



Comparative Gender Dimensions in Food Unsecured Farm Households in Orsu Local Government Area of Imo State, Nigeria

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Authors' contributions

Author ECO designed the study; produced data gathering instrument, coordinated data collection and collation, and wrote the first draft, edited and corrected the peer reviewed manuscripts. Authors IOB and NAN collected data mostly from male-headed households and read through the edited draft. Authors ACO, OKC and IGMC handled the statistical analysis and literature search as well as read through the edited draft. Author ACO is handling all correspondence for this publication. All authors read and approved the final manuscript.

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ABSTRACT

This Study was conducted to compare gender dimensions in farm households with challenges of food insecurity in Orsu local Government Area of Imo State, Nigeria. Cross sectional data from forty male-headed and forty female-headed farm households selected purposively from a random sample of ten out of 21 communities of Orsu Local Government Area of the state was subjected to descriptive and inferential statistical analyses. Male-headed farm households posted food insecurity line of ₦9, 278.78 as against ₦5, 243.67 shown by female-headed farm households. These household groups had head count food insecurity incidence (ratios) of 0.375 and 0.250 for male-headed and female-headed farm households respectively. The female-headed farm households were relatively more food secured than their male counter-parts. Food insecurity in male-headed farm households was determined by dependency ratio, education level, monthly

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expenditure, frequency of contact with agricultural extension agency, and status of farming. In the female-headed farm households, food insecurity was determined by household size, level of education, monthly expenditure, age of household head, and frequency of contact with agricultural extension agency. The most sensitive variables that needed to be increased to alleviate food insecurity in farm households were farm size, and frequency of contact with extension agents. Farm households should enhance productivity of their food crops and livestock by adopting technologies recommended by agricultural extension outfits to help cushion devastating effects of food insecurity amongst them.

Keywords: Food insecurity; farm household; gender dimensions; orsu; own foods.

1. INTRODUCTION

Most foods produced by poor farming households in Nigeria are consumed, or sold for cash only to be repurchased when household barns run short with supplies. This cyclic and unstable condition most times leaves affected farm households in a state of insecurity with food supplies. Food security in a household truly refers to that amount of food available and to which members are entitled to (accessibility) in a household at any given time [1]. A food secured household has enough food available to it to ensure minimum intake for all members (usage), with adequate capacity for effective demand for more food if there is such need. Contributing to food security for all (M. Alamgir and P. Arora writing to International Fund for Agricultural Development (IFAD) had observed that this minimum intake should relate to body weight, sex, size, nature of work and for women, their state of pregnancy, and lactation. Unfortunately, an international development agency- Food Agriculture Organization (FAO) and some researchers and [2] had warned that food insecurity ranks high amongst household developmental problems in Nigeria. A farm household in line with [3] is that economic unit consisting of either a single person or a group of persons who live together and depend on common income and within the limits of that income, exercise choices in meeting specific objectives with at least one member describing their major occupation as farming. In different farm households male and female members have their roles to perform as part of farm activities [4]. Gender dimensions examine status, trends, gaps, extent, size, aspects and/or quality of involvements as well as tools or differentiated ways used by males and females in household activities. The (FAO on Gender Dimensions of rural Agricultural Employment: Differentiated Pathways out of Poverty, Status, Trends and Gaps, for International Labour Organization) and [5] observed that gender dimensions in households constitute pertinent issues in emerging fight against household hunger and starvation, and provide indispensable tool for food policy planning, implementation, monitoring and assessment.

The problem remains that there are glaring differences in traditionally assigned roles to males and females in household food production, processing, and preservations such that issues with male-led and female-led decisions on food matters come out differently in explaining food insecurity. Similarly, in matters of housekeeping and nutrition management, households headed by college-educated women have comparative advantage over households headed by their male counterparts who may have higher incomes and controlling powers over production and purchasing power [6]. In Bangladesh, it has been observed that women in agriculture work longer hours per day but earn less income than the men. In Africa women in household leadership perform indispensable roles in food processing, meal preparation, and care to children and sick members of households [7].

