

Environmental and Socio Economic Determinant of Food Security among Rural Households in Oyo State

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Abstract: *Achieving food security is plausible in an wholesome and appealing environment with feasible agricultural policy. Food security thrives in a setting where all the stakeholders are fortified and armed with promising, affirmative and propitious strategies. Hunger is a threat that can result to economic setback of a populace and make the national progress indefinable. This study explores environmental and socio-economic portent allied with food security among the rural households in Oyo State, Nigeria. Multi-stage sampling procedure was used to elicit information from 120 respondents through pre-tested structured questionnaires. Analysis was carried out using descriptive statistics and logit regression model. Socio economic analysis reveals that majority of the respondents (72.5 percent) were male while 27.5 percent were female. The log likelihood value was -118.96 with Chi-square of 758.21 significance ($P < 0.01$). This shows that the model was a good fit. Analysis of the factor influencing food security revealed that four explanatory variables were significant. These are household size, marital status, income and environmental threat. Household size was negatively significant ($P < 0.05$). This connotes that farmers with larger household members are less likelihood to be food secured. Marital status was positively significant ($P < 0.01$). This means that married households are more likelihood to be more food, secured than the unmarried farming household. Income was positively significant ($P < 0.1$). This indicates that farmers with higher income are more likelihood to be more food secured than those with lower income. Environmental threats is negatively significant ($P < 0.01$). It implies that farmers experiencing hazard and threats resulting to crop wreckage and loss are more likely to be food unsecured. The study concludes that environmental hazard juxtaposed with socio-economic variable limit and imposes menace to food security in the study area. The research recommends that planting machinery should be devised by the farmers to improve production and storage of crops. This will reduce environmental threat-agent such as reptiles, rodents and birds. Early marriage should be encouraged among the younger farmers. Further investment in farming should be invigorated and strengthened.*

Keywords: Environmental, Socio-economic, Food-Security, Rural-Households, Oyo-State.

1. Introduction

The global challenge of food security in this technological epoch has called for the intervention of both national, regional and international government. The annual explosion in worldwide population growth which results in the environmental imbalance is a pointer to the failure in the potency of natural resources needed in food production. The reason is due to natural and man-made factors which daily growing in uncontrollable manner. These indicators must be properly tackled to make wide-reaching eradication of hunger by 2050 a reality

Food is a basic human need and the major source of nutrients needed for human existence. Food security indicates the availability of and access to food. The issue according to (4) became prominent in the 1970s and has been a topic of considerable attention since then.

One of the most influential definitions of food Security was given by the World Bank (8) as “access by all people at all

times to sufficient food for an active and healthy life.” Food security is also defined as the physical and economic access to adequate food for all household members, without undue risk of losing the access (10). It is the capacity of households, community and the state to mobilize sufficient food through production, acquisition and distribution on a sustainable basis. Food security is a fundamental objective of Nigeria’s agricultural policy (6). However, it has not been given the adequate attention necessary to achieve this objective.

Recently (8) asserted that the number of hungry people in the country is over 53 million, which is about 30 percent of the country’s total population of roughly 150 million and 52 percent live under the poverty line. The Global Food Security Index (GFSI), of the Economist Intelligence Unit has ranked Nigeria as the 80th among 105 countries with food affordability, availability and quality.

2. Problem Statement

The population of Nigeria is over 200 million. In 2010, food importation was N122.6 billion and with the attendance annual increase of 12.6 percent result to increase of N334.3 billion in 2019 and N1127 billion in March 2020. In spite of the commitment of Nigerian government to food importation in the last decade, food insecurity still lingering because presently, several millions of Nigeria population could not afford three square meal for their daily survival .while the import menace still dawdles, Nigeria government has asserted to employ favorable policy that will boost food production and reduce food importation.

Meeting the food needs of families in Sub-Saharan Africa remains a serious challenge. This challenge emerges due to widespread poverty and conflict (11) drought, famine and other negative weather patterns exacerbated by global climate change (7) degradation and deforestation (9), increased food prices due to the growth in demand for biofuels (13) and low agricultural productivity (16). Combination of these factors restricts access to food for many in developing countries.

