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Influence of Socio-economic Characteristics on the Food Security Status of Rural Households in Edo State, Nigeria

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ABSTRACT The present research study focused on the influence of socio-economic characteristics on the food security status of rural households in Edo State, Nigeria. Data used in the study were collected from both primary and secondary sources. Multistage sampling procedure which involved both purposive and random sampling techniques was used to select 360 respondents for the study. Logit probability regression model was employed to determine the significant variables influencing food security status in the study area. The result showed that 73.1 percent of the households were headed by males while 26.9 percent were by females. The mean age of household heads was 47.78 years, 76.6 percent of them were married, 41.4 percent of them had no formal education and 84.3 percent of them owned their own houses. The average household size was estimated to be seven. The result also showed that four variables in the logit model had significant effect on the food security status of the households. These were age of the household head, farming experience, household size and off-farm income. It was recommended that agricultural extension services across rural communities in Edo State should be revamped to ensure that rural farmers have access to such services. This will ensure that information dissemination as regards improved farming techniques and availability of improved farm input such as seeds, seedlings, fertilizers and others, gets to rural farmers easily.

INTRODUCTION

Food security has attracted global attention in recent times and achieving rapid improvement in food security and sustainable agricultural development and total eradication of poverty in Nigeria is among the most serious challenges facing successive administrations (Oyebanji 2005).

Despite bold initiatives by successive government, food crisis still persist in Nigeria and food access is increasingly being constrained by high food prices. This has resulted in many rural households in Edo State and other parts of Nigeria experiencing inadequate food intake and harsh economic conditions owing to food insecurity. Several studies including that of Olayemi (1995), Adio (2000), Makinde (2000) and Sanusi et al. (2006), indicate that the socio-economic characteristics of a household and resources available for production exert considerable influence on its nutritional status.

In spite of Nigeria's vast agricultural and natural resources, and the bold initiatives by successive governments, food crisis still persist in Nigeria and food access is increasingly being constrained by high food prices and the population is facing hunger and poverty (Thomas and Canagarajah 2002). This scenario has affected the food security situation in both rural and urban households in Edo State as well as other parts of the country. Most affected are the rural households who constitute over 80 percent of the farming population and produce the bulk of food consumed in the country and yet, do not have enough to eat all year round and majority of these households lack access to modern inputs and resource endowments for production (Nzenwa and Oboh 2005). As a result, farm output and income are generally low leading to low food consumption and widespread poverty, malnutrition and diseases which eventually affect their capacity to produce. Arthur (2009) investigated that the concern for food security and nutritional wellbeing in an economy is predicated on the role of human element in economic development. This shows why, at national level, food is of economic and political significance especially in issues relating to national security, maintaining political stability and ensuring peace among the populace.

Objectives of the Study

The prime objective of the present research paper was to assess the influence of socio-eco-

nomic characteristics on food security among rural households in Edo State, Nigeria.

To achieve this prime objective, the specific objectives pursued were:

1. To examine the socio-economic characteristics of respondents in the study area;
2. To examine the relationship between socio-economic characteristics and the estimated food security status in the study area.

Hypotheses of the Study

The hypothesis (Ho) of the study was specified as follows:

1. There is no significant relationship between socio-economic characteristics of respondents and their food security status.

Conceptual Framework

Arthur (2009) reported that Nigeria is an agricultural country but is among developing countries that are not yet food-secure. The concern for food security, therefore, has greatly increased in the country, generating public discourse and cynicism. The study informed that in response to the above situation the Nigerian government made food security a top priority in its economic reform agenda and has also formulated agricultural policies and adopted some strategies it believes will make the agricultural sector of the economy more viable to ensure food security.

The concept of food security, according to Chrisholm and Tyers (1982), and FAO (2002), became prominent in the 1970's, kindled by the 1972 – 1974 world food crisis which saw unprecedented increase in the international price of staple foods. In response to this crisis, the United Nations (UN) convened a world food summit to look at issues relating to famine, hunger and food shortage. The outcome of the summit was the first accepted definition of food security by the United Nations. UN (1975) then defined food security as the availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuation in production and prices.

