



Economic Analysis of Layer Production in Jalingo Local Government Area of Taraba State, Nigeria

Zakari, H.U; Bashir, M.B; Abubakar, R.U; Lawan, U.A; and Mohammed, U.S

Department of Agricultural Extension and Management
Taraba State College of Agriculture, Jalingo, Taraba State, Nigeria.
E-mail: zakarihu@gmail.com

ABSTRACT

This study examined economic analysis of layer production in Jalingo Local Government of Taraba State. Primary data were collected from 124 farmers drawn from the area of study by a simple random sampling technique. Analysis of data was carried out through the use of descriptive statistics, multiple regression, costs and returns analysis (budgeting). The costs and returns analysis indicated that an average farmer invested annually NGN (Nigerian Naira Currency, 13, 504, 352, (USD 1 is approximately NGN 205) in poultry egg production. The gross margin, net income and gross return invested where NGN 13, 874, 663.19, NGN 12,797, 772.19 and 1.95 respectively. These figures suggest that egg production in the study area was profitable. The study showed that poultry egg production was profitable in Jalingo Local Government but the farmers were not fully efficient in the use of their resources. To improve the profitability and use of resources of poultry production, it was recommended that poultry egg farmers should implement better management practices to minimize the incidence of disease outbreaks, thereby reducing the cost of production.

Keywords: Poultry Egg Production, Cost and Return, Resource Use Efficiency, Poultry Farmers

INTRODUCTION

The poultry industry is very important to the Nigerian economