



ACCESS AND DEMAND FOR CREDIT AMONG SMALL SCALE AGRO-BASED PROCESSORS IN UYO AGRICULTURAL ZONE, AKWA IBOM STATE, NIGERIA

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Abstract

The study analysed the determinants of access and demand for credit among agro-based processors in Uyo Agricultural Zone of Akwa Ibom State. A multi-stage sampling technique was employed to select 110 agro-based processors (cassava graters and oil palm millers). A structured questionnaire was administered to the processors to collect the required information. The descriptive statistics and Heckman two-step selection model were used to analyze the information collected. Results show that majority of the processors were males, who had access to credit information and ICT facility; were married and moderately educated. They were of average age (46.58 years), processing experience (19.83 years), household size of about 6 persons, belonged to a social group (0.76 years), and with an average annual income of about N305, 222.70. The empirical results revealed that the processors' age, education, social capital, access to ICT, experience, household size and credit information were significant determinants of access to credit. Also, education, experience, household size, machine capacity, social group, labour cost, the amount of collateral, interest rate, distance to credit source and income from other sources influenced the level of credit demand among the processors. To promote credit access and demand among agro-based processors, it is recommended that, social capital formation among the processors is the key. Also, intensifying adult education and family planning would enhance credit access and demand among the processors. In addition, the youths should be encouraged to engage in agro-based processing as a way to decrease the cost of labour and ensure the sustainability of the business in the State. Furthermore, internet coverage should be expanded in the rural areas while the amount of interest rate charged on loans from the informal credit sources should be moderated.

Keywords: Credit, Agro-Processors, Cassava, Oil Palm, and Akwa Ibom State

Introduction

Agro-based processors are generally considered as the engine room or the drivers of economic growth and development of the agricultural sector especially in developing economies (FAO, 2013). They are entrepreneurs that utilize agricultural raw materials as their major factor of production. Agro-processing focuses on transforming the raw produce into value-added agricultural products which are capable of improving food quality and security, revenue, the wellbeing of farmers and the consumers alike (Wilkinson and Rocha, 2008). Fellows (2011), noted that most small scale agro-processing enterprises in developing economies used simple technology that is easily adaptable and assimilated, and capable of being used with minimum training. For efficient delivery and improved services, Rolle (2011) asserted that, agro-based processing needs, enabling factors such as access to consistent supplies of good quality raw materials, access to appropriate technology, human resource development, meeting requirements for food safety and quality and access to credit.

For the past decade in Nigeria, many small scale businesses have folded or found it difficult to cope with the economic realities due to the multifaceted issues related to political instability, volatility in macroeconomic variables, poor infrastructures, and unsustainable financial markets among others (Hassan and Olaniran, 2011; Oni and Daniya 2012 and Oduntan, 2014). Following the dismal performance of small scale enterprises in Nigeria in recent times, many researchers have directed this to lack of appropriate external stimulant such as credit (Oduntan, 2014 and Oni and Daniya 2012). Provision of credit is regarded as an important instrument for generating income, mobilizing resources and creating competitive production and economic environment (Akpan *et al.*, 2012; Akpan *et al.*, 2013; Essien and Arene 2014). For the agro-based processors, credit is critical since most farmers are resource-poor, and agricultural production and processing are time-bound. Beck and Demirguc-Kunt, (2005), noted that the provision of credit enhances the welfare of the vulnerable through income smoothening.

It is an essential ingredient of sustainable agricultural production and processing; as such its accessibility and demand are prerequisites for attaining the national goal of reducing rural poverty, creating sustainable employment and ensuring self-sufficiency in food production in the country (Jeiyol *et al.*, 2013 and Akpan *et al.*, 2013).

With the importance of credit to the agricultural sector and its multiplier effect on the economy, the Federal Government of Nigeria had initiated various agricultural credits-related policies and programmes in an attempt to improve agricultural production and its value chain through the provision of cheap financial resources to active stakeholders in the sector at a concessionary or a single-digit interest rate (Akpan *et al.*, 2012). For instance, in 2009, the Central Bank of Nigeria (CBN) in collaboration with the Federal Ministry of Agriculture and Water Resources (FMAWR) established the Commercial Agriculture Credit Scheme (CACS) to provide finance for the country's agricultural value chain in production, processing, storage and marketing (CBN, 2020). Given the incentives provided by the government to the agro-based enterprises in the country to boost performance (Akpan *et al.*, 2012); the presence of the dualistic structure of the credit market, which provides flexibility in credit access and demand and the prevalence of an effective market system; many researchers have reported abysmal performance and insufficient credit to the agro-based processors in the country (FAO, 2013, Essien and Arene 2014 and Essien *et al.*, 2016). As suggested by Essien *et al.*, (2016), Akpan *et al.*, (2016) and Akpan *et al.*, (2019), the low performance of the small scale agro enterprises would likely intensify poverty, hunger, unemployment and low standard of living for many rural families.

