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EFFECTS OF LIVELIHOOD ASSETS ON FOOD SECURITY STATUS AMONG SMALL HOLDERS' FARMERS IN BEKWARRA LOCAL GOVERNMENT AREA OF CROSS RIVER STATE, NIGERIA

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Abstract:

This study analyzed the effects of livelihood assets on food security status among smallholder farmers in Bekwarra Local Government Area of Cross River State, Nigeria. Data were collected from 152 respondents using a multistage sampling technique and structured questionnaires. Analytical tools included descriptive statistics, food security index, and binary logistic regression. Results showed that 54.6% of respondents had household sizes of 6–10 members, with a mean of 7, and 69.7% were aged 41–60 years with an average of 50 years. About 44.1% had secondary education. The mean monthly per capita food expenditure was ₦12,940.92, while the food security line was set at ₦8,627.28, revealing that 41.4% of households were food secure, and 58.6% were food insecure. Access to physical (93.4%), human (62.8%), social (63.8%), and natural assets (57.2%) was relatively high, while financial assets (51.3%) were less accessible. Logistic regression showed that access to loans, machinery, improved seed, and farm size positively and significantly influenced food security at the 1% level. Gender and social aggregate index were negative and significant at 1%. Land ownership negatively affected food security (10% significance), while educational status had a positive impact (10%). Access to health facilities was negatively significant at 5%. Coping strategies included letting children eat first (ranked 1st), selling livestock (2nd), and eating wild fruits (3rd). The study concludes that improving livelihood assets especially education, health care, social networks, financial support, and physical resources are critical. It recommends policies that enhance literacy, vocational training, and agricultural extension services to improve household food security.

Keywords:

Livelihood assets, food security, Smallholders' Farmers.

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Introduction

Agriculture plays a pivotal role in Nigeria's economy, employing about 70% of the labor force and serving as a significant source of income and food for the majority of its population (Omorogiuwa *et al.*, 2014). In Cross River State, agriculture is a critical sector, with a diverse range of crops such as yams, palm oil, cocoa, and rice predominantly cultivated by smallholder farmers (Ugwu, 2009). The state's agriculture is characterized by its potential for high productivity due to favorable climatic conditions and rich soil types; however, productivity is often undermined by various socioeconomic and environmental challenges (Shah and Wu, 2019).

Smallholder farmers are the backbone of the agricultural sector in many developing countries, including Nigeria. They manage less than 2 hectares of land and are responsible for the majority of food production in the country (Mgbenka *et al.,* 2016). These farmers play a crucial role in ensuring food security at both local and national levels, but their productivity is frequently limited by inadequate access to resources and modern farming technologies (Adeyeye, 2017).

The concept of livelihood assets is integral to understanding how individuals and households secure their means of living. Livelihood assets, as described by the Sustainable Livelihoods Framework, include five key dimensions: human, social, physical, natural, and financial capitals. Each of these assets contributes differently to the livelihood strategies adopted by households (DFID, 1999). For smallholder farmers in Cross River State, these assets encompass knowledge and skills, community networks, agricultural equipment, access to land and water, and financial services necessary for agricultural activities (Chambers and Conway, 1992).

Food security exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2001). The dynamics of food security involve availability, access, utilization, and stability of food resources, each influenced by a range of factors including agricultural production, market stability, and socio-economic policies (World Food Summit, 1996).

The relationship between livelihood assets and food security is critical, particularly in regions plagued by economic constraints and climatic challenges. Livelihood assets provide the means for production and income generation, which in turn enhance food security by improving access to food either through direct production or by purchasing power (Ellis, 2000). In regions like Cross River State, the degree to which smallholder farmers can utilize their assets directly correlates with their food security status.

