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## Assessment of Households' Food Access and Food Insecurity in Urban Nigeria: A Case Study of Lagos Metropolis

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**Keywords:** *access, assess, dietary, food, harvest, hunger, insecurity, metropolis, probit, secure.*

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# Assessment of Households' Food Access and Food Insecurity in Urban Nigeria: A Case Study of Lagos Metropolis

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## I. INTRODUCTION

Ensuring food security is currently one of the greatest challenges facing the world community presently because of soaring food prices. This challenge is said to be most critical in Low Income Food Deficit African countries, of which Nigeria is one (FAO, 2008). The problem of food insecurity over the past decade has worsened. The National Planning Commission (NPC, 2005; 2010) pointed out that the existence of this problem of food insecurity when in 2004, more than a third of the population (34.9%) lived in a state of food poverty and worsened over a five year period in 2010 to 38.7% of the Nigerian population. Giovanni *et al* (1987) and Delisle (1990) pointed out that food problems was worsening over the rural - urban

divide with more and more people in the urban areas becoming less food secure. This phenomenon arguably arises from the fall out of the urbanisation problem. Again, given that rural areas are the sites for majority of the food consumed in Nigeria, food problem are less likely to be pronounced in rural areas compared to the case of urban areas where agricultural activities are minimal. Urbanisation coupled with the volatile world food prices present a situation of food crisis. As Badmus and Yekini (2011) pointed out, a steady increase in the number of people living in and around cities in Nigeria has implications for food security since the costs of supplying food from rural to urban areas are also rising.

In order to be able to tackle the problem of food insecurity in a country with high levels of urbanisation like Nigeria (NPC, 2005), it is paramount to understand the nature of food insecurity in the area. The International Institute of Tropical Agriculture (IITA, 2012) using the Global Food Security Index (GFSI) of the Economic Intelligence Unit helped in understanding the dimension of food insecurity experienced presently in Nigeria. Using the GFSI, IITA ranked Nigeria very high in terms of food availability or supply among many other countries. However, in the area of food affordability or food access, Nigeria was ranked very low. In fact, out of a total of 105 countries, Nigeria ranked 80. This throws to the fore the fact that food insecurity problems in Nigeria is particularly access related.

A failure to address the problem of food insecurity in Nigeria, has the capacity of tilting the polity, thereby creating political and economic instability as was the case in the Arab Spring, where soaring food prices and hunger triggered a revolution that ousted governments of the country where this uprising began (Egypt and Tunisia). Therefore, if the rapidly emanating trend of food crisis in urban areas relative to rural areas is to be arrested, it is paramount to understand the characteristics of urban dwellers that predispose them to poor food access and ultimately food insecurity for policy making purposes.

### a) Theoretical and conceptual framework

The United States Agency for International Development (USAID, 1992) defined food security as a situation when all people at all times have both physical

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and economic access to sufficient food needed to meet their dietary needs for a productive and healthy life. Three pillars of food security are also identified as food availability, food access and food utilisation.

Food insecurity on the other hand is the condition of limited or uncertain ability to procure food required to meet dietary needs for a productive and healthy life. Food insecurity problem in Nigeria has been identified to be mainly access dominated. Food access has been defined as the ability of individuals or households to acquire sufficient quantity(s) and quality of food to meet all households' members' nutritional requirements (Langworthy *et al* 2003). An attempt to assess food insecurity in a country like Nigeria where food insecurity is dominated by lack of access would be largely successful, if the focus of the analysis is on household or individuals' food access. Thus households or individuals with adequate food access would be food secure while those with inadequate food access would be food insecure. As such, in a country like Nigeria, under the prevailing access dominated food insecurity condition, food access can be used as a proxy for measuring food insecurity. A household is said to have adequate food access when it has adequate incomes or other resources to purchase or barter to obtain levels of appropriate foods needed to maintain consumption of an adequate diet or nutritional level (USAID, 1992).

