		359.87	1			
RURAL						
1.	Akpu/Fufu(Uncooked)	13.79	0.0309	3370	25	134.80
2.	Millet(Jero or Maiwa)	57.36	0.1285	3410	27.62	123.46
3.	Sorghum(Guinea Corn)	201.55	0.4515	3420	27.87	122.71
4.	Maize Grain(White)	51.33	0.1150	3570	31.31	114.02
5.	Maize Paste-White(Ogi/Akamu)	1.87	0.0042	4140	36.48	113.49
6.	Gari(White)	9.81	0.0220	3510	41.15	85.30
7.	Groundnut(Shelled)	5.98	0.0134	5950	80	74.38
8.	Coconut Without Top(Fibrous Shell)	7.07	0.0158	3880	53.46	72.58
9.	Beans Ball(Akara)	13.86	0.0310	6060	100.11	60.53
10.	Cassava Tuber	6.58	0.0147	1490	28.48	52.32
11.	Rice(Agric)	36.66	0.0821	3570	77.80	45.89
12.	Sweet Potato	4.98	0.0112	1210	27.75	43.60
13.	Yam Flour	13.59	0.0304	3350	85.43	39.21
14.	Sour Milk	5.01	0.0112	1220	31.39	38.87
15.	Eko(Agidi/Kafa)	16.99	0.0381	1400	38.53	36.34
		446.43	1			

Source: Computed by the Author based on information from the National Bureau of Statistics (NBS) and various Food Composition Tables as well as 2004 prices.

Table 5.6: Cheapest Food Items Consumed in North Central Urban and Rural

S/N	FOOD ITEMS	WEIGHT	RELATIVE SHARE	CALORIE (PER KG)	PRICE (PER KG)	CALORIE PER NAIRA
URBAN						
1.	Sorghum(Guinea Corn)	37.63	0.0758	3420	27.84	122.84
2.	Maize Grain(White)	73.01	0.1472	3570	30.78	115.98
3.	Millet(Jero or Maiwa)	73.01	0.1472	3410	30.44	112.02
4.	Groundnut(Shelled)	10.02	0.0202	5950	57.44	103.59
5.	Beans Ball(Akara)	64.35	0.1297	6060	75.13	80.66
6.	Gari(White)	4.32	0.0087	3510	44.19	79.43
7.	Cassava Tuber	49.38	0.0995	1490	21.08	70.68
8.	Coconut Without Top(Fibrous Shell)	9.08	0.0183	3880	64.13	60.50
9.	Yam Flour	2.78	0.0056	3350	75.73	44.24
10.	Rice(Agric)	108.88	0.2195	3570	82.63	43.20
11.	Palm Oil	25.71	0.0518	8750	229.20	38.18
12.	Sweet Potato	1.3	0.0026	1210	33.20	36.45
13.	Eko(Agidi/Kafa)	23.34	0.0470	1400	50.65	27.64
14.	Sugar(in Cube)(St.Louis)	3.77	0.0076	3870	150.86	25.65
15.	Melonseed(Shelled)	9.54	0.0192	5180	226.06	22.91
		496.12	1			
RURAL						
1.	Maize Grain(White)	114.01	0.2869	3570	26.50	134.72
2.	Sorghum(Guinea Corn)	29.47	0.0742	3420	29.13	117.40
3.	Millet(Jero or Maiwa)	66.48	0.1673	3410	29.76	114.58
4.	Gari(White)	3.38	0.0085	3510	39.32	89.27
5.	Groundnut(Shelled)	10.44	0.0263	5950	67.93	87.59
6.	Beans Ball(Akara)	4.85	0.0122	6060	85.96	70.50
7.	Coconut Without Top(Fibrous Shell)	9.46	0.0238	3880	64.90	59.78
8.	Yam Flour	11.91	0.0300	3350	58.38	57.38
9.	Cassava Tuber	26.99	0.0679	1490	33.73	44.17
10.	Rice(Agric)	74.55	0.1876	3570	87.51	40.80
11.	Sweet Potato	3.16	0.0080	1210	32.06	37.74
12.	Cocoyam	14.74	0.0371	1020	28.46	35.84
13.	Palm Oil	13.09	0.0329	8750	249.72	35.04
14.	Sour Milk	4.86	0.0122	1220	38.83	31.42
15.	Melonseed(Shelled)	9.94	0.0250	5180	170.54	30.37
		397.33	1			

Source: Computed by the Author based on information from the National Bureau of Statistics (NBS) and various Food Composition Tables as well as 2004 prices.

A careful observation of Tables 5.1 to 5.6 would reveal that, in general, the highest ranking cheapest food items consumed in the southern zones of Nigeria are Akpu/Fufu, Maize Grain (White), Gari (White), Beans Ball (Akara) and Plaintain Flour. In the northern zones of the country, the highest ranking cheapest food items consumed are, in general, Sorghum (Guinea Corn), Millet (Jero or Maiwa), Maize Grain and Akpu/Fufu.

5.1.2 Food Poverty Lines by Zone in Nigeria

Table 5.7 shows our zonal food poverty lines for the various geo-political zones in Nigeria. The zonal food poverty lines are zonal annual household per adult equivalent least-cost food expenditures, after accounting for calorie losses during food preparation and plate waste (by multiplying total annual least-cost food expenditures by a factor of 1.1) and after catering for economies of scale in household food consumption, using the representative household.

As can be seen from Table 5.7, food poverty lines vary across the zones and between the urban and rural sectors. This provides justification for the use of zone-specific food poverty lines. Suffice it to say that the use of a single food poverty line for all the zones would have led to underestimation of food poverty in some of the zones and overestimation in some others. The food poverty lines for the urban areas are higher than those of the rural areas in all the zones. The food poverty lines for the southern zones are generally higher than the food poverty lines for the northern zones. When only the urban food poverty lines are considered, South South zone has the highest urban food poverty line followed by South East zone and South West zone respectively whereas North East zone has the lowest urban food poverty line. If we consider only the rural food poverty lines we will observe that South South zone has the highest rural food poverty line followed by South East zone and North Central zone respectively while North East zone has the lowest rural food poverty line. If we consider both urban and rural food poverty lines we will observe that South South Urban has the highest food poverty line in Nigeria followed by South South Rural, South East Urban and South West Urban respectively. North East Rural has the lowest food poverty line followed by North West Rural, North East Urban and South West Rural respectively.

Table 5.7: Food Poverty Lines for the Various Geo-political Zones (Urban/Rural) in Nigeria

Zone	Urban	Rural
South East	₦19,745.34	₦18,277.92
South West	₦19,654.87	₦14,401.92
South South	₦26,862.36	₦24,097.14
North East	₦14,152.27	₦10,509.39
North West	₦16,199.87	₦11,092.18
North Central	₦15,579.68	₦14,576.76

Source: Computed by the Author Note: The food poverty lines are based on 2004 prices.

The food poverty lines are a reflection of the costs of living with respect to food consumption in the various zones. Generally, the costs of living with respect to food consumption are higher in the urban areas than in the rural areas. The costs of living with respect to food consumption are generally higher in the southern zones than in the northern zones. Specifically, the table implies that the cost of living with respect to food consumption is highest in South South Urban followed by South South Rural, South East Urban and South West Urban respectively; the cost of living with respect to food consumption is least in North East Rural followed by North West Rural, North East Urban and South West Rural respectively.

5.2 Incidence, Depth and Severity of Food Poverty for Nigeria and by Zone (Urban/Rural) and Sector

Table 5.8 shows that the food poverty incidence for Nigeria is 50.23%. This implies that food poverty is highly pronounced in the country. The food poverty depth and severity for the country are 0.2277 and 0.1447 respectively. Food poverty incidence, depth and severity are higher in the urban sector than in the rural sector. This is attributable to the fact that food is produced mainly in the rural areas, and food prices are generally lower in the rural areas than in the urban areas.

Table 5.8 also shows that South South Rural has the highest incidence of food poverty in Nigeria followed by South South Urban, North Central Urban and South West Urban respectively; South East Urban has the lowest incidence of food poverty. Thus food poverty is most pronounced in South South Rural and least pronounced in South East Urban. North Central Urban has the highest depth and severity of food poverty followed by South West Urban, North Central Rural and South South Rural respectively; South East Rural has the lowest depth and severity of food poverty. Thus it would be easiest to lift the average food poor person in South East Rural out of food poverty and hardest to do so in North Central Urban. Similarly, the distribution of food expenditure among the food poor is worst in North Central Urban and best in South East Rural.

Table 5.8: Food Poverty Headcount, Gap and Severity for Nigeria and by Zone(Urban/Rural) and Sector, based on Zonal Food Poverty lines.

ZONE/SECTOR/ NIGERIA	Food Poverty Headcount (in %)	F-statistic/t-statistic for Equality of Means with respect to Headcount	Food Poverty Gap	F-statistic/t-statistic for Equality of Means with respect to Gap	Food Poverty Severity	F-statistic/t-statistic for Equality of Means with respect to Severity
South East Urban	25.5	672,546.1*	0.1043	1,204,957*	0.0630	1,428,599*
South West Urban	60.9	(F-statistic)	0.3657	(F-statistic)	0.2836	(F-statistic)
South South Urban	62.6		0.2582		0.1461	
North East Urban	47.3		0.1601		0.0838	
North West Urban	41.7		0.1631		0.0898	
North Central Urban	61.8		0.3823		0.2956	
South East Rural	29.3		0.1017		0.0497	
South West Rural	32.3		0.1249		0.0716	
South South Rural	63.5		0.2704		0.1519	
North East Rural	47.2		0.1682		0.0830	
North West Rural	46.4		0.1675		0.0859	
North Central Rural	59.4		0.3026		0.2045	
Urban	53.11	575.3*	0.2703	1,367.3*	0.1894	1,692.98*
Rural	47.96	(t-statistic)	0.1941	(t-statistic)	0.1095	(t-statistic)
Nigeria	50.23		0.2277		0.1447	

Source: Computed by the Author using NLSS 2004. *Statistically significant at 1%. Equal variances are not assumed for the t-statistics.

With respect to tests of statistical significance, the table shows that there are significant differences in food poverty indices (Headcount, Gap and Severity) across the various zones (by urban/rural) and between the urban and rural sectors. These are shown by the values of the various F-statistics and t-statistics for equality of means which are all statistically significant at 1%.

Table 5.9 shows that the South South geo-political zone has the highest incidence of food poverty in Nigeria followed by North Central zone and South West zone respectively; South East zone has the lowest incidence of food poverty in the country. Thus, food poverty is most pronounced in the South South zone and least pronounced in the South East zone. The foregoing is in sharp contrast with the estimates of the National Bureau of Statistics (NBS) which are based on a single food poverty line. The estimates of the NBS show that extreme poverty is highest in North East zone followed by North Central zone and North West zone respectively whereas it is lowest in South East zone followed by South West zone and South South zone respectively. As the foregoing shows, with respect to South East zone, both the estimates of this study and those of the NBS show that the zone has the lowest food/extreme poverty incidence.

As further shown in Table 5.9, North Central zone has the highest depth of food poverty followed by South West zone and South South zone respectively; South East zone has the lowest depth of food poverty in the country. Food poverty severity is highest in South West zone followed by North Central zone and South South zone respectively; South East zone has the lowest food poverty severity. Coming to tests of statistical significance, the table shows that there are significant differences in food poverty indices (Headcount, Gap and Severity) across the various zones. These are shown by the values of the various F-statistics for equality of means which are all statistically significant at 1%.

Also, Table 5.9 shows that male-headed households have higher food poverty incidence than female-headed households. This is consistent with the evidences from earlier studies that show that poverty is more pronounced among male-headed households in Nigeria (see FOS, 1999a; Canagarajah et al., 1997; Aigbokhan, 2000b). However, female-headed households have higher food poverty gap and severity than male-headed households. With respect to tests of statistical significance, the table

indicates that there are significant differences in food poverty indices between male-headed households and female-headed households. These are shown by the values of the various t-statistics for equality of means which are all statistically significant at 1%. Figures 5.1a and 5.1b show that food poverty incidence by gender of household head varies across zones. For the urban sector, male-headed households have higher food poverty incidence than female-headed households in South West and South South zones whereas the reverse is the case in South East, North East, North West and North Central zones. South South zone has the highest food poverty incidence among male-headed households while South East zone has the lowest. North Central zone has the highest food poverty incidence among female-headed households whereas South East zone has the lowest. For the rural sector, South South zone also has the highest food poverty incidence among male-headed households while South East zone also has the lowest. North Central zone has the highest food poverty incidence among female-headed households while North West zone has the lowest.

Table 5.9 further shows that food poverty incidence in Nigeria is most pronounced among households whose heads have only elementary education followed by households whose heads have no education. It is least pronounced among households whose heads have tertiary education. Previous studies also show that poverty is most pronounced among households whose heads have low and no education whereas it is least pronounced among households whose heads have tertiary/post-secondary education (see FOS 1999a; Canagarajah et al., 1997; NBS, 2005b). Food poverty depth and severity, on aggregate, are most pronounced among households whose heads have only elementary education and least pronounced among households with heads whose educational levels are classified as "others". Coming to tests of statistical significance, the table indicates that there are significant differences in food poverty indices across various households whose heads have various educational levels. These are shown by the values of the various F-statistics for equality of means which are all statistically significant at 1%.

Figures 5.2a and 5.2b show that food poverty incidence by education of household head varies across zones. For instance, for the urban sector, households whose heads have tertiary education have the least food poverty incidence in South West, North East, North West and North Central zones. But in South East zone, food poverty incidence is least pronounced among households whose heads have only primary education and in South South zone it is least pronounced among households whose heads have educational levels that are classified as others. For the rural sector, households with tertiary education have the least food poverty incidence only in South South, North East and North West zones. In South East zone, food poverty incidence is least pronounced among households whose heads have secondary education; in South West zone, it is least pronounced among households whose heads have only primary education; and in North Central zone, it is least pronounced among households whose heads have educational levels that are classified as "others".

Table 5.9: Food Poverty Headcount, Gap and Severity by Zone, Gender and Educational Level of Household Head in Nigeria, based on Zonal Food Poverty Lines

	Food Poverty Headcount (in %)	F-statistic/t-statistic for Equality of Means with respect to Headcount	Food Poverty Gap	F-statistic/t-statistic for Equality of Means with respect to Gap	Food Poverty Severity	F-statistic/t-statistic for Equality of Means with respect to Severity
ZONE						
South East	28.34	1,198,824*	0.1024	2,046,274*	0.0530	2,398,270*
South West	55.88	(F-statistic)	0.3234	(F-statistic)	0.2464	(F-statistic)
South South	63.20		0.2660		0.1498	
North East	47.24		0.1654		0.0833	
North West	44.58		0.1658		0.0874	
North Central	60.29		0.3314		0.2375	
SEX OF HOUSEHOLD HEAD						
Male	50.47	158.1*	0.2264	-131.7*	0.1425	-256.2*
Female	48.17	(t-statistic)	0.2389		0.1634	(t-statistic)
EDUCATIONAL LEVEL OF HOUSEHOLD HEAD						
No Education	53.10	123,519.2*	0.2266	39,000.8*	0.1340	96,016.5*
Elementary Education	61.24	(F-statistic)	0.3101		0.2087	(F-statistic)
Primary Education	48.92		0.2319		0.1470	
Secondary Education	49.72		0.2333		0.1531	
Tertiary Education	41.04		0.2275		0.1746	
Others	49.0		0.2045		0.1226	

Source: Computed by the Author using NLSS 2004. *Statistically significant at 1%. Equal variances are not assumed for the t-statistics.