While previous studies have identified broad correlations between livelihood assets and food security, there is a substantial gap in localized, empirical research that quantifies and elucidates these relationships within the specific context of Cross River State. This study aims to fill this gap by examining how variations in livelihood assets directly affect food

security outcomes among smallholder farmers in the region, thereby providing a nuanced understanding that can inform targeted interventions (Barrett *et al.*, 2014). The broad objective of this study is to analyze the effects of livelihood assets on food security status of smallholders' farmers in Bekwarra Local Government Area of Cross River State, Nigeria, while the specific objectives were to:describe the socio-economic characteristics of the respondent in the study area; describe the food security status of the respondent in the study area; describe the various dimensions of livelihood assets among smallholders farmers in the study area; determine the effects of livelihood assets on food security status among smallholders' farmers in the study area and identify the coping strategies adopted toward food insecurity in the study area.

Research Methodology

Study Area

The study area is Bekwarra Local Government area of Cross River State, which is located within the south-south of Nigeria. Bekwarra Local Government falls under the northern senatorial district of Cross River State otherwise known as cross river north senatorial district alongside Obanliku, Obudu, ogoja, yala. The local government area is bounded in the north by Vandeikya local government area of Benue state ,in the east by Obudu local government area ,in the south by Ogoja local government area ,and in the west by Yala local government .Bekwarra has ten words which are Abouchiche(Headquaters), Afrike Ochagbe, Afrike Okpeche, Beten, Gakem, Ibiaragidi, Nyanya, Otukpuru, Ugboro, Ukpah. Bekwarra has a population as of the 2006 national population census of 105,822 and 127,445 in 2011and 173,907 by 2015 (base on growth rate of 2.8% per annum). Bekwarra lies between latitude 6 ^{0}. 37^{1} and 6^{o}45^{1}North and longitude 9^{o}48^{1} East of the equator with an estimated land area of about 400squaremeter.The annual mean temperature of Bekwarra ranges from 29^{0}C – 32^{0}C. The average rainfall varies from about 2286.00mm to 2285.00mm.

Method of Data Collection

Primary data was used for this research and it was collected with the aid of well-structured questionnaires, which were administered to households in the study area. A multistage random sampling technique was undertaken in Bekwarra Local Government area. The first stage involved random selection of 5 wards (Nyanya, Ukpah, Ibiaragidi, Afrike Ochagbe and Ugboro). In the second stage 16 villages was randomly selected from the selected wards. The third stage involved random selection proportionate to the size of the households in each sampled villages, which gave rise one hundred and fifty two (152) respondents.

Analytical Techniques

Descriptive statistics such as frequency, percentage and mean was used to achieve objective 1, 3 and 5 (one, three and five) and Principal Component Analysis (PCA) was used for objective 3, Food security index (per capita food expenditure) was used to achieved objective two (2) and binary logistic regression was used to analyze objective four (4).

Food Security Index

The households were classified into food secured and food insecure households using the food security index as earlier used by Titus and Adetokunbo (2007). This was used to establish the food security status of various households. It is given by:

Fi = Per capita food expenditure for the each household 2/3 mean per capita food expenditure of all households

……..... (1)

Where, Fi = food security index, when Fi >1 = household is food secured and Fi <1 =household is food insecure. A food secured household is therefore those with a per capita monthly food expenditure falling above or equal to two-third of the mean per capita food expenditure. On the other hand, a food insecure household is that whose per capita food expenditure falls below two-third of the mean monthly per capita food expenditure.

Binary Regression Model

The logit model was also used to estimate the determinants of food security among households. The relationship between food security status variable Yi and its determinants Xi is given as:

Yi = i xi +μβ ……..... (2)

Were Yi = 1 for Xi >0 otherwise and i= 1, 2, 3…n Xi is a vector of explanatory variables and â is the vector of parameters. The logit model computes a maximum likelihood estimator of β given the non-linear variable, which is one when the household is food secured and zero if otherwise. The explanatory variables Xi are,

X_1 = Educational status (years spent in school)
X_2 = Access to health care (Yes = 1, N0 = 0)
X_3 = Land ownership (Yes = 1, N0 = 0)
X_4 = Access to loan (Yes = 1, N0 = 0)
X_5 = Access to Machinery (Yes = 1, N0 = 0)
X_6 = Gender (Male = 1, Female = 0)
X_7 = Improved seed (Used = 1, Not used = 0)
X_8 = Farm size (Ha)
X_9 = Social aggregates index
μi = error term.