There are two major approaches to measuring the food access component of food security (or food insecurity as the case may be). The first of the approaches to measuring food insecurity, albeit the access aspect is the quantitative approach which though methodologically sophisticated and empirically grounded as a measurement scale, poorly reflects an individuals' true deprivation. This is because such scales use income-based measures of food insecurity at the household level (Webb *et al.*, 2002) which may not truly reflect food security or insecurity status especially for households producing own food. Usually, this income-based measure of food security at the household level involves manipulation of data of the household income and determining relationships between income-based variables and certain household characteristics (Coates *et al.*, 2003). A typical example of such empirical approach is found in the work of Omonona and Agoi (2007) in which food insecurity situation among urban households in Nigeria was measured. Omonona and Agoi (2007) developed an index for food insecurity as the ratio of per capita food expenditure for a household to the mean per capita food expenditure of all households. An index greater than or equal to one was interpreted as being food secure while one with an index less than one was interpreted as being food insecure. Though empirically appealing, this approach could be limited in its usefulness if one considers households whose food consumption consists of home grown or produced food, or those

households who enjoy food aids or source for food in socially acceptable ways but which do not necessary involve expenditure for food acquisition. A more direct approach which would address household food experience arguably needs be evolved. Recent field validation has shown the usefulness of qualitative approaches in measuring food insecurity in the world over (Webb *et al.*, 2002, Coates *et al.*, 2003, Frongillo and Nanama, 2003). Qualitative measures were found to be strongly correlated with common indicators of poverty and food consumption as well as with indicators used by international aid agencies for monitoring food security-related activities. For the purpose of measuring food insecurity or the food access component of food security, the Food and Agriculture Organisation (FAO, 2008) utilised two types of qualitative measures namely, the Household Food Insecurity Access Scale (HFIAS) and the Household Dietary Diversity Score (HDDS). For the purpose of this study, these two tools were also utilised. Both are simple tools providing information on household's diets in relation to their ability to access food. The HFIAS tool is composed of nine questions that asked about modifications households make in their diet or food consumption patterns when having limited resources to acquire food. The tool elicits whether in the previous month households experienced anxiety about household food supply, and if they reduced the quality or quantity of food consumed. On the other, the HDDS is a measure of the total number of different food groups eaten in the previous 24 hours and such reflects both availability and in particular food access on the premise that households consume a variety of foods when they have the means to consume them.

Therefore using the qualitative approach, the objectives of the study are therefore

- i. To determine the level of household food access during harvest and hunger periods in Lagos metropolis.
- ii. To determine the prevalence of food insecurity among urban households between the harvest and hunger periods in Lagos metropolis.
- iii. To determine the factors responsible for urban households food insecurity in Lagos metropolis.

## II. RESEARCH METHODOLOGY

The sample population for this research was drawn from Lagos metropolis to capture Low Income high population density areas, Medium Income medium population density areas and High Income low population density areas. Based on a classification model adopted by Okuneye *et al* (2007) to study the interplay of migration and urban expansion on health and environment in Lagos metropolis, the three types of settlements were drawn from Lagos metropolis. Ikoyi LGA was selected to represent High Income Low Population density settlements. Surulere LGA was

selected to represent Middle Income and Medium Population Density settlements. While Agege LGA was selected to represent Low Income and High Population density settlements.

The sampling procedure used for this research is a multi-stage sampling technique. Firstly, using the classification criteria adopted from Okuneye *et al.*, (2007) the metropolis was classified as described above. A total of 180 randomly selected respondents were covered and these were drawn from three purposively selected Local Government Areas (LGAs) specified above. In each LGA, the street listings of the 2006 National Census were used to draw a random list of six streets after which systematic random sampling was used to select 10 houses (first house was selected by the use of random numbers, subsequently, every fourth house was selected) per street from which a household was subsequently selected. From this starting point, socio-economic, economic, household food consumption and risk structure investigations were then carried out in the metropolis. The selected households were interviewed during the post harvest period when food stores are normally good, between September and October of 2010. This was based on the predictions of the Famine Early Warning Systems Network (2010) of harvest season for the southern part of Nigeria where the metropolis is located. A repeat survey was carried out on the same set of households during the hunger period, between December and January of 2011. This was done in order to be able to compare the prevalence or otherwise of food insecurity among households in both settlements over a period of time and to capture accurately the concept of volatility of household consumption between the two time periods. The research instrument was a combination of structured questionnaires designed to elicit responses on household characteristics, socio-economic as well as economic characteristics and HFIAS tool as discussed in the body of this work.

