



## IMPACT OF CREDIT ON POULTRY PRODUCTIVITY IN SOUTH-WESTERN NIGERIA

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### ABSTRACT

Livestock is important for increased productivity in Nigerian agriculture. It provides food, fuel, fertilizer and draught to sustain the rural economy. Among livestock-based vocations, poultry occupies a pivotal position because of its enormous potential to bring about rapid economic growth. The neglect of the livestock sector led to the decline in poultry production over the years. There is therefore low productivity in the sub sector. The focus of this study is to assess the impact of credit on poultry productivity. The study was carried out in Ogun, Osun and Oyo states of southwestern Nigeria. Data collection was by personal administration of questionnaires designed to obtain information on poultry farmers' characteristics, flock size, production characteristics and economic aspect of production. Data were collected from three hundred poultry farms but data from two hundred and eighty respondents were used for the purpose of analysis. In the selection of the data used for analysis, emphasis was placed on the use of farms that kept fairly good and accurate records of their operations. These farmers were selected through multi stage sampling technique. Descriptive statistics, Logit and multiple regression models were used for the analysis of the data. Results of the analysis showed that the mean age of the poultry farmers was 46 years while 60% had up to secondary school education. Average period of poultry experience was 8 years while the average farm household size was 7 members. About 55% of these farmers sourced their funds from personal savings while 20% used loans from co-operative societies. The sigma square ( $\sigma^2$ ) value of 33.141 indicated a good fit for the model and a normal distribution of the error term. Many small scale poultry farmers complained of limited access to funds which is often linked with their low level of farm income and insufficient collateral securities. Level of education, years of experience in poultry keeping and number of poultry birds were positively significant variables. It was realized that credit acquisition by the farmers had a significant impact on the productivity of poultry. Furthermore, household size, feeds, source and amount of credit had a significant direct relationship with poultry productivity.

**Keywords:** poultry productivity, credit, livestock, logit, south-western Nigeria.

### INTRODUCTION

Agriculture in Nigeria has remained the largest sector contributing nearly 39% to the Gross Domestic Product for the past two decades and employing nearly 60% of its workforce. Over 80% of the country's population living in the rural areas is directly or indirectly dependent on agriculture for its livelihood (NBS, 2005). The Nigerian's livestock resources consist of 13,885,813 Cattle; 34,453,724 Goat; 22,092,602 Sheep; 3,406,381 Pigs; 104,247,960 poultry (RIM, 1992). From these figures, poultry is about 58.72 percent of the total livestock production, which indicates the place of poultry sub sectors in the livestock industry. Poultry meat and eggs play a very useful role in bridging the protein gap in Nigeria. They are palatable and generally acceptable. This acceptability cuts across nearly all cultural religion boundaries in Nigeria. The poultry industry plays important roles in the development of Nigerian economy. It is a major source of eggs and meat which have a high nutritional value particularly in the supply of protein. Eggs are also important in the preparation of confectionary and vaccines. The poultry industry also provides employment opportunities for the populace, thereby serving as a source of income to the people. However, the poultry industry in Nigeria, as well as other developing countries of Africa, is continually characterized by low production levels (Okoli, 1991). The importance of poultry to the national economy

cannot be overemphasized, as it has become popular industry for the small holders that have great contribution to the economy of the country. The profession has assumed greater importance in improving the employment opportunity and animal food production in Nigeria.

Given its strategic importance to national economy and the development of the rural areas, almost all governments (past and present administrations of Federal, State and Local) gave high priority to improving agricultural productivity and hence farmer's income. Government policies however, promoted crop over livestock production. This has led to a decline in livestock production over the years in the country. This is largely associated with lack or limited finance (credit facilities) for the procurement of basic poultry equipment and materials. Feed ingredients are also expensive. This makes it difficult for the farmers to produce and supply sufficient and good quality feeds to the poultry birds (Akanni, 2007). The business of rearing livestock especially poultry is cost-sensitive. Feed cost, for instance, account for between 65% and 70% of the total cost of raising poultry. Feed, the major factor militating against the poultry industry, hampers production, not only on the basis of high cost but also due to low quality feeds supplied by the feed millers which has a negative impact on the productivity - low level of egg production as well as rendering the birds susceptible to diseases, hence, the need for quality feeds



by each poultry farm - firm (Bamiro, *et al.*, 2001). This and other cost of poultry production has increased the price of eggs and other poultry products beyond the reach of most Nigerians. The economic implication on the part of the producer is that any producer who can lower his costs by a few Naira per crate of eggs will gain a large share of the market. These important roles played by poultry production makes imperative the need for financial assistance for livestock farmers. The importance of agricultural credit cannot therefore be overemphasized.