Food security is conventionally defined as access by all people, at all times, to enough food for an active and healthy life (World Bank 1986). This definition implies that food security entails not only food production and accessibility, as it could be undermined by a number of agro-physical, socio-economic and biological factors. Some authors have identified three elements of food security, these are: food availability, accessibility and utilization (Bonnard 1999; Kennedy 2003; Obamiro et al. 2005). Besides, others like FAO (1996), Gross et al. (1999), and Ninno et al. (2003) identified stability of food access as the fourth element of food security.

Arene and Anyaeji (2010) used binary logistic model to ascertain the determinants of food security in Enugu State. Further, findings from the study revealed that only two variables were important in explaining the food security status of the households. They were income and age household head.

Income of households head had positive effect on food security status implying that the higher the income of a household head, the greater his or her chances of being food secure. Age of household head also had positive effect on food security status implying that older household head had higher probability of being food secure.

In another paper, Oluwatayo (2009), employed binary logistics model to ascertain the relationship between respondents' food security status in Ekiti State and their membership of co-operatives. Other household's socio economic variables were also included as regressors in the model. In addition, findings from the study revealed that age, marital status, gender, educational level, household size, membership of co-operatives and income were major determinants of food security in the study area. The co-efficient of age was positively related to food security indicating that food security status of respondents' increases as their age increases. In addition, the co-efficient of marital status was positive indicating that married respondents are more secured than single, divorced or widowed respondents. This is attributable to the possibility of couples assisting each other to augment households' needs. In addition, while the co-efficient of education was positively related to respondents food security status, that of household size was negatively related to it. In other words, the higher the educational level of respondents, the more food secure they are while respondents with large household size are more prone to food insecurity than those with small household size.

Further, Onya (2014) used logit regression analysis to identify the determinants of food security among retirees in Ondo State, Nigeria. Findings revealed that income of retirees at retirement point, highest expenditure on non-food items and belonging to social group, ceteris paribus, tended to increase household food security and were statistically significant at 5 percent while household size tended to reduce retirees household food security (given other factors).

The study concluded that demographic and socio-economic factors such as income at retirement point, highest educational level, expenditure on non-food items and belonging to social group increase the probability of the retiree's household becoming food secure while households size increases the odds of the retiree's household becoming food insecure.

Drawing from the experiences of the reviewed research works, this paper seeks to identify the socio-economic characteristics influencing the food security status of rural households in Edo State, Nigeria.

METHODOLOGY

Area and Scope of the Study

The study was carried out in Edo State, Nigeria. The state lies between longitude 05^0 04'E and 06^0 45'E and latitude 05^0 44'N and 07^0 34N'. It is bounded in the South by Delta State, in the West by Ondo State, in the North by Kogi State and in the East by Kogi and Anambra States. It occupies a land area of about 17,920 km^2. According to 2006 population census, Edo State has a population of 3,233,366 (comprising 1,633,946 males and 1,599,420 females) accounting for 2.30 percent of Nigeria's total population (NPC 2006).With a growth rate of 2.7 percent per annum, it is projected that the State population will reach 3,896,260 by 2013. The state is in the rain forest zone with annual rainfall of 1,300mm – 2,300mm per annum.

To meet the administrative purposes, the State is divided into three senatorial districts or geopolitical zones with a total of eighteen local government areas. Edo state is an agrarian state made up of mostly farmers, fishermen and women as well as hunters. The nature of the climate favors the growth of a variety of food and cash crops such as yam, cassava, maize, rubber, cocoa among others. Art and Craft work/Bronze casting are also prominent in the State.

Sources of Data/Method of Data Collection

Both primary and secondary data were used for the study. The primary data was collected by means of questionnaire administration using the interview schedule method. Information on the demographic characteristics of respondent, income and expenditure patterns, mean per capita daily calorie intake of households, food security level among rural households, as well as factors affecting the attainment of food security were obtained through this method. Secondary data were sourced from textbooks, journals, Internet, Food and Agriculture Organisation (FAO) reports as well as other relevant publications.

Sampling Procedure/Sample Size

Multistage sampling procedure was used. The study covered the entire State in line with the three agro-ecological zones delineated by Edo State Agricultural Development Project (EDOADP). These are Edo North zone with six local government areas, Edo Central zone with five local government areas and Edo South zone with seven local government areas.