If the small scale agro-based processors must have to play a significant role in transforming positively the downstream activities in the agricultural sector, and meet the increasing demand for food in the country; they should be provided with sufficient external booster such as credit (Adeyonu, *et al.*, 2017). As indicated by Akpan *et al.*, (2013), several factors are thought to limit agro-based entrepreneurs' access and demand for credit in Nigeria. A study that is aimed at identifying these factors is necessary to provide evidence to policymakers on how to tackle the problem of credit deficiency in the sub-sector. The study, therefore, identified and examined factors that influence access and demand for credit among agro-based processors in Uyo Agricultural Zone of Akwa Ibom State.

Methodology

Study Area

The study was carried out in Uyo Agricultural Zone in Akwa Ibom State, Nigeria. Uyo Agricultural Zone consists of the following Local Government Areas; Ibiono Ibom, Itu, Ibesikpo Asutan, Uruan, and Uyo. The Zone is segmented into 8 blocks which cut across the five local government areas. The area falls within the rainforest zone with an annual rainfall of about 2000mm

to 3000mm and annual temperature of about 27°C and relative humidity range of 70 to 80%. There are two distinct seasons; the dry season (November – March), and a rainy season (April-October). The economic activities of the inhabitants are farming, trading, crafts, transportation, civil service and artisans among others.

Sampling Techniques and Sample Size

A two-stage sampling method was used in the study. The first stage was the purposive selection of the five Local Government Areas that make up the zone due to the intensity of processing activities in the LGAs. This was necessary to have a sufficient number of agro-based processors. The second stage involved the random selection of twenty-two (22) agro-based processors in each of the selected LGAs, giving a total of one hundred and ten agro-based processors for detailed study. The agro-based processors used in the study were small scale cassava graters/grinders and oil palm millers. Sixty (60) cassava graters and fifty (50) oil palm millers constituted the sample population. Within the framework of this study, a small scale agro-based processor is an entrepreneur that owns the business, source for capital and bears all the risks involved in the business. Also, a total of 2 to 6 persons are employed and operation is localized. It is also assumed that the total cost of setting up the business is less than one million naira. Primary and secondary data were collected from the agro-based processors selected. The primary data were elicited from a well-structured questionnaire administered to the processors.

Analytical techniques

The study is based on the theoretical framework of utility maximization of a consumer. For instance, an agro-based processor is assumed to be a rational consumer and maximizes utility hence, initially operates on a utility function thus;

$$U_i = f(G_i, R_i, C_i, L_i, K_i, Z_i) \dots \dots \dots (1)$$

Where, U_i is the initial utility maximized, G_i is the gross margin of production, R_i , C_i , L_i , K_i and Z_i are quantity of raw materials/inputs, the capacity of the machine, labour wage, capital used and other exogenous variables respectively. At the initial stage of production, the processor is assumed to be unconstrained in resources. But as the production is expanded, he/she becomes constrained in resources such that, a new level of utility maximization (U_x) is anticipated subject to the available income in the business and exogenous income outside the business (E_r). Following Marennya and Barrett (2007) and Nkamleu and Adesina (2000), an entrepreneur will only access exogenous assistance if the anticipated utility is greater than the current utility. Hence, equation 1 becomes;

$$U_x > U_i = f(G_x, R, C_x, L_x, K_x, Z_x) \dots \dots (2)$$

$$s. t. Y_x = Q_x P_x + E_r \dots \dots \dots (3)$$

Forming a Lagrange multiplier relationship, we have: (note, P_x is the price of output and Q_x is the quantity of output of the agro-based processor)

$$U_x = f(G_x, R, C_x, L_x, K_x, Z_x) + \lambda(Y_x - Q_x P_x - E_r) \dots (4)$$

Given the relationship (eqn. 4), it is observed that the price (P_x) and output (Q_x) depending on the market situation and the season of production might not be able to adequately generate sufficient revenue to upset the production cost. Under this situation, an individual processor will only maximize (U_x) if E_x is also maximized, and provided the price of factors of production remain constant or varies insignificantly. Thus a new relationship can be derived from the above assumption as:

$$U_x = E_x = f(G_x, R_x, C_x, L_x, K_x, Z_x, Y_x) \dots (5)$$

The new relationship implies that the income from the exogenous source would depend on the quantity or cost of the factors of production, processors' business income and other exogenous factors. The descriptive statistics and Heckman's two-stage selection model were used to analyze the information collected from the processors. The Heckman two-stage selection model (Heckman 1979) has an underlying assumption that access to credit and the amount of credit demanded or borrowed by the agro-based processors are two distinct or independent decisions. If the relationship exists between access to credit and demand for credit, it would lead to the problem of simultaneity and selection bias. Also, the Heckman model assumes that different sets of explanatory variables influence the decisions to access and demand credit. The first step in the Heckman two-stage model is the estimation of access to credit following the binary Probit model or the selection equation model. The Probit model also provides the value of the Inverse Mills Ratio (IMR) defined as "the ratio of the ordinate of a standard normal distribution to the tail area of the distribution" (Greene, 2003). The IMR term (λ) corrects the problem of selection bias (Greene, 2003). The mill's ratio shows the probability that an observation belongs to the selected sample. The ratio was added as an explanatory variable in the outcome equation or the credit demand equation in step two of the Heckman model to correct for potential selection bias and simultaneity. If the term (λ) is not statistically significant, then sample selection bias was not a problem (Heckman, 1979). The significant value of λ implies that a significant difference exists between the processors that access credit and those that borrowed credit. The selection equation is specified thus:

