

Determinants of Poverty Status among Broiler Farmers in Calabar Metropolis, Cross River State, Nigeria

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Abstract: *The objective of this study was to determine the poverty status of broiler farmers in Calabar Metropolis in Cross River State. The specific objectives were: To assess the socio-economic characteristics of the broiler farmers, estimate the poverty status of these farmers in the study area, and estimate the determinants of poverty among the broiler farmers in the study area and to make recommendation based on findings. Descriptive statistics and logistic regression model were used to evaluate the extent of the impact of variables such as sex, marital status, education, farming experience, number of birds, access to improved breeds and ownership of assets of broiler farmers in Calabar South and Calabar Municipality of Cross River State. Structured questionnaires were administered on 47 heads of household of broiler farmers to generate primary data. Based on the results, three of the logit coefficients were significant at 10% level of significance in predicting if a broiler farmer was poor or non-poor and four other variables were significant at 5% level. The estimated adjusted R² value of 0.794 indicates that the strength of association between the independent and the dependent variables is about 79.4%.The study suggest that improving the broiler farmers socioeconomic status would enhance their productivity and increase profitability thus reducing the poverty rate among them.*

Keywords: *Broiler farmers, poverty status, logit coefficients*

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I. Introduction

Recently, combating poverty is high on the agenda of governments and the international community. The Millennium Development Goals (MDGs) is specifically aimed at having the number of people living in poverty by 2015. The livestock subsectors can play a major role in achieving this goal.

Poultry is the largest livestock group and is estimated to be about 14,000 million consisting mainly of chickens, ducks and turkey (FAO, 1999). Poverty is one of the most serious manifestations of human deprivation and is intricately linked to human capital development. The World Bank estimate that about 950 million people in developing countries live in condition of poverty. Over half live the region of South Asia (over 350 million) and East Asia (150 million). Another 280 million absolute poor live in largely rural areas of Sub-Saharan Africa. In Europe, Middle East, and North African region as well as the region of Latin America and the Caribbean, poverty is estimated to afflict a lot of people.

Despite Nigeria's plentiful agricultural resources and oil wealth poverty is widespread in the country and has increase since the late 1990s. Some 70 percent of Nigerians live on less than US\$ 1.25 a day. Poverty is especially severe in rural areas where up to 80 percent of the population lives below poverty line. According to the Human Development Report of the United Nations Development Programme (2005), the poverty situation in Nigeria has been on the increase since 1980 (Federal Bureau Statistics (FBS), 1999).

In total, poultry products (eggs and meat) contribute 30% of all animal protein consumed worldwide poultry is the most commonly kept livestock and over 70% of those keeping livestock are reported to keep chickens (Armar-Klemsu& Maxwell, 2000; Etim&Udoh, 2006). With increase in population and the corresponding decrease in marginal productivity of land, coupled with a recent government policy aimed at increasing the Caloric intake per caput per person to 2,200kcal of crude protein consumption of between 60 and 65 grams, as well as adequate proportionate increase of animal protein relative to protein from other sources, poultry production enterprises has in recent times formed a major crux of most government poverty alleviation programmes. These has made broiler production to become more attractive both to rural and peri-urban dwellers. In Cross River State Broiler production is particularly a common feature of both rural and peri-urban areas. The Lacuna and limited understanding of the underlying causal mechanism linking poverty and broiler production prompted the focus of this study on the sector.

II. Conceptual Framework

In estimating the determinants of poverty in the study area, we rely on the relative poverty approach, using the income of Broiler Farmers to ascertain their poverty status, which also served as the Dependent variable in the Logistic Regression analysis. To determine the poverty status of the broiler farmers, which essentially requires classifying them into “poor” and “non-poor” categories, we follow the NBS, 2005 and 2012, in estimating the Two-Thirds of the Total Per Capita Expenditure (Income) or the “relative poverty line”.

P-alpha poverty measure (Foster-Greer-Thorbecke index) was used for the measurement of poverty among the respondents while the binary logistic regression model was used to estimate the determinants of poverty among broiler farmer households. Following Foster-Greer-Thorbecke (1984) and World Bank (1996);

$$P_{\alpha} = \frac{1}{n} \sum_{i=1}^n q_i \left[\frac{Z - Y_{pi}}{Z} \right]^{\alpha} \quad (1)$$

Where Z is the poverty line value; Y_{pi} is the income of the i th poor groups of persons; n is total population; n is number of income earning group below the poverty line; q_i is number of persons in the i th group below the poverty line $q = \sum q_i$; is the number of income earners below the poverty line. The analysis of poverty status using FGT measure of poverty involves the ranking of income in ascending order of magnitude such that $Y_{1i} \leq Y_{2i} \leq Y_{qi} < Z_i \leq Y_{(q+1)i} \leq \dots \leq Y_{ni}$

This class of poverty measure is flexible in two ways. One, α is a policy parameter that can be varied to approximately reflect poverty “aversion” and two, the P_{α} class of poverty indices is sub-group decomposable.

