

Analysis of Food Security Status of Farmers in Ovia North-East Local Government Area, Edo State, Nigeria

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Abstract

The study assessed the food security status of farmers in Ovia North-East Local Government Area of Edo State. A simple random sampling technique was employed to sample a total of 120 farmers from the study area for the study. Data collection was achieved using structured questionnaire. Data were analyzed using descriptive statistics, food security status analysis and logit regression model. The results showed that farming in the study area was dominated by males (87%) who were married (92%). They had average age, household size, farming experience and crop farm size of 45 years, 7 persons, 7 years and 1.8 ha respectively. Majority of the farmers (77%) were literate. The farmers generated income from both farming of ₦1,780,592.00 (US\$5,813.04) and other non-farm sources of ₦107,874.00 (US\$352.17), representing 94.28% and 5.72% of total income respectively. Their average per capita income and per capita food expenditure were ₦739.13 (US\$2.41) and ₦246.48 (US\$0.81) respectively. The farmers' average per capita calorie food intake was 1923.55kcal which is lower than the FAO recommended per capita food consumption of 2700kcal. Consequently, majority (86%) of them were food insecure. The logit regression result showed that age, sex and household size had negative and significant influence on the food security status of the farmers while income from farming had positive and significant effect. It was recommended that since farm income had significant and positive effect on food security, farmers should increase the proportion of their income allocated for food expenditure so as to decrease food insecurity.

Keywords: Analysis, Farmers, Food consumption, Food security, Nigeria

Analyse du Statut de Sécurité Alimentaire des Agriculteurs dans la Zone des Gouvernements Locaux du Nord-Est d'ovia, état d'edo, Nigéria

Résumé

L'étude a évalué le statut des agriculteurs en matière de sécurité alimentaire dans la région des administrations locales d'Ovia, dans le nord-est de l'État d'Edo. Une technique d'échantillonnage aléatoire simple a été utilisée pour échantillonner un total de 120 agriculteurs de la zone d'étude pour l'étude. La collecte des données a été effectuée au moyen d'un questionnaire structuré. Les données ont été analysées à l'aide de statistiques descriptives, d'une analyse de l'état de la sécurité alimentaire et d'un modèle de régression logit. Les résultats ont montré que l'agriculture dans la zone d'étude était dominée par les hommes (87%) mariés (92%). Ils avaient en moyenne 45 ans, la taille du ménage de 7 personnes, expérience agricole de 7 ans et la taille de l'exploitation agricole de 1,8 hectare. La majorité des agriculteurs (77%) étaient alphabétisés. Les agriculteurs ont

généralisé des revenus de ₦ 1 780 592,00 (5 813,04 \$US) et d'autres sources non agricoles de ₦107,874.00 (352,17 \$US). Leur revenu moyen par habitant et leurs dépenses alimentaires par habitant étaient ₦739,13 (2,41 \$US) et ₦ 246,48 (0,81 \$US) respectivement. L'apport calorique moyen des agriculteurs par habitant était de 1923,55 kcal, ce qui est inférieur à la consommation alimentaire par habitant de 2700 kcal recommandée par FAO. Par conséquent, la majorité (86 %) d'entre eux étaient en situation d'insécurité alimentaire. Le résultat de la régression logit a montré que l'âge, le sexe et la taille du ménage avaient une influence négative et significative sur la sécurité alimentaire des agriculteurs, tandis que le revenu de l'agriculture avait un effet positif et significatif. Étant donné que le revenu agricole a un effet important et positif sur la sécurité alimentaire, il a été recommandé aux agriculteurs d'augmenter la proportion de leur revenu consacrée aux dépenses alimentaires afin de réduire l'insécurité alimentaire.

Mots-clés : Analyse, Agriculteurs, Consommation alimentaire Sécurité alimentaire, Nigéria

Introduction

“Food security exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food that meet their dietary needs and food preference for active and healthy life” (FAO, 2002a). Several measures of food security do exist, however, the golden standard as reported by WFP (2008) is measurement of food security using kilocalories, the per-capita calorie consumption. Also, the work of Beyene and Muche (2010) emphasized that the focus in food security is on calories rather than on micro-nutrients, protein, food safety and quality. It therefore means that when people are unable to meet the recommended minimum per capita calorie intake (2700kcal) for maintaining an active and healthy life, they are considered to be food insecure (FAO, 1996 and 2012). This recommended minimum per capita calorie intake entails adequate quantity and quality of food consumption, which cuts across food from both animal and plant sources, emphasizing the importance of agriculture.