$$\text{Selection equation } d_i = X_{li}' \beta_1 + U_i, \\ U_i \sim N(0,1) \dots (6)$$

$$D_i = \{1 \text{ if } d_i > 0, \text{ and is } 0 \text{ if } d_i \leq 0\}$$

Where D_i is the latent discrete variable that denotes binary censoring, X_{li} is a vector of explanatory variables hypothesized to influence credit access and β_1 is a vector of parameters, while U_i represents the standard error term. The D_i is the probability to access credit, it is a dummy that denotes 1 when a processor has access to credit and 0 otherwise. Empirically, the Probit model is stated as thus:

$$D_i = X_{li}' \beta_1 + U_i \dots \dots \dots (7)$$

The second stage involves an outcome equation, which uses an ordinary least squares estimation method to

determine the level of credit demand among the agro-based processors. The model is expressed thus:

$$y_i = X_{2i}' \beta_2 + \delta_i \lambda_{ij} + V_i, \quad V_i \sim 0 (0, \delta^2) \dots \dots (8)$$

Where y_i is observed only if the processors have access to credit.

$$Y_i = \{y_i \text{ if } d_i = 1 \text{ and } y_i > 0 \text{ and is } 0 \\ \text{if } d_i = 0 \text{ and } y_i \leq 0\} \dots \dots (9)$$

Empirically, the outcome equation becomes

$$Y_i = X_{2i}' \beta_2 + \delta_i \lambda_{ij} + V_i \dots \dots \dots (10)$$

Where "Y_i" represents the amount of loan acquired by a processor; X_{2i} is a vector of explanatory variables hypothesized to influence credit demand and β_2 is a vector of parameters, λ is the inverse Mills ratio (IMR) estimated in step 1 of the Heckman model and V_i is the error term.

Determinants of credit access among the agro-based processors

The implicit binary Probit link function used to identify factors that influence credit access among the agro-based processors is stated thus:

$$CRE = \left(\frac{P_i}{1 - P_i} \right) = Z_i = \beta_0 + \beta_1 AGE + \beta_2 GEN + \beta_3 EDU + \beta_4 MAR + \\ \beta_5 SOC + \beta_6 ICT + \beta_7 EXP + \beta_8 INF + \beta_9 INO + \beta_{10} HHS + U_i \dots \dots (11)$$

Where:

CRE = Access to credit (i.e. either informal or formal sources or both) by the processor (dummy; 1 for yes and 0 for no)

AGE = Age of a processor (years)

GEN = Gender of a processor (1=Male, 0=otherwise)

EDU = Educational level of a processor (years)

MAR = Marital status of a processor (1 for married and 0 otherwise)

SOC = Membership of a social group (number of years)

ICT = Access to ICT (dummy; 1 for yes and 0 for no)

EXP = Processing experience (years)

INF = Credit information sources (number)

INO = Non-processing income (Naira)

HHS = Household size (number)

U = stochastic error term

P_i = Probability to engage in agricultural activity

Determinants of credit demand among agro-based processors

The implicit form and the variables used in the outcome equation are stated thus:

$$DEM_i = \beta_0 + \beta_1 AGE + \beta_2 EDU + \beta_3 GEN + \beta_4 EXP + \beta_5 HHS + \beta_6 MAC + \beta_7 SOC + \\ \beta_8 LAB + \beta_9 NEA + \beta_{10} INO + \beta_{11} INT + \beta_{12} COL + \delta_i IMR + v_i \dots \dots \dots (12)$$

Where,

DEM = Amount of credit obtained by a processor (i.e. either from informal or formal source or both) (Naira)

AGE = Age of processor (years)

EDU = Education level of the processor (years)

GEN = Gender (dummy 1 for the male processor and 0 for female processor)

EXP = Processing experience (years)

HHS = Household size (number)
 MAC = Machine capacity (tons)
 SOC = Membership in a social organization (Number of years)
 LAB = Cost of labour (naira)
 NEA = Nearness to the financial institution (dummy, 1 for near and 0 otherwise)
 INO = Income from other sources (naira)
 INT = Interest on loan (naira)
 COL = Collateral proxy, by the value of the asset of a processor (naira)
 IMR = Inverse mills ratio derived from the Probit link function

Results and Discussion

Socioeconomic Characteristics of agro-based Processors

The result of the socio-economic analyses of the agro-based processors is shown in Table 1. The findings revealed that about 92.73% of the processors were males, while only 7.27% were females. The dominance of the male in the processing business is obvious given the tedious activities involved and the general perception that, the job is mainly for the males. The age distribution of the processors revealed that about 3.64% of the processors were within the age range of 20 – 30 years, while 24.55%, 44.50%, and 20.00% were within the age range of 31-40, 41-50 and 51-60 years respectively. The aged group only constituted about 7.27% of the total processors while an average age of the processors stood at 46.58years.

