Influence of socio-economic characteristics on rural farmers' food consumption in Ogun state

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Abstract
The study analysed influence of socio-economic characteristics on farmers' food consumption in Yewa North Local Government Area of Ogun State with a view to providing policy information toward enhancing the nutritional status of Nigeria. The prevalent problem of hunger and malnutrition in developing countries like Nigeria necessitates the development of goals to reduce the number of chronically undernourished people. The challenge of many countries of the world is the problem of food and nutrition security. The survey was achieved through cross sectional data that was collected by employing stratified random sampling on the socio-economic characteristics and consumption expenditure of 120 sampled households of which only 112 questionnaires were relevant for the analysis using descriptive and regression techniques. This study confirmed that 76.8% of the household farmers had average income below N30,000 per month. The household farmer's expenditure was N4,961.24 and per capital average expenditure was N925.605. This revealed that the level of poverty in the study area is very abnormal and needs urgent attention. Based on these findings, it was recommended that appropriate, achievable and attainable poverty alleviation/income enhancing programmes should be put in place and that income should be redistributed in favour of low-income group to benefit the identified demographic groups which should also be extended to all Nigerians especially the low-income earners.

Keywords: Livelihood, per capita income, household

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Introduction

Food insecurity has become acute (very serious and severe) in Nigeria as increasing number of people are finding it difficult to meet their requirement as well as the nutritional quality of their food intake such as protein, fat, minerals. Food insecurity in Nigeria and many other developing countries is both quantitative and qualitative. The qualitative aspect relates to the inadequacy of food supply to meet the qualitative requirement of consumer in terms of basic nutrients such as protein, fats and oils and essentials vitamins (Olayide, 1998) [9]. The quantitative dimension involves the shortage of the right types of food needed by the body to provide balance diet. Recent nutritional research has led to the development of measuring malnutrition in terms of two energy intake rather than insufficient protein or vitamins intake alone. Energy is provided through carbohydrates, fats, and oil, protein, minerals and of course water. A nutritionally adequate diet is one in which all the necessary nutrients are included in sufficient amounts to meet body needs. These body needs will vary according to the type of activity engaged in, although nutritionists are in agreement as to precisely what human need are under a given set of conditions for maintenance of body functions, growth and activity. The Food and Agricultural Organisation has estimated that the daily protein in takes in Nigeria is 58.8g per caput about 20% less than the minimum level recommended by the organization, thus this low level of protein consumption posed a problem. (Olayide, 1998) [9] reported that protein supply from various food items was estimated to about 58.7% per caput per day as against the minimum 65g per day for an adult. Records of per capital protein intake in Nigeria that 51.7g of protein is taken daily on average out of which only 8.6 is from animal, hence against 35g of daily requirement. The situation is different in developed countries where the protein intake per capital is about 90g with more than 65g of it from animal source.

For several reasons food consumption is of interest to the Nigerian economy. First, the volume of food consumed by rural farming households by far represents a large proportion of aggregate

from output. This being so, the pattern of food consumption exerts a decisive influence on the level and composition of total agricultural output produced. Second, the quantity and quality of food consumed by households affect their health and economic well-being and these in turn have significant repercussions on the general level of economic activities and productivity. Despite, government efforts to increase food production through the introduction of special agricultural projects in conjunction with the World Bank and other related Agricultural Development Projects (ADPs) such as; Agricultural Development Projects (ADPs) in 1975, Operation Feed the Nation (OFN) in 1976, Green Revolution in 1980, Directorate for Food, Road and Rural Infrastructure (DFRRI) including development policies, like Structural Adjustment Programme, Better Life Programme and Family Support Programme, yet the Nigerian economy still pose the problem of under-nutrition and malnutrition to average Nigerian consumer. An indispensable input in the formulation of food nutrition policy and even in the orientation of agricultural and general economic development plans is information on food consumption pattern of the people. Unfortunately, this information has not always been available and empirical studies of food consumption pattern in the country (e.g. Anthoni and Oni, 1999) [2] have been sparse.

