

Volume 4, No. 1, April, 2013

Journal of Sustainable Technology JoST

JoST

ISSN: 2251-0680



Journal of Sustainable Technology

Volume 4, No. 1, April, 2013

CERAD

CENTRE FOR RESEARCH AND DEVELOPMENT
THE FEDERAL UNIVERSITY OF TECHNOLOGY,
AKURE, NIGERIA.

www.jost.futa.edu.ng



An econometric analysis of household vulnerability to food poverty in urban Nigeria: A case study of Ibadan metropolis

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ABSTRACT: This study analysed household food vulnerability during harvest and hunger (post-harvest) periods in Ibadan metropolis, Nigeria. Primary data were collected through the use of questionnaire. The metropolis was stratified into low, medium and high income settlement areas from each of which 60 households were randomly selected to make a total of 180 households. The data were analysed by descriptive and econometric techniques including 3 Stage Feasible Generalised Least Squares regression methods. Majority of the households in the metropolis were male headed (68.5%) and had an average household size of between 4 and 8 members (71.6%), 95.7% of the households had at least one literate household member. Household per capita food consumption was significantly reduced in Ibadan metropolis by increased use of management coping strategy ($p < 0.01$), increasing the number of adult female members ($p < 0.05$) as well as households increased involvement in secondary occupations ($p < 0.01$). Dummy for household being self employed increased significantly ($p < 0.01$) household per capita food consumption. In terms of variability in household per capita food consumption, dummy for household head been self employed ($p < 0.1$) was responsible for the largest variability in per capita food consumption, followed by household use of social group coping strategy ($p < 0.05$) and finally by the dummy for the sex of household head been male ($p < 0.05$). In all, 70.4% of the respondents interviewed were found to be food vulnerable. The study therefore, recommends that family planning, ensuring of basic education by urbanites as well as a diverse and vibrant economic system be put in place.

Keywords: Vulnerability, poverty, shocks, food, caloric

JoST. 2013. 4(1): 88-100.

Accepted for Publication, April 22, 2013

INTRODUCTION

As early as 2002, analysts have asserted that Nigerians were hungry then more than ever before, with most people's existence revolving around looking for food alone (Partnership for Development, 2002). By 2010, it was already an established fact that food poverty was prevalent in the nation. The National Bureau of Statistics (NBS, 2011) asserted that by 2010, 41.0% of the

Nigerian population lived in food poverty. By geographical difference, food poverty was more prevalent in rural Nigeria (48.3%) than in the urban Nigeria (26.7%) for the year 2010. However, on closer introspection, a trend earlier predicted at the international stage, was already playing out, where the gap between the poor and non-poor for the urban areas and rural areas were

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almost converging. One of such proponents of this phenomenon whereby the proportion of the poor in the rural was falling while that of the urban areas was slowly and steadily rising is Giovanni *et al.* (1987). Giovanni *et al.* (1987) pointed out that a demographic revolution was moving hunger and poverty problems in developing countries away from rural areas to urban areas. This transition away from the rural areas that is now swelling the ranks of the urban dwellers cannot be overlooked for its policy implication. More and more urban dwellers are becoming poor, especially so for food poverty, probably due to the effects of urbanisation and its negative influence on the food needs and availability among urban dwellers, particularly for the south-western Nigeria where the hub of urbanisation in the country is. Besides the impact of urbanisation on food poverty status of urban dwellers, the problem of volatility of world food prices peaking and dropping with season can also not be ignored as it introduces a dynamic twist to food poverty statuses of households and individuals. In fact, the National Planning Commission (2005), identified seasonal volatility of food prices as a major limitation to food access in Nigeria with households' food status changing from one season to the other. It therefore behoves upon us to identify the characteristics of urbanites that with seasonal changes, could be responsible for household being food poor.