The age distribution implies that most of the processors are still in their active age, but there is still a need to encourage the youths to venture into agro-processing to sustain the business. The marital status revealed that about 79.09% of the processors were married while 20.91% were single. The distribution indicates that agro-processing business in the study area is a reliable source of livelihood for many families. About 4.55% of the processors had no form of formal education, 41.82%, 50.91%, and 2.73% attained primary, secondary, and tertiary levels of education respectively. An average of 7.43 years of formal education was estimated among the processors. The level of educational attainment among the processors implies that most of the processors can access and process the information on credit in the study area. The level of formal education is an essential factor for effecting desirable or positive change in attitudes, skill and knowledge of individuals.

The results also show that about 32.73% had a household size range of 1-5 persons, while 65.45% and 1.82% had 6-10 and greater than 10 persons respectively. Average household size of 6 members was estimated among the processors. This implies that family labour is important in agro-based processing business in the study area. The processing experience is critical in managing the risks and uncertainties involved in agro-based processing. About 17.27% of the processors had less than a year and between 1-10years experience each, while 22.73%, 18.18%, 12.73% and 11.82% had processing experience range

of 11 – 20, 21 – 30, 31-40 and more than 40years years respectively, with an average of 19.83years. This long year of processing experience acquired by the processors is an incentive for innovation adoption and risk-taking in the business. The finding also revealed that about 71.82% of the processors have access to credit information and was able to obtain loans from various sources. Most of the loan sources available were informal and include; monthly rotational contribution, local money lenders and monthly saving thrift and loans from friends and relatives. The findings also showed that the majority of the processors (67.27%) do not belong to any social organization, while only 23.64% and 4.55% belong to a social organization for the period of 1 – 10years and greater than 21years respectively, with an average of 0.76 years. This implies that the processors have a low level of social interaction. Hence, the low degree of social capital formation among the processors in the study area implies that some processors might not have sufficient information or relevant data to update the current level of their processing techniques.

In addition, the result reveals that about 96.36% of the processors do not have access to agricultural extension services, while only 3.64% had access. The failure of the public extension services calls for urgent implementation of the private extension services to adequately provide essential services to the processors. About 54.55% of the processors have access to internet services, while 45.45% do not. Internet services are important for essential information and also create a forum for markets. This innovation is paramount to the success of a firm and needs to be emphasized through massive sensitisation. Perhaps, this is a new form of social capital for the processors, as the physical group membership proved unattractive to most of them. The income distribution of the processors reveals that only 9.09% of the processors had an annual income less than N10,000, while, 30.00%, 15.45%, 17.27% and 28.18% had income ranges of N10,000-N100,000, N100,001-N200,000, N200,001-N400,000 and more than N400,000 respectively, with an average of N305,222.70. This finding implies that the business of agro-processing is lucrative in the study area and justifies the fact that most of the processors used the proceeds from the business to support their families.

Table1: Socioeconomic Characteristics of agro-processors

Characteristic	Frequency	Percentage	Mean
Gender (dummy)			
Male	102	92.73	
Female	8	7.27	0.93
Total	110	100.00	
Age (Years)			
20-30	4	3.64	
31-40	27	24.55	
41-50	49	44.55	
51-60	22	20.00	46.58
>60	8	7.27	
Total	110	100.00	
Marital Status (dummy)			
Married	87	79.09	0.79
Single	23	20.91	
Total	110	100.00	
Educational Level (years)			
No formal education	5	4.55	
Primary school	46	41.82	7.43
Secondary School	56	50.91	
Tertiary Institution	3	2.73	
Total	110	100.00	
Household Size (number)			
1 – 5	36	32.73	
6 – 10	72	65.45	6.00
>10	2	1.82	
Total	110	100.00	
Processing Exp. (Years)			
< 1	19	17.27	
1– 10	19	17.27	
11 – 20	25	22.73	
21 – 30	20	18.18	19.83
31 – 40	14	12.73	
>40	13	11.82	
Total	110	100.00	
Access to credit (dummy)			
Yes	79	71.82	0.59
No	31	28.18	
Total	110	100.00	
Credit Demand (Naira)			
No credit	31	28.18	
<10, 000	37	33.64	30391.53
10,000 – 100,000	33	30.00	
100,001 – 200,000	8	7.27	
> 200,000	1	0.91	
Total	110	100.00	
Social organization (Years)			
0	74	67.27	
1 – 10	26	23.64	
11 – 20	5	4.55	0.76
>21	5	4.55	
Total	110	100.00	
Agric. Extension ser. (dummy)			
Yes	4	3.64	
No	106	96.36	0.036
Total	110	100.00	
Access to ICT(Number)			
Yes	60	54.55	
No	50	45.45	0.545
Total	110	100.00	
Annual income (naira)			
<10, 000	10	9.09	
10,000 – 100,000	33	30.00	
100,001 – 200,000	17	15.45	305,222.70
200,001 – 400,000	19	17.27	
> 400,000	31	28.18	
Total	110	100.00	

