Research Article

Resource Use Efficiency in Small and Medium Scale Poultry (Egg) Farming in Ogun State

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Abstract

This study focused on resources use efficiency among small and medium scale poultry farmers in Ogun State, Nigeria. The data analysis was carried out with the use of primary and secondary data through the use of structured questionnaire administered on 100 poultry farmers. The respondents were selected by multistage sampling techniques. Descriptive analysis were used to analyze the socio economic characteristics of the poultry farmers in the study area. Budgetary analysis was also used to estimate the cost and return structure of poultry production in the study area. Multiple regression analysis was done to determine the effects of resources use on poultry production. Also, stochastic frontier production function was used to access the effect of socio economic factors on poultry production. The findings revealed that 76% percent of the farmers had formal education up to tertiary level and 8.8% had poultry farming as their main occupation. The budgetary analysis showed that poultry production was quite profitable in the study area. The average gross margin for small scale N337,921.00 while for medium scale is N275,309.00 and the net income for small scale was N329,288.80, while for medium was N256,615.9. This is because small - scale poultry farmers are in majority and due to small scale of operation they are able to effective utilize the available resources to maximize their farm output. the stochastic frontier analysis result revealed that some variables such as educational level, farm experience and credit obtained have negative coefficient and statistically significant, which implies increase in these variables will decrease the technical inefficient and positive coefficient variables will increase the technical efficiency of the poultry farmers. It is therefore recommended that the small scale poultry farmers should be encouraged financially since the success of poultry production depends on them in the short run.

Keywords: Poultry; Budgetary; Production; Stochastic; Output

Introduction

Agriculture is very important on the economic development of a nation. Its crucial position in the economy lies in its distribution to employment, the Nation Gross Domestic Product (GDP), foreign exchange earnings, saving and the provision of food and fibre for local consumption and raw materials for the agro-allied industries [1].

In a large number of developing countries including Nigeria, agriculture remains the dominant sector. Even with this level of importance, agriculture in recent years has not been able to meet the food needs of the country; the domestic food shortages are offset by food imports this committing the scarce foreign exchange earnings which should have been used to purchase capital goods needed for industrial expansion. Hence, productivity gains in agriculture in Nigeria are necessary for sustainable economic development.

However, agriculture is considered a high risk venture unlike the industrial sector, which is not affected by vagaries of the weather. Many factors including reduction in farm yields and income as a concomitant of natural hazards such as pests and diseases, flood, fire, drought, lightening and windstorm have considerably reduced the quantum of investment in agriculture. The variations in pro-

ductivity induced by nature is enormous and farmers have devised measures to limit these risks through crop rotation, crop diversification intercropping, staggered planting, use of law yield but hardy varieties, tillage systems, share tenancy, contractual inter-linking, involvement in non-farm sources of income and other socio-cultural strategies which distribute risks within the extended family. However, the effectiveness of the above mentioned traditional risk management measures are severely limiting [2].

Types of poultry birds reared in Nigeria

The poultry subsector is the most commercialized (capitalized) of all the sub-sectors of the Nigerian agriculture. The types of poultry that are commonly reared in Nigeria are chickens, ducks, guinea fowls, turkeys, pigeons and more recently ostriches. Those that are of economic or commercial importance given the trade in poultry, however, are chickens, guinea fowls, and turkey amongst which chicken dominates [3].

The band of poultry products by the Federal Government of Nigeria (FGN) has caused a turn around in poultry which grew by 10.3 percent as composed to 0.3 percent in 2003. This growth was partly due to the ban and also the use of veterinary services by lots of farmers [4-6].

Every poultry farm has its own risk profile for the introduction of pathogens, subsequent development of disease and spread of pathogens to other farms. The risk port folio is determined by a complex interaction between the levels of interaction within the study area, the measures implemented on the farm to prevent disease and other factors, including the density of farms in the area and linkages with other farms and the markets. Farm bio-security measures reduce but do not eliminate the risk of introduction or onward transmission of pathogens; they include factors such as the location of farms, the physical facilities, and the operational procedures implemented [7].

