

PROFITABILITY AND RESOURCE USE EFFICIENCY OF LAYERS PRODUCTION IN BAUCHI METROPOLIS OF BAUCHI STATE

By

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ABSTRACT

This study examined the profitability and resource use efficiency of layers production in Bauchi metropolis of Bauchi State. Sixty Farmers were selected from the study area using simple random technique. The data were collected using structured questionnaire and analyzed using descriptive statistics, farm budgeting and multiple regression models. The results revealed that about 23% of the farmers fell between the age bracket of 35-39 years of age with a mean age of 39 years and about 39% of the sampled farmers attended tertiary institutions. Majority (50%) of them had a family size of 4-6 persons per household, about 28% of the producers had 7-9 years of farming experience and majority (50%) of them utilized family members as a source of labour. The result further revealed that farmers obtained Gross Margin, Net Farm Income and Returns per naira invested of ₦2838.12, ₦2660.66 and 0.53 respectively. The result of the regression analysis revealed that flock size, feed, cost of medication and cost of brooding significantly ($p < 0.05$) influence the level of layers production in the study area. The result of the study further revealed that the utilization of the inputs factors was inefficient since the ratio of MVP to MFC is more or less than unity for feeds, cost of medication and labour inputs. However, prevalence of disease outbreak, high costs of feed, among others was the major constraints to layers production in the study area. It was therefore recommended that farmers should form cooperatives groups to enable them obtain credit from government and financial institutions and improved veterinary services should also be provided. In addition, farmers need to adjust the usage of the resources appropriately.

Key words: Profitability, Resource Use Efficiency, Layers Production, Gross margin

INTRODUCTION

The Nigeria Agricultural Sector is responsible for the production of food and livestock with poultry production accounting for 80% of the production (Oyedipe, 2000). Expansion of the poultry industry holds the greatest promise for bridging the animal gap in the country. It has become the foremost among the subsidiary occupations of farmers to supplement their

income because it assures quick returns, requires minimum space and investment can be carried out by ordinary farmers. (Ekunwe & Soniregun, 2007).

It was also observed that developing the poultry industry is the fastest means of bridging protein deficiency gap in the country (Haruna & Hamidu, 2004). Hence, it has become imperative to encourage our farmers to venture into commercial poultry production

especially now that the federal government has placed the embargo on the importation of poultry products since 2002.

In general, poultry production, overcome other livestock production sectors in many economic advantages such as higher rate of capital turnover, ease of management, and quick return to investment (Haruna and Hamidu 2004). In layers production as well as other agricultural sectors, the core of economic efficiency is the resource-use efficiency. It means that given a certain level of inputs, layers producers should be able to achieve maximum profit. It is obvious for resources a business purchases that the less it spends to produce a given amount of output, the greater its profitability. This implies that for producers to achieve their goals in earning more profit the available resources used in production should be efficiently utilized. Inefficient use of these resources and technologies by producers will end in more cost-effective efficiency improvement to increase output (Effiong, 2005; Ike, 2008). The importance of resource efficiency in increasing production has been widely recognized by researchers (Ike, 2008; Okoye, 2006; Ike and Inoni, 2006; Nwaru, 2005). Economic efficiency refers to the use of resources to maximize production (Steven, 2003). It is the allocation of resources to their highest valued use. An economically efficient situation is that when production proceeds at the lowest possible per-unit cost of resource or it is an economic state in which every resource is optimally allocated. The result of achieving economic efficiency is that production of a unit of good is at the lowest possible cost. It is often subjective and very important to measure economic efficiency in different agricultural activities; layers production is not an exception. Economic efficiency measures were the main issue to be addressed in many literature of poultry production analysis (Cooper et al., 1999; Bricc and Lemaire, 1999; Ray, 1997; Färe and Grosskopf, 1997)

Food and Agricultural organization (FAO 1991), recommended that an individual takes 35g of animal protein for sustainable growth and development. However, the animal protein consumption in Nigeria is less than 8g per person per day which is a far-cry from FAO minimum recommendation (Oyedipe 2000). In Nigeria despite the growth in the egg production industry since 2000, local demand has not been matched by local supply with reported egg imports of 730 million in 2000 (United States department of Agriculture, 2011). This is due to fact that poultry production in Nigeria is faced with low productivity and inefficiency in resources allocation and utilization (Oladeebo, 2007). Also, Poultry production in the study area is being threatened by many problems despite its importance these includes high cost of feeds ,poor or lack of veterinary services, inadequate supply of day old chicks, disease condition, poor management, lack of hatchery machine, uncertain environmental conditions and other production inputs coupled with inefficient utilization of resources by farmers.

The resultant effects is usually high overhead cost which results in low profitability and has a negative effect on the efficiency and productivity of most farmers. Adequate efforts must therefore be made to solve these problems, for the industry to be economically viable. This study, therefore, seeks to address these knowledge gaps by finding answers to the following research questions.