Apart from owned sources, major sources of credit existing for Nigeria farmers are: Informal Sources, Formal Sources. The non-formal credit sources include lending and gifts from relative, merchants, friends, and local moneylenders. In line with above examples of informal credit, loan sources, informal sources are usually non-governmental. The formal institution sources of farm credit in Nigeria include; Agricultural Credit Guarantee Scheme (ACGS), the Nigeria Agricultural and Cooperative Bank (NACB), the Commercial and Merchant bank, the Cooperative institution and the agricultural development programme which give credit more in kind rather than in cash. The formal sources are those established by law and which can be influenced by government policies. Oboth (2003) observed that about 88.9 percent of the poultry farms were funded to the tune of N2.5 million per annum while the average annual funding rate was N1.701 million. This thus indicated the poor funding status of the small scale poultry farms in South Western Nigeria. It was also reported that only 4.21% of the poultry farms had between N3.1 - N3.5 million funding rate per year. As the majority of these farms operated below fund secure level, there were limited credit facilities to procure necessary items such as high quality and abundant feeds, drugs and vaccines, cages and feeding troughs, hybrid chicks and so on. Funds were also required for settling workers' salaries, constructing feed mills and rendering various marketing services. The low level of credit supply to the poultry farms therefore limits productivity and expansion in the sub-sector. To enhance performance in the small scale commercial poultry farms, therefore, adequate and timely release of funds that will see the farms beyond the fund insecure zone is essential. This could be made possible through joint efforts of the private investors, government agencies and co-operative societies. It has been argued that if only sufficient agricultural finance was made available, the decline in the production and supply of poultry products in Nigeria, would improve (Oludimu and Fabiyi, 1983). An increase in the level of finance of the poultry industry, better management practices, leading to good nutritional egg and meat production, are required to supply the essential protein for the population (Oboth, 2003). Again, poultry production is considered a high risk investment by most financial institutions due to high rate of poultry mortality, low productivity in many cases and low levels of loan repayments. This situation has led to skepticism on the part of financiers when considering financial requests for poultry production. At present a large proportion of the

operators in small scale poultry industry in South Western Nigeria are in poverty due to poor financial standing and high business risk which reduces the level of accruable profit (Oludimu, Awojobi and Akanni, 2004).

Credit supply to farmers is widely perceived as an effective strategy for enhancing the increase in agricultural productivity (Phillip *et al.*, 2008). Agricultural credit is considered essential to the process of improving agriculture and transformation of the rural economy. According to Mahmood *et al.*, (2009), the introduction of easy and cheap credit is the quickest way for boosting agricultural production. The argument is that the agricultural sector depends more on credit than any other sector of the economy because of the seasonal variations in the farmers' returns and credit requirement in the transformation of subsistence to commercial farming. Credit provides the opportunity for them to earn more money and improve on their standard of living (Mahmood, *et al.*, 2009). There is thus a growing concern for lack of credit to the poultry farmers even though there are credit policies on the ground. For instance, in the year 2000, a total of N5 million was provided by the federal government through the Nigerian Agricultural Cooperative and Rural Development Bank as an investment revolving fund in each local government area in the country, (FRN, 2000). The importance of the availability of agricultural credit is evident by the fact that the mean input expenditures per hectare were found to be significantly higher for farmers with credit irrespective of their wealth status. Higher input expenditures were linked with higher productivity growth (Saeed *et al.*, 1996).

The major objective of this study is to determine the impact of credit use on poultry productivity in the study area. Secondly, effect of the farmer's socioeconomic characteristics and institutional factors on poultry productivity was examined. This will help to guide the policy makers in the improvement of the credit policy in the agricultural sector.

