

EFFECT OF CREDIT ON SMALL RUMINANT PRODUCTION IN DELTA STATE, NIGERIA: IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT

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Abstract: The study examined the effect of credit on sheep and goat production in Delta State, Nigeria. The specific objectives were the identification of the socio-economic characteristics of the farmers as they affect their access to credit, the sources and volume of credit available to these farmers, areas of sheep and goat development that accessed credit was applied and effect of credit on output and income. Data were obtained with the aid of pre-tested questionnaire administered to 360 sheep and goat farmers. The multi-stage sampling procedure was employed, involving both purposive and simple random sampling techniques. Data collected were analyzed using descriptive statistics such as frequency counts, percentages, mean scores, and the logit model. The findings were that sheep and goat production was dominated by males (58%) as against 42% females. Majority of the respondents fell within the age bracket of 51-60years and were all married, 76.1% of the respondents had one form of education or the other with mean family size of 6, mean farming experience of 19years and 20years for the credit beneficiaries and non-beneficiaries respectively. An annual mean income of ₦121,050.46 was recorded for credit beneficiaries as against ₦29,316.96 for non-beneficiaries of credit with mean annual difference of ₦91,733 which was significant at 5% level. Majority of the credit

beneficiaries (60%) invested the accessed funds on feeds, veterinary services, provision of modern pens for their stock as well as the purchase of better breeds of animals. The Logit analysis showed that gender (0.763) and education (0.538) had the probability of increasing access to credit, while the effects of credit on production for those that had access to credit were: increase in stock population, acquisition of more animals, improvement in infrastructures for their stocks as well as increase in income resulting from increased sales. Mobilization of sheep and goat farmers into economic groups is recommended to enhance access to technologies and credit for sustainable production and empowerment of farmers.

Keywords: *Credit, Effect, Small Ruminant, Production, Delta, Nigeria*

INTRODUCTION

The primary objective of government over the years in Nigeria as regards sustainable development has been to improve the living conditions of its citizens through appropriate policies. In Nigeria, the livestock sector provides employment for many families. The practice ranges from extensive to intensive animal husbandry, which includes poultry, piggery, sheep and goat and cattle. The sector suffers from several limiting factors

ranging from poor infrastructures, low productivity, inadequate capital, poor credit delivery, to low returns on investment. There is the general belief that all of these problems can be ameliorated if credit is made available to the farmers. According to [1], lack of adequate funding of the agricultural sector has led to low productivity, rural-urban migration and as such a threat to the food security programme of the Federal government. However government has adopted several agricultural policies and developmental programmes to address these problems. These include credit allocation and control, institutional credit incentives to farmers and the establishment of highly subsidized lending institutions to improve growth and development of the sector and affect standard of living of the people. Despite all these initiatives of government, livestock production is yet to meet the protein needs of the growing population. This study was therefore undertaken to examine the effect of available credit facilities from both institutional and non-institutional sources on small ruminant production which is also a major source of protein.

The importance of agricultural credit in agricultural production can never be over emphasized, particularly when agricultural production is linked with the availability of funds for all farm operations. This recognition has led government at all levels to establish one form of agricultural credit scheme or another to help address the challenges associated with credit delivery to all categories of farmers. Despite all these efforts by government to make credit available for farm operations, farmers are still in dire need of adequate capital. The poor performance of these schemes and its implications on farm operations has resulted in poor output in agricultural production.

According to [2], the uncoordinated and inconsistency in the Nigerian credit policies as it concerns agriculture has led to uneven distribution of credit to all the sectors of agriculture as well as the non-performance of the sector. In consideration of the importance of the livestock sub-sector and the problems it has gone through just like other sub-sectors of agriculture in acquiring credit for its operations it has become imperatives to find out how available credit if any has impacted on the production of sheep and goat. The study therefore identified the sources and volume of credit facilities available to sheep and goat farmers in the study area, identified areas where credit sourced by the farmers was applied, assessed the effect of credit obtained on their output and income and examined the effect of the socio-economic characteristics of the farmers on their access to credit facilities.

The issue of credit as it affects agriculture in general has been examined by many authors but little or nothing has been done to specifically focus attention on how those involved in sheep and goat production have coped regarding this issue. Most conclusions reached by the various literatures on credit were mainly aimed at addressing the issues of crop production, fishery, forestry and general livestock production, but concrete information on credit as it concerns sheep and goat production is lacking.