Figure 5.1a: Zonal Poverty Incidence (%) by Gender of Household Head (Urban) [2004]

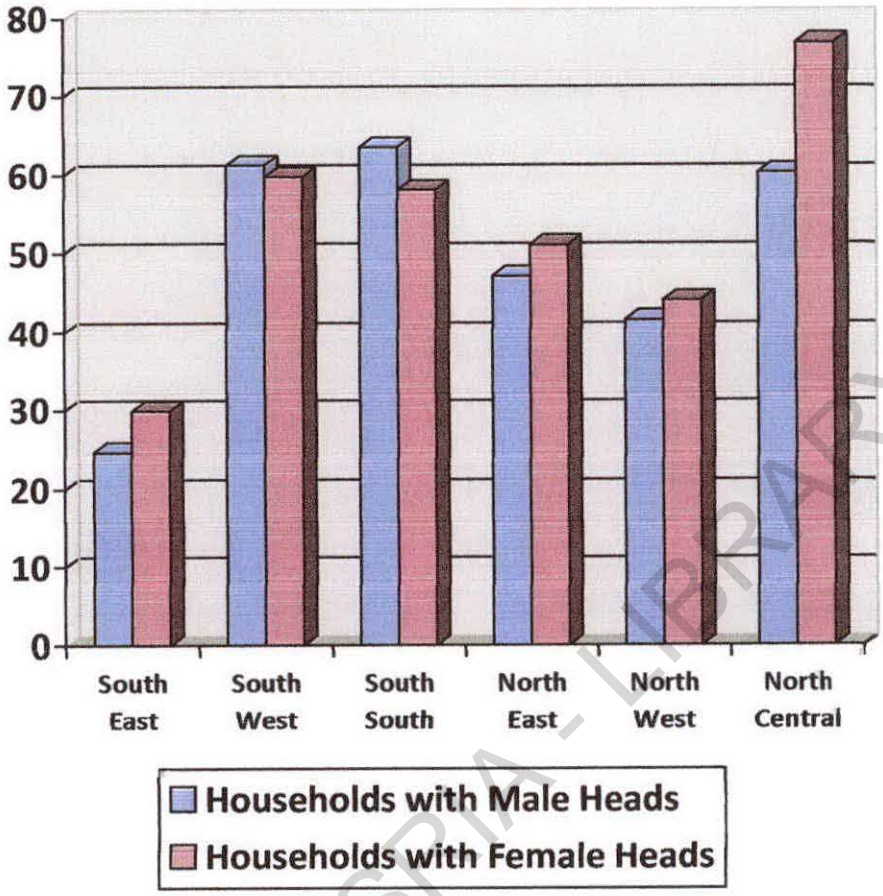


Figure 5.1b: Zonal Poverty Incidence (%) by Gender of Household Head (Rural) [2004]

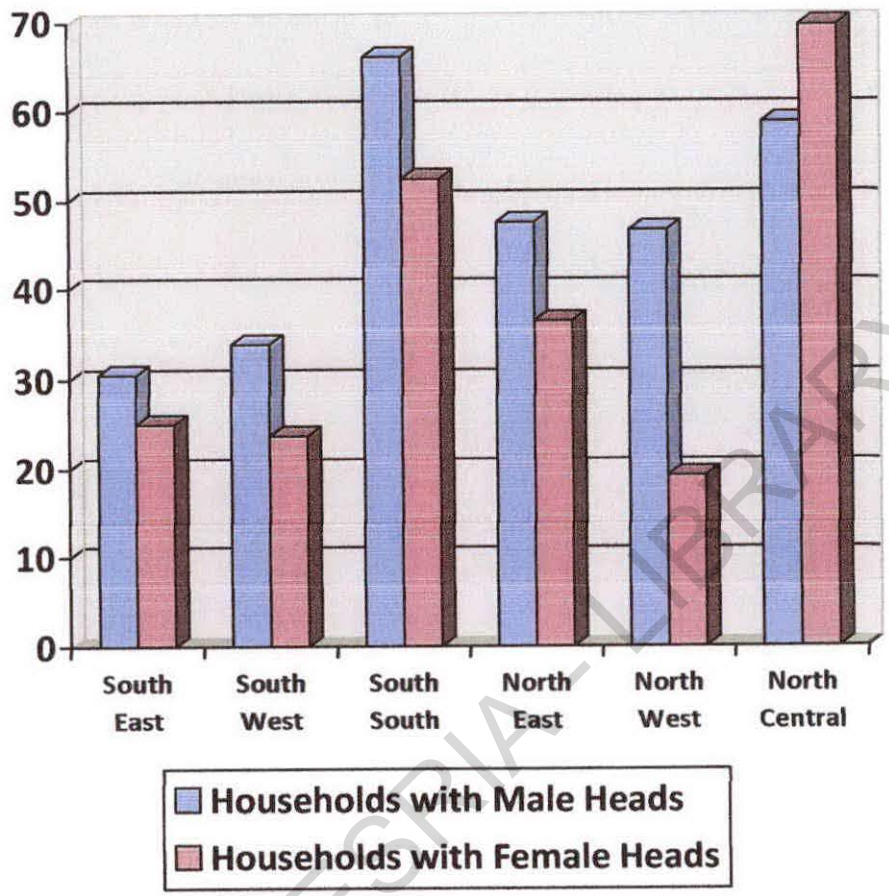


Figure 5.2a: Zonal Poverty Incidence (%) by Education of Household Head (Urban) [2004]

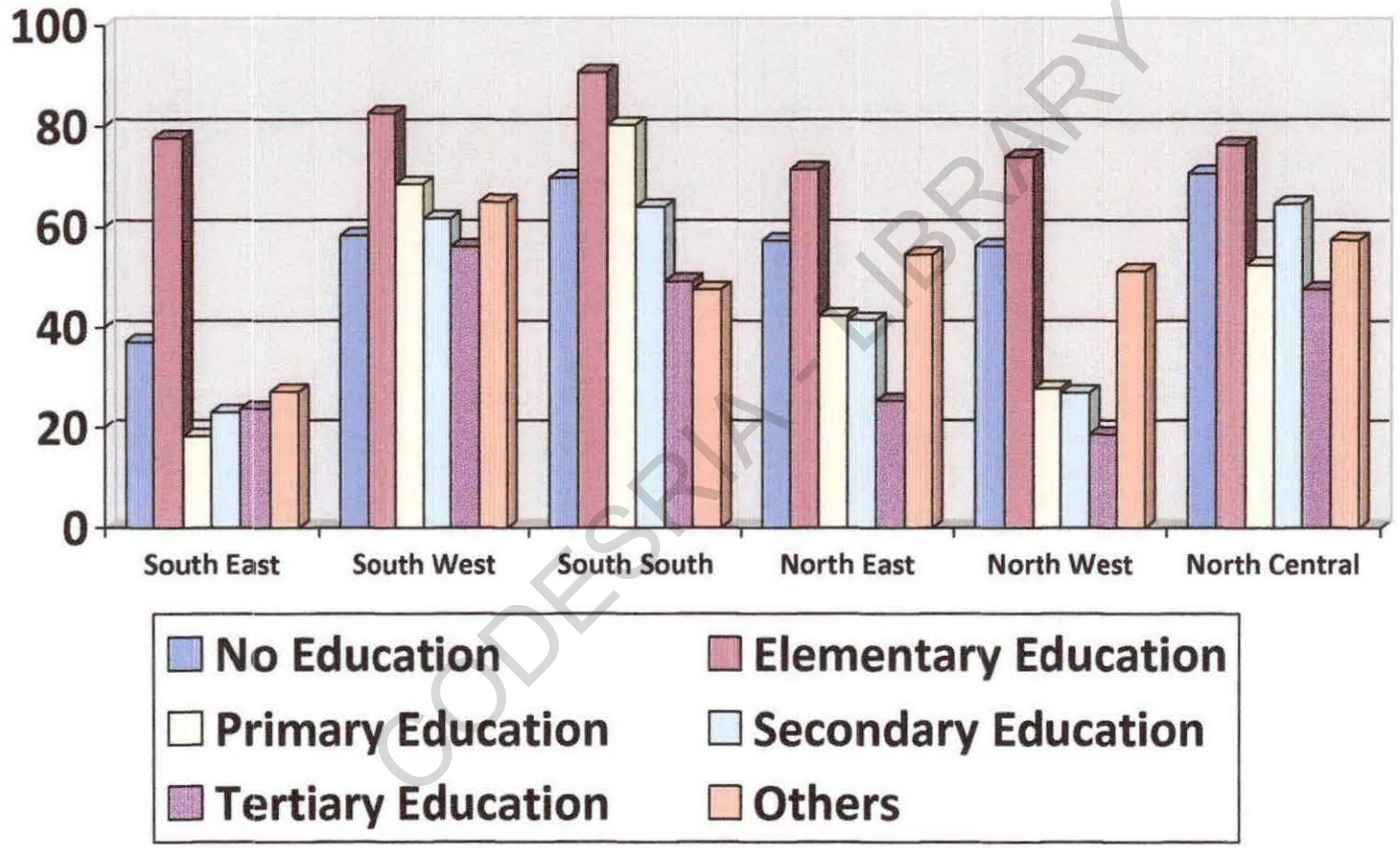


Figure 5.2b: Zonal Poverty Incidence (%) by Education of Household Head (Rural) [2004]

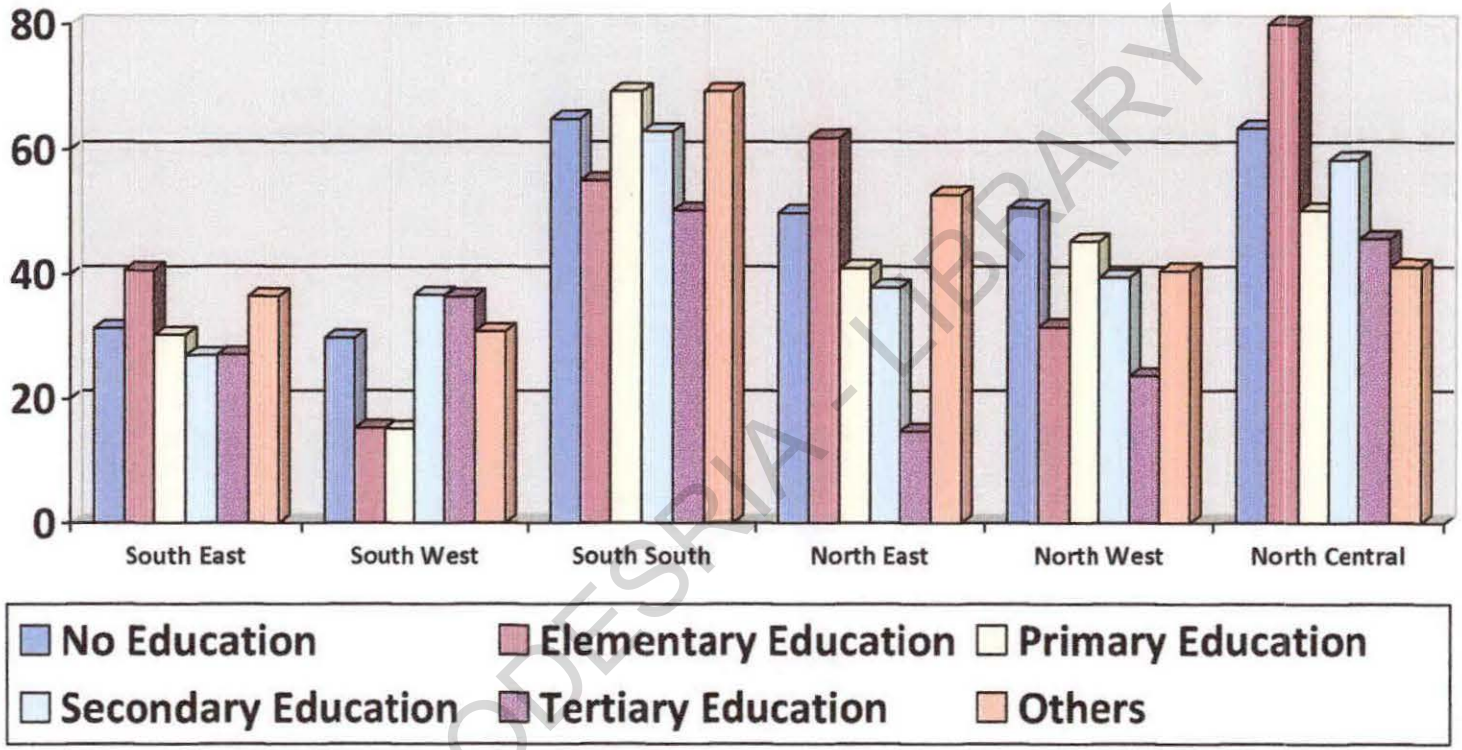


Table 5.10 shows that households whose heads are in polygamous marriage have the highest food poverty incidence followed by those in informal union and those that are widowed respectively; households whose heads are never married have the lowest incidence of food poverty. Households whose heads are in informal union have the highest depth of food poverty followed by those that are divorced and those that are in polygamous marriage respectively; households whose heads are never married have the lowest depth of food poverty. Households whose heads are in informal union have the highest food poverty severity followed by those that are divorced and those that are separated respectively; households whose heads are in monogamous marriage have the least food poverty severity. Coming to tests of statistical significance, the table shows that there are significant differences in food poverty indices across various households with diverse marital status. These are shown by the values of the various F-statistics for equality of means which are all statistically significant at 1%.

Also, Table 5.10 shows that households whose heads are in administration have the highest food poverty incidence,depth and severity followed by those in services and related group and those that are students, retired, unemployed or inactive respectively. Households whose heads are in professional or technical group have the lowest food poverty incidence whereas households whose heads are in agriculture and forestry group have the lowest depth and severity of food poverty. As regards tests of statistical significance, the table indicates that there are significant differences in food poverty indices across various households whose heads are in diverse occupations. These are shown by the values of the various F-statistics for equality of means which are all statistically significant at 1%.

Table 5.10 further shows that households whose heads are in the age group 55 – 64years have the highest food poverty incidence followed by households whose heads are 75years and above and households whose heads are 65-74years respectively; households whose heads are in the age group 15 – 24years have the lowest food poverty incidence. Households whose heads are 75years and above have the highest depth and severity of food poverty followed by households whose heads are in the age group 55 – 64years and households whose heads are in the age group 65-74years respectively; households whose heads are in the age group 25 – 34years have the lowest depth and severity of food poverty. With respect to tests of statistical significance, the table indicates that there are significant differences in food poverty indices across various households whose heads are in diverse age groups. These are

shown by the values of the various F-statistics for equality of means which are all statistically significant at 1%.

As further shown in Table 5.10, food poverty incidence in Nigeria varies directly with household size. This is consistent with estimates from earlier studies on poverty in Nigeria (see FOS, 1999a; NBS, 2005b). On aggregate, households with only 1 person have the lowest food poverty incidence while households that have more than 20 persons have the highest food poverty incidence. Households that have 1 person have the lowest depth of food poverty followed by households that have 2 – 4 persons and households that have 5 – 9persons respectively; households that have 10 – 20 persons have the highest depth of food poverty. Households that have 2 – 4persons have the lowest food poverty severity followed by households that have only 1 persons and households that have 5 – 9 persons respectively; households that have 10 – 20 persons have the highest food poverty severity. With regard to tests of statistical significance, the table indicates that there are significant differences in food poverty indices across various households with different sizes. These are shown by the values of the various F-statistics for equality of means which are all statistically significant at 1%.

Figures 5.3a and 5.3b show that food poverty incidence by household size varies across zones. However, for the urban sector, food poverty incidence varies directly with household size in all the zones except in South East and North West zones. And for the rural sector, food poverty incidence varies directly with household size in all the zones except in North West zone.

