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# ALLOCATIVE EFFICIENCY OF SMALL-SCALE POULTRY PRODUCERS IN BOSSO LOCAL GOVERNMENT AREA, NIGER STATE, NIGERIA

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## ABSTRACT

This study examined the allocative efficiency in small-scale broiler production in Bosso Local Government area, Niger state, Nigeria. The primary data for the study were obtained using structured questionnaire administered to 80 randomly sampled poultry farmers. Descriptive statistics and production function using regression model were used to analyse the data. The study revealed that 75% of the variation in output is explained by the variables included in the models. The study also showed that labour and feed were underutilized. The major constraint to poultry production in the study area is inadequate capital. It is recommended that farmers should increase the use labour and feed resources in order to enhance their profit also, farmers should be encouraged to form cooperatives in order to pool their resources together and improve their capital for increased production.

Key words: Resource use, efficiency, poultry, Bosso Local Government Area.

## INTRODUCTION

The poultry industry has a significant effect on Nigerian economy. About ten percent of the Nigerian population are engaged in poultry production, mostly subsistence and small or medium-size farms (Okonkwo and Akubuo, 2001). Statistics provided by CBN (2002) showed that the average annual growth rate of poultry meat in the country from 1980-2002 was 1.93%, while the human population growth rate was 2.89%. Invariably the demand for poultry meat increased as the human population increased thereby putting the supply always at a deficit. Some of the factors militating against the growth of poultry production in different localities of the country are inadequate capital, high cost of inputs and high mortality (FOS, 1999; Akeeb, 1997; Agbato, 1997).

The findings of the study could enable government draw up medium and short term investment strategies which will benefit the livestock sub sector and create opportunity for policy makers to evaluate previous livestock production policies and programmes based on current knowledge and make appropriate adjustments. This in turn will assist in enhancing and improving efficiency of livestock production.

The result from this study if utilized, have the propensity to raise livestock agricultural output in Nigeria to ensure their availability, enhance farmers' earning capacity or income and ensure food security for the teeming population. With enhanced income, it

is possible for farmers to have more access to better quality food and improved livelihoods.

It is to this end that this paper intends to determine the resource use efficiency and the constraints of small-scale poultry production in Bosso Local Government Area of Niger state in order to know the direction of resource adjustment in the study area.

## METHODOLOGY

The study was conducted in Bosso Local Government Area (L.G.A) of Niger State, Nigeria. The State is located between Latitudes 8°20' N and 11°30' N and Longitudes 3°30' E and 7°20' E with a total land area of 76,363 km<sup>2</sup> and a population of 4,082,558 people (Wikipedia, 2008). The state is agrarian and well suited for production of a wide variety of crops such as yam, cassava, maize, millet, rice, cowpea and tomato and animal production such as poultry, sheep, goats, etc because of favourable climatic conditions. The annual rainfall is between 1100 – 1600 mm with average monthly temperature ranges from 23°C and 37°C (NSADP, 1994). The vegetation consists mainly of short grasses, shrubs and scattered trees.

### Sampling technique

Simple random sampling technique was used for the purpose of this study. Eight villages were randomly selected from Bosso LGA, Ten respondents randomly sampled from each of the selected villages based on a comprehensive list of poultry farms obtained from the study area. Thus a total of eighty (80) poultry farmers

were sampled. Data were collected on input information such as labour input in hours, feed in kilograms, medication in naira etc, prices of inputs and output, socio-economic characteristics of farmers such as age, farming experience, household size etc as well as output information. The data was collected in 2009.

**Production function estimation**

A production function stipulates the technical relationship between inputs and output in a production process. Ordinary Least Square (OLS) Multiple Regression analysis was used to generate parameter estimates of interest in order to determine the

efficiency of resource use analysis. The production function is:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, U_i)$$

Where  $Y$  = output (₦),  $X_1$  = labour (hours)

$X_2$  = Feed (kg).

$X_3$  = Drugs and medication (₦).

$X_4$  = expenses on day old chicks purchased (₦).

$X_5$  = Capital inputs (₦).

$X_6$  = Cost of housing (₦),  $U_i$  = Error

Four different functional forms of poultry production were specified in their explicit forms as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + U_i \text{ (Linear)} \tag{2}$$

$$\ln Y = a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + U_i \text{ (Double-log)} \tag{3}$$

$$Y = a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + U_i \text{ (Semi-log)} \tag{4}$$

$$\ln Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + U_i \text{ (Exponential)} \tag{5}$$

**RESULTS AND DISCUSSION**

**Socio-economic characteristics of respondents**

The socio-economic variables analyzed in this study included age, gender, marital status, education and years of farming experience.

Table 1 shows that 51.25% of the sampled farmers were between the ages of 31-40 years. Thus, majority of the sampled farmers were middle aged, which could result in a positive effect on poultry production. The majority (32.50%) of the respondents have secondary education, while 11.25% have non-formal education. Adebayo and Adeola (2005) also reported similar results. The table revealed that 70% of the farmers were within the range of 1-5 years farming experience, while 2.50% had 11-15 years and above farming experience. This shows that the small-scale poultry production only gained popularity in the study area in the past five years.

