Food Price Fluctuation and its Influence on Food Accessibility amongst Households in Jos, Plateau State.

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Abstract: Food prices have continued to fluctuate with season, space and other factors thereby making future predictions uncertain over the years. This research assesses the fluctuation of food prices and its influence or implication for household food accessibility in Jos area. Specifically, the research focuses on the price fluctuation of selected food items (rice, yam, maize, sugar and palm oil) through the year 2012 to 2016 and to identify food accessibility status of the various households. The study was based on the data obtained from 246 sampled households which were selected on the basis of stratified convenience sampling. Data on records of food item prices were obtained from the Plateau Agricultural Development Program (PADP). Descriptive statistics was employed to present and analyze the data collected for easy understanding and clarity while household food accessibility status was measured using The Household Food Insecurity Access Scale (HFIAS). Results of the study show that, the prices of food items fluctuated throughout the year 2012-2016, it was fluctuating and got to the peak in 2016. Only 5.3% of the sampled households have a secure food accessibility status, about 94.7% of the households face a type of insecure food accessibility status.

IndexTerms - Key Words: Food price fluctuation, Influence, Food accessibility, Households, Jos area.

I. INTRODUCTION

Agricultural commodity price volatility or fluctuation drew much attention of economists, policymakers and media since the food price hike of 2007-2008 (International Food Policy Research Institute, 2011). The extent of the fluctuation of international prices of many basic food commodities in the time period 2006 to 2008 raises many questions across a broad section of society; particularly among policy makers, the media and the general public. Within the latter group, there is a large sub-sector of low income families who have had to make often very painful adjustments to cope with the consequences of their reduced purchasing power, involving in some cases reduced consumption of their basic sources of sustenance (John *et al*., 2009).

Among the instruments most frequently recommended are strategic grain reserves and public buffer stock schemes. However, these policies come at high economic and fiscal costs and there is no guarantee that market interventions reduce domestic price volatility (Kornher and Kalkhul, 2013).

It is in the context of the international dimensions of the 2008 food crisis that the nature, impact, and policy responses in Nigeria can be understood. Although the prices of many commodities slumped during the first couple of years of the new millennium, some commodities (coffee, cotton, sugar, rubber, cocoa and rice amongst others) started to witness a rebound thereafter. By 2008, however, the price rises have assumed crisis dimension in food markets across the developing world, including Nigeria (Olomola, 2015). Variations in prices become problematic when they are large and cannot be anticipated; as a result they create a level of uncertainty that increases risks for producers, traders, consumers and governments.

According to Agiri (2000), there is no efficient pricing and marketing system for agricultural products in Nigeria. The lack of reliable market outlets forces the farmers to sell their produce at whatever price they can get at the farm gate. In view of its direct impact on the standard of living of most Nigerians, fluctuations in the prices of agricultural products have become of great concern to economists and policy makers (Adekoya *et al*., 2013). This research therefore is designed to examine the agricultural food price fluctuation and its implications on food access among Nigerian households.

1.1 STATEMENT OF THE PROBLEM

The problem necessitating this study is that food prices have continued to fluctuate with season, space and other factors thereby making future predictions, production and planning uncertain over the years. Agricultural food price fluctuation is a global phenomenon; studies on this subject have been done all around the world. The FAO's report in 2008 on Food Price Fluctuations, Policies and Rural Development in Europe and Central Asia, reveals that there has been an upward trend and high volatility of food prices since 2001 but was acutely experienced in 2008 in countries in Albania, Armenia, Georgia and Moldova. While, Mustapha and Culas, (2014) in their research titled 'Cause, magnitude and Consequences of Price Variability in Agricultural Commodity Market: An African Perspective' reported the magnitude and seriousness of food price variability with its negative impacts in Africa.

Unfortunately, despite the many researches that have been carried out in the different countries and regions of the world on this subject matter, there has been no attempt to study food price fluctuation in Jos area of Plateau state thus creating a knowledge gap in literature. It is against this backdrop that this research focused on the influence of food price fluctuation on food accessibility among households in Jos, Plateau State; so as to foster effective policy formulation on checking food price fluctuation in the study area, as well as to bridge literature gap.