The first stage was to randomly select two local government areas from each zone to give a total of six local government areas. The second stage involved the purposive selection of three rural communities (cells) in each of the local government areas to give a total of eighteen (18) cells. The last stage was a random selection of twenty (20) households each within the communities. This gave a total of 360 households. However, only 338 copies of the questionnaire were found useful for the study.

Analytical Techniques

The data collected was analyzed using descriptive and inferential statistics in line with the stated objectives as follows:

Objective 1: To describe the socio-economic characteristics of respondents in the study area.

The use of tables, frequency counts, percentages and mean were adopted in describing

the socio-economic characteristics of rural household heads in the survey area.

Objective 2: To examine the relationship between socio-economic characteristics and the estimated food security status in the study area.

Logit regression model was employed in determining the significant variables influencing food security status in the study area as exemplified in Makinde (2000), Babatunde et al. (2007), Bogale and Shimelis (2009). Following Gujarati (2004), the logistic probability model can be expressed as:

$$Pi = 1 - Pi = \frac{1}{1 + e - (\beta 0 + \beta iXi)} \; or \frac{1}{1 + e - z} = \frac{e^z}{1 + e^z} \quad (1)$$

Where:

Pi = probability that a household would be food secure.

e = base of the natural logarithm.

β = coefficient

Xi = explanatory variables of the model.

$z = \beta_0 + \beta_i X_i$

It could also be expressed as:

$$1 - Pi = \frac{1}{1 + e - (\beta_0 + \beta Xi)} \; or = \frac{e^z}{1 + e^z} \quad (2)$$

Where:

1 -Pi = probability that a household would be food insecure.

For ease of interpretation of the coefficients, the logistic model could be written in terms of the odds. The odds ratio is the ratio of the probability that a household would be food secure (Pi) to the probability that a household would be food insecure (1-Pi); that is,

Pi/(1-Pi) = equation 1 / equation 2

$$Pi/(1-Pi) = e^z \quad (3)$$

Taking the natural logarithm (Ln) of equation (3) yields

$$Li = In \left[\frac{Pi}{1 - Pi}\right] = z = \beta_0 + \beta_1 X_1 \quad (4)$$

If the disturbance term u_i is taken into account, the logit model becomes:

$$Li = In \left[\frac{Pi}{1 - Pi}\right] = \beta_0 + \beta_1 X_{1+\ldots} \ldots \beta_{10} X_{10} + u_i \quad (5)$$

Where Li, is the log of the odd ratio, X_1 - X_{10} represent the stated socio-economic characteristics which are gender, age, education, farm size, farming experience, house ownership, household size, and access to extension services, farm income and off-farm income respectively.

Parameters of the logit were estimated with the aid of an SPSS (Statistical Package for the Social Sciences) software version 20.0. The standard error test and student t – test were used to test the significance of the variables at $p \leq 0.050$. The sign of the estimated logit parameter were interpreted as would the sign of a regression coefficient. In other words, if β_1 is positive, then a positive increase in the magnitude of X_1 would be expected to result in an increased likelihood that the household would be food secure, while if β_2 is negative on the other hand, an increase in the magnitude of X_2 would increase the likelihood of a household being food insecure. However, the overall significance of the logit model was based on the value of the unadjusted co-efficient of multiple determinations (R^2) and the chi-square statistic (χ^2). High values of R^2 and χ^2 are indicative of a significant model.

RESULTS

The results of the socio-economic characteristics of respondents are presented in Table 1. Further, from the results, 73.1 percent of the households were headed by males while 26.9 percent were headed by females. The result indicates that males headed more households than females in the study area. This is consistent with the position of Adoeti (2006), who reported that more men were found in farming than women. The mean age of household heads was 47.78 percent indicating that most of the respondents were middle age, which is an active age for farming and trading. Majority of the respondents were married (76.6%) which shows that rural households attach importance to marriage as it confers responsibility on them and probably raise family labor.

