

Food Insecurity Levels Among Yam-Based Rural Farming Households in Orhionmwon Local Government Area of Edo State, Nigeria

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Abstract – A country achieves food security when food supply equals or exceeds food demand. Nigeria is yet to meet this standard. The study assessed food insecurity levels among yam-based farming households in Orhionmwon LGA and specifically focused on households socio-economic variables which include sex, age, marital status, level of education, farm size, household size and households income and expenditure profile among others. Data were analyzed by appropriate statistical analysis which included frequency counts, percentages, mean and Foster, Greer and Thorbecke (F.G.T.) modified poverty index techniques.

The results showed that (80.8%) of household heads representing majority of the respondents were males, (92.5%) of household heads, which constitute another majority of respondents were married, the mean age of household heads was 50 years, 53% owned houses and 58% had farming experience of between 11 – 12 years. The mean household size was estimated as seven people with a mean farm size of 1.35 hectares. The mean annual household income in the study area was estimated as ₦496, 850.00 out of which farm income contributed 62.43% and off-farm income contributed 37% the mean monthly household expenditure was ₦40, 934.31 out of which food expenditures accounted for 40.22%. The degree of food insecurity levels among households shows incidence, depth and severity increasing with age whilst along the line of marital status; the incidence of food insecurity was worse-off with the married than the unmarried. It was also worse with males than females.

It was recommended that government should empower farmers with inputs that will enable them expand their farm sizes to enhance a positive effect on food security. Government should provide enlightenment campaign on nutritional value and intake of food to enable farmers fit enough for tasks on the farm to address food security.

Keywords – Effect, Food Security, Nigeria, Yam-Based Production.

I. INTRODUCTION

Food security exists, when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life [1]. Thoughts on food insecurity in Nigeria between 1950 and 1960 would have been waved off as a product of idleness, then production was at subsistence but self-sufficient level. The Nigeria economy was experiencing rapid growth of 4.5% between 1958 and 1963, the driving force being a booming trade in agricultural commodities exports, growing annually at 5.5% [2].

Over the last 10 years, agriculture has remained the highest growth driver of the Nigeria economy, growing by 10% on the average and contributing about 73.1% of output expansion annually throughout the period. Crop production, which was driven largely by favourable weather condition, was the dominant agricultural sub sector growth with an annual growth rate of 11.5% [3]. In recent years, Nigeria's huge spending on fertilizer subsidy has not imparted much on the sector, for instance, in 2009 crop season, the country spent ₦50 billion to purchase 500,000 tonnes of fertilizer [4]. While the scheme was intended to benefit small-scale farmers for increased crop yield, the real beneficiaries have been rent-seeking government officials, fertilizers merchants and agents despite the federal government's laudable policies and huge budgetary allocation to the sector, the country is currently spending billions of naira on importation of major food items. The fire brigade remedy of importing food has failed, as food import bills is growing astronomically and becoming a major contender for the increasing scarce foreign exchange in the face of a biting global economic meltdown. The dismal handling of oil wealth since the oil-boom era till date, coupled with dwindling foreign reserves, has made issues of food self sufficiency and food security to become topical to Nigeria government.

Food security measurements are a highly complex issue determined by a number of interdependent risk factors, including agricultural development and capacity; international trade flows, environmental resources and meteorological conditions. There is no single indicator that best measures household food insecurity. However, there have been a number of different assessment methods some of which are the use of balance sheets, rainfall and marketing data, anthropometric measure [5]. Assets ownership, household size and dependency ratio at household level [6], data collected on a number of meals eaten in a day in rural households [7]. Reference [8] also adopted the use of level of calorie intake as an indicator of food security while. Reference [9] advanced this study by modifying FGT poverty index into Food Security Index to estimate food insecurity of rural households in some South-Western Nigeria.

This study, therefore adopted this modification to measure the food insecurity levels of farming households in the study area.