Recent surge in world food prices, changing climatic pattern resulting in global warming as well as growing demand for arable land for cultivation of biofuel has worsen the food security situation in most part of the world especially developing countries. Therefore, it is based on the above-mentioned problem that this research is set to investigate the environmental and socioeconomic determinant of food security among rural households in Oyo state. Specifically, the study aims at describing the socio-economic characteristic of the farmers, describe the food security status of the farming households and appraise the environmental and socioeconomic factors that influence food security and factors militating against food security in Oyo state

3. Theoretical and Conceptual Framework

Food security according to the World Food Summit of 1996, exists “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life. It includes a minimum availability of nutritionally adequate and safe foods; and an assured ability to acquire acceptable foods in socially acceptable ways (i.e. without resorting to emergency food supplies, scavenging, stealing or other coping strategies). Food insecurity is a lack of access to sufficient, safe and nutritious food to maintain a healthy and active economic and social life. Four component of are identifiable from the definition of food security. These include; food availability, food accessibility, food utilization and food stability. Due to the multiple components of food security, finding a single indicator to capture these dynamics becomes difficult. However, several measurements of or for food security status include, household calorie acquisition, individual calorie intake, dietary diversity indicators (HDDS), food consumption score, food frequency scores, coping strategy index HDDS, HFIAS, two-third mean household expenditure on food (2/3 MHHEF), cost of basic needs (CBN), Food-Energy-Intake (FEI) (11). Generally, these measure captures undernourishment, food intake, anthropogenic measure, food availability, accessibility and usage. Food security is imperative because the presence and

prevalence of hunger and malnutrition have long-term effect that could throughout the life cycle of an individual. For instance, poorly nourished children grow up to be less healthy and productive than they could be, also despite improved agricultural technology adoption, hungry and malnourished farmer may provide less labour and resources with consequences on productivity and implication for agricultural income, food security and poverty statuses.

Environmental Factor

Environmental factors are one of the factors that affects agricultural productivity and food security. Several of these environmental hazards are linked with contemporary changing climate experiences. These hazard include, flooding, riverbank and top soil erosion, crop pest invasion, soil salinity, soil degradation, changing precipitation and temperature among others (8). These hazard often lead to loss of livestock, loss of crop, loss of farm land, reduced agricultural productivity and income which ultimately accumulate to lowered food security for those who depend of agriculture directly and by extension lowered national agricultural productivity (8).

Socioeconomic Factor

Socioeconomic factors have been identified in literature through various econometric techniques to be have some extent of effect of food security status of individuals and households. These factors include, gender, age, marital status, family size, employment, family size, education, income and geographical location. number of active labour in household, education attainment and location do have significant association with food insecurity (2).



Plate 1: Map of Oyo State of Nigeria

4. Materials and Method

The study Area

The study area is Oyo state. The state has approximately an area of 28,454 square kilometers and with the population of 5,580,894. Oyo state share a boundary with Ogun state in the south, Oyo state in the east, Kwara state in the north and republic of Benin in the west. The Climate is equatorial, notably with dry and wet seasons with relatively high humidity. The dry season lasts from November to

March while the wet season starts from April and ends in October. Average daily temperature ranges between 25 °C and 35 °C almost throughout the year. Agriculture is the main occupation of the people of Oyo State. The *climate* in the state favors the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, palm produce, cashew etc. There are also vast cattle ranches at Saki, Fasola and Ibadan, a dairy farm at Monatan in Ibadan and the state-wide Oyo State Agricultural Development Programme with headquarters at Saki. The population of the study comprises all Farm households in Oyo State. Primary and secondary data were used for this study. Primary data was collected through the means of structured questionnaire administered to the farming households from the sample area. Data collected from Farming household includes expenditure on food, income, socio-economic and environmental records and income. Secondary data was sourced from the review of past and relevant literatures.

