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Efficiency Differentials and Access to Credit among Poultry Farmers in Ogbomoso Agricultural Zone

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ABSTRACT
Credit has become a prominent resource in agricultural production in Nigeria in an effort to redress resource poverty endemic among the farming populace. Formal and in formal credit resources have been inaugurated. This study was designed to examine the efficiency differentials and access to credit among poultry farmers in Ogbomoso Agricultural zone. Primary data were collected from randomly sample poultry farmers. Data were analyzed with frequency counts, percentage, stochastic frontier production function and Logit models. Results show that credit using poultry farmers are more technically efficient than non credit using counterparts. Age of the farmers (X_1) , family size (X_3), educational level (X_3), farming experience (X_4)and membership of poultry farmer associations (X_5) were statistically significant factors influencing technical efficiency. The ranges of technical efficiency were 0.745 to 1.000 with a mean of 0.912 for credit using poultry farmers and 0.730 to 0.999 with a mean of 0.878 for non credit using poultry farmers. It would take an average credit using poultry farmers 9 percent cost savings and an average non credit using poultry farmers 12 percent cost savings to become the best performing farmers in their respective groups. These indicate that there is room for the credit using poultry farmers and the non credit using poultry farmers to improve their technical efficiency.The study concluded by recommending that agricultural credit programmes should be refocused and pursued with more vigour. Such policies should be more youth friendly and targeted more at the experience farmers.
Key words:- Efficiency differentials, Access to credit, Poultry farmers, Agricultural zone

INTRODUCTION

In Nigeria, the production of food has increased at the rate that cannot meet the increasing population. While food production increases at the rate of 2.5%,food demand increases at the rate of more than 3.5%% due to high rate of population growth at the rate of 2.83% (CBN,2004) .The demand and supply gap for animal protein intake is so high. The food Agricultural Organization (FAO) recommends that the minimum intake of protein by an average person that should come from animal sources. Nigeria is presently unable to meet this requirement. The animal protein consumption in Nigeria is less than 8gm person per day which is a far cry from FAO minimum recommendation (Niang and Jubrin, 2001).However, as a result of the above, widespread hunger and malnutrition are evidence in the country.

Poultry meat and egg offer considerable potential for bridging the nutritional gap in view of the fact that high yielding exotic poultry are easily adaptable to our environment and the technology of production is relatively simple with returns on investment appreciably high. Poultry bird mature earlier than most breeds of livestock and can bring economic returns within relatively short period of about 10-12 weeks. These important roles played by poultry production makes imperative need for financial assistance for poultry farmers. The importance of agricultural credit cannot therefore be over emphasized. Credit means having use or a possession of goods and services without immediate payment and loan is money borrowed at an agreed interest rate for an agreed time (Mbah, 2001).

Credit means ability to command the capital in return for a promise to pay at some specified time in the future (David, 1990).Access to credit is very crucial to small scale farmers especially in less developed nations of the world. This is because it increases farmer production and improve their total productivity. Credit can be in form of money, cash, bank overdraft or in kinds as a form of input purchased and supplied to the farmers. Moreover, animal scientist, economist and policy makers are of the opinion that the development of livestock industry is the only option for bridging the generally low protein deficiency gap in a Nigerian's diets (Odiase-Alegimhen,2004). Poultry eggs and meat contribution of the livestock share of the Gross Domestic product (GDP) increased from 26% to 27% in 2004 (CBN,2004). This significant improvement in poultry production was been sustained by availability and use of improved vaccines which curtailed mortality rates in birds, reduction in the tariffs on imported day- old chicks and parent stock (CBN, 2004) and the relative ease of compounding efficient food using easily available local feed stuffs (Afolabi and Ojo, 2000).

Statement of the Problem

It has been observed that poultry farmers do not have access to formal sources of agricultural credit to boost poultry production. Government's goal of achieving self sufficiency in poultry production to a large extent will depend on the level of poultry farmers productivity which can be determined by their roles of adoption of

improve technologies by farmers as a result of resource poverty among other reason, efficiency improvement becomes an important and significant factor increasing productivity. The research is therefore designed to provide answers to the following questions

i What are the factors determining access to formal credit ?
ii Are the poultry farmers technically efficient?
iii What are the factors determining technical efficiency among poultry farmers? **Hypotheses of the Study**

i. Poultry farmers are not technically efficient.
ii. There is no significant difference in technical efficiency of poultry farmers who Used credit and non credit users.

METHODOLOGY

The Study Area

The study was carried out in Ogbomoso. It is a town in Oyo state. It has five local Government which includes: Ogo Oluwa Local Government, Surulere Local Government, Orire Local Government, Ogbomoso South Local Government and Ogbomoso North Local Government.

