EFFECT OF ACCESS TO MICROCREDIT ON FOOD SECURITY STATUS OF FARM HOUSEHOLDS IN NIGER-DELTA, NIGERIA

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Abstract

The study examined the effect of access to micro credit on the food security status of farm households in Niger Delta region of Nigeria. Multistage sampling technique was used to select 384 respondents stratified into beneficiaries and non-beneficiaries of micro credit schemes. Primary data was used for the study and analyzed using frequencies, percentages and multiple discriminant function. The most patronized sources of micro credit were the informal sources (65.82%), while the patronage of the formal sources was 34.17% in the region. The dependent variable-food security status, comprise of three groups namely, marginal food security, low food security, and very low food security. Based on factor loadings, the strongest predictor was borrowing money for farming (0.749), and the weakest predictor was remittance status (0.308). The canonical correlation of 0.597 implied that 35.64% of the variation in the grouping variable was explained by the discriminators included in the model. The chi-square statistic (60.4) of Wilk's lambda was significant (p<0.01), implying that discriminant function was appropriate and significant. Therefore, micro credit access was a major determinant of which food security typology the small-scale farmers in the study area belonged to and had effect on the food security status of farm households. Therefore, government, development organizations, agricultural cooperatives and individuals among others should set up micro credit schemes to support farmers in agricultural production.

Keywords: Multiple Discriminant Function, farm households, food security status, and micro credit

Introduction

Food is important because it accounts for a substantial part of a typical Nigerian household budget (Omonona and Agori, 2007). Nigeria, the most populous country in Africa with over 140 million people constitutes about a quarter of continental total population and has agriculture as the largest sector of the economy providing about two-thirds of the nation's workforce (NISER, 2002). Agriculture generates employment, income and provides food security (Von Brau, *et al*., 2004). Food security is an issue of prime importance for every country of the world whether developed or developing. However, the enormity of food insecurity differs from nation to nation and time to time (Abdul-Jalil, 2015).

Food security should emphasize local sources of production and processing within a food system that supports economic and environmental sustainability but, focuses primarily on creating food access, especially for low-income people (Rimkus, 2004). The region produces immense oil wealth and has become the engine of Nigeria's economy, but it also portrays a paradox as the vast revenues barely touch Niger Delta own pervasive poverty, hence giving birth to formidable challenges to sustainable human development in the region. People are more volatile, resulting in youth restiveness, conflicts between youths and community leaders, youth and government agencies, youth and multinational companies (UNDP, 2006). These propagated negative nominal and real shocks in every sector of the economy including agriculture, with the economy operating under the atmosphere of politically unstable, eroded productivity and declined private investments (MNDA, 2011).

The credit market in the Niger Delta is dualistic in nature with small scale agro-based producers relying on both formal and informal financial resources to fund production (MNDA, 2011). Whereas, the formal credit market is organized, basically under government supervision, but the informal credit market is not organized, with a lot of informality in its operations (Essien and Idiong, 2008). Low incomes and the savings

capacity are insufficient to finance farmers' investment in new technology. Therefore, external capital is required to facilitate agricultural production which is dominated by small scale farmers, who produce mainly for subsistence and have small land holdings which makes their demand for credit small (Elhiraika, 1999).

Agriculture though a major contributor to Nigeria's GDP, small scale farmers however play a dominant role in this contribution but their productivity and growth are hindered by limited access to credit facilities (Odemenem and Obinne 2010). The need to increase farm income and agricultural productivity among small-scale farmers is important if the farmers must maintain their role of feeding the nation.