In particular, when $\alpha = 0$

$$P_0 = q/n = H \quad (2)$$

Where, H is the head-count ratio, that is, the proportion of total income receiving units below the poverty line. When $\alpha = 1$, the poverty measure becomes the poverty-gap index (PG)

$$P_{\alpha=1} = PG = \frac{1}{n} \sum_{i=1}^n q_i \left[\frac{Z - Y_{pi}}{Z} \right] = HI \quad (3)$$

$$\text{Where } I = \frac{1}{q} \sum_{i=1}^n q \left[\frac{Z - Y_{pi}}{Z} \right] = HI \quad (4)$$

is the income gap ratio. I is the mean of the poverty gaps expressed as a portion of the poverty line. This measure is insensitive to income distribution among the poor, hence, to reflect the degree of inequality or severity of poverty among the poor, a greater weight has to be given to the poorest income-earning units and this is achieved by assigning values that are greater than 1 to α .

When $\alpha = 2$, the squared poverty gap index (SPG) is generated given by,

$$P_{\alpha=2} = SPG = \frac{1}{n} \sum_{i=1}^n q_i \left[\frac{Z - Y_{pi}}{Z} \right]^2 \quad (5)$$

2.1 The Logistic Regression Model

The logit regression model is characterized by a binary dependent variable with mutually exclusive and exhaustive outcomes. The dependent variable is the poverty status of the respondents, which is one if poor and zero if non-poor. Following Maddala (1990) and Babcock et al. (1995), the model specification gives rise to a system of two probabilities thus:

$$\text{Pr ob}(Y_{i=j}) = \frac{e^{\beta_j X_i}}{e^{\beta_j X_i} + e^{\beta_0 X_i}} \quad (6)$$

Where, j = 0 or 1

Expanding equation 1:

$$\text{Pr ob}(Y_i = j) = \frac{e^{n_j X_i}}{e^{n_0 X_i} + e^{n_j X_i}} \quad (7)$$

The equations above have inter-determinacy problem and need to be removed. We therefore assume that n_0 in the denominator is zero i.e. $n_0 = 0$. Then, $e^{n_0 X_i} = 1$, hence

$$\text{Pr ob}(Y_i = j) = \frac{e^{n_j X_i}}{1 + e^{n_j X_i}} \quad (8)$$

$$\text{Prob}(Y_i = j) = \frac{e^{n_j X_i}}{1 + \sum_{k=1}^2 e^{n_k X_i}}$$

Then, the probability of being in each group (j = 0 or 1) is:

$$\text{Prob. } (Y_i = 0) = \frac{1}{1 + \sum_{k=1}^2 e^{\beta_k X_i}} \quad (9)$$

$$\text{Prob. } (Y_i = 1) = \frac{e^{\beta_1 X_i}}{1 + \sum_{k=1}^2 e^{\beta_k X_i}} \quad (10)$$

Where β_j is a vector of parameters that relate the explanatory variable X_i to the probability that $Y = j$

Where β_j is a vector of parameters that relate the explanatory variable X_i to the probability that $Y = j$

$Y_i = j$ = Poverty status of the broiler farmer

Thus;

Y = Poverty status (categorical); poor=0 and non- poor =1

X_1 = Sex of household head (categorical covariate)

X_2 = Marital Status (categorical covariate)

X_3 = Educational Status (continuous covariate)

X_4 = Farming experience (continuous covariate)

X_5 = Stocking density (continuous covariate)

X_6 = Access to improved breeds (categorical covariate)

X_7 = Ownership of Assets (continuous covariate)

III. Methodology

This study was carried out in Calabar Municipality and Calabar South Local Government Areas of Cross River State jointly referred to as Calabar Metropolis. Calabar Metropolis is a coastal town lying between latitude 04°.15 and 5°.15N and Longitude 8°.15E of the Equator. Calabar has an area of 7, 245, 935 sq.km and a population of about 2.4 million. Calabar Metropolis is an urban area with high population density, urban crop production and animal husbandry is predominantly practiced.

In this study, the multi-stage random sampling technique was used to select broiler farming households. Field survey was carried out, which involved a detailed appraisal of the objective was carried out with the use of structured questionnaire. Thus, the respondents were made up of household of poultry farmers which were randomly selected within the study area. A total 47 questionnaire were administered in the study area.

Descriptive Statistical tools were used to analyze the socioeconomic characteristics of broiler farming households. Foster-Greer-Thorbecke (FGT) and logit regression models were employed to determine the extent and level of poverty among respondents and estimate the effect of selected variables on the occurrence of poverty among respondents.