Sequel to this, in Nigeria, women supply the markets with traditional and high-value farm products. In spite of this, many homes have remained food unsecured [5]. Attempts have been made to alleviate this burden of food insecurity in Nigeria [8,9]. Notwithstanding these attempts, gender disaggregated information on food insecurity have quite rarely been reported in the country and in Imo state. More so, food insecurity indices have rarely been reported in the country and in the state. This study therefore was aimed at achieving the following specific objectives: (i) compute and compare food security indices among female-headed and male-headed farm households in Orsu Local Government Area of Imo State; (ii) determine and compare factors that influenced food insecurity in male-headed and female-headed farm households in the study area; (iii) analyze marginal effects of all variables hypothesized to influence food insecurity in male-headed and female-headed farm households in the study area; and (iv) articulate policy implications of activities of gender in household leadership in alleviating food insecurity in Nigeria.

2. METHODOLOGY

2.1 Area of Study

This study was carried out in Orsu Local Government Area (LGA) of Imo State, Nigeria. Orsu LGA was by 1983 part of Orlu LGA but became a fully fledged LGA in 1990. Orsu LGA shares boundaries in the East with present Orlu LGA, in the west with Oru East, in the South with Njaba all in Imo State and with Ihiala LGA in Anambra State of Nigeria in the North. Orsu is located between Latitudes $5^{\circ}10'$ N and $5^{\circ}2'$ N of the Equator and between Longitudes $6^{\circ}32'$ E and $6^{\circ}52'$ E of the Greenwich Meridian. It is situated within high populated Igbo eastern heartland with 120,003 inhabitants made up of 61,950 males and 58,053 females (Nigerian National Population, 2006 census figure by states and local government Areas). Orsu LGA with headquarters at Orsu-Ihitte Ukwa has 21 autonomous communities namely Okwunamaralhe, Isiama, Okwefuruaku, Awo-Idemili, Etit, Orsuihiteukwa, Eziawa, Etit-Okabia, Elugwu Okabia, Amaebu, Ammannachi, Amazu, Emenyi, Amadiaba, Akumannanansa, Amanogu, Umuoka, Assah Ubrilem, Amaruru, and Ebenesses. These communities are inhabited by about 14,672 farm households among which about 54.0% are food unsecured (Imo State Agricultural Development Programme, Document). The area is notable for agricultural production, producing tree crops like oil palm, and cashew. Livestock farming in the area involves production of poultry, pigs, goats, sheep and aquaculture. Food crops grown in the state are cassava, sweet potatoes, plantain, banana, cowpeas, vegetables, melon, pineapples and maize. The commonest cropping system in Orsu is mixed cropping with most farmers operate on scales that classify them as smallholders. Many of the smallholder farmers combine farming with petty trading, civil service jobs and capture fishery along Njaba River.

2.2 Sampling Technique and Data Collection

Multi-stage random sampling technique was used to collect cross-sectional information on household socioeconomic, farm production, product processing and storage from selected farmers in the study area. In the first stage, ten autonomous communities were randomly selected from the twenty one autonomous communities that make up Orsu LGA. In the second stage, one village was selected from each of the chosen communities. In the third stage, eight farm households were purposively chosen from each of the selected villages to include four male-headed and four-female headed households. This gave a sample of eighty (80) farm households consisted of forty male-headed and forty female headed households

involved in this study. Data was collected with a questionnaire pre-tested with similar households in Nkume village within the area. Nkume was not among the villages selected for actual data collection. The pre-test helped to standardize the questions in structure, instructions, space for their answers, time used for interviewee response, and ease of flow of response. The questions thus addressed what they ought to address (validity) and gave consistent answers from the same respondents in a test, retest trial (reliability). Socioeconomic data collected included gender of household head, Marital status, age of household head, household age distribution, level of formal education, household size, number of very old members of household, number of invalid/bed-ridden members of a household, farm size, farm income, years of farming experience, major occupation of household, household monthly earnings, and household expenditure on foods.