Methodology
Study area
The study area is the Niger Delta region of Nigeria. Nine of Nigeria's constituent States makes up the region, namely; Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Ondo, Imo, and Rivers, with an area of 112,000sqkm, population of 27 million people, 185 LGA's, about 13,329 settlements; 94% of which have population of less than 5,000 (Ichite, 2015). According MNDA (2011), the climate of the Niger Delta Region varies from the hot equatorial forest type in the southern lowlands to the humid tropical in the northern highlands and the cool montane type in the Obudu plateau area. Further, the wet season is relatively long, lasting between seven and eight months of the year from the months of March to October. The region has huge oil reserves and ranks sixth exporter of crude oil and third as world's largest producer of palm oil after Malaysia and Indonesia. Further, the Delta leads in the production of timber, pineapple and fish, also; cocoa, cashew, rice, yam and orange are produced in large quantities in the area. The major occupation of the people is fishing and agriculture but activities of oil companies have impacted on the environment with poor access to water, transport, telecommunication, power and fuel, housing, and poor educational structure (Igbuzor, 2000); this led to conflict in the region some years back. Traditional industries in the area include: canoe carving, pottery, cloth weaving, mat-making, thatch making (roofing materials), and palm oil processing, etc.

Sampling Technique
Multistage sampling technique was used to select respondents for the study. In the first stage, four States (Abia, Akwa Ibom, Delta and Rivers), were randomly selected from the region. In the second stage, one Agricultural Zone was randomly selected from each state. In the third stage, two Local Government Areas (LGAs) were randomly selected from each Agricultural Zone. In the fourth stage, three farming communities were randomly selected from each LGA. Finally, sixteen small-scale crop farmers stratified into beneficiaries and non beneficiaries of micro credit schemes were randomly selected from each community to give a sample size of 384. Data for the study were collected from primary sources through field survey with the aid of structured and pretested questionnaire.

Analytical Techniques
Percentages and frequencies were used and the Multiple Discriminant Function analysis. Discriminant function analysis was used to estimate the weighted linear combination of categorical variables that influenced food security status of farm households in the study area. The goal of the discriminant analysis is to combine the variable scores in such a way that a single composite variable, the discriminant score, is produced. It involves the determination of a linear equation that would predict which group the case belongs to, or the group which respondents are mostly inclined to. The Discriminant function Analysis was used to classify the farmers into three mutually exclusive and exhaustive categories. Using food security status as a basis, farmers are classified into three groups. Group one consist of farm households who are marginally food secure, group two consist of farm households whose food security is low, whereas, group three consist of farm households whose food security status is very low.   The model is presented explicitly as:

$$D_1 = b_0 + b_1 Z_{1i} + b_2 Z_{2i} \ldots\ldots.b_n Z_{ni} - \alpha \ldots\ldots (1)$$

$$Z_i = X_{ij} - x \ldots\ldots (2)$$

Z_i = the ith individual's discriminant score or the contribution of each independent variable to the total discriminant score (D_1).
D_1 = total discriminant score j[th] independent variable.
X_{ij} = the ith individual value of the jth independent variable.
b_{ij} = the discriminant coefficient for the jth variable
$\overline{X}$ = mean value of the independent variables
A = standard deviation of the independent variables
Let each individual score be a function of the independent variables following Ogbanje *et al*. (2014) thus;

$$Z_i = b_0 + b_1 X_{ij} + b_2 X_{2i} + \ldots\ldots b_n X_{ni} \ldots. (3)$$

The grouping variable was food security status typology specified thus:

$$D = v_1 X_1 + v_2 X_2 + \cdots + v_{22} X_{22} + a \ldots\ldots (4)$$

Where;
D = discriminate function; the groups include; Marginally Food Secure (MFS), Low Food Security (LFS), and Very Low Food Security (VLFS), otherwise denoted as food security typology,
v = discriminant coefficient or weight for the variable
X_1 = respondent's score for access to micro credit
X_2 = respondent's score for dependent relatives
X_3 = respondent's score for cooperative membership
X_4 = respondent's score for household size
X_5 = respondent's score for gender
X_6 = respondent's score for farm size
X_7 = respondent's score for remittance status
X_8 = respondent's score for education

X_9 =respondent's score for marital status
X_{10} =respondent's score for age
X_{11} =respondent's score for household income
X_{12} =respondent's score for farming experience
and, a= constant

Results and Discussion
Micro credit sources available to small scale farmers in the region
Table 1 shows the micro credit sources available to small scale farmers in the region. The most accessed source of micro credit is: Cooperatives (30.73%), followed by Esusu (15.63%), and Banks (14.06%).