In Sub-Saharan Africa, Agriculture employs more than 50% of the total labour force, contributes to gross domestic product, provide raw materials and food needed for survival (Fulginiti *et al.*, 2004). However, these benefits are not seen to have significant effect on the people and the economy due to several constraints in agricultural

production including the low average yields constantly faced by the farmers who are mainly smallholders (Diao *et al.*, 2008), thereby posing serious threats to attaining food security.

Food security is built on four main dimensions – food availability, accessibility, utilization and stability (Jrad *et al.*, 2010). Food availability is concerned with the physical supply of food which could be from domestic production or import. It indicates whether the quantity of food supplied is adequate (Gregory *et al.*, 2005; Oni and Fashogbon, 2013). Food accessibility refers to the ability of an individual or household to acquire sufficient quality food for healthy living. It is determined by food distribution, the income of the individuals or households, the food prices as well as social and political factors influencing the acquisition of the food (Kuwornu *et al.*, 2011). Food utilization deals with the safety of the food for ingestion to meet the physiological requirements of the individuals (FAO, 2002b). The ability to have sufficient food supply all year round is referred to as food stability. In this sense, people are food secure only when there is stability of food availability,

accessibility and proper utilization over time. It therefore means that any nation or individual that falls short of these four main dimensions of food security is said to be food insecure.

Food insecurity is a serious problem at the global, national and household levels. (FAO, IFAD, UNICEF, WFP and WHO, 2017) showed that one in ten people in the world (9.3 percent) suffered from severe food insecurity equivalent to about 689 million people. However, the problem of food insecurity is rising and highest in Africa reaching 27.4 % equivalent to almost four times that of any other region. The rise is particularly seen in Sub-Saharan Africa (SSA), with an increase of almost three percentage points from 2014 to 2016 (FAO, IFAD, UNICEF, WFP and WHO, 2017). In West African sub-region, about 16% of the population is under-nourished (Oluyole and Lawal, 2008). In Nigeria specifically, the percentage of food insecure households was 18% in 1986 and this increased to over 40% in 2005 (Sanusi *et al.*, 2006).

In order to curb the endemic food insecurity challenge worldwide, attention in recent times has been focused on the means to eliminate food insecurity. Delvaux and Paloma, (2018) reported that agriculture and rural development support is key in tackling the problem of food insecurity. In SSA, Pinstrip-Andersen (2013) reported that the idea is to increase agricultural productivity, most especially the production of staple crops. Also, Baiphethi and Jacobs (2009) stated that increasing agricultural productivity of smallholder farmers through the use of improved inputs will ensure long-term food security. In Nigeria specifically, addressing the problem of food insecurity has been one of the key developmental policies of the government and various agencies over the years through setting up of several

agricultural programmes. Amongst such programmes were Agricultural Development Programmes (ADPs) first launched in 1972, aimed at increasing food production and to raise the income of small-scale farmers; National Accelerated Food Production Programme (NAFPP) initiated in 1972, aimed at increasing significantly the production of maize, cassava, rice and wheat; Operation Feed the Nation (OFN) (1976-1980) aimed at increasing local food production in order to reduce imports; Green Revolution inaugurated in 1980 and aimed at increasing food production and raw materials in order to ensure food security; Directorate of Food, Roads and Rural Infrastructure (DFRRI) was instituted in 1986 and aimed at development of the rural areas; National Fadama Development Project (NFDP) started in 1990 and aimed at addressing the challenge of poverty in Nigeria; National Special Programme on Food Security (NSPFS) launched in January 2002, aimed at increasing food production and to eliminate rural poverty; Root and Tuber Expansion Programme (RTEP) launched in April, 2003, designed to address the problem of food production and rural poverty; and Community-Based Agricultural and Rural Development Programme (CBARDP) was launched in 2003, aimed to reduce poverty by improving the living conditions and livelihoods of poor rural communities most especially women and vulnerable groups.