Data obtained was analysed using descriptive statistics such as tables, percentages, frequencies, mean etc. to describe socio-economic characteristics of households. Probit regression model was specified to determine the influence of certain socio-economic characteristics in increasing or decreasing the probability of households being food insecure.

➤ The mean HFIAS score from the HFIAS scale and the mean HDDS score from HDDS scale both of the of the USAID supported FANTA (2003) were used to analyse objective (i) which is to determine level of food access for households in the urban areas. The HFIAS module contains 9 questions with each having a maximum score of 3 for frequency of experience food hunger experience(s). Based on the response to the nine questions and frequency of occurrence over the past 30 days, households are

assigned a score that ranges from 0 to 27. A higher HFIAS score is indicative of poorer access to food and greater household food insecurity. Three degrees of severity of food insecurity was developed adopting the approach of FAO (2008) most food secure = scores of 0-11; medium food secure/moderately food insecure = 12-16; and least food secure/severely food insecure = 17 or more. The HDDS measured the total number of different food groups eaten in the previous 24 hours by any household member. This type of measure according to FAO (2008) is a reflection both of food availability and in particular of food access, on the premise that households consume a variety of foods when they have the means to acquire them. The food groups covered by the HDDS adopting FAO (2008) approach are meant to reflect a range from foods, from those that do not contribute to a nutritious diet but require resources to acquire, such as sugar, sweets, beverages and condiments, to foods that contribute to the quality of the diet in terms of essential nutrients. The tool asked questions on about 12 food groups which for simplicity and compactness was reduced to 8 for the purpose of analysis. The score is a simple sum of food groups consumed by any household member from the total of twelve (FAO 2008). Households were classified into three dietary groups based on the overall distribution of the dietary diversity (DD) score for the metropolis, each combined using data from the first survey. The same categories were maintained for analysis of the metropolis in the second round: low DD = 3 or fewer food groups; medium = 4; and high = 5 or more. Ranges for the mean HFIAS and HDDS were arrived at 95% confidence interval.

- The HFIAP tool of the HFIAS scale was used to analyse objective (ii) which is to determine the prevalence of food insecurity among urban households between the harvest and hunger periods in Lagos metropolis.
- The probit regression model was specified to determine the factors increasing the probability of households being food insecure or otherwise.

Stating the probit model as a latent variable model, and supposing an auxiliary random variable  $Y^*$  exists, then

$$Y = \mathbf{1}_{\{Y^* > 0\}} = \begin{cases} Y^* = X'\beta + \varepsilon, \\ 1 & \text{if } Y^* > 0 \text{ i.e. } -\varepsilon < X'\beta, \\ 0 & \text{otherwise.} \end{cases}$$

$$\begin{aligned} \Pr(Y = 1 | X) &= \Pr(Y^* > 0) = \Pr(X'\beta + \varepsilon > 0) \\ &= \Pr(\varepsilon > -X'\beta) \\ &= \Pr(\varepsilon < X'\beta) \quad (\text{by symmetry of the normal dist}) \\ &= \Phi(X'\beta) \end{aligned}$$

and following the work of FAO (2008) a dichotomous dependent variable of food insecurity is set. Taking household food insecurity (access) as the dependent variable, the probability of the *i*th household being food insecure or not depends on unobservable index  $Y_i$  that is determined by the explanatory variable in such a way that the larger the value of index  $Y_i$  the greater the probability of the household being food insecure (access). The index  $Y_i$  can be expressed as  $Y_i = \beta_1 + \beta_2$

$X_i$ , where  $X_i$  are the explanatory variables. Therefore, for each household there is a critical or threshold level  $Y_i^*$ , such that if  $Y_i$  exceeds  $Y_i^*$  (HFAS > 17), the household would be food insecure, otherwise not. Values equal to one are assigned for non-zero observations, so that they have dichotomous value for household food insecurity. The following equation is thus specified given the set of parameters  $\beta$  reflecting the impact of changes in  $X$  on the probability of  $Y$  being 1.

$$P(Y=1|X) = \Pr(Y^* > 0) = \Pr(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_n X_n + \alpha > 0).$$

- $X_1$ = Household head's age
- $X_2$ = Number of spouses by household head
- $X_3$ = Number of female household member above 15 years
- $X_4$ = Number of male household member above 15 years
- $X_5$ = Household size
- $X_6$ = Number of household member with minimum of primary education
- $X_7$ = Job type of household head (Self-employed=1, employee=0)
- $X_8$ = Supplementary source of income (Yes=1, No=0)
- $X_9$ = Household monthly income from productive members.
- $X_{10}$ = Household monthly saving in formal and informal institutions
- $X_{11}$ = Experience of job loss within the research year (Yes=1, No=0)
- $X_{12}$ = Experience of hospitalised illness within the research year (Yes=1, No=0)
- $X_{13}$ = Eviction notice(s) served within the research year (Yes=1, No=0)

### III. RESULT AND DISCUSSION

Table 1 shows that in Lagos metropolis, in all the three areas, majority of the households were male headed with as much as over 70% of the respondents in two of the areas (76.7% and 76% respectively for the low income Agege and high income Ikoyi settlements). It also showed that among the household heads none was above 60 years of age in the low income Agege, while a very minute portion of the medium income Surulere and high income Ikoyi population (1.7% and 3% respectively) had household heads above the age of 60. Interestingly, majority of the interviewed household heads were between the ages of 31 and 40 years (51.7%, 40.7% and 36.7% respectively for low income Agege, medium income Surulere and high income Ikoyi

areas). The implication of having majority of the household head being within this young age group is that most of them are still economically active and productive, capable of pursuing multiple livelihood strategies and ensuring household food security through various streams of income. On the down side however, as it has been argued, wealth tends to be accumulated over a life cycle and it is thus expected that households with older household head tend to have broader wealth base acquired over the years (Wolff, 1979). This wealth base could serve as household insurance against food consumption shocks/risks if the need arises, lacking which, the households suffer. It was observed that none of the respondents from the high income Ikoyi settlement had household sizes above 8 members while households in medium income Surulere

and low income Agege settlements had (5.1% and 1.7% respectively) had. Majority of the households in all three settlement areas had household sizes ranging from 4 to 8 members (68.3%, 74.9% and 61.7% respectively for low income Agege, medium income Surulere and high income Ikoyi settlements). This is a testament to the fact

that higher income households tend to have smaller household sizes which ultimately enhances their food security since they have fewer mouths to feed with their relatively better income. In terms of educational diversity, household members with a minimum of primary education varied across the settlement areas.

Table 1 : Socio-economic characteristics of households in Lagos metropolis

	LI (Agege)		MI (Surulere)		HI(Ikoyi)		Total	
	Freq	%	Freq	%	Freq	%	Freq	%
Sex of household head								
Male	46	76.7	40	67.8	50	83.3	136	76.0
Female	14	23.3	19	32.2	10	16.7	43	24.0
Total	60	100.0	59*	100.0	60	100.0	179	100.0
Age of household head								
Below 30 yrs	1	1.7	3	5.1	4	6.7	8	4.5
31-40 yrs	31	51.7	24	40.7	22	36.7	77	43.1
41-50 yrs	18	30.0	23	39.0	19	31.7	60	33.2
51-60 yrs	10	16.7	8	13.6	13	21.7	31	17.4
Above 60 yrs	0	0.0	1	1.7	2	3.3	3	1.8
Total	60	100.0	59*	100.0	60	100.0	179	100.0
Household size								
<4 members	18	30.0	13	22.0	23	38.2	54	30.2
4- 8 members	41	68.3	43	74.9	37	61.7	121	67.6
>8 members	1	1.7	3	5.1	0	0.0	4	2.2
Total	60	100.0	59*	100.0	60	100.0	179	100.0
Household members with minimum of pry sch education								
0	4	6.7	3	5.1	2	3.3	9	5.1
1-3 members	24	40.0	29	49.1	38	63.3	91	50.8
4-8 members	31	41.6	26	44.1	20	33.4	77	43.0
>8 members	1	1.7	1	1.7	0	0.0	2	1.1
Total	60	100.0	59*	100.0	60	100.0	179	100.0
Occupation type of household head								
Self employed	25	41.7	22	37.3	23	38.3	70	39.1
Employee	35	58.3	37	62.7	37	61.7	109	60.9
Total	60	100.0	59*	100.0	60	100.0	179	100.0
Secondary income sources by household heads								
Yes	17	28.7	24	40.7	20	33.3	61	34.1
No	43	71.7	35	59.3	40	66.7	118	65.9
Ratio of household members above 15 yrs								
0.1 to 0.25	20	33.33	12	20.30	10	16.67	42	23.5
0.26 to 0.50	1	7.67	21	35.60	23	38.33	45	25.1
0.50 to 0.75	39	65.00	26	44.10	27	45.00	92	51.4
Total	60	100.0	59*	100.0	60	100.0	179	100.0
Ratio of working household members								
0.1 to 0.25	2	36.67	23	39.0	26	43.33	51	28.5
0.26 to 0.50	24	10.00	30	50.8	23	38.33	77	43.0
0.50 to 0.75	32	46.67	1	1.7	10	16.67	43	24.0
0.76 to 0.99	2	6.67	5	8.5	1	1.67	8	4.5
Total	60	100.0	59*	100.0	60	100.0	179	100.0

Source : Field survey, 2011

Of the 1.7% who had above 8 household members in low income Agege, all had a minimum of primary education, while 1.7% of the 5.1% who had more than 8 household members in the medium income Surulere had a minimum of primary education. Again, even though all three settlements had about a third of interviewed household heads with alternative/secondary sources of income, majority were without secondary sources of income (71.7%, 59.3% and 66.7% respectively for the low income Agege, medium income Surulere and high income Ikoyi settlements). Having an alternative source of income would serve as an insurance for the household against income shocks or income loss arising from any form of eventuality that could be unforeseen especially for households with heads being self employed and whose livelihood are seriously subject to the vicissitude of economic environment in which they are found.

Table 2 shows the level of food access among households in Lagos metropolis. Combining settlements, it shows that all settlements had better food access during the harvest period than in the hunger period as indicated by the lower mean score of the HFIAS during the harvest period. By implication, the seasonality of food in terms of food scarcity during off-season as well as the attendant high prices of food with season change has serious impact on an average household in the metropolis as they were unable to secure an adequate food access for their household in the hunger period. Another possible reason for an average household being unable to secure adequate food access for itself could be as a result of the high standard of living within the metropolis which could also make it difficult for households to smooth out consumption and hence maintain the adequate food access of the harvest season (Fourchard, 2003). On the average, households in the metropolis had adequate food access since the score ranged between 5.63 and 7.27, all less than 11 the cut off point for adequate food access. In the hunger period, on the average, households had relatively moderate food access but did not have adequate food access, since the score ranged from 11.55 to 13.22 at 95% confidence interval. Using Z-test to test for difference in means for households in different settlements between the two rounds of survey and comparing between settlements, consistently in all the three settlements in Lagos metropolis, household members became significantly worse off in terms of food access during the hunger period than in the harvest period ( $p < 0.01$ ).

Table 3 shows that in the low income Agege settlement area, the proportion of food insecure household increased by about 50% in the hunger period from the harvest period; in medium income Surulere it increased by about 30% and strangely by about 45% in high income Ikoyi settlement area. In the low income

Agege settlement area less than a tenth (5%) was severely food insecure in the harvest period; this percentage increased to about a quarter of the population (25%) in the hunger period. The proportion of the moderately food insecure households in low income Agege settlement area increased to about a half of the households (48.3%) in the hunger period from about a quarter (23.3%) during the harvest period. Also, from table 3 it can be seen that among the medium income Surulere settlement, the percentage of severely food insecure went up from about less than a tenth of the population (5.1%) in the harvest period to about a third of the population (32.2%), while there was only a slight increase in the percentage of moderately food insecure household from 30.5% to 35.6%. In the high income Ikoyi settlements, during the harvest period, none was severely food insecure while just a twentieth (5%) was moderately food insecure. The proportion of severely food insecure household increased to just slightly above a tenth (13.3%) in the hunger period from nil during the harvest period. In the same vein, it went up to just slightly above a third for moderately food insecure. In all the three settlement areas, the prevalence of household food insecurity (whether moderate food insecurity or severe food insecurity) decreased as we go up the income class from 73.3% in low income agege, to 67.8% in medium income surulere and finally to 50.0% in high income ikoyi. This result buttresses the findings of Riber and Hamrick (2003) who pointed out that households transit in and out food insecurity over time, as well as the work of Obamiro *et al.* (2005) who posited that the problem of food insecurity in the hunger period is a long standing one.

Table 4 shows household dietary diversity at 2 time periods by settlements in Lagos metropolis. Combined by metropolises, there was a significant difference in the mean number of food groups consumed by households during both periods; the households in Lagos metropolis had higher mean score for dietary diversity in the harvest period than in the hunger period. In the harvest period the combined mean score of food groups consumed during the harvest period was 3.25 i.e. households in Ibadan metropolis consumed an average of 3 food groups during the harvest period. This figure decreased to an average score of 2.54 i.e. households in the settlement consumed lesser food groups in the hunger period. The difference in the mean score for food groups, using Z-test, between the 2 periods was significant at 0.01 level.

Table 2 : Assessment of Household Food Access Using HFIAS score

Combined settlements	Mean HFIAS $\pm$ standard error of the mean	95% confidence interval
September – October 2010	6.45 $\pm$ 0.41	5.63-7.27
December – January 2011	12.44 $\pm$ 0.45	11.55-13.32
Low Income (Agege) survey 1 <sup>a,b</sup>	7.22 $\pm$ 0.81	5.60 - 8.84
Low Income (Agege) survey 2 <sup>c</sup>	13.83 $\pm$ 0.70	12.42 - 15.24
Medium Income (Surulere) survey 1 <sup>d,e</sup>	7.76 $\pm$ 0.78	6.21 - 9.32
Medium Income (Surulere) survey 2 <sup>f</sup>	13.34 $\pm$ 0.81	11.72 - 14.90
High Income (Ikoyi) survey 1 <sup>g</sup>	4.40 $\pm$ 0.45	3.00 - 4.80
High Income (Ikoyi) survey 2	10.15 $\pm$ 0.75	8.15 - 11.15