Source: Field survey, 2019

Determinants of access to credit among agro-based processors

The Heckman two-step procedure was used to determine the factors influencing credit access and the level of demand by the agro-based processors (Table 2). Both the selection and outcome equations were estimated simultaneously. The post estimation of selection equation results was done to determine the marginal effects of changes in explanatory variables on the expected value of probability to access credit. The value of IMR was significant and positive, which connotes that the error terms of the selection equation and outcome equations were correlated positively. This implies that there was evidence of self-selection bias which justifies the choice of Heckman two-step model. The diagnostic tests also showed that the likelihood function of the two-step model was significant at 1%, depicting a strong explanatory power of both equations. The empirical result shows that the processor's age has a significant positive relationship at 10% probability level with access to credit. This implies that a unit increase in the processor's age would lead to a 0.0093 unit's increase in the probability to access credit. Many reasons could be attributed to this result, and the most likely ones are the previous credit experience and trustworthiness in managing credit matters. It could be that older processors are less prone to default and are credible compared to the younger ones. Also, older processors would likely establish more contacts with credit sources and can easily have first-hand information on credit

availability compared to the younger ones. The finding corroborates Ajagbe (2012), Akpan *et al.*, (2013), Essien and Arene (2014) and Sulemana *et al.*, (2017). The coefficient of the processing experience showed a significant positive relationship with access to credit at a 5% level of significance. This implies that an increase in the processing experience of the processors by one year would increase the probability of accessing credit by 0.0034%. In other words, the higher the number of years in the processing business, the higher the probability to access credit. This result agrees with *a priori* expectation of the study because an increase in the processing experience is correlated with the ability to manage the firm resources and the risks bearing capacity of the processors. Hence, the need for the loan is assumed to depend on the length of time a processor is involved in the business. The result follows the findings of Adebayo (2018). The result showed a positive and significant relationship at 1% level between the years of formal education of the processors and the probability of credit access. This implies that an increase in formal education by one year would lead to an increase in the probability of credit access by 0.0041%. This is expected because education is a human capital tool that helps individuals to access credit information easily. The finding agrees with the report of Ajagbe (2012), Akpan *et al.*, (2013), Sulemana *et al.*, (2017), Faisal *et al.*, (2018) and Usman and Kamba (2019).

Table 2: Estimates of the Heckman two-step model for the Probability of access to and demand for credit among the agro-based processors in the study area

Outcome equation (Credit Demand equation)					
Variable	Coefficient	Std. Error	Z -value	p-value	Marginal effect
Constant	44882.8	33056	1.3578	0.1745	–
Age	252.706	1047.87	0.2412	0.8094	252.706
Education	1645.78	490.78	3.3534***	0.0003	1645.78
Gender	4407.1	14407.8	0.3059	0.7597	4407.1
Processing experience	137.066	43.909	3.1216***	0.0070	137.066
Household size	–321.656	140.62	–2.2874**	0.0501	–321.656
Machine capacity	8.0930	2.6712	3.0298***	0.0094	8.0930
Social organization	1227.14	539.87	2.2730**	0.0443	1227.14
Labour cost	0.6591	0.1606	4.1025***	0.0000	0.6591
Distance to credit source	–5698.23	3023.4	–1.8847*	0.0879	–5698.23
Income sources	–0.5459	0.1299	–4.1999***	0.0000	–0.5459
Interest rate	–15.7489	2.5814	–6.1010***	0.0000	–15.7489
Collateral	0.1580	0.0276	5.7246***	0.0000	0.1580
Inverse Mill's ratio (λ)	39357	15025.9	2.6193**	0.0110	–
Selection equation (Access to Credit)					
Constant	2.1085	0.8657	2.4357**	0.0149	–
Age	0.0239	0.0123	1.9411*	0.0680	0.0093
Gender	0.0328	0.3435	0.0955	0.9240	0.0133
Education	0.0106	0.0030	3.5277***	0.0001	0.0041
Marital status	0.3606	0.3561	1.0125	0.3113	0.1353
Social organization	0.091	0.0351	2.5893**	0.0120	0.0353
Access to ICT	0.1736	0.0704	2.4670**	0.0136	0.0669
Processing Exp.	0.0087	0.0039	2.2342**	0.0495	0.0034
Household size	–0.0111	0.003895	–2.8497***	0.0017	–0.0043
Non – processing income	–1.30E-05	1.08E-05	–1.1946	0.2323	–5.04e-06
Credit Info. source	0.1045	0.0306	3.4173***	0.0004	0.0406
Censored observations	31 (28.18%)			Sigma	45628.43
Uncensored observations	79 (71.82%)			rho	–0.8626
Number of observations	110			Wald chi2(12)	61.92***

