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Assessment of Rural Households' Food Insecurity in Ekiti State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Authors SOWT and AAA designed the study. Authors AA and AOA managed the literature review searches. Authors FOO and FMO performed the statistical analysis. All authors were involved in enumeration and its accompanied cost. All authors read and approved the final manuscript.

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ABSTRACT

Attaining food security is one of the targets of the Sustainable Development Goals. Despite the various efforts made by governments, food insecurity continues to be a major developmental problem across the globe. Research shows that food production in Nigeria is increasing at a rate of less than 2.0% while the population growth rate is estimated to be increasing at 2.5% per annum. Therefore, this study was carried out to assess rural households' food insecurity in Ekiti state, Nigeria. Descriptive statistics, Per-capita Food Consumption Expenditure, Probit Regression Analysis, Likert Rating Scale, and Household Food Insecurity Access Scale (HFIAS) were used to achieve the objectives. A multi-stage sampling procedure was used to select 240 respondents used for the study. Results show that the respondents were in their active working age with an average age of about 46 years and marital status, educational qualification, primary occupation, access to credit, and age were significant drivers of food insecurity in the study area. Also, 68.33% of the respondents were food insecure while only 31.67% of the respondents were food secure. Seven out of ten generated perception statements developed were rated 'agreed' while the remaining three statements were rated disagreed. The results of HFIAS show that 31.7% of the respondents were

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least food insecure and 48.2% were moderately food insecure while the remaining 20.1% were most food insecure. Recommendations were made based on the findings of the research work that governmental and non-governmental organizations should make credit facilities available to the people in the study area in other to augment income inconsistency and policy measures that will enhance increase scale of production should be encouraged.

Keywords: Assessment; rural; household's; food; insecurity; Ekiti.

1. INTRODUCTION

Food insecurity is a situation that exists when people lack secure access to enough amounts of safe and nutritious food for normal growth and development and active and healthy life. It may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level [1]. However, the importance of food for the healthy growth and productive life of an individual cannot be over-emphasized. Based on this assertion, the World Food Conference of 1974 made it compulsory for the government of all nations to strategize on how to improve the agricultural production to meet the food demand of the world population [2].

Based on the outcome of the World Food Conference, Nigeria launched many agricultural programmes and policies. Some of these programs include; Operation Feed the Nation (OFN) 1976-1979, Green Revolution (GR) which aimed at improving agricultural production, River Basin Development Authority (RBDAs) of 1979 geared towards developing irrigation farming, Directorate of Food Road and Rural Infrastructure (DFRRI) and Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB) were all established to enhanced food production in the country. Other recent programs specifically geared towards food security include National Economic Empowerment Development Strategies (NEEDS) and National Food Security Program (NFSP) launched in 2004 and 2008 respectively. Despite all these programmes and policies, the large segment of the Nigerian population subsisting on inadequate nutrition keeps on increasing day by day and thereby, the number of food-insecure people increases annually [3].

At the household level, food insecurity exists when members of a household have an inadequate diet for part or all the year or face the possibility of an inadequate diet in the future [4]. When household members skip meals or when they get worried about their food stocks, this is an indication of food insecurity. So, household types reflect the means and methods by which households acquire food for consumption, that is, the market-food-oriented household and the non-market-food oriented household. A market-food-oriented household may be defined as any household that acquires the bulk of its food through the exchange of resources such as cash, services, or goods and a non-market-food oriented household acquires the bulk of its food supplies through own production [5]. Therefore, the level of food insecurity varies from one household to another. Loss of entitlements exposes market-food-oriented households to food insecurity as stated by Tarasuk and Vogt [6], revealing that the prevalence of food insecurity increased markedly as income adequacy declined. External factors render non-market-food oriented households vulnerable to food insecurity as highlighted by Bogale [7], which opined that food insecurity could also be determined by external factors such as rainfall patterns, land degradation, and climate change.