Table 1 : Percentage distribution of respondents according to microcredit sources accessed

Sn	Microcredit sources	Frequency	Percentage
1	Banks	27	14.06
2	Government	25	13.02
3	NGO	8	4.17
4	Esusu	30	15.63
5	Cooperative	59	30.73
6	Money lender	21	10.94
7	Friends, neighbors and relatives	22	11.46

Source: Field survey 2015. Multiple responses recorded

To avoid incurring much loss, most micro credit entities adopt the group solidarity approach (lending to farmers as cooperatives). This has to do with lending to a group of five to twenty- five individuals who are pursuing common economic objectives and micro enterprise activities. These groups provide joint guarantees of each other's loan. The essence of group selection will encourage the members of the group to have confidence in one another to the extent that access to credit for any member of the group will depend on the consent of all the members of the group. The group members share in the risk and benefits that are associated with the loan collected (Zeller *et al*., 2001 and Bullen, 2004). Furthermore, in the Niger Delta region, the informal sources are the most patronized sources (72.93%), while the patronage of the formal sources is 27.08%. Udoh (2005) noted that in agricultural financing, informal credit sources are unquestionably the most popular. The nature and operation of formal sources which have failed not only in promoting a viable delivery system has caused an increase in the patronage of informal credit sources by small scale farmers (Egbe, 2000). Informal sources according to Ijere (2000) are provided by traditional institutions that work together for the mutual benefits of their members. These institutions provide savings and credit services to their clients.

Summary of Canonical Discriminant Functions
The structure matrix in Table 2 indicate the relative importance of the predictors as it displayed the correlations of each variable with each discriminate function, resulting in discriminant loadings. With 0.30 as the cut-off point, and using function one, the strongest predictor was borrowing money for farming (0.749), followed by dependents (-0.428), cooperative membership (0.399), household size (-0.335), gender (0.327), farm size (0.318) and remittance status (0.308). Predictors which were not loaded on the discriminant function were education (0.127), household income (0.123) and farming experience (-0.091).

Table 2: Structure Matrix

Variables	Function
borrow money for farming	0.749[*]
dependents	-0.428[*]
cooperative membership	0.399[*]
household size	-0.335[*]
gender	0.327[*]
farm size	0.318[*]
remittance status	0.308[*]
education	0.127
marital status	-0.019
age	0.003
household income	0.123
farming experience	-0.091

Source: Computed from field survey data, 2015. [*]indicates significance

This shows that borrowing micro credit is the highest determinant of a household being food secure or not; implying that, micro credit has effect on the food security status of small-scale farmers in the region. The result supports the findings of Thuita *et al*. (2013) who examined the effect of access to micro finance credit by women on household food security in three urban low income areas in Nairobi, Kenya. Findings showed that, households of micro finance clients consumed more nutritious and diverse diets compared to those of non-clients reflected in the dietary diversity scores for the two groups which were significantly different. Participation in micro finance programmes led to improved food security in the households of clients. The study provides evidence that access to micro finance credit influences household food consumption patterns positively, following the studies of Aidoo *et al*. (2013), Brannen (2010), Hamad *et al*. (2010), and Hazarika and Khasnobis (2008). Furthermore, households that have the opportunity to receive microcredit would build their capacity to produce more and enhance their food security status through the use of improved seeds and adoption of improved technologies (Bogale and Shimelis (2009). The negative sign of dependent parameter estimates implies that the lower the number of dependants, the higher the probability of food insecurity. Ayantoye (2009) noted that households with high dependency ratio are particularly prone to food insecurity and vice versa.