It is expected that this study will specifically address the issue of credit as it affects sheep and goat production and also give insight into the developmental problems associated with the sector and the findings reached will not only provoke further research, but also generate appropriate information for policies that are more result and people oriented. This would be of valuable benefit to policy makers, farmers and the lending institutions.

[3] noted that adequate capital must be provided to the sector to enhance rapid and continual use of growth inputs. It in this perspective and stressed that unless production credit is made available on suitable terms, the majority of small scale farmers that constitute over 90% of farmers will be seriously handicapped in adopting profitable techniques. Hence credit is a major factor in agricultural production and development and the lack of it is usually given as the explanation for many of the problems facing the sector in developing countries. [5] argued that if credit was made available on a continuous basis, the retarded growth and development currently being experienced by the sector will give way to modernization.

[6], on their part examining the provision of nutritive browses as supplement for goats considered availability of credit facilities as basis for development of the goat sub-sector of agriculture. [7] on the issue of the goat types of Ethiopia and Eritrea also reviewed credit as a basic consideration for their expansion, management as well as development.

The entire agricultural sector and indeed the livestock sub-sector depends on sustainable credit for possible expansion and development. [8], describe the development of the sector to be dependent on the amount of financial resources the government can make available to it. Supporting this view is [9]Ajakaiye (1998) where he attested to the important role of credit in small-ruminant development, he thus recommended that government at all levels should as a matter of policy mandate the commercial banks to adhere strictly to all the credit initiatives put in place by the government through the Central Bank of Nigeria (C.B.N) to ensure effective credit delivery to the livestock sub-sector and indeed the entire

agricultural sector as a way of guaranteeing economic development of the country

Table 1: Distribution of respondents in the sampled area

Senatorial District	Village/Town	Distributed Copies	Retrieved Copies
Delta North			
Oshimili	Okpanam	20	18
	Anwai	20	19
Ika South	Abavo	20	16
	Boji Boji Uwa	20	20
Ndokwa West	Kwale	20	17
	Iselegu/Osisa	20	20
Delta South			
Isoko South	Oleh	20	20
	Otor-Oweh	20	20
Warri North	Koko Town	20	15
	Ajagbodudu	20	15
Patani	Water side	20	18
	Patani town	20	15
Delta Central			
Ethiope west	Oghara	20	18
	Jesse	20	20
Ughelli North	Agbarho-Otor	20	20
	Agbarho	20	20
Uvwie	Effurun	20	20
	Osubi	20	17
Total	9	18	360

METHODOLOGY

Area and scope of study

The study covered nine local government areas in Delta State, Nigeria, and the rationale for the choice of these local government areas rested on the following: (i) Large population of sheep and goat as compared to other local government areas in the state (ii) Long history of rearing sheep and goat in the state.

Delta State was carved out from the defunct Bendel State and lies within longitude 50° and 60° East and latitudes 50° and 60° 30' North. It is bound in the north by Edo-State, Bayelsa State in the south-west, in the east and north-east by Anambra and Kogi States respectively, while to the south is the Atlantic Ocean, (Delta State Ministry of Information, [10]

The selected LGAs were, Isoko South, Warri North, Patani, Oshimili South, Ndokwa West, Ika South, Ethiope West, Ughelli North and Uvwie Local Government Areas.

Data Collection: Both primary and secondary data were used to elicit information for this study. The secondary data were obtained from the publications of the State Ministry of Agriculture and Natural Resources, journals, the internet, as well as the State Ministry of Information and Orientation. In the collection of the primary data copies of a well structured and pre-tested questionnaire were administered through personal interview.

SAMPLING PROCEDURE

The multi-stage sampling procedure was adopted in this study and three stages were involved. This first

stage involved the purposive selection of the nine local government areas. At the second stage, there was the random selection of two villages/towns in each of the selected local government areas while at the third stage 20 sheep and goat farmers in each of the villages/towns were randomly selected giving a sample size of 360, however only 330 copies of the questionnaire were retrieved and used for the analysis. The total sample is shown in Table 1.

Analytical techniques

Data collected for the study were analyzed using both descriptive and inferential statistics. The descriptive statistics involved the measures of central tendencies such as arithmetic means, percentages, and frequency counts. Under the descriptive approach, information on the sources and volume of credit by credit beneficiaries were summed up according to sources, and averages were computed for each group and were used for comparative analysis with non-beneficiaries. Descriptive statistics were also employed in investment areas where credit sourced by beneficiaries where possibly applied.