2.3 Data Analytical Technique

A combination of statistical tools including frequency distribution, percentages, and means was used in analyzing the data collected for this study. While frequency, percentages and means were used to describe the socio-economic characteristics of the farm households, food security index and head count ratio were used to analyze food insecurity indicators (indices) in the households. Thus:

$$\text{Food Security Index (F}_1\text{)} = \frac{\text{Per capita food expenditure for each of the household}}{2/3 \text{ mean per capita food expenditure of all households}}$$

Where:

$$\begin{aligned} F_1 \geq 1 & \dots \text{ Food secured} \\ F_1 < 1 & \dots \text{ Food unsecured [10,8];} \end{aligned}$$

A food secured household therefore was one whose per capita monthly food expenditure fell above or was equal to two-third of the mean per capita monthly food expenditure of all the households. By same reasoning, a food unsecured household was one whose per capita monthly food expenditure was less than two-third of the mean per capita monthly food expenditure of all the households [8].

$$\text{Food insecurity incidence (head count ratio)} = \frac{\text{Number of food unsecured households}}{\text{Total number of sampled households [10].}}$$

The difference between food security and food unsecured indices in male-headed and female headed households was tested with chi-square (χ^2) test on the sub-samples with the following model:

$$\chi^2 = \frac{(n-1)\hat{\sigma}^2}{\bar{\sigma}^2}$$

where:

$$\begin{aligned} n-1 &= \text{degree of freedom;} \\ \hat{\sigma}^2 &= \text{Estimated study sample variance;} \\ \bar{\sigma}^2 &= \text{Study sample variance;} \end{aligned}$$

$$\text{But, } \hat{\sigma}^2 = \frac{n}{n-1} S^2$$

Where S^2 = Sample variance

$$\text{Computed } \chi^2 = \frac{(n-1) S^2 \frac{n}{\delta^2}}{n-1} = \frac{S^2 n}{\delta^2}$$

A limited response dependent variable multiple regression-probit model was used in analyzing factors hypothesized to influence food insecurity in farm households. The model of limited dependent variable used was as introduced by [11] and as applied by [12] and corrected for bias [13] in selection of respondents. This probit model was stated as follows:

$$Y_{ij} = \alpha_j + \beta_j \sum_{k=1}^s H_{ijks} + \varepsilon_{ij} \dots \quad (1)$$

Where the H_{ijs} are vectors of s explanatory variables of the j th household apparently threatened by some degrees of food insecurity; Y_{ij} is a vector of binary variables such that $Y_{ij}=1$ if the j th household accepts being unsecured with food, and 0 otherwise. Since Y_{ij} can only assume two different values 1 or 0 for the condition the expected probability was defined as follows:

$$\begin{aligned} E(Y_{ij}) &= E \left[\alpha_j + \beta_j \sum_{k=1}^s H_{ijks} + \varepsilon_{ij} \right] \\ &= \alpha_j + \beta_j \sum_{k=1}^s H_{ij} E(H_{ij}) \end{aligned} \quad \dots(2)$$

Equation (2) defines the proportion of households with characteristics (H_{ij}) likely to influence food insecurity. The empirical model was specified for food insecurity thus:

$$\begin{aligned} EXP_{ij} &= \beta_0 + \beta_1 \ln (AG_{ij}) + \beta_2 \ln (MS_{ij}) + \beta_3 \ln (HS_{ij}) + \beta_4 \ln (DR_{ij}) + \beta_5 \ln (ED_{ij}) \\ &+ \beta_6 \ln (FS_{ij}) + \beta_7 \ln (ME_{ij}) + \beta_8 \ln (EC_{ij}) + \varepsilon_{ij} \dots \end{aligned} \quad (3)$$

Where explanatory variables (continuous, discrete and binary) are as defined in Table 1. The dependent variable for equation (3) is household's perception of status of food insecurity as defined in equation (1). It was hypothesized that (i) food insecurity in male-headed farm households would positively be influenced by: AG_{ij} ; MS_{ij} ; HS_{ij} ; DR_{ij} ; ME_{ij} ; SF_{ij} ; and (ii) that food insecurity in female-headed farm households would positively be influenced by: AG_{ij} ; MS_{ij} ; HS_{ij} ; DR_{ij} ; ME_{ij} ; SF_{ij} ; and (iii) that food insecurity in male-headed farm households would negatively be influenced by: MS_{ij} ; ED_{ij} ; FE_{ij} ; FS_{ij} ; EC_{ij} and (iv) that food insecurity in female-headed farm households would negatively be influenced by: MS_{ij} ; ED_{ij} ; FE_{ij} ; FS_{ij} ; EC_{ij} . The variables were computed but estimated differently to justify existing literature on status of contribution of men and women in leadership to household wealth by measures of labour to farm productivity [14,15,16], hours of paid and unpaid works, legal and cultural rights to production resources [17,18] and unequal power distribution in households. All these could affect food insecurity differently in male-headed and in female headed farm households.