Small and medium scale poultry farmers are faced with a lot of problems which have stood as barrier to their existence and growth and which in one way or the other affect not just the agriculture sector but the Nigeria economy at large [8]. Some of these problems are attributable to the risks that are encountered in poultry farming. Absence of detailed analysis and management of the risks in poultry farming has acted as a clear impediment to the growth of the subsector.

The risks that plagued livestock operations of small and medium scale poultry farmer could be in the following forms: (i) Natural risks e.g. Drought, Heat; (ii) Medical risks e.g. Diseases; (iii) Social risks e.g. Burglary, Thief; (iv) Economic risks e.g. Price fluctuation, loss etc. (v) Uncertainties risks e.g. Unstable feed supply.

Objectives of the Study

The broad objective of the study is to analyze resource-use efficiency in small and medium scale poultry (egg) farming in Yewa Division, Ogun State.

The specific objectives are to:

1. Examine the productivity of resource used in the egg laying enterprise of small and medium scale poultry farmers.

2. Estimate the cost-return structure of egg production system in the study area.

Research Methodology
Study area and methods of data collection

The empirical setting for this study is Yewa Division of Ogun State, Nigeria. Both primary and secondary data were used for the study. The primary data were collected through structured questionnaires coupled with oral interview to collect information bothering on socio-economic variables, input cost, labour, output level, risks on productivity etc. while secondary data were obtained from past records, journals, magazines, internet and periodical publications.

Sampling techniques

Multistage sampling technique was used for the study. The first stage involved the selection of two Local Government Areas, namely: Yewa North and Imeko-Afon Local Government Area out of the six Local Government Areas in the study area. The second stage involved random selection of 4 communities from the two selected local government areas. While, the third stage involved random selection of 10 poultry farmers from the selected communities. A total of 80 respondents were used for the study. Out of the 80 sampled farms, fifty (50) were small while the thirty (30) were medium scale poultry farms. Following Omotosho and Oladele (1998), Suliash., et al. (1999) and Ojo [9], farms containing was < 1000 birds were considered as small farms; farms with 1000 - 3000 birds as medium farms while those having 3000 and above birds were classified as large farms.

Methods of data analysis

Both descriptive and inferential statistics were used in analysing data collected for this study. Descriptive statistical technique was employed. The tools involved the construction of frequency tables and charts which were used to describe and compare the different socio-economic characteristics such as age, sex, primary occupation from size etc of farmers. While econometric models (stochastic frontier production function and Ordinary Least Square (OLS)) and budgetary analysis were used to achieve objective (iii) and (iv), respectively.

Model specifications

In order to determine the productivity of resource use in the poultry enterprise; the total factor productivity model was be used. The TFP (total factor productivity) is the ratio of the output to the Total Variable Cost (TVC) as shown below:

$TFP = Y/TVC$

Where: Y= Quantity of output in kilogram

TVC = Total Variable Cost (N)

Using Cobb -Douglas production function

$Y = f (X_1, X_2, X_3, X_4, X_5, X_6 \ldots \ldots \ldots X_n)$

$Y = \beta_0 + \beta_1 X_i + U$

$Y = \beta_o + \beta_1 X_i\, \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + U$

Where:

Y = Value of Output (N)

X_1 = Cost of feeds

X_2 = Cost of drugs

X_3 = Average egg production

X_4 = Cost of poultry house

X_5 = Feed Quality

X_6 = No. of birds

Budgetary Analysis

Budgetary Analysis was employed to estimate the cost-return structure of egg producing farmers in the study area.