Table 5.10: Food Poverty in Nigeria by Marital Status, Occupation, Age Group of Household Head and Household Size

	Food Poverty Headcount (in %)	F-statistic for Equality of Means with respect to Headcount	Food Poverty Gap	F-statistic for Equality of Means with respect to Gap	Food Poverty Severity	F-statistic for Equality of Means with respect to Severity
MARITAL STATUS OF HOUSEHOLD HEAD						
Monogamous Marriage	48.16	225,636.5*	0.2164	80,550.96*	0.1383	34,445.9*
Polygamous Marriage	59.13		0.2584		0.1524	
Informal Union	53.50		0.2762		0.1873	
Divorced	47.19		0.2609		0.1841	
Separated	47.15		0.2472		0.1790	
Widowed	48.47		0.2397		0.1642	
Never Married	34.16		0.1887		0.1439	
OCCUPATION OF HOUSEHOLD HEAD						
Students Retired, Unemployed or Inactive	55.22	24,045.7*	0.2725	194,193.7*	0.1921	359,821.8*
Professional or Technical	46.61		0.2436		0.1737	
Administration	58.55		0.4940		0.4492	
Clerical	51.20		0.2518		0.1766	
Sales and Related	51.62		0.2556		0.1753	
Services and Related	56.13		0.2866		0.1959	
Agriculture and Forestry	49.28		0.1974		0.1096	
Production and Transport	49.95		0.2278		0.1446	
Manufacturing and Processing	51.75		0.2599		0.1840	
Others	51.92		0.2565		0.1782	
AGE GROUP OF HOUSEHOLD HEAD						
		288,173.1*		226,671.4*		132,332.0*
15 – 24years	34.32		0.1837		0.1417	
25 – 34years	36.63		0.1593		0.1016	
35 – 44years	46.69		0.2028		0.1270	
45 – 54years	52.93		0.2382		0.1526	
55 – 64years	57.17		0.2662		0.1669	
65 – 74years	53.77		0.2548		0.1622	
75 years and above	54.13		0.2674		0.1758	
HOUSEHOLD SIZE						
1 person	26.08	1,869,673.9	0.1574	867,266.3*	0.1256	306,133.1*
2 – 4persons	34.52	*	0.1585		0.1076	
5 – 9 persons	53.51		0.2408		0.1523	
10 – 20 persons	68.01		0.3069		0.1820	
Above 20 persons	82.93		0.2575		0.1534	

Source: Computed by the Author using NLSS 2004. *Statistically significant at 1%.

Figure 5.3a: Zonal Poverty Incidence by Household Size (Urban) [2004]

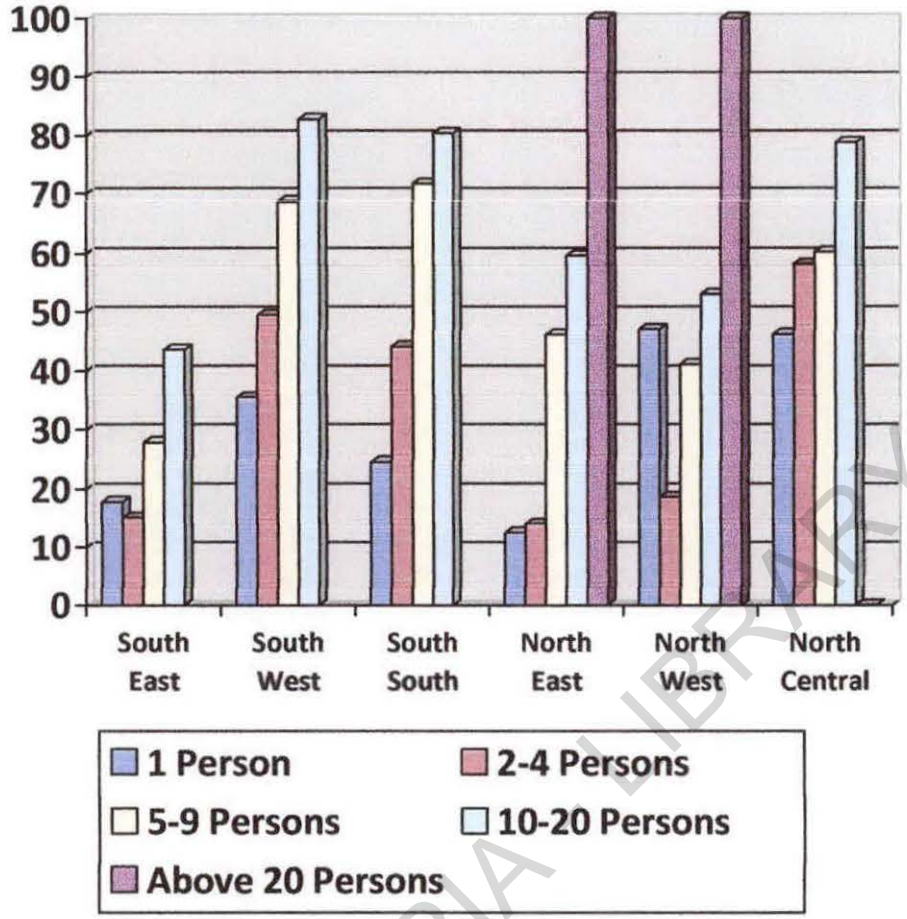
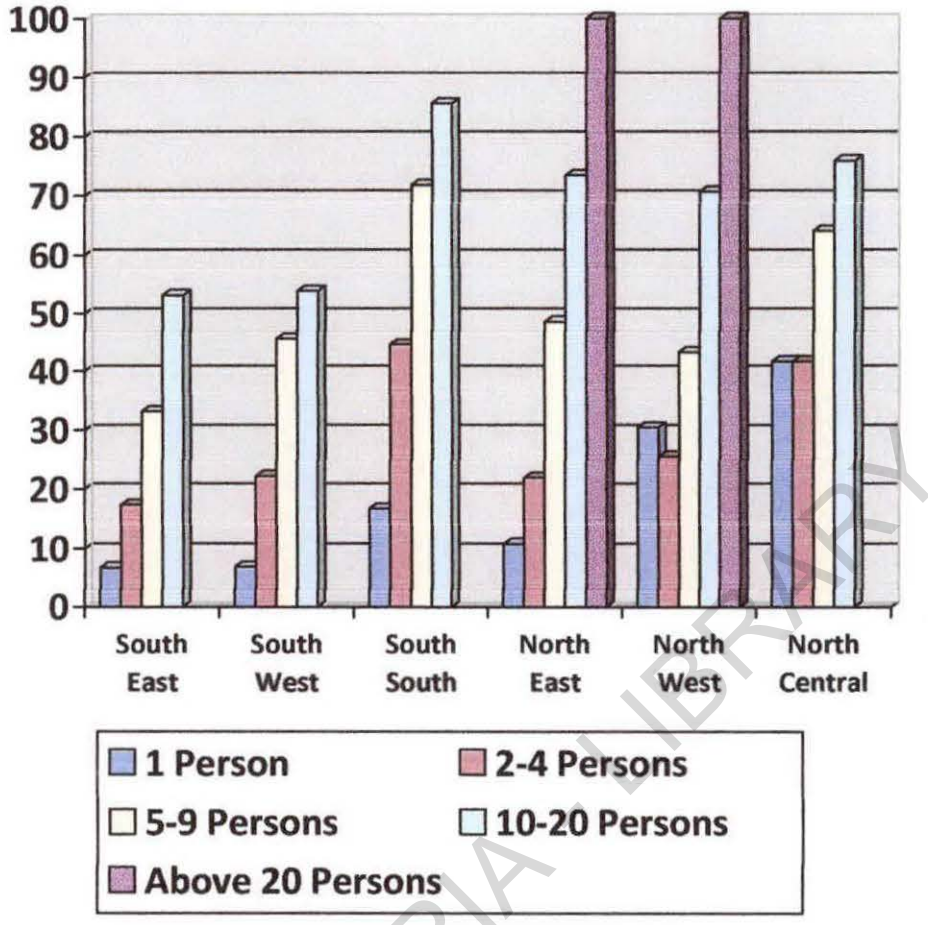


Figure 5.3b: Zonal Poverty Incidence by Household Size (Rural) [2004]



5.3 Determinants of Food Poverty in Nigeria

Tables 5.11 – 5.23 show estimates of determinants of food poverty for Nigeria and for the various zones in the country. The estimates are made using Logistic Regression Technique.

5.3.1 Determinants of Food Poverty for Nigeria as a Whole

Table 5.11 shows estimates of determinants of food poverty for Nigeria. The model is generally robust; all the regressors, on aggregate, have significant impact on food poverty in Nigeria. This is shown by the fact that the likelihood ratio statistic is statistically significant at 1%. Two pseudo R^2 are presented namely the Cox and Snell R^2 and the Nagelkerke R^2; these are measures of goodness of fit; they are 0.233 and 0.311 respectively. However, as noted by Gujarati and Porter (2009), in binary regressand models, goodness of fit is of secondary importance. What matters are the signs of the regression coefficients and their statistical and/or practical significance.

As can be seen from the table, only the parameter estimate associated with never married household type is not statistically significant at either 1% or 5% level of significance; the rest parameter estimates are statistically significant at 1%. Most of the parameter estimates have the expected signs. Some of the variables such as household ownership of housing unit, education of household head with respect to secondary education and proportion of household members that are more than 60years old do not have the expected signs. Male headship of households on the average brings about reduction in the odds in favour of being in food poverty in Nigeria; the odds ratio of 0.887 shows that households with male heads are less likely to be food poor compared to households with female heads; this may be due to the fact that in Nigeria, males, on the average, engage more in productive activities that prevent or mitigate poverty than females. Household ownership of housing unit is directly associated with food poverty in Nigeria; the odds ratio of 1.003 shows that households that own houses in the country, on aggregate, are more likely to be food poor compared to households that do not own houses; this result is puzzling and very hard to explain. Number of adult equivalents per room and household size are directly related to food poverty in Nigeria; this is in line with expectation and it is consistent with some previous studies on poverty such as Allen and Thompson (1990), Omonona (2001), Okurut et al. (2002), and Anyanwu (2005). Age of household head increases the odds in favour of being in food poverty; this implies that households with older

people as heads have higher probability of being in food poverty than households with younger people as heads. Household ownership of agricultural land, on the average, reduces the odds in favour of being in food poverty; this agrees with the results of the study on poverty by Omonona (2001); the odds ratio of 0.780 shows that households that own agricultural lands, on aggregate, are less likely to be food poor compared to households that do not own agricultural lands; this is consistent with expectation. Thus, ownership of agricultural land can pave the way for high level of agricultural production and output at highly reduced cost.

Migration, in general, reduces the odds in favour of being in food poverty in Nigeria; the odds ratio of 0.920 shows that households that migrate are less likely to be food poor compared to households that do not migrate; this implies that people, on the average, migrate to areas in the country where their economic conditions would improve.

Households whose heads have no education generally suffer from food poverty in Nigeria; this is in consonance with the results of a previous study on poverty in Nigeria by Anyanwu (2005); the odds ratio of 1.583 shows that households whose heads have no education are more likely to be in food poverty compared to households whose heads have primary education; this is consistent with expectation. Educational levels of household head with respect to elementary education and secondary education are directly associated with food poverty in Nigeria; this suggests that elementary education and secondary education, on the average, do not bring about reduction in food poverty in the country. The odds ratios of 1.685 and 1.104 for elementary education and secondary education respectively show that households whose heads have elementary education/secondary education are more likely to be food poor compared to households whose heads have primary education. Education of household head with respect to tertiary education reduces the odds in favour of being in food poverty; this agrees with the results of some previous studies on poverty such as Omonona(2001), Okurut et al. (2002) and Anyanwu(2005); this suggests that very high level of education above secondary level, on the average, helps to reduce food poverty in Nigeria; the odds ratio of 0.379 shows that households whose heads have tertiary education, on the average, are less likely to be food poor compared to households whose heads have primary education. Ratio of food expenditure to total expenditure, on the average, brings about reduction in food poverty; this is in line with expectation. Monogamous and polygamous household types increase the odds in

favour of being in food poverty whereas household type associated with widowhood is inversely related with food poverty in the country; this suggests that marriage, on the average, increases the odds in favour of being in food poverty. The odds ratios of 1.092 and 1.063 for monogamous marriage and polygamous marriage respectively show that households whose heads are in monogamous marriage or polygamous marriage are more likely to be food poor compared to households whose heads are in informal union, divorced or separated; and the odds ratio of 0.968 for widowhood shows that households whose heads are widows/widowers are less likely to be food poor compared to households whose heads are in informal union, divorced or separated.

Occupation of household head with respect to professional or technical group reduces the odds in favour of being in food poverty in Nigeria; this is consistent with the findings of a study on poverty by Rodriguez(2002); this implies that technical/professional jobs, on the average, bring about reduction in food poverty; the odds ratio of 0.874 implies that households whose heads are in professional/technical occupations are less likely to be food poor compared to households whose heads are students, retired, unemployed or inactive. Occupation of household head with respect to administration/clerical group reduces the odds in favour of being in food poverty. The odds ratio of 0.962 shows that households whose heads are in administration or clerical occupational group are less likely to be food poor compared to households whose heads are students, retired, unemployed or inactive. Occupation of household head with respect to sales, services or related group is inversely related to food poverty; the odds ratio of 0.916 shows that households whose heads are in sales, services or related occupational group are less likely to be food poor compared to households whose heads are students, retired, unemployed or inactive. Occupation of household heads with respect to agriculture/forestry is directly associated with food poverty; the odds ratio of 1.407 shows that households whose heads are in agriculture/forestry are more likely to be food poor compared to households whose heads are students, retired, unemployed or inactive; this implies that agriculture/forestry is generally not lucrative in Nigeria and is associated with food poverty. Occupation of household heads with respect to production, transport, manufacturing and processing group are inversely related to food poverty; the odds ratio of 0.898 indicates that households whose heads are in production, transport, manufacturing and processing group are less likely to be in food poverty compared to

households whose heads are students, retired, unemployed or inactive. It is instructive to point out here that of all the various occupational groups, the one that has the least odds ratio associated with being is food poverty is professional/technical group.

Proportion of females in the household is inversely related to food poverty in Nigeria; this suggests that females, on the average, contribute more than males to the food needs of households in the country. Proportion of household members that are more than 60years reduces the odds in favour of being in food poverty in Nigeria. This suggests that people that are more than 60 years contribute greatly to the food needs of households in the country. Suffice it to say that the income that comes from accumulated wealth can make old people to be above poverty even though they are not currently economically very active. Access to regular remittances, access to credit and proportion of working members in the household reduce the odds in favour of being in food poverty; these are consistent with expectations. Omonona (2001) found, among other things, that access to remittances and agricultural credit are inversely related to poverty. Proportion of household members that are between 0 and 15years increase the odds of being in food poverty; this is in line with expectation and it agrees with the findings of a study on poverty by Omonona(2001); indeed, high child dependency ratio is expected to be associated with food poverty because children between 0 and 15 years are unproductive and yet take a great proportion of income in terms of food, clothing, healthcare, education and other requirements.The constant term has positive sign and it is statistically significant at 1%.

The foregoing can be detected by looking at the signs of the various estimates and the associated values of Exp (B). Exp (B) is an indicator of the change in odds resulting from a unit change in the predictor or regressor. When Exp (B) is greater than 1 it implies that the associated variable increases the odds in favour of being in food poverty; and when Exp (B) is less than 1 it indicates that the associated variable reduces the odds in favour of being in food poverty.

Table 5.11: Determinants of Food Poverty for Nigeria

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	-0.120*	0.001	0.000	0.887
Ownership of Housing Unit	0.003*	0.001	0.000	1.003
Number of Adult Equivalents per Room	0.035*	0.000	0.000	1.036
Age of Household Head	0.016*	0.000	0.000	1.016
Household Size	0.148*	0.000	0.000	1.159
Household Ownership of Agricultural Land	-0.248*	0.001	0.000	0.780
Migration	-0.084*	0.001	0.000	0.920
Education of Household Head with respect to No Education	0.459*	0.001	0.000	1.583
Education of Household Head with respect to Elementary Education	0.522*	0.002	0.000	1.685
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	0.099*	0.001	0.000	1.104
Education of Household Head with respect to Tertiary Education	-0.970*	0.001	0.000	0.379
Education of Household Head with respect to the category called "Others"	-0.023*	0.001	0.000	0.978
Ratio of Food Expenditure to Total Expenditure	-0.051*	0.000	0.000	0.950
Household Type with respect to Monogamous Marriage	0.088*	0.001	0.000	1.092
Household Type with respect to Polygamous Marriage	0.061*	0.001	0.000	1.063
Household Type with respect to Widowhood	-0.032*	0.001	0.000	0.968
Household Type with respect to Never Married	-0.003α	0.002	0.171	0.997
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	-0.135*	0.001	0.000	0.874
Occupation of Household Head with respect Administration and Clerical Group	-0.039*	0.001	0.000	0.962
Occupation of Household Head with respect to Sales, Services and Related Group	-0.088*	0.001	0.000	0.916
Occupation of Household Head with respect to Agriculture or Forestry Group	0.342*	0.001	0.000	1.407
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	-0.108*	0.001	0.000	0.898
Occupation of Household Head with respect to the category called "Others"	-0.071*	0.001	0.000	0.931
Proportion of Females in the Household	-0.419*	0.001	0.000	0.658
Proportion of Household Members that are more than 60 years old	-1.257*	0.002	0.000	0.284
Access to Regular Remittances	-0.137*	0.001	0.000	0.872
Access to Credit	-0.228*	0.001	0.000	0.796
Proportion of Working Members in the Household	-0.287*	0.001	0.000	0.750
Proportion of Household Members that are between 0 and 15 years	0.476*	0.001	0.000	1.609
Constant	1.220*	0.003	0.000	3.386

Cox & Snell $R^2 = 0.233$; Nagelkerke $R^2 = 0.311$
The likelihood ratio statistic is 33,507,581.

