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Keywords: *perspectives, food security, male/female headed households.*

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Perspectives on Food Security: A Gender based Comparison of Rural Households in South East Nigeria

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Abstract- Household food insecurity remains a persistent and pressing social concern despite the economic gains that Nigeria has made over the years.The study focused on identifying the perception of male and female headed households about food security; the gaps in calories supplied as well as factors that interact to influence food supply.Primary data was collected using the farming and rural systems approach to randomly select and interview 120 households but a subsection of the sample is the basis for this study. Descriptive statistics was used to describe the perceptions about food security and gaps in calories supplied. Two-stage Least Square regression and the General Linear Model were used to determine the factors that influence calorie supply to the households as well as the influence exacted by the interaction of those factors. The results showed that the definition of food security from the respondents points of view includes the taste, quality, quantity and specific food items available to the households and that these differ between male and female heads. Also quantitative and qualitative factors interact to affect the total calories supplied to the household. Cash transfers significantly influence calories available to Male Headed Households but not for Female Headed Households.

Keywords: perspectives, food security, male/female headed households.

I. Introduction

Food insecurity is an important element of rural households because of poverty and the poor standard of living that results from it. Poverty and a low standard of living are in turn associated with poor infrastructural facilities in the rural areas and the resource endowment of the people (World Bank 2003). As such, efforts to ameliorate the food insecurity situation must tackle the problems faced by rural smallholder farmers in their efforts to increase production and have a better livelihood.This is because much of the food production in the country is by smallholder farmers who basically reside in the rural areas and are noted to be less food secure than the rest of the population (Obamiro, 2004; Ayantoye, K, et al, 2011).

This thought is at the background of several recent rural development efforts in Nigeria. Such efforts include the establishment of the Roots and Tubers Programme nationwide, the establishment of microfinance banks to enhance the diversification of income opportunities; creation of rural roads to open up the hinterland where primary production is based; release of loans by the central bank to individuals who are involved in agribusiness enterprises and farming; creation off health care facilities in rural areas e.t.c (Omonona, B. T. and G.A. Agoi, 2007, Ayantoye K et al, 2011)). These actions are taken in the right direction if supported by consistent policies. These steps are also in line with recommendations from the body of literature regarding food security (FAO, 2006 and Murphy S, 2005).

The widely accepted background for the discussion and suggestions on food security derives from the World Bank (1986) definition of it as "access by all people at all times to sufficient food for an active and healthy life." This definition encompasses production in relation to food availability; distribution and consumption. As such interventions have been focussed more on the production and distribution side, however also implied in this definition is the food requirement of the people. As suggested by Doppler (2002, 2003) food security is a situation that involves food supply and food requirement; and food requirement is a function of factors such as sex, age and current physiological status. This then implies that beyond the definition and description of food security, specific empirical data needs to be generated at the micro level which will explain the gap and what needs to be filled. He thereby, reaffirms that food insecurity is essentially a micro-level problem which requires empirical evidence.

In line with this thought, Akinsanmi (2005) statesthat "Food supply and food requirement are central components of food security situation. As such it is assumed that the underlying factors which influence food supply to the households also influence food requirement. These factors overlap in different areas such as income, physiological makeup of the individuals; and are dynamic in nature. The bi-directional relationships and inter-dependencies are obvious in specific areas such as input, farm investment and resources, etc. An overall cyclical impression is given … which is subject to time and influenced by socio cultural and macro-economic environment. In other words other

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'external' and 'internal' variants affect them. In order to influence the food security situation positively both sides need to be simultaneously addressed".

This idea raises a lot of questions related to the definition of food requirement for empirical purposes and the measurement of food supply/requirement change alongside changing family and economic conditions. It hints at metabolic and physiological requirements but also suggests that the question of 'enough food' is implicitly and simply defined to be what is available and shared within the household in a time frame; which is better defined by the individuals.

However, it has the merit of giving a real, practical and less hazy view of food security that lends itself to a reasonable level of measurement beyond being expressed by indicators. This study seeks to demonstrate the concept of food supply and food requirement and provide empirical evidence for the interactions of factors which influence both within the context of male and female headed households. The context of a comparison between male and female headed households stems from the fact that the experience and response to food vulnerability issues may be different.

The specific objectives are:

- To profile the household structure of male and female heads
- To profile the perceptions of food security by the household heads
- To profile the sources of calories in different time periods to the households
- Examine qualitative and quantitative factors which influence calorie supply and calorie requirement of the households.