Gross margin analysis

GM = TR – TVC ……………(1)
Where:
GM = Gross Margin
TR = Total Revenue
TVC = Total Variable Cost

Net Income Analysis

NI = TR – TC ……………. (2)
Where:
NI = Net Income
TR = Total Revenue
TC = Total Cost
TFC = Total Fixed Cost

Profitability Index

PI = NI/TR x 100% ………….. (3)

The Rate of Return on Investment (%)

RRI = (NI/TC) x 100 ………….. (4)

The Rate of Return on Variable Cost

RRVC = (TR - TFC)/TVC x 100 ……….. (5)

Operating Ratio

TVC/TR ……….. (6)

Results and Discussion

From findings revealed that the age of the farmers is an important factor that affects their level of productivity and overall coping ability in poultry business. Age is also believed to influence the level of physical work and the willingness to take risk. Age distribution showed that the majority of the respondents are below 60 years. This implies that the age groups of the farmers are within the active ages; thus, having high level of productivity. This is because this age group is less risk averse, more educated and more likely to adopt innovation that would enhance production. Poultry farming like any other business require experience and managerial skill, which are associated with age. The greater proportion of the economically active age group is indicative of the potential that exist for adoption of any intervention that could serve as a preventive measure for future outbreak of birds flu and other poultry diseases.

Sex determines the ability to perform some physical works. It also known that men are more competent in farming than women. This is because they are more energetic than their women. Table 2 shows that 71.3% of the respondents are males while 28.8% of the respondents were females. This is means that poultry farming in the study area was dominated by male poultry farmers. This could be due to the energy demands of the venture.

Educational level is a key factor in shaping the perception of farmers and it also influences adoption decision of farmers. This study shows that farmers with formal education have a great abil-

ity to adopt new technology and innovation. This is expected to have a positive influence on their level of efficiency. Table 1 showed that 76% the respondents had their formal education to MBA level while 24% of the respondents had no formal education. The high level of education among farmers in the area of study could mean that most of the farmers are into other professions and only embraced poultry rearing as a part - time venture.

Variables	Frequency	Percentage
Age (years)		
21 - 40	40	50.0
41 - 60	35	43.8
61 - 80	5	6.3
Sex		
Male	57	71.3
Female	23	28.8
Educational Level		
Primary School	7	8.8
Primary school	22	27.5
NCE/OND	14	17.5
B.SC/HND	10	12.5
MBA and above	8	10.0
No formal/education	19	23.8
Location		
Rural	63	83.0
Urban	17	17.0
Marital Status		
Single	26	32.5
Married	47	58.8
Divorced	2	2.5
Widow	5	6.3
Household Size		
Less than 5	48	60.1
6 - 10	31	38.9
11 or more	1	1.3
Farming Experience (years)		
1 - 2	20	25.0
3 - 5	40	50.1
6 - 8	15	18.7
9 - 11	2	2.5
12 - 14	3	3.7
Main Occupation		
Poultry farming	79	98.7
Others	1	1.3
Source of Income		
Personal savings	46	66.0
Other and personal savings	34	34.0
Total	80	100

Table 1: Socio-economic characteristics of poultry farmers.

Source: Field Survey, 2017.

The study revealed that the poultry farmers are more concentrated in rural areas than in the urban areas. About 83% of the Farms were located in the rural areas, 16% of the farms were located in the areas while 1% of the farm were located in both the rural and the urban areas. This is so because rural areas have more land to spare for poultry production and for dispose of poultry wastes. The distribution according to marital status shows that 58.8% of the respondents were married, 32.5% were single, 2.5% were divorced while 6.3% were widowed. This means that majority of the respondent were settled family people and also have family responsibilities. As households expand, there is increased need to get more income through poultry production so as to meet the needs of the family.