Results and Discussion

Socio-Economics Characteristics Smallholders' Farmers

Table 1 show that majority (78.3) of the respondents were males while 21.7 were females, this implies that men were more actively engaged in farm work than women. The age distribution of the respondent in the study area shows that 17.8% falls within the age of 21-40 years, 70.2% falls within the age of 41- 60 and 12.6% falls within the age of 61- 80 years with a mean age of 50.40 years. The structure of the ages implied that majority of household heads were in their productive years and could engage in one or more income generating activities. This is in line with Babatunde *et al*. (2007) who opined that, age of household head is expected to have impact on his or her output and food security status.Also,6.6% of respondents have no formal education, 22.4% acquired primary education, 44.1% acquired

secondary education while 27.0% of respondents had acquired tertiary education. This might be as a result of easier access to educational facilities and schools.

The result also shows that 73.0% of the respondents were married. This indicates that majority of household heads were married and therefore have supply for family labour than unmarried household. The high level of married household heads can be due to the importance placed on marriage by the society.The total farm size of the respondents is the number of the farm owned or leased by the farmer use for farming activities. The available data on farm size shows that 54.3% of the respondents had farm size between 1- 3 hectares, 41.1% had farm size of between 4-7 hectares, 4.6% of the respondents owned farm size between 8-11 hectares and above with a mean farm size of 3.63hectares.Household size refers to the number of persons living together in one house. The result shows that 37.5% of respondents had a household size of 1-5, 54.6% of the respondents have a household size of 6-10, 7.2% of the respondents have a household size of 11-15, 7% of the respondents has a household size of 16-20 with a mean household size of 6.66 persons. This may be due to the passion for agriculture in the state. This is in line with the findings of Babatunde *et al.*(2007) and Omonoma and Agoi (2007) which revealed that the incidence of food insecurity increased with increase in household size.

The result further shows that 61.2% of household heads were members of cooperatives while 38.8% of the household head were not members of cooperative. This could be because of a lack of knowledge of the economic importance and benefits of cooperatives by the household heads. Access to credit refers to the ability of individuals or enterprises to obtain financial services including credit, insurance and other risk management services. The result shows that 64.5% of respondents have taken credit while 35.8% of respondents have not taken credit. This could be due to the lack of credit worthiness of rural dwellers or unwillingness of financial institutions to operate in rural areas.

Table 1: Socio-Economics Characteristics Smallholders Farmers

Variables	Frequency	Percentage	Mean
Sex			
Male	119	78.3	
Female	33	21.7	
Age			
21-40	27	17.8	
41-60	106	69.7	
61-80	19	12.5	50.40
Level of Education			
No formal Education	10	6.6	
Primary	34	22.4	
Secondary	67	44.1	
Tertiary	41	27.0	
Marital Status			
Single	3	2.0	
Married	111	73.0	

Widow/Widower	22	14.5	
Separated	16	10.5	
Farm Size			
1-3	83	54.6	
4-7	62	40.8	
8-11	7	4.6	3.63
Household Size			
1-5	57	37.5	
6-10	83	54.6	
11-15	11	7.2	
16-20	1	7	6.66
Cooperative Membership			
Yes	93	61.2	
No	59	38.8	
Access to Credit			
Yes	98	64.5	
No	54	35.5	
Total	152	100.0	