Despite these efforts by the government, food insecurity, hunger and poverty remains a main challenge in Nigeria. An important question would be, Does food insecurity prevalent among farmers who are the main food producers and also who depend on agriculture as their primary occupation and source of food and income? It was therefore imperative to embark on a study to know the food security status of these farmers for proper policy formulation and implementation.

The main objective of this study was to analyze the food security status of farmers in Ovia North East Local Government Area (LGA) of Edo State, Nigeria. The specific objectives were to: describe the socio-economic characteristics of farmers in the study area; estimate their food security status and examine the factors affecting food security status of the farmers in the study area.

Research Methodology

Study area and scope of study

The study was carried out in Ovia North East LGA of Edo State, Nigeria. The study area which occupies a land area of 2,301km² (Edo State Government, 2012) has a total population of 155, 344 people (80,433 *males* and 74,911 *females*, representing about 52% and 48% of the total population respectively) (National Population Commission, NPC, 2006). It is located in the rain forest zone of South–South Nigeria, particularly in Edo South. The average annual rainfall in the study area is 2500mm, the mean annual minimum and maximum temperature is about 25°C in the rainy season and 28°C in the dry season and the relative humidity is about 83% (Edo State Government, 2012). The main occupation of the inhabitants of the study area includes farming, trading, crafting and civil service jobs. The major crops produced in the area were plantain, cocoa, rubber, oil-palm, maize, yam, cassava and pineapple, while livestock production includes poultry, fishery, snailery, rabbitry and goat production.

In scope, the study covered the socio-economic characteristics of the farmers, their income, food expenditure, food calorie intake and the factors affecting their food security status. The food security analysis was limited only to the dietary intake; other dimensions for food security are subjects for further study.

Sampling procedure and Data Collection

A two-stage sampling procedure was used in selecting the respondents for the study. In the first stage, three major communities were purposively selected for the study. This is because these communities were largely populated with farmers. The second stage involved employing a simple random sampling technique in selecting 40 respondents from each of the selected communities, thus giving a total sample size of 120 respondents.

The primary data for the study were collected using structured questionnaire in 2017. Data were collected on the socio-economic characteristics of the farmers, their income levels from different sources, food expenditure and quantity of food consumed.

Data Analysis

Data were analyzed using descriptive statistics, food security status analysis and logit regression model.

Descriptive Statistics: The descriptive statistics employed included means, frequency counts, percentages and standard deviation.

Food Security Status Analysis: In this analysis, the calorie intake of the farmers was first estimated, followed by the choice of their food security line which was used to separate them into their food security status. The calorie intake as measure of food security was also used by Abu and Soom (2016). This procedure is discussed as follows:

Calorie Intake: The calorie content of the food consumed by the respondents was estimated using the nutrient composition table of commonly eaten foods in Nigeria (Oguntona and Akinyele, 1995). After adjusting for adult equivalent using the consumption factors for age-sex categories, the per capita calorie intake was computed as:

$$\text{Per capita calorie intake} = \frac{\text{Household daily calorie intake}}{\text{Household size}} \dots\dots (1)$$

The various food used for computing the calorie intake were yam, garri, potato, meat, fish, rice, cowpea, pumpkin, milk, beer, maggi and salt. The analysis was based on the assumption that these are the only foods consumed by the farmers and nothing else. This assumption was necessary to identify the food consumed and to pose a restriction as there could be other foods consumed by the farmers not captured in the analysis.

Food Security Line: The food security line used in this study was the recommended per capita calorie intake of 2700kcal by FAO (2012).

Food Security Status: The food security line was used to dichotomize the farmers into food secured or insecured. Farmers with per capita calorie intake equal to or greater than 2700kcal were considered food secured and those below 2700kcal were regarded as food insecured. Mathematically, the food security status of the farmers is expressed as:

$$Y = \frac{M_i}{R} \dots\dots (2)$$

Where: Y is Food security status of the ⁱth farmer, M_i is Per capita calorie intake of the ⁱth farmer and R is the Recommended per capita calorie intake (2700kcal). If Y ≥ 1, the farmer is considered food secured. If Y < 1, the farmer is food insecured.