Sampling size and Procedure

Multi-stage sampling procedure was used to select one hundred and forty four respondents for the study. The first stage was the purposive selection of Ogbomosho Zone from four agricultural zones in Oyo state. These are Ibadan-Ibarapa, Oyo, Ogbomosho, and Saki. The selection of this zone was informed because of the wide participation of farmers in array of all crops in Oyo state. In the second stage, Oriire, Surulere and Ogbomosho south LGAs were randomly selected from five LGAs namely: Ogbomoso South, Ogbomoso North, Oriire, Surulere and Ogo Oluwa LGAs that made up Ogbomosho agricultural zones The third stage involves a random selection of eight villages from each local government to make twenty-four villages in all. The final-stage involves random selection of 6 farmers from each village to give one hundred and forty-four respondents for the study. However, twenty-four questionnaires were excluded owing to discrepancy in the response

Table 1: Sampling Size and Procedure

	Total Sampling Size	Sampling Size			Sampling Frame
Stage 1 OYADPs	1	Ogbomosho Zone out of Ibadan-Ibarapa, Oyo, Ogbomosho and Saki			4
Stage 2 LGAs	3	Oriire	Surulere	Ogbomosho South	5
Stage 2 VILLAGE	24	8 out of 66 villages	8 out of 97	8 out of 44	207
Stage 2	144	48	48	48	1230

Field work 2019

Estimation Technique

Analysis was carried out using binary logistic model to estimate the food security status of households. The food security status was determined by estimating two-third mean per capital in food expenditure. This was estimated to be N1846.67. Household whose expenditure falls below this value is categorized as food insecure and therefore scored zero. If the mean expenditure on food exceed the mean per capital in food expenditure, household is scored one. The study is modeled within the suggested framework of

Shiferaw and others. The relationship between the dependent and independent variable is given as:

$$Z_n = \alpha X_i + \mu_t$$

The explicit function of the logistic model is represented below

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \mu_t$$

Where; Y is food security status of household, α is the intercept of the model, β_{1-12} are the coefficient, and μ_t is error term.

Summary of Description of Variables

Variable	Description (and Measurement)	Type
Food Security Status (Y)	Food Secure = 1, Otherwise = 0	Nominal/Binary
Age (X ₁)	Age of household head (Years)	Continuous
Edu (X ₂)	Educational Attainment (Years)	Continuous
Marital Status (X ₃)	Marital Status of head (Married =1, otherwise = 0)	Nominal
Farm Size (X ₄)	Size of farm land (Farm size in ha)	Continuous
Household size (X ₅)	Household size in head count	Continuous
Experience (X ₆)	Farming experience (Years)	Continuous
Income (X ₇)	Monthly income (Naira)	Continuous
Gender (X ₈)	Gender of head	Nominal
Land rent (X ₉)	Amount spent on land lease (Naira)	Continuous
Fertcost (X ₁₀)	Amount spent on fertilizer (N) proxy of soil infertility due to erosion	Continuous
Environmental Hazard (X ₁₁)	Experiencing of environmental treats and pest (Yes= 1, otherwise = 0)	Nominal
Farmscale (X ₁₂)	Scale of farming large scale (1 otherwise 0)	Nominal

5. Results and Discussion

Socio-Economic Characteristics

Age is an important socio-demographic feature of respondent because it directly affects farm performance. The age distribution ranges between 20-80 years with modal age class of 41-50. This constitutes 32.5 percent of the respondents. The lowest age group had less than 30 years and are in minority. It is obvious that the younger farmers were less educated and this may have a serious implication on their socioeconomic viability.

Gender shows manliness participations in the production activities with respect to agriculture. It refers to socio-economic variable used to analyze roles, responsibility, constraint and mode of incentives in agriculture (15). Table 2 shows that majority of the respondents are male with a percentage of 72.5 percent, while the female ones are 27.5 percent. This is in agreement with the finding of (6) in his research on climate change on the yield of White Yam in oke-ogun agricultural zone of Oyo state.

The table shows that 57.5 percent of the respondents are Christian, while 1.7 percent are traditional believers.

