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RESOURCE USE EFFICIENCY OF POULTRY LAYERS PRODUCTION IN ROGO LOCAL GOVERNMENT AREA KANO STATE, NIGERIA

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Abstract

The study was carried out to determine the resource use efficiency of poultry-layers production in Rogo Local Government Area of Kano State. A sample of 150 farmers was selected by simple random sampling technique. The data was analyzed using descriptive statistics, frequency, percentage, multiple regression and marginal analysis. The result reveals that, the cost incurred on purchasing chicks has significant at 1%; medication has significant at 5% and labour at 5%. The positive nature of the relationship of the chicks, medication and labour means increase at one unit of chick; medication and labour would cause the quantity of output to increase by certain percentage. The negative relationship of electricity to the returns implies that decrease in one unit cost of the input will cause the return to decrease by certain percentage. The result indicates that all the variables inputs in the production were inefficiently utilized because none of the ratio equals to one. The farmers under-utilized the chicks, electricity and medication. The labour ratio is less than one showing that the farmers over-utilized labour. The result indicates the need for making input affordable and accessible to farmers so as to improve efficiency. It also implies that the farmers might be earning higher returns if more of the various resources were efficiently utilized. It was also recommended that poultry layers farmers should implement better management practices to minimize the incident of their resource used inefficiently to improve the profitability and resource use efficiency of poultry production.

Key words**:** *poultry layers production, resource use efficiency, marginal analysis, Rogo L.G.A., Kano State*

INTRODUCTION

Poultry production in Nigeria is an important industry as evidenced by the fact that Nigeria leads all other African countries in poultry production [3]. Poultry production is one of the fastest and most economical routes to achieve the much desired objectives of increased animal protein intake, as well as diversification of several agricultural rural economies [9] Poultry provides an acceptable form of protein to most people throughout the world. Poultry enterprises have rapid production cycle interval and high rate of productivity. Certain breeds of birds can produce eggs within sixteen weeks of age like Rhodes Island, New Hampshire, and Leghorn [11]. Poultry product is used in the manufacture of many industrial goods and is also suitable for genetic nutritional and physiological studies [11]. According to [14], poultry production is one of the profitable agricultural enterprises and it is this accruing return from the enterprises that can be used to improve the life of rural dwellers. [1] Reported that, the level of consumption of meat and other animal protein in Nigeria is estimated at about 8 grams per caput per day, which is about 27 grams less than the minimum requirements recommended by National Research Council of United States of America. The recommended protein intake in Nigeria is 35/grams/caput/day [3] the task of closing this animal protein gap or deficiency, taking into consideration may largely depends on increased poultry production at least in the short run. The poultry products which are sold contribute about 15% to the annual financial income of the household [8]. [2] Reported that the commercialization of poultry-keeping is a recent development in the humid tropical country like Nigeria. In Nigeria as contrasted with the temperate countries the industry is less capitalized, consisting of smaller units who depends more on manual labour. The birds usually perform at a lower level, and partly on this account, the cost of poultry production is higher. [10],

in Nigeria, despite the growth in the egg production industry since 2000 local demand and has not been matched supply with reported egg imports of 730 million eggs imported in 1999 [13].

Efficiency and productivity, although referring to distinct concept derived from production function are interrelated and are common performers measure by which agricultural units are evaluated. The everyday meaning of the term 'efficiency' refers to a situation where resource is used to their capacity so that no resource is wasted. [6], it is a measure of efficiency accounting for a single output and multiple outputs. The efficiency of an economic unit is a holistic measure used and all inputs produced in determining 'how well' or 'how effectively' the decision making unit combines input to produce output.

Research question

It is against this background that the current study to answer the following research questions:

(i)What is the socio-economical characteristic of the layers producers in Rogo?

(ii)Are the resources efficiently utilized?

(iii)What are the relationship between the value of output and the value of input used in the production?

The objectives of the study:

The broad objective of the research is to determine the resource use efficiency of poultry layers production in Rogo Local Government.

The specific objectives of the study are:

(i) Identify the socio-economic characteristics of layers producers in the study area.

(ii)Determine the relationship between the value of output and the value of input used in the production.

(iii)Determine the resource use efficiency in the study area.

MATERIALS AND METHODS

The study Area

The study was carried out in Rogo Local Government Area of Kano state Nigeria. It was created out of Karaye Local Government in 1996 with it headquarters at Rogo town and it is located at the western part of the state. The Local Government has twenty-two districts. The area lies between Sudan vegetation zones with annual rainfall of 870.20 mm – 1,100mm [5]. It has the minimum and maximum temperature 35ºC to 40º C respectively. The location of the area is at latitude 10º 33¹ N and longitude 7º 34¹ E.