Table 1. Description of variables analyzed by probit regression model

Variable	Variable Type	Expected Sign Eqn. 3	Description of Variable
EXPij	Binary		1 if the jth household perceived being food unsecured; 0 if otherwise Eqn. (3);
AGij	Continuous	+	Age of male or female head of household (years);
MSij	Binary	+/-	Marital status (1 if Married; 0 if otherwise)
HSij	Continuous	+	Household size (a single person or a group of persons living together and depending on common income and within limits of that income, exercise choices in meeting specific objectives and where at least one member describes their major occupation as farming);
DRij	Continuous	+	Dependency ratio (ratio of aged, infants, children of school age, and invalids to household size);
EDij	Continuous	-	Number of years of formal Education of head of household;
FEij	Continuous	-	Years of farming Experience
FS ij	Binary	-	1 if size of farmland is at least 3.0 hectares or number of livestock is at least 100 heads; 0 if otherwise;
MEij	Continuous	+	Monthly Expenditure
ECij	Discrete	-	Number of times in contact with extension agents in a three months;
SFij	Discrete	+/-	Status of farming: Full time=1;Part-time=0;

3. RESULTS AND DISCUSSIONS

3.1 Household Characteristics

Table 2 shows the general characteristics of male- and female- headed farm households involved in this study. The mean age of males who headed farm households was 49 years while that of females who headed farm households was 51 years. The distribution showed that 10.0% of young male household heads were aged at most 34 years compared with 5.0% of young female household heads in that age cohort. Within the age bracket of 35-64 years, 85.0% female-headed households were observed compared with 67.5% male-headed households in this age category. Female household heads were more in this category on account of cumulative effect of stable marriages, single female parenthood, and relative more female divorcees/remarriages than observed with males in this age category.

Table 2. Characteristics of farm households in Orsu LGA of Imo State Nigeria, 2012

Variable	Headed-Households M: (n=40)		Female-Headed Households F: (n=40)	
	Number	Percent	Number	Percent
Age of household head (Years):				
< 34	4	10.0	2	5.0
35-64	27	67.5	34	85.0
65 and above	9	22.5	4	10.0
Mean: M=49; F=51				
Marital Status of household head				
Married	24	70.0	34	85.0
Singles	4	10.0	2	5.0
Widower	8	20.0	n.a	n.a
Widow	n.a	n.a	8	20.0
Highest Formal Education of house head:				
No formal Education	10	25.0	2	5.0
Primary Education	5	12.5	4	10.0
Secondary Education	9	22.5	4	10.0
Tertiary Education	16	40.0	30	75.0
Farming Experience (Years):				
< 5	9	22.5	15	37.5
6-11	21	52.5	20	50.0
>12	10	25.0	5	12.5
Mean: M= 12 ; F=10				
Household Size (Number):				
1- 6	28	70.0	22	55.0
7 – 13	9	22.5	14	35.0
>13	3	7.5	4	10.0
Total: M=252; F=269				
Mean: M= 6.3 ; F= 6.7				
Household Dependants*:				
School age Children	117	46.4	102	37.9
Invalids and bed-ridden	9	3.6	11	4.1
Persons above 70 years	10	4.0	12	4.5
Household Monthly Expenditure on food (N'000):				
10-19	19	47.5	30	75.0
20-30	14	35.0	8	20.0
>30	7	17.5	2	5.0
Mean: M= 20.9 ; F=11.8				

Source: Field survey: 2012; * As part and proportion of household size; n.a= Not applicable
 ₦150.00 ≈ US \$1.00

In terms of marital status, a relatively larger proportion (85.0%) of females than males (70.0%) took household decisions in farm households in their capacity as married persons. Single male household heads were more in number than single female household heads in the area. They existed as single male household heads (10.0%), and widower (20.0%) compared with single female household heads (5.0%) and widows (20.0%) in the area.