Household size is the total number of people living together in a house, feeding from the same pot. It is expected to have a negative influence on efficiency. Okike [10] confirmed the negative influence of household size on farmer's efficiency. Large family size having economic in efficiency is reasonable considering the value of the farm products that could have been sold but are consumed directly by the household size is large and only a small proportion of the farm labour is derived from it, then inefficiency effects is expected to be greater. The table indicated that 60% of the respondents have a household size below 5,38.7% of the respondents fall between the range of 6 and 10 while 1.3% of the respondents fall between the range of 11 and above, People per household size. This implies that the labour requirements of poultry farming can be easily obtained from family source if so required.

Farming experience could have negative or positive effect on the efficiency of the farmer. Parikh., *et al.* [11] reported a positive relationship between the age of the farmers (which is positively correlated with farming in Pakistan and Ethiopia respectively. This finding stem from the fact that farmers with more years of experience are older and are therefore less willing to adopt new efficiencies in production. The table indicates that 50% of the respondents had 3 to 6 years of farming experience. These findings indicate that the farmers must use of improved inputs to the increase the level of production. This implies that appreciable proportion of the farmers were quite knowledgeable in poultry production and management. The number of year of experience of a poultry farmer could be an important factor in predicting adoption behaviour.

It is common for some farm household to engage in other non-farming activities to complement their earning from the farming occupation for their livelihood. It could be positive or negative (AMAZA 2000). From the findings, it is revealed that about 98% are into poultry production as the main occupation while few 1.3% are into other business. The table above, revealed that majority (98.7%) of the poultry farmers are into full time poultry farming while 1.3% of the respondents engage in other non-farm activities.

This implies involvement of the farmers in poultry production is profitable and positively influenced their standard of living. About 66% of the respondents had their source of income from their personal saving while 34% of the respondent had their source of income both personal saving and other sources like loan, cooperative societies etc. It is revealed that farmers also acquire credit for their production. This implies that credit has a direct, positive and significant relationship with the farm output.

Productivity of input used in the egg production Enterprise

Table 2 shows the Ordinary Least Square (OLS) regression of poultry production in the study area. In order to estimate the coefficient and determine the signs of factors that determine gross farm income, which was used as a measure of farm output, multiple regression was used. From the table 2, it could be deduced that the explanatory power of 58.1% of the variation in the farm output of poultry production farmers is explained by the identified factors influencing the output. About 41.9% of the variation in farm output was caused by the explanatory variables not included in the model. Thus, the regression has a good fit implying that the most important explanatory variables are included in the model. Also, the F-value of 19.262 was significant at 99% level of confidence. This, it indicate a strong influence of the selected six variables on the farm output.

Variable Code	Variable Name	Regression Coefficient	T- value
β_o	Constant	0.184	0.744
X_1	Cost of feed	0.307	3.884*
X_2	Cost of drugs	-0.130	-1.626***
X_3	Average egg production	-0.152	-2.037**
X_4	Cost of poultry house	0.008	0.104
X_5	Feed quality	-0.048	-0.618
X_6	Number of birds in stock	0.667	8.523*
Multiple R = 0.783			
R^2 = 0.613			
Adjusted R^2 = 0.581			
F-value = 19.262*			

Table 2: OLS estimate for poultry production.

*: Significant at 10%; **: Significant at 5%; ***: Significant at 10%.
Source: Field Survey 2017.

Cost of feed (X_1) is significant at 1% level of significance with a positive coefficient, it means that increase cost of feed will lead to an increase in resources use by the poultry farmers. Cost of drugs (X_2) is significant at 10% but negative, the negative sign of cost of drugs increase, there is decrease in the resources use by the poultry farmers. The average egg production (X_3): The coefficient of average egg production is significant at 5% and negative, this implies that the increase in the average egg production without acquiring modern inputs can the lower the effectiveness of resource use on poultry production. Cost of poultry house (X_4). The coefficient of X_4 is positive but not significant, this implies that increase in cost allocated to of poultry house will invariably increase in the resources use by and consequently increase the output. Feed quality (X_5). The coefficient of feed positive it is not significant, it means that increase in the feed quality will cause increase the farm output and thereby generate more income for the farmers for the farmers and improve their standard of living. Likewise, the importance of stock cannot be underestimated, the higher the stock, the more likely the gross income will increase if all other factors are input in place.