II. OBJECTIVES OF THE STUDY

The study therefore describes the socio-economic characteristics of farm households in the study areas, their income and expenditure profile were analysed, as well as their level of food insecurity while policy recommendations were offered.

III. LITERATURE REVIEW

According to [10], food security at the global and regional levels is attained when the world produces enough food to meet the needs of the fast growing populations; there are no barriers to international food trade so that nations can supplement their production with imports at relatively stable prices and where necessary establish security reserves to safeguard against production deficits or sharp increase in prices. However, meeting these challenges in the world scenario is not an easy work. Therefore, according to [11], global food security will remain a worldwide concern for some time to come.

It has been argued that substantial progress has been made in reducing the food insecure population globally, but food security problem is more chronic and endemic in developing regions especially in Asia and Sub-Saharan Africa. According to the [12] over 852 million people were estimated to be undernourished worldwide in 2000-2002 including 815 million in developing countries, 28 million in the countries in transition and 9 million in the industrialized countries. Sub-Saharan Africa countries has been known to be a region facing deep structural economic problems, political conflicts and various forms of social malaise. It is hoped that the regional and sub-regional collaborative bodies such as the African Union (AU), the New Partnership for African Development (NEPAD), the Economic Community of West African States (ECOWAS), the African Peer Review Mechanism (APRM) etc, can promote the use of common currency market integration, lower trade tariffs and exchange idea and information for good governance. These are essential for the attainment and sustenance of food security.

In the Nigerian context, there are two major sources of food supply. These are domestic food production and food imports. According to statistics from [13], cassava and yam were the most produced crops. Although most of the crops recorded annual increases in output, their aggregates were inadequate to meet annual demand. Indeed, Nigeria's domestic food production has for many years fallen short of demand. It is observed that between 1994 and 2001 for which fairly constant data are available, Nigeria's domestic food production increased from 86.70 million tonnes in 1994 to 103.86 million tonnes in 1994 to 110.37 million tonnes in 2001. Thus the disparity between domestic food production and food demand in the country resulted in food short falls which increased dramatically from 0.53 million tonnes in 1994 to 6.91 million tonnes in 2001.

Yam (*discorea spp*) a tropical root and tuber crop, occupies a pre-eminent position as a food crop, next only to cereals and grain legumes and it is staple food of over

20% of the world population [14]. According to [15] global production has been estimated to be 20 tonnes a year. The greater part of this output is derived from West Africa with Nigeria providing about half the world's total. The author further affirmed that yam is also important in parts of South East Asia and Oceania, and in Caribbean and neighboring parts of the tropical America.

In spite of its economic importance, yam (*discorea spp*) has not received that attention that it deserves with regards to its quantitative contributions to food security in Nigeria in particular and the world at large.

IV. RESEARCH METHODOLOGY

4.1 Area and scope of study

This study was conducted in Edo State Nigeria, the state is created from the defunct Bendel State in Midwestern part of Nigeria on August 27, 1991. According to the National Population Census 2011, Edo State has a population of 3,233,366 (comprising 1,633,946 males and 1,599,420 females) accounting for 2.3% of Nigeria's total population [3]. The State is in the rainforest zone with annual rainfall of 1,300mm – 2,300mm per annum.

The target population of this study were farm households whose cropping system is yam-based, that is, the households derive more than 50% of their farm income from the sale of yam harvested from their farms.

4.2 Sampling Procedure and Methods of Data Collection

A two-stage sampling process was adopted in selecting yam-based farmers within the yam producing areas of Edo South. The first stage involved purposively selecting one block out of the seven blocks making up Edo-South Agro-Ecological Zone. This was based on the researcher's prior knowledge of the intensity of yam-production activities population of yam producers and the availability of market for yam products in the study area. The second stage involved a proportional sampling of five (5) villages from Orhionmwon block and finally thirty (30) Edo Agricultural Development Programme (EADP) contact farmer's from each village.

In all, 150 yam-based farmers were interviewed in the LGA using trained enumerators. However, for analysis only 120 copies of the questionnaire were found adequate and useful for the study.