Source: Data from field survey, 2019. The gretl econometric software was used for the analysis Asterisks *, ** and * represent significant levels at 10%, 5% and 1% respectively**

The relationship between the social capital formation and the probability of credit access by the agro-based processors was positive and significant at 5% level. The result implies that an increase in years spent as a member of a social group would lead to about 0.353% increase in the probability of credit access by the processors. The finding is in agreement with *a priori* expectations because being a member of a social organization would create a platform to interact and connect with other members who may be opportune to occupy prominent positions in the society and can leverage on the network to enhance their credit access and demand. The result also suggests that being a member of a social group would enhance information sharing and networking in areas such as marketing, production and inputs, among others. This would surely broaden the information base of the processors and encourage the efficient management of the business resources including its sustainability. The result is similar to the findings of

Ajagbe (2012), Akpan *et al.*, (2013), Essien and Arene (2014) and Faisal *et al.*, (2018). The empirical findings of the relationship between access to ICT and the probability to access credit facilities by the processors showed a positive and significant relationship at a 5% significance level. Increase in access to information and communication technology facilities by a processor would lead to an increase in the probability of credit access by 0.0669%. Through an increase in ICT access, processors can reach out to a wider range of low interest and long term credit tailored towards meeting their enterprise requirements, following Faisal *et al.*, (2018) assertion.

The coefficient of the household size has an indirect relationship with the probability of credit access. This connotes that, as the household size of the processor increases, the probability to access credit decreases. For instance, an increase in the household size of the processor by one person would lead to a 0.0043%

decrease in the probability to access credit. An increase in the household size is synonymous with the increase in household expenditure. Maintenance of the family wellbeing is fundamental and is a good opportunity cost for firm investment. Alternatively, the increase in household expenditure would likely cause disinvestment in farm business because the processor would likely forgo or reduce activities like social capital formation, access to the internet and self-training due to insufficient funding. The result is in line with the findings of Jeiyol *et al.*, (2013) and Akpan *et al.*, (2013). The results further revealed that the coefficient of access to credit information sources was positive and significant at 1% level, indicating that credit access would increase with an increase in access to credit information sources. This implies that an increase in the number of credit information sources by one would lead to about 0.0406% increase in the probability of credit access by the agro-based processors in the study area. Increase in access to information on credit sources will widen the processor's opportunities to an array of credit options based on their demand and conditions attached to the credit.

Determinants of Credit Demand among the Agro-Based Processors

The results in Table 2 show the outcome equation results for credit demand among the agro-processors in the study area. The empirical result revealed that the level of formal education of the processor has a significant positive relationship with the amount of credit demanded. An increase in the level of formal education of the processor by one year would lead to an increase in the demand for credit facility by N1645.78. This is as expected because education broadens processors' knowledge and expose them to various credit sources and are more likely to understand the procedures and the requirements needed for a successful credit transaction, following the findings of Ajagbe (2012), Akpan *et al.*, (2013) and Adebayo (2018). The coefficient for the processors' experience was positive and significant at 1% level. This implies that an increase in the processors' experience by one year, would lead to an increase in credit demand by N137.07. This suggests that the more experienced processors have a strong affinity to loan demand than the younger ones. This result could be because, experienced processors understand the working environment better, risks and perhaps the best time to acquire a loan facility. Also, the need by the processors to expand the capacity utilization of their processing unit grows with the increase in experience and this might be a fundamental reason for credit demand, following the study of Akpan *et al.*, (2013).

The slope coefficient of the household size of the processors was negative and significant at the 5% level. This implies that an increase in the household size of the processor by one person would lead to a decrease in credit demand by N321.66. This is in line with theoretical postulation because an increase in household size will translate to huge family expenditure leading to excessive financial pressure on-farm or business

investment that may deprive the owner sufficient collaterals or other required conditions needed to acquire credit facility. From the welfare point of view of a small scale business operator, family wellbeing in the form of an increase in expenditure is an opportunity cost of farm or business investment.

The estimated result of the machine capacity of the processor was positive and significant at the 1% level. An increase in the machine capacity of the processor by one ton would lead to about N8.093 increase in credit demand. The result satisfies *a priori* expectation because a larger machine capacity unit would require a huge capital outlay to purchase and also a larger quantity of raw materials to meet the optimum capacity utilization rate. Since most of the small scale processors are resource-poor, hence the need for an exogenous stimulant like credit becomes important. In addition, there is a direct relationship between social capital (membership of a social group) and demand for credit by the Agra-based processors in the study area. For instance, an increase in social capital by one year would lead to a corresponding increase in credit demand by N1227.14. The finding suggests that the accumulation of social capital would lead to an increase in the amount of credit a processor may wish to demand. Social capital is also associated with networking and sharing of information and general wellbeing of a social group. Social capital can also build trust among members and could be a source of guarantor or collateral for loan acquisition. Therefore, the more the agro-based processor enjoys being a member of a social group, the more opportunity available to the processor to demand loan, following Ajagbe (2012).