Problem statement
Food security is a fundamental objective of development policy and also a measure of its success. Achieving food security is still a major problem for households in most rural areas of Nigeria, therefore, the associated symptoms of food crisis are found throughout the country, though with differences based on occupation, agro-ecological, socio-economic factors and rural versus urban location (Olarinde and Kuponiyi, 2005) [8]. Durojaiye and Olubanjo (1987) [4] affirmed that food crisis in Nigeria, has two dimensions. First, there is a calorie deficiency in the amount of calories available per person per day and this is short of the requirement, while the second dimension constitutes a much more serious problem which relates to the inability of the available food to supply sufficient nutrient to meet the needs of the body. With this undernourishments and malnutrition, the manifestations of the two dimensions, respectively continue to exist side by side in Nigeria. This situation makes imperative the need to formulate a comprehensive food nutrition policy for the country and to continuously reviewed (Durojaiye and Olubanjo, 1987) [4].

Objectives of the study
The broad objectives of this study were to determine the influence of socio-economic characteristics of the rural farming household on food expenditure with a focus on income groups among the households in Yewa North Local Government Area, a typical rural town in Ogun State, Nigeria. The specific objectives were; determine the socio-economic characteristics of the households in the study area; determine the per capital household food expenditure according to income group; examine the effect of socio-economic factors on food expenditure of the household in the study area and estimate the marginal propensity to consume for different food items

Research methodology
Study area
The empirical setting for this study is Yewa North Local Government Area, Ogun State, Nigeria. Yewa North Local Government Area is one of the twenty Local Government Areas in Ogun State. The Local Government Area is bounded in the

west by Republic of Benin and bounded in the south by Yewa South Local Government Area and in the north by Oyo State. Ayetoro is the headquarters, it is located on latitude $7^0\ 15^1$ N and $3^0\ 3^1$ E in a deciduous derived savannah zone of Ogun State. This area has a land size of about 200,213.5 hectares. There are 11wards in this Local Government Area namely; Ayetoro ward I, Ayetoro ward II, Idofoi, Sunwa, Ijoun, Eggua, Ohunbe, Igbogila, Ibese, Joga-Orile/Ibooro and Imasai. The inhabitants are mainly Yoruba, speaking various dialects like Yewa, Ketu etc. The projected of this Local Government is about 140, 848 (NPC, 2006). The people are predominantly farmers.

Data collection and sampling technique
Primary data were collected for the study. A cross-sectional survey of arable crop farmers from the study area was conducted by random selection. The study area was selected for its predominance in arable crops production e.g. rice, maize, yam, cassava, potato, vegetables to mention few. The sampled farmers were selected by a stratified random sampling technique. The Local Government Area was divided into eight (08) strata based on the existing political wards in the area. From each stratum, one (01) adjourning village were randomly selected and 15 households farmers were randomly selected from each village in the stratum making a sample size of one hundred and twenty households (120), the communities were Ayetoro, Ibooro, Ibese, Igbogila, Igan Okoto, Ijoun, Igan Alade and Sala-Orile. However, subsequent data analysis was based on complete responses from one hundred and fourteen (112) farmers.

Method of data analysis
Descriptive statistics such means, standard errors, percentages and frequency table etc., Tobit probability model and regression techniques were employed in the analyses of the study data.
The Tobit model was fitted to determine the effect of socio-economic characteristics on the household consumption. The model was fitted because a number of households reported zero expenditure for some food item and Tobit model proved satisfactory for the stated purposes of this study. The model is specified as;

$$Yi = \{Xi\ \beta + Ui\ \text{if}\ Xi\ \beta + ui > O\ I = 1, 2,... N\ O\ \text{if}\ Xi\ \beta + ui < O \quad (1)$$

Where N is the number of observations, Yi is the dependent variable, Xi is a vector of explanatory variables, β is a vector of unknown coefficients, while u is an independently distributed error term assumed to be normally distributed with zero mean and constant variance σ^2 (McDonald and Moffit, 1980) [6].
Mathematically, the empirical model for the study is given by;

$$yik = bok + bjk\ Xij + eik;\ i = 1, 2... n;\ j = 1, 2,... J\ \text{and}\ k = 1, 2,..., k \quad (2)$$