- i. What are the socio-economic characteristics of layer producers in Bauchi metropolis?
- ii. What are the cost and returns in layer production in the study area?
- iii. What are the effect of inputs on layers output?

- iv. How resources are efficiently utilized by layers producer's poultry in the study area?
- v. What are the constraints to layers production in the study area?
- ix. Estimate the resource use efficiency of poultry enterprises in the study area
- x. Identify the constraints to layers production in the study area.

Justification of the Study

The demand for poultry product by both urban and rural dwellers in the country is growing rapidly to meet up with protein requirement. A part from the nutritional benefits of the industry, it also constitutes an important sector in the economy of the nation because it serves as source of employment and income to the producer and the government respectively. Few studies investigated the economic efficiency of layers production in Bauchi metropolis. Thus, this study was aimed at determining the profitability and resource use efficiency of layers production in Bauchi metropolis. Determining economic resource-use efficiency will provide practical tools for decision makers and poultry farmers to apply production policies needed to improve layers production. The study will also bridge the existing knowledge gap on layers production and how resources were utilized to achieve maximum profitability.

Objectives of the Study

The broad objective of this research is to determine the profitability and resource use efficiency of layers production in Bauchi metropolis. The specific objectives of the study were to:

- vi. Identify the socio-economic characteristics of layer producers in Bauchi metropolis.
- vii. Determine the cost and returns in layer production in the study area.
- viii. Determine the effect of productive Inputs on layers output

METHODOLOGY

Bauchi metropolis is located on latitude 10° 17' and longitude 9° E, situated are 690.20 meters above sea level within the northern guinea savannah ecological zone of Nigeria. The mean minimum and mean maximum temperature of 13.7°C and 30.11°C is gotten in the month of April and it's found to be the hottest month in the year (BSADP, 1995). The mean relative humidity is characterized by two (2) seasons i.e. wet and dry season, with the wet season commencing between may/June to September/October and dry season being between September/October and April/May.

According to National Population Commission (2006), the population of Bauchi metropolis was 493,810 people out of which 180,225 were males and 161,533 were females. The metropolis is a multi-ethnic area predominantly occupied by the Gerewa, Hausawa, Fulani, Jarawa and host of others all juxtaposed together. The major economic activity in the metropolis is trading, agriculture and civil service work. Major crops grown include sorghum, maize, rice, cowpea, groundnut, legumes and vegetables. Being the Capital of the state, the metropolis has been one of the most attractive sport cities in the nation, which has a lot of sporting facilities that hosted both national and international competitions. The major markets in the metropolis are Central Market, MudaLawal, Wunti, Sabuwar Kasuwa and Railway Market.

A simple random sampling technique was used to select ten (10) layers producers in six (6) selected areas of Bauchi metropolis which includes Yelwa, Gwallameji, Wunti dada, GRA, Nassarawa and Rafin Zurfi, making a total of sixty (60) respondents for the study. The data were collected through the use of structured

questionnaire. The information sought includes age of the respondents, sex, marital status, household size, level of education, source of initial capital, cost of feed, day old chick.

The data was analyzed using descriptive statistics, farm budgeting and multiple regression model.

Descriptive statistics such as mean, percentages and frequency distribution was used to achieve objective I and VI of the study.

Farm Budgeting Model

Farm budget is a detailed physical and financial plan for operation of a farm for a specific period. This is

$$NFI = TR - TC \text{ ----- (I)}$$

Where,

NFI = Net Farm income

TR = Total Revenue

TC = Total cost

Multiple Regression Analysis

This technique was used to estimate a production function to determine the relationship between the inputs and layer output of the layers

$$Y = F (X_1, X_2, X_3, X_4, X_5, X_6, U) - - - - - (2)$$

Where,

Y = Output of layer (crate of eggs)

X₁ = Flock size (number of birds)

X₂ = Feed (kg)

X₃ = cost of medication (N)

X₄ = cost of labour (N)

X₅ = cost of Brooding (N)

X₆ = cost of Day-old chick (N)

U = Random factor

Resource Use Efficiency

In order to determine the resource use efficiency of poultry egg farmers, the study adopted the method used by Oladeebo and Ambe-Lamidi (2007),

used to determine the profitability of a farm. It involves estimating the gross revenue and total cost of production (Olukosi and Erhabor, 2005).

This technique was applied to achieve objective (II) of the study. The farm budgeting techniques applied in this study is specified as follows.

Net Farm Income

The net farm income is the difference between total revenue and total cost of production (Olukosi and Erhabor, 2005). The total cost encompasses both fixed and variable cost.

producers. The technique was used to achieve objective (III) and (IV)

The production function is expressed implicitly as follows:

$$- - - - - (2)$$

where the marginal value product (MVP), the additional income received from using an additional unit of financial input for each resource was computed and compared with the respective acquisition cost (MFC).