Literacy level was quite high with female household heads showing the lead. Female household heads that attained tertiary level of education constituted 75.0% as against 40.0% males at that level of formal education. There were 25.0% males with no formal education as against 5.0% females with no formal education. Existence of female household heads that received more formal education than the males suggests a number of issues. First, the females stood better chance of combining their farm work with other formal wage paying employments both in public and in private sector than the males. Secondly, in their farms, the female household heads were in better positions of receiving and implementing better technologies to increase crop and livestock yield and even bargain better prices for their products. However, a relatively cumulative larger proportion of males (77.5%) had at least six years experience in farming compared to 62.5% of the females with that number of years of experience in farming. More females (37.5%) than male household heads (22.5%) had less than 5 years experience in farming.

Table 2 further showed that household sizes were more evenly distributed between the male-headed and female-headed farm households in the area. The mean household size skewed less in favour of male-headed (6.3) as against the female-headed (6.7) households. Existence of many mouths to be fed indicated responsibility and this was a drain to household income and savings. The male-headed farm households shouldered more responsibilities as they had relatively more dependants. These dependants were more (46.4%) as children of school age and least (3.6%) as invalids and bedridden members of the households. The female-headed households had more dependants than the male-headed households in terms of invalids and bed-ridden (4.1%) and persons above seventy years of age (4.5%). This was plausible as women generally are better medical care givers in homes. They also have innate market bargaining strength in transactions on food items. This possibly accounted for the relatively smaller expenditure they incurred than the male household heads in the area. In support of this was a revelation in neighbouring African country of Ghana that poverty rate declined faster in female-headed households than in male-headed households with similar characteristics between 1987 and 1992 (C. Newman, S. Canagarajah submission to World Bank Policy Research, Working Paper No. 2367).

Cumulatively, male-headed households spent a mean of ₦20, 877.25 as against a mean sum of ₦11, 798.25 spent monthly on food and maintenance by female-headed households.

3.2 Indices of Household Food Insecurity

Estimates of indices of food insecurity in the observed households are shown by gender of heads in Table 3. The indices revealed that the male-headed households were food unsecured in terms of per month mean expenditure on food (food insecurity line) of ₦9, 278.78 and for female-headed households by ₦5, 243.67. These estimates were comparable to the estimates of ₦7, 967.19 in Lagos State, Nigeria [8]. The estimates showed that even where food items were available, household budget line was quite low and inadequate for the households. The lower threshold budget line in female-headed households suggested that women required a lower budget to provide nutritionally balanced foods for their households than the men needed in buying same food items in the area. The proportion of male-headed food secured households was 62.50% compared to 75.00% of food secured female-headed households. This left food unsecured male-headed households at 37.50% as against 25.00% female-headed food unsecured households. In addition, Chi-square value of difference test between the food insecurity indices in male-headed and female-headed farm households showed a significant difference between food securities in favour of female-headed households. The female household heads indicated better

performance in food processing, food storage and provision of balanced meals especially where they headed households on account of out-migration of their spouses. During such conditions they were better empowered with remittances which enable them take better food management decisions (T. Paris, MF. Rola-Rubzen, J. Luis, TT. Ngoc Chi, C. Wongsanum, D. Villanueva. T Synthesis of Findings on Impact of Labour Migration on Rice Farming households and Gender Roles: in Thailand, The Philippines and Vietnam submitted to International Rice Research Institute).