**Table 1: Socio-economic characteristics of sampled farmers**

Variable	Frequency	Proportion (%)
<b>Age</b>		
20-30	4	5.00
31-40	41	51.25
41-50	28	35.00
51-60	7	8.75
<b>Mean age 21.24</b>		
<b>Gender</b>		
Male	44	55
Female	36	45
<b>Marital status</b>		
Single	8	10.00
Married	67	83.75
Divorced	5	6.25
<b>Education</b>		
Primary	18	22.50
Secondary	26	32.50
Tertiary	17	21.25
Adult education	10	12.50
Non-formal	9	11.25
<b>Farming experience (Years)</b>		
<1	5	6.25
1-5	56	70.00
6-10	17	21.25
11-15	2	2.50
<b>Mean 13.57</b>		

**Production function analysis:**  
The production function that was used to determine the effect of the use of resources in poultry

production is shown in Table 2, the linear production function is the lead equation.

**Table 2: Ordinary least square multiple regression analysis for factors affecting broiler production in Bosso LGA, Niger state**

Variable	Linear	Double - Log	Semi - Log	Exponential
Constant	3396.271 (0.732)	3.136 (3.085)***	-172542.1 (-3.952)***	9.481 (75.676)***
Labour	413.019 (9.941)***	0.588 (5.897)***	32850.616 (7.670)***	0.007 (5.953)***
Feed	1.007 (3.424)***	0.385 (4.478)***	8673.871 (2.348)***	3.45 E -0.05 (3.986)***
Medication	-0.379 (-0.600)	0.32 (0.382)	9.457 (0.003)	4.47 E -0.07 (0.024)
Chicks	-0.057 (-0.452)	0.064 (0.646)	771.569 (0.182)	-8.66 E -0.07 (-0.233)
Capital	0.347 (0.339)	0.378 (0.706)	-6051.634 (-0.263)	2.96 E -0.05 (0.981)
Housing	-0.323 (-0.302)	-0.330 (-0.699)	5483.436 (0.270)	-2.80 E -0.05 (-0.889)
R <sup>2</sup>	0.750	0.719	0.693	0.634
R <sup>2</sup> Adjusted	0.729	0.695	0.668	0.644
F statistic	36.459***	31.074***	27.456***	21.078***

Source: Computerized data, 2009.

\*\*\* = Implies Statistically Significant at 1%, \*\* = Implies Statistically Significant at 5%, \* = Implies Statistically Significant at 10%. Figures in parentheses are the respective t- ratios.

The linear functional form has an R<sup>2</sup> value of 0.750 implying that 75% of the variation in output of broiler (Y) is explained by the explanatory variables included in the model. The remaining 25% is as a result of non inclusion of some important explanatory variables as well as error in estimation. The result also showed that labour and feed input are statistically significant at 1%, which explains the output of broilers.

Labour input has an estimated regression coefficient of 413.019 which is significant at 1%, which implies that as employment of labour increases, output also increases. Feed input has an estimated regression coefficient of 1.007 which is significant at 1%. This also implies that as supply of feed increases output also increases.

**Table 3: Resource use efficiency indices of resources**

Variable	Elasticity (b)	P <sub>y</sub> (₦)	MVP (b * P <sub>y</sub> ) (₦)	MFC (₦)	MVP/MFC
Labour	1.6366	1,500	2,454.9	200	12.275
Feed	0.5239	1,500	785.85	90	8.732

Source: Computed from survey data, 2009

Note: P<sub>y</sub> = price of unit output = ₦1, 500, b = elasticity. Since the lead equation is linear, the elasticities were computed using

$$\text{the formula: } b = \frac{\partial y}{\partial x} \cdot \frac{\bar{x}}{\bar{y}}$$

Where,  $\frac{\partial x}{\partial y}$  = marginal physical products (first partial derivative with respect to y),  $\bar{x}$ , and  $\bar{y}$  are the geometric means of X and Y respectively. Elasticity of output of labour (b) = 1.6366. Elasticity of output of feed (b) = 0.5239

Result in Table 3 indicated that all the resources are not efficiently used because their values are greater than one. The computed efficiency ratio for labour is 12.275 which is greater than one. It implies that labour input is being under utilized in the study area. To maximize returns the broiler producer should increase the level of labour employment, as this stage of production is an irrational stage. The computed efficiency ratio for feed is 8.732 which is greater than one. It implies that feed input is being under utilized in the study area, i.e. not efficiently utilized. In order to maximize returns or profit, the broiler producer should increase the level of feed supplement, as this stage of production is also irrational stage.

#### Constraints to poultry production

Table 4 depicts that 53.75% of the respondents reported inadequate capital as the major constraint to broiler production. This is in agreement with the findings of Akeeb (1997) and Agbato (1997). About 39% reported high mortality rate, and 3.75 % of the respondents reported that they have problem in marketing their products.

**Table 4: Distribution of respondents based on production constraints**

Constraint	Frequency	(%)
Inadequate capital	43	53.75
Pest and Diseases	3	3.75
Marketing Problems	3	3.75
High Mortality Rate	31	38.75

Source: Field survey data, 2009.

#### CONCLUSION AND RECOMMENDATIONS

This study examined the allocative efficiency in small-scale broiler production in Bosso Local Government

area, Niger state, Nigeria. The study revealed that of the variation in output was explained by variables included in the models. The study revealed that labour and feed were underutilized. major constraint to poultry production in the study is inadequate capital. It is recommended that farmers should increase the use labour and feed resources in order to enhance their profit also, farmers should be encouraged to form cooperatives in order to pool their resources together to consolidate their capital base and increased production.

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