The MVP of a particular resource was computed using equation below:

$$MVP = MPP_{x_i} \cdot P_Q \quad \text{--- (3)}$$

Where,

MVP = Marginal Value product

MPP_{x_i} = the marginal physical product of X_i resource that was used in the production process.

P_q = price of X_i resource

RESULTS AND DISCUSSION

age of the famer, educational level, household size, years of farming experience, sources of labour and capital level

Socio-economic characteristics of the respondents

The socio-economic characteristics of the respondents considered in this study include gender, marital status,

Table 1: Distribution of respondents according to Socio-economic characteristics

	Variable	Frequency	Percentage
Gender	Male	36	60
	Female	24	40
Marital Status	Married	35	58.30
	Single	22	36.6
	Divorced	3	5.0
Age	Widowed	0	0
	≥ 29	10	16.66
Educational Level	30 - 34	8	13.33
	35- 39	14	23.33
	40 above	28	46.66
	Primary	1	1.66
House hold size	Secondary	20	33.33
	Tertiary	37	61.66
	Quaranic education	2	3.33
	1 - 6	38	63.33
	7 - 9	17	28.33
Type of labour used	10Above	5	8.33
	Family labour	30	50.00
	Hired labour	10	16.66
Farming Experience	Both hired and family	20	33.33
	1- 3	10	16.66
	4 - 6	13	21.66
	7 - 9	17	28.33

	10 Above	20	33.33
Number of Birds stocked	50- 1000	53	88.3
	1001 – 2000	5	8.3
	Above 2000	2	3.4

Source: Field Survey, 2015.

Table 1.revealed that 60% of the respondents were male while the remaining (40%) of the respondents were females. It can therefore, be concluded that layers production in the study area was dominated by males. The table also indicated that majority (58.3%) of the respondents were married while 36.7% and 5% were single and divorced respectively. The table revealed that 23% of the respondents fell within the age bracket of 35-39 years. Thus, it can be deduced that layers producers in the study area are relatively young and still in their productive years and can take good decision as regards effective management. Majority (61.7%) of the respondents had attended tertiary institutions, 33.3% had Secondary education and the remaining had Qur'anic and primary education. This might be due to presence of higher educational institutions in the study area. The result of the analysis of household size shows that Majority (63.33%) of the respondents had a family size

of 1-6 people per household. The result further shows that majority(50%) of the respondents use family labour as source of labour, 33.3% uses both hired labour and family labour and16.7% use hired labour. The table reveals that 28.32% of the respondents had 7-9 years of farming experience while the least (6.7%) of the respondents had above 10 years of farming experience. The results further revealed that Majority (88.3%) of the respondents rose between 50- 1000 birds.

Costs and Returns Analysis

In order to achieve objective 2 of this study a simple budgeting model was employed to estimate the cost and return to layers production in Bauchi metropolis. This includes gross income, net farm income, and return per naira invested.

Table 2: Average Cost and Returns Analysis in layers production per bird per production cycle

ITEMS	AMOUNT (N)/BIRD	PERCENTAGE
COST		
Fixed costs		
Housing	149.01	83.97
Feeders	8.01	4.51
Drinkers	7.43	4.19
Wheelbarrow	1.66	0.94
Broom	1.22	0.69
Bucket	1.59	0.90
Others	8.54	4.81
Total fixed cost (TFC)	177.46	100
Variable costs		
Day old chicks	194.70	3.99

Feed	4029.22	82.63
Wages on labour	332.16	6.81
Veterinary services	69.86	1.43
Electricity charges	54.83	1.12
Water	24.04	0.49
Medication	68.22	1.40
Brooding	37.98	0.78
Other	70.46	1.46
Total Variable cost (TVC)	4875.93	
Total cost (TC)	5053.39	
REVENUE		
Sales of spent layer	935.0	12.12
Sales of Egg	6088.5	78.92
Sales of empty bags & liters	690.55	8.95
Total Revenue	7714.05	
Gross margin	2838.12	
Net Farm Income	2660.66	
Returns per Naira invested	0.53	

Source: Field survey, 2015.

The table (2) revealed that the average fixed of layers production is N149.01 and was incurred on housing which represents 83.97% of the total fixed cost, while the remaining 16.01% of the total fixed cost was spent on feeders, drinkers and other fixed expenses. The result also shows that the total variable costs for one cycle of production were found to be N5053.39 and out this feeds accounted for 82.63% of total Variable cost, this agrees with the findings of Adepaju (2008) which stated that feed cost is the major important cost elements in poultry egg production. The gross margin, the net farm income and the returns per naira invested on layers production were found to be N2838.12, N2660.66 and N0.53 respectively. This implies that layers production is profitable in the study area.