Agricultural Cooperative membership has effect on food security. Gibremichael (2014) supports this finding in his study of the Role of Agric Cooperatives in Promoting Food Security and Rural Women's Empowerment in Ethiopia. His findings show that cooperatives have the capacity to improve the living standard of their members, as they undertake various economic activities which help in promoting food security and gender equity. Household size is also a determinant of food security status. Aidoo *et al*. (2013),

in their study of determinants of household food security in Sekyere-afam plains district of Ghana showed that larger households were found to be food insecure compared to smaller households sizes. This outcome is consistent with the findings from a research conducted by Idrisa *et al*. (2008). However, the negative sign of household size implies an inverse relationship with food security, the smaller the household size, the less the incidence of food insecurity. Considering gender, Omonona and Agoi (2007) in their study on analysis of food security situation among urban households' evidence from Lagos State Nigeria, reported that, food insecurity incidence is higher in female headed households than in male headed households.

Farm size had a significant effect on household food security. Food insecurity incidence decreases with increase in farm size. According to Gebrehiwot and Van der Veen (2010), food production can be increased extensively through expansion of areas under cultivation and households can also diversify. Aidoo *et al*. (2013) and Bogale and Shimelis (2009) also shared similar views. Remittance status even though it was the weakest predictor, made a difference in households' living standards. Household receiving remittances fared much better that household not receiving any remittance. Furthermore, it increased household's income significantly and raised the probability of a household being food secure (Regmi *et al*. 2015). This outcome is consistent with the findings from a research conducted by Abadi, (2013).

Eigen values
Squaring the canonical correlation (0.597) in table 3 suggested that, 35.64% of the variation in the grouping variable was explained whether a respondent belonged to either of the food security typology. The low canonical correlation was attributed to the obvious overlapping of the groups.

Table 3: Eigen values

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.555[a]	89.4	89.4	.597
2	.066[a]	10.6	100.0	.248

First 2 canonical discriminant functions were used in the analysis.

Source: Computed from field survey data, 2015

Table 4: Wilks' Lambda

Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 2	.604	189.305	26	.000

Source: computed from field survey data, 2015

In Table 4, the chi-square statistic (60.40) of Wilks' lambda was significant (p<0.01), implying that the discriminant function was significant and appropriate for the data.

Table 5: Test of equality of group means

	Wilks' Lambda	F value	Significance
Marital satus	.994	1.119	.328
Household size	.978	4.375	.013
Education	.985	2.804	.062
Age	.998	.300	.741
Gender	.985	2.905	.056
Dependants	.977	4.555	.011
Farming experience	.995	.987	.374
Farm size	.992	1.608	.202
Remittance status	.994	1.229	.294
Household income	.990	1.887	.153
Borrow money for farming	.760	60.112	.000
Cooperative membership	.948	10.370	.000

Source: Computed from field survey data, 2015

The test of equality of group means in Table 5, provided strong statistical evidence of significant differences between means among the components of food security. All the variables produced significant F-statistic with the highest F-statistic coming from borrowing money for farming.

Conclusion

Farm households borrow micro credit and engage in agricultural production, to reduce poverty and food insecurity problems. From the study, apart from borrowing money for farming (micro credit), other factors such as: cooperative membership, farm size, gender, household size and remittance status influenced the food security status of farm households. Micro credit schemes in the study area have been successful in raising income levels and improving food security of beneficiaries, therefore, micro credit still remains the greatest tool with a potential of alleviating food insecurity among the poor. To achieve this goal, the scope should be expanded and the volume increased, this will go a long way in alleviating their capital. It will also serve as platform for the most vulnerable to cope with the current economic realities. Furthermore, placing the Sustainable Development Goal of; eradicating hunger and food insecurity in the world at the center of financing for development, is a step in the right direction towards enhancing food security in the region.

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