Table 3. Computed food insecurity indices of farm households in Orsu Imo State, Nigeria

Variable	Male-headed household Index (n=40)	Female-headed household Index (n=40)	Chi-square (χ^2) value of difference between Sub-samples & study sample
Food insecurity line (₦/Month)	9,278.78	5,243.67	n.a
Food Insecurity incidence	0.375	0.250	56.70 n.s
Food secured Household (%)	62.50	75.00	98.70**
Food unsecured household (%)	37.50	25.00	56.70 n.s

Source: Field survey: 2012; ** Significant at 5.0% level; n.a= Not applicable; n.s= Not significant at 5.0% Level ₦150.00 ≈ US \$1.00

4. DETERMINANTS OF FOOD INSECURITY IN FARM HOUSEHOLDS

Estimates of probit regression model on variables hypothesized to influence household food insecurity are shown in Table 4. The model correctly predicted 71.0% and 74.0% of the variations in dependent variables as explained by the independent variables at very significant LR Chi-square value. The table revealed that five out of ten factors variedly determined food insecurity in male-headed farm households and different five out of the ten factors variedly determined food insecurity in female-headed farm households in Orsu, Imo state, Nigeria. The most significant (P= 0.01) of the five factors that determined food insecurity in male-headed farm households were dependency ratio, education level, and monthly expenditure. Monthly expenditure had positive effect on food insecurity suggesting that as a farm household spends more on needed food items than it gets from own production, the more food unsecured it was. Both the dependency ratio and education level were negatively signed meaning that the higher the dependency ratio, and the higher the level of formal education which the household head had acquired, the more the household was food unsecured. Such affected farm households bought most of their needed foods with their off-farm cash income. The other two factors that influenced food insecurity but at high probability level (P= 0.10) in male-headed farm households are frequency of contact with agricultural extension agency and status of farming. These factors exerted negative influences on household food insecurity. Full time farmers who had regular contact with agricultural extension agency were less food unsecured because they adopted better technologies that helped them increase and improve their food productivity, storage and usage.

Table 4. Probit estimates of factors determining food insecurity in farm households in Orsu

Variable	Male-headed Household (n=40)			Marginal Effect ≈ Coefficient	Female headed Household (n=40)			Marginal Effect ≈ Coefficient
	Coefficient	S. Error	t-Ratio		Coefficient	S. Error	t-Ratio	
Constant	-3.404	2.607	1.31		6.162***	1.647	-3.74	
Age	0.026	0.030	0.87	0.027	0.085**	0.030	2.83	0.085
Marital Status	0.057	0.772	0.07	0.057	-0.471	0.710	-0.66	-0.471
Household Size	0.228	0.203	1.12	0.230	0.018***	0.002	9.00	0.021
Dependency Ratio	-0.281***	0.065	-4.32	-0.279	0.398	0.341	1.17	0.399
Education Level	-0.524***	0.131	-4.0	-0.520	-0.364***	0.084	-4.33	-0.360
Farming Experience	-0.045	0.059	-0.76	-0.042	-0.015	0.074	-0.20	-0.014
Farm Size	-0.048	0.106	-0.45	-0.055	0.281	0.332	0.85	0.279
Monthly Expenditure	0.0003***	0.0001	3.00	0.0003	0.0001***	0.00003	3.33	0.0001
Freq. of Extension Contact	-1.924*	1.000	-1.92	-1.932	-0.089*	0.036	-2.47	-0.087
Status of Farming	-2.059*	1.300	-1.60	-2.059	0.077	0.516	0.15	0.077
Log. Likelihood	-52.142				-70.667			
LR Chi ²	30.77**				53.72**			
Correctly Predicted	71.0%				74.0%			

Source: Field survey: 2012; ≈Coefficient when explanatory variable(s) was increased by one unit in-turn in the model.

***, **, and * denote significant at 1.0%, 5.0% and 10.0% alpha levels of probability respectively.

In the female-headed farm households (Table 4), the most significant ($P=0.01$) of the five factors that determined food insecurity were household size, level of education and monthly expenditure. Household size and monthly expenditure had positive effects on food insecurity meaning that households with large number of members were more unsecured with needed foods and also spent more on foods. When such was the case, all own produced foods were consumed with no surpluses for market. In such households, large proportion of income earned from off-farm employments was used in buying bulk of the needed foods to avoid starvation. Thus the expenditures on foods were higher in food unsecured households. The level of education of household heads had negative effect on household food insecurity. This means that highly educated female household heads most likely had opportunities for off-farm paid employments in civil service, public service, and other self-employments and only did farming as a part-time occupation. They embarked on farming mainly to augment foods bought from the markets. The other two factors that determined food insecurity but at some higher probability levels ($P=0.05$) and ($P=0.10$) in female-headed farm households were age of household head, and frequency of contact with agricultural extension agency. The age of the female farm household head had positive effect on food insecurity meaning that as female farm household heads advanced in age, the more food unsecured their households became. This was plausible, because aged women were less physically strong to undertake crop cultivation or livestock keeping which were characterized with drudgery. The frequency of contact with extension agency however had negative effect on food insecurity in female-headed farm households. More frequent contacts of farmers with agricultural extension agency suggested keeping abreast and adopting evolving farm technologies that increased farm yield and ensured food security.