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at 1%. The alpha (α) indicates that the parameter estimate is not statistically significant at either 1% or 5%.

Note: (a) B represents the various parameter estimates; S.E. stands for the standard errors associated with the various parameter estimates; Sig. stands for the significant levels or the probability values of the various parameter estimates; Exp(B) represents the odds ratios associated with the various parameter estimates(these are obtained by taking the natural antilogarithms of the respective parameter estimates)[38]. (b) All the values are approximated to three decimal places.

[38] The Logit becomes negative and increasingly large in magnitude as the odds ratio decreases from 1 to 0 and becomes increasingly large and positive as the odds ratio increases from 1 to infinity (see Gujarati and Porter, 2009).

5.3.2 Determinants of Food Poverty by Zone (Urban)

Tables 5.12-5.17 show that the determinants of food poverty vary across zones for the urban sector. However, the variables that are most consistent in being directly related to food poverty across the zones include age of household head, household size, education of household head with respect to no education, education of household head with respect to elementary education, occupation of household head with respect to sales, services and related group, occupation of household head with respect to agriculture/forestry group, occupation of household head with respect to production, transport, manufacturing and processing group and proportion of children in the household. On the other hand, the variables that are most consistent in being inversely related to food poverty across the zones include migration, ratio of food expenditure to total expenditure, proportion of females in the household and access to regular remittances. Furthermore, the variables that have the widest variations with regard to their association with food poverty include ownership of housing unit and education of household head with respect to secondary education. It is obvious from Tables 5.12-5.17 that even though there are variations in the determinants of food poverty across zones (for the urban sector) some variables have similar behaviours with respect to their association with food poverty.

In all the zones (for the urban sector) as shown in Tables 5.12-5.17, all the predictors, on aggregate, have significant impact on food poverty. This is shown by the fact that the likelihood ratio statistics (which follow the χ^2 distribution with 29 degrees of freedom) are all statistically significant at 1%. The Cox and Snell R^2 are 0.278, 0.325, 0.289, 0.370, 0.313 and 0.363 for South East Urban, South West Urban, South South Urban, North East Urban, North West Urban and North Central Urban respectively whereas the corresponding values with respect to Nagelkerke R^2 are 0.410, 0.440, 0.394, 0.493, 0.422, and 0.494 respectively.

Table 5.12: Determinants of Food Poverty for South East Urban

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	-0.340*	0.006	0.000	0.712
Ownership of Housing Unit	1.322*	0.005	0.000	3.751
Number of Adult Equivalents per Room	0.587*	0.002	0.000	1.798
Age of Household Head	0.031*	0.000	0.000	1.031
Household Size	-0.034*	0.001	0.000	0.967
Household Ownership of Agricultural Land	-0.408*	0.004	0.000	0.665
Migration	0.145*	0.004	0.000	1.156
Education of Household Head with respect to No Education	2.863*	0.010	0.000	17.507
Education of Household Head with respect to Elementary Education	3.889*	0.019	0.000	48.869
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	1.655*	0.008	0.000	5.235
Education of Household Head with respect to Tertiary Education	1.132*	0.009	0.000	3.102
Education of Household Head with respect to the category called "Others"	1.634*	0.011	0.000	5.123
Ratio of Food Expenditure to Total Expenditure	-0.067*	0.000	0.000	0.935
Household Type with respect to Monogamous Marriage	0.524*	0.010	0.000	1.690
Household Type with respect to Polygamous Marriage	1.875*	0.013	0.000	6.521
Household Type with respect to Widowhood	-0.005α	0.010	0.608	0.995
Household Type with respect to Never Married	1.405*	0.012	0.000	4.074
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	1.621*	0.007	0.000	5.059
Occupation of Household Head with respect Administration and Clerical Group	0.925*	0.007	0.000	2.522
Occupation of Household Head with respect to Sales, Services and Related Group	1.034*	0.006	0.000	2.811
Occupation of Household Head with respect to Agriculture or Forestry Group	1.200*	0.007	0.000	3.321
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	1.133*	0.007	0.000	3.105
Occupation of Household Head with respect to the category called "Others"	-0.995*	0.011	0.000	0.370
Proportion of Females in the Household	-0.299*	0.008	0.000	0.742
Proportion of Household Members that are more than 60 years old	-3.240*	0.019	0.000	0.039
Access to Regular Remittances	-0.225*	0.006	0.000	0.799
Access to Credit	1.101*	0.005	0.000	3.007
Proportion of Working Members in the Household	0.530*	0.008	0.000	1.700
Proportion of Household Members that are between 0 and 15 years	0.187*	0.008	0.000	1.206
Constant	-3.847*	0.020	0.000	0.021

Cox & Snell $R^2 = 0.278$; Nagelkerke $R^2 = 0.410$
The likelihood ratio statistic is 1,240,939.2

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at 1%. The alpha (α) indicates that the parameter estimate is not statistically significant at either 1% or 5%.

Note: Same as Table 5.11.

Table 5.13: Determinants of Food Poverty for South West Urban

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	0.312*	0.002	0.000	1.366
Ownership of Housing Unit	-0.020*	0.001	0.000	0.980
Number of Adult Equivalents per Room	0.226*	0.001	0.000	1.253
Age of Household Head	0.005*	0.000	0.000	1.005
Household Size	0.202*	0.000	0.000	1.223
Household Ownership of Agricultural Land	0.005α	0.003	0.053	1.005
Migration	-0.050*	0.001	0.000	0.951
Education of Household Head with respect to No Education	0.403*	0.004	0.000	1.497
Education of Household Head with respect to Elementary Education	0.835*	0.008	0.000	2.305
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	-0.065*	0.004	0.000	0.937
Education of Household Head with respect to Tertiary Education	-0.926*	0.004	0.000	0.396
Education of Household Head with respect to the category called "Others"	-0.236*	0.004	0.000	0.790
Ratio of Food Expenditure to Total Expenditure	-0.063*	0.000	0.000	0.939
Household Type with respect to Monogamous Marriage	-0.347*	0.003	0.000	0.707
Household Type with respect to Polygamous Marriage	-0.161*	0.003	0.000	0.851
Household Type with respect to Widowhood	0.473*	0.003	0.000	1.605
Household Type with respect to Never Married	-0.505*	0.004	0.000	0.603
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	0.170*	0.003	0.000	1.185
Occupation of Household Head with respect Administration and Clerical Group	-0.078*	0.003	0.000	0.925
Occupation of Household Head with respect to Sales, Services and Related Group . .	0.324*	0.003	0.000	1.383
Occupation of Household Head with respect to Agriculture or Forestry Group	0.406*	0.003	0.000	1.501
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	0.197*	0.003	0.000	1.218
Occupation of Household Head with respect to the category called "Others"	-0.073*	0.003	0.000	0.929
Proportion of Females in the Household	-0.173*	0.003	0.000	0.841
Proportion of Household Members that are more than 60 years old	-1.220*	0.004	0.000	0.295
Access to Regular Remittances	-0.258*	0.002	0.000	0.772
Access to Credit	-0.651*	0.002	0.000	0.522
Proportion of Working Members in the Household	-0.952*	0.003	0.000	0.386
Proportion of Household Members that are between 0 and 15 years	-0.011*	0.003	0.000	0.989
Constant	2.206*	0.007	0.000	9.079

Cox & Snell $R^2 = 0.325$; Nagelkerke $R^2 = 0.440$
The likelihood ratio staistic is 7,995,477.1

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at 1%. The alpha (α) indicates that the parameter estimate is not statistically significant at either 1% or 5%.

Note: Same as Table 5.11.

Table 5.14: Determinants of Food Poverty for South South Urban

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	-0.177*	0.004	0.000	0.838
Ownership of Housing Unit	0.294*	0.003	0.000	1.342
Number of Adult Equivalents per Room	0.080*	0.001	0.000	1.083
Age of Household Head	0.021*	0.000	0.000	1.021
Household Size	0.034*	0.001	0.000	1.035
Household Ownership of Agricultural Land	1.054*	0.004	0.000	2.870
Migration	-0.446*	0.002	0.000	0.640
Education of Household Head with respect to No Education	0.006$^{\alpha}$	0.006	0.298	1.006
Education of Household Head with respect to Elementary Education	1.647*	0.012	0.000	5.191
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	-0.312*	0.005	0.000	0.732
Education of Household Head with respect to Tertiary Education	-1.298*	0.006	0.000	0.273
Education of Household Head with respect to the category called "Others"	-0.783*	0.007	0.000	0.457
Ratio of Food Expenditure to Total Expenditure	-0.047*	0.000	0.000	0.954
Household Type with respect to Monogamous Marriage	1.909*	0.004	0.000	6.745
Household Type with respect to Polygamous Marriage	1.022*	0.006	0.000	2.779
Household Type with respect to Widowhood	1.172*	0.005	0.000	3.229
Household Type with respect to Never Married	1.334*	0.007	0.000	3.797
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	0.023*	0.005	0.000	1.023
Occupation of Household Head with respect Administration and Clerical Group	1.109*	0.005	0.000	3.030
Occupation of Household Head with respect to Sales, Services and Related Group	1.082*	0.004	0.000	2.951
Occupation of Household Head with respect to Agriculture or Forestry Group	0.243*	0.005	0.000	1.275
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	1.285*	0.005	0.000	3.616
Occupation of Household Head with respect to the category called "Others"	2.014*	0.006	0.000	7.496
Proportion of Females in the Household	-0.417*	0.005	0.000	0.659
Proportion of Household Members that are more than 60 years old	-3.052*	0.012	0.000	0.047
Access to Regular Remittances	-0.301*	0.003	0.000	0.740
Access to Credit	-0.450*	0.004	0.000	0.638
Proportion of Working Members in the Household	-1.852*	0.005	0.000	0.157
Proportion of Household Members that are between 0 and 15 years	0.863*	0.005	0.000	2.371
Constant	0.322*	0.011	0.000	1.380

Cox & Snell $R^2 = 0.289$; Nagelkerke $R^2 = 0.394$
Likelihood ratio statistic is 2,322,769.6

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at.1%. The alpha (α) indicates that the parameter estimate is not statistically significant at either 1% or 5%.

Note: Same as Table 5.11.

Table 5.15: Determinants of Food Poverty for North East Urban

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	1.366*	0.011	0.000	3.921
Ownership of Housing Unit	-0.085*	0.003	0.000	0.919
Number of Adult Equivalents per Room	0.024*	0.001	0.000	1.024
Age of Household Head	0.030*	0.000	0.000	1.031
Household Size	0.238*	0.000	0.000	1.269
Household Ownership of Agricultural Land	-1.003*	0.003	0.000	0.367
Migration	-0.171*	0.004	0.000	0.843
Education of Household Head with respect to No Education	3.379*	0.007	0.000	29.342
Education of Household Head with respect to Elementary Education	2.738*	0.013	0.000	15.457
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	2.543*	0.007	0.000	12.720
Education of Household Head with respect to Tertiary Education	1.159*	0.008	0.000	3.186
Education of Household Head with respect to the category called "Others"	2.348*	0.007	0.000	10.467
Ratio of Food Expenditure to Total Expenditure	-0.062*	0.000	0.000	0.939
Household Type with respect to Monogamous Marriage	-2.228*	0.011	0.000	0.108
Household Type with respect to Polygamous Marriage	-2.167*	0.012	0.000	0.115
Household Type with respect to Widowhood	0.659*	0.011	0.000	1.932
Household Type with respect to Never Married	-0.524*	0.015	0.000	0.592
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	-0.733*	0.007	0.000	0.480
Occupation of Household Head with respect Administration and Clerical Group	-1.399*	0.007	0.000	0.247
Occupation of Household Head with respect to Sales, Services and Related Group	-0.512*	0.006	0.000	0.599
Occupation of Household Head with respect to Agriculture or Forestry Group	1.109*	0.007	0.000	3.033
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	0.362*	0.007	0.000	1.436
Occupation of Household Head with respect to the category called "Others"	0.511*	0.008	0.000	1.667
Proportion of Females in the Household	-0.933*	0.007	0.000	0.393
Proportion of Household Members that are more than 60 years old	-2.950*	0.021	0.000	0.052
Access to Regular Remittances	0.606*	0.004	0.000	1.833
Access to Credit	0.661*	0.006	0.000	1.936
Proportion of Working Members in the Household	-0.920*	0.006	0.000	0.399
Proportion of Household Members that are between 0 and 15 years	0.762*	0.007	0.000	2.143
Constant	-1.332*	0.016	0.000	0.264

Cox & Snell $R^2 = 0.370$; Nagelkerke $R^2 = 0.493$
Likelihood ratio statistic is 2,662,152.7

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at 1%.
Note: Same as Table 5.11.

Table 5.16: Determinants of Food Poverty for North West Urban

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	-0.789*	0.007	0.000	0.454
Ownership of Housing Unit	1.014*	0.002	0.000	2.757
Number of Adult Equivalents per Room	-0.025*	0.001	0.000	0.975
Age of Household Head	0.014*	0.000	0.000	1.014
Household Size	0.098*	0.000	0.000	1.103
Household Ownership of Agricultural Land	0.810*	0.002	0.000	2.249
Migration	-0.191*	0.002	0.000	0.826
Education of Household Head with respect to No Education	2.445*	0.007	0.000	11.535
Education of Household Head with respect to Elementary Education	3.456*	0.011	0.000	31.681
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	1.168*	0.007	0.000	3.215
Education of Household Head with respect to Tertiary Education	0.186*	0.007	0.000	1.205
Education of Household Head with respect to the category called "Others"	2.355*	0.007	0.000	10.536
Ratio of Food Expenditure to Total Expenditure	-0.064*	0.000	0.000	0.938
Household Type with respect to Monogamous Marriage	3.188*	0.012	0.000	24.241
Household Type with respect to Polygamous Marriage	2.814*	0.012	0.000	16.669
Household Type with respect to Widowhood	2.718*	0.011	0.000	15.143
Household Type with respect to Never Married	3.719*	0.014	0.000	41.237
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	-0.280*	0.005	0.000	0.756
Occupation of Household Head with respect Administration and Clerical Group	0.676*	0.005	0.000	1.967
Occupation of Household Head with respect to Sales, Services and Related Group	0.269*	0.004	0.000	1.309
Occupation of Household Head with respect to Agriculture or Forestry Group	0.414*	0.005	0.000	1.512
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	0.390*	0.005	0.000	1.478
Occupation of Household Head with respect to the category called "Others"	0.475*	0.005	0.000	1.608
Proportion of Females in the Household	-1.554*	0.004	0.000	0.211
Proportion of Household Members that are more than 60 years old	0.852*	0.011	0.000	2.343
Access to Regular Remittances	-0.223*	0.003	0.000	0.800
Access to Credit	0.107*	0.004	0.000	1.113
Proportion of Working Members in the Household	-0.316*	0.004	0.000	0.729
Proportion of Household Members that are between 0 and 15 years	1.377*	0.004	0.000	3.964
Constant	-3.313*	0.014	0.000	0.036

Cox & Snell $R^2 = 0.313$; Nagelkerke $R^2 = 0.422$
Likelihood ratio statistic is 4,655,766.2

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at 1%.
Note: Same as Table 5.11.