2.1 THE STUDY AREA

The city of Jos is located on the Jos-plateau in Nigeria's middle belt region at an elevation of about 1,238 metres or 4,062 feet high above sea level. Jos metropolis is located on latitudes 9°56′N and longitude 8°53′E, with an estimated total land area of about 340km^2. It is bounded by Bauchi State to the Northeast, Bassa L.G.A to the East and Northeast, Bukuru (Jos- South) to the South and Jos-East L.G.A to the East (Jidauna *et al*., 2014).

According to the Köppen Climate Classification system, Jos has a tropical savanna climate. Average monthly temperatures range from 21°–25 °C (70–77 °F), and from mid-November to late January, night-time temperatures drop as low as 11 °C (52 °F). During the months of December and January, temperatures are usually below 10°C. The months of March and April are the hottest months with temperatures rising as high as 30°C (Ihemegbulem and Nyong, 2002). Average monthly temperatures range from 21°–25 °C (70–77 °F), and from mid-November to late January, night-time temperatures drop as low as 11 °C (52 °F). During the months of December and January, temperatures are usually below 10°C. The months of March and April are the hottest months with temperatures rising as high as 30°C (Ihemegbulem and Nyong, 2002).

Jos receives about 1,400 millimeters' (55 inches) of rainfall annually. Rainfall is high and characterized with two distinct seasons (wet and dry). The rainy season lasts from April to October with its peak in July and dry season lasts from November to March (Eziashi, 2007). Jos town is located on a plateau bearing its name (the Jos-Plateau) at an altitude of about 1,200m above sea level. The drainage pattern of the Jos Plateau is redial and is said to be the hydrological centre of Nigeria as many rivers flow away from the Jos Plateau to other areas. Some of the rivers are perennial while others are seasonal (Nyam and Ayuba, 2010).

