OSEGHALE, A. I.

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PROFITABILITY AND TECHNICAL EFFICIENCY AMONG BROILER FARMERS IN KWARA STATE, NIGERIA

Adebayo, C. O., Oseghale, A. I. and Adewumi, A. A.

ABSTRACT

Department of Agricultural Economics, Federal University of Technology, Minna. cadebayo2001@yahoo.com; cornelius.adebayo@futminna.edu.ng

This study examined the profitability and technical efficiency of broiler production in selected Local Government Areas namely Ilorin West, Ilorin South, and Ilorin East of Kwara State, Nigeria. A multi-stage sampling technique was used in the selection of 90 respondents. The data were collected with the aid of structured questionnaires which were administered by the researcher. The data were analyzed using descriptive statistics, Net Farm income and stochastic frontier production function. Cost of feed had the highest share of the total cost of production. The average farm income per respondent was ₦106, 551.71 while the profitability index was 0.21 which means that to every naira earned as revenue, 21 kobo was returned to the broiler farmer as net income; an indication that broiler production is profitable. The maximum likelihood estimate of the stochastic frontier production function shows that cost of feeds and day old chicks significantly affected level of production at 10% and 1% respectively. On the other hand, the inefficiency factors that affected broiler production were age of farmers and household size. The mean efficiency level of the broiler farmers was 62%.high cost of feed was the major constraint. It was therefore recommended that farmers need to acquire skills necessary for them to be able to compound feed.

Keywords: profitability, technical efficiency, stochastic frontier, broiler

INTRODUCTION

The poultry industry specifically, has been described (Akpabio *et al.*, 2007) as the fastest means of bridging the protein gap prevailing in Nigeria. The rational for the promotion of poultry production is predicated on the fact that poultry meat and egg offer considerable potentials for meeting human need for dietary animal supply (Folorunsho and Onibi, 2005). According to Ukoha and Augustine (2007) poultry industry goes a long way in providing animal protein for the populace because it provides meat and egg in very short time. The poultry industry has become a diverse industry with a variety of business interest such as egg production, broiler production, hatchery and poultry equipment business interest (Amos, 2006). Poultry production in the past was not counted as an important occupation; it has developed and occupies a place of pride among the livestock enterprise due to rapid monetary turnover (Amos, 2006). This singular reason, among others has made the enterprise attractive and popular among small, medium as well as large scale poultry farmers. Poultry production in Nigeria increased tremendously in the few decades (Okoli, 2006). Over these periods, successive Governments encourage the development of large scale modern poultry enterprise. Despite the development in the subsector, Gona (2009) stressed that Nigeria is among the least consumer of animal protein in the world, adding that her production is not enough to meet domestic consumption requirement.

In spite of the significance of poultry industry to the National economy, poultry farm have been facing various problems. The major problem of poultry production in Nigeria is that of low productivity which is been attributed to technical inefficiency, high production cost, inadequate extension and training facilities and high bills (Ezeh *et al.*, 2012). For Nigeria to be able to bridge the gap between supply of and demand for, broiler production must be profitable and technically efficient. According to Ojo, 2003, the analysis of the factors affecting farm level efficiency in an economy where improved technologies are lacking, efficiency studies offers the possibilities of raising productivity by improving efficiency without necessarily increasing the resource base. Therefore the broad objective of the study is to determine the profitability and technical efficiency of broiler production in Ilorin West, Ilorin South and Ilorin East Local Government Areas of Kwara State, Nigeria. The specific objectives are to: (i) estimate the costs and returns among broiler farmers (ii) determine factors affecting technical efficiency of boiler farmers and (iii) identify constraints facing broiler farmers in the study areas.

METHODOLOGY

Study area

Kwara State lies between latitude 7° 45' N and 9° 30' N and longitude 2° 30' E and 6° 23' E. Kwara State cover a total land area of 332,500 sq kilometer or 8% of the land area of Nigeria (Fakayode *et al.*, 2008). According to the National population census (2006) the state has a population of 2,591,555 which is projected to be 3,005,409 by 2012 (Aruna, 2005) at annual population growth rate of 2.5%. It is located in the transition zone between deciduous woodland of the south dry savannah of Northern Nigeria (Jimoh, 2003) making it a good site for livestock production. The state climate is characterized by both dry and wet season each lasting for about 6 month. The raining season begins toward the end of April and last till October while dry season beginning in

November and end in Match, days are very hot during the dry season, from November to January. Temperature typically range is between 33°c to 34°c, while from February to April, the temperature is between 36.4°C to 37°C. The State is divided into four agricultural zones (zone A-D) by the Kwara State Agricultural Development project (KWADP) based on the ecological and cultural characteristics / practices and project administrative convenience of the State (KWADP, 2004). The zones are include A (Baruten and Kaiyama Local Government Area), B (Edu and Patigi Local Government Areas), C (Asa, Ilorin East, Ilorin South, Ilorin West and Moro Local Government Areas) and D (Ekiti, Ifelodun, Irepodin, Offa, Oyun, Isin, and Oke-Ero local Government Areas).