II. Research Methodology

The Farming and Rural Systems Approach (FRSA) was used in this study. The approach focuses on the analyses of the development of a system, the development of the solutions to the problems and measures the future impact of change on the system. That is, it provides the philosophy, the concept and strategy for developing and introducing solutions to decision making bodies at the micro, meso and macro levels (Doppler 2002).

a) Description of the Study Area

The research was carried out in Imo state, south-east Nigeria. Imo state is one of the five states that constitute the south eastern region of Nigeria. The east occupies a land area of approximately 7,861,200 ha of land and has a population of 25,652,036 people. This translates to an average land area of 0.31ha/ person (Nwajiuba, 2002).Though the states are reasonably urbanized, the majority live in rural areas. Imo State was chosen from the region based on the knowledge of the prevailing situation.Imo state, occupying a total land area of 5,530 km2, is one of the states that make up the southeastern part of Nigeria. According to the 2006 population figures, 2,032,286 males and 1,902,613 males, that is a total of 3,934,899 people, live in the state. It has a population density of about 230 people per square kilometer. It is bordered by Abia State to the east, Rivers to the South and West and Anambra to the North. It consists of coastal lowlands to the east of Niger River. The state has original tropical rainforest vegetation. The state is known to be one of the low income states in Nigeria. The average farm income in some of the agricultural zones as at the year 2002 has been estimated to be about N60, 197.81 per annum and N7, 524. 73 per capita income.

The family structure in the state holds that the man is the head of the family (like most of Nigeria) and is responsible for the welfare of his family members. Also inheritance is patrilineal and in most rural communities; women have access to land by marriage or relationship to other men. The state has great potentials for increased food production and high income generation in the agricultural sector because it has the manpower and the natural resources required. This research can enhance the achievement of a sustainable food security situation by providing basic information for policy planning and design.

b) Data Sources and Sampling Technique

The farming and rural systems approach was used in the study. Imo state was purposively chosen because of the knowledge of the prevailing situation but a multi stage random sampling process was used to select the final respondents. It is known to have 27 Local Government Areas based on the geographical structure that it had before other states were carved out of it. Four local government areas were randomly selected; after which two villages were randomly selected from each LGA. A total sample size of 120 household were drawn from the list of names (sometimes with addresses) obtained from the village leader or his representative. The survey was carried out with the use of a structured questionnaire though the administration was interactive in approach. The questionnaire was designed to give information on different aspects of respondent's lives such as income generating activities, socio economic data, production activities, food consumed and food expenditure etc.

A Hierarchical Cluster Analysis was carried out to get natural groupings or clusters among the sample units which are homogeneous within and heterogeneous to each other. The results led to two major farming systems upon which the descriptive and comparative analyses are based.

- *Peri-Urban Farming Systems (P-UFS):* These are located in villages which are close to urban areas and cities such as Owerri and Umuahia with more

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possibilities for off-farm income. There are also major access roads to these villages. The population density is low compared with the other regions.

- *Remote Farming Systems (RFS):* These are located in more remote areas and are densely populated. They are also relatively less endowed in terms of resource ownership compared with their counterparts.These were further divided into Male Headed Household and Female Headed Households.

c) Methods of Data Computation and Analysis

Two major farming systems classified based on sex of the household head (Male Headed Household – MHH and Female Headed Household-FHH) formed the platform upon which the descriptive and comparative analyses are based.The data on calories available from own production and market purchase were computed based on the items produced or purchased and the frequency of consumption using standard conversion rates after adjusting for processing and gifts.Estimation of energy requirement for healthy individuals takes account of age, gender, body weight and activity level. The activity level, being mainly farming and a combination of 2 to 3 off-farm income sources, is considered to be high. The average net weight of 62 for male and 55 for female and high activity level were assumed. For computational reasons, food requirement is defined as the quantity available and used in the household. An alternative approach would be to make computations based on the family composition and estimated factors of energy levels (Doppler, 2002). WHO/FAO (2001) standard is used as a point of reference.

Descriptive statistics were used in profiling respondents perception while a non parametric test was used to test the class means difference socio-economic variables. The 2-stage Least Square regression was used in evaluating the factors that influence subsistence and total calorie supply, the General Linear Model was used in estimating factor influence on the dependent variables.

Stage Least Square Regression: It extends regression to cover models where the researcher assumes that the disturbance term of the dependent variable is correlated with the cause(s) of the independent variable(s). Also used for the same purpose if there are multiple endogenous variables in the model.

The General Linear Model provides regression analysis and analysis of variance for multiple dependent variables by one or more factor variables or covariates. The general form is given as

$$YM = Xb + e \qquad (i)$$

Here Y, X, b, and e are as described for the multivariate regression model and M is an m x s matrix of coefficients defining s linear transformation of the dependent variable.