Logit regression model: The logit regression model was used to examine the determinants of food security status of the farmers. The model, as given by Pindyck and Rubinfeld (1991) is expressed as:

$$P_i(Y = 1/X_i) = \ln \left(\frac{Y}{1-Y} \right) = a + b_1 X_1 + \dots + b_7 X_7 + U \dots\dots\dots (2)$$

Where: Y is Food security status of the ⁱth farmer (food secure = 1, food insecure = 0), P_i(Y = 1/X_i) is the Probability of Y (attaining food security) occurring, given that X_i has occurred, a is Constant intercept, b₁ - b₇ are coefficients of the independent variables to be estimated and X₁ - X₇ are explanatory variables defined as follows: X₁ is age (years), X₂ is (male = 1; female = 0), X₃ is marital status (married = 1; otherwise = 0), X₄ is household size (persons), X₅ is size of crop farmland (ha), X₆ is farm income (₦), X₇ is non-farm income (₦) and U is error term.

Limitations of Study

The study has some limitations: First, there was no formal record keeping by the farmers. So, the information provided for the study was solely based on memory recall and estimates. As a result, the data collected might not be as accurate as when proper records were kept. Secondly, the conservatism of some of the farmers, coupled with the fear of insecurity made them to be reluctant to disclose some information concerning their personal life, production and income. They completed the questionnaire after much persuasion. Consequently, the information provided might not be 100% accurate. The implication of these limitations is that, there would be some level of error in the results of the study. They would not, in any way, render the data invalid as the data were still relevant.

Results and Discussion

Socio-economic Characteristics of Farmers

Table 1 shows the results of the socio-economic characteristics of the farmers in Ovia North-East LGA of Edo State. It can be seen that majority of the farmers (73%) were between the age group 31 – 50 years with mean age of 45 years. This is similar to the findings of Egbodion and Ahmadu (2012)

Table 1: Socio-economic Characteristics of Farmers in Ovia North-East LGA of Edo State

Variables Age (years)	Frequency (n=120)	Percentages (100)	Mean
< 31	12	10	
31 – 40	23	19	
41 – 50	65	54	
51 – 60	15	13	
> 60	5	4	45
Sex			
Male	104	87	
Female	16	13	
Marital Status			
Married	110	92	
Single	7	6	
Widowed	3	2	
Household Size(persons)			
< 5	22	18	
5 – 8	64	53	
9 – 12	27	23	
> 12	7	6	
Occupation			
Farming	114	95	
Civil Servant	5	4	
Trading	1	1	
Educational level			
No formal education	27	22	
Primary education	44	37	
Secondary education	43	36	
Tertiary education	6	5	
Farming experience (years)			
< 3	12	10	
4 – 6	39	33	
7 – 9	41	34	
>9	28	23	
Access to extension services			
Yes	13	11	
No	107	89	
Crop farm Size (ha)			
≤2	53	44	
3 – 4	45	37	
5 – 6	20	17	
≥ 7	2	2	

Source: Field survey, 2017

where the small-holder farmers in Edo State had an average age of 42 years. This age group is within the working force of the population (Ovharhe, 2015) and, thus, it is expected to have a positive effect on labour supply which should in turn contribute to increase in farm productivity and food security. Farming in the study area was dominated by males (87%). Similarly, Alufohai et al. (2017) reported the dominance of male farmers (about 56%) in arable crop production in Edo State. This could be due to the strenuous operations involved in the farming activities. Majority of the respondents (92%) were married with average household size of 7 persons. This is in line with the findings of Egbodion and Ahmadu (2012) who reported that 72% of smallholder farming households were married. Also, Alufohai et al. (2017) reported that about 84% of arable farmers in Edo State were married with mean household size of 10 persons, and Ahmadu and Owati (2014) reported that 93% of cassava farmers in Edo State were married. The implication of this is that, being married coupled with large family size, there would be more mouths to feed and this could negatively affect food security status of the farmers, all things being equal. Farming was the major occupation of the farmers (95%), implying that the respondents would pay attention to their business which could result in increased productivity, *ceteris paribus*. This result agrees with previous findings (Egbodion and Ilavbarhe, 2014) which showed that farming is the major occupation of plantain farmers in the study area.