With respect to education, the result shows that 41.4 percent of the respondents had no formal education, while about 21.0 percent could not complete their primary education and only 9.5 percent had tertiary education. This means that majority of the respondents were not educated and this could constitute a big challenge to the reception and adoption of modern farming techniques that can lead to improved food security. The low level of education could also limit opportunity for better off-farm jobs. This was also the position of Babatunde et al. (2007). The majority of the respondents were farmers. About 84.5 percent were crop farmers, 0.6percent were livestock farmers, 7.7 percent were both crop and livestock farmers while 7.4 percent did other jobs. Most of the respondents also engage in secondary occupations including trad-

Table 1: Socio-economic characteristics of respondents

Variables	*Frequency (n)*	*%*	*Mean*
Gender of Household Head			
Male	247	73.1	
Female	91	26.9	
Age of Household Head (Years)			
30 and below	3	0.9	
31-40	32	9.5	
41-50	185	54.7	48.00
51 - 60	94	27.8	
Above 60	24	7.1	
Marital Status			
Married	259	76.6	
Single	9	2.7	
Widow	53	15.7	
Widower	17	5.0	
Educational Attainment			
No formal education	140	41.4	
Primary education completed	21	6.2	
Primary education not completed	71	21.0	
Secondary education completed	21	6.2	
Secondary education not completed	53	15.7	
Tertiary education	32	9.5	
Primary Occupation			
Crop farming	285	84.3	
Livestock farming	2	0.6	
Crop and Livestock	26	7.7	
Others	25	7.4	
Secondary Occupation			
Trading	60	17.7	
Tailoring	21	6.2	
Farm labour hire services	33	9.8	
Hunting	17	5.0	
Carpentry	9	2.7	
House building	10	3.0	
Others	69	20.4	
No response	119	35.2	
Farm Size (Ha)			
<0.5	16	4.7	
0.5-0.9	98	29.0	
1.0-1.4	100	29.6	1.29
1.5-1.9	86	25.4	
2.0 and above	38	11.2	
Farming Experience (Years)			
1-10	44	13.0	19.95
11-20	154	45.6	
21-0	73	21.5	
Above 30	67	19.8	
House Ownership			
House owned	285	84.3	
House not owned	53	15.7	
Access to Extension Services			
Accessible	9	2.7	
Not accessible	329	97.3	

Total frequency = 338

ing, tailoring and employment in the civil service, to earn additional income to augment income from the farm. The mean farm size of the respondents was 1.29 ha. This is a strong indication of food insecurity especially when modern farming techniques and inputs such as improved seeds, fertilizer and others were not used.

With respect to house ownership, the result shows that about 84.3 percent of the respondents owned their own houses while 15.7 percent did not. Many of the houses were mud houses built many years ago through community effort while some were product of inheritance. This means that majority of respondents did not need to spend money on rent and could use their houses for such purpose as collateral to secure loan to expand their farming activities. This could increase the food security level of respondents.

About 57.1 percent of respondents had a household size of between five and eight, while 21 percent had a household size between one and four and about 19.8 percent had a family size between nine and 12. This shows that most of the households had access to family labor, but as the household size increases, the household tend to be food insecure especially where there are many children / dependents and elderly people in the family. This agrees with the position of Omotesho et al. (2007), who stated that a household tend to be poor as its size increases.

Further, about 97.3 percent of respondents had no access to extension services, while only 2.7 percent had access to extension services. The implication of this result is that access to extension services in the study areas was poor and this has negative effect on the attainment of food security. Getting information about modern farming techniques and disseminating research results concerning scientific breakthrough would be difficult with this situation. Bembridge (1984) found that the best farmers had significantly greater contact with all sources of information, which confirms the importance of knowledge, and information in improving farming efficiency. Nompozolo (2000) suggests that for good performance, a reasonable amount of information is necessary to back up agricultural productivity. He also recommends that extension officers must be trained in indigenous knowledge relevant to the farming communities they serve.

The result of the logit model presented in Table 2 displays that four variables had signifi-

cant effect on the food security status of respondents. These include age of household head (t = 2.245), farming experience (t = 2.538), household size (t = 4.282) and off-farm income (t = 2.759). The overall model had a chi-square statistic of 55.47 ($p<0.050$), thus, implying that the overall logit model was significant, that is, the explanatory variables were relevant in determining the household food security status. The overall percentage correctness of 87.6 implies that the model correctly specified the food security status of respondents up to 87.6 percent. The coefficient of determination ($R^2 = 0.665$) implies that about 66.5 percent of the variation in the food security status of respondents was due to the variation in the stated socio-economic characteristics.