This shows that the research area is dominated by Christians with Traditional worshippers constituting the minority. Marital Status of respondents shows the number of them that were married. Married people have more responsibilities than unmarried ones because they are in charge of feeding their family members. The table shows that 95.0 percent of the respondents are married, 0.8 percent is single, while 4.2 percent are widowed. The high percentage of married respondents implies that most of the Farmers are married and responsible. This finding is in agreement with the finding of Barker (8) which states that married people are found to be the participators and initiators in the community development programs. Respondents with family size of 6-10 constitute 58.3 percent with family size of 1-5 constituting the least size with 9.1 percent. This means that over 58 percent of the respondents has reasonable family size and few of them has small family size. This finding is in agreement with (7) who observed that farmers had household size of between 7-16 persons in a study in Akwa Family size which is directly related to marital status is one of the sampled variables.

Education plays significantly role in all human activities, including farming. The below Table indicates that 39.2 percent of the respondents had no formal education, 42.5 percent had primary education, 18.3 percent had secondary education. The study area is one of the places where the first Christian Missionaries settled and established schools. However, this result is in contrary to that of (10) where the majority of the farmers in the study area did not have formal education.

Table 2 further reveals that the monthly farm income distribution. It shows that 63.3 percent of the respondents earn 21000 – 40000 per month while 3.3 percent of the respondents earns more than 61000 per month. This means majorly of the respondents are living below 2 dollar per day meaning that there is high level of poverty among the people of the study Area. Because of this reason they would have little for investment on their farms. This is agreement with the finding of (13) which says most people in Sub-Sahara region are living below poverty line. Farming experience would dictate how the respondent would respond to challenges when there is any. The experience of the farmers shows that 35.8 percent of the respondents had 11-20 years of farming experience, while 10.8 percent had more than 40 years farming experience. This is a reflection of the good performance in the farming activities in the study area.

The Table shows that 54.2 percent of the respondents engaged in farming as their major occupation, while 45.8 percent engaged in other occupation as a means of livelihood. This implies that most of the respondents are fulltime farmers but because of peasant level of operation, some of them looked for other means to support the living. This is with agreement with (8) which find out that 61.3 percent of the respondents had additional occupation while the remaining 38.7 percent did not have. The Table also shows that 54.2 percent of the respondents inherited the land they cultivate on, while 6.7 percent bought the land. This means there is not much problem of land tenure, expectedly there should be high level of production, but

because of little capital in their hands, many of them cannot do much. This implies that majority of the respondents do not pay rent to acquire additional land anyone, they are the owners of their farm lands, so they have the basic right relating to ownership of land (Property rights).

It can be seen from the Table that 53.3 percent of the respondents uses both hired and family labour to prepare their plots for farming, 45.8 percent of the respondents use hired labour to prepare their plots while 0.8 percent of the respondents uses only family labour for the preparation of their plots. This implies that majority of the respondents pay for labour because they hire labour for the preparations of their plots. With this, it means cost of production would be high which in turn would make price of their product to be higher. Farm size refers to the total land in hectares that the respondents cultivate. Regards to farm size, Table 2 reveals that 76.7 percent of the respondents have farm size between the range of 1-10 hectares of land, 4.9 percent had farm size greater than 20 hectares. This is clear indication that respondent are peasant farmers, they cannot do much as a result of so many limiting factors.

Table: Socio Economic Characteristics of the Respondent

Variable	Frequency	Percentage	
Age	<30	3	2.5
	31-50	71	59.2
	51-70	46	38.3
	Total	120	100.0
Sex	Male	87	72.5
	Female	33	27.5
	Total	120	100.0
Religion	Christianity	69	57.5
	Muslim	49	40.8
	Others	02	1.7
	Total	120	100.0
Marital Status	Married	114	95.0
	Single	6	5.0
Educational status	Non-formal	47	39.2
	Primary	51	42.5
	Secondary	22	18.3
	Total	120	100.0
Income	10000-20000	27	22.5
	21000-40000	76	63.3
	41000-60000	13	10.8
	Greater 60000	4	3.3
	Total	120	100.0
Experience	1-20	68	56.5
	21-40	22	18.3
	41-60	30	24.9
	Total	120	100.0
land Ownership	Inheritance/purchase	73	60.9
	Rent	19	15.8
	Community land	28	23.3
	Total	120	100.0
Size of farm land	1-10	92	76.7
	11-20	22	18.3
	21 and above	6	4.9
	Total	120	100

Source: Field Survey 2019.