Cost - return structure of small and medium scale egg laying enterprise

Budgetary analysis was done to estimate the profitability of poultry production in the study area. The variable costs were cost of bird stocked, feed cost, hired labour, medication and vaccination cost etc. The fixed inputs identified were costs of lands, battery cage house etc. As shown in table 3, total revenue for small scale amounted to (TR) N473,800.00 while total revenue for medium scale amounted to N387,597.00. The total cost was N144,511.70 for small scale, and the total cost for medium scale was 130,981.00. This implies that poultry production was profitable in the study area [12-27].

Conclusion and Recommendations

The study examined the resource use efficiency among small and medium scale poultry farmers in Yewa Division, Ogun State. From the result, it was found that the poultry production is generally profitable but the extent of profitability was depend, on poultry farm size, the total quantity of feed, total of all variable expenses, total amount of family and hired labour, location of the farms, total cost of fixed inputs have positive effect on the poultry production. This indicates that the output of poultry farms increased with a positive effect in the types of bird reared, location of the farm and total quantity of feeds. To achieve a higher level of poultry production, there is need to increase the resource use efficiency of the poultry farms in Ogun State. It is therefore recommended that

Item	Small Scale		Medium Scale	
	Mean value	% of total cost	Mean Value	% of total cost
Stock	80550.00	17%	150,947.00	38.9%
Quality of eggs	66550.00	14%	82100.00	21.1%
Price per crate	700.00	0.14%	750.00	0.19%
Sales of egg	326000.00	68.8%	153,800.00	39.6%
Total Revenue (TR)	473800.00		387,597.00	35.6%
Variable Cost				
Cost of bird stocked	20,000.00	1.47%	40,000.00	37.4%
Feed cost	307966.00	22.6%	420.871	26.3%
Hired labour cost	382169.00	28%	296,126.00	20.3%
Medical and vaccination cost	65140.00	47%	22,890.00	30.5%
Other operating cost	583515.00	42%	343,000.00	40%
Total Variable Cost (TVC)	135879.00		112,288	
Gross Margin	337,921.00		275,309	
Fixed Cost (value as monthly depreciation)				
Rent on land (₦/month)	1,163.65.00	13%	7,561.00	40%
Poultry house	2,100.00	24%	7,500.00	16%
Battery cage	5,018.8.00	58%	3011.9	1.17%
Drinkers	100.25.00	1.16%	220.2	2.1%
Feeders	250.00	2.8%	40.00	
Total Fixed Cost (TFC)	8,632.70		18,693.1	
Total Cost	144,511.70		130,981.1	
Net Income	329,288.80		256,615.90	

Table 3: Budgetary analysis for small scale poultry farming in yewa division, ogun state.

Source: Field Survey 2011.

Government should encourage the establishment of more livestock feed mill to increase the availability of concentrate at affordable prices. This will reduce the total production cost in poultry that is allocated to feeds increasing the maximum intake by birds for eventual growth in production. Education should be provided for risk, pests and diseases that are often after the production output.

Bibliography

1. Awojobi AO. "An Economic Analysis of Risk Management among Poultry Farmers in Ogun State". An Unpublished M.Sc. Thesis, Olabisi Onabanjo University, College of Agricultural Sciences, Yewa Campus, Ayetoro, Ogun State (2004): 1-5.

2. Adeyeye. "Essential of Agricultural Economics". Impact of Publisher Nigeria Limited, University of Ibadan (1998): 129-146.

3.   Adene DF and AE Oguntade. "The Structure and Importance of the Commercial and Village-Based Poultry Industry in Nigeria". FAO (Rome) Study (2006).