Table 2: Logit regression estimates of factors influencing food security status of respondents in the study area (logit model)

Variables	*Coefficients (b)*	*t*	*Prob level*	*Odd ratio*
Gender	0.576	1.253	0.176	1.778
Age	0.11	2.245*	0.025	1.116
Education	0.112	1.067	0.285	0.894
Farm size	0.225	0.615	0.538	1.253
Farming experience	0.066	2.538*	0.011	0.936
House ownership	0.818	1.598	0.110	2.266
Household size	-0.471	4.282**	0.000	0.625
Access to extension	19.83	0.002	0.999	0.000
Farm income	0.07	0.376	0.706	0.932
Off-farm income	0.309	2.759**	0.006	0.734
Constant	-2.955	-1.415	0.157	0.052

χ^2 27.69 (df = 8; $p>0.050$)
Overall percentage correctness = 87.6
Omnibus Test of model coefficients $x^2 = 55.47$
(df = 10; $p<0.050$)
R square = 0.665
* Significant at 5% (critical t = 1.972)
** Significant at 1% (critical t = 2.601

DISCUSSION

The findings from the study revealed that age of household head, faming experience of the household head, household size and off-farm income were the major socio-economic characteristics that determine the food security status of rural households in the study area. The age of the household head was positively related to food security implying also that older household heads have higher probability of being food secure. This agrees with the work of Asogwa and Umeh (2012), who reported that the higher the age of the household head, the better the food security situation as there may be more options of making food available from both agricultural and non-farm opportunities. It is also in line with apriori expectation. This means that as the age increases to a certain level, the greater the likelihood of the household being food secure because the farmer becomes more experienced. Farming experience also had positive relationship with food security which means that with more experience the likelihood to be food secure increases. This result is consistent with that of Oluyole et al. (2009), who reported that a more experienced farmer is likely to have higher productivity and hence be able to provide more food for his household members. This is in line with apriori expectation.

Household size had a negative relationship with food security. This means that households with fewer members are more likely to be food secure than household with many members. The position is consistent with the work of Hail et al. (2005), and Babatunde et al. (2007) who reported that large households are more likely to be food insecure than small size households. With respect to off-farm income, the variable was positively related to food security. This informed that as households off-farm income increase so also is their likelihood of being food secure. This is in line with apriori expectation. This also agrees with Asogwa and Umeh (2012), who stated in their report that alternative income sources outside farming provide enhanced security for household's livelihood. It also agrees with Babatunde and Qaim (2010), who posited that descriptive analyses and econometric approaches have shown that off-farm income contribute to improved calorie supply at the household level.

Hypotheses Testing

A test of relationship between socio-economic characteristics of respondents and their food security level brought out that t cal > critical t at 5 percent and 1 percent, hence the null hypothesis was rejected. This means that there is significant relationship between socio-economic characteristics of respondents and their food security status. This finding is similar to that of Sanusi et al. (2006), who reported that the socio-economic characteristics and resources of individual households have been identified as ba-

sic factors influencing the food security status of households.

CONCLUSION

The present research concluded that socio-economic profiles of rural households in Edo State greatly influenced their food security level. The low literacy level of respondents in the study area limits access to other off-farm jobs which could increase their income profile and also enable them to have access to the right type of food, thus, enhancing their food security level.

Four of the explanatory variables which include age of household head, farming experience, household size and off-farm income, significantly influenced the food security level of respondents in the study area. Further, while age of household head, farming experience of household head and off-farm income positively and significantly affected the food security status of the respondents, household size had negative and significant effects on the respondents' food security status. Households with fewer members are more likely to be food secure than household with many members because the more the members in the household, the more food insecure the family/household will be, ceteris paribus.

RECOMMENDATIONS

1. It is recommended that policy measures directed towards improved rural dwellers' access to education and credit facility in Edo State should be given adequate attention and priority by the Government at the Federal, State and Local Government levels.
2. In addition, agricultural extension services across rural communities in Edo State should be reviewed and strengthened to ensure that rural farmers have access to such services. This will ensure that information dissemination as regards improved farming techniques and availability of improved farm input such as seeds, seedlings, fertilizers and others, gets to rural farmers easily.
3. Government at all levels, should step up adequate advocacy campaigns to educate the citizen especially, the rural households on the negative effect of large household size ion food size on food security to enable them live a better fulfilled life.

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