The factor variables divide the population into groups. The general linear model procedure is used to test the null hypotheses about:

- Effects of factor variables on the means of various groupings of a joint distribution of dependent variables; and
- Investigate interactions between factors as well as the effects of individual factors; in addition the effects of covariates and covariate interactions with factors can be included.

III. Results and Discussions

a) Structure of the Households

The composition of the households are similar in that both active and none active members are included. However, age and the number of years of exposure to formal education are significantly different. Also the MHH seem to have more dependants than the FHH which could be because the women are widows and by culture may not have many dependants at such age. The FHH have a lower family income generated but a smaller family size compared with the MHH.

Table 1 : Characteristics of Male and Female Headed Households

Item	Male Headed Households (N=37)	Female Headed Households (N=20)
Age	59.03* (±12.551)	61.30* (±10.682)
Education...(years)	7.89** (±4.345)	3.60** (±3.872)
Family size	5.95	4.85
14-60 Years old Male	2.22	1.85
14-60 Years old Female	1.82	1.73
Mean Number :		
<14 Male	0.35	0.15
>60 Male	0.32**	0.05**
<14 Female	0.59**	0.10**

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>60 Female	0.03**	0.40**
Family Income	376437.08 (±964588.35)	223806.75 (±233645.94)

Notes: * Significant at 90% confidence interval ** Significant at both 95% and 90% confidence interval Values in parenthesis are standard deviation. All tests are Mann-Whitney test

b) Perceptions of Food 'Security'

The understanding of Food Security (FS) differs among respondents (Table 1). To a large percentage it implies having a kind of food stuff at home at all times. A few consider it to mean just having enough at home, a subjective expression of not being in want. Its description in own words suggests the gaps that need to be filled for the situation to be ameliorated. The cultural perception of food is reflected in the response given e.g the perception that food security implies having a regular store of particularcarbohydrates such as 'Cassava'. It also gives an evidence of poor and unvaried diet since some respondents, particularly female headed households, consider being food secure as access to just any food irrespective of taste or quality.The expressions are similar in both groups but within each system are the vulnerable few who describe and define food security in non committal terms. These in the context of the study area may be identified as those in extreme conditions.

Table 2 : Male and Female Heads of Households' Perspectives on Food Security

Item	Male Heads of Households (n=37)	Female Heads of Households (n=20)
FS in Terms of 'Quantity'	**Frequency (%)**	**Frequency (%)**
Number of meals	5	6
More of a particular food Item	55	43
Variety of Foods	22	24
Enough	12	15
Just Eat	**6**	**12**
FS in Terms of 'Quality'		
Tasty	4	6
Nutritious/Balanced diet	82	78
Better mode of preparation	10	10
Any food eaten	**4**	**6**
FS in Terms of A Food Item		
Cassava	38	19
Other Carbohydrates	15	32
Foods containing Proteins	43	43
Any Food Stuff	**4**	**6**

Table 3 : Food Consumed During Cash and Food Shortage Periods

Item	Male Headed Household (n=37) %	Female Headed Household (n=20) %
"Garri"	50	30
Any Food	6	8
Normal diet	16	23
Fruits and vegetables	12	14
Rice	16	0
Fish/Meat	0	22

Diverse descriptions of how farm families cope during the periods of food and cash shortage include the consumption of low quality food or meals that they normally would not like such as 'rice'. The irony of the expressions here is that fruits and vegetables which are healthy are consumed more when 'culturally' accepted foods are missing. These are sourced from nearby forest and farms and are not necessarily part of own production. The consumption of meat and fish by the FHH is not as a major component of a meal but as being the main component of a poorly prepared source. The consumption of 'garri' by over 50 % of the respondents at as such period explains why a constant supply of cassava is considered as being food secure. The information given further highlights the deficiencies in the current meal pattern and areas where positive changes are required (Table 2).

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c) Calorie Availability: Sources and Time Periods

Farm families depend on the output produced and purchases from the market to meet their nutritional requirements. These two sources are the major supply of food to the households, some households may receive food stuffs as gifts but these were accounted for as produced items because it is customary to share and 'exchange' food items in the culture. The resultsshow that the farm and market supplies are relatively lower in the female headed households. This could be as a result of lower output or limited cash available. An average adult in the household falls short of the expected energy consumption value (Table 3).

Table 4 : Subsistence and Market Supply of Calories In Relation to Total Food Supply

Item	Male Headed Household (n=37) Kilocalories	Female Headed Household (n=20) Kilocalories
Subsistence Supply	320,000	210,000
Market Supply	30,000	39,000
Total Calorie Supply	350,000	249,000
Average Total Energy/Day	11,667	8,300
Average Total Energy/Person/Day	1,944	1,660
WHO/FAO DAILY STANDARD	2,500	

IV. Explanatory Variables Explaining Calorie Supply and Requirement

a) Quantitative factors influencing calorie availability

The assumptions made are that several variables can have direct impact on the calories available to the individuals. Increased off-farm income is expected to increase purchasing power of the families; transfers if in favour of the rural families, will also have a positive impact. However, the issues of personal preferences and goals may limit the overall effects.