## MATERIALS AND METHODS

The poultry business is very popular among the residents of the area as there is a ready market for the poultry products. Primary data which were collected with the aid of sets of structured questionnaires were sourced from small scale commercial poultry farms scattered over three randomly selected states. These are Oyo, Ogun, Ondo and Osun states. The respondents were the operators of commercial (small-scale) poultry farms having less than 3000 birds per farm. The sets of questionnaire were administered to the operators of poultry farms between February and October, 2009.

A multi-stage sampling technique was used in obtaining the data from the field. Purposive sampling technique was used to select four local government areas where there are prevalent poultry farmers in each state. A total of five villages were randomly selected from each local government making a sum of eighty villages. In each of the village, a proportional number of farmers were randomly selected from a list of livestock farmers



developed with the help of the village head. Therefore, a total of three hundred and twenty (320) farmers were sampled for the study but data from two hundred and eighty respondents (280) were used for the purpose of the analysis, since emphasis was placed on those farms that kept fairly good and accurate records of their operations. The farmers were divided into two groups: farmers that took loans (whether from formal or informal sources) for poultry production and the farmers that did not. Information was sought on the socioeconomic characteristics of the poultry farmers such as age, farm size, feeds, gender, veterinary services, educational background, output, experience and household size of the farmer among others, their sources and level of access to credit etc. Description of explanatory variables used in modeling the factors influencing the poultry productivity is shown in Table-1. The descriptive statistical method was used to explain the socio-economic characteristics of the poultry farmers. This involved the use of frequency Tables and percentages. The logit regression model was used to determine the impact of credit on poultry productivity while multiple regression was used to determine the effect of the farmer's socioeconomic and institutional factors on the poultry productivity.

**THE MODEL SPECIFICATION**

**Logit regression**

The study used quasi-experiments to assess the impact of credit on livestock productivity. The quasi-experiment involved selection of respondents who willingly sort for credit and compared them with those who did not obtain any form of loan for livestock production who have similar observable biophysical and socio-economic characteristics. Since the dependent variable, credit or no credit is of an ordinal nature, an ordinal logit model, a variant of the ordered probit (Zavoina and McElvey, 1975), was used for the analysis of the dichotomous credit use. For the ordinal logit model we let,

$$Y_i^* = \beta' x_i + \varepsilon_i \text{-----} (1)$$

**Simple linear form:**

$$PP = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \mu_1 \text{-----} (4)$$

**Semi-logarithmic form:**

$$PP = \text{Log} \beta_0 + \beta_1 \text{Log} X_1 + \beta_2 \text{Log} X_2 + \beta_3 \text{Log} X_3 + \beta_4 \text{Log} X_4 + \beta_5 \text{Log} X_5 + \beta_6 \text{Log} X_6 + \beta_7 \text{Log} X_7 + \beta_8 \text{Log} X_8 + \beta_9 \text{Log} X_9 + \beta_{10} \text{Log} X_{10} + \mu_1 \text{-----} (5)$$

**Double-logarithmic form:**

$$\text{Log} PP = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \mu_1 \text{-----} (6)$$

**Exponential form:**

$$\text{Log} PP = \text{Log} \beta_0 + \beta_1 \text{Log} X_1 + \beta_2 \text{Log} X_2 + \beta_3 \text{Log} X_3 + \beta_4 \text{Log} X_4 + \beta_5 \text{Log} X_5 + \beta_6 \text{Log} X_6 + \beta_7 \text{Log} X_7 + \beta_8 \text{Log} X_8 + \beta_9 \text{Log} X_9 + \beta_{10} \text{Log} X_{10} + \mu_1 \text{-----} (7)$$

Where  $Y_i^*$  is the underlying latent variable that indexes the credit access that a poultry farmer experiences,  $x_i$  is a vector of explanatory variables,  $\beta$  is a column vector of parameters to be estimated, and  $\beta_i$  is the stochastic error term. The latent variable exhibits itself in ordinal categories, which could be coded as 1, 2, 3 .....J. The probability for each of the observed ordinal response, which in our case had only two categories (1, 2) for credit access; no credit access will be given as;

$$P(Y=1) = P(Y^* \leq 1) = P(\beta' x + \varepsilon \leq 1) = F(-\beta' x)$$

$$P(Y=2) = F(\delta_2 - \beta' x) - F(-\beta' x) \text{-----} (2)$$

Where F is the cumulative distribution function (CDF) for the stochastic error term  $\varepsilon$ .