On educational level, 78% of the respondents had at least primary education, confirming the findings of Egbodion and Ilavbarhe (2014)

who reported that about 67% of plantain farmers in southern part of Edo State had formal education. Also, in the work of Alufohai et al. (2017), more (65%) of arable farmers in Edo State had at least primary education. Majority of the farmers having at least a level of education would enable them adopt new innovation of farming if disseminated to them, as well as improve their managerial ability to efficiently operate their farm. The farmers had average farming experience of 7 years. It is expected that the experience acquired by the farmers would enable them to be efficient in managing their farms, thus, increasing productivity and food availability for consumption. Access to extension services by the farmers was low (11%). This implies that most of the farmers would not be aware of improved production technologies which could have been disseminated to them through extension services to help them improve their production. The average farm size of the farmers was low (1.8 ha), indicating that they were mainly small-scale farmers. This is similar to the findings of Erie et al. (2011) who reported that the arable crop farmers in Edo State had low farm size of 1.04 ha. Low farm size also implies low farm production which has implication for food security.

Income Level of Respondents

The results presented in Table 2 indicate that the major source of income of the farmers was income from crop production (93.96%). This is due to the fact that majority of the farmers were mainly into crop production. The farmers also generated income from other sources which included animal production (0.35%), hunting (0.95%), trading (3.14%) and civil service job (1.63%). These represented income diversification which could help improve the food security status of the farmers. However, the average per capita income of a farmer (₦739.13) was lower than the mean per capita income of ₦988.70

Table 2: Income Level of Farmers in Ovia North-East LGA of Edo State

Source of Income	Mean income/Annum (N)*	Percentage (%)	Per capita income (N)*
Farm income			
Crop production	1,773,925.00	93.96	
Animal Production	6,667.00	0.35	
Sub-total	1,780,592.00	94.28	
Non-farm income			
Hunting	17,833.00	0.95	
Trading	59,208.00	3.14	
Civil Service	30,833.00	1.63	
Sub-total	107,874.00	5.72	
Total	1,888,466.00	100	739.13

Source: Field survey, 2017

* US\$1.00 = N306.31 as at December, 2017 (CBN, 2017)

estimated for average Nigerian about eight years ago (CBN, 2009). This would have negative implication on the food security status of the farmers considering the devaluation of the Nigeria Naira as reflected in the Dollar-Naira exchange rate between 2009 (US\$1.00 = ₦149.80) and 2017 (US\$1.00 = ₦306.31) (CBN, 2017).

Per Capita Food Expenditure and Consumption of Farmers

The results of the per capita food expenditure and consumption of the farmers are presented in Table 3. The farmers' average per capita food expenditure was ₦246.48 which is low relative to their average per capita income (₦739.13) presented in Table 2. This may be due to expenditure on other non-food items (rent, clothing, health care, education, transportation, utility and other social activities such as marriages, burials, birthday celebrations and cultural and religious festivals), savings and investments not captured in this study. There is need to increase the proportion of income allocated

for food expenditure if food security is to be achieved.

The expenditure on starchy foods (yam, garri, and potato) accounted for about 34% of the total food expenditure with expenditure on garri being the highest (22%). Consequently, the starchy foods had the highest per capita calorie consumption (862.54kcal) accounting for about 45% of the total calorie food consumption with garri taking the lead (28.81%). This could be due to the fact that starchy foods serve as energy giving foods and because of their ease of accessibility and affordability (Robinson, 1996). Also, Robinson (1996) reported that garri is the most consumed staple food in Nigeria. Cereals (rice) which is another source of carbohydrate food had a mean per capita calorie consumption representing about 15% of the total food consumption, thus, bringing the total carbohydrate food consumption (1,151.45kcal) to about 60% of the total calorie consumption. This indicates that carbohydrate consumption is high in the study

Table 3: Per Capita Food Expenditure and Consumption of in Ovia North-East LGA of Edo State