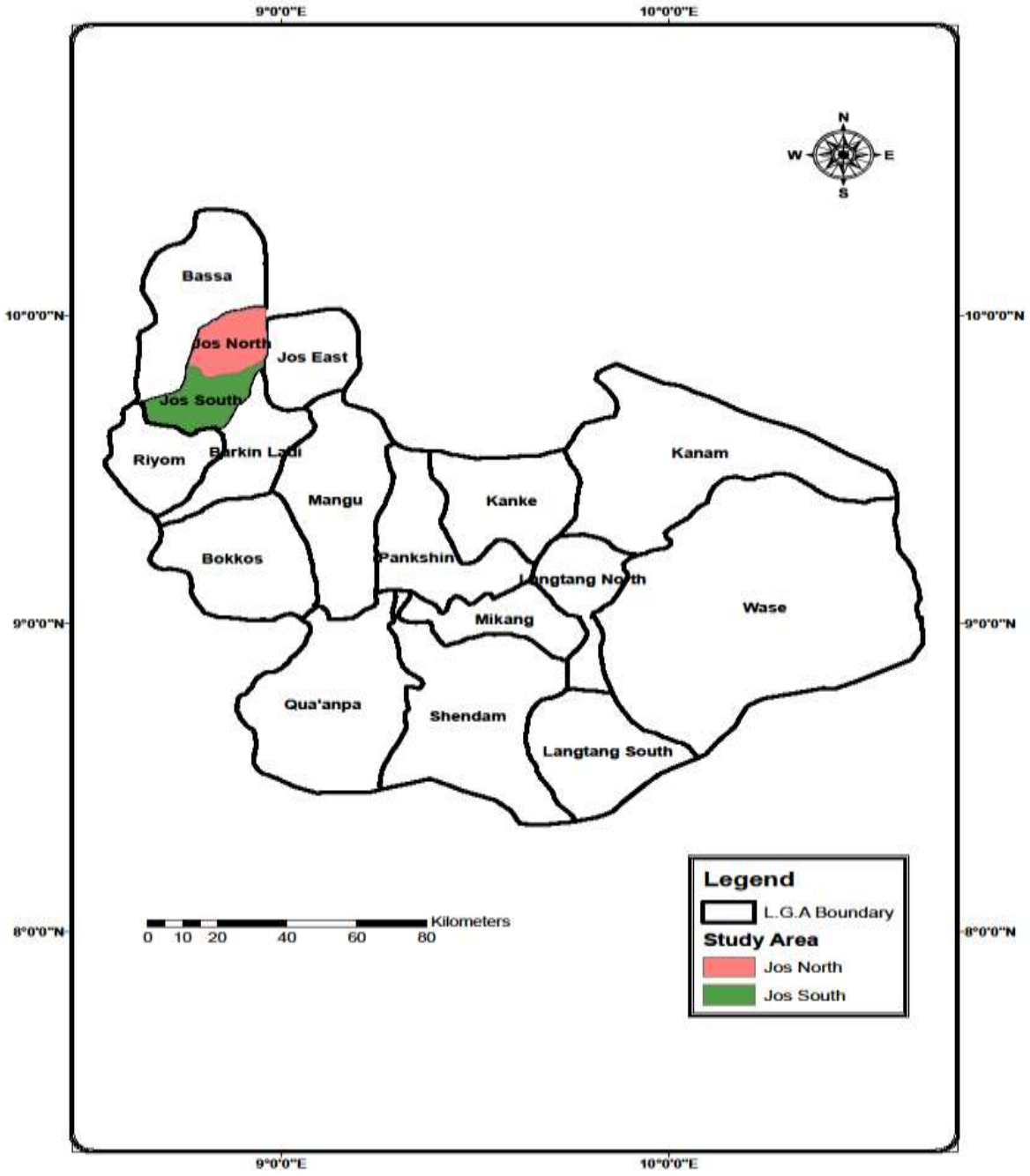

Fig. 1: Plateau State showing Jos North and Jos South.
Source: National Centre for Remote Sensing.