Determinant of Food Security

The logistic regression estimation results and discussions on the determinants of food security is presented in this section. The logistic regression analysis revealed that for explanatory variables were significant in influencing food security. These are age of household head, household size, marital status, and income.

The coefficient of age of household head is negative and significant. This imply that the older the household head the lower the chances of household being food secure. This is in consistent with (2), and a plausible reason for this is that ageing lead lowered economic and agricultural productivity due to age. This consequently lead to lowered chances of food security. This is however contrary to the findings of (14) Household Size had positive and significant coefficient (-0.00045 and is statistically significant (P < 0.05). This mean that increase in household size would lead to a decrease in the chances of improved food security status probability of a household. Specifically, when there is a member increase in household size, the probability of household food security decreased by 0.00045. The result is possible because of higher number of vulnerable and economically unproductive persons in the household which include aged, infants, children and disabled persons. Also purchasing power of a large household is lowered compare to a small sized household, due to reduced per capita income and expenditure available to the household. This eventually lead to reduced potential to obtain nutritionally adequate food. The result is in line with the findings of (2) and (3)

With respect to marital status, the positive relationship with household food security status indicates that the probability of household food security increases with married household heads. Specifically, households with married heads have about 0.25092 increased chances of being food secure. The ability of two people to put resources together for better welfare shows the benefit of marriage and explains the positive result of marital status in the study. This finding is in line with the findings of Mustapha et al., (2018). Income was positively significant (P<0.1). This indicates that farmers with higher or increasing income from farm sale have increased likelihood to be more food secured than those of lower income. Increase in income means that households have higher purchasing power and higher food consumption expenditure. This finding is in line with that of (4) and (8) carried out in Kano State Nigeria and South Africa respectively. Environmental Hazard which is one of the variable of interest of this study is negative but not significant. It implies that though farmers experiencing hazard and threats resulting to crop wreckage and loss are less likely to be food secured but the severity of impact on food security in the study area is not significant.

Table: Logistic regression Estimate on Determinants of Food Security

Variable	Coefficient	Standard Error	Marginal Effect	Z	P
Constant	-12.34954	11.3425	-	-1.09	0.276
Age	-0.0001	0.0636	0.0014*	-13.79	0.000
Edu	0.00036	0.2375	-0.0034	0.97	0.324
Farm Size	0.00064	0.4309	-0.0003	0.05	0.957
Household size	-0.00045	0.2902	-0.0009**	-2.08	0.029
Marital Status	0.25092	3.803	0.8089*	3.22	0.031

Experience	0.00017	0.1147	-0.0021	-1.23	0.206
Income	0,000	0.0000	2.05e-08***	1.78	0.060
Gender	1.27273	8.5533	0.1465	0.12	0.837
Land rent	0.0000	0.0012	-3.41e-07	-0.20	0.840
Fertcost	0.000	0.0000	3.19e-09	-0.11	0.914
Farmscale	1.4287	3.607	0.0263946	0.18	0.850
Environmental Hazard	-0.1351	4.2043	-0.5377162	3.98	0.180
Wald chi ² (12)	249.57				
Log likelihood	-355.025				
Prob> chi ²	0.0000				

Source: Computed by Authors, 2019

6. Conclusion

This study analyzed food security among 120 farming households in Ogbomosho agricultural zone, Oyo State, Nigeria. Based on the findings, it can be concluded that the older household heads are more likely to be food secured, while the younger household heads are more likely to be food insecure, also male headed households are less likely to be food insecure while female headed households are more likely to be food insecure. The household sizes also has a negative influence on being food secured, the larger the households it increases the likelihood of being food secured while smaller household significantly increase the likelihood of being food secured.

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