Table 5.17: Determinants of Food Poverty for North Central Urban

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	-0.866*	0.006	0.000	0.420
Ownership of Housing Unit	-0.086*	0.003	0.000	0.918
Number of Adult Equivalents per Room	-0.149*	0.001	0.000	0.862
Age of Household Head	0.013*	0.000	0.000	1.013
Household Size	0.184*	0.001	0.000	1.202
Household Ownership of Agricultural Land	-0.864*	0.004	0.000	0.422
Migration	-0.441*	0.003	0.000	0.643
Education of Household Head with respect to No Education	0.346*	0.006	0.000	1.413
Education of Household Head with respect to Elementary Education	0.437*	0.015	0.000	1.548
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	-0.092*	0.005	0.000	0.912
Education of Household Head with respect to Tertiary Education	-2.160*	0.006	0.000	0.115
Education of Household Head with respect to the category called "Others"	-0.518*	0.007	0.000	0.595
Ratio of Food Expenditure to Total Expenditure	-0.076*	0.000	0.000	0.927
Household Type with respect to Monogamous Marriage	0.834*	0.008	0.000	2.302
Household Type with respect to Polygamous Marriage	1.331*	0.008	0.000	3.784
Household Type with respect to Widowhood	-0.148*	0.008	0.000	0.863
Household Type with respect to Never Married	0.357*	0.010	0.000	1.429
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	0.959*	0.007	0.000	2.610
Occupation of Household Head with respect Administration and Clerical Group	0.929*	0.007	0.000	2.532
Occupation of Household Head with respect to Sales, Services and Related Group	0.706*	0.006	0.000	2.027
Occupation of Household Head with respect to Agriculture or Forestry Group	1.612*	0.007	0.000	5.011
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	-0.040*	0.007	0.000	0.961
Occupation of Household Head with respect to the category called "Others"	1.245*	0.007	0.000	3.472
Proportion of Females in the Household	-1.018*	0.006	0.000	0.361
Proportion of Household Members that are more than 60 years old	0.446*	0.012	0.000	1.562
Access to Regular Remittances	-0.526*	0.004	0.000	0.591
Access to Credit	0.563*	0.004	0.000	1.756
Proportion of Working Members in the Household	0.614*	0.006	0.000	1.847
Proportion of Household Members that are between 0 and 15 years	0.286*	0.006	0.000	1.331
Constant	2.469*	0.012	0.000	11.816

Cox & Snell $R^2 = 0.363$; Nagelkerke $R^2 = 0.494$
Likelihood ratio statistic is 2,967,496.3

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at 1%.
Note: Same as Table 5.11.

5.3.3 Determinant of Food Poverty by Zone (Rural)

Tables 5.18-5.23 show that, just like the urban sector, the determinants of food poverty also vary across zones for the rural sector. Nevertheless, the variables that are most consistent in being directly related to food poverty across the zones(for the rural sector) include ownership of housing unit, age of household head, household size and education of household head with respect to no education. On the other hand, the variables that are most consistent in being inversely related to food poverty across the zones include education of household head with respect to tertiary education, ratio of food expenditure to total expenditure, household type with respect to never married, occupation of household head with respect to professional or technical group, occupation of household head with respect to production, transport, manufacturing and processing group, proportion of females in the household, proportion of household members that are more than 60 years old, access to regular remittances, access to credit and proportion of working members in the household. Further to the foregoing, the variables that have the widest variations with respect to their association with food poverty include household ownership of agricultural land, migration, education of household head with respect to elementary education, education of household head with respect to secondary education, household type with respect to monogamous marriage and household type with respect to widowhood.

Like the urban sector, in all the zones for the rural sector as shown in Tables 5.18-5.23, all the predictors, on aggregate, have significant impact on food poverty. This is shown by the fact that the likelihood ratio statistics (which follow the χ^2 distribution with 29 degrees of freedom) are all statistically significant at 1%. The Cox and Snell R^2 are 0.191, 0.303, 0.219, 0.250, 0.238 and 0.306 for South East Rural, South West Rural, South South Rural, North East Rural, North West Rural and North Central Rural. The corresponding values with respect to Nagelkerke R^2 are 0.273, 0.423, 0.300, 0.333, 0.317 and 0.413 respectively.

Table 5.18: Determinants of Food Poverty for South East Rural

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	0.151*	0.003	0.000	1.163
Ownership of Housing Unit	0.243*	0.003	0.000	1.275
Number of Adult Equivalents per Room	0.127*	0.001	0.000	1.136
Age of Household Head	-0.012*	0.000	0.000	0.988
Household Size	0.232*	0.000	0.000	1.261
Household Ownership of Agricultural Land	-0.539*	0.002	0.000	0.583
Migration	-0.647*	0.003	0.000	0.524
Education of Household Head with respect to No Education	0.134*	0.003	0.000	1.144
Education of Household Head with respect to Elementary Education	0.444*	0.005	0.000	1.559
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	-0.310*	0.003	0.000	0.733
Education of Household Head with respect to Tertiary Education	-0.611*	0.005	0.000	0.543
Education of Household Head with respect to the category called "Others"	0.058*	0.005	0.000	1.060
Ratio of Food Expenditure to Total Expenditure	-0.038*	0.000	0.000	0.962
Household Type with respect to Monogamous Marriage	-0.775*	0.007	0.000	0.461
Household Type with respect to Polygamous Marriage	-0.909*	0.007	0.000	0.403
Household Type with respect to Widowhood	-0.883*	0.007	0.000	0.413
Household Type with respect to Never Married	-0.661*	0.009	0.000	0.516
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	-0.596*	0.005	0.000	0.551
Occupation of Household Head with respect Administration and Clerical Group	-0.718*	0.005	0.000	0.488
Occupation of Household Head with respect to Sales, Services and Related Group	-0.777*	0.004	0.000	0.460
Occupation of Household Head with respect to Agriculture or Forestry Group	-0.211*	0.003	0.000	0.810
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	-0.934*	0.005	0.000	0.393
Occupation of Household Head with respect to the category called "Others"	-0.976*	0.005	0.000	0.377
Proportion of Females in the Household	-0.360*	0.004	0.000	0.697
Proportion of Household Members that are more than 60 years old	-0.592*	0.007	0.000	0.553
Access to Regular Remittances	-0.024*	0.002	0.000	0.976
Access to Credit	-0.436*	0.002	0.000	0.647
Proportion of Working Members in the Household	-1.079*	0.003	0.000	0.340
Proportion of Household Members that are between 0 and 15 years	-0.195*	0.004	0.000	0.823
Constant	2.533*	0.010	0.000	12.587

Cox & Snell $R^2 = 0.191$; Nagelkerke $R^2 = 0.273$
Likelihood ratio statistic is 2,433,492.0

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at 1%.
Note: Same as Table 5.11.

Table 5.19: Determinants of Food Poverty for South West Rural

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	0.329*	0.007	0.000	1.390
Ownership of Housing Unit	0.035*	0.003	0.000	1.036
Number of Adult Equivalents per Room	0.138*	0.001	0.000	1.148
Age of Household Head	0.046*	0.000	0.000	1.047
Household Size	0.150*	0.001	0.000	1.162
Household Ownership of Agricultural Land	0.061*	0.003	0.000	1.063
Migration	0.197*	0.004	0.000	1.218
Education of Household Head with respect to No Education	1.233*	0.009	0.000	3.430
Education of Household Head with respect to Elementary Education	-0.038**	0.017	0.029	0.963
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	1.349*	0.009	0.000	3.853
Education of Household Head with respect to Tertiary Education	0.828*	0.010	0.000	2.290
Education of Household Head with respect to the category called "Others"	0.721*	0.011	0.000	2.057
Ratio of Food Expenditure to Total Expenditure	-0.066*	0.000	0.000	0.936
Household Type with respect to Monogamous Marriage	0.350*	0.008	0.000	1.419
Household Type with respect to Polygamous Marriage	0.447*	0.009	0.000	1.563
Household Type with respect to Widowhood	0.251*	0.009	0.000	1.285
Household Type with respect to Never Married	-0.395*	0.014	0.000	0.674
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	-1.909*	0.010	0.000	0.148
Occupation of Household Head with respect Administration and Clerical Group	-0.117*	0.011	0.000	0.889
Occupation of Household Head with respect to Sales, Services and Related Group	-0.720*	0.009	0.000	0.487
Occupation of Household Head with respect to Agriculture or Forestry Group	-1.087*	0.008	0.000	0.337
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	-1.065*	0.010	0.000	0.345
Occupation of Household Head with respect to the category called "Others"	-0.556*	0.010	0.000	0.573
Proportion of Females in the Household	-1.155*	0.007	0.000	0.315
Proportion of Household Members that are more than 60 years old	-2.466*	0.010	0.000	0.085
Access to Regular Remittances	-0.068*	0.004	0.000	0.934
Access to Credit	-0.445*	0.004	0.000	0.641
Proportion of Working Members in the Household	-0.257*	0.005	0.000	0.774
Proportion of Household Members that are between 0 and 15 years	1.566*	0.007	0.000	4.788
Constant	-0.831*	0.016	0.000	0.436

Cox & Snell $R^2 = 0.303$; Nagelkerke $R^2 = 0.423$
Likelihood ratio statistic is 1,563,606.8

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The single star(*) indicates that the parameter estimate is statistically significant at 1% and the double stars(**) indicate that the parameter estimate is statistically significant at 5%.

Note: Same as Table 5.11.

Table 5.20: Determinants of Food Poverty for South South Rural

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	0.244*	0.003	0.000	1.277
Ownership of Housing Unit	-0.110*	0.002	0.000	0.896
Number of Adult Equivalents per Room	0.186*	0.001	0.000	1.205
Age of Household Head	0.025*	0.000	0.000	1.025
Household Size	0.199*	0.000	0.000	1.221
Household Ownership of Agricultural Land	0.141*	0.001	0.000	1.152
Migration	-0.270*	0.002	0.000	0.764
Education of Household Head with respect to No Education	-0.007**	0.003	0.011	0.993
Education of Household Head with respect to Elementary Education	-0.586*	0.007	0.000	0.557
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	-0.413*	0.003	0.000	0.662
Education of Household Head with respect to Tertiary Education	-1.897*	0.005	0.000	0.150
Education of Household Head with respect to the category called "Others"	-1.027*	0.005	0.000	0.358
Ratio of Food Expenditure to Total Expenditure	-0.034*	0.000	0.000	0.967
Household Type with respect to Monogamous Marriage	0.451*	0.003	0.000	1.570
Household Type with respect to Polygamous Marriage	0.053*	0.004	0.000	1.055
Household Type with respect to Widowhood	0.252*	0.003	0.000	1.286
Household Type with respect to Never Married	-0.023*	0.005	0.000	0.977
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	0.999*	0.005	0.000	2.715
Occupation of Household Head with respect Administration and Clerical Group	0.560*	0.005	0.000	1.750
Occupation of Household Head with respect to Sales, Services and Related Group	0.541*	0.004	0.000	1.718
Occupation of Household Head with respect to Agriculture or Forestry Group	0.304*	0.004	0.000	1.355
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group.	0.227*	0.005	0.000	1.255
Occupation of Household Head with respect to the category called "Others"	0.351*	0.005	0.000	1.420
Proportion of Females in the Household	-0.465*	0.004	0.000	0.628
Proportion of Household Members that are more than 60 years old	-0.882*	0.006	0.000	0.414
Access to Regular Remittances	-0.549*	0.002	0.000	0.578
Access to Credit	-0.160*	0.002	0.000	0.852
Proportion of Working Members in the Household	-0.801*	0.003	0.000	0.449
Proportion of Household Members that are between 0 and 15 years	-0.126*	0.003	0.000	0.881
Constant	0.133*	0.008	0.000	1.143

Cox & Snell $R^2 = 0.219$; Nagelkerke $R^2 = 0.300$
Likelihood ratio statistic is 3,001,910.0

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The single star(*) indicates that the parameter estimate is statistically significant at 1% and the double stars(**) indicate that the parameter estimate is statistically significant at 5%.

Note: Same as Table 5.11.

Table 5.21: Determinants of Food Poverty for North East Rural

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	-0.466*	0.006	0.000	0.628
Ownership of Housing Unit	0.144*	0.004	0.000	1.154
Number of Adult Equivalents per Room	0.064*	0.001	0.000	1.066
Age of Household Head	0.016*	0.000	0.000	1.017
Household Size	0.225*	0.000	0.000	1.253
Household Ownership of Agricultural Land	0.132*	0.002	0.000	1.141
Migration	-0.071*	0.003	0.000	0.932
Education of Household Head with respect to No Education	0.703*	0.004	0.000	2.019
Education of Household Head with respect to Elementary Education	0.341*	0.009	0.000	1.406
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	0.208*	0.005	0.000	1.232
Education of Household Head with respect to Tertiary Education	-1.140*	0.008	0.000	0.320
Education of Household Head with respect to the category called "Others"	0.813*	0.005	0.000	2.255
Ratio of Food Expenditure to Total Expenditure	-0.038*	0.000	0.000	0.963
Household Type with respect to Monogamous Marriage	-0.092*	0.007	0.000	0.912
Household Type with respect to Polygamous Marriage	0.134*	0.007	0.000	1.144
Household Type with respect to Widowhood	-0.550*	0.009	0.000	0.577
Household Type with respect to Never Married	-0.467*	0.011	0.000	0.627
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	-0.498*	0.008	0.000	0.608
Occupation of Household Head with respect Administration and Clerical Group	0.282*	0.009	0.000	1.326
Occupation of Household Head with respect to Sales, Services and Related Group	0.329*	0.008	0.000	1.389
Occupation of Household Head with respect to Agriculture or Forestry Group	0.551*	0.007	0.000	1.735
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	-1.380*	0.012	0.000	0.252
Occupation of Household Head with respect to the category called "Others"	-0.808*	0.010	0.000	0.446
Proportion of Females in the Household	-0.041*	0.005	0.000	0.960
Proportion of Household Members that are more than 60 years old	-0.834*	0.010	0.000	0.434
Access to Regular Remittances	-0.691*	0.003	0.000	0.501
Access to Credit	-0.874*	0.003	0.000	0.417
Proportion of Working Members in the Household	-0.138*	0.003	0.000	0.871
Proportion of Household Members that are between 0 and 15 years	0.356*	0.004	0.000	1.427
Constant	-1.033*	0.013	0.000	0.356

Cox & Snell $R^2 = 0.250$; Nagelkerke $R^2 = 0.333$
Likelihood ratio statistic is 3,186,975.4

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at 1%.
Note: Same as Table 5.11.

Table 5.22: Determinants of Food Poverty for North West Rural

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	1.900*	0.011	0.000	6.688
Ownership of Housing Unit	0.534*	0.004	0.000	1.706
Number of Adult Equivalents per Room	-0.041*	0.000	0.000	0.960
Age of Household Head	0.014*	0.000	0.000	1.014
Household Size	0.201*	0.000	0.000	1.223
Household Ownership of Agricultural Land	-0.051*	0.002	0.000	0.950
Migration	0.086*	0.002	0.000	1.090
Education of Household Head with respect to No Education	0.666*	0.005	0.000	1.947
Education of Household Head with respect to Elementary Education	-0.591*	0.008	0.000	0.554
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	-0.137*	0.005	0.000	0.872
Education of Household Head with respect to Tertiary Education	-0.876*	0.008	0.000	0.417
Education of Household Head with respect to the category called "Others"	0.033*	0.005	0.000	1.033
Ratio of Food Expenditure to Total Expenditure	-0.052*	0.000	0.000	0.949
Household Type with respect to Monogamous Marriage	0.792*	0.009	0.000	2.208
Household Type with respect to Polygamous Marriage	0.786*	0.009	0.000	2.194
Household Type with respect to Widowhood	1.702*	0.012	0.000	5.487
Household Type with respect to Never Married	1.962*	0.014	0.000	7.113
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	-1.666*	0.007	0.000	0.189
Occupation of Household Head with respect Administration and Clerical Group	-1.197*	0.006	0.000	0.302
Occupation of Household Head with respect to Sales, Services and Related Group	-1.435*	0.006	0.000	0.238
Occupation of Household Head with respect to Agriculture or Forestry Group	-0.670*	0.004	0.000	0.512
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	-0.985*	0.010	0.000	0.373
Occupation of Household Head with respect to the category called "Others"	-2.111*	0.009	0.000	0.121
Proportion of Females in the Household	-0.022*	0.003	0.000	0.978
Proportion of Household Members that are more than 60 years old	0.101*	0.008	0.000	1.107
Access to Regular Remittances	0.230*	0.001	0.000	1.259
Access to Credit	-0.212*	0.003	0.000	0.809
Proportion of Working Members in the Household	-0.575*	0.003	0.000	0.563
Proportion of Household Members that are between 0 and 15 years	0.906*	0.004	0.000	2.474
Constant	-1.915*	0.016	0.000	0.147

Cox & Snell $R^2 = 0.238$; Nagelkerke $R^2 = 0.317$
Likelihood ratio statistic is 5,428,223.1

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at 1%.
Note: Same as Table 5.11.