A multi-stage sampling technique was employed in the selection of respondents for this study. First, three (3) LGAs were purposively selected from zone C due to the preponderance of broiler farmers; this was followed by the random selection of three (3) wards from each of the three (3) LGAs. Third stage involved a simple random selection of Ten, (10) broiler farmers from each ward to give a sample size of 90 respondents. The data were collected with the aid of structured questionnaire which was administered by the researcher. The data obtained were analyzed using descriptive statistics, farm budget technique and Cobb-Douglas Stochastic frontier model. Descriptive statistics such as mean, percentage, and frequency were used to identify the constraints associated with broiler production. Farm budget techniques such as Gross Margin and Net farm income (NFI) were used to estimate the costs and returns among broiler farmers. Gross Margin (GM) which is the difference between the total revenue and the total variable cost of production is expressed as:

GM= TR – TVC .....(1).

GM= Gross Margin

TR=Total Revenue

TVC=Total Variable Cost.

On the other hand, Net Farm Income (NFI) which is the difference between the total revenue and total cost of production is expressed as:

NFI= GM –TFC.....(2)

Where

NFI= Net Farm Income.

GM=Gross Margin

TFC=Total Fixed Cost.

The stochastic frontier model was used to determine the efficiency of resource use of broiler farmers in the study area. The stochastic production model is specified following Battese and Coelli, (1995).

$$LnY = \beta o + \beta_1 LnX_1 + \beta_2 Ln X_2 + \beta_3 Ln X_3 + \beta_4 Ln X_4 + \beta_5 Ln X_5 + \beta_5 Ln X_6 + (VI - UI) \quad (3)$$

Where,

Ln = represents the natural logarithm

Y = Number of broiler produced in a year

X_1 = Cost of feed (₦), X_2 = Cost of day old chicks (₦), X_3 = Cost of medications (₦), X_4 = Depreciation of fixed assets (₦), X_5 = Cost of labour (₦), X_6 = Cost of housing and equipment (₦)

VI and UI = are assumed to be independently and identically distributed

UI = is a non-negative random variable associated with technical inefficiency in production.

VI = is a random error which is associated with random factors not under control of the farmers.

Following Battese and Coelli (1995), the mean of farm specific technical inefficiency UI is defined as;

$$UI = \delta_0 + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_4 Z_4 + \delta_5 Z_5 + \delta_6 Z_6 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where,

Z_1 = age of farmers, Z_2 = Sex, Z_3= Marital status, Z_4 = household size, Z_5 = educational level of farmers, Z_6 = Years of experience of farmers, Z_7 =Access to credit

RESULTS AND DISCUSSION

Cost and returns of broiler production

This is an attempt to show how profitable the broiler enterprises were in the study area. This was achieved by considering the costs and returns associated with broiler production in the study area. Table 1 shows that the variable costs constituted the highest share of costs of production (₦353, 758.22 per respondent) representing 99.53% of the total costs of production while fixed cost was ₦29, 356.81 per respondent representing only 0.58%. Cost of feed accounted for the highest share (67.13%) of total cost. This means that feed is the largest cost item in broiler production. This finding is in agreement with those of Okezie and Bime (2006), Mgbakor and Chinonso (2013), in their various studies also found that cost of feed constituted the highest share of total cost broiler production in Cross River and Anambra States of Nigeria. Cost of day old chicks accounted for the second largest variable cost of ₦81, 158.06 per respondent. The average gross income and net farm income per respondent were ₦489, 666.74 and ₦106, 551.71 respectively.

Further gross margin analysis shows that the operating ratio was 0.92 meaning that 92% of the gross income was used to pay for the variable costs. The decision rule is that the lower the value of the operating ratio, the better the financial position of the farm. An operating ratio of 1 implies that the gross income can scarcely cover the expenses on the variable. The income/expenses ratio was 1.27 implying that the farm generated 1.27 times more income that expenses incurred or total cost of production. Income/expenses of large magnitude suggest that the enterprise is in a healthy financial position. In this case it indicates that broiler production was profitable. The Profitability Index (PI) was 0.21 which means that for every naira earned as revenue, 21 kobo was returned to the broiler farmer as net income; as PI is the level of returns per unit gross income. The decision rule is that for a farm to be profitable, the PI should be greater than zero. However, if the PI is negative it implies that the farm is running at a loss.