Where: yik is the ith household's monthly expenditure on the kth food commodity (or total food); Xij is the value of the jth explanatory variable in the ith household. The operational definitions of the variables in the model are presented in the table below. The parameters of the model were estimated using the Tobit regression procedure in SHAZAM econometric software professional edition).
The tobit procedure in SHAZAM is a maximum likelihood estimation of parameters of a transformed model $I_t = X't\ \alpha = X't$ (β/σ) in which the expected value of the latent variable associated with the dependent variable of the original model

$(Y*_t = X_{,t}\beta$ while $Y_t = 0$ if $Y*_t < 0$, $Y_t = Y*t$ if $Y* > 0$) is defined as $E(Y*_t) = \sigma I_t$ (Whistler, White, Wrong and Bates, 2001) [12]. A typical result of tobit regression procedure in SHAZAM generates estimates of the normalized coefficients, α with the associated standard errors and t values as well as standard error of estimate, σ. It also provides among others estimates of the original regression coefficients (β = σα), the predicted probability of Y > limit (p = F(X'α)), the expected value of Y, E(Y), given the average X(1); as well as elasticity of E(Y) for the Kth variable, evaluated at the sample means, e_k, which Whistler, White, Wrong and Bates (2001) [12] reported is computer as:

$$e_k = \beta_k F(X'\alpha)[X_k/Y^E] \tag{3}$$

Where Y^E is the expectation of Y estimated at the mean values

as $YE = \sigma(X'\alpha)F(X'\alpha)$, F is the cumulative normal distribution function and f is the normal density function. While the marginal effect of an explanatory variable is not part of a typical SHAZAM's output, Whistler, White, Wrong and Bates (2001) [12], observed that this may be computed as;

$$\partial E(Y_t/I_t)/\partial X_t = \beta F(I_t) \tag{4}$$

While several statistics and table were generated from the regression, this study presents only the regression coefficients and the associated asymptotic z-statistics. The marginal effects were estimated, based on equation 4, for an average household as β F(x'α). Other relevant statistics presented includes the predicted probability of a positive expenditure (i.e. y > limit) and expected level of expenditure on each commodity.

Table 1: Operational and definition of dependent variables

Dependent variables	Definitions
Total Food	Total food expenditure per month (N)
Industrial Products flakes per month (N)	Expenditure on baked foods, bakery, pastry and beverages, semovita, butter, bread, corn
Other animal protein sources	Expenditure on egg and milk per month (N)
Plant protein	Expenditure on legumes-beans, soya beans per month (N)
Energy giving food month (N).	Expenditure on cereals, garri, fufu, yam flour, cassava flour, plantain, cocoyam, potato per
Fruveg	Expenditure on vegetables and fruits.
Fruveg	Expenditure on vegetables and fruits per month (N).
Other food	Expenditure on cooking oils, pepper per month (N).
Cereals	Expenditure on rice, maize and other cereals per month (N).
Beverages	Expenditure on beverages, tea and coffee per month (N).
Cassava flour	Expenditure on cassava and yam flour per month (N).
Yams	Expenditure on yam, cocoyam and potato per month (N).
Other meats per month (N).	Expenditure on other animal product like pork, chicken, turkey, bush meat, snail, crab, prawn

Source: Field survey, 2017

Table 2: Operational and definition of independent variables

Dependent variables	Definitions
HHI	Household monthly income (N).
Age	Age of the household head (years)
Education	Years of non-formal and formal schooling by the household head
Sex	1, if the household head is male and 2, if female
HHS	Household size
Unmarry	1, if the household head is unmarried, 0 otherwise
Single	1, if the household head is single, 0 otherwise.

Source: Field survey, 2017

Results and Discussion
This chapter presents the analysis, interpretation and discussion of the data collected from the field survey undertaken in April, 2008. It discusses the results and findings that emanated from the use of descriptive statistics such as frequency, percentages, mean, standard deviation, standard errors and Tobit regression analysis.
Table 4 and 5 presents the socio-economic characteristics of the respondents. The distribution of farmers by sex revealed that 79.5 percent of the farmers are male while the female farmers are 20.5 percent only. This implies that majority of the farmers are men while the women contributes a less significant role. Majority 78.0% of the respondents' falls within the age category of <30 and 50 and the mean age is 41 years. This implies that majority of the respondents are in their active age. The large