Ogbomoso lies within latitude 70^0N and Longitude 40^0E of the globe on the geographical map. It is located along the transitional forest zone of southern Nigeria and guinea savannah of middle –belt with a fairly high uniform temperature, moderate to heavy seasonal rainfall and high relative humidity characterizes the climate of the region. The main annual temperature is 26.2^0c . the lowest temperance that is experience in July – September. The major occupation of the people of Ogbomoso is farming. A considerable large percentage of the population take to farming not merely on a subsistence level, but as a fully time occupations like pottery, dyeing, mat making, tailoring, and trading.

The Population of the Study

The target population of the study was the poultry farmers in Ogbomoso Agricultural zone.

Sampling Procedure and Sampling Size

A random sampling technique was used to select poultry farmers. A list of poultry farmers was collected from their general meeting in which a total number of ninety poultry farmers was selected randomly from the list. The sampling covered all the five local government in Ogbomoso zone.

Data and Method of Data Collection

The study made use of primary data with the aid of a structure questionnaire and interview schedule was used to collect relevant information from the poultry farmers. Data on the socio – economic characteristics of poultry farmers, access to credit by poultry farmers, input-output data, factors determining technical efficiency of poultry farmers and constraint to poultry production

Method of Data Analysis

The analytical technique that is employed in data analysis includes:

i. Descriptive Statistic such as frequency scores , Mean and Standard deviation.
ii Logit Model: Use to analyzed determinants of access to credit by poultry farmers.
Iii Stochastic production frontier:- Use to analyzed technical efficiency of poultry farmers and their determinants.

Model Specification

The stochastic frontier production function model for estimating farm level technical efficiency is specified as.

$Yi = f(Xi, \beta) + E \quad i = 1,2 - - n$---------- (1)

Here Yi is output of egg in number of crates, xi denoted the actual input vector, β is vector of production function

Where,

$,X_{11}$ - Feed in kg
X_{22} - Day old Chick
X_{33} - Labour in man-day
X_{44} - Drugs and vaccine in liter
X_{55} – Capital in naira

and e is the error term that is composed of two element that is:

$E = Vi - Ui$ ----------(2)

The technical inefficiency effect Ui is defined as

Where,

$_{Z1}$- Age in years
Z_2 - Sex (male= 1, otherwise=0)

Z_3 - Educational level in years of formal education
Z_4 - year of experience
Z_5 - Membership of poultry Association(member=1, otherwise=0)

DETERMINANTS OF ACCESS TO CREDIT

Logistic regression analysis was used to asses the factors determining access to credit. This logit regression model was as stated below.

$$Y = X_i\beta + E$$

$$Y = (0 \text{ If } y_1^{\alpha} > 0 \text{ other wise})$$

$$P\ (y=1) = \lambda\ (x : \beta)$$

$$= \exp\ (Xi\beta)$$

$$1 + \text{Exp}\ (Xi\beta)$$

The independent variables specified as determinants of access to credit are defined below.

X_1 = Age in years
X_2 = Sex (1if male, 0 others)
X_3 = Household size
X_4= Year of schooling
X_5 = Farming Experience in years
X_6 = Main occupation (1 if farming ,0 others)
X_7 = Member of Poultry Associations (1 if members, 0 others)

RESULT AND DISCUSSIONS

(1) Determinants of Access to Credit

Generally, log likelihood function value of 35.64 and chi-square value of 48.05 which was significant and positive at 1% showing the goodness of fit of the model. In table 2 below, only four variables out of seven included variables were significant and positive. Coefficient of years of formal education(X_2) is significant and positive, this implies that educated poultry farmers are more likely to have access to credit than an uneducated poultry farmers. Experience in poultry farming (X_5) is positive and significant showing that as years of experience increases, the likelihood of poultry farmers having access to credit also increases. This implies that experience poultry farmers are more likely to have access to credit than inexperience poultry farmers. Coefficient of Major occupation (X_6) is positive and significant showing that farmers who took poultry production as full time business are likely to have access to credit than part time poultry farmers. This implies that poultry farmers who were fully engaged in poultry production are likely to have access to credit than part time poultry farmers. Membership of association (X_7) is positive significant showing that poultry farmers who belong to one or more poultry farmers associations or cooperatives are more likely to have access to credit facilities than those who did not belong to any poultry farmers association or cooperative.