Sampling technique and sampling size

A purposive sampling technique was used in selecting the districts, villages and the respondents. The selection of the village was based on the large volume of poultry (layer) production in the area. Ten district were selected out of the twenty-two district and they are; Zarewa, Rogo, Beli, Ruwan Bago, Kadana, Bari, Falgore, Yanoko and Barbaji. In each village, fifteen farmers were selected. A total of 150 respondents were selected in the areas. The list of the poultry farmers were obtained from Kano state Agricultural and Rural Development Authority (KNARDA), from the random selection was accomplished. The method employed for the random selection in each district was that the numbers of the layer farmers was written on a paper. The papers were shuffle and boys were asked to pick continuously until the desired sample size was obtained in each of the selected districts.

Method of data collection

The data for this study was collected through the use of structured questionnaire. The questionnaire were designed to provide relevant information on the socio-economic characteristics of the layers farmers, the relationship between the value of output and the value of input used in the production and the resource use efficiency in the study area.

Data analysis

The analytical techniques used for the data analysis includes descriptive statistics, frequency and percentage to determine the socio-economical characteristics of the poultry layers farmer. The production function analysis was used to determine the relationship between the output value and input value in production. The marginal analysis was used to find the efficiency in the resources used in the production.

Specification of the regression model

The multiple regression models were used to analyze the relationship between the dependent variables (Yi) and the independent variable (Xi). The independent variable examined were the cost of chicks (Xi), cost of transportation (X2), cost of electricity (X3), cost of housing (X4), cost of feed (X5), cost of medication (X6), cost of labour (X7) and cost of feeders and drinkers (X8). In this study, the linear and semi-log functions of the multiple regression models were employed and express in (1) and (2) respectively.
Linear functional form is:

$Y = a + b1x1+b2x2 + b3x3 + b4x4 + b5x5 + b6x6 + b7x7 + b8x8 + u$ …….. (1)

The functional form of semi-log was transformed into logarithmic equation form to linearize and simplify the function.
The logarithmic transformation of the model is:

$Log\ Y = log + b1logx1 + b2logx2 + b3logx3 + b4logx4 + b5logx5 + b6logx6 + b7logx7 + b8logx8 + u$ ……..... (2)

The functional form of the model used in the analysis include linear and Cobb Douglas functional forms. The model with the best fit (e.g. linear) was selected on the basis of R^2 value, F-ratio value and number of significant coefficients.

Measurement of resource use efficiency

In order to determine the resource use efficiency of poultry layers farmers, the study adopt the method used by [7] where the marginal value product (MVP), the additional income received from using an additional units of financial input for each resource was computed and compared with the respective acquisition cost (MFC).
r = marginal value product/marginal factor cost = MVP / MFC ……..... (3)
r = efficiency ratio.
MVP = value of one unit of the product.
MFC = cost of one unit of a particular resource.
The MVP was calculated as follows:

$MVP = MPPX1 \times Py$

$MPPX1 = dy / dx1 = b1x/y$

Note: Y and X are the arithmetic mean values of the yield (Y) and input (X) respectively, bi is as defined earlier and by Py is the price of unit output.
Decision rules:
If r = 1 it implies that resource is efficiently utilized.
r > 1 it implies that resour5ce is underutilized.
r < 1 it implies that resource is over utilized.

RESULTS AND DISCUSSIONS

Socio-economic characteristics of the respondents

Table 1 set out the socio-economic parameters of the respondent, while Table 2 shows the multiple regression analysis to express the relationship between the value of output and the value of input used in the production. Table 3 shows the marginal analysis to determine whether the resource was efficiently utilized.

Table 1. Distribution of the respondents by socio-economic characteristics

Demographic factors	Frequency	Percentage
Gender		
Male	120	80
Female	30	20
Marital status		
Married	115	77
Single	35	23
Household size		
1 – 4	25	16.7
6 – 10	110	73.3
11 – 20	15	10
Educational level		
Qur'anic	25	16.7
Primary	1	0.6
Secondary	15	10
Tertiary	109	72.6
Years of Experience		
1 – 5	20	13.33
6 – 10	120	80
11 – 20	10	6.6

Source: Field survey, 2018.

The results in Table1 show that most of the respondents were male (80%) and married (77%). The dominance of males in the poultry

business may be connected with the huge sums of money needed to start the business which is often difficult for women to raise in the part of the world. The household size of the respondents was 6 – 10. According to [12], the large family labour especially when labour - intensive techniques are required. All the respondents are educated with a majority (72.6%); having University education that shows the higher the level of education aid the adaptation of new innovations and perceptions was attributed to the level of education that leads in increasing the productivity [7s]. The result shows that (80%), of the respondents 6 – 10 years of experience in poultry layers production. It indicates that the farmers in the study area had more experience up to (80%) which indicates that, the years of experience had direct relationship with age of the producers. The older the farmer in the business the more the experienced he is in layers production and so the more output realizes and higher net farm income [5].