Source: Author's compilation

Food Security Status of Respondents

Food security index which is per capita food expenditure for the i^{th} household divided by 2/3 mean per capita food expenditure of all households was used to determine the food security status (Olayiwola *et al.,* 2017). The result of the food security status of the respondents was revealed in table 2.Per capita monthly food expenditure was used to determine the food security index status of individual households in order to classify them into food secure and food insecure households. A food secure household is one whose per capita monthly food expenditure is greater than two third the mean per capita monthly food expenditure. The mean per capita expenditure of households was estimated to be ₦12,940.92 and this value was used as food security index. The food security line was ₦8,627.28.This implies that, all respondents whose per capita monthly food expenditure falls less ₦8,627.28 were regarded as being food insecure. This is because; it is an indication that these households were unable to meet their expected food expenditure. The finding indicates that 58.6% of respondents were food insecure while 41.4% were food secured. This implies that, the incidence of food insecurity among the respondents is high and this is in agreement with the finding of Olayiwola *et al*. (2017) who reported that, 58.7% of the respondents were food insecure.

Table 2: Food Security Status of the Respondents

Food Security Status	Frequency	Percentage
Food insecure	89	58.6
Food Secure	63	41.4
Total	152	100.0
Mean per capita household		

food expenditure
(MPCHHFE) is ₦12,940.92
Food security line (2/3 of
MPCHHFE) is ₦8,627.28

Source: Author's Compilation

Livelihood assets of the respondent in the study area

The study assessed respondents' access to the five core livelihood assets as outlined in the Sustainable Livelihood Framework—physical, human, financial, social, and natural assets. The distribution across these categories provides valuable insight into the capacity of households to sustain and improve their livelihoods. Access to physical assets was found to be significantly high among the respondents, with 93.4% reporting high levels of endowment, while only 1.7% and 4.9% reported low and moderate access, respectively. Physical assets assessed included house ownership, vehicle ownership, access to electricity, proximity to tarmac roads, and market access. This high rate of access suggests a strong infrastructural foundation in the study area, potentially enhancing mobility, storage, communication, and market engagement. Such assets are critical for supporting income-generating activities and overall resilience.The study also found a generally high level of human asset endowment. Specifically, 62.8% of respondents reported high access to human capital resources such as labor availability, healthcare access, formal education, and farming experience. A smaller proportion—21.1% and 16.1%—had moderate and low access, respectively. These findings imply that a majority of households possess the knowledge, skills, and health necessary for productive engagement in livelihood activities. The relatively high educational attainment and farming experience can contribute significantly to agricultural productivity and informed decision-making, thereby enhancing food security and income generation.

In contrast to physical and human assets, financial assets were the most limited among respondents. A significant 51.3% of households reported low access to financial capital, with only 10.9% being highly endowed and 37.8% falling in the moderate category. Financial assets considered included personal income (salary), credit access through cooperatives and banks, remittances, livestock ownership, and value of farm produce. This limited access to financial resources could constrain the ability of households to invest in livelihood diversification, improve productivity, or cope with economic shocks. The lack of reliable financial capital underscores a potential vulnerability that could affect long-term livelihood sustainability.

On the other hand, social asset endowment was relatively strong, with 63.8% of respondents reporting high access. Social assets were evaluated based on participation in community organizations, involvement in decision-making processes, and reliance on social networks such as friends, relatives, and remittances. Strong social networks can serve as a form of informal insurance and are vital in times of need, facilitating information sharing, labor exchange, and emotional support. The high levels of social connectedness indicate a potentially robust safety net and community cohesion.

Access to natural resources was also relatively favorable. 57.2% of respondents had high access to natural assets, while 36.8% and 6.0% had moderate and low access, respectively. Natural assets include access to land, water, forests, and biodiversity. This level of access indicates a significant reliance on natural resources for livelihood activities, particularly agriculture and resource-based enterprises. However, the sustainability of these assets depends on effective management and environmental conservation practices, especially in the face of climate change and land degradation.

Table 3: Distribution of Households by Access to Livelihood Assets

Livelihood Assets	Low (%)	Moderate (%)	High (%)
Physical	1.7	4.9	93.4
Human	16.1	21.1	62.8
Financial	51.3	37.8	10.9
Social	26.4	9.8	63.8
Natural	6.0	36.8	57.2

Source: Author's compilation

Effects of Livelihood Assets on Food Security Status

The binary logit regression model was used to analyze the effects of livelihood assets on food security status of smallholder farmers as presented in table 4. The Pseudo R-square of 0.446 implies that all the explanatory variables included in the model were able to explain 44.6% of the variation in food security status of the respondents. The log-likelihood ratio (LR) test was significant at one percent (1%) meaning that the model was adequate in explaining the probability of the effect of the explanatory variables on food security status.