For the effect of credit on production for credit beneficiaries compared to those without credit use, the unequal sample t-test, [11] was employed and is stated as Eq (1).

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 1} \left[\frac{1}{n_1} + \frac{1}{n_2} \right]}} \dots\dots\dots (1)$$

Where:

- \bar{x}_1 = Sample mean of group 1(credit beneficiaries)
- \bar{x}_2 = Sample mean of group 2(non credit beneficiaries)
- n_1 = Sample size in group 1(credit beneficiaries)
- n_2 = Sample size in group 2(non-credit beneficiaries)
- S_1^2 = Sample variance of group 1 (credit beneficiaries) given as Eq (2)

$$S_1^2 = \frac{\sum_{i=1}^{n_1} x_1^2 - \frac{(\sum x_1)^2}{n_1}}{n_1 - 1} \dots\dots\dots(2)$$

S_2^2 = Sample variance of group 2 (non-credit beneficiaries) given as Eq. (3)

$$S_2^2 = \frac{\sum_{i=1}^{n_2} x_2^2 - \frac{(\sum x_2)^2}{n_2}}{n_2 - 1} \dots\dots\dots(3)$$

The t–statistic was then used to test the statistical significance of the effect of accessed credit by beneficiaries.

The logit model: The logit model which examined the conditional probability of a single qualitative variable, given a set of other variables (which may be qualitative or cardinal) was also adopted to verify the socio-economic characteristics of the farmers as they affect access to credit. The model was based on earlier publications by [12], [11], [12] and [13], [14], is given as Eq (4):

$$P(Y = 1/x) = \frac{\exp((\sum b_k X_k))}{[1 + \exp(\sum b_k X_k)]} \dots\dots\dots(4)$$

The decision by the credit granting institutions as regard granting or not granting credit to applicants yielded a qualitative response variable (socio-economic characteristics) hence its analysis by the logit model. The question in this model is the probability (P) that Y takes’ on the value 1 or 2 (that is decision to grant or not to grant credit by credit institutions depending on the observed variables (in this case, the socio-economic variable of the farmers) is Eq (5)

$$P = P(Y = 1/x_i) \dots\dots\dots x_k \dots\dots\dots(5)$$

The relationship between y and Xi is given by the unknown parameters (bk) which are to be estimated using the maximum likelihood estimation (MLE). The Logit likelihood is given as Eq (6)

$$L(y_i / (x_i, \beta)) = \ln \left(\frac{P_i}{1 - P_i} \right) = b_0 + b_1 X_{i1} + b_2 X_{i2} + \dots + b_k X_{ki} \tag{6}$$

Explicitly expressed in odds ratio form as Eq (7);

$$\text{Logit } (P_i) = \ln \left(\frac{P_i}{1 - P_i} \right) = b_0 + b_1 X_{i1} + b_2 X_{i2} + \dots + b_k X_{ki} \tag{7}$$

Where P = probability that a farmer with a particular socio-economic characteristics may get credit.

1-P_i = probability that a farmer with a particular socio-economic characteristic may not get credit.

b_i = parameters to be estimated by maximum likelihood (MLE) whether a farmer with a particular socio-economic characteristics may or may not be granted credit by credit institutions as Eq (8).

$$\left(\frac{P_i}{1 - P_i} \right) = \text{Odds ratio.} \tag{8}$$

X₁ X_k = Socio-economic characteristics of the farmers.

X₁ = age

X₂ = sex

X₃ = marital status

X₄ = educational level

X₅ = farming experience

X₆ = household size

The t – statistic was used to test the statistical differences.

RESULTS AND DISCUSSION

Socio-economic characteristics of sheep and goat farmers

The socio-economic characteristics of the farmers as presented in Table 2, showed that majority of the farmers were males (57.87%) as against 42.6% being female. The farmers were also found to be middle aged (51-60 years) with mean ages of 49 and 48 for beneficiaries and non beneficiaries of credit respectively. This findings also agrees with [15] that due to the massive rural - urban drift of our able - bodied men and women, the mean active farming age now falls between 45-60 because according to them this group of persons are either retired from other businesses or are tired of the life-styles the city does offer.