The assumptions about the functional form of F will determine whether a logit (logistic CDF), probit (standard normal CDF) or other model is used. Following Occam's razor, we use the logistic specification in this study. Although we expect the predicted probabilities to be similar to those of a probit model within the broad range of the data except at the tails (see Maddala, 1983; Aldrich and Nelson, 1984).

**Multiple regression analysis**

The multiple regression model was also applied to determine the effect of the farmer's socioeconomic characteristics and institutional factors on the livestock productivity. For those farmers that had access to loan, the difference in the average net income of the farmers from the livestock sources before and after credit use was used as a proxy for poultry productivity:

$$PP = \pi_a - \pi_b \text{-----} (3)$$

Where

a and b represent after and before, respectively.

It therefore implies that the effect of the credit variable on productivity is already captured by the poultry productivity proxy in equation (3).

Four functional forms of the specified model were tried: Simple linear, semi-logarithmic, double-logarithmic, and exponential.



The lead equation was chosen on the basis of correct sign of the explanatory variables, the significance of the regression coefficient and the value of the coefficient of multiple determinations.

Where

PP = Poultry productivity

$\beta$  = is the vector of parameters to be estimated

$X$ 's = is the matrix of the explanatory variables (Table-1).

**Table-1.** Description of explanatory variables used in modeling the factors influencing poultry productivity.

Variable name	Description
Productivity (PP)	The monetary value of the increment in poultry size and their by-products.
Age ( $X_1$ )	The age of the farmer measured in years.
Gender ( $X_2$ )	The value is 1 if female and 2 if male.
Household size ( $X_3$ )	The number of household members
Education level ( $X_4$ )	Number of years spent by the farmer in a formal institution.
Experience ( $X_5$ )	This is the number of years a farmer has been in poultry production.
Extension ( $X_6$ )	Extension visit to disseminate production technology.
Feeds ( $X_7$ )	This is the monetary value of feeds the poultry were fed with.
Veterinary services ( $X_8$ )	This is the monetary value of services rendered to the birds by an animal health official.
Source of credit ( $X_9$ )	The value is 1 if friends and relatives, 2 if money lenders, 3 if Banks, 4 if cooperatives and 5 if personal.
Amount borrowed ( $X_{10}$ )	This is the monetary value of credit.

## RESULTS AND DISCUSSIONS

Results of the analysis indicated that 92% of the farmers were below 60 years of age (Table-2) while the average age was 46 years. This implies that these farmers were within the active working age bracket. Again 30 % of these farmers were 40 years old and below. These are particularly young people who could afford to venture into the poultry business which is known to be characterized by risks such as disease, fire outbreak and theft. About 68.0 percent of the poultry farm operators had up to 10-year poultry keeping experience while the average period of poultry keeping experience was 8 years. Expectedly, the more the numbers of years of experience in poultry keeping, the better the ability to manage the poultry business well. Cases of disease attack, fire outbreaks, poor feed quality and pilferage should be better handled by experienced poultry farmers. With better handling of production resources in poultry, there should be a higher level of production in the industry. This will ultimately translate to increased income level for the poultry farmers.

About 15.0 percent of the poultry farmers had no formal education while 60 percent had up to secondary school education (Table-2). On the whole, poultry farmers need to have good education on poultry keeping so that they are able to properly harness all available resources to the advantage of production process. With this, the level of production per poultry farm will increase. Knowledge about the latest research efforts in the areas of genetic engineering and health management, particularly as they

affect the prevention of communicable diseases such as avian influenza is necessary for effective performance and increased productivity of the poultry industry.