Food category	Food item	Per capita food expenditure		Per capita food consumption		
		Mean amount (N)	%	Mean quantity (Kg)	Mean kcal	%
Starchy	Yam	28.66	11.63	0.13	196.98	10.24
	Garri	53.32	21.63	0.12	554.08	28.81
	Potato	2.76	1.12	0.07	111.48	5.80
Sub-total		84.48	34.38	0.32	862.54	44.85
Animal products	Meat	50.72	20.58	0.06	204.15	10.61
	Fish	17.76	7.21	0.04	126.35	6.57
Sub-total		68.48	27.78	0.10	330.50	17.18
Cereals	Rice	46.12	18.71	0.18	288.91	15.02
Grain legumes	Cowpea	23.98	9.73	0.06	416.14	21.63
Fruits and vegetables	Pumpkin	14.51	5.89	0.01	9.77	0.51
Beverages	Milk	3.23	1.31	0.0002	12.92	0.67
Drinks	Beer	3.40	1.38	0.002	1.43	0.07
Condiments and spices	Maggi and salt	2.02	0.82	0.004	1.34	0.07
Total		246.48	100.00	0.6762	1923.55	100.00

Source: Field survey, 2017

area, a condition that needs to be revised if food security is to be achieved by farmers in the study area. The farmers' average per capita calorie food intake was 1924kcal which is lower than the FAO recommended per capita food consumption of 2700kcal (FAO, 2012). This means that many of the farmers would be at the risk of food insecurity.

Food Security Status of the Farmers

The result of the farmers' food security status presented in Table 4 was computed based on the recommended calorie intake of 2700kcal for developing countries by FAO (2012). The result shows that about 86% of the farmers were not able to meet the

recommended per capita calorie intake of 2700kcal; hence, they were food insecure while only about 14% of them were food secured. This result confirms the reality of high level of food insecurity in Nigeria. The findings of Iyangbe (2007) showed that 75.4% of rural farming households in Ikpoba-Okha and Orhionmwon LGAs of Edo State were food insecure, while only 24.6% were food secured.

Determinants of Food Security Status of the Farmers

The logit regression results (Table 5) show that the independent variables under consideration in the regression model

Table 4: Food Security Status of Farmers in Ovia North-East LGA of Edo State

Status	Frequency	Percentage (%)
Not food secure (per capita calorie intake < 2700kcal)	103	86
Food secure (per capita calorie intake \geq 2700kcal)	17	14
Total	120	100

Source: Field survey, 2017

Table 5: Factors affecting Food Security Status among Farmers in Ovia North-East LGA of Edo State

Variables	Coefficient (b)	t-value	Sig.
Constant	2043.000	4.204	0.000
Age	-18.000	-2.487**	0.015
Sex	-370.200	-1.990**	0.049
Marital status	153.000	1.240	0.218
Household size	-476.400	-10.600*	0.000
Size of crop farmland	-25.500	-0.303	0.763
Farm income	7.8223	13.015*	0.000
Non-farm income	0.002	1.000	0.507

R² = 64.7%, Adjusted R² = 61.8% *significant at 1% level ** significant at 5% level

Source: Field survey, 2017

explained about 64% of the variation in the food security status of the farmers. The unexplained variation (36%) might be due to other variables such as farming experience, extension contact, occupation and access to credit, among others not captured in the study. There is need for them to be captured in further studies in order to ascertain their effect on food security status of farmers. Age, sex, household size and farm income were the significant variables explaining the food security status of the farmers. Age and sex were negatively signed and significant at 5% level of significance. Household size also had negative influence on the food security status of the farmers and significant at 1%, while farm income had positive effect and significant at 1%.

The negative influence of age implies that older farmers were less food secured than the younger ones, which is expected as the youths are more vibrant and innovative to carry out production activities leading to higher productivity. The inverse relationship of sex with food security status of the farmers indicates that female farmers were more food secured than their male counterparts, contrary to the expectation and the established fact that women are more vulnerable to food insecurity than men in any region of the world (FAO, IFAD, UNICEF, WFP and WHO, 2017). This might be due to the fact that the women might have concentrated more on meeting their food need while the men tended to be more concerned with other projects such as building, education of children and

marriages.