Table 5.23: Determinants of Food Poverty for North Central Rural

Variable	B	S.E.	Sig.	Exp (B)
Sex of Household Head	-0.142*	0.005	0.000	0.868
Ownership of Housing Unit	0.024*	0.003	0.000	1.025
Number of Adult Equivalents per Room	-0.032*	0.001	0.000	0.969
Age of Household Head	0.026*	0.000	0.000	1.026
Household Size	0.193*	0.000	0.000	1.213
Household Ownership of Agricultural Land	-0.672*	0.002	0.000	0.511
Migration	0.154*	0.002	0.000	1.166
Education of Household Head with respect to No Education	0.746*	0.004	0.000	2.108
Education of Household Head with respect to Elementary Education	1.045*	0.011	0.000	2.843
Education of Household Head with respect to Primary Education				
Education of Household Head with respect to Secondary Education	0.381*	0.004	0.000	1.464
Education of Household Head with respect to Tertiary Education	-0.881*	0.005	0.000	0.414
Education of Household Head with respect to the category called "Others"	-0.610*	0.005	0.000	0.544
Ratio of Food Expenditure to Total Expenditure	-0.058*	0.000	0.000	0.944
Household Type with respect to Monogamous Marriage	-0.239*	0.005	0.000	0.788
Household Type with respect to Polygamous Marriage	-0.360*	0.006	0.000	0.697
Household Type with respect to Widowhood	-0.678*	0.007	0.000	0.508
Household Type with respect to Never Married	-0.369*	0.008	0.000	0.692
Household Type with respect to Informal Union, Divorced or Separated				
Occupation of Household Head with respect to Student, Retired, Unemployed or Inactive Group				
Occupation of Household Head with respect to Professional or Technical Group	-0.254*	0.006	0.000	0.776
Occupation of Household Head with respect Administration and Clerical Group	-0.105*	0.007	0.000	0.901
Occupation of Household Head with respect to Sales, Services and Related Group	-0.593*	0.006	0.000	0.553
Occupation of Household Head with respect to Agriculture or Forestry Group	-0.203*	0.005	0.000	0.817
Occupation of Household Head with respect to Production,Transport, Manufacturing and Processing Group	-0.404*	0.008	0.000	0.668
Occupation of Household Head with respect to the category called "Others"	-1.013*	0.008	0.000	0.363
Proportion of Females in the Household	0.032*	0.004	0.000	1.033
Proportion of Household Members that are more than 60 years old	-0.615*	0.009	0.000	0.541
Access to Regular Remittances	-0.300*	0.003	0.000	0.741
Access to Credit	-0.077*	0.003	0.000	0.926
Proportion of Working Members in the Household	-0.058*	0.003	0.000	0.944
Proportion of Household Members that are between 0 and 15 years	0.911*	0.004	0.000	2.486
Constant	1.764*	0.011	0.000	5.837

Cox & Snell $R^2 = 0.306$; Nagelkerke $R^2 = 0.413$
Likelihood ratio statistic is 4,223,523.2

P value for likelihood ratio statitistc (which follows the χ^2 distribution, with 29 d.f) =0.000

Source: Computed by the Author using NLSS 2004. The star(*) indicates that the parameter estimate is statistically significant at 1%.
Note: Same as Table 5.11.

5.4 Vulnerability to Food Poverty in Nigeria

Table 5.24 shows the magnitude of vulnerability to food poverty in each of the designated zones (urban/rural) in Nigeria. The zones where vulnerability to food poverty is higher in the urban sector than in the rural sector are South West, South South, North East and North Central. In the South East and North West zones, vulnerability to food poverty is higher in the rural sector than in the urban sector. For the urban sector, South West zone has the highest vulnerability to food poverty headcount while North West zone has the least. For the rural sector, North Central zone has the highest vulnerability to food poverty headcount whereas North East zone has the lowest. When we combine the urban and rural sectors, South West Urban has the highest incidence of vulnerability to food poverty in Nigeria followed by North Central Urban, North Central Rural and South South Urban respectively. North East Rural has the lowest incidence of vulnerability to food poverty in the country followed by North West Urban, South West Rural and South East Urban respectively. The foregoing implies that the circumstances/factors that make people to be at risk of falling into or remaining in food poverty are most prevalent in South West Urban and least prevalent in North East Rural. In all the zones (urban/rural) with the exception of North East Rural, more than half of the population there are plagued by vulnerability to food poverty. The foregoing implies that the magnitude of vulnerability to food poverty is very high across the various zones (urban/rural) in Nigeria.

As regards tests of statistical significance, Table 5.24 indicates that there are significant differences in the magnitudes of vulnerability to food poverty across the various zones (urban/rural). These are shown by the value of the F-statistic for equality of means with respect to Vulnerability to Food Poverty Headcount which is statistically significant at 1%.

Table 5.24: Vulnerability to Food Poverty in various Zones (Urban/Rural)

Zone	Vulnerability to Food Poverty Headcount (%)		F-Statistic for Equality of Mean with respect to Vulnerability to Food Poverty Headcount
	Urban	Rural	
South East	57.87	63.82	263,643.1*
South West	70.75	56.93	
South South	66.41	61.59	
North East	60.95	44.59	
North West	54.95	59.44	
North Central	69.06	67.59	

Source: Computed by the Author using NLSS 2004. *Statistically significant at 1%.

Table 5.25 shows that vulnerability to food poverty is more pronounced in the urban sector than in the rural sector. This may be due to the fact that more agricultural activities take place in the rural sector than in the urban sector; there is greater likelihood for availability of food in the rural sector and food is usually cheaper in the rural sector than in the urban sector. Besides, there is apparently greater support for food needs (neighbours tend to support one another) in the rural areas than in the urban areas. With respect to test of statistical significance, the table indicates that there are significant differences in the magnitudes of vulnerability to food poverty between the urban and rural sectors. These are shown by the value of the t-statistic for equality of means with respect to Vulnerability to Food Poverty Headcount which is statistically significant at 1%.

As further shown in Table 5.25, the South West zone has the highest incidence of vulnerability to food poverty in Nigeria closely followed by North Central zone; however the difference in the magnitude of vulnerability to food poverty between the two zones is very small. The zone that has the third highest incidence of vulnerability to food poverty in Nigeria is South South. The North East zone has the lowest incidence of vulnerability to food poverty in the country followed by North West zone and South East zone respectively. The foregoing suggests that the North East zone has the best circumstances and the fewest odds associated with food security in Nigeria followed by North West zone. And the South West zone has the worst circumstances and the highest odds associated with food security in the country followed by North Central zone. Coming to tests of statistical significance, the table indicates that there are significant differences in the magnitudes of vulnerability to food poverty across the various zones. These are shown by the value of the F-statistic for equality of means with respect to Vulnerability to Food Poverty Headcount which is statistically significant at 1%.

Table 5.25 further shows the magnitude of vulnerability to food poverty in Nigeria as a whole. The table indicates that about 62% of Nigerians are vulnerability to food poverty. Thus it is evident that the magnitude of vulnerability to food poverty in the country is very high.

Table 5.25: Vulnerability to Food Poverty Headcount in Nigeria and by Zone and Sector

ZONE/SECTOR/AGGREGATE	Vulnerability of Food Poverty Headcount (in %)	F-statistic/t-statistic for Equality of Means with respect to Vulnerability to Food Poverty Headcount
South East	62.33	398,512.9*
South West	68.32	(F-statistic)
South South	63.33	
North East	50.19	
North West	57.72	
North Central	68.13	
SECTOR		
Urban	64.61	604.4*
Rural	59.37	(t-statistic)
AGGREGATE		
Nigeria	61.68	

Source: Computed by the Author using NLSS 2004. *Statistically significant at 1%. Equal variances are not assumed for the t-statistic.

5.5 Decomposition Analysis of Vulnerability to Food Poverty Incidence in Nigeria by Food Poor and Non Food Poor

Table 5.26 shows the percentage of the food poor and the percentage of the non food poor that are vulnerable to food poverty in each of the designated zones in Nigeria. The table indicates that the food poor are more vulnerable to food poverty than the non food poor in all the zones and in both the rural and urban sectors. This is in line with expectation. The food poor, in general, are often more at risk of having odds associated with food poverty than the non food poor. For the urban sector, the South West zone has the highest percentage of the food poor that are vulnerable to food poverty followed by North Central zone and South East zone respectively; North West zone has the lowest. With respect to the percentage of the non food poor that are vulnerable to food poverty, it is highest in North Central zone followed by South West zone and South South zone respectively; it is lowest in North West zone. For the rural sector, the North Central zone has the highest percentage of the food poor that are vulnerable to food poverty followed by South East zone and North West zone respectively; North East zone has the lowest. With regard to the percentage of the non food poor that are vulnerable to food poverty, it is highest in South East zone followed by North Central zone and North West zone respectively; it is lowest in North East zone.

Combining urban and rural sectors, South West Urban has the highest percentage of the food poor that are vulnerable to food poverty followed by North Central Urban and South East Urban respectively; North East Rural has the lowest percentage of the food poor that are vulnerable to food poverty. With respect to percentage of the non food poor that are vulnerable to food poverty, it is highest in South East Rural followed closely by North Central Rural and North Central Urban respectively; North East Rural has the lowest percentage of the non food poor that are vulnerable to food poverty.

As regards tests of statistical significance, Table 5.26 shows that there are significant differences in the percentage of the food poor and the percentage of the non food poor that are vulnerable to food poverty across the various zones (urban/rural). These are indicated by the values of the F-statistics for equality of means which are all statistically significant at 1%.

Table 5.26: Vulnerability to Food Poverty Headcount by Food Poor and Non Food Poor in Various Zones (Urban/Rural) in Nigeria

Zone	Percentage of the Food Poor that are Vulnerable to Food Poverty	F-statistic for Equality of Means with respect to Column 2	Percentage of the Non-Food Poor that are Vulnerable to Food Poverty	F-statistic for Equality of Means with respect to Column 4
URBAN				
South East	73.48	189,552.2*	52.53	72,861.4*
South West	79.44		57.22	
South South	72.00		57.07	
North East	69.30		53.46	
North West	66.71		46.54	
North Central	74.80		59.78	
RURAL				
South East	71.26		60.73	
South West	66.88		52.18	
South South	66.86		52.41	
North East	46.96		42.48	
North West	67.09		52.83	
North Central	72.49		60.43	

Source: Computed by the Author using NLSS 2004. *Statistically significant at 1%.

Table 5.27 shows that the percentage of the food poor that are vulnerable to food poverty is higher in the urban sector than in the rural sector. On the other hand, the percentage of the non food poor that are vulnerable to food poverty is slightly higher in the rural sector than in the urban sector. In both the urban and rural sectors, the food poor are more vulnerable to food poverty than the non food poor. With respect to tests of statistical significance, the table shows that there are significant differences in the percentage of the food poor and the percentage of the non food poor that are vulnerable to food poverty between the urban and rural sectors. This is indicated by the values of the t-statistics for equality of means which are all statistically significant at 1%. The table also shows that there are significant differences between the percentage of the food poor that are vulnerable to food poverty (FPOVFVUL) and the percentage of the non food poor that are vulnerable to food poverty (NFPVFP) in the urban and rural sectors. These are indicated by the values of the t-statistics for differences between FPOVFVUL and NFPVFP which are all statistically significant at 1%.

Table 5.27 also shows that the food poor are more vulnerable to food poverty than the non food poor in all the geo-political zones. The South West zone has the highest percentage of the food poor that are vulnerable to food poverty followed by North Central zone and South East zone respectively; North East zone has the least percentage of the food poor that are vulnerable to food poverty. As regards percentage of the non food poor that are vulnerable to food poverty, it is highest in North Central zone followed by South East zone and South West zone respectively; it is lowest in North East zone. Coming to tests of statistical significance, the table shows that there are significant differences in the percentage of the food poor and the percentage of the non food poor that are vulnerable to food poverty across the various geo-political zones. These are indicated by the values of the F-statistics for equality of means which are all statistically significant at 1%. The table further indicates that there are significant differences between the percentage of the food poor that are vulnerable to food poverty (FPOVFVUL) and the percentage of the non food poor that are vulnerable to food poverty (NFPVFP) in all the geo-political zones. These are shown by the values of the t-statistics for differences between FPOVFVUL and NFPVFP which are all statistically significant at 1%.

Table 5.27 further shows that 69.6% of the food poor are vulnerable to food poverty while 53.69% of the non food poor are vulnerable to food poverty; thus, on aggregate, the food poor are more vulnerable to food poverty than the non-food poor. The t-statistic for difference between FPOVFVUL and NPFVFP (for Nigeria as a whole) which is statistically significant at 1% indicates that there is significant difference between the percentage of the food poor that are vulnerable to food poverty and the percentage of the non food poor that are vulnerable to food poverty(taking the country as a whole).

Table 5.27: Vulnerability to Food Poverty Headcount by Food Poor and Non Food Poor in Nigeria and in Various Zones/Sectors

Zone/Sector and Aggregate	Percentage of the Food Poor that are Vulnerable to Food Poverty	F-statistic/t-statistic for Equality of Means with respect to Column 2	Percentage of the Non Food Poor that are Vulnerable to Food Poverty	F-statistic/t-statistic for Equality of Means with respect to Column 4	t-statistic for Difference between Columns 2 and 4
ZONE					
South East	71.76	298,737.8*	58.61	107,390.3*	500.6*
South West	78.16	(F-statistic)	55.86	(F-	1,192.2*
South South	68.69		54.11	statistic)	629.7*
North East	54.61		46.24		344.6*
North West	66.95		50.30		974.2*
North Central	73.35		60.20		581.4*
SECTOR					
Urban	74.38	781.7*	53.55	-18.9*	1,648.6*
Rural	65.42	(t-statistic)	53.79	(t-statistic)	1,003.3*
AGGREGATE					
Nigeria	69.6		53.69		1,863.4*

Source: Computed by the Author using NLSS 2004. *Statistically significant at 1%. Equal variance is not assumed for t-statistic.

Table 5.28 shows the percentage of the population that are food poor and vulnerable to food poverty as well as the percentage of the population that are non food poor and vulnerable to food poverty in various zones(urban/rural) in Nigeria. For the urban sector, the percentage of the population that are food poor and vulnerable to food poverty is highest in South West zone followed by North Central zone and South South zone respectively; it is lowest in South East zone. The percentage of the population that are non food poor and vulnerable to food poverty is highest in South East zone followed by North East zone and North West zone respectively; it is lowest in South South zone. For the rural sector, the percentage of the population that are food poor and vulnerable to food poverty is highest in North Central zone followed by South South zone and North West zone respectively; it is lowest in South East zone. The percentage of the population that are non food poor and vulnerable to food poverty is highest in South East zone followed by South West zone and North West zone respectively; it is lowest in South South zone.

Combining the urban and rural sectors, South West Urban has the highest percentage of the population that are food poor and vulnerable to food poverty followed by North Central Urban and South South Urban respectively; South East Urban has the lowest percentage of the population that are food poor and vulnerable to food poverty. South East Rural has the highest percentage of the population that are non food poor and vulnerable to food poverty followed by South East Urban and South West Rual respectively; South South Rural has the lowest percentage of the population that are non food poor and vulnerable to food poverty.

With respect to tests of statistical significance, Table 5.28 indicates that there are significant differences in the percentage of the population that are food poor and vulnerable to food poverty as well as in the percentage of the population that are non food poor and vulnerable to food poverty across the various zones (urban/rural). These are indicated by the values of the F-statistics for equality of means which are all statistically significant at 1%.