Food poverty is a condition which exists when individuals' food consumption falls below an ex ante identified food poverty line. It is a key aspect of absolute poverty measure and is a strong indicator of absolute poverty (NBS, 2011). Adopting the specified national minimum caloric consumption required per adult equivalent for Nigeria, a reasonable benchmark of 3000 calories was arrived at while the cost of calorie approach

was used by the NBS (2011) to fit a food poverty line of ₦39,759.49. Therefore a household consuming below this benchmark or in lieu whose cost of calorie is less than the benchmark is said to be food poor. Given that poverty is a status already arrived at, examining characteristics of households with respect to their likelihood of being food poor in a future time cannot be addressed effectively by just studying their food poverty statuses, hence the need for a dynamic framework within which these statuses can be examined vis-à-vis the household's characteristics. Vulnerability studies have been advocated variously over time to be included alongside risks studies in order to better appreciate the concepts of poverty. It is believed that households' characteristics in the presence of certain risks/shock factors could influence future poverty status in any of two directions, bearing in mind a poverty benchmark defined beforehand. As Alwang *et al.* (2001) pointed out that a household is said to be vulnerable to future loss of welfare below socially accepted norm caused by risky events, with the degree of vulnerability depending on the characteristic of the risks and the household's ability to respond to risks. In essence, a food vulnerable household would be one that is vulnerable to food poverty given certain household specific shocks/risks, household coping strategies and household characteristics (essentially types of assets e.g. human, physical, financial, natural etc.). Chaudhuri *et al.* (2002) developed an approach for estimating vulnerability to poverty which would be adopted in this work also for estimating vulnerability to food poverty. The approach involved stating household's vulnerability to poverty as a probability statement reflecting the inability of households to attain a minimum level of consumption in the future. Formally speaking,

Chaudhuri *et al.* (2002) defined the vulnerability level of a household h at time t as the probability that the household would find itself consumption poor at time $t+1$ i.e.

$V_{h,t} = \Pr (C_{h,t+1} \leq Z)$, where C measures the household per capita consumption (in this case, per capita food consumption) at time $t+1$ and Z is an appropriate consumption benchmark or poverty line (in this case, food poverty line) and \Pr is the probability function which is dependent on the household's expected (mean) consumption and volatility (variance) of its consumption streams. Expectedly therefore, both estimates of expected consumption as well as variance of consumption are required to quantify the level of household vulnerability to poverty. This follows from the methodology of Chaudhuri *et al.* (2002).

Obtaining estimates for both the mean consumption and variance of consumption and the household characteristics influencing them (risks/shocks as well adaptive /coping strategies adopted), Christiaensen *et al.* (2000) and Chaudhuri *et al.* (2002) stated the stochastic process generating household consumption as: $\ln C_h = X_h \beta + e_h$, where C_h is per capita consumption expenditure, X_h is observable household characteristics such as household size, dependency ratio etc., β is a vector of parameters and e_h is a mean-zero disturbance term capturing idiosyncratic shocks or risks (i.e.) contributing to different per capita consumption levels for households otherwise observationally equivalent. However, the assumption of the error term capturing unobservable idiosyncratic shocks/risks presupposes that the effect of these idiosyncratic shocks/risks varies across

household. The fallout is the violation of the homoscedastic assumption of the error term. Thus, using a 3-stage heteroscedastic corrective procedure, a feasible generalised least square (FGLS) approach was adopted by Christiaensen *et al.* (2002) to obtain estimates for β and σ^2 which are asymptotically efficient and symbolising expected value of consumption and variance of consumption respectively, given X_h . This is represented as follows:

$E(\ln C_h | X_h) = X_h \beta$ i.e. expected household per capita consumption

$Var(\ln C_h | X_h) = \sigma^2_{e,h} = X_h \sigma^2$ i.e. variance of consumption

From here, Chaudhuri *et al.* (2002) estimated a probability of falling into poverty (since the mean consumption and variance of consumption had been estimated), assuming log-normality of distribution. Therefore, the probability of falling into poverty (i.e. vulnerability to poverty) was given as

$$V_h = \Pr [\ln C_h < \ln Z_h | X_h] = \frac{1}{\sigma} \left[\frac{\ln Z_h - X_h \beta}{\sqrt{X_h \sigma^2}} \right]$$

Using the above approach, this work therefore attempts to:

- i. Determine the household characteristics that are significant determinants of household per capita food consumption.
- ii. Determine what urban shock/risks factors significantly influence variability of household per capita food consumption.
- iii. Determine the proportion of households in Ibadan metropolis that are vulnerable to food poverty and what their socio-economic characteristics are.

METHODOLOGY

Multi-stage sampling procedure was used for this research based on the classification criteria adopted from Okuneye *et al.*, (2007), Ayeni (1982), NISER (1988), Abumere (1994) and Asiyanbola and Filani (2008). The metropolis was classified as relatively High Income and Low Population density settlements, Relatively Middle Income and moderate Population density settlements and Relatively Low Income and High Population density settlements. A total of 180 randomly selected respondents were covered and these were drawn from three purposively selected Local Government Areas (LGAs) representing relatively high-income and low traffic, relatively middle-income and traffic and relatively low-income, high traffic sectors of the cities. 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 over a period of time 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 as well as specific identified and documented common urban risks/shock variables such as experience of eviction, lack of adequate healthcare leading to loss of income, job losses, etc .

Analytical procedure

Data obtained was analysed using descriptive statistics such as tables, percentages, frequencies, mean, etc. to describe socio-economic characteristics of households. Also, a 3 stage Feasible Generalised Least Squares regression model adopted from Christiaensen *et al.* (2000), Chaudhuri *et al.* (2002) was specified to show the influence of selected exogenous variables (in this case, socioeconomic characteristic and household adaptive capacities) on volatility of household consumption in a future time. From here, a vulnerability estimate was arrived at.

Dummies for Coping strategies and shock variables in the model.

The choice of coping strategy variables used in this research was guided by identified coping strategies among urban dwellers in the works of Frankenberger (1992), Maxwell (1996) and Hossain (2005) as well as empirical studies on vulnerability to various forms of poverty among households in the works of Sarris and Karfakis (2006), Luigi (2004) and Adekoya (2009).

For the purpose of building dummies for coping strategy(s) as well as identifying coping strategies adopted by the households as it impacts upon households ability to influence the outcome of shocks on households per capita

food status, coping strategies was categorised as follows:

(a) Management Coping Strategy: this strategy include the use of the following mechanisms: (i). Borrowing (ii) splitting of household expenses (iii) exchange services (iv) Resource pooling by household members. For the purpose of this research, the use of at least one of these listed mechanisms was considered sufficient to identify the household as adopting management coping strategy.

(b) Asset Coping Strategy: this strategy include the use of the following coping mechanisms: (i) Sales of strategic or productive assets (ii) Sales of household luxuries (iii) sales of replaceable assets. For the purpose of this research, the use of at least one of these listed mechanisms was considered sufficient to identify the household as adopting asset coping strategy.

(c) Social Group Coping Strategy: this strategy include the use of the following coping mechanisms: (i) Support from religious bodies (ii) Support from ethnic groups (iii) Support from cooperative societies (iv) Credit support from financial institutions (v) Support from family and friends. The use of any one of these mechanisms was sufficient evidence in this research that the household adopted social group coping strategy when confronted with shocks.

The choice of shock or risks variables to which urban households are exposed and which are capable of impacting negatively on household food status in the face of inadequate coping strategies, was guided by the works of Luigi (2004), Thomas (2008), Sarris and Karfakis (2006) and Christiaensen and Subbarao (2001) were useful in selecting relevant variables. These variables included dummies for an experience of job loss or means of livelihood by a previously employed household member within the research year, an experience of eviction from places of residence that required mobilising

household resources for the purpose of getting another accommodation within the research year, as well as an experience of illnesses that required a productive member of the household be hospitalised during the research year when otherwise they could have been productive.

Analytical tools

The per capita household food consumption model for this research work is specified in formal terms as follows

$$\ln c_j = \alpha + \beta X_j + \epsilon_j$$

where $j = 1, 2, \dots, n$ is the unit of analysis, namely the household

X_j is a vector of exogenous determinants of household welfare in this case log of household food expenditure ($\ln c_j$)

X_1 = Number of adult males (16-65yrs) residential within the household

X_2 = Number of adult females (16-65yrs) residential within the household

X_3 = number of spouses had by household head

X_4 = Sex of household head (Male=1, Female=0)

X_5 = Household Size

X_6 = Household Savings in formal and informal sources

X_7 = Major occupation of household head (Self-employed=1, Employee=0)

X_8 = ownership of non residential land (owned =1, not owned=0)

X_9 = Part time occupations of household head (part-time jobs=1, no part time jobs=0)

X_{10} = management coping strategy (any of the management strategy used=1, non-use of any management strategy=0)

X_{11} = asset coping strategy (any of the asset coping strategy used=1, non-use of any asset strategy =0)

X_{12} = social group coping strategy (any of the social group coping strategy used= 1, non-use of social group coping strategy= 0)

X_{13} = Experience of job loss within the research year (Yes=1, No=0)

X_{14} = Experience of hospitalised illness within the research year (Yes=1, No=0)

X_{15} = Eviction notice(s) served within the research year (Yes=1, No=0)

X_{16} = Number of household member with minimum of primary education

α is the intercept

β is the set of coefficients to be estimated by the regression and

ϵ_j is the random error term.

Thereafter, a 3 stage FGLS model adopted by Christiaensen *et al.* (2001), Chaudhuri *et al.* (2002) was specified, correcting for the error of multiple heteroscedasticity, while specifying the error term (theoretically used to capture idiosyncratic or unidentifiable risks/shocks affecting households in a more random manner) as a function of household characteristics. From here, estimates for β and σ^2 which are asymptotically efficient and symbolising expected value of consumption and variance of consumption respectively (given X_h) are arrived at and represented as follows: $E(\ln C_h | X_h) = X_h \beta$ i.e. expected household per capita consumption

$\text{Var}(\ln C_h | X_h) = \sigma_{e,h}^2 = X_h \sigma^2$ i.e. variance of consumption.

Given these estimates and the household characteristics responsible for their values, the food vulnerability status of each household was calculated as follows;

$$V_h = \Pr(\ln Y_h < \ln Z_h | X_h) = \hat{\Phi} \left[\frac{\ln Z_h - X_h \beta}{\sqrt{X_h \sigma^2}} \right]$$

Following Chaudhuri (2000), two natural thresholds for vulnerability index or estimate are selected: viz., the observed national poverty rate, in this case of food vulnerability, the proportion of population consuming below 3000 Calories of food per day and the threshold 50%. The rationale for choosing 50% has to do with having a household having at least an even chance of having food consumption downturn in the next period (Ramon *et al.*, 2007). Using these two thresholds, operationally a household is defined as food vulnerable if the predicted vulnerability level is greater than the national rate or proportion which for 2010 was 38.7% (National Bureau of Statistics, NBS, 2011), highly food vulnerable if the vulnerability level is greater than 50% and relatively vulnerable if the household is vulnerable but not highly vulnerable (i.e. between 39% and 50%).

RESULTS AND DISCUSSION

Table 1 shows that majority of the household heads were male (70%, 66.7% and 68.5% respectively for low income Mapo, medium income Oke-Ado and high income Bodija settlements). With the exception of medium income Oke-Ado settlement (with 2.1% of its respondent) none of the other settlements had household head above the age of 60 years. The table shows that majority of the respondents in Ibadan metropolis were within the age range of 31 to 40 years (60%, 52.1% and 48.1% respectively for low income Mapo, medium income Oke-Ado and high income Bodija

settlements). This composition could have implications for the asset base of the household as wealth is known to be accumulated over a life cycle according to life cycle hypothesis of income, and again wealth could serve as an insurance against consumption risks when it is used as means of obtaining credit facilities, loans or converted to liquid assets that could be used to facilitate consumption. Majority of the households had household sizes ranging between 4 and 8 members (80%, 70.8% and 62.9% respectively for low income Mapo, medium income Oke-Ado and high income Bodija

settlements) with high income Bodija having the highest proportion of its respondent with more than 8 household members (16.7%) as against 11.7% and 6.3% respectively for low income Mapo and medium income Oke-Ado. A possible reason for the large household size in Ibadan metropolis could be that the metropolis is categorised as the most fertile in the south western Nigeria, followed by Ile-Ife and Oyo town (Olusanya and Purcell, 1981). Given this high fertility rate, Olusanya and Purcell (1981) purported an increase in fertility with the rate of urbanisation, it can be therefore assumed that in a metropolis like Ibadan, having a large household size is a natural propensity and which would be more embraced in such a fertile metropolis by those who can afford to. An interesting observation for Ibadan metropolis was that there was the presence of household members without a minimum of primary education. High income Bodija had the highest percentage of its population with more than 8 household members having a minimum of primary education (5.5%) followed by medium income Oke-Ado (4.2%) and then by low income Mapo settlement (3.3%). Majority of the respondents in low income Mapo and high income Bodija had between 4 and 8 members with a minimum of primary education (56.7% and 66.7%) while majority of those in medium income Oke-Ado settlement (52.1%) had between 1 and 3 household members with a minimum of primary education. In low income Mapo settlement (60%) were self employed while majority in the medium income Oke-Ado and high income Bodija (56.2% and 55.6% respectively) were employees in both the public and private sectors. Across the three settlements, less than a third of the total respondents had secondary sources of income (15%, 27.1% and 22.3% respectively for low income Mapo, medium income Oke-Ado, and high income Bodija). By implication, majority of

households in the area would have no means of insuring household food consumption in cases of shocks to food consumption arising perhaps from income loss or loss of their primary means of livelihoods. In the low income Mapo settlement, two-thirds of the respondents (63.33%) had between half of its members to three-quarters of its members above 15 years old while in the medium income Oke-Ado settlements (43.75%) had about half of its members above 15 years old. Majority of household members in low income Mapo settlement had as much as three-quarters of its household members gainfully employed while in medium income Oke-Ado and high income Bodija settlements, majority (47.9% and 48.1% respectively) had between a tenth and a quarter of the household members being gainfully employed.

Table 2 shows the 3 stage feasible generalised least squares estimates of the conditional mean and conditional variance of consumption. The consumption regressions explain 42.63% of the variance of consumption in Ibadan metropolis. The F-tests demonstrate that the variables are significant at 1% confidence interval in the metropolis. Since the dependent variable is in natural logarithm form, the estimated regression coefficients measure the percentage change in per capita consumption within the household resulting from a unit change in the independent variable.

In Ibadan metropolis, dummies for sex of household head being male ($p < 0.05$) and household heads occupation being self-employed ($p < 0.1$), as well as for household use of social group coping strategy ($p < 0.05$), were the only significant variables explaining significant variance in household per capita food consumption. In Ibadan metropolis, households headed by male members significantly had larger variability of food consumption (vulnerability of food

Table 1: Socio-economic Characteristics of Households in Ibadan Metropolis

	LI (Mapo)		MI (Oke-Ado)		HI(Bodija)		Total	
	Freq	%	Freq	%	Freq	%	Freq	%
<u>Sex of household head</u>								
Male	42	70.0	32	66.7	37	68.5	111	68.5
Female	18	30.0	16	33.3	17	31.5	51	31.5
Total	60	100.0	48*	100.0	54*	100.0	162	100.0
<u>Age of household head</u>								
Below 30 yrs	5	8.3	3	6.3	3	5.6	11	6.8
31-40 yrs	36	60.0	25	52.1	26	48.1	87	57.3
41-50 yrs	12	20.0	14	29.2	19	35.2	45	27.8
51-60 yrs	7	11.7	5	10.4	6	11.1	18	11.1
Above 60 yrs	0	0.0	1	2.1	0	0.0	1	1.0
Total	60	100.0	48*	100.0	54*	100.0	162	100.0
<u>Household size</u>								
<4 members	5	8.3	11	22.9	11	20.4	27	16.7
4- 8 members	48	80.0	34	70.8	34	62.9	116	71.6
>8 members	7	11.7	3	6.3	9	16.7	19	11.7
Total	60	100.0	48*	100.0	54*	100.0	162	100.0
<u>Household members with minimum of pry sch education</u>								
0	2	3.3	2	4.2	3	5.6	7	4.3
1-3 members	23	38.3	25	52.1	12	22.2	60	37.0
4-8 members	34	56.7	21	43.7	36	66.7	91	56.2
>8 members	1	1.7	0	0	3	5.5	4	2.5
Total	60	100.0	48*	100.0	54*	100.0	162	100.0
<u>Occupation type of household head</u>								
Self employed	36	60.0	21	43.8	24	44.4	81	50.0
Employee	24	40.0	27	56.2	30	55.6	81	50.0
Total	60	100.0	48*	100.0	54*	100.0	162	100.0
<u>Secondary income sources by household heads</u>								
Yes	9	15.0	13	27.1	12	22.3	34	21
No	51	85.0	35	72.9	42	77.7	128	79
<u>Ratio of household members above 15 yrs</u>								
0.1 to 0.25	14	23.33	12	25.0	7	13.0	33	20.4
0.26 to 0.50	8	13.33	21	43.75	20	37.0	49	30.2
0.50 to 0.75	38	63.33	15	31.25	27	50.0	80	49.4
Total	60	100.0	48*	100.0	54*	100.0	162	100.0
<u>Ratio of working household members</u>								
0.1 to 0.25	22	36.67	23	47.9	26	48.1	71	43.8
0.26 to 0.50	6	10.00	19	39.6	17	31.5	42	25.9
0.50 to 0.75	28	46.67	1	2.1	10	18.5	39	24.1
0.76 to 0.99	4	6.67	5	10.4	1	1.9	10	6.2
Total	60	100.0	48*	100.0	54*	100.0	162	100.0