Eighty-nine (89) percent of the poultry farmers had up to 9 household members. The average household member was however 7. This implies that the poultry farm operators in South Western Nigeria generally had a large family size. The family might be exploited as cheap sources of labour for the poultry farms. However, large family sizes might be a drain for business profit, as household expenditure, particularly on consumption, is high. This basically explains why most small scale farms close down when they could no longer provide the required funds for their smooth operation. Fifty-five (55) percent of the small scale poultry farm operators sourced their finance internally from personal savings while 20% sourced funds from loans obtained from co-operative societies (Table-2). Lack or limited collateral securities, however, made it difficult to obtain bank loans as only 10.71 percent could secure bank loans. Some poultry farmers, sourced finance from a combination of personal savings, bank loans and co-operative societies' loans. Internal sourcing of finance from owners' equity (personal saving) is constrained, as most of the poultry farm operators had a weak financial base. Additional sources of funds are therefore required for the poultry operators to sustainably solidify their financial base with assured increased output level.

**Table-2.** Socio-economics characteristics of respondents.

Characteristics	Frequency	Percentage (%)
<b>Age of poultry farmer (years)</b>		
20 - 30	45	6.7
31 - 40	67	22.7
41 - 50	116	37.2
51 - 60	37	25.0
> 60	15	8.3
Mean age = 46		
<b>Source of credit</b>		
Personal savings	154	55.0
Cooperatives	56	20.0
Banks	30	10.7
Friends and relatives	28	10.0
Money lenders	12	4.29
<b>Household size</b>		
1 - 4	64	22.85
5 - 9	187	66.79
10 - 14	19	6.78
≥ 15	10	3.57
<b>Marital status</b>		
Married	241	78.3
Single	39	6.11
<b>Educational status (years)</b>		
No formal education	42	15.00
1 - 6	60	21.42
7 - 9	168	60.00
10 - 12	6	2.14
≥ 13	4	1.44
Mean = 7		
<b>Experience (years)</b>		
1 - 5	27	9.64
6 - 10	163	58.21
11 - 15	71	25.36
≥ 15	19	6.79

**Source:** Field survey 2009. N = 280

#### **Determinants of credit use on poultry productivity**

The Logit regression model was used to identify the effect credit use by the poultry farm operators. It measured the parameters of the conditional probability of having access to the required level of funds and the marginal changes in explanatory variables on the finance

status of the poultry units. Respondents were classified into with loan and without loan. The regression parameters and diagnostic statistics were estimated using the maximum likelihood estimation (MLE) technique (Table-3). Results showed that seven out of the ten included regressors had significant influence on the poultry



productivity. The sigma square ( $\sigma^2$ ) value was 33.141, with a p-value of less than 0.01 and log likelihood function of -47.384. Hence, sigma square was statistically significant, thus indicating that the model displays a good

fit. The model also met the parallelism assumption that requires that parameters in the subsequent equations are the same. The link test also revealed that the model was correctly specified.

**Table-3.** Logit model explaining the determinants of credit on poultry productivity.

Variables	Marginal probability coefficients	Standard error
Age ( $X_1$ )	0.088	0.778
Gender ( $X_2$ )	7.021*	0.023
Household size ( $X_3$ )	7.264***	0.004
Educational level ( $X_4$ )	4.953**	0.028
Experience ( $X_5$ )	1.084	0.217
Extension visit ( $X_6$ )	3.447	0.063
Feed ( $X_7$ )	6.342***	0.016
Veterinary service ( $X_8$ )	4.462**	0.35
Sources of credit ( $X_9$ )	5.249**	0.064
Amount borrowed ( $X_{10}$ )	6.543*	0.047