Table 5.28: Population Share of those that are Food Poor/Non Food Poor and Vulnerable to Food Poverty in Various Zones (Urban/Rural) in Nigeria

Zone	Food Poor and Vulnerable to Food Poverty (%)	F-statistic for Equality of Means with respect to Column 2	Non Food Poor and Vulnerable to Food Poverty (%)	F-statistic for Equality of Means with respect to Column 4
URBAN				
South East	18.72	565,042.5*	39.15	267,750.8*
South West	48.38		22.37	
South South	45.06		21.35	
North East	32.75		28.19	
North West	27.80		27.15	
North Central	46.24		22.83	
RURAL				
South East	20.88		42.94	
South West	21.60		35.33	
South South	42.49		19.11	
North East	22.17		22.42	
North West	31.12		28.32	
North Central	43.08		24.52	

Source: Computed by the Author using NLSS 2004. *Statistically significant at 1%.

Table 5.29 indicates that the percentage of the population that are food poor and vulnerable to food poverty is higher than the percentage of the population that are non food poor and vulnerable to food poverty in both urban and rural sectors. The percentage of the population that are food poor and vulnerable to food poverty is higher in the urban sector than in the rural sector whereas the percentage of the population that are non food poor and vulnerable to food poverty is higher in the rural sector than in the urban sector. As regards tests of statistical significance, the table indicates that there are significant differences in the percentage of the population that are food poor and vulnerable to food poverty as well as in the percentage of the population that are non food poor and vulnerable to food poverty between the urban and rural sectors. These are shown by the values of the t-statistics for equality of means which are all statistically significant at 1%. Also, there are significant differences between the percentage of the population that are food poor and vulnerable to food poverty(PFPVFP) and the percentage of the population that are non food poor and vulnerable to food poverty(PNFPVFP) in both the urban and rural sectors. These are shown by the values of the t-statistics for differences between the two groups which are all statistically significant at 1%.

As further shown in Table 5.29, in South East zone, the percentage of the population that are food poor and vulnerable to food poverty is lower than the percentage of the population that are non food poor and vulnerable to food poverty; the reverse is the case in the other zones. North Central zone has the highest percentage of the population that are food poor and vulnerable to food poverty closely followed by South West and South South zones respectively; South East zone has the lowest percentage of the population that are food poor and vulnerable to food poverty. South East zone has the highest percentage of the population that are non food poor and vulnerable to food povery followed by North West and South West zones respectively; South South zone has the least percentage of the population that are non food poor and vulnerable to food poverty. Coming to tests of statistical significance, the table shows that there are significant differences in the percentage of the population that are food poor and vulnerable to food poverty as well as in the percentage of the population that are non food poor and vulnerable to food poverty across the geo-political zones. These are shown by the values of the F-statistics which are all statistically significant at 1%. Also, there are significant differences between the percentage of the population that are food poor and vulnerable to food

poverty(PFPVFP) and the percentage of the population that are non food poor and vulnerable to food poverty(PNFPVFP) in all the geo-political zones. These are shown by the values of the t-statistics for differences between the two groups which are all statistically significant at 1%.

Table 5.29: Population Share of those that are Food Poor/Non Food Poor and Vulnerable to Food Poverty in Various Zones/Sectors in Nigeria

Zone/Sector	Percentage of the Population that are Food Poor and Vulnerable to Food Poverty	F-statistic/t-statistic for Equality of Means with respect to Column 2**	Percentage of the Population that are Non Food Poor and Vulnerable to Food Poverty	F-statistic/t-statistic for Equality of Means with respect to Column 4**	t-statistic for Difference between Columns 2 and 4.
ZONE					
South East	20.34	940,936.7*	42.00	502,430.5*	-1,114.5*
South West	43.68	(F-statistic)	24.64	(F-statistic)	1,176.2*
South South	43.41		19.91		1,344.6*
North East	25.79		24.40		81.1*
North West	29.85		27.87		148.3*
North Central	44.22		23.90		1,082.0*
SECTOR					
Urban	39.50	948.2*	25.11	-365.1*	1,358.3*
Rural	31.38	(t-statistic)	27.99	(t-statistic)	369.7*

Source: Computed by the Author using NLSS 2004. *Statistically significant at 1%. **Equal variances are not assumed for t-statistic.

As indicated in Table 5.30, the percentage of the population that are food poor and vulnerable to food poverty is higher than the percentage of the population that are non food poor and vulnerable to food poverty. As shown in the table, 34.96% of the population are food poor and vulnerable to food poverty whereas 26.72% of the population are non food poor and vulnerable to food poverty. The foregoing further shows that the food poor are generally more vulnerable to food poverty than the non food poor. The t-statistic for difference between the two groups is statistically significant at 1% and shows that there is significant difference between the percentage of the population that are food poor and vulnerable to food poverty, and the percentage of the population that are non food poor and vulnerable to food poverty.

Table 5.30: Population Share of those that are Food Poor/Non Food Poor and Vulnerable to Food Poverty in Nigeria (Aggregate)

	Food Poor	Not Food Poor	Total	t-statistic for difference between columns 2 and 3
Vulnerable to Food Poverty (Vo>=0.5)	44,157,849 (34.96%)	33,749,616 (26.72%)	77,907,465 (61.68%)	1,185.7*
Not Vulnerable to Food Poverty (Vo<0.5)	19,287,274 (15.27%)	29,110,435 (23.05%)	48,397,709 (38.32%)	-1,423.3*
Total	63,445,123 (50.23%)	62,860,051 (49.77%)	126,305,174 (100%)	

Source: Computed by the Author using NLSS 2004. *Statistically significant at 1%. Equal variances are not assumed for t-statistic. Vo is the probability that a household will be poor in the next period.

CHAPTER 6

SUMMARY, RECOMMENDATIONS AND CONCLUSION

6.1 Summary of Major Findings

Food poverty lines vary across zones in Nigeria. In both the urban and rural sectors, South South zone has the highest food poverty lines (₦26, 862.36 and ₦24,097.14 respectively) whereas North East zone has the lowest food poverty lines(₦14,152.27 and ₦10,509.39 respectively).There are significant variations in food preferences/tastes and prices across the various zones in Nigeria; this provides a justification for the use of zone -specific food poverty lines in the estimation of food poverty in the country. The food poverty lines are a reflection of the cost of living with regard to food consumption in the various zones. Thus it is evident that the cost of living with respect to food consumption is highest in South South zone and lowest in North East zone. The food poverty lines for the southern zones are generally higher than the food poverty lines for the northern zones; this implies that the cost of living with respect to food consumption is, on the average, higher in Southern Nigeria than in Northern Nigeria. The food poverty lines for the urban areas are, on the average, higher than the food poverty lines for the rural areas; this implies that the cost of living with respect to food consumption is higher in the urban sector than in the rural sector.

In the urban and rural sectors, South South zone has the highest food poverty incidences (62.6% and 63.5% respectively) while South East zone has the lowest incidences (25.5% and 29.3% respectively). The pooled data for the zones also show that the South South zone has the highest incidence of food poverty in Nigeria (63.20%) whereas the South East zone has the least incidence of food poverty in the country (28.34%). The North Central zone has the highest depth of food poverty in Nigeria (0.3314) while the South East zone has the lowest (0.1024). The South West zone has the highest severity of food poverty in Nigeria (0.2464) whereas the South East zone has the lowest severity of food poverty in the country (0.0530).

The urban sector in Nigeria, on aggregate, has higher food poverty incidence, depth and severity than the rural sector. The food poverty incidence, depth and

severity for the urban sector in Nigeria, on aggregate, are 53.11%, 0.2703 and 0.1894 respectively while the corresponding figures for the rural sector are 47.96%, 0.1941 and 0.1095 respectively.

The pooled data for the country show a food poverty incidence of 50.23%. This implies that half of the Nigerian population suffers from food poverty; thus the incidence of food poverty in Nigeria is very high. The depth and severity of food poverty for the country are 0.2277 and 0.1447 respectively.

On aggregate, male-headed households have higher food poverty incidence in Nigeria (50.47%) than female-headed households (48.17%). But female-headed households have higher depth and severity of food poverty than male-headed households. The depth and severity of food poverty for female-headed households are 0.2389 and 0.1634 respectively while the corresponding figures for male-headed households are 0.2264 and 0.1425 respectively.

On aggregate, households whose heads have only elementary education have the highest incidence of food poverty in Nigeria (61.24%) followed by households whose heads have no education (53.10%) whereas households whose heads have tertiary education have the lowest incidence of food poverty (41.04%). Households whose heads have only elementary education also have the highest depth of food poverty in Nigeria (0.3101) while households whose heads have educational levels that are classified as "others" have the lowest depth of food poverty(0.2045). Households whose heads have only elementary education have the highest severity of food poverty in Nigeria (0.2087) whereas households whose heads have educational levels that are classified as "others" have the lowest severity of food poverty (0.1226).

Households whose heads are never married, on aggregate, have the lowest food poverty incidence in Nigeria (34.16%) while households whose heads are in polygamous marriage have the highest food poverty incidence (59.13%). Households whose heads are in informal union, on aggregate, have the highest depth of food poverty in Nigeria (0.2762) while households whose heads are never married have the lowest depth of food poverty (0.1887). Households whose heads are in informal union, on aggregate, have the highest severity of food poverty in Nigeria (0.1873) whereas households whose heads are in monogamous marriage have the lowest severity of food poverty (0.1383).

On aggregate, households whose heads are in administration have the highest incidence, depth and severity of food poverty in Nigeria (58.55%, 0.4940 and 0.4492

respectively). Households whose heads are in professional or technical occupational group have the least incidence of food poverty (46.61%) whereas households whose heads are in agricultural/forestry have the least depth and severity of food poverty (0.1974 and 0.1096 respectively).

On aggregate, households whose heads are 55 – 64years have the highest food poverty incidence (57.17%) whereas households whose heads are 15 – 24 years have the lowest food poverty incidence in Nigeria (34.32%). Households whose heads are 75years and above have the highest depth and severity of food poverty (0.2674 and 0.1758 respectively) while households whose heads are 25 – 34years have the lowest depth and severity of food poverty (0.1593 and 0.1016 respectively).

Results of food poverty incidence and household size reveal that, on aggregate, they vary directly. Households that have above 20 persons have the highest food poverty incidence in Nigeria (82.93%) whereas households that have only 1 person have the least food poverty incidence (26.08%).

Estimates of determinants of food poverty show that, on aggregate, the variables that are positively related to food poverty in Nigeria include absence of education (0.459) and low level of education (0.522) of household heads, proportion of children in households (0.476), household size (0.148) and household heads engaged in agriculture (0.342). On the other hand, the variables that are inversely related to food poverty include household ownership of agricultural land (-0.248), tertiary education of household heads (-0.970), access to credit (-0.228) and access to regular remittances (-0.137).

Estimates of the probability of being in food poverty in the next period reveal that the incidence of vulnerability to food poverty in Nigeria is 61.68%; this is higher than the incidence of food poverty in the country which is 50.23%. This implies that the magnitude of vulnerability to food poverty in Nigeria is very high. The foregoing show that current food poverty and vulnerability to food poverty are separate dimensions of well being and failure to account for vulnerability to food poverty might lead to substantial underestimation of a people's food consumption well being.

The urban sector in Nigeria has higher incidence of vulnerability to food poverty than the rural sector. The incidence of vulnerability to food poverty in the urban sector is 64.61% while that of the rural sector is 59.37%. The South West zone has the highest incidence of vulnerability to food poverty in Nigeria (68.32%) whereas the the North East zone has the lowest incidence of vulnerability to food

poverty in the country (50.19%). North East Rural has the lowest incidence of vulnerability to food poverty in Nigeria (44.59%) while South West Urban has the highest incidence of vulnerability to food poverty in the country (70.75%).

In general, the food poor are more vulnerable to food poverty than the non food poor. On aggregate, 69.9% of the food poor are vulnerable to food poverty whereas 53.69% of the non food poor are vulnerable to food poverty.

6.2 Policy Implications and Recommendations

There are some zones in Nigeria that have very high food poverty lines. The zones include South South and South East zones. Very high food poverty line is an indication of very high cost of living with respect to food consumption. This therefore calls for policies that will pave the way for great reduction in the cost of living with regard to food consumption in such zones. Agricultural production should be adequately boosted in such zones as much as possible so as to bring about sufficient availability of basic food items and great reduction in food prices in the zones. Efficient transportation system and road network that will bring about minimum transportation cost should be put in place in Nigeria so that basic food items can efficiently and optimally be transported from the areas of abundance to the areas of scarcity. In general, adequate machinery should be set in motion to ensure that there is sufficient food security in all zones in Nigeria. This is a major way to bring about abliteration of hunger and extreme poverty within a short time (preferably before or by 2015 AD in line with the first Millennium Development Goal). It is instructive to state at this point that variations in costs of living across various zones call for incomes policy that will in particular provide for differential wage structure for the country. Zones that have higher costs of living should be given higher wages than zones with lower costs of living.

About half of the population of Nigeria are in food poverty. This shows that the food poverty incidence in the country is very high. Thus there is need for policies that will efficiently and optimally address the problem of food poverty in the country. As indicated earlier, steps should be taken to adequately boost food production and ensure food availability and affordability.

It has been shown that food poverty is more pronounced among households whose heads have only elementary education and among households whose heads have no education. Thus there is need to focus policy on providing adequate access to

sound and high level education so that this can positively impact on food security. With adequate sound and high level of education, the stock of human capital will be greatly increased and this will have some positive effects of agricultural activities. Suffice it to say that human capital development holds the major key to sustainable poverty reduction (World Bank, 1991a, 1993a, 1993b, 1997, 2001, 2006 and 2009).

It has been shown that, on aggregate, food poverty varies directly with household size; households with the highest size, on the average, have the highest food poverty incidence whereas households with the lowest size have the lowest food poverty incidence. This therefore calls for policies and programmes that will make households in all zones in Nigeria to have small sizes. Efficient birth control measures should be put in place to reduce average household sizes. People should be discouraged from having children that they cannot adequately cater for. Adequate enlightenment campaigns/programmes should be used to sufficiently educate Nigerians on the various methods of family planning/birth control and on the importance of having small household size that will pave the way for maximum prosperity and welfare in the household. The National Population Policy of four children per woman needs to be revisited and effort should be made to make the population policy functional. The foregoing will, all other things being equal, bring about tremendous positive impact on aggregate food poverty incidence in Nigeria.

It is worthy of note that occupation of household head with respect to agriculture, on aggregate, increases the odds in favour of being in food poverty. This implies that agriculture does not provide good remuneration to its workers. It is instructive to state here, that agriculture is a major provider of employment in Nigeria, particularly in the rural sector of the country which accounts for majority of the people living in poverty in the country. There is need, therefore, to put adequate and efficient machinery in motion to make agriculture highly lucrative in Nigeria. This will encourage more people in the country to engage in agriculture. It will encourage agriculturalists to work extremely hard to tremendously increase agricultural production; this will ultimately reduce food insecurity greatly or even eradicate the phenomenon. It is common knowledge that the technology used in the agricultural sector in Nigeria is generally weak and this brings about low output per hectre and ultimately low incomes for agriculturalists. Efforts should be made to sufficiently increase the level of technology in the agricultural sector so as to tremendously increase output per hectre and the incomes of agriculturalists.

It has been shown that access to regular remittances, access to credit and ownership of agricultural land - on aggregate - are among the major variables that reduce the odds in favour of being in food poverty in Nigeria. Thus measures should be taken to adequately increase regular remittances and access to credit to households in Nigeria. Also lands should be provided at affordable costs for people that are willing to go into agriculture; this will help in boosing food production.

Given that there is very high magnitude of vulnerability to food poverty in Nigeria, the government should identify the factors that contribute to vulnerability to food poverty in the country and take sufficient and urgent steps to efficiently tackle them. Indeed, efforts should not only be directed towards solving the problem of food poverty in Nigeria rather adequate and efficient measures should also be taken to optimally address the associated problem of vulnerability to food poverty in the country. This will pave the way for sustainable and enduring poverty reduction in the country; indeed, when food poverty and vulnerability to food poverty are adequately and efficiently tackled in Nigeria, it can lead to effective poverty reduction and it can ultimately bring about rapid and sustainable growth and development in the country. Evidence from the results show that shocks could increase the level of food insecurity in the country as many of the households that are not food poor are vulnerable to food poverty. Therefore, there is need to be proactive in ways of handling such shocks to avoid making many of the food poor and the non food poor be in food poverty in the future.