The results in Table 2 indicates that semi – log and linear production functions analysis shows the cost incurred on purchasing chicks (x1) had significant at 1%, medication (x6) had significant at 5% and labour had significant at 5%.

This positive nature of the relationship of the chicks, medication and labour means increase in one unit of chicks, medication and labour would cause the quantity of output produced to increases by certain percentage of 0.996%, 0.2224% and 0.228% respectively.

The quantity of electricity (x3), had a negative significant at 1%. The negative relationship of supply of electricity to the output produced implies that decrease in one unit cost of (x3) would cause the production of output to decrease by 0.2%. The transportation (x2), housing (x4), feeds (x5), drinkers and feeders were not statically significant at any of the conventional level to affect the output of layers producers.

The non significant of these inputs, may be attributed to the fact that the farmer did not used these inputs at the right time.

Table 2. Production function estimates for poultry layers enterprise

Variables	Coefficients	STD Error	T – value
Constant	-0.002	0.823	-0.003
Chicks (x1)	0.996	0.120	8.333*
Transportation (x2)	0.085	0.103	0.824
Electricity (x3)	-0.214	0.071	-3.021*
Housing (x4)	-0.152	0.129	-1.175
Feeds (x5)	0.007	0.075	0.096
Medication (x6)	0.224	0.094	2.389**
Labour (x7)	0.228	0.945	2.412**
Drinkers and Feeders (x8)	0.082	0.055	1.26

R^2 = 0.66, F = 34.72** and ** significant at 1% and 5 level of profitability respectively.
R^2 = adjusted = 0.64
Source: Field survey, 2018.

The result further revealed that about 64% 0f the variation in output value was accounted for the inputs included in the analysis. It is therefore follows that other factors not in the analysis accounted for the remaining 36% of variations in output value.

Resource use efficiency

Marginal analysis was used to determine economic efficiency of resources used. Evaluation of the resources used enable a firm to know their operation status in order to know their operation status in order to adjust the production prizes to achieve economic rationality.

The results indicates that all the variables inputs in the production were in efficiently utilized because none of the ratios equal to one as indicated in table 3.

Table 3. Estimation of Resources use efficiency of significant variables

Variables	APP	MPP	MVP	MFC	R = MVP/MFC
Chicks	5.49	5.471	656.52	120	5.47
Electricity	33.19	7.103	355.15	5000	7.1
Medication	54.209	12.1438	1760.70	14500	12.14
Labour	180.86	41.185	1075.0	1500	0.71

Source: Field survey, 2018

The ratios indicated that sampled farmers under-utilized the chicks, electricity and medication. The reasons could be due to high price of chicks, electricity and medication. The under-utilization of chicks was due to high cost of purchasing the day old chicks and started pullet, while, the electricity was due to lack of constant supply light for brooding while, the medication could be due to high cost of the input and farmers do not apply drugs and medication except when there is any sign of sickness. The efficiency ratio for the labour was less than one showing that the sampled farmers over utilized labour on the farms. This could be due to low wage rate for labour and availability of family labour which was usually not valued.

The results was collaborated with [4], that reported farmers were inefficient in all of the resources in his analysis, that indicates the need for making inputs affordable and accessible to the farmers so as to improve efficiency. It also implies that the farmers might have been earning higher returns if more of the various resources were efficiently utilized. The relationship between the value of output and the value input used in the production indicates that the total average cost of the production was £89062, 473, while the total average net farm income was found to be £152651.01higher than the total cost of production.Thus, from the analysis it can be seen that layers production is profitable. This relationship of output value and the value of input was explained by the semi-log function that estimates the physical input-output relationship.

CONCLUSIONS

Evidently, the study established that poultry layers production was in lucrative business in Rogo Local Government area. However, farmers were far from being efficient in their use of productive resources. The study revealed that some of the inputs (chicks, medication and electricity) were underutilized. While labour was over-utilized. The study led to the following recommendations:

(i)Therefore, there was a need on extension activities of the Agricultural Development project to focus attention on ways farmers could be trained in inputs utilization.

(ii)A deliberate policy on labor management practices should also be encouraged so that farmers can utilize labour efficiently.

(iii) To improve the profitability and resource use efficiency of poultry production farmers should implement better management practices to minimize the incidence of disease outbreaks, thereby reducing the cost of production.

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