The finding shows that educational status which stands for human asset (X_1) has positive impact on food security and is significant at 10%. This implies that a unit increase is educational status increases food security by 1.3 units. This agrees with Omonona *et al.* (2007) who opined that level of education should positively affect the income earning capacity and level of efficiency of the household's food resources.

Access and utilization of health facilities (human asset) (X_2) is negative and significant at 5%. The result shows that a unit increase in access to health facilities by the household heads will reduce the probability of food security by 24.3 unit because the more the household head spend more on health care the less he will have money for food for his household which will in turn decrease the food security status of his household. Physical asset such as Land ownership(X_3) is negative and significant at 10%. This implies that any unit increase in land ownership will lead to 32.0 unit decrease in food security status of the farmer. This is because the more a farmer uses his resources to acquire more land, he may not have enough resources to take of his family or in other way round, he may not be able to manage all the land, which will make it less productive and in turn reduce the food security status of the farmer. Financial asset such as having access to loan(X_4) is significant at 1% and has a positive

impact on food security. It shows that a unit increase in access to loan will lead to 1.2 unit increase in food security of the farmer.

Access to machineries (Physical asset) (X_5) is significant at 1% and had a positive relationship. This implies every unit increase in the use of machinery lead to 2.1 unit increase in food security status of the farmers. Gender which stand for human asset (X_6) is significant at 1% and had a negative relationship. This means that households headed by males will have lower food insecurity than their female household heads. This is in-line with Omonona *et al* (2007) who found out that food insecurity incidence is higher in female headed households than in male headed households and may be as a result of lower dependency ratio observed in male headed households where both the head and their spouse are engaged in income generating activities.

Physical asset such as improve seeds (X_7) is significant at 1% and had a positive effect on food security, which implies that every unit increase in the use of improved seed will lead to 2.7 unit increase in food security status of the farmers. Natural asset such as farm size (X_8) is significant at 1% and had a positive effect on food security in rural households. Which implies for every unit increase in farm size leads to 2.4 unit increase in food security of the farmers. Social aggregates index (X_9) is significant at 1% and had a negative effect on the smallholder farmers' food security.This implies that for every unit increase in social aggregates index leads to -2.6 unit decreases in the food security status of the smallholder farmers.

Table 4: Result of Binary Logit Regression for Effects of Livelihood Assets on Food Security

Variables	Odd Ratios	Coefficient	Standard error	Probability
Educational status (X_1)	1.270698	0.2395666	0.1638978	0.063*
Access to health facilities (X_2)	0.2439355	-1.410859	0.1547172	0.026**
Land ownership (X_3)	0.3248497	-1.124393	0.2012349	0.070*
Access to loan (X_4)	3.337375	1.205184	1.046498	0.000***
Access to Machinery (X_5)	8.535257	2.144206	3.971952	0.000***
Gender (X_6)	0.0517894	-2.960571	0.0450886	0.001***
Improved seed (X_7)	12.94272	2.560534	8.749339	0.000***
Farm size (X_8)	10.76866	2.37664	8.912718	0.004***
Social aggregates index (X_9)	0.0766173	-2.568933	0.6016646	0.001***
Constant	0.0003708	-7.899778	0.0006229	0.000***
Pseudo R^2	0.4463.			
Prob > chi^2	0.000			
LR $chi^2(9)$	85.95			