percentage (48.2%) of the respondents had between 5 and 8 and the mean household size is 6. This implies that they have more dependent who feed from their low income.
Also the large percentage of (76.8%) of the respondents had low income below N30.000.00. It depicts that the level of poverty in the area is very high and it needs government urgent attention. 83.0 percent are while 10.7% are single, 1.8 percent are divorced, 1.8 percent are widowed and 2.7 percent are separated. This implies that majority of the respondent had family responsibility. It also suggested that they would be desirous of opportunities that could be explored towards increasing their income earning capacity and improving their standard of living. 48.0% of the respondent had primary school education, and 17.9 percent of the respondents had no formal education, which shows that the level of education among the farmers is low. 79.0 percent of the respondents are ordinary citizen in the community while 8 percent are only household head, 12.0 percent are religion head, 12.0 percent are just civil servant and public servant and 1.0 percent is Oba or community head. The result shows that majority (70.5%) of the respondents are ordinary citizens, which implies that they are more recognized and significant in the community. 99.1 percent of the respondents are mainly farmers while 0.9 percent are not farmers. The implication of this is that the community is agrarian in nature and thereby, concentration should be given to them to ease their farming system. Majority 63.0% of the respondents are Christians while others (38.0%) are Muslim.

Table 3: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage	Means
Sex			
Male	89	79.5	
Female	23	20.5	
Age (years)			
< 30	29	25.9	
31 – 40	30	26.8	
41 – 50	28	25	41
51 – 60	13	11.6	
> 60	12	10.7	
Household size (number)			
1 – 4	44	39.3	
5 – 8	54	48.1	
9 – 12	13	11.6	6
> 13	1	1.0	
Household income (N)	86	76.8	
Below N 30,000	86	6.3	
N 30,001 - N 40,000	7	6.3	
N 40,001 - N 50,000	10	8.9	N23, 679.02
N 50,001 - N 60,000	6	5.4	
Above N 60,001	3	2.7	

Source: Field survey, 2017

Table 4: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage	Means
Marital status			
Married	93	83.0	
Single	12	10.7	
Divorced	2	1.8	
Separated	3	2.7	
Educational level			
No formal education	20	17.9	
Primary education	54	48.2	
Secondary education	21	18.8	
Tertiary education	17	15.1	
Position held			
Ordinary citizens	79	70.5	
Household head	8	7.1	
Traditional/religion head	12	10.7	
Civil/public servant	12	10.7	
Oba/community head	1	1.0	
Major occupation			
Farmers	111	99.1	
Others	1	0.9	
Religion			
Christian	70	63.0	
Muslim	42	38.0	
Total	112	100.0	

Source: Field survey, 2017

Per capita food expenditure
Per capita food expenditure of total food and individual food items are presented in Table 6. The results showed that the total food expenditure is N4, 961.24. The proportion of the food for energy giving food, protein and vegetable fruits in total food expenditures are 54.18%, 32.19% and 13.63 respectively. Per capita food expenditure is about N925.605 which implies that an individual in the sample expended on food per month. The per capita expenditure on energy giving food is very high. A relatively small amount was expended on fruit and vegetables per month.

Summarily, the results indicate that the sampled households consumed higher quantity of carbohydrates (energy giving) and relatively small amount of vitamins. This reveals that the level of poverty in the study area is very high and needs government

urgent attention.

Table 5: Distribution of expenditure based on food items

Items	Household expenditure (N)	Percentage income (%)	Per capital expenditure (N)	Food share percentage (%)
Rice	1020.71	4.311	190.431	20.57
Cassava	443.08	1.871	82.664	8.93
Yam flour	270.71	1.143	50.506	5.46
Beans	386.38	1.632	70.086	7.79
Cocoyams	461.96	1.951	86.187	9.31
Fufu	181.43	0.766	33.849	3.66
Plantain	137.50	0.581	25.653	2.77
Semovita	152.73	0.645	28.498	3.08
Beverages	328.75	1.388	61.334	6.63
Pasteries	20.00	0.085	3.731	0.40
Fish	716.88	3.028	133.746	14.45
Egg (Beef)	225.45	0.952	42.062	4.54
Vegetable	127.95	0.540	23.871	2.58
Pepper	217.68	0.913	40.612	4.39
Oil	251.70	1.063	46.959	5.07
Spices	16.52	0.070	3.082	0.33
Others	1.79	0.008	0.334	0.04
Total	N4,961.24	20.947	N925.605	