Table 1: Determinant of access to credit

Variable	Coefficient	t-value	P. value
Constant (X_0)	4.271	-2.483	.0130
Age (X_1)	-.100	-.333	.7390
Sex (X_2)	369	.097	.9228
Family Size (X_3)	-.264	-.635	.5254
Year of schooling (X_4)	.1771	2.428	.0152**
Experience (X_5)	.299	3.323	.0009***
Major occupation (X_6)	1.855	2.966	.0030***
Membership of poultry association (X_7)	1.105	2.584	.0098***
Log likelihood function	-	35.64	-
Restricted likelihood	-	-59.67	-
Chi- Square	-	- 48.05***	-

Source;- Field survey 2012

(2) Stochastic Frontier Production Function

The estimated stochastic frontier production functions by the Maximum Likelihood Estimation (MLE) and the associated Ordinary Least Squares (OLS) for the credit using and non credit using poultry farmers were summarized and presented in table2 below. Generally, Sigma Square, Gamma and Log likelihood for both credit and non credit users were significant showing the goodness fit of the model's. In each case, the Maximum Likelihood Estimates proved better than the ordinary least squares estimates base on the numbers of significant

variables.

For the credit using poultry farmers, the constant term is positive and statistically significant at 5%. Coefficient of quantity of feed (X_{11}) and hired labour (X_{33}) were positive and statistically significant at 10% and 1% respectively, this shows that the two inputs have positive impact on egg output. It implies that 0.251 and 0.048 unit increase in feed and labour input respectively will lead to a unit increase in output in egg production.

For non credit using poultry farmers, the constant term is negative and statistically significant at 1% and the coefficient of feed (X_{11}) and day old chick (X_{22}) were positive and statistically significant at 5% and 1% level of significance respectively. This shows that 0.006 and 1.082 unit increase in feed and day old chicks input will lead to a unit increase in output in poultry production.

Table 2: Estimated stochastic frontier production functions for the credit using and non credit using poultry farmers.

	CREDIT USERS		NON CREDIT USERS	
Variables	**MLE**	**OLS**	**MLE**	**OLS**
Constant (X_{00})	2.200	2.247	-0.335	-2.304
	(2.221)**	(2.143)**	(-2.730)**	(-0.784)
Feed (X_{11})	0.251	0.202	0.006	-0.065
	(1.708)* (1.563)		(2.096)**	(-0.140)
Day old chick (X_{22})	0.180	0.024	1.082	0.967
	(0.670)	(0.094)	(9.132)***	(1.070)
Labour (X_{33})	0.048	1.506	-0.005	-0.104
	(3.204)***	(1.815)*	(-0.364)	(-0.617)
Drug (X_{44})	-0.205	-0.170	0.058	0.382
	(-1.063)	(-1.013)	(1.175)	(0.847)
Capital (X_{55})	-0.015	-0.029	-0.021	0.231
	(-0.51)	(-0.154)	(-0.376)	(0.196)
Sigma square	0.095		0.770	
	(3.104)***		(7.676)***	
Gamma	0.000		1.000	
(3.075546.4)***				
Log likelihood value	-6.833***		16.991***	

Source: field survey, 2012

***, **and* imply statistically significant at 1, 5 and 10 percent, respectably.

(3) Inefficiency model

For credit using poultry farmers, the estimated coefficient for age is statistically significant and maintained the right a priori negative relationship with technical efficiency for credit users at 5% and education is statistically significant and positively related to technical efficiency at 1%. This is according to a priori expectations and agrees with the results from Coelli (2002). The more educated the farmers are, the less technically inefficient they become or the more technically efficient they will be.

For non credit users, age is negative and statistically significant at 5%. That is, the older a farmer becomes, the more his efficiency drops. This is similar to the findings by Ojo and Ajibefun (2000), Okike et al. (2001) and Onu et al.. (2000). It has been observed that the innovativeness of a farmer, his mental capacity to cope with the daily challenges and demands of farm production activities and his ability to do manual work, all of which bear directly on his production efficiency tend to decrease the older he becomes. Sex is also statistically significant and negatively related to the technical efficiency at 1%. Farming experience as a variable in the efficiency model is statistically significant and positive at 1%. This conforms to a priori expectations. Ojo and Ajibefun (2000) reported a significant negative relationship between practical training and technical inefficiency. However, this result disagrees with those from Onu et al. (2000) who explained that experience correlates with age, which would always associate with reduced energy and optimism necessary in farming. The coefficient of poultry farmers association is statistically significant and negatively signed according to a priori expectations. Membership of farmer associations is expected to increase the farmers interactions with his fellow farmers and other entrepreneurs in his locality. It is hoped that such interaction would help them to receive and synthesize new information on economic activities in his locality and even beyond.

Table3 : Estimated determinants of technical efficiency for the credit using and non credit using poultry farmers.