Source: Author's compilation *** Sig at 1%, ** Sig at 5% and * Sig at 10%

Coping Strategies Adopted by the Respondents in the Study Area

Amakye (2017) define coping strategies as what people are willing to embark on for sustainability were they are food insecure. Table 8 shows the coping strategies employed by

the respondents toward food insecurity base on ranking in order of most preferred coping strategy. According to Adebayo and Abegunrin, (2013), who revealed that these strategies are effective in coping with the problem associated with food security? The frequency of use of various coping strategies was ranked letting children eat first was ranked 1st with mean score (2.69). This shows that children are allowed to eat no matter the quantity of food available to the household. Selling livestock to buy food ranked 2nd with mean score of 2.68. Eating of wild fruit is ranked 3rd with mean score of 2.50. Consuming seed reserved is ranked 4th with mean score of (2.28), Buying of less expensive food is ranked 5th with a mean score of (2.26), Reliance on less preferred food is ranked 6th with a mean score of (2.25), Selling durable assets is ranked 7th with a mean score of (2.15). Limiting food portion at mealtime is ranked 8th with a mean score of (2.11). Eating once a day is ranked 9th with a mean score of 2.01. Withdrawal of children from school is ranked 10th with a mean score of 2.00. Picking leftover food at social functions is ranked11th with a mean score of 1.99. Migrating to search for job is ranked 12th with a mean score of (1.90), Harvesting immature food crops is ranked 13th with mean score of (1.86), Buying food on credit is ranked 14th with a mean score of (1.73).

Table 5: Coping Strategies Adopted by the Respondents in the Study Area

Coping Strategies	Mean	Rank
Buying of less expensive food	2.26	6
Buying food on credit	1.73	14
Limiting food portion at meal	2.11	8
Reliance on less preferred food	2.25	5
Selling livestock to buy food	2.68	2
Selling durable assets	2.15	7
Eating once a day	2.01	9
Eating wild fruit	2.50	3
Consuming food reserve	2.28	4
Withdrawing children from school	2.00	10
Harvesting immature crops	1.86	13
Migrating to search for job	1.90	12
Picking leftover food at social function	1.99	11
Letting children eat first	2.69	1

Source: Author's compilation

Conclusion and Recommendations

The study examined the socioeconomic characteristics, food security status, livelihood assets, and coping strategies of smallholder farmers. Findings indicate that farming is male dominated, with most household heads engaged in agriculture. Farmers are in their productive years, and primary education influences their decision-making and technology

adoption. Most farmers are married with large households' size, providing labor, but small farm sizes and limited credit access hinder productivity. Membership in cooperatives and access to credit enhance productivity, yet many farmers lack financial support. Food insecurity is prevalent, with many households struggling to meet basic food needs. Education, loans, machinery, and improved seeds positively impact food security, while healthcare costs, land constraints, and social indices have negative effects. Farmers adopt coping strategies like income diversification and cooperative participation, but more support is needed to enhance resilience and ensure sustainable food security.It was recommended that:

i. Policies should be formulated to focus on improving literacy programs, vocational training, and agricultural extension services to equip households with better farming and income-generating skills.
ii. Efforts should be made to strengthen rural healthcare infrastructure, ensure affordable healthcare, and promote health insurance schemes for farming households.
iii. Land tenure policies should be strengthened to enable smallholder farmers to have secure land ownership, which improves their ability to invest in long-term agricultural productivity and food security.
iv. Financial institutions and government programs should provide low-interest loans and flexible repayment plans tailored to farmers' needs.
v. Programs that encourage farm mechanization, such as subsidies for machinery purchase, cooperative ownership models, and training on modern farming techniques should be promoted.
vi. Targeted interventions such as women's cooperatives, microfinance initiatives, and skill-building programs should be implemented to enhance their economic resilience.
vii. Government agencies, research institutions, and NGOs should promote access to high-yield, drought-resistant, and pest-resistant seed varieties.
viii. Farmers should be encouraged to adopt sustainable intensification methods, such as crop rotation, irrigation, and precision farming, to maximize yields even with limited land size.
ix. Policies should be enacted to promote farmers' associations, cooperatives, and other forms of collective action that enhance knowledge sharing and resource access.

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