4.3 Model Specification

Level of Food Insecurity:- The levels of food insecurity among households in the study area was assessed using the three food insecurity measures (incidence of food insecurity (F_0) depth of food insecurity (F_1) and severity of food insecurity (F_2) [16]- [9]. The incidence of food insecurity (F_0): This measures the percentages of individuals within an household of a community whose calorie intake level is below the minimum required.

- i) The depth of food insecurity (F_1): This gives the mean shortfall of calorie intake below the food insecurity line as a proportion of the food insecurity line
- ii) The severity of food insecurity (F_2): This measures does not assign equal weight to the food insecure.

Rather, the greater weight are assigned to the more food insecure in measuring the depth of food insecurity. That is, the weight are given to greater falls from the food insecure line.

To specifically achieve this, the study used a modification of the (F.G.T.) poverty index developed by [17]. This modified index by [16]- [9] was used by [18] to estimate the (FGT) Food insecurity index. The model is a class of additively decomposable measure of poverty. The measure subsumes the headcount index and the poverty gap and provides the distributionally sensitive measure through the choice of a poverty aversion parameter ‘ α ’ the larger the value the greater the weight given by the index to the severity of poverty [19]. The modified index is given by the general formulas:

$$F_o = \frac{i}{N} \sum_{i=1}^p \frac{(FL - C_i)^\alpha}{FL}$$

The α parameter takes a value of 0, 1 and 2 with different implications in line with the original equation, Where:

F_α = food insecurity (index) is a measure of food insecurity level. When $F_\alpha = 0$, it measures incidence, when $F_\alpha = 1$, it measures the depth; when $F_\alpha = 2$, it measure severity, is a measure of inequality aversion P = Number of individual within an household whose calorie intake fall below the minimum recommended level.

N = Number of individual or households in the community
 FL = Food insecurity line, i.e, the minimum recommended daily allowance (RDA) of 2260kcal per capita calorie were used as the food insecurity line in this study.

C_i = The calorie intake of the individual household member; when $F = 0$, the formulae become $F_o = \frac{P}{N}$

Table 1: Recommended Calorie Intake of Individual Household members

Age group	Energy (Kilocalories/day)	
	Male	Female
<6 years	1553.33	1355.00
6 – 10 years	1888.86	1709.21
11 – 18 years	2440.29	1975.46
19 – 59 years	2550.00	1936.00
Above 60 years	2285.00	1900.00

Source: Garrow, T.S and W.P.T. James (1993). Human nutrition and dietetics. Churchill, Livingstone pg. 785 – 786.

V. RESULTS AND DISCUSSION

5.1 General Characteristics of the Respondents in the Study Area

The general characteristics of the households as presented in Table 2 below indicates that (80.8%) of the households were headed by males while females headed (19.2%) of surveyed households. This result further attests to the fact that males owned and controlled most farmlands in the survey area. This could be due to social, cultural and economic limitation which a patrimonial society like ours imposes on women. However, there is a gradual trend towards the prevalence of female-headed households in third world countries [12]. The average age of farmers in the study areas was about 50 years. This agrees with [20], who estimated the average age of West Africa farmer to be 50 years and above. Also 92.5% of those sampled confirmed that they were married. This forms majority of the sampled respondents, corroborating the findings of [21], that society places high value on marriage with married people assumed to be more responsible than the unmarried. The results further showed that 2.5% had no formal education, 16.7% had tertiary education. The moderate level of education in rural areas is a rapidly emerging trend and is thought to have positive influence on the calorie intake of household members (as an appreciation of the nutritive values of food is expected to be positively correlated with level of education). This view is also buttressed [22]. Another advantage that might be enjoyed by respondents due to their level of education is the development of their curiosity to adopt and utilize technologies which could increase agricultural production. Finally, the advantage on the side of moderate educational level is the prospect of getting better off-farm jobs.