Variables	Credit Users	Non Credit Users
Constant (X_0)	0.102	2.196
	(0.144)	(2.124)**
Age (Z_1)	-0.133	0.103
	(-2.030)**	(-2.323)**
Sex (Z_2)	- 0.153	2.662
	(-0.973)	(-3.973)***
Educational Level (Z_3)	0.003	0.123
	(2.153)**	(-1.380)
Years of experience (Z_4)	0.012	0.463
	(0.609)	(4.910)***
Membership of	0.084	-1.726
poultry association (Z_5)	(0.541)	(-3.190)**

Source : Field Survey, 2012.
***,** and *imply statistically significant at 1, 5 and 10 percent, respectively.

(4) Technical Efficiency Estimates Of Credit Using And Non Credit Using Poultry Farmers

The technical efficiency estimates of the poultry farmers were derived, summarized and presented in table 4 below. The range of technical efficiencies vary widely, being 0.7 45 to 1.000 with mean of 0.912 for the credit using poultry farmers and 0.730 to 0.999 with a mean of 0.878 for the non credit using poultry farmers. A t - test of difference between means shows that the mean technical efficiency of the credit using poultry farmers is significantly higher than those of non credit using poultry farmers. This implies that the credit using poultry farmers are more technically efficiency than the non credit using poultry farmers.

This result is consistent with those from Onyenweaku and Nwaru (2005) in Eastern Nigeria, and differs with that from Okike (2001) in Northern Nigeria. These indicate that the credit using poultry farmers are more efficient than the non credit using poultry farmers. The more credit the farmer uses, the more efficient he becomes in poultry production. This result is consistent with a priori expectation. However, Okike (2001) reported a contrary result that receiving credit contributed to farmers economic inefficiency. They explained that this could be the result of disbursement of credit in cash rather than in kind and loan misapplication endangered by resource poverty.

The foregoing analyses imply that it will take an average credit using poultry farmers and non credit using poultry farmers 8.8 percent cost savings and 12.2 percent cost savings respectively to become the most efficient poultry farmers.

Table 4: Distribution of the poultry farmers according to their technical efficiency estimates.

	Credit Users		Non Credit Users	
	Frequency	Percentage	Frequency	Percentage
0.71-0.80	4	9.09	3	7.02
0.81-0.90	12	36.36	14	24.56
0.91-1.00	18	54.54	39	68.42
Total	34	100	56	100
Minimum value	0.745		0.730	
Maximum Value	0.745		0.999	
Mean value	0.912		0.878	

(5) Problems Faced in Poultry Production

Table 5 Shows that 26. 5% of credit users faced infestation of disease in poultry production, 58.8% of them faced marketing problem and 55.9% of them faced environmental problem in poultry production. While 57. 2% of non credit users faced infestation of disease, 39.3% of them faced marketing problem, 21.4% of them faced environmental problem and 10.7% of them faced poor performance in poultry production.

Table5: Distribution of Respondents based on the problems faced.

	Credit Users		Non Credit Users	
	Frequency	Percentage	Frequency	Percentage
Infestation of disease	9	26.5	32	57.2
Marketing problem	20	58.8	22	39.3
Environment Problem	19	55.9	12	21.3
Poor Performance	-	-	6	10.7

***Multiple Response**

Source: Field Survey, 2012.

(6) Ways Out Of The Problems Stated.

Table 6 shows that 73.5% of credit users suggest proper management as one of the ways out of problems facing poultry production while 64.7% of them suggest adequate vaccination as one of the ways out. While 57.1% of non credit users credit users suggest proper management as one of the ways out of the problems facing poultry production while 32.1% of them suggest adequate vaccination as one of the ways out.

Table 6: Distribution of respondents based on the ways out of the problems stated.

	Credit Users		Non Credit Users	
	Frequency	Percentage	Frequency	Percentage
Proper management	25	73.5	32	57.1
Adequate vaccination	22	64.7	18	32.1

***Multiple Response**
Field survey:-2012

Conclusion

The research work had shown that credit using poultry farmers are more efficient than non credit using poultry farmers. The more credit the farmer uses, the more efficient he becomes in poultry production. This study also revealed that the socio-economic characteristics of the poultry farmers have great impact on the technical efficiency and access to credit of the poultry farmers. So it could be concluded that the farmers depended on credit to increase their agricultural productivity and to generate more income from farm production. The major problem facing poultry farmers are infestation of diseases and marketing problem.

The study concluded by recommending that agricultural credit programmes should be refocused and pursued with more vigour. Such policies should be more youth friendly and targeted more on the experience farmers.

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