The coefficient of labour cost was positive and significant at 1% level, indicating that credit demand will increase with an increase in the cost of labour. This implies that an increase in labour cost by one naira would marginally increase credit demand by N0.66. The plausible reason for the result could be because, the increase in labour costs will increase the overall production cost of the business, thereby compelling processors to search for extra funds to meet the business requirements, following the study of Akpan *et al.*, (2013). The coefficient of a processor's income from other sources was negative and significant at 1% level. The finding indicates that, as income from other sources increases, it will exert a negative effect on the demand for credit by the processors. In other words, an increase in the non-processing income by one naira would lead to a decrease in credit demand by N0.55. The increase in income from alternative sources implies that there is an increasing tendency of livelihood diversification among the agro-based processors. The seasonality effect of agro-processing is one factor that pushes processors to opt for alternative income sources, especially during the lean season. Besides, access to alternative sources of income will boost the processors' liquidity situation and decrease their possibilities of acquiring additional income in the form of credit.

The coefficient of distance to credit source was negative

and significant at 10% level. This implies that an increase in distance to credit source by one kilometer would decrease demand for credit by N5698.23. The distance is a physical barrier to credit access and demand due to the issues of insecurity and probably trust and poor information dissemination. The negative relationship between the interest rate charged on loans and the demand for a loan is in line with economic theory. For instance, a 1% increase in the interest rate charged by the lender would lead to about a N15.75 decrease in credit demand by the processors. A high-interest rate would discourage the processors from acquiring more loans. Some of the factors include; the risky nature of the agricultural production, seasonality of the raw materials and issue of low return on agricultural-based investment. Furthermore, the empirical result revealed that the amount of collateral tendered by the agro-based processors had a direct relationship with credit demand at 1% level of significance. This implies that an increase in the amount of collateral by one naira would increase credit demand marginally by N0.02. The result suggests that most of the credit demanded by the processors do not require stringent collateral and this could explain the size of the marginal effect reported. Though collateral gives the lender opportunity to recover part of the loan in case of default, most of the loans available to the processors are from the informal sources and builds on the mild collateral requirement, following the findings of Ajagbe (2012).

Conclusion

Results show that the majority of the agro-based processors have access to credit information and borrowed to finance their processing business, but the bulk of the loan came from the informal credit sources. The empirical results revealed that the agro-based processor's age, years of formal education, membership in social organization, access to ICT, working experience and household size are important factors that influence credit accessibility among the processors in the study area. Moreover, the processor's years of formal education, experience, household size, processing capacity, membership in social organization, labour cost, distance to credit sources, income from other sources and the amount charged as interest on loan and collateral were estimated as important determinants of credit demand. The results, therefore, call for policies aimed at strengthening social capital formation or social groups among the agro-based processors in the State. The adult education programme should be intensified in rural areas as a way to increase the literacy level of the agro-based processors for enhanced credit access and demand. The youths should be encouraged to engage in agro-based processing to decrease the cost of labour and ensure the sustainability of the business in the State. Extending internet coverage in rural areas would enhance credit access to the processors. Moderating the amount of interest rate charged on loans from the informal credit sources in the State would enhance credit demand among the agro-based processors.

References

- Adebayo, C. O. (2018). Demand for formal credit among small scale cassava farmers in Kogi State, Nigeria: A double hurdle analysis. *Agro Science*, 17(2):44-49.
doi: <https://dx.doi.org/10.4314/as.v17i2.6>.
- Adeyonu, A., Ajiboye, B., Isitor, S. and Faseyi, S. (2017). An Analysis of the Factors Influencing Access to Credit by Poultry Farmers in Abuja, Nigeria. *Agriculturae Conspectus Scientific Paper*, 82(1): 55-62.
- Ajagbe F. A. (2012). Analysis of Access to and Demand for Credit by Small Scale Entrepreneurs. Evidence from Oyo State, Nigeria. *Journal of Emerging Trends in Economics and Management Sciences*, 3(3):180–183.
- Akpan, S. B., Uwemedimo, E. O. and Ima-abasi, S. A. (2019). Poverty coping strategies of oil palm farmers in Akwa Ibom State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment*, 15(1):20–30.
- Akpan, S. B., Obot D. Akpan and Ubon A. Essien, (2012). Government Agricultural Credit Policy and Macroeconomic Fundamentals: a case study of Agricultural Credit Scheme Fund (ACGSF) in Nigeria. *Public Policy and Administration Research*, 2(2): 61-75.
- Akpan, S. B., Inimfon, V. P. and Amina, A. (2016). Level of Income Inequality and Determinants of Poverty Incidence among Youth Farmers in Akwa Ibom State, Nigeria. *Journal of Sustainable Development*, 9(5):162–174.
- Akpan, S. B., Inimfon V. P., Samuel J. U., Edem A. O., and Uwemedimo E. O. (2013). Determinants of Credit Access and Demand among Poultry Farmers in Akwa Ibom State, Nigeria. *American Journal of Experimental Agriculture*, 3(2): 293-307.
- Beck, T. and Demirguc-Kunt, A. (2005). Small and Medium-Size Enterprises: Access to Finance as Growth Constraints. *Journal of Banking and Finance*, 30(11):2931–2943.
- CBN (2020). Central Bank of Nigeria. Information retrieved from CBN website on the 29th of April, 2020. <https://www.cbn.gov.ng/devfin/acgsf.asp>.
- Essien, U. A. and Arene, C. J. (2014). An analysis of access to credit markets and the performance of small scale agro-based enterprises in the Niger Delta region of Nigeria. *International Journal of Food and Agricultural Economics*, 2(3):105-120.
- Essien, U. A., Ibekwe, U. C., Akpan, S. B. and Ben-Chendo, N. G. (2016). Determinants of Informal credit Delinquency among Food Crop Farmers in rural Niger Delta of Nigeria. *Review of Agricultural and Applied Economics*, 19(1):50-55. doi: 10.15414/raae/2016.19.01.50-55.
- Faisal B., John M. and Anthony, T. (2018). Factors Affecting Access to Formal Credit by Micro and Small Enterprises in Uganda. *Athens Journal of Business and Economics*, 4(4):405-424.
<https://doi.org/10.30958/ajbe.4-4-4>
doi=10.30958/ajbe.4-4-4.
- Fellows, P. (2011). Processing for prosperity.