However, food insecurity remains the fundamental problem of Nigerians as food production is increasing at a rate of less than 2.0% while the population growth rate is estimated to be increasing at a rate of 2.5% per annum [8,9]. Thus, the increasing evidence of change in population and available food production has generated contention and empirical questions. Therefore, the disparity between food production and population growth rate will generate a high rate of food demand, thereby causing the food Demand-Supply gap which gives rise to food insecurity. Based on the Global Hunger Index (GHI), Nigeria was rank 40th among 79 countries in 2012, together with rising food prices, malnutrition, and deaths as a result of wide-spread poverty which indicates the prevalence of food insecurity in the country. To support the GHI report of 2012, Adegun [10], observed that parents in Ekiti State appear to involve their children below 15 years of age in labour work such as hawking on the street in other to generate income to meet their daily

consumption expenditure. It is no longer rare to see children as young as six or seven years old specialized mainly in the sale of sachet water in motor parks, at bus stops, and on busy roads in the state. Therefore, it is necessary to provide adequate information on the causes, effects and magnitude of food insecurity in Ekiti State.

2. METHODOLOGY

2.1 The Study Area

This study was carried out in Ekiti State Nigeria. The state is buoyant in agricultural resources with cocoa as its leading cash crop. The area is also known for its forest resources, notably timber. Because of the favourable climatic conditions, the area enjoys luxuriant vegetation, thus, it has abundant resources of different species of timber. Food crops such as yam, cassava, and grains like rice and maize are grown in large quantities. Other notable crops such as kola nut and varieties of fruits are also cultivated in commercial quantities in the state (Ekiti State Government, 2006). The State enjoys a tropical climate with two distinct seasons; rainy season (April–October) and the dry season (November–March). Temperature ranges between 21° and 28°C with high humidity.

2.2 Sampling Technique

A multi-stage sampling procedure was used to select respondents for the study. The first stage involved the selection of the sixteen (16) LGAs of the State. The second stage involved the random selection of three rural communities from each of the 16 LGAs. The third stage involved a random selection of five (5) households from each community and in all, a total of 240 respondents were selected for interview.

2.3 Data Collection

A pre-tested structured questionnaire was used to obtain information from respondents (household heads) in the selected rural communities. Data were collected on socio-economic characteristics of the respondents such as age, sex, marital status, income level, and also on the perception of the respondents on the causes of food insecurity. The questionnaire also contained the Household Food Insecurity Access Scale (HFIAS) generic questions which were used to estimate the magnitude of household food insecurity in the study area.

2.4 Analytical Techniques

The data analytical tools used in this study comprised of descriptive statistical techniques (such as mean, mode, standard deviation, frequency counts and percentages), Per-capita food consumption expenditure, Household Food Insecurity Access Scale (HFIAS), Likert Rating Scale and Probit Regression Analysis.

2.5 Model Specification

2.5.1 Per-capita food consumption expenditure

Per-Capita Food Consumption Expenditure was calculated as follows;

(PCFCEXP) = (Food Consumption Expenditure)/ (Household size) (1)

Total Per-capita Food Consumption Expenditure (TPCFCEXP) = summation of PCFCEXP (2)

Mean TPCFCEXP = (TPCFCEXP) / (Total number of household) (3)

Food Security Line = 2/3 of MTPCFCEXP (4)
TPCFCEXP = ₦2, 520, 000
MTPCFCEXP = 2, 520, 000 / 240
MTPCFCEXP = ₦10, 500
Food Security Line = 2/3 of ₦10, 500
Food Security Line = ₦7, 000

2.5.2 Household food insecurity access scale (HFIAS, adapted from Coates, et al, 2007) [11]

Household Food Insecurity Access Scale (HFIAS) was used to estimate the magnitude of household food insecurity in the study area. However, households' food insecurity was assessed using the 9 items of Household Food Insecurity Access Scale (HFIAS). The household heads were interviewed to provide information about the modifications a household made in the diet or food consumption patterns due to limited resources of acquiring food. HFIAS was used to assess whether households experienced problems in accessing food or not and reference period of 30 days prior to the survey date was used [11].