Table 4 shows that net transfers have a higher impact on calorie supply among the male headed households while days lost to illness significantly impacts it in the female headed households. In both cases and as expected, off-farm income influences calorie supply through market purchases and own production. The estimates as indicated in Table 5 are negative for net transfer. That is the male heads transfer more in terms of cash and in kind than they receive. This points to family dynamics such as a child being sent to live in town with other people and thus making it necessary to make food available to such host families and stipend to the child. It is positive for the female heads but does not significantly influence food supply. Contrary to expectation, thevariable 'days lost to illness' has a positive estimation. This could be an indirect effect of non commensurate wage earning on labour use.

Table 5 : Factor Effects on Calorie supply and Calorie Required

Source	F MHH	Partial Eta² MHH	F FHH	Partial Eta² FHH
Corrected Model	6.913**	.386	4.426**	.454
	7.982**	.421	5.059**	.487
Net transfers	12.398**	.273	.204	.013
	15.239**	.316	.420	.026
Days lost to illness	5.787**	.149	12.054**	.430
	5.899**	.152	13.909**	.465
Off-farm Income	7.429**	.184	.063**	.004
	8.529**	.205	.100	.006

Notes: *Significant at 90% confidence interval **Significant at both 95% and 90% confidence interval

MHH: Calorie Supply $R^2 = .39$ Calorie Required $R^2 = .42$

FHH: Calorie Supply $R^2 = .45$ Calorie Required $R^2 = .49$

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Table 6 : Factor influencing calorie availability

	Calorie Supply Estimates		Calorie Required Estimates	
	FHH	MHH	FHH	MHH
Net Transfer	0.09	-0.59**	0.65	-0.65**
Days Lost to Illness	0.7**	0.33**	3.73**	0.33**
Off-farm Income	0.05	0.46**	0.32	0.48**

*Notes:** Significant at 90% confidence interval ** Significant at both 95% and 90% confidence interval
MHH: Calorie supply $R^2 = .39$ $F = 6.9$** Calorie Required $R^2 = .42$ $F = 7.98$**
FHH: Calorie supply $R^2 = .45$ $F = 4.43$**, Calorie Required $R^2 = .49$ $F = 5.06$**

b) Qualitative factors influencing calorie availability

This is assumed to have the capacity to influence rational behaviour in food choices or behaviour. Among poor male and female headed households, scarcity of resource and the attitude towards it are possible factors that influence the perception of food risk and the decisions taken to avoid or mitigate it. The results as shown in table 6 indicate that the rights to land and the attitude towards resource management have a stronger impact on food supply in the female headed household. Expectedly, the interaction between the two variables has a higher impactin the male headed households but the partial impact of the variables is lower than those of the FHH. Rights to land, attitude to owned resources are critical issues that need to be resolved in achieving food security in the area.

Table 7 : Effects of qualitative factors on food supply and Food Requirement

Source	F MHH	Partial Eta² MHH	F FHH	Partial Eta² FHH
Corrected Model	5.291**	.460	14.761**	0.45
	5.032**	.448	17.077**	0.35
Rights to Land	5.515**	.262	14.761**	0.50
	5.217**	.252	17.077**	0.50
Attitude to Own Resource	8.262**	.210	0.40.	0.103
	7.839**	.202	0.38	0.098
Rights * attitude to owned resource	6.407**	.292	0.50	.124
	6.117**	.283	0.50	.122

*Notes:**Significant at 90% confidence interval ** Significant at both 95% and 90% confidence interval
MHH: Subsistence supply, $R^2 = .46$ Total food supply $R^2 = .45$
FHH: Subsistence supply, $R^2 = .45$ Total food supply $R^2 = .35$

V. Conclusion

Food security/ insecurity as defined by the persons concerned elucidates the importance of socio cultural factors in its understanding and why they may not view themselves as being food insecure. The ability to capture estimated kilocalories consumed by an individual in a day and by the household members in a month lends credibility to the poor food situation particularly for the vulnerable ones. Capturing the factors that influence both food supply and requirement while eliminating endogenous variables lends credibility to the fact that both supply and requirement side must be put into consideration while designing interventions else a less than optimal response will be obtained. The importance of the interaction of factors to influence both reiterates the importance of 'cultural Shifts' in order to achieve food security. This is also underscored by the fact that the households compared have similar socio-economic background but differ significantly only in the influence of qualitative factors on their food security situations.

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