Source: Field Survey, 2011.

*reduced number of respondents due to non-response during 2nd round of data gathering

Table 2: 3-Stage FGLS estimates of conditional mean and conditional variance of log calorie intake per capita during the hunger season

	Ibadan metropolis Log per capita consumption $E(\ln C_{t+1} X_t)$	Variance of log per capita consumption $\ln \text{Var}(\ln C_{t+1} X_t)$
Sex	-0.12E-08 (-1.32)	-0.37E-08** (-1.91)
Spouses	-0.7E-09 (-0.09)	0.17E-09 (5.07)
Males>15yrs	-0.29E-08 (-0.83)	0.3492E-09 (0.24)
Female>15yrs	-0.87E-10** (-2.35)	-0.582E-10 (0.04)
Household size	-0.2E-09 (-0.11)	-0.23E-09 (-0.21)
Minimum of pry education	0.34E-09 (1.18)	0.23E-09 (0.19)
Household head job	0.19E-08*** (2.45)	0.28E-08* (2.76)
Part-time jobs	-0.21E-09*** (-2.62)	-0.82E-09 (-0.20)
Household savings	0.01 (0.15)	-0.71E-14 (0.04)
Ownership of farmland	-0.26E-09 (-0.27)	-0.120E-08 (-0.30)
Job loss	-0.10E-08 (-0.85)	0.12E-08 (0.23)
Illnesses	0.26E-09*** (3.26)	0.12E-09 (0.03)
Evictions	-0.64E-09 (-0.72)	-0.46E-09 (-0.12)
Management strategies	-0.97E-09*** (-2.51)	0.47E-09 (0.26)
Asset strategy	0.51E-09 (0.85)	-0.12E-09 (-0.04)
Social Group	0.12E-09 (0.53)	0.349E-09** (2.32)
R ² , F	0.4263	6.73
N	162	

Source: Field Survey, 2011 Figures in parenthesis are t-ratios

***Significant at 0.01 level

**significant at 0.05 level

*significant at 0.10 level

consumption) probably due to the fact that if they fall on hard times, unlike their female counterparts they hardly find people to sympathise with their plight and hence enjoy little solidarity. The largest variability in consumption was caused by the nature of household heads occupation. Household heads being self employed increased the variability of

consumption significantly in Ibadan metropolis. This could be because income from private businesses is not as competitive as income from the organised public and private sector due to poor business or economic environment. Next in line in causing variability in consumption was the use of social groups such as cooperative societies, ethnic groups, and religious bodies

etc as coping mechanisms. Just as Maxwell (1996) pointed out, coping strategies are not indications that households are getting by but that rather they are indicators that household food security are declining to nutritionally unsustainable level. In terms of per capita food consumption, different sets of variables were culprits the metropolis. In Ibadan metropolis, increase in the use of management strategies ($p < 0.01$), the number of adult female household members ($p < 0.05$) and secondary occupations ($p < 0.01$) all significantly reduced per capita consumption of households, while only the dummy for household head being self employed ($p < 0.1$) increased per capita food consumption. The implication is that, using management strategies such as maternal buffering (where the mother foregoes eating in order to make enough food available to her children), borrowing, cutting consumption etc. does not make for increased caloric intake for households in Ibadan metropolis therefore making this coping strategy detrimental in the metropolis. Also, increasing female adults in the metropolis contributed negatively to household per capita food consumption.