Table 1: Costs and returns of broiler production in the study areas

	Cost	Total value	Average	%
A	Variable costs			
	Feed	21,375,770.00	237,508.56	67.13867
	Day old chick	7,304,225.00	81,158.06	22.94167
	Vaccines and medications	390,325.00	433.94	1.225963
	Labour	2,410,500.00	26,783.33	7.571084
	Disinfectants	60,960.00	677.33	0.191468
	Sawdust	98,350.00	1,092.78	0.308905
	Electricity and water	50,910.00	565.67	0.159902
	Transportation	147,200.00	1,635.56	0.462337
B	Total Variable Costs	31,838,240.00	353,758.22	99.53766
C	Fixed Cost			
	Depreciation on fixed assets	2,642,113.00	29,356.81	
D	Total costs =(B+C)	34,480,353.00	383,115.03	
E	Gross Income	44,070,007.00	489,666.74	
F	Net Farm Income =(E-D)	9,589,654.00	106,551.71	
G	Farm Financial Ratios			
	Operating ratio =B/D	0.923373377		
	Income/expenses ratio = (E/D)	1.278119368		
	Profitability index = F/E	0.217600465		

Source: Field Survey 2013

Table 2 shows the Maximum Likelihood Estimates (MLE) of the stochastic frontier production function of broiler farmers in the study area. The result shows that two of the explanatory variables (inputs) namely cost of feed and day old chicks were significant at 10% and 1% respectively. This means an increase in these factors of production will increase the output of broiler farming. This finding is in agreement with those of Udoh and Etim (2009) and Ezeh *et al.*, (2012) in which they found out that broiler production and quantity of feeds were directly related. They also found out that feed was the most important factor of production as birds that were fed *ad libitum* gained weight faster, attained table weight earlier and attracted higher unit prices.

On the other hand the inefficiency factors affecting broiler production were age of farmers and household size. The age of farmers were negatively significant, which means that it is decreasing technical inefficiency and increasing technical efficiency while household size was positively significant which means that it is increasing technical inefficiency and decreasing technical efficiency. In other words as household size increase efficiency, production decreases. The estimated variance (δ^2) was statistically significant at 1%, an indication of the goodness of fit and correction of the specified assumptions of the composite error term distribution. Gamma (γ) was 0.99; this indicates that 99% technical efficiency level was attained by broiler farmers.

Table 3 shows broiler farmers' level of technical efficiency ratings. The minimum and maximum efficiency levels of the farmers were 0.443 and 0.917 respectively with a mean efficiency of 0.617 (62%) indicating that there was a 38% allowance for improving efficiency. It also shows that average sampled broiler farmers will realize about 38% in cost savings in order to attain the level of the most efficient farmer. The result further shows that no broiler farmer was technically efficient. This finding is at variance with that of Chukwuji *et al.* (2006) in which it was reported that broiler farmers were generally efficient. Table 4 shows that 55.56% of the respondents are faced with the problem of high cost of feed, followed by respondents with problem of inadequate capital (20%). The problem of diseases and mortality accounted for about 13% of the production constraints while the least identified constraint was glut in the marketing of table size broilers (11%). The result above implies that respondent in the study area spent most of their income on feeds; also the low glut rate shows that broiler producer sells more directly to the end consumer.

Table 2: Maximum likelihood estimates of factors affecting technical efficiency

Variables	Parameters	Coefficient	T-Values
Production factors			
Intercept (constant)	β_0	-0.476	8.688***
Cost of feed	β_1	0.739	1.76*
Cost of day old chicks	β_2	0.888	20.69***
Cost of medication	β_3	0.197	0.958
Depreciation	β_4	-0.339	-0.387
Labour	β_5	0.123	0.795
Cost of Building and equipment	β_6	0.405	0.528
Sum of elasticity		1.627	
Inefficiency factors			
Constant	Z_0	0.586	2.200**
Age	Z_1	-0.329	-7.01***
Sex	Z_2	-0.126	-0.58
Marital status	Z_3	0.157	0.462
Household size	Z_4	0.125	3.89**
Education level	Z_5	-0.471	0.928
Experience	Z_6	-0.155	-0.530
Access to credit	Z_7	-0.497	-0.204
Diagnostic statistics			
Likelihood ratio 0.704			
LR test 0.104			
Sigma square	δ^2	0.122	6.47***
Gamma	γ	0.999	0.244

Computation from field survey, 2013
*, ** and ***implies significance level at 0.10, 0.05 and 0.01 probability levels respectively

Table 3: Distribution of technical efficiency ratings of broiler farmers in Kwara State

Efficiency	Frequency	Percentage
<0.50	5	5.55
0.51-0.55	14	15.55
0.56-0.60	22	24.44
0.61-0.65	25	27.77
0.66-0.70	15	16.66
0.71-0.75	7	7.77
>0.76	2	2.22
Total	90	100
Mean efficiency 0.617		
Minimum efficiency 0.443		
Maximum efficiency 0.917		

Table 4: Broiler production constraints

Constraints	Frequency	Percentage
High cost of feed	50	55.56
Inadequate capital	18	20.00
Disease and mortality	12	13.33
Glut in market	10	11.11
Total	90	100

Source: Field Survey 2013

CONCLUSION AND RECOMMENDATIONS

Broiler production is profitable with an average farm income per respondent of ₦106, 551.71 and a profitability index of 0.21. The main hindrance to higher level of productivity in broiler production in the study area was high cost of inputs for production especially feed. Based on the findings of this work the following recommendations were made. The poultry farmers should acquire skills necessary for compounding feed at a reduced cost. The poultry farmer should increase the number of birds they raise and reduce cost of feed input and also reduce their expenditure on labour in order to maximize output and profit.

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