However, three themes were covered by this tool;

2.5.3 Anxiety and uncertainty about the household food supply

Did you worry that your household would not have enough food?

2.5.3.1 Insufficient quality (Included variety and preferences of the type of food)

- Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?
- Did you or any household member have to eat a limited variety of foods due to lack of resources?
- Did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?

2.5.3.2 Insufficient food intake and its physical consequences

- Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?
- Did you or any household member have to eat fewer meals in a day because there was not enough food?
- Was there ever no food to eat of any kind in your household because of a lack of resources to get food?
- Did you or any household members go to sleep at night hungry because there was not enough food?
- Did you or any household member go a whole day and night without eating anything because there was not enough food?

Based on the HFIAS generic questions and the respondents' responses to the questions, the households were scored as follow;

if it did not experience any of the nine items of the HFIAS = 0
if it rarely did (once or twice in the past 4 weeks) = 1
if it sometimes did (three to ten times in the past 4 weeks) = 2
if it often did (more than 10 times in the past 4 weeks) = 3

Therefore, three categories of food insecurity were created using the HFIAS scores. The categories are: a score of 0 to 2, 3 to 10, and a score of 11 to 27 indicating least food insecure, moderate and most food Insecure, respectively.

2.5.4 Likert rating scale

Likert Rating Scale was used to analyze the respondents' perception on the causes of food insecurity. Various perception statements were generated, and the respondents were asked to rate the statements as follow on a scale of 1-5;

- Strongly disagree was awarded 1 point
- Disagree was awarded 2 points
- Undecided was awarded 3 points
- Agree was awarded 4 points
- Strongly agree was awarded 5 points

Therefore, weighted mean was generated to give rank on each of the listed perception statement. A mean score of 3 and above were classified as agreed while a mean score less than 3 were classified as disagree.

$$\text{Weighted mean} = \frac{\text{SA}\times5 + \text{A}\times4 + \text{UN}\times3 + \text{DA}\times2 + \text{SD}\times1}{\text{Total number of observers}} \quad (1)$$

$$\text{Grand mean} = \frac{\text{WM1} + \text{WM2} + \text{WM3} + \ldots\ldots\ldots\ldots\ldots + \text{WM10}}{\text{Total number of perception statements}} \quad (2)$$

2.5.5 Probit regression analysis

Probit Regression Analysis was used to analyze the factors influencing food insecurity status of the respondents.

The model is specified as follows;

$Pr(y = 1) = f(X_i\beta)$ (3)
Pr= probability function
y= dependent variable
Xi= Independent Variables
β=kx1 vector of parameter to be estimated
y = Food insecurity status (food insecure=1, food secure=0)
X_1 = Sex of the respondent (male =1, female= 0)
X_2 = Age of the respondent (years)
X_3 = Marital status (married=1, others=0)
X_4= Educational qualification (year spent in school)
X_5 = primary occupation (farming=1, others=0)
X_6 = Farm Size (hectare)
X_7 = Household Size
X_8 = Source of food (own production=1, others=0)
X_9= Access to credit (Yes=1, No=0)
X_{10} = Extension visit (Yes=1, No=0)

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of the Respondents

The result of the analysis of socioeconomic characteristics of the respondents is

presented Table 1. The study revealed that the respondents were mostly male with majority of them married and relatively young people with average age of about 46 years and with a large household size of about 7 people per household on average. It was also revealed that the major primary occupation of the respondents was farming and there was high literacy level with only 13.3% have no formal education. The average monthly income from primary occupation was ₦35, 400.00.