Marginal analyses of effects of these variables on the model gave increasing marginal effects with five of them, decreased with three and remained constant with others. In male-headed farm households for instant, the variables gave increasing effects (in absolute terms) with, age (0.001), household size (0.002), dependency ratio (0.002), level of education (0.004) and farming experience (0.003). The variables that showed decreasing marginal effects in male-headed farm households are farm size (0.007) and frequency of extension contact (0.008) whereas marital status, monthly expenditure and status of farming showed constant marginal effects. The most sensitive variables in male-headed farm households that needed to be increased to fight food insecurity were therefore farm size and frequency of extension contacts. In female-headed farm households the marginal effects increased (in absolute terms) with household size (0.003), dependency ratio (0.001), education level (0.004), farming experience (0.001), and frequency of extension contact (0.001). Marginal effects however showed a decrease with farm size (-0.002) in female-headed farm households but showed no change with age, marital status, monthly expenditure and status of farming. Thus in the female-headed farm households, farm size remained the most sensitive variable that should inform a protective policy on women in ownership of land and its use in farming. Culturally in the area, women have no title to land except where they purchased them. Ownership rights on land for most uses and for cultivation of crops belong to their husbands and/or to sons of the widows. However, women in the area can access land for farming through lease, or purchase and/or exchange contracts.

The above findings have shown that food insecurity in homes was both a social and an economic problem. Though this study has handled it as a micro phenomenon, it is a problem seen affecting the entire Nigerian economy at macro level. The study has exposed variables that will inform policy both in male-led and female-led rural households in rural communities. The variables can as well be tried in urban-based male-led and female-led households to observe whether the same significant influences will be seen or whether there will be any

variations. Thus far it has dealt with issues on single-gender decision conditions. We request that future researches on it be expanded to observe what comes out as indicators of the phenomenon in co-gender led households of farm and nonfarm pursuits. With some emerging trends, there is need to investigate severity of food insecurity with strategies adopted in coping with climate change in male-headed and female-headed farm and nonfarm households under different geo-climatic zones of Nigeria and elsewhere.

5. CONCLUSIONS AND IMPLICATIONS FOR POLICY

The estimated food insecurity line in male-headed farm households was higher than that of female-headed farm households. In terms of proportion (incidence) also, there was more food unsecured male-headed farm households than there was female-headed farm households in Orsu, Imo State, Nigeria. Women could use the same budget line to secure nutritionally balanced and required foods for their households than could their male counterparts. Different factors variously determined food insecurity in male-headed and female-headed farm households in the area. The factors that determined food insecurity in male-headed farm households were dependency ratio, education level, monthly expenditure, frequency of contact with agricultural extension agency, and status of farming. In the female-headed farm households however, factors that determined food insecurity were household size, level of education, monthly expenditure, age of household head, and frequency of contact with agricultural extension agency. The most sensitive variables that needed to be increased to alleviate food insecurity in male-headed farm households were farm size, and frequency of contact with extension agents. In female-headed farm households the most sensitive variable to be increased to alleviate food insecurity was farm size.

These imply that female-headed farm households were relatively more food secured than the male-headed farm households. Cultural and legislative interventions are needed to alleviate the plight of male-headed and female-headed farm households in the area and should stress on helping farmers with credit to enable them acquire more farmlands and increase number of their livestock. The agricultural extension outfits should increase frequency of their visitation to farmers in the area to acquaint them with recently improved production technologies. Since food insecurity remained a problem associated with low farm productivity, poverty and/or poor home management, farm households should enhance productivity of their food crops and livestock by adopting technologies recommended by agricultural extension outfits. These will help cushion devastating effects of food insecurity amongst them.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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