**Source:** Field Survey 2009. Chi square value  $\sigma^2 = 33.141$   $P < 0.01$

Log likelihood value = -47.384. \*\*\*sig. at 1%, \*\*sig. at 5%, \*sig. at 10%

The variables that had significant co-efficient are gender ( $X_2$ ), household size ( $X_3$ ), educational level ( $X_4$ ), feed ( $X_7$ ), veterinary services ( $X_8$ ), sources of credit ( $X_9$ ) and amount borrowed ( $X_{10}$ ). It should be noted that a positive sign on a parameter indicated that higher values of the variables tend to increase the likelihood of credit impact on poultry productivity. Similarly, a negative value of a co-efficient implied that higher values of the variables would reduce the probability of credit impact on the poultry productivity. Specifically all the coefficient of the variables are positive. The probability of credit impact on poultry productivity was highest for household size (7.024) and least for farmers' age (0.088), implying that increasing poultry farm labour through harnessing of family labour was the most desirable. Also, in the same category is the coefficient of variable Feed ( $X_7$ ) which is significant at 1% level. This had a direct bearing on policy formulation as good quality and sufficient feeds were required for good performance of poultry birds. Hence, good quality feed should attract topmost importance on the priority list of the investors in poultry business. The probability level of 7.021 associated with the relationship between sex of household head and credit impact on poultry productivity implied that *ceteris paribus*, the probability that the poultry productivity of a particular household will be above any given level, 7.0 times higher for a male headed household than for a female headed household. This can be explained by the fact that culturally in, southwestern Nigeria; men own and have more access to resources than women.

The result of the multiple regression model estimates is shown on Table-4. The Table shows that six

of the nine variables included in the model were significant for farmers with credit while three variables were significant for farmers without credit. The results showed that age, experience were not significant for both groups. The non credit group had in addition the coefficient of variables age, feed, veterinary services and gender not significant. The results for the farmers without credit are poor; this could be an indication of inefficient use of the available resource and inability to acquire additional capital for expansion. The results obtained for the farmers with credit indicated that they are resourcefully efficient than their counterparts producing without credit. This result is expected and points to the positive impact of credit on poultry productivity. However, while extension and education variables had significant inverse relationships with poultry productivity; household size, feeds, source of credit and gender variables show direct relationships with poultry productivity. A group discussion carried out with the farmers revealed that most of the male farmers came in contact with the extension agents who in most cases failed to deliver the information needed by them. In addition, the women and children who were mostly responsible for the rearing of the poultry were mostly left out of extension plans. This might have contributed to the negative sign of the extension variable. The negative sign of the education variable may be due to the fact that the higher the level of education of the farmers, the more likely they out migrate in search for better placed employment. Credit availability is very significant in poultry production. The farmers need credit to buy feeds and pay for veterinary services.

**Table-4.** Multiple regressions estimate of factors affecting poultry productivity.

Factors	Respondents with credit (n = 120)	Respondent without credit (n = 160)
Age	2122.72 (2.01)	463.42 (0.57)
Household size	1544.68* (3.27)	1846.75* (3.52)
Educational level	-1756.18** (2.18)	-1275.41* (0.98)
Experience	1725.0 (1.89)	1312.0 (0.62)
Extension	-5978.01* (2.19)	-6632.00* (2.74)
Feed	28.15** (2.06)	11.28 (1.96)
Veterinary service	0.31*** (3.46)	0.27 (1.87)
Source of credit	0.27** (3.60)	0.068 (1.02)
Gender	0.11 (0.21)	0.026 (0.31)
Constant	14292.75	37481.32
Adjusted R <sup>2</sup>	77.68	68.78
F- ratio	56.6947	42.3621

**Source:** Field Survey 2009.

\*\*\*sig. at 1%; \*\*sig. at 5%; \*sig. at 10%. Values in the bracket are the t-values.

## CONCLUSIONS

Insufficient funding of small-scale poultry has limited the spate of development of the industry in south western Nigeria. This has often caused low level of production output in the industry. In this study therefore, the impact of credit on poultry productivity in small-scale poultry business was investigated. The sample consisted of 280 small-scale poultry farmers who were selected through multistage sampling technique. For the poultry farmers to be productive they needed to improve on their level of education, years of experience in poultry farming, feeding, frequent visitation and veterinary services by the extension agent is highly essential. This study shows that credit is very important in livestock rearing and the credit source cannot be overlooked. Farmers shy away from formal lending and depend on personal savings, relatives and friends. Policy makers should therefore solve for the bottlenecks that hinder formal lending to livestock farmers. This is a major challenge to policymakers and operators of credit institutions such as banks and cooperative societies. The role of labour as captured by the household size is equally found to be critical. This implies that improvement in the livestock sector could help to absorb the unemployed and untrained rural labour thereby helping to check the migration process of rural labour to the cities. Finally, as more funds were made available to the small scale poultry farmers at minimal costs, the level of output in industry will improve.

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