Table 1. Distribution of respondents by socio-economic characteristics

Characteristics	Category	Frequency (n=240)	Percentage	Mean
Gender	Male	141	58.8	
	Female	99	41.2	
Age of respondent	≤ 30	62	25.8	
	31 – 40	49	20.4	
	41 – 50	31	12.9	45.93
	51 – 60	55	22.9	
	> 60	43	17.91	
Marital Status	Single	48	20.0	
	Married	159	66.2	
	Widowed	21	8.8	
	Widower	12	5.0	
Educational Status	None	32	13.3	
	Primary Education	28	11.7	
	Secondary Education	107	44.6	
	Tertiary Education	73	30.4	
Primary Occupation	Artisan	87	36.2	
	Civil Servant	60	25.0	
	Farming	93	38.8	
Monthly Income from primary occupation (₦)	≤ 20000	102	42.53	
	21000 – 30000	37	15.43	
	31000 – 40000	35	14.58	35400.00
	41000 – 50000	26	10.83	
	51000 – 60000	8	3.33	
	>60000	32	13.30	
Household size	≤ 4	50	20.8	
	5 – 7	93	38.8	6.96
	8- 10	61	25.4	
	>10	36	15.0	

Source: Field survey, 2018

Table 2. Distribution of Respondents by monthly food consumption expenditure

Expenditure ₦	Frequency	Percentage
≤5000	76	31.7
5001-7000	90	37.5
7001-9000	37	15.4
9001-11000	23	9.6
>11000	14	5.8
Total	240	100.0
Mean	6, 423.65	
Maximum	15, 000	
Minimum	2, 500	
Standard deviation	8, 416.749	

Source: Field survey, 2018

3.2 Respondents Monthly Food Consumption Expenditure

Table 2 shows the food consumption expenditure of respondents in the study area. From the table, the average food consumption expenditure was N6, 423.65 and the minimum food consumption expenditure was N2, 500 while the maximum food consumption expenditure was N15, 000. The result implies that many of the respondents spend less than the average food consumption expenditure.

3.3 Food Insecurity Status of the Respondents

Per-capita food consumption expenditure was used to ascertain food insecurity in the study area. The households were categorized to 'food secure' and 'food insecure' group using the two third of mean total Per-capita food consumption expenditure (Food security line) as benchmark. However, household whose monthly food consumption expenditure fall below the Food security line were regarded as food insecure while those that fall above the Food security line were regarded as food secure. The food insecurity line defined as two-thirds of the mean per-capita food expenditure of the total households stood at ₦7, 000. This implies that a household whose monthly food consumption expenditure was below ₦7, 000 was classified as food insecure while a household whose food consumption expenditure equaled or was above this amount was classified as food secure.

From the table, 68.33% were food insecure while the remaining 31.67% were food secure. This implies that food insecurity is prevalent among the respondents in the study area. The higher level of food insecurity in the study could be as a result of two factors; the farm size and incomes from both primary and secondary occupations. Most of the respondents (60%) cultivate less than 5 hectares and this could be the reason why they purchase bulk of their food from the market which is subjected to the level of their incomes.

3.4 Percentage Distribution of Household Responses to the Household Food Insecurity Access Scale (Hfias)

Table 4 presents results from the household responses to the HFIAS questions. A higher number of the households indicated high levels of uncertainties about their access to food for all household members in the past 30days prior to the start of the study. The results show that 84.8% were worried that food would run out and 81.7% expressed worries that the household would not have enough food to eat. Least percentage of households reported the severe forms of food access problems such as having no food at all in the household and having no way of accessing food at least once, some members going to bed hungry and some household members not eating for a whole day.

3.5 Estimation of the Magnitude of Household Food Insecurity in the Study Area

Household Food Insecurity Access Scale (HFIAS) was used to estimate the magnitude of household food insecurity in the study area. However, household food insecurity was assessed using the 9 items of HFIAS. The respondents were interviewed to provide information about the modifications a household made in the diet or food consumption patterns due to limited resources of acquiring food. HFIAS was used to assess whether households experienced problems in accessing food or not and reference period of 30 days prior to the survey date was used [11].

The result of the analysis of HFIAS showed in the Table 5, revealed how the households were categorized based on the HFIAS scores that generated from nine generic questions of HFIAS. The table showed that 31.7% were Least Food Insecure (0-2) and 48.2% were Moderate Food Insecure (3-10) while the remaining 20.1% were Most Food Insecure (11-27). The result indicates that most of respondents in the study area were moderately food insecure and this was in accordance with the respondents' affirmative responses percentage. The affirmative responses percentage showed that the severe food insecurity situations such as no food at all in the household, went to sleep hungry and did not eat for a whole day were less affirmed compare to least and moderate food insecurity situations.