Table 3 shows the percentage of households that were actually food vulnerable using estimates obtained from the 3 stage FGLS model specified. In the metropolis 32.7% of the respondents were highly food vulnerable while 37.7% were relatively food vulnerable. This makes a total of 70.4% of the total respondents who are food vulnerable in one sense or the other. Compared to the national figure of those

living below the food poverty line (38.7%), it can be seen that the proportion of those actually vulnerable to food poverty was almost double the population of those already living in food poverty. By implication, more people are likely to slip into situations of food poverty in the future, if the factors identified as culprits for significant variability in food consumption identified in table 2 above in the research area are not meticulously looked into.

Table 4 shows the percentage composition of household's food vulnerability with respect to certain characteristics. There was a higher incidence of food vulnerability (84.68%) among the households that were male headed than among the female headed households (39.22%). This shows that female headed households in Ibadan metropolis are less vulnerable to food poverty compared to those headed by their male counterparts and it supports the result in Table 2 that households being male headed significantly contributed to uninsured variability in food consumption. Among, the households that have at least one literate household member 30.97% were not food vulnerable compared to 0.00% of those with no literate household members as non-food vulnerable. Of households that have less than 4 household members, 85.20% were not food vulnerable while just 14.80% were food vulnerable; compared with households having above 8 household members, just 26.32% were not food vulnerable, while 73.68% were food vulnerable.

Table 3: Food Vulnerability Profile of Households in Ibadan metropolis

Ibadan Metropolis	
Not Vulnerable	48
$V < 0.39$	(29.6)
Relatively Vulnerable	61
$0.39 \leq V < 0.50$	(37.7)
Highly Vulnerable	53
$V < 0.50$	(32.7)

Table 4: Food Vulnerability Profile of Households in Ibadan metropolis by Socio-economic Characteristics

Household Characteristics	Non-Food Vulnerable	Relatively Food Vulnerable	Highly Food Vulnerable	Total
Male Headed Households	17(15.32)	50(45.05)	44(39.63)	111(100.0)
Female Headed Households	31(60.78)	11(21.57)	9(17.65)	51(100.0)
Total	48	61	53	162
< 4 household members	23(85.20)	4(14.80)	0(0.0)	27(100.0)
4-8 household members	20(17.24)	53(45.70)	43(37.07)	116(100.0)
>8 household members	5(26.32)	4(21.05)	10(52.63)	19(100.0)
Total	48	61	53	162
Literate household head	48(30.97)	55(35.48)	52(33.55)	155(100.0)
Non-literate household heads	0(0.0)	6(85.71)	1(14.29)	7(100.0)
Total	48	61	53	162

Source: Field Survey, 2011. Figures in parentheses are the percentage calculation for each group of socio-economic characteristics observed.

CONCLUSION AND RECOMMENDATIONS

- i. Female headed households are less food vulnerable compared to male headed households.
 - ii. The incidence of vulnerability to food poverty (food vulnerability) was higher among larger sized households compared to smaller sized households; while households with more literate members had lesser incidence of food vulnerability compared to households with less literate members.
 - iii. None of the specified common urban shock components were significant in determining variability in household per capita food consumption. This means that other unidentified shock variables that affect households in a more random fashion (captured by the error term and representing idiosyncratic shocks) were responsible for variability in per capita food consumption in Ibadan metropolis. Also, some coping strategies were found to be detrimental, in some instances, to the probability of households falling into food poverty in the future. The use of social group coping strategy was found to contribute significantly to household food vulnerability.
- Therefore, the following recommendations are made:
- i. Ensuring as much as possible, that people get a basic education is paramount at this stage, be it for adults or children. This is in view of the fact that, households with more literate members had lesser incidence of food vulnerability compared to those with lesser literate members.
 - ii. Efforts should be made to improve the means of livelihood of households such that they are able to earn more income as it was observed that occupation type was a significant determinant of variability of household food consumption.
 - iii. Cautiously crafted social assistance programmes should be put in place to replace other forms of coping strategies that are detrimental to household's livelihood and future food security.

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