Source : Field survey, 2011

- a. Z-stat = 2.936, significant difference in mean HFIAS between 2 time periods in Low Income Agege Settlement Area ( $p < 0.01$ )
- b. Z-stat = 3.121, significant difference in mean HFIAS between Low Income Agege and High Income Ikoyi Area during harvest period ( $p < 0.01$ )
- c. Z-stat = 2.714, significant difference in mean HFIAS between Low Income Agege and High Income Ikoyi Area during hunger period ( $p < 0.01$ )
- d. Z-stat = 2.597, significant difference in mean HFIAS between 2 time periods in Medium Income Surulere Settlement Area ( $p < 0.01$ )
- e. Z-stat = 3.943, significant difference in mean HFIAS between Medium Income Surulere and High Income Ikoyi Area during harvest period ( $p < 0.01$ )
- f. Z-stat = 2.639, significant difference in mean HFIAS between Medium Income Surulere and High Income Ikoyi Area during hunger period ( $p < 0.01$ )
- g. Z-stat = 4.126, significant difference in mean HFIAS between 2 time periods in High Income Ikoyi Settlement Area ( $p < 0.01$ ).

Table 3 : Assessment of prevalence of varying degrees of food insecurity in Lagos metropolis

	Percentage of moderately food insecure households	Percentage of severely food insecure households	Total food insecure households
LI (Agege) survey1	23.3	5.0	28.3
LI (Agege) survey 2	48.3	25.0	73.3
Total	71.6	30.0	
MI (Surulere) survey1	30.5	5.1	35.6
MI (Surulere) survey2	35.6	32.2	67.8
Total	66.1	37.3	
HI (Ikoyi) survey1	5.0	0.0	5.0
HI (Ikoyi) survey2	36.7	13.3	50.0
Total	36.7	13.3	

Source : Field survey, 2011

Table 4 : Assessment of Household Dietary Diversity during harvest and hunger periods in Lagos metropolis

Combined settlements	Mean HDDS $\pm$ standard error of the mean	95% confidence interval
September – October 2010	3.25 $\pm$ 0.10	3.04 – 3.46
December – January 2011	2.54 $\pm$ 0.09	2.79 – 3.18
Low Income (Agege) survey 1	2.55 $\pm$ 0.07	2.40 – 2.69
Low Income (Agege) survey 2	2.37 $\pm$ 0.10	2.16 – 2.57
Medium Income (Surulere) survey 1	2.25 $\pm$ 0.10	1.55 – 1.95
Medium Income (Surulere) survey 2	2.22 $\pm$ 0.12	1.48 – 1.96
High Income (Ikoyi) survey 1 <sup>a</sup>	4.98 $\pm$ 0.08	4.32 – 4.64
High Income (Ikoyi) survey 2	4.33 $\pm$ 0.13	3.56 – 4.10

Source : Field survey, 2011



a. Z- stat = 2.732, significant difference between HDDS for High Income Ikoyi during 2 periods ( $p < 0.01$ )

Table 4 also shows that in the low income Agege and medium income Surulere settlement the differences between mean score of food groups consumed during the harvest period and the hunger period were slight and insignificant. At the two periods, the average food groups consumed were slightly less than two but ranged between 2.37 and 2.55 as well as between 2.22 and 2.35 respectively for the low income settlements and medium income settlements in the time periods. In the high income Ikoyi settlement area, the mean number of food group was significantly different (0.01 level) than was observed for the low income and medium income settlements. The mean score of food groups consumed by the households in the high income Ikoyi settlement ranged from 4.32 to 4.64 at 95% confidence interval for the harvest period and between 3.56 and 4.10 during the hunger period.

Table 5 shows the household dietary diversity among households combined in Lagos metropolis. The households consumed fewer food groups in the hunger period than in the harvest period. However, the mean number of food groups consumed was not significantly different during the hunger period. A cursory look at the diets of the households in the metropolis gives a clear idea of the quality of food that households have access to. It is noteworthy however that, though this significantly better dietary diversity (a proxy for the quality of diet to which an average household has access) was experienced in both metropolises during the harvest period, yet the dietary status of an average household was ranked as low. It is easily appreciated that an average household in Lagos metropolis had adequate access to the desired quantity of food during both the harvest and hunger period but in terms of quality, an average household had low access to wide spectrum of food types either as a result of off-season scarcity of different types of food during hunger period.