The mean farm size was estimated to be 1.35 ha, farm size is expected to be positively related to food security. [23] , observed that there are three million small-holder farming families across Ghana and Nigeria, 90% of whom cultivates less than 2.5 ha and this agrees with 1.35ha of this study. The small farm size cultivated is a strong pointer to food insecurity on the average, households in the study area had a mean farming experience of 14.6 years. Experience in farming is desirable to improve skills and knowledge of farming operations, especially where such skills and knowledge are modern and this will in the long-run impact positively on food security status.

Table 2: Socio-Economic Characteristics of Respondents

Category	Frequency	%	Mean (\bar{x})
Sex: Female	23	19.2	
Male	97	80.8	
Total	120	100	
Age: (range)	4	3.3	
30 & below			
31-40	13	10.8	
41-50	46	38.3	(\bar{x} = 49.67 yrs)
51- 60	46	38.3	
61-70	11	9.2	
Total	120	100	
Marital status:	111	92.5	

Married			
Single	5	4.2	
Widow(er)	4	3.3	
Total	120	100	
Educational level:			
No formal education	3	2.5	
Primary education	20	16.7	
Secondary education	77	64.2	
Tertiary education	20	16.7	
Total	120	100	
Farm size:			
1 ha & below	49	40.8	
1.1– 2.0	38	31.7	
2.1 – 3.0	15	12.5	(\bar{x} = 1.35ha)
3.1 – 4.0	11	9.2	
> 4.0	7	5.8	
Total	120	100	
Farming Experience (yrs)			
1 – 10	35	29.2	
11 – 20	58	48.2	
21 -30	24	20.2	(\bar{x} =14.58 yrs)
> 30	3	2.5	
Total	120	100	
House ownership: Non-owner	57	47.5	
House owner	63	52.5	
Total	120	100	
Household size 1-4	26	21.7	
(range) 5-8	59	49.2	(\bar{x} = 6.50)
9-12	35	29.1	
Total	120	100	
Crop farming status			
Part-time	65	54.2	
Full-time	55	45.8	
Total	120	100	
Cropping pattern			
Sole cropping	25	20.8	
Mixed cropping	95	79.2	
Total	120	100	

(Source): Field data, 2012

5.2 Income and Expenditure Pattern of the Respondents in the Study area

Table 3 shows the income and expenditure pattern of the target household in the study area. The highest percentage (28.3%) of the respondents earned between ₦100,000 and ₦200,000.00 as annual income (\$1.00 = ₦160.00). This shows that an average household size of persons had ₦310,288.33 to spend in a year, giving ₦25,857.36 a month, thus giving us ₦3,693.90 per person. This was less than the absolute poverty line of \$1.00 per day which would give ₦4800.00 per month. This showed that an average respondent in the study area was impoverished and this has been found to be positively correlated to food insecurity status of the households. This was found to be insufficient for the household, taking into consideration the prevailing market price as at the time of data collection.

The total expenditure of an average household in the study area per month was ₦40, 934.51 (Table 3). On individual basis this translates to ₦5, 847.75, this indicates

that amount spent on general consumption is higher than monthly income, one might submit that the household either draw from past savings or borrow from relative; furthermore the amount of money spent on food was more than the amount spent on other items used in the households. This is consistent with Engel's law that low income earners spend a higher proportion of their income on food.

Table 3: Average Annual Income and Average Monthly Expenditures of Households in the Study Area

Average income	Frequency	Percentage (%)
100,000 & below	22	18.3
100,001 – 200,000	34	28.3
200,001 – 300,000	26	21.7
300,001 – 400,000	14	11.7
>N400,000	24	20.8
Total	120	100

Mean annual farm income = ₦310, 228.33

Mean Expenditure on Household Needs

Household Needs	Amount (₦)	Percentage (%)
Accommodation	6,445.45	15.74
Transportation	1,878.90	4.59
Education	6,245.12	15.25
Health	3,003.60	9.33
Clothing	5,463.91	13.34
Utilities	1,433.30	3.50
Food item	16,464.03	40.22
Total	₦40,934.31	100