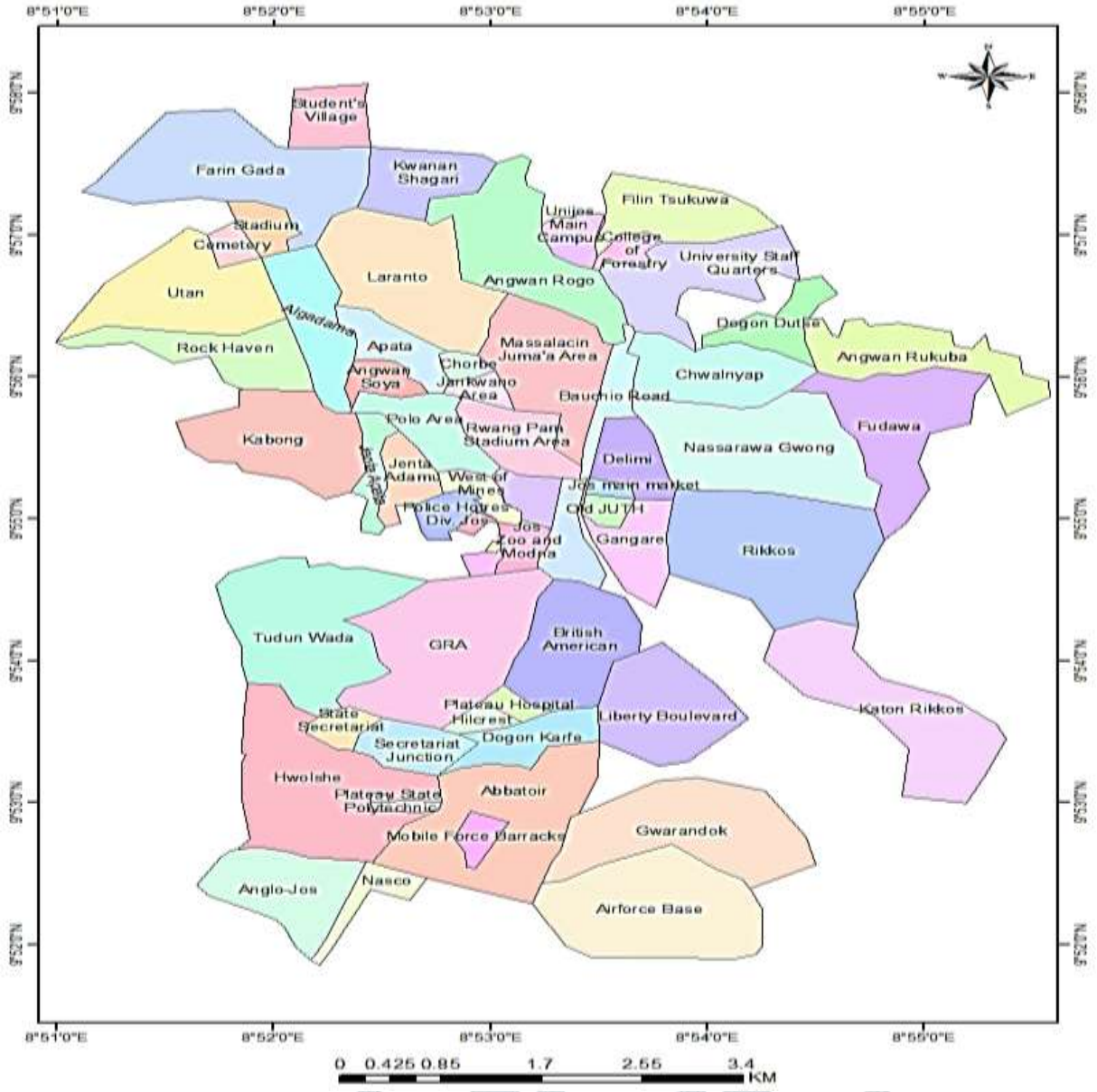

Fig. 2: Study Area (Jos City).
Source: National Centre for Remote Sensing Jos, 2016.

3.0 METHODOLOGY

The methodology section outline the plan and method that how the study is conducted. This includes research design, sources of data, population sample and theoretical framework. The details are as follows;

3.1Population and Sample

To ensure that all sampled households are given a fair chance of selection and because Jos area has a heterogeneous population, the stratified convenience sampling method was adopted. The data from Independent National Electoral Commission (INEC) revealed that there are fifteen (15) registration areas within Jos area with their respective polling units. There are five hundred and twelve (512) polling units all together, which makes the total population. The population was stratified based on registration areas (RA) and for each stratum (registration areas) samples are drawn which are a representation of each of the fifteen (15) strata, using the formula, Sample = N/2 where; N is the population of the stratum Therefore, the population is two hundred and fifty two (252) households. The samples on table 4 represent the different strata, which are the locations where questionnaires were administered. Implying that one questionnaire was administered in each one of the randomly selected samples (Polling Units). The various locations as seen in table 4 represent the different strata ranging from one to fifteen (1 to 15) afterwards the copies of questionnaires were administered based on convenience, meaning that the respondents or heads of households that were available were interviewed.

Collection of data was carried out from November 15th to December 5th, 2016; two hundred and fifty two (252) households were selected as a representative fraction of the population. Hence, a total of two hundred and fifty two (252) copies of questionnaire were administered but two hundred and forty six (246) copies were correctly filled and returned for analysis and summarization, six (6) of the questionnaires were not returned. This gives 97% (ninety seven percent) response rate.

Table 1: Sampled Sub-units (Households) in Jos Area

Location/Registration Areas	No. of Polling Units	No. of Samples	Percentage of Samples
Abba Na Shehu	29	14	5.6
Ali Kazaure	38	19	7.5
Garba Daho	26	13	5.2
Gangare	20	10	4.0
Giring	38	19	7.5
Ibrahim katsina	25	12	4.8
Jenta Adamu	24	12	4.8
Jenta Apata	34	17	6.7
Jos Jarawa	37	18	7.1
Naraguta A	31	15	6.0
Naraguta B	106	53	21.0
Sarkin Arab	17	8	3.2
Tafawa balewa	11	5	2.0
Tudun wada-Kabong	65	32	12.6
Vanderpuye	11	5	2.0
Total	**512**	**252**	**100.0**

Source: Culled from INEC, 2015 (Directory of Polling Units, Plateau State).

3.2 Data and Sources of Data

In order to achieve the objectives of this study already outlined in 1.3 of chapter one, the nature of data needed for this study has been classified into five sections.

a. Socio-economic and demographic characteristics of the respondents, which include; household type, age, marital status, household size, educational attainment, occupation and data on the amount of money spent in the last one month as reported by the respondents
b. Major source of food for households and the staple food group consumed in household.
c. Causes and impacts of food price fluctuation and nature of food prices as perceived by respondents.
d. Household food accessibility status using the Household Food Insecurity Access Scale (HFIAS) questions and data on household food price fluctuation coping strategies.
e. Data on market prices of selected food item (Rice, Yam, Palm oil, Sugar and Maize) from 2012-2016.