IV. Results And Discussion

4.1

Socio-Economic characteristics of Broiler Farmers in Calabar Metropolis
Table 4.1: Distribution of Broiler Farmers by Socioeconomic Characteristics

Variables	Frequency	Percentage
Sex of Farmer		
Male	15	31.91
Female	32	68.09
Total	47	100
Marital Status of Farmer		
Married	29	61.70
Single	18	38.30
Total	47	100
Size of Household		
1 – 3	33	70.21
4 – 6	14	29.79
Total	47	100
Age of Farmer		
21 – 30	6	12.77
31 – 40	18	38.29
41 – 50	17	36.17
Above 50	6	12.77
Total	47	100
Educational Level in years		
Primary (1-6 years)	2	4.26
Secondary (7-12 years)	12	25.53
Tertiary (above 12 years)	33	70.21
Total	47	100
Farming Experience		
0 – 5	15	31.92
6 – 10	20	42.55
11 – 20	12	25.53
Total	47	100
Value of Assets Owned		
5000 – 150000	14	29.79
150001 – 300000	7	14.89
300001 – 600000	6	12.76
600001 – 1000000	5	10.64
Above 1000000	15	31.92
Total	47	100

Source: Field Survey, 2012.

Sex distribution among the broilers farmers revealed more female (68.1%) compared to their male (31.9%) counterparts (Table 4.1). This is attributable to the fact that broiler farming requires a small take off grant which is easily accessible to women usually in form of thrift savings thus enabling more women to be involved. Through broiler farming, women provide substantial support to the family in times of financial difficulties.

The marital status of the broiler farmers shows that majority (67.1%) of the broiler farmers were married. Broiler Farming offers an alternative livelihood option to most married women in the study area thereby contributing to household economy in terms of income generation. Result on Household size shows that 70.2% of the broiler farmers have family size of 1 – 3 members while 29.8% has family size of 4 – 6 members indicating availability of family labor for broiler farming operations.

Majority (74.5%) of those involved in broiler farming are in their active productive year (31-50years). Only 12.77% of the broiler farmers are over 50 years.

It can be seen from table 3.1 that 70.2% of the broiler farmers had tertiary education, followed by 25.5% with secondary education while only 4.3% had primary education.

Table 3.1 shows that 31.9% of the broiler farmers owned assets valued above one million naira (₦ 1,000,000.00 about \$ 6,250) while 29.8% of them owned the lowest range of assets (₦ 5000 (\$31.25)– N150, 000(\$937.5)). The rest (38.3%) owned assets ranging from ₦150, 000(\$937.5) - ₦ 1,000,000(\$625).

Majority of the broiler farmers (42.5%) had 6-10 years of experience, followed by 0 – 5 years (31.8%) while only 25.5% had 11-12 years broiler farming experience. The result showed clearly the predominant involvement of experienced people in broiler farming in the study area. This observation coupled with respondents years of broiler farming experience of over 6 years (68%) have created a situation whereby broiler farmers stick to a particular system of production.

4.2 Determinants of Poverty

Table 4.2: Logistic regression results (Dependent Variable: Poverty Status)

Independent Variables	Logit Estimate (b)	Odds ratio Exp (b)	Standard Error	Wald	significance
Sex (1)	5.482	240.250	3.030	3.272	0.70*
Marital status (1)	2.706	14.972	1.320	3.171	0.075*
Education	0.827	2.287	0.370	4.986	0.026**
Farming experience	-0.459	0.632	0.231	3.964	0.046**
Number of Birds	0.005	1.005	0.002	4.352	0.037**
Access to improved Breeds (1)	-6.680	0.001	3.415	3.827	0.05**
Ownership of Assets	0.000	1.000	0.000	3.599	0.059*
Constants	-12.088	0.000	5.306	5.189	0.023**
Diagnostic statistics					
Nagelkerke R ²	0.794				
Chi-Square	41.663***				
-2 log likelihood	21.759				
No of iterations	12				

*** (Significant at 1) ** (Significant at 5%) and * Significant at 10%.

4.2.1 Diagnostic Statistics

The improvement in fit made by the explanatory variables included in the model was measured by chi-square statistics of 41.663 which is significant at 1% level of probability indicating that the independent variables included in the model jointly significantly predicted the dependent variable in the logistic regression.

The strength of association between the dependent and the independent variables is captured by the Nagelkerke's R² which estimated value is 0.794. This indicates that the strength of association between the dependent and the independent variables is about 79.4%.

The result of the study shows that three of the logit (effect) coefficient is significant at 10% level of significance in predicting if a broiler farmer in Cross River State was poor or non-poor. These include sex, marital status and value of assets owned by the broiler farmer. Furthermore education, farming experience, number of birds kept. Access to improved breeds was significant at 5% level in predicting the poverty status of broiler farmers. The interpretation of the coefficient was based on both logit estimate (b) and the odds ratio.