On marital status and family size, over 60% of the respondents were married with average family size of 6 persons. The findings equally agrees with [16] which states that family size between 5 – 10 is very meaningful particularly when they are involved in the agricultural activities of the family, they thus help to reduce labour cost for the family.

With respect to education, the results indicate that majority (70%) of the respondents had one form of

education or the other. Their high literacy level could have accounted for the over 50% loan applications recorded in the study. Education according [17] create positive attitude towards the adoption of modern farming innovations including accessing credit for expansion leading to more profit. On farming experience about 74% of the loan beneficiaries had up to 20 years experience. This shows that the sheep and goat business was well established in the study area.

CREDIT SOURCES AND VOLUME

Credit sources and volume as shown in Table 3 revealed that the major sources available for credit seekers were friends and relatives, co-operative societies, thrift/esusu, commercial banks, as well as money lenders. A total volume of ₦12,733,188 was sourced from the different sources of credit. Co-operative societies provided the highest amount of credit (₦9,534,976) as shown in the table followed by thrift/esusu (₦1,817,000) commercial money lenders (₦222,000). This result confirms the findings of [18] which identified co-operative societies as a major factor that has led to the growth and development of the livestock sector. This according to them is made possible due to the credit provision initiatives of the co-operative societies.

Table 2: Socio-economic characteristics of sheep and goat farmers in the study area.

Socio-economic variable	Credit Beneficiaries		Non credit Beneficiaries			Total			
	Freq	%	Mean	Freq	%	Mean	Freq)	%	Mean
Age									
30 and above	38	17.4		24		21.4	62	18	43.5
31-40 years	36	16.5		17		15.2	53	16.1	
41-50 years	43	19.7		22		19.6	65	19.7	
51-60 years	52	23.9		24		21.4	76	23.0	
61-70 years	27	12.4		12		10.7	39	11.8	
> 70	22	10.1	49	13		11.6	48	35	10.6
Sex									
Female	95	43.6		44		39.3	139	42.2	
Male	123	56.4		68		60.7	191	57.9	
Marital status									
Single	16	7.3		12		10.7	28	3.5	
Married	144	66.1		24		66.1	218	66.1	
Divorced/separated	34	15.6		19		17.0	53	16.1	
Widow/widowers	24	11.0		7		6.3	31	9.4	
Level of Education									
No formal education	56	25.7		23		20.5	79	23.9	
Primary	49	22.3		22		19.6	71	21.5	
Secondary	68	31.2		41		36.6	109	33.0	
Tertiary	45	20.6		26		23.2	71	21.5	
Farming experience									
10 and below	64	29.4		33		29.5	97	29.4	
11-20 years	83	38.1		39		34.8	122	37.0	
> 20	71	32.6		40		35.7	111	33.6	
Household size									
4 and below	106	48.6		48		42.9	154	46.7	
5-10	80	36.7		47		42.0	127	33.5	
> 10	32	14.7		17		15.2	49	14.8	

Table 3: Sources and volume of credit accessed by beneficiaries.

Credit sources	Freq	%	Volume (₦)	Mean (₦)	S. Deviation
Friends and relatives	21	12.72	1,158,000	38,600	25001.275
Co-operative societies	84	50.90	9,534,976	74,492	92089.908
Thrift/Esusu	45	27.27	1,817,000	40,377	25083.759
Commercial Banks	10	6.06	1,210,000	121,000	947.120
Money Lenders	5	3.03	222,000	44,400	146.625
Total	165	100	12,733,188	318,869	75355.36

Table 4: Utilization of acquired credit by respondents

Areas	Frequency	Percentage
Acquisition of more animals	82	37.61
Housing provision	103	47.24
Veterinary service provision	63	28.89
Use of concentrate feed	72	33.02
No traceable investment	36	16.51
Total	356*	163.27*

Table 5: Comparison of income of beneficiaries and non beneficiaries

Credit Status	Frequency (₦)	Annual Mean (₦)	Difference (₦)	t-value
Beneficiaries	165	121,050.46	91.733	15.15*
Non Beneficiaries	165	29,316.96		

Source: Field survey

*Significant at 5%

Table 6: Parameter estimates based on the logit model.