The data were obtained mainly from the primary sources. The data were collected directly from the field through field observations together with questionnaire administration to various households in Jos Area. Other sources include; extraction of related materials from the internet, textbooks, Journals, Published articles, previous works, information from Independent National Electoral Commission (INEC), Plateau Agricultural Development Program (PADP), National Centre for Remote Sensing (NCRS) and National Library.

In this study, observational and survey research designs were adopted with emphasis on quantitative data. This type of research involves merging of data from direct field observation and questionnaire administration so as to ascertain people's opinions on the subject matter. The study focused on the influence of food price fluctuation on food accessibility among households in Jos, Plateau State. The research was designed and structured as thus;

i. Using questionnaires to elicit information from respondents on the impacts of food price fluctuation.
ii. Sourcing of data from the Plateau Agricultural Development Program (PADP) on market prices of selected food items from the year 2012 to 2016 and he averages of these food item prices are presented.
iii. Using the Household Food Insecurity Access Scale (HFIAS) questions to analyze the household food accessibility status in the study area.

Data needs on food accessibility status of households were collected using the food security assessment module. The Household Food Insecurity Access Scale (HFIAS) is a brief survey instrument developed by Food and Nutrition Technical Assistance (FANTA) to access whether households have experienced problems with food access during the last 30 days (Coates et al, 2007).

This tool measures food insecurity during the past 30 days as self-reported by the household, it is an indicator for measuring household food access in developing countries.

3.3 Theoretical framework

The conceptual framework for this study has been developed based on previous studies which provide a framework for understanding what factors account for variations in availability and accessibility to food. Dean and Sharkey (2011) developed 'the conceptual model of food insecurity and determinants of access to food resources'. The model shows food insecurity as the outcome of a variety of factors that determine food accessibility, including residential setting; perceived collective social functioning, which accounts for plausible causal links between perceptions of collective social functioning; and food insecurity such as individual experiences with communally-based means of food redistribution, and a range of personal characteristics.

The usefulness of the concept of food price fluctuation has spurred many researchers to look into the subject matter. For instance, Radukic *et al*. (2015) used the concept to investigate the effect of food Prices on Inflation in the Republic of Serbia and found out that high volatility of food prices is present in Serbia because of market instability due to seasonal fluctuations of supply and the effects of natural factors. Also, Adekoya *et al*., (2013) used the concept to establish that there is an upward trend in prices of both rural and urban markets of the selected food grains for the period of the study which covers 1988-2012 in Ogun state.

In this study on food price fluctuation and its influence on food accessibility amongst households in Jos, this concept is relevant based on the fact that it helped to describe the pattern of food price fluctuation and analyze food accessibility status of households. It is relevant to study this subject matter as it helps foster sustainable environmental planning and development.