The household size that was negatively signed indicates that farmers with larger household size were more food insecure than those with smaller household size. This is consistent with the findings of Iyangbe (2007) who stated that larger households are more food insecure than smaller ones. The reason for this result is that, the more people in the family, the more food is required to feed them, hence the negative effect on food security. The positive effect of farm income on food security status of the farmers implies that the higher the farm income, the more food secured they were and vice versa. This result of the farm income was expected because of its high value relative to income from non-farm sources. The non-farm income was not significant in explaining the food security status of the respondents. This may be due to its low value.

Farm size was not a significant determinant of food security status in this study probably because it was low and the productivity of the land might be low. Its negative influence on the food security status of the farmers might not be unconnected with decreased productivity when farm size increased as the small-scale farmers might not have enough of other inputs for efficient management of large farms. Furthermore, large farm size does not automatically imply adequate food for consumption as the farmers might not process the products for consumption but might prefer to sell them and buy the processed food and other food items they could not produce.

Conclusion / Recommendations

The study has indicated that the average per capita food expenditure of farmers in Ovia North LGA of Edo State was low relative to their average per capita income. As a result, their per capita calorie food intake fell below the recommended per capita calorie food

intake for healthy and productive life. Besides, highest proportion of the total per capita calorie consumption by the farmers was from carbohydrate foods. Consequently, majority of the farmers were food insecure. The food security status of the farmers was negatively and significantly influenced by their age, sex and household size and positively and significantly influenced by farm income. The high level of food insecurity among the farmers is an unhealthy condition that needs urgent attention to be revised.

Based on the findings of this study, the following recommendations are made:

1. Since income from farming was the increasing function of food security, the farmers should increase the proportion of their income allocated for food expenditure so as to decrease food insecurity.
2. Since the younger farmers were more food secure than the older ones, more youths should engage in farming in order to increase food security in the State.
3. Enlightenment programme on birth control should be organized for the farming households to discourage large family size which is one of the causes of food insecurity in the study area. The family size should be based on the recommended household size by the government of Nigeria.

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References

Abu, G.A. and Soom, A. (2016). Analysis of

- factors affecting food security in rural and urban farming households of Benue State, Nigeria. *International Journal of Food and Agricultural Economics*, 4(1):55-68.
- Ahmadu, J. and T.A. Owati (2014): Strategies for Combating The Effect of Climate Change on Cassava Production in Edo State, Nigeria. *Agricultural Economics and Extension Research Studies* 3(2): 23 - 35.
- Alufohai, G.O.; J. Ahmadu and D.E. Oyoboh (2017). Effect of Flood Disaster on the Income and Standard of Living of Arable Crop Farmers in Edo and Delta States, Nigeria. *Agricultural Economics and Extension Research Studies* 5 (1): 39 – 52.
- Baiphethi, M.N. and Jacobs, P.T. (2009). The contribution of subsistence farming to food security in South Africa. *Agrekon*, 48(4): 459-482.
- Beyene, F. and Mucbe, M. (2010). Determinants of food security among rural households of Central Ethiopia: An empirical analysis. *Quarterly Journal of International Agriculture*, 49(4):299-318.
- Central Bank of Nigeria, CBN (2009). World development indicators. CBN statistical bulletin, various issues.
- Central Bank of Nigeria, CBN (2017). Monthly average exchange rate of the naira per unit of foreign currency. CBN. Retrieved from <https://www.cbn.gov.ng/rates/exrate.asp?year=2017&months=2>
- Delvaux, P.A.G. and Paloma, S.G. (2018). Access to common resources and food security: Evidence from national surveys in Nigeria. *Food security*, 10:121-140.
- Diao, X., Headey, D., and Johnson, M. (2008). Toward a green revolution in Africa: what would it achieve, and what would it require? *Journal of Agricultural Economics*, 39, 539–550. doi:10.1111/j.1574-0862.2008.00358.x.
- Edo State Government (2012). Geography of Edo State. Retrieved on March 12, 2013 from: www.edostate.goving/geography.
- Egbodion, J. and Ilavbarhe, K.O. (2014). Effects of Demographic Factors on Plantain Production in Southern Part of Edo State, Nigeria. *IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)*. 7(7): 20-22.
- Egbodion, J. and J. Ahmadu (2012): Analysis of Efficiency of Arable Crop-Based Enterprise Combination among Small Holder Farmers in Edo State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment* 8 (3): 67–71. Available online at: <http://www.njafe.org/Njafe2012V8No3.html>
- Erie, O.G.; Osifo, A.A. and Muhammed-Lawal, A. (2011). Technical Efficiency of Arable Crop Farmers in Edo State, Nigeria. *International Journal of Agricultural Economics and Extension Services* 1(1): 67–75.
- Food and Agriculture Organisation (FAO), International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Programme (WFP) and World Health Organisation (WHO). (2017). The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security. Rome, FAO.
- Food and Agricultural Organisation (FAO). (2012). FAOSTAT statistical database (available at faostat.fao.org).
- Food and Agricultural Organisation (FAO). (2002a). The state of food insecurity in the World 2001. FAO:Rome.
- Food and Agriculture Organisation (FAO) (2002b). Safe and nutritious food for consumers. World Summit, Rome, Italy.
- Food and Agriculture Organisation, FAO (1996). Food and Agricultural Organisation, Rome Declaration on world food Security. World Food