Source: Field survey, 2017

Tobit regression analysis for food expenditure
The result from this regression analysis as it is being presented in Table 7, 8 and 9 below. The result explained the effect of socio-economic characteristics (marital status, household size, sex, education level, age and household income) on food items. The estimates of Tobit regression parameters for each food items/groups as well as on total food expenditure. Income was indicated to have exercised negative and significant influence on expenditure. Age has significant effect on the consumption of the food items as well as on income. This was negative in cereal, non-food expenditure, protein and all the rest were positive.

The household size has positive effect on all the food items and a significant effect on yam flour, cocoyam, and cassava. The essence of this result is that consumption expenditure on energy giving food, the coefficient of the household size is positive in-line with all. The table shows that as household size increases, all the food item for energy giving food also increases. The household size has significant impact on protein and vegetables with a positive value which means that as household size increases, the consumption expenditure on fruit and vegetables increases. In case of industrial products (such as semovita, baked food, and beverages) and other foods, household size does not have any significant effect but on semovita and baked food it had positive value which signify that as household size increases, these food consumption expenditures also increases.

The significant of sex and marital status on the consumption expenditure on the food commodity except energy giving food, non-food expenditure and total income, revealed that much of energy food are consumed by both single and married. Where the single consumed less of animal protein, cassava, cereal, cocoyam, protein, vegetable and yam flour, the married consume more of these commodities. In the case of sex, it has no significance effect on total food expenditure except on energy giving food and food expenditure. It also revealed that total expenditure of female household head on food in less than that of female household head. In the same vein, women expenditure on food items is less than that of their male counterpart who is household heads. This is not unexpected because on the average the income of male who is household head is higher than their

female counterpart. This result corroborates the findings of Babalola (1978).

Education has significant impact on animal protein, energy giving food, other food, plant protein and yam flour but its effect is not significant on vegetable, beverages, cassava, cereal and nonfood expenditure. Though education has significant effect on animal protein sources (such as egg and milk) and other (such as turkey, chicken pork, bush meat and snail) which are considered as the food for elite in the society in not significant, nevertheless

the result indicates increases in other animal protein sources and other meat consumption with the level of education. For educated household, in the sample expenditure on processed foods such as bakery products and dairy products and beverages and those food that cab be quickly prepared (i.e. fast foods) like eggs, bread etc. increases with higher level of education compared to the natural or raw foods that tend to take more time to prepare like garri, fufu, beans and cassava flour.

Table 6: Distribution of industrial food product, fruit, Vegetable and other fruits expenditure food community items/groups

Explanatory variables	Beverages	Other food	Vegetable and fruits
Constant	120.29	-93.252	-28.715
Age	0.82689	5.1633	1.4249
	(0.1226)	(0.7554)	(0.3834)
Household size	10.803	38.177	27.075
	(0.2800)	(0.9037)	(1.273)
Female	211.07	186.23	80.663
	(1.038)	(0.9037)	(0.7200)
Married	-133.67	56.741	107.88
	(-0.7730)	(0.1581)	(0.5530)
Single	-358.28	-600.44	-83.862
	(1.732)*	(-1.278)	(-0.3284)
Education	56.032	114.32	25.313
	(1.732)	(3.488)***	(1.420)
Log likelihood	-11866.4	-11866.4	-11866.4
R^2/square r	0.0423	0.1408	0.0414

Source: Field survey, 2017

Table 7: Distribution of protein food expenditure food community items/groups

Explanatory variables	Animal Protein	Plant protein
Constant	120.29	571.25
Age	0.82689	-2.2080
	(0.1226)	(-0.3794)
Household size	10.803	31.587
	(0.2800)	(0.6483)*
Female	211.07	239.54
	(1.038)	(1.365)
Married	-133.67	-346.2
	(-0.7730)	(-1.133)
Single	-358.28	-711.29
	(1.732)*	(-1.778)
Education	56.032	52.345
	(1.732)	(1.875)*
Log likelihood	-11866.4	-11866.4
R^2/square r	0.0877	0.0650