In tackling the problem of vulnerability to food poverty in Nigeria, the areas with the highest or very high magnitude of vulnerability should take priority over all other areas. It has been shown that the urban sector in Nigeria has higher incidence of vulnerability to food poverty than the rural sector. Thus measures to address vulnerability to food poverty in the country should be concentrated more in the urban sector of the country. This will lead to rapid/tremendous reduction in vulnerability to food poverty within a short time. Further to the foregoing, in tackling vulnerability to food poverty in Nigeria, more attention should be given to the food poor given that they are more vulnerable to food poverty than the non food poor.

6.3 Limitations of the Study

The food poverty lines that are constructed for the study are based on a given minimum energy requirements measured in calories (i.e. 2900kcal per adult

equivalence per day). It is assumed that once adequate energy requirements are met, other nutritional requirements will automatically be met. Therefore, adequate food consumption is taken to be synonymous with meeting adequate energy requirements. This does not always hold in reality for it is possible to meet food energy requirements without meeting other nutritional requirements. Thus it may be said that the study does not cater for all nutritional requirements in food consumption.

To adequately access vulnerability to poverty one needs longitudinal/panel data set containing cross sectional data sets derived from surveys that are conducted at various dates, on the same sample frame and for the same households. Unfortunately, there are no household based longitudinal/panel data in Nigeria appropriate for this study. Therefore, this study examines the issue of household vulnerability to food poverty in Nigeria using a single cross sectional data set – the data set based on the Nigeria Living Standard Survey (NLSS) of 2004. Suffice it to say that the use of a single cross sectional data set does not allow the study to capture the impact of inter-temporal/aggregate shocks.

Despite the foregoing limitations, the study has adequately analysed the problems of food poverty and vulnerability to food poverty in Nigeria. The estimates of the study are generally robust. Thus the study will provide sufficient guide to the Nigerian government and policy makers in their policy formulation and implementation for the reduction of food poverty and vulnerability to food poverty in the country.

6.4 Suggested Areas for Future Research

There are many aspects of poverty and vulnerability to poverty. This study has been able to address the issues of food poverty and vulnerability to food poverty in Nigeria using expenditure/consumption and quantitative approaches, based on a single cross sectional data set. Future researches should, among other things, focus on the following:

- In future, studies on vulnerability to food poverty in Nigeria should be done using adequate panel data when available. This will enable such studies to sufficiently capture the impact of inter-temporal/aggregate shocks; it will help such studies to clearly show how households move in and out of food poverty. Panel data will make it possible for a study on vulnerability to food poverty to

adequately capture inter-temporal variability in food consumption/ expenditure; indeed such data will enable a study to sufficiently estimate and analyse both transient food poverty and chronic food poverty.

6.5 Conclusion

Food poverty and vulnerability to food poverty are major antitheses of development. Thus their reduction may be considered as a principal step towards the enthronement of rapid and sustainable growth and development. This study has estimated and analysed the extent of food poverty and vulnerability to food poverty in Nigeria. The study has shown that 50.23% of the Nigerian population is plagued with food poverty while 61.68% of the population of the country is vulnerable to food poverty; this shows that the incidences of food poverty and vulnerability to food poverty in Nigeria are very high. The magnitudes of both food poverty and vulnerability to food poverty vary across geo-political zones in the country. On aggregate, the urban sector of the country has higher food poverty incidence, depth and severity than the rural sector. With respect to vulnerability to food poverty, the urban sector of the country has higher incidence of vulnerability to food poverty than the rural sector. The foregoing shows that both food poverty and vulnerability to food poverty are more pronounced in the urban sector than in the rural sector of the country.

Nigeria aims at becoming one of the twenty leading economies by the year 2020. There is no way this dream can materialise when both food poverty and vulnerability to food poverty are pervasive in the country. The government of Nigeria should take urgent, adequate and efficient steps to sufficiently reduce food consumption deficits, food poverty and vulnerability to food poverty in the country. This is a major way to make the country to develop very fast. For Nigeria to become one of the twenty leading economies in the world in 2020, the country has to "leap frog" or move at an extremely fast rate with regard to growth and development; indeed, the country has to move at a much faster rate of growth and development than some of the countries that are currently among the twenty leading economies in the world with a view to surpassing them before or by 2020. To achieve the above, the country should begin by putting sufficient and efficient machinery in motion to optimally increase food production, enhance food distribution and ensure food availability and affordability to all Nigerians.

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APPENDIX A

SPSS FINAL OUTPUT OF VULNERABILITY TO FOOD POVERTY HEADCOUNT

TABLE A1: VULNERABILITY TO FOOD POVERTY HEADCOUNT: SOUTH EAST URBAN

Frequencies

Statistics

FVul

N	Valid	3803000
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	1602338	42.1	42.1	42.1
	Vulnerable to Food Poverty	2200662	57.9	57.9	100.0
	Total	3803000	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	3803000	.00	1.00	.5787	.49377
Valid N (listwise)	3803000				

Source: Designed by the Author using SPSS.

TABLE A2: VULNERABILITY TO FOOD POVERTY HEADCOUNT: SOUTH WEST URBAN

Frequencies

Statistics

FVul

N	Valid	20362977
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	5956309	29.3	29.3	29.3
	Vulnerable to Food Poverty	14406667	70.7	70.7	100.0
	Total	20362977	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	20362977	.00	1.00	.7075	.45491
Valid N (listwise)	20362977				

Source: Designed by the Author using SPSS.

TABLE A3: VULNERABILITY TO FOOD POVERTY HEADCOUNT: SOUTH SOUTH URBAN

Frequencies

Statistics

FVul

N	Valid	6808097
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	2286548	33.6	33.6	33.6
	Vulnerable to Food Poverty	4521549	66.4	66.4	100.0
	Total	6808097	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	6808097	.00	1.00	.6641	.47229
Valid N (listwise)	6808097				

Source: Designed by the Author using SPSS.

TABLE A4: VULNERABILITY TO FOOD POVERTY HEADCOUNT: NORTH EAST URBAN

Frequencies

Statistics

FVul

N	Valid	5771597
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	2253898	39.1	39.1	39.1
	Vulnerable to Food Poverty	3517699	60.9	60.9	100.0
	Total	5771597	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	5771597	.00	1.00	.6095	.48787
Valid N (listwise)	5771597				

Designed by the Author using SPSS.

TABLE A5: VULNERABILITY TO FOOD POVERTY HEADCOUNT: NORTH WEST URBAN

Frequencies

Statistics

FVul

N	Valid	12386010
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	5580420	45.1	45.1	45.1
	Vulnerable to Food Poverty	6805590	54.9	54.9	100.0
	Total	12386010	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	12386010	.00	1.00	.5495	.49755
Valid N (listwise)	12386010				

Source: Designed by the Author using SPSS.

TABLE A6: VULNERABILITY TO FOOD POVERTY HEADCOUNT: NORTH CENTRAL URBAN

Frequencies

Statistics

FVul

N	Valid	6574761
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	2034014	30.9	30.9	30.9
	Vulnerable to Food Poverty	4540748	69.1	69.1	100.0
	Total	6574761	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	6574761	.00	1.00	.6906	.46223
Valid N (listwise)	6574761				

Source: Designed by the Author using SPSS.

TABLE A7: VULNERABILITY TO FOOD POVERTY HEADCOUNT: SOUTH EAST RURAL

Frequencies

Statistics

FVul

N	Valid	11460105
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	4146627	36.2	36.2	36.2
	Vulnerable to Food Poverty	7313477	63.8	63.8	100.0
	Total	11460105	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	11460105	.00	1.00	.6382	.48053
Valid N (listwise)	11460105				

Source: Designed by the Author using SPSS.

TABLE A8: VULNERABILITY TO FOOD POVERTY HEADCOUNT: SOUTH WEST RURAL

Frequencies

Statistics

FVul

N	Valid	4333804
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	1866606	43.1	43.1	43.1
	Vulnerable to Food Poverty	2467198	56.9	56.9	100.0
	Total	4333804	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	4333804	.00	1.00	.5693	.49518
Valid N (listwise)	4333804				

Source: Designed by the Author using SPSS.

TABLE A9: VULNERABILITY TO FOOD POVERTY HEADCOUNT: SOUTH SOUTH RURAL

Frequencies

Statistics

FVul

N	Valid	12118131
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	4654224	38.4	38.4	38.4
	Vulnerable to Food Poverty	7463907	61.6	61.6	100.0
	Total	12118131	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	12118131	.00	1.00	.6159	.48637
Valid N (listwise)	12118131				

Source: Designed by the Author using SPSS.

TABLE A10: VULNERABILITY TO FOOD POVERTY HEADCOUNT: NORTH EAST RURAL

Frequencies

Statistics

FVul

N	Valid	11096688
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	6148204	55.4	55.4	55.4
	Vulnerable to Food Poverty	4948484	44.6	44.6	100.0
	Total	11096688	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	11096688	.00	1.00	.4459	.49707
Valid N (listwise)	11096688				

Source: Designed by the Author using SPSS.

TABLE A11: VULNERABILITY TO FOOD POVERTY HEADCOUNT: NORTH WEST RURAL

Frequencies

Statistics

FVul

N	Valid	20014881
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	8117437	40.6	40.6	40.6
	Vulnerable to Food Poverty	11897444	59.4	59.4	100.0
	Total	20014881	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	20014881	.00	1.00	.5944	.49100
Valid N (listwise)	20014881				

Source: Designed by the Author using SPSS.

TABLE A12: VULNERABILITY TO FOOD POVERTY HEADCOUNT: NORTH CENTRAL URBAN

Frequencies

Statistics

FVul

N	Valid	11575122
	Missing	0

Frequencies

FVul

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	3751083	32.4	32.4	32.4
	Vulnerable to Food Poverty	7824039	67.6	67.6	100.0
	Total	11575122	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	11575122	.00	1.00	.6759	.46802
Valid N (listwise)	11575122				

Source: Designed by the Author using SPSS.

TABLE A13: VULNERABILITY TO FOOD POVERTY HEADCOUNT: NIGERIA

Frequencies

Statistics

FVUL

N	Valid	126305174
	Missing	0

Frequencies

FVUL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Vulnerable to Food Poverty	48397709	38.3	38.3	38.3
	Vulnerable to Food Poverty	77907465	61.7	61.7	100.0
	Total	126305174	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FVUL	126305174	.00	1.00	.6168	.48616
Valid N (listwise)	126305174				

Source: Designed by the Author using SPSS.

APPENDIX B

TABLE B: SURVEY AND POPULATION SHARES OF THE VARIOUS ZONES/SECTORS IN NIGERIA

ZONE/REGION/SECTOR	SURVEY SHARE(NUMBER OF HOUSEHOLDS)	POPULATION SHARE(NUMBER OF PEOPLE)
South East Urban	346	3,803,000
South West Urban	1,862	20,362,977
South South Urban	525	6,808,097
North East Urban	482	5,771,597
North West Urban	705	12,386,010
North Central Urban	726	6,574,762
South East Rural	2,351	11,460,105
South West Rural	1,193	4,333,804
South South Rural	2,363	12,118,131
North East Rural	2,732	11,096,688
North West Rural	3,122	20,014,881
North Central Rural	2,751	11,575,122
TOTAL	**19,158**	**126,305,174**
South East	2,697	15,263,105
South West	3,055	24,696,781
South South	2,888	18,926,228
North East	3,214	16,868,285
North West	3,827	32,400,891
North Central	3,477	18,149,884
TOTAL	**19,158**	**126,305,174**
Urban	4,646	55,706,443
Rural	14,512	70,598,731
TOTAL	**19,158**	**126,305,174**
South	8,640	58,886,114
North	10,518	67,419,060
TOTAL	**19,158**	**126,305,174**

Source: NBS NLSS Data Set (2004).

APPENDIX C

TABLE C1: ADULT EQUIVALENT SCALE ADOPTED BY THE NATIONAL BUREAU OF STATISTICS (DERIVED FROM THE FOOD AND AGRICULTURE ORGANISATION)

	ADULT EQUIVALENT SCALES	
	SEX	
AGE GROUP(IN YEARS)	MALE	FEMALE
0-1	0.27	0.27
1-3	0.45	0.45
4-6	0.61	0.61
7-9	0.73	0.73
10-12	0.86	0.78
13-15	0.96	0.83
16-19	1.02	0.77
20 and above	1.00	0.73

Source: NBS (2005b).

TABLE C2: STATES IN THE SIX GEOPOLITICAL ZONES IN NIGERIA (BASED ON THE 36 STATES AND FEDERAL CAPITAL TERRITORY STRUCTURE)

SOUTH EAST ZONE: Anambra State* Enugu State Ebonyi State Imo State* Abia State	**NORTH EAST ZONE:** Taraba State Adamawa State Borno State* Yobe State Bauchi State* Gombe State
SOUTH WEST ZONE: Lagos State Ogun State Oyo State* Osun State Ondo State* Ekiti State	**NORTH WEST ZONE:** Sokoto State* Zamfara State Kebbi State Kaduna State Katsina State Kano State* Jigawa State
SOUTH SOUTH ZONE: Edo State Delta State Rivers State* Bayelsa State Cross River State* Akwa-Ibom State	**NORTH CENTRAL ZONE:** Kwara State Kogi State Plateau State* Nassarawa State Benue State Niger State* Federal Capital Territory(FCT)

Sources: (i) FGN.2001. *National poverty eradication programme(NAPEP): a blueprint for the scheme, revised.* Abuja: FGN. (ii) Uga, E.O. 2003. Governance and human resource deficiency: the political economy of a Nigerian paradox. *Proceedings of the 2002 Annual Conferenceof the Nigerian Economic Society (NES).* Ozo-Esan, P.I. and Evbuomwan,G. Eds. Ibadan: NES. 271-296. * selected states used in the construction of zone/region-specific food poverty lines.

APPENDIX D

TABLE D: DESCRIPTION OF SOME OF THE VARIABLES USED IN THE STUDY

Variable	Description
ASW	Access to source of water in terms of distance to water. For in dwelling and within 500 metres, a household is considered to have access and for more than 500 metres a household is considered not to have access.
CSD	Household consumption of safe drinking water. The sources of drinking water include treated pipe-borne water, untreated pipe-borne water, bore hole/hand pump, protected well, unprotected well/rain water, river/lake/pond and vendor/truck – the first four sources are considered as safe while the rest are considered as unsafe.
QF	Quality of fuel used by household for cooking. Cooking fuels include kerosene, gas, electricity, firewood, charcoal, crop residue/sawdust and animal waste – the last four are considered to be of inferior quality.
MH	Migration. Movement of household from one place of residence to another "in the last five years" is taken as a proxy for migration.
TOFA	Quality of toilet facility. Only flush system and VIP laterine are considered to be of high quality. The rest such as toilet on water, pail or bucket and pit latrine are considered to be of low quality.
MRMA	Main roofing material. Only corrugated iron sheet, cement or concrete and roofing tiles are considered to be of high quality. The rest such as mud or mud bricks, thatch grass or straw, and wood or bamboo are considered to be of low quality.
MFM	Main flooring material. Only concrete is considered to be of high quality. The rest such as earth or mud, straw, plank and wood are considered to be of low quality.
MSL	Main source of lighting. Only gas, main electricity, electricity from generator and battery are considered to be of high quality. The rest such as candle, firewood and kerosene are considered to be of low quality.
PII	Prevalence of illness or injury; that is, proportion of household members that frequently suffer from illness or injury or both (i.e. those that experience such within "the last two weeks"). This is health shock.
AC	Access to credit. If a household received credit from any credit union "within the past 12 months" such a household is considered to have access to credit.
PWM	Proportion of working members in the household. This is proportion of household members that are in wage or self employment.
LWA	Loss of welfare due to lack of access to agricultural inputs. This considers if households suffer loss of welfare due to prices of agricultural inputs being too high or agricultural inputs not available or lack of agricultural inputs due to other factors or low agricultural production or drought. This represents agricultural inputs shocks.
LWBE	Loss of welfare due to poor business and/or economic condition. This considers if households suffer loss of welfare due to business not doing well or low profit from business or hard economic times/decline of the economy. This represents business/ economic shock.

Source: Author's Compilation.