- Diversification booklet number 5 Second edition. A publication of the Rural Infrastructure and Agro-Industries Division, Food and Agriculture Organization of the United Nations Rome.
- FAO (2013). Food and Agricultural Organization. Enabling environments for agribusiness and agro-industries development – Regional and country perspectives. Rome. Retrieved from [www.fao.org/docrep](http://www.fao.org/docrep/010/1044420/104442001.pdf) on the 10th of March, 2020.
- Greene, W. H. (2002). *Econometric Analysis*. 5th Edition, Prentice-Hall, Upper Saddle River New York, USA.
- Hassan, M. A. and Olaniran, S. O. (2011). Developing Small Business Entrepreneur through Assistance Institutions: The Role of Industrial Development Centre, Osogbo, Nigeria. *International Journal of Business and Management*, 6(2): 213–226.
- Heckman J.J. (1979). Sample Selection Bias as a Specification Error. *Econometrica*, 47: 153-161.
- Jeiyol, E. N., Sunday, B. A. and Terver, N. T., (2013). Gender Analysis of Access to Credit by Rural Small Scale Farmers in Benue State Nigeria. *American International Journal of Social Science*, 2(6):70 – 78.
- Marennya, P.M. and Barrett, C.B. (2007). Household-level determinants of adoption of improved natural resources management practices among smallholder farmers in Western Kenya. *Food Policy*, 32(4):515–36.
- National Population Commission (2006). Nigeria's Population. Retrieved from the NPC website on the 20th of April 2020. <http://www.population.gov.ng/>.
- Nkamleu, G. B. and Adesina, A.A. (2000). Determinants of chemical input use in peri-urban lowland systems: Bivariate probit analysis in Cameroon. *Agricultural Systems*, 63:111–121.
- Oduntan, K. O. (2014). The Role of Small and Medium Enterprises in Economic Development: The Nigerian Experience. International Conference on Arts, Economics and Management (ICAEM'14), March 22-23, Dubai (UAE). Pp.75-78. <http://dx.doi.org/10.15242/ICEHM.ED0314038>.
- Oni, E. O., and Daniya A. A. (2012). Development of Small and Medium Scale Enterprises: The role of Government and other Financial Institutions. *Arabian Journal of Business and Management Review*, 1(7): 16–29.
- Rolle, R. S. (2011). Role of food processing and post-harvest management in improving food and nutrition security in cities. Food for the Cities - Regional Workshop held in Bangkok with the theme: Ensuring Resilient Food Systems in Asian Cities from 17-18 November 2011. Page 1 – 17. <http://www.fao.org/fileadmin/templates/FCIT/workshops/Bangkok-2011/2-Rosa-Rolle-Rolefoodprocessingandpostharvestmanagement.pdf>.
- Sulemana, S., Ayambila, S. N. and Atinga, D. (2017). Factors Influencing Access to Credit among Micro and Small Agro-based Enterprises in the Tamale Metropolis, Ghana. *Journal of Economics, Management and Trade*, 20(3):1-15.
- Usman, M. F. and Kamba, M. K. (2019). Determinants of Access to Entrepreneurial Credit: Examining Women Entrepreneurs in Sokoto State, Nigeria. *European Journal of Business, and Management*, 11(8):95–100. DOI: 10.7176/EJBM.
- Wilkinson, J. and Rocha, R. (2008). The Agro-Processing Sector: Empirical Overview, Recent Trends and Development Impacts. Plenary paper presented at the Global Agro-industries Forum, sponsored by the FAO, UNIDO, IFAD and Indian Government in April 2008. Page 1 – 64.