Source: Field survey, 2017

Table 8: The distribution of energy giving Food commodity item/groups

Explanatory variables	Cassava	Cereal	Cocoyam	Plantain	Yam flour
Constant	135.53	816.80	401.33	2157.4	196.14
Age	7.8618	-3.9119	4.4777	13.543	6.1963
	(1.258)	(-0.3114)	(0.6648)	(0.5207)	(1.158)
Household size	54.500	31.074	20.664	217.90	75.949
	(1.524)	(0.4323)	(0.5363)	(1.464)**	(2.480)**
Female	265.45	363.43	262.83	1399.4	165.64
	(1.409)	(0.9595)	(1.294)	(1.785)*	(1.026)
Married	65.171	69.676	-329.69	-605.80	-32.815
	(0.1987)	(0.1056)	(-0.9325)	(-0.4437)	(-0.1168)
Single	-44.721	-909.34	-813.83	-3204.9	-493.54
	(-0.1041)	(-1.053)	(-1.7580)	(-1.793)*	(-1.342)
Education	0.77781	76.028	34.757	219.41	43.454
	(0.2596)	(1.262)	(1.076)	(1.759)	(1.693)
Likelihood	-11866.4	-11866.4	-11866.4	-11866.4	-11866.4
R^2/square	0.0381	0.0493	0.0601	0.0879	0.0843

Source: Field survey, 2017, Significant level: *** (1%), ** (5%), * (10%);
Figure in parenthesis are asymptotic to t - value

Conclusion

The conclusions were based on the attainment of the objectives of the study. In order to attain household food and nutrition security, majority of the males and females heads of households engaged in both agricultural and non-agricultural activity while some are involved in multiple activities. Nevertheless, they are still poor and majority of the female heads of household had no formal education and this majority made decision on food consumption in the household.

However, household food availability in the study area is average, while members have occasional access to food and consumption of nutritious food culminating into chronic food and nutrition insecurity in the study area. Infrastructural facility often posed constraints to both female heads and male heads of household in their struggle to attain food and nutrition security. This include lack of constant supply of electricity, lack of knowledge of nutritious food, lack of access to credit facility to engage in small business, lack of appropriate technology for processing storage and preservation, lack of money to purchase pesticides, lack of portable water, problem of unemployment, reliance on crude farm inputs, such as hoe, cutlass, poor maintenance of road, poor health facility, unavailability of pesticides, high cost of petroleum product like petrol, kerosene and diesel, high cost of food items, high cost of agricultural inputs, inadequate extension reach out and inadequate supply of fertilizer.

Importantly, both the female and male heads of household are aware of the importance of food and nutrition security attainment. However, they are indifference to its attainment and they have lost confidence in the government, therefore, it appears they do not rely on government for provision of these facilities. The study revealed a significant relationship existing, (i) only in religion affiliation, household size, (ii) no significant difference between income, (iii) between activities contributed by both household gender heads, (iv) between the extent to which household gender heads are confronted with constraints in the process of ascertaining household food and nutrition security and (v) between attitudes of gender heads to provision of food and nutrition security and level of food and nutrition security.

The study revealed also that, in considering household food availability determinant, number of years spend in school, marital status, income per month by wife, age and income per month by children are the most discriminating variables and are therefore important variables to be considered in any study. The household accessibility (income) determinant could also be considered by the following most discriminating variables, these are income from non-agricultural activities and agricultural activities. It has also been established in this study that variables like household size, number of years spend in school, Cosmo politeness, income from both agricultural and non-agricultural activities and income by wife are the most important and relevant variable to be considered when measuring household food consumption.

Recommendations

Based on the findings of the study, the following recommendations are proffered:

1. Government should increase trade flows, which will generate rural income by encouraging the establishment of cottage industries and the survival of the existing ones.
2. Government should increase financial flows via agricultural export and influence price in domestic market, which will go a long way to affect dietary pattern and food production in the rural area. Government should make and implement price policy that will promote food and nutrition security in the country.
3. There should be adequate funding of research at all times to cause advances in our transport system and generic engineering that will enable more micronutrient rich there to be achieved thereby facilitating agricultural.
4. The non-governmental organization should also support in the funding of rural communities.
5. There should be free access to credit facility combine with support services such as improve input delivery and provision of employment for the people by the government.

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