Source: field data, 2012

5.3 Food Insecurity Level of Rural Farming Households in the Study Area

The study results revealed that there was a high level of food insecurity among the rural farming households in the LGA. The food insecurity assessment along the age categorization showed in (Table 4) revealed that adults in the age brackets of between 51 and 60 years were most affected having 40.4% incidence of food insecurity in the study area, this is followed closely by young adults within the age brackets of 41 years and 50 years having 35.1% of food insecurity incidence. The general trend noticed in the study area shows an increase in food security problem along the age group line as the age increases except at the oldest class where food security problem came to an end. The implication of this is that the young ones are better fed than the older ones excepts, of course at the last rung, where reversal of the trend was noticed. The values of F1 confirms this fact with the food insecure among this age brackets needing 49% RDA to meet up the required minimum daily allowance (RDA). However, the general pattern could be due to adults' willingness to make sure their children are better-off than them, although adults within the age brackets of 61-70 years were food secured. This is also explained by the fact that farming activities reduce with increasing age and supplementary food provision usually come in through emigrated children of the household living in the urban areas.

The food insecurity along the line of marital status of the respondents in the study area as depicted in table 4, shows the Headcount ratio were 0.93, 0.035 and 0.035 for married, singled and widower respectively, it show that 93% of the married were food insecure while both single and widower had the same 35% food insecurity level; this confirms that the married respondents are worse-off than both the single and widower. The married respondents needed 54.6% of the RDA to meet up with the recommended minimum calorie intake whilst both the single and the widower needed 44.6% and 17.2% of the RDA respectively.

Finally, the food insecurity analysis along gender lines is presented in table 4, with the head count ratio of 0.22 and 0.77 for female and male respectively, it implies that 22.8% of the female were food insecure requiring 45% of RDA to meet up with the recommended minimum calorie intake on the other hand, the males were worse off with 77.2% being food insecure and requiring 47% RDA to meet up with recommended minimum calorie intake.

Table 4: Food Insecurity and Distribution of respondents in Orhionmwon Local Government Area of Edo State

Category	Food insecurity Incidence (Fo)	Food insecurity Depth (F1)	Food Insecurity Severity (F2)
Marital status			
Married	0.930	0.546	0.266
Single	0.035	0.446	0.299
Widow(er)	0.035	0.172	0.030
Gender lines			
Females	0.228	0.457	0.231
Males	0.772	0.471	0.267
Age lines			
30 & below	0.035	0.546	0.299
31 – 40	0.123	0.339	0.132
41 – 50	0.351	0.458	0.251
51 – 60	0.404	0.505	0.291
61 – 70	0.088	0.490	0.304

Source: Field data, 2012

VI. CONCLUSION AND RECOMMENDATIONS

This study attempted to analyze the food insecurity level among yam-based rural farming households in the selected local government area in Edo State. The study area was fairly food secured, which still means that there are still food security problems in the study area. The survey explored the level of food insecurity along sex, marital status and age group lines; the results along gender lines indicated that males were 77% food insecure requiring 47% RDA, while females' farmers were 22% food insecure requiring 45% RDA. Along marital status, single households were 3.5% food while married households were 93% food insecure.

Furthermore, severity of food insecurity was prevalent among the juvenile but not with the aged. The nature of food insecurity may have been worsened by low level of farm size, farm income and off-farm income, the implication is that government needs to evolve strategy of giving bigger farm size to respondents from reserved areas and giving of loans to farmers to boost their production. Finally, the study recommends the following measures to be undertaken by government viz;

- Promotion of increased agricultural activities
- A kind of enlightenment campaign (through the media) on meeting nutritional imbalance should be embarked upon at grassroots level for all.
- The government at the grassroots can vigorously pursue the meal subsidy/food aid for all, especially those of farming age, so that the target audience will be the actual beneficiary and
- Provision of more infrastructures would go a long way to improve food security situation in the study area.

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