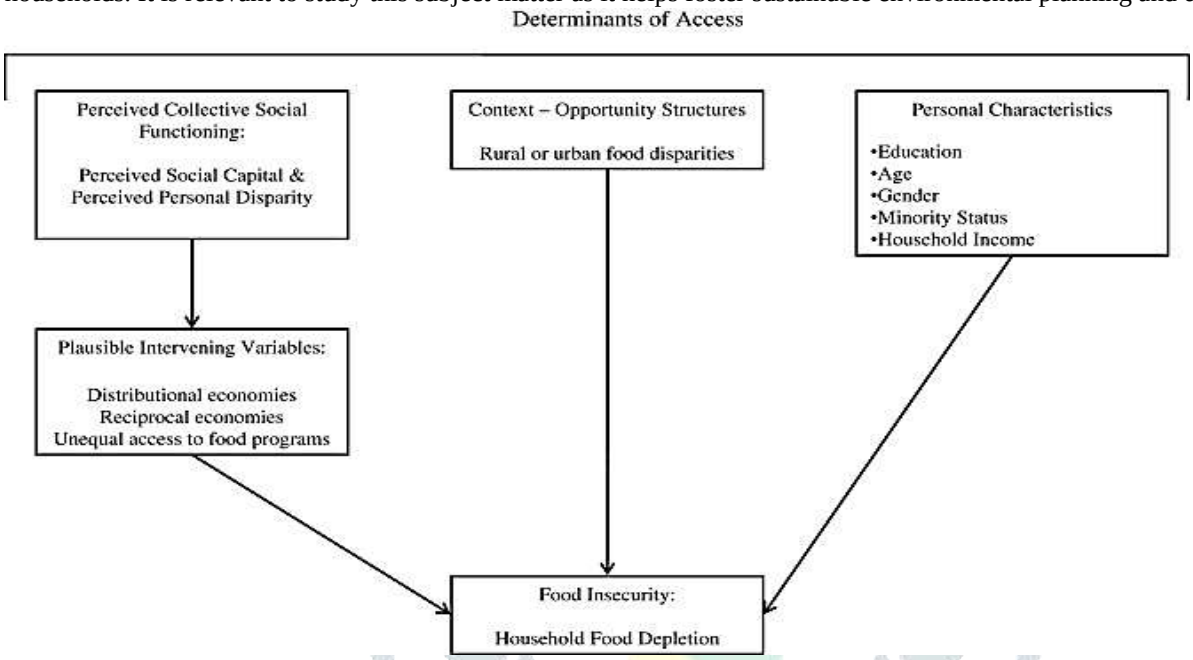

Fig. 3: Conceptual Model of Food Insecurity and Determinants of Food Accessibility.
Source: Dean and Sharkey, 2011.

3.4. Descriptive Statistics

Stratified convenience sampling technique was adopted since the population of the study area is heterogeneous and the area is broad. The research design was a descriptive survey; it makes use of hybrid (numerical and textual) data for the empirical study (Moutton, 2001). The study design was adopted because it provides an efficient and rapid way of getting numeric primary data on food price fluctuation and possible implications on household food accessibility. This approach combines both qualitative and quantitative methods in survey and is useful for obtaining comprehensive information about a large population through a representative sample of that population as highlighted by Oladele (2016).

Data from the field were collated, coded and entered into the computer for summarization, analysis and presentation. For clarity and understanding, both graphical and numerical, methods were employed to summarize data in terms of proportions and percentages. Graphs and charts were employed which facilitated the presentation of data features, Microsoft Excel software was used to achieve this. The analysis of variance (ANOVA) statistical test was used to test the postulated hypotheses of this study.

4.0 RESULTS AND DISCUSSION

This research was conducted to assess the impact of food price fluctuation on food accessibility among households in Jos. The results of the study are discussed below.

4.1 Pattern of Food Price Fluctuation in the study Area.

Information on the pattern of food price fluctuation is presented with the aid of line graph, five food items that are household staple diet items are presented, these are; rice, yam, palm oil, sugar and maize. These are presented for the year 2012 to 2015 and the averages of prices (per kg/ltr) of each food item from the year 2012 to 2015 are seen in Table 2 and Figure 4.

Table 2: Averages of food item prices in naira (₦) between 2012 and 2016

Food Item	Year				
	2012	**2013**	**2014**	**2015**	**2016**
Rice	85.81	232.21	33.8	100.22	294.11
Yam	119.17	91.02	40.88	83.39	165.57
Palm oil	311.33	294.86	98.33	176.4	518.68
Sugar	118.36	151.38	31	103.73	305.6
Maize	80.04	89.51	42.55	46.78	152.14

Source: PADP, 2016.