The result (Table4.2) shows that the sex of broiler farmers has a positive logit effect of 5.482 which implies the predominance of females in broiler farming in study area that female broiler farmers increases the likelihood of being non-poor by 5.482 times. Thus the odds ratio of 240.25 means that as more females take to broiler production their likelihood of being non-poor will increase by 5.482 percent. This is in accordance with poverty estimates which indicate that rural household headed by males is poorer than female headed household, with all three poverty measures higher for male headed household in 1996 and 2004.

We find that the marital status of broiler farmers has positive logit effect of 2.706, implying that if broiler farmers were married, their likelihood of being non-poor increase by 2.706 times. Thus the odds ratio of 14.972 means that if the number of married female broiler farmers increased by 14.972, then the likelihood of non-poor will increase by 2.706%. Being married with children enhances broiler farmers to be more serious about their business. This is because of their financial needs to feed and trained the children.

Ownership of assets was not significant in the determination of the poverty status of Cross River state broiler farmers. It also carried a positive logit coefficient of 0.000 which means that the ownership of assets has no significance in the predictions of the poverty status of broiler farmers. This can be traced to the fact that most broiler farmers being married women lack access to key factors of production such as capital, land and information. Women are often denied formal credit system due to lack of collateral and are mainly small scale operators. Thus, the odds ratio of 1.00 indicates that even if the broiler farmers increases their ownership of assets by 1.00, it will make a difference in their likelihood of being non-poor.

Education is one of the major determinants of poverty status of any individual. It significantly affects the poverty status of Cross River State broiler farmers. Thus is reflected in the posited logit coefficient of 0.827 which confirmed the result that majority of the broiler farmers (97.02%) had tertiary education. This places broiler farming among the high skilled business which mainly the literate masses in the society are involved. High productivity and wages is a direct result of high educational attainment which in turn increases the human stock capital. Therefore increasing the educational level of the poor will tend to reduce poverty. This is in line with the assertion by Bastos et al. (2009) that poverty is a vicious cycle in that low education lead to poverty and poverty is due to low education.

Moreover, the poor finds it difficult to attain schools, even which it is publicly provided. This is because of high opportunity cost between choosing to go to school and working for survival. The result of this study shows that poverty status of Calabar broiler farmers was significantly dependent on educational attainment because of the high technicality involved in broiler production. It therefore means that broiler farming requires high level of education to improve the productivity and decreases the probability of being poor.

This is necessary since high educational attainment will boost the farmers understanding of innovation and newly improved techniques for better performance. Thus the odds ratio of 2.827 implies that if the years spent in school increases by 3, then the likelihood of being non-poor would increase by 1 percent.

Though farming experience has a significant input on broiler production and in the prediction of the poverty status of broiler farming in Calabar yet it has a negative logit effect of -0.459 which tries to peg the minimum years needed to do well in broiler farming. This may be traced to unwillingness in the part of the broiler farmers to adapt to newly improved techniques when it has experienced in the job. Thus the odds ratio of 0.632 implies that if the experience in broiler farming is increased by 0.632, the likelihood of being poor is reduced by 0.46 percent.

We find that the number of birds kept by the farmer has a positive logit effect of 0.005 which implies that as the number of birds' increases, the probability of being non-poor also increases. This is because as the number of birds increases provided all other variables of production such as capital, labor and access to information are made adequate then output would increase resulting in increase in income and reduction on poverty status. This assertion is in line with that of FOS (1999) and Omonona (2000). Our finding shows that increase in number of birds usually translates into higher income and lower incidence of poverty. Therefore number of birds has the odds ratio of 1.005 (approximately 1) which implies that as the number of birds is increase by one the likelihood of being non-poor is roughly increased by 0.005 percent.

Access to improved breeds has a negative logit effect of 6.680, meaning that as access to improved breeds decreases, the likelihood of being poor increases. This means that the probability of being non-poor increases as the access to improved breeds increases, leading to increase in income as it is a significant contribution in the determination of the poverty status of broiler farmers in Calabar in particular and in Cross River State as a whole. The implication of access to improved breeds is that it has been largely responsible for the increase in broiler production in the state. In addition to production and productivity, access to improve breeds guarantees high quality birds and disease resistance, (Thornton, 2010). The odds ratio of 0.001 means that if the access to improved breeds increases by 0.001, the probability of being poor decreases by 6.680 percent.

V. Conclusion

This study has confirmed that the determinants of poverty status among broiler farmers in Calabar metropolis in their order of significance include education attainment, numbers of stock of birds, farming experience and access to improve breeds. Poverty alleviation policies should ab initio address these variables. Other explanatory variables that did not significantly affect the prediction of broiler farmer's poverty status in the study area includes sex, ownership of assets and marital status.

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