- Summit, November 13th -17th, 1996, Rome. Technical background documents, 6(13): 2-47.
- Fulginiti, L. E., Perrin, R. K., and Yu, B. (2004). Institutions and agricultural productivity in Sub-Saharan Africa. *Journal of Agricultural Economics*, 31(2-3), 169–180.
- Greyory, P., Ingram, J.S.I., and Brklacich, M. (2005). Climate change and food security. *Philosophical Transactions of the Royal Society B-Biological sciences*, 360(1463): 2139-2148.
- Iyangbe, C.O. (2007). Household Food Security Problem in Edo State: A Case Study of Ikpoba- Okha and Orhionmwon LGAs. An M.Sc Thesis submitted to the Department of Agricultural Economics and Extension Services, University of Benin, Benin City, Nigeria.
- Jrad, S., Nahas, B., and Baghasa, H. (2010). Food Security Models. Ministry of Agriculture and Agrarian Reform, National Agricultural Policy Centre. Policy Brief No 33. Pp 3. Syrian Arabic Republic.
- Kuwornu, J.K.M., Mensah-Bonsu, A., and Ibrahim, H. (2011). Analysis of Food stuff Price Volatility in Ghana: Implications for food security. *European Journal of Business and Management* 3(4): 100-118.
- National Population Commission (2006). Population and housing census enumerator manual. Federal Republic of Nigeria. 66p.
- Oguntona, E. B. and Akinyele, I. O. (1995). Nutrient Composition of Commonly Eaten Foods in Nigeria- Raw, Processed and Prepared. Food Basket Publication Series, Ibadan, Nigeria. P131.
- Oluyole, K.A. and Lawal, J.O. (2008). An Appraisal of the Impact of Agro-services Co-operation. Proceedings of the 9th International Conference on Precision Agriculture, 20–23 July, 2008.
- Oni, O. A. and Fashogbon, A. E. (2013). Food poverty and livelihoods issues in rural Nigeria. *African Journal of Agricultural and Resource Economics*, 8(2), 108–135.
- Ovharhe, J.O. (2015). [Socio-economic determinants of plantain production in Ovia North East local government area in Edo State](#), *Journal of Agriculture and Food Sciences*, 13(2): 43-50.
- Pindyck, R.S. and Rubinfeld, D.L. (1991). Econometric models and economic forecasts, 3rd edition. New York: McGraw-Hill Book Co.
- Pinstrup-Andersen, P. (2013). Can agriculture meet future nutrition challenges? *The European Journal of Development Research*, 25(1), 5–12. <https://doi.org/10.1057/ejdr.2012.4>
- Robinson, J.C. (1996). Bananas and Plantains. CAB International, Wallingford, Oxon, Uk, 238pp.
- Sanusi, R.A., Badejo, C.A. and Yusuf, B.O. (2006). Measuring household food insecurity selected local Government Areas of Lagos and Ibadan, Nigeria. *Pakistan Journal of Nutrition*, 5:62-67.
- World Food Programme (WFP) (2008). Food consumption analysis: calculation and use of the food consumption score in food security analysis. Technical Guidance Sheet. United Nations World Food Programme Headquarters, Rome, Italy.