3.6 Perception of Respondents on the Causes of Food Insecurity

Likert Rating Scale was used to analyze the respondents' perception of the causes of food insecurity. Various perception statements were generated, and the respondents were asked to rate the statements on a scale of 1-5. Table 6 shows the result of the Likert rating scale.

Table 3. Distribution of respondents by food insecurity/security status

Food Insecurity/Security status	Frequency	Percentage
Food insecure	164	68.33
Food secure	76	31.67
Total	240	100.00

Source: Field survey, 2018

Table 4. Percentage distribution of household responses to the HFIAS questions

Food access statement	*Frequency	Affirmative responses (%)
Worried that food would run out	139	84.8
Unable to eat balanced meal	125	76.2
Worried that household would not have enough food	134	81.7
Ate non-preferred food	109	66.5
Reduced size of meals	118	71.9
Skipped some meals in a day	67	40.9
No food at all in the household	52	31.7
Went to sleep hungry	54	32.9
Did not eat for a whole day	36	21.9

*Source: Field survey, 2018*Multiple responses recorded*

Table 5. Distribution of the respondents to the magnitude of household food insecurity

Food Insecurity Category	Food Insecure Score	Frequency	Percentage
Least Food Insecure	0-2	52	31.7
Moderate Food Insecure	3-10	79	48.2
Most Food Insecure	11-27	33	20.1
Total		164	100.0

Source: Field survey, 2018

The table shows the respondents' responses to the perception statements generated by the research to analyze the respondents' perception of the causes of food insecurity. To arrive at the rating, a rating mean termed weighted mean was generated for each of the perception statements. From the table, the grand mean of 3.42 shows that the respondents agree with the majority of the generated perception statement on the causes of food insecurity.

Specifically, the respondents agreed with 7 out of 10 generated food insecurity perception statements. The weighted mean was generated by finding the average of the respondents' perception score in each of the 10 generated perception statements. From the table, the perception statement that poor agricultural financing can cause a household to be more food insecure was rated first with a mean value of 3.94 while poor storage facilities can cause food insecurity was rated second with a mean value of 3.83 and household headed by a female may be more food insecure than the household headed by a male was ranked 10^{th} position with the mean value of 2.68.

3.7 Factors Influencing Food Insecurity Status of the Respondents

The factors influencing food insecurity status of the respondents in the study area were analyzed using probit regression analysis. Table 7 presents the results of probit regression analysis, the table showed how socio-economic characteristics of the respondents influenced their food insecurity status. The food insecurity status was measured using the result of per-capita food consumption expenditure. The likelihood estimates of the probit model indicated that Chi-square ($\chi 2$) statistic of 56.91 was significant (Prob > 0.0032) suggesting that the model has a strong explanatory power. The pseudo coefficient of multiple determinations (R^2) showed that 63.70 percent variation in the dependent variable was explained by the included independent variables. This implies that the model showed a good fit to the data. The results revealed that marital status, educational qualification, primary occupation and access to credit were all statistically significant at 1% while age was statistically significant at 5%, implying

Table 6. The respondents' perception of the causes of food insecurity

Food insecurity perception statement	SA	A	UN	DA	SD	PIV	Remark	Rank
A household headed by female maybe more food insecure than the household headed by a male.	32	35	53	65	55	2.68	Disagree	10th
Food insecurity can be as a result of inconsistency of government policy (agricultural programmes).	40	31	71	58	40	2.89	Disagree	9th
Food insecurity can be caused as a result of natural disaster such as a climate change.	59	51	90	30	10	3.49	Agree	6th
High cost of food in the market can result to food insecurity.	73	93	23	43	8	3.75	Agree	3rd
Poor agricultural financing can cause a household to be food insecure.	92	95	13	27	13	3.94	Agree	1st
Income inconsistence of the household head can cause a household to be food insecure.	91	82	11	18	38	3.71	Agree	4th
Poor storage facilities can cause food insecurity.	94	70	30	34	12	3.83	Agree	2nd
Large number of household size can cause food insecurity.	71	46	78	33	12	3.55	Agree	5th
Access to credit can reduce food insecurity.	38	94	44	41	23	3.35	Agree	7th
Regular visitation of extension agents can reduce food insecurity.	40	48	55	65	32	2.99	Disagree	8th