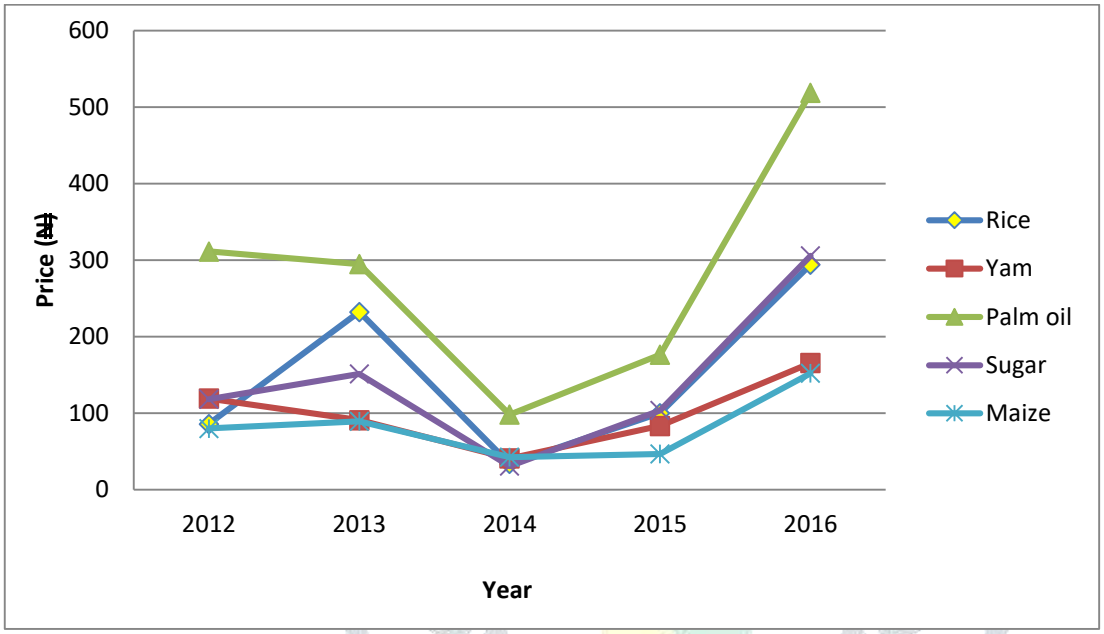

Fig. 4: Averages of Food Item Prices in Jos Area between 2012 and 2015.

The prices of food items prices in 2014 are relatively low, this is because food prices held steady in Nigeria. According to reports by business news (2014), the Federal Ministry of Agriculture and Rural Development disclosed that there was no significant change in the prices of staples in Nigeria as the prices of rice, garri, cowpea, maize and millet remained largely stable at the end of the second quarter of 2014, also oil prices were fair and the naira had not depreciated as opposed to what is obtainable in 2016. The spike of food prices in 2016 can be explained by the current economic recession in the country occasioned by the fall in prices of oil in the international market which has dealt a devastating blow on Nigerians, following the depreciation of the naira against the dollar among other economic challenges.

4.2 Food Accessibility Status of Households in the Study Area.

The following are the conditions of questions to be met by households for each food accessibility status where 1, 2 and 3 are frequency of occurrence, 1= rarely, 2= sometimes, 3= often.

Food secure = [(Q1=0 or Q1=1 and Q2=0 and Q3=0 and Q5=0 and Q6=0 and Q7=0 and Q8=0 and Q9=0)]

Mildly Food Insecure Access= [(Q1= 2 or Q1= 3 or Q2 =1 or Q2 =2 or Q2 = 3, or Q3 =1 or Q4 =1) and Q5 = 0 and Q6 = 0 and Q7 = 0 and Q8 = 0 and Q9 = 0)]

Moderately Food insecure Access = [(Q3 = 2 or Q3 = 3 or Q4 = 2 or Q4 = 3 or Q5 = 1 or Q5 =2 or Q6 = 1 or Q6 = 2) and Q7 = 0 and Q8 = 0 and Q9 = 0)]

Severely Food Insecure Access = [(Q5 = 3 or Q6 = 3 or Q7 = 1 or Q7 = 2 or Q7 = 3 or Q8 = 1 or Q8 = 2 or Q8 = 3 or Q9 = 1 or Q9 = 2 or Q9 = 3)].

The Household Food Insecurity Access Scale (HFIAS) is a brief survey instrument adapted from the United States Department of Agriculture USDA, it is used to assess whether households have experienced problems with food access in the last 30 days (Coates et al, 2007). Table 2 shows the HFIAS assessment module.

Table 3: Household Food Access Scale Questions (HFIAS)

S/N	Occurrence Questions	Tick if Yes	How often did it happen
1.	Did you worry that your household would not have enough food?		
2.	Were you or any household member not able to eat the kinds of food you preferred because of lack of resources?		
3.	Did you or any household member have to eat a limited/few variety of food due to lack of resources?		
4.	Did you or any household member have to eat some foods that you really did not want to eat because of lack of resources to obtain other types of foods?		
5.	Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?		
6.	Did you or any household member have to eat fewer meals in a day i.e., skip meal because there was not enough food?		
7.	Was there ever no food to eat of any kind in your household because of lack of resources to get food?		
8	Did you or any household member go to sleep at night hungry because there was not enough food?		
9	Did you or any household member go a whole day and night without eating anything because there was not enough food?		