4.   Central Bank of Nigeria. "Annual Report and Statement of Account". CBN Publications (2004).

5.   Central Bank of Nigeria. "Annual report and statement of accounts". CBN publications (1999).

6.   Central Bank of Nigeria, CBN. "Statistical Bulletin". CBN Publication (2004).

7.   Sims LO. "Risks Associated with Poultry Production Systems". Asia Pacific Information Services, Palm Core, Australia (2007): 10-15.

8.   Laseinde EAO. "Theory and Practical on Poultry Farming". Agricultural Colleges Newsletter. Ahmadu Bello University, Zaria, Nigeria 5.2 (1982): 22-28.

9.   Ojo SO. "Productivity and Technical Efficiency of Poultry Egg Production in Nigeria". *International Journal of Poultry Science* 2.6 (2003): 459-464.

10. Okike I. "Crop Livestock Interactions and Economic Efficiency of farmers" (2000).

11. Parikh A and K Shah. "Measurement of Technical Efficiency in the North-West Frontier Province of Pakistan". *Journal of Agricultural Economics* 45.1 (1995): 132-138.

12. Afolabi and SO Ojo. "Economic Analysis of Replacing the Fish meal component in broiler Starter Mash with gliricidia sepium". Animal Option Book of Proceeding. Edited by S.N Ukachukwu., *et al.* AF Farming J (2000): 4.

13. Ajibefun IA and Daramola AG. "Measurement and Sources of Technical Inefficiency in Poultry Egg Production in Ondo State, Nigeria". *Journal of Economics and Rural Development* 13.2 (1999): 85-94.

14. Bassey. "Past Experience with Poultry Development. Projects Proceeding Smallholder Rural Poultry Production Requirements of Research and Development". Thessaloniki, Greece. Volume 1, Country Reports (1990): 53-60.

15. Battese GE and TJ Coelli. "Frontier Production Functions, Technical Efficiency and Panel Data: With Application to Paddy Farmers in India". *The Journal of Productivity Analysis* 3.1-2 (1992): 153-169.

16. Bravo-Ureta B and A Pinheiro. "Technical economic and Allocative Efficiency in Peasant Farming. Evidence from the Dominican Republic". *The Developing Economics* 35.1 (1997): 48-67.

17. Coelli TJ. "Recent Development in Frontier Modeling and Efficiency Measurement". *Australian Journal of Agricultural and Resource Economics* 3 (1995): 219-245.

18. Coelli TJ. "A guide to Frontier Version 4.1. A computer program for Stochastic frontier Production and Cost for estimate memo". Department of Econometrics, University of England, Armidale 32 (1994).

19. Dada SL. "Problems and prospects in Poultry Production". B. Agric Project, Almadu Bello University, Zaria (2000): 63.

20. Dada EE. "Livestock Farmer". Business Magazine for livestock farmers 14 (1988): 2-4.

21. Debereu and Koopmans. "The Coefficient of Resources Utilization". *Econometrica* 19.3 (1951): 273-292.

22. FAO. "Agricultural Insurance Legislation". (By Beatrice Galan), Rome. FAO (Legislative Study, No. 22) (1981).

23. Farrel MJ. "The Measurement of Productive Efficiency". *Journal of Royal Statistical Society (Series A, General)* 120.3 (1957): 253-290.

24. Ifarajimi GO. "Fundamental Management: Principle and Practice". Published by Centre for Sandwich Programme (CESAP), Ogun State University (1993).

25. Mbanassor JA and AC Nwosu. "Economic Revival and Sustenance in Nigeria. The Analysis of Livestock Industry". Proceeding of silver Anniversary Conference of NASP/WASAP Inaugural Conference, Nigeria Paper No 223 (1998): 442.

26. Nang T and S Jubrin. Quarterly Newsletter of the Nigeria Agricultural Question and Answer Service 1.3 (2001).

27. Olayide SO and EO Heady. "Introduction to Agricultural Production Economics". Ibadan, University Press, Nigeria (1982).