Factors influencing in layers production

The level of output obtained in any production to a certain level is determined by input applied. Thus table 3 shows the regression analysis on the influence of input on output. The estimated equation showed a good R^2 value of 0.81. The double log form shows significance in respect of stock size, cost of feed, cost of medication and cost of brooding contrastingly cost of labour and cost of day old chick was not significant in the form.

According to the result, the Cobb-Douglas equation provided the best fit of all the functional forms listed and hence selected as lead form. The signs of the coefficients were consistent with priori expectations. Therefore this form is chosen as a lead equation because it has the highest number of significant parameters.

Table 3: Result of the Regression Analysis showing factors influencing layers output

Variable	Coefficient	Standard error	t-value
Constant	-10590.616	15414.151	-0.687**
Stock size	12.231	3.214	3.805***
Feed	0.020	.058	0.349*
Cost of medication	-0.025	.009	-2.768***
Cost of labour	0.000	.002	-0.078NS
Cost of brooding	0.373	.032	11.757***
Cost of DOC	29.648	75.370	0.393NS
R ²	0.814		
F- Ratio	38.761*		
N	60		

Source: field survey (2015), *** (p<0.01), ** (p<0.05), * (p<0.1), NS- Not Significant

The result of the regression analysis indicates that flock size, feed and cost of brooding were found to be highly significant (p<0.1), factors influencing layers production in study area. This agrees with the finding of Oladeebo and Ambe-Lamidi (2007) which stated that the larger the flock size of a poultry farm, the higher the number of eggs and income generated in poultry production.

The coefficient for the cost of medication was found to be negatively significant (P<0.1). The implication of this is that an increase in the cost of medication would lead to a decrease in the quantity of egg (crates) produced.

. The result further showed that 81% of the variation in the profitability of layers production was explained by variation in the explanatory variables included in the model, the remaining 19% may be attributed to other factors not included in the models

Resource Use Efficiency

The estimated coefficients were used to compute the marginal value product (MVP) and its ratio with marginal fixed cost (MFC), to determine the economic efficiency of resources used.

Table 4: Resource use efficiency

Resource	MPP	MVP	MFC	MVP/MFC	Conclusion
Stock size	12.231	8274.27	194.67	42.50	Under utilized
Feed	0.020	12.177	96	0.13	Over utilized
Cost of Medication	-0.025	-16.91	701	- 0.02	Over utilized
Labour	0.005	64.251	88.54	0.726	Over utilized
Cost of brooding	0.373	252.33	37.97	6.65	Under utilized

Source: Field Survey, 2015

Table 4 revealed that the ratios of the MVP to MFC for stock size and cost of brooding were greater than unity; indicating that these two inputs were underutilized on the farm during the production process, hence increase their rate will increase output and profit. The table also, reveals that the ratios of feeds, cost of medication and labour were less than unity; indicating these inputs were excessively used or over utilized hence decreasing quantity of the inputs will increase output and profit level.

Constraints to Layers production

This section investigates the constraints to fresh fish marketing as reported by the respondents and

the result is presented in table 5. The table shows that majority (68.3%) of the respondents indicated that prevalence of disease outbreak was the major constraints to layers production in the study area. This could be as results of poor veterinary services or poor adoptions of innovations on the part of the poultry farmers.

The findings also revealed that High cost of feed, lack of market and seasonality in production as well as inadequate capital accounted for 63.3%, 55% and 45.3% respectively are the major constraints to layers production in the study area.

Table 5: Distribution of respondents according to constraints to layers production

Problems	Frequency*	Percentage	Ranking
Prevalence of disease outbreak	41	68.3	1 st
High cost of feeds	38	63.3	2 nd
Seasonality in production	33	55.0	3 rd
Inadequate capital	26	43.3	4 th
Inadequate extension services	19	31.6	5 th
Managerial skills	18	30.0	6 th
Inadequate drugs and vaccines	9	15.0	7 th
High mortality rate	5	8.3	8 th
Theft	1	1.6	9 th

Source: Field Survey, 2015. * Multiple Responses

CONCLUSION/RECOMMENDATION

The result revealed that layers production is a profitable enterprise as indicated by the Net Farm Income and Returns per Naira invested of N2660.66 and 0.53 respectively. However, farmers are far from being efficient in their use of productive resources. It is therefore recommended that;

- I. Farmers should form agricultural cooperatives groups that will enable them

obtain credit facilities from government and financial institutions.

- II. Improved veterinary services that are targeted at reducing incidence of disease in layer production should be put in place so as to reduce the cost of medication and lower the mortality rate.
- III. Feed mills should be established to provide producers with locally made feed in order to reduce the costs of feeds.

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