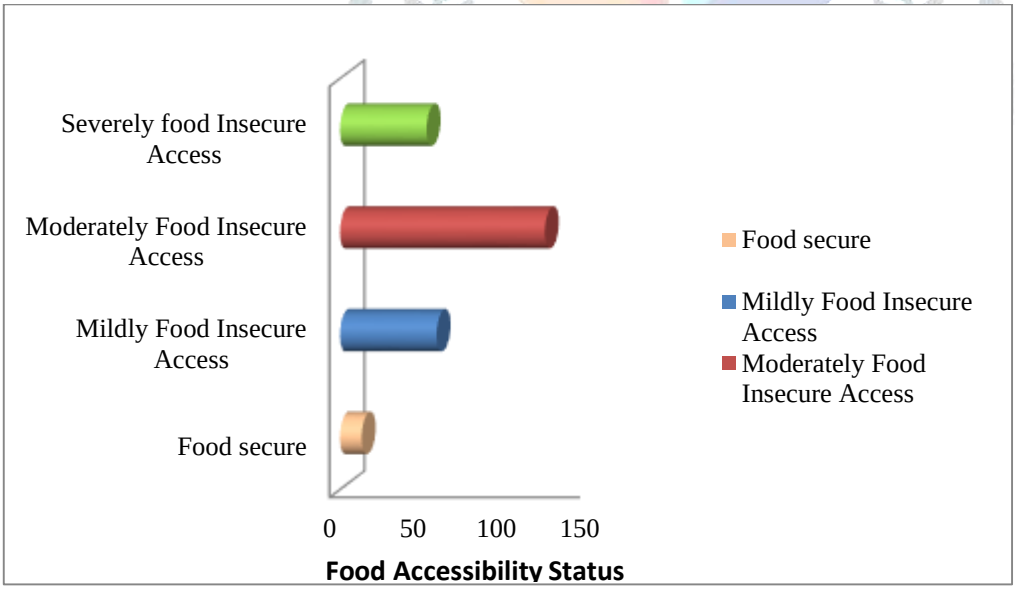

Fig. 5: Food Accessibility Status of Households in Jos Area.

Figure 5 reveals that a larger population falls within the moderately food insecure access group representing 50%, followed by 58 households that responded to mildly food insecure access representing 23.6%, 52 households were calculated to have experienced severe food insecure access with a prevalence of 21.16 and 13 households did not experience any food accessibility constraints representing 5.3%. In Jos area about 94.7% of households experienced a form of food insecure accessibility (i.e. mildly, moderately, or severely) and only 5.3% of total households are food secure in terms of food accessibility, this is so because of many factors. The most notable being that, the naira has depreciated against the dollar and oil prices have fallen. Sessou and Kolawale (2016) also reported in a vanguard paper that, Nigerian families now grapple with astronomical prices of food items and are gearing under the high price of food items which have increased by 100% in 2016.

According to Nigeria's former Minister of water resources and agriculture, Abba Ruma, 65% of the Nigerian population is suffering from lack of food security, adding that 40% of children under five are stunted and 25% are under weight, this was noted by Ojo and Adebayo (2012), they further stressed that Nigeria's food situation is not good enough and Nigeria is far from been food secured. The IFPRI (2011), confirms that Nigeria was ranked 33rd on the global Index of Hunger in 2015 with a prevalence

of 25.5% and the situation is on a serious scale. Also, Evans (2011) agrees by stating that according to UNICEF statistics, about 65% of Nigeria's population is food insecure and that food insecurity is the greatest threat to National stability.

With emphasis on the findings of this study**,** the following conclusions are made; that fluctuation of food item prices is experienced in Jos area and all food items are affected by food price fluctuation with a price peak in the year 2016. Hunger, malnutrition and reduced purchasing power are the highest ranking impacts of food price fluctuation in Jos area. Lastly, only 5.3% of the sampled households have a secure food accessibility status, about 94.7% of the households face a type of insecure food accessibility that is either on a mild, moderate or severe scale.

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