Source: Field survey, 2018

Table 7. Factors influencing food insecurity status of the respondents

Variables	Coefficient	Std. Error	P>|z|
Sex	0.0948	0.0473	0.623
Age	0.0043**	0.0018	0.012
Marital status	0.5058***	0.0394	0.000
Educational qualification	-0.4484***	0.0208	0.005
Primary occupation	-0.5322***	0.0201	0.003
Farm size	-0.0092	0.0537	0.425
Household size	0.0063	0.0068	0.190
Source of food	-0.0718	0.0213	0.111
Access to credit	-0.0507***	0.0357	0.001
Extension service	-0.1292	0.0375	0.204
Constant	0.2229	0.0947	0.000
LR Chi-square	56.91		
Pseudo R2	0.6370		

*Source: Field survey, 2018 *** represent 1% significance level. ** represents 5% significance level*

that they were significant in influencing the level of food insecurity status of the respondents in the study area.

Also, sex, age, marital status and household size showed a positive relationship with the dependent variable (food insecurity status), that is, for every 1 unit increase in these variables, there is probability of increase in the level of food insecurity status of the respondents. The negative relationship that exist in educational qualification, primary occupation, farm size, source of food, extension services and access to credit indicates that the higher these variables were, the lesser the food insecurity status of the respondents.

Age of the respondents was significant at 5% and positively affected the probability of a respondent to be food insecure. This indicates

that as the respondents are ageing, the probability of being food insecure increase. Also, marital status is significant at 1% and positively related to the probability of the household to be food insecure. The implication of this result is that, married households are more food insecure compared to the other forms of households, this could be attributed to the large household's size. This result is in accordance with Abimbola and Kayode [12].

Educational qualification was significant at 1% and negatively related to the probability of household being food insecure. Based on the result of the probit regression analysis, the more educated a respondent is, the lesser the incident of food insecurity status of such household. This could be attributed to the fact that higher educational attainment widens the horizon of knowledge which makes it easier for households to embrace food security measures. The result conformed to the findings of Amaza, Abdoulaye, Kwaghe and Tegbaru [13] that higher educational statuses reduce food insecurity.

Primary occupation was statistically significant at 1% and has a negative relationship with the probability of household to be food insecure. Since farming dominates the primary occupation in the study area, therefore, farming households are more food secure than non-farming households. This is because; the rural farming households are mainly subsistent farmers who produce only for their immediate family.

Access to credit is statistically significant and negatively related to the probability of household being food insecure. This implies that household with access to credit are less food insecure compare with households that have no access. The implication of this result is that, household that have access to credit has high tendency of being food secure. This is because, access to credit served as means of augment for income inconsistency.

4. CONCLUSION AND RECOMMENDATION

Based on the findings of this study, it could be concluded that age, marital status, educational qualification, primary occupation, and access to credit were significant drivers of food insecurity in the study area. Most of the respondents were moderately food insecure. Poor agricultural financing, Poor storage facilities, and High cost of food in the market are the most perceived causes of food insecurity in the study area.

It is therefore recommended that governmental and non-governmental organizations should make credit available to the people with little or no interest in other to raise them out of the menace of food insecurity. The government should encourage the people in the study area to engage in mechanized farming by providing machinery and other farm inputs.

The respondents should be encouraged to form themselves into cooperative societies to facilitate credit procurement and policies that will enhance increase scale of production should be embraced.

CONSENT

As per international standard, Rural households' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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