Variable	parameter estimate	std.error	t-values	Odd ratio
X ₁ age	0.016	0.011	1.455	1.0161
X ₂ gender	0.763*	0.252	3.028	2.1447*
X ₄ education	0.588*	0.221	2.661	1.8004*
X ₅ farming experience	0.027	0.016	1.688	1.0274
X ₆ household size	-0.024	0.026	-0.828	0.9763
constant	1.001	0.478	094	2.7210

Goodness of fit:

No of observation 330

chi-square (X²) = 36.12

Likelihood ratio 62.7

Source: Field survey

*Significant at 5%

UTILIZATION OF ACQUIRED CREDIT BY RESPONDENTS

Table 4 shows the different areas where acquired credit was applied by those who had access to credit. The investment by the beneficiaries were made in areas such as housing, acquisition of more and better breeds of animals, provision of veterinary services as well as provision of concentrate feeds. All these initiatives were geared towards modernizing the sector in attempt to bring about intensive production. All these efforts according to credit beneficiaries were relatively new and if sustained with regular credit, will bring about substantial improvement in the sector especially in the area of building modern pens for their animals which used to roam about.

EFFECT OF CREDIT ON OUTPUT AND INCOME

The effect of credit was observed in areas such as acquisition of more animals which led to increase in stock population, better infrastructure for stocks, improved veterinary services for stocks and increased income for those farmers who had access to credit.

For instance, for credit beneficiaries an annual mean income of ₦121,050.46 was recorded as against ₦29,316.96 for non-beneficiaries of credit with mean annual difference of ₦91,733 which was significant at 5% level. It was also found that for credit beneficiaries before the use of credit an annual mean income of ₦31,334.86 was recorded as against ₦66,550.46 after the use of credit. This gave an annual mean difference of ₦35,215, which was also significant at 5%. The general results thus indicated that credit had significant influence on the production of small-ruminants in all the sampled areas as shown in Table 5.

EFFECT OF RESPONDENTS' SOCIO-ECONOMIC CHARACTERISTICS ON THEIR ACCESS TO CREDIT

The results of the logit analysis presented in Table 6 showed two variables; gender and education having significant effect on farmers' ability to access credit, as shown by the high coefficient values of 0.763 and 0.538 for gender and education respectively which indicates that being a male and having some form of education may increase the probability of being granted credit for sheep and goat production.

The results agree with and [19] that education and gender have significant effect on farmers' access to credit facilities. They asserted that most lending institutions as well as the cultural settings in Nigeria favour the male gender when it comes to granting of credit. Education also indicated high probability of increasing respondents' access to credit. People with some form of education are preferred based on the simple fact that they are better equipped to manage

their resources efficiently and take advantage of new techniques of production.

IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT

Sheep and goat farmers were mostly within the age group of 51-60 years and farming experience of up to 20 years. This implies that efforts should be made to encourage younger farmers to go into sheep and goat rearing. Over 50% of them farmers had access to credit with up to 90% obtaining their credit from informal sources were low credits were accessed implying that farmers will continue to operate on small scale except they have access to higher volume of credit which formal sources could offer. Improved production and income were observed and respondents invested the accessed funds in developmental areas of sheep and goat production such as the provision of pens (houses) purchase of concentrate feeds, acquisition of better breeds of stocks and improved veterinary services. There was significant difference between output and incomes of beneficiaries and non-beneficiaries of credit which further strengthen the need for credit facility to the farmers. Gender and education were the main socio-economic factors that affected access to credit. More women and youths should take up sheep and goat farming. Economic interest groups could address access to credit from formal sources, encourage the vulnerable gender groups: females and youths which could sustainably increase sheep and goat production in the study area.

CONCLUSION

Findings from the study established the usefulness of credit in the production of sheep and goats. It can be concluded that credit has positive effect on stock size, infrastructural development, output and income of farmers and that the production of sheep and goat could gradually move from the present extensive (traditional system) to more intensive production system, if regular credit is made available

RECOMMENDATIONS

Based on the findings of the study the following recommendations were made:

- (1) Sheep and goat farmers should be encouraged to join co-operative societies or farmers' groups which should be encouraged, by way of occasional grants/credit, to support their members for possible expansion.
- (2) Government may formulate policies aimed at encouraging the formal sources of credit to compliment the efforts of the informal sources to improve their production.
- (3) Credit bodies may also be advised to be gender balanced in the choice of their beneficiaries rather

than being more favourably disposed to granting loans to males.

(4) Since education also had some influence in accessing credit, farmers should avail themselves of some form of educational opportunities to improve their access to credit.

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