Table 5 : Assessment of Household Dietary Diversity for Combined Settlements in Lagos metropolis

Combined settlements	Mean HDDS $\pm$ standard error of the mean	95% confidence interval
Lagos metropolis		
September – October 2010	3.25 $\pm$ 0.10	3.04 – 3.46
December – January 2011	2.54 $\pm$ 0.09	2.79 – 3.18

Source : Field survey, 2011

Table 6 shows the probit result for determinants of household food insecurity in Lagos metropolis. With respect to the goodness of fit of the model, 74.86% of the time, the estimated coefficients of the model explains variations in observations of the food insecurity index. This is shown by the value of percentage correctly explained. Also, together, the explanatory variables or the coefficients are statistically significant since the LR

statistic is 20.8766 with a  $p$  value of 0.0754. For Lagos metropolis, households with older head ( $p < 0.01$ ), larger sizes ( $p < 0.1$ ) and experiencing job loss among employed members ( $p < 0.1$ ) had the propensity of being food insecure. On the other hand, households with more adult male members ( $p < 0.05$ ) had the propensity of being food secure.

Table 6 : Probit regression result of determinant of household food insecurity in Lagos metropolis

Dependent variable: Household food insecurity Convergence achieved after 4 iterations

Variable name	Estimated coefficient( $\beta$ )	Standard error	t-ratio
Age of household head	0.28149***	0.10047	2.80170
No of spouse(s)	-0.28994	0.32228	-0.89966
No of females >15yrs	0.11051	0.10339	1.06886
No of males >15yrs	-0.23720**	0.10533	-2.2519
Household size	0.20314*	0.10424	1.9480
No of household member with pry education	-0.10634	0.10334	-1.029
Occupation of household head	0.32821	0.22658	1.4486
Supplementary source of household head income	-0.97119E-02	0.22303	-0.43545E-01
Household monthly income	-0.32160E-05	0.29427E-05	-1.0929
Household savings	-0.84576E-05	0.12230E-04	-0.69157
Job loss experience	0.42903*	0.23600	1.8179

Hospitalised illness	-0.29386	0.21985	-1.3366
Eviction notices	-0.23303	0.23991	-0.97130
Constant	-1.5768	0.60792	-2.5938

Source: Field survey, 2011

No of observations = 179, \*\*\* sig at 0.01, \*\* sig at 0.05, \* sig at 0.10

Loglikelihood function = -95.587,

scale factor = 0.32177,

% correctly predicted = 74.86%

Chow R-squared = 0.11686

Cragg-uhler R-squared = 0.15859

F = 0.11760 at 13 d.f

Likelihood ratio statistics = 20.8766

p> chi squared = 0.07540

#### IV. CONCLUSION AND RECOMMENDATION

From the study, the following can be concluded;

- i. Harvest period food access was significantly better than hunger period food access for an average household in the metropolis.
- ii. Seasonal nature of food commodities affects an average household access to food commodities.
- iii. Access to food in the right quantity among households in the metropolis does not guarantee access to food of the right quality as situations existed where average households in Lagos metropolis had adequate food access in both harvest and hunger periods but when their dietary diversity was considered, they were ranked low.
- iv. Food insecurity was prevalent transiting from harvest to hunger period, albeit the more for low income settlement areas than for the higher income areas.
- v. Household's experience of job loss was significant as risks or shock variables capable of plunging households into conditions of food insecurity.
- vi. Households with older heads tended to be food insecure than those with younger heads in the metropolis.
- vii. Larger households were significantly more food insecure than smaller households.

Therefore, this research work recommends the following;

- i. Urgent steps should be taken to stem the tide of increasing food prices to affordable levels.
- ii. Agricultural policy(s) aimed at strengthening the agricultural sector of the economy to ensure sustainable food security in the country, should be formulated
- iii. Encourage family planning such that households would learn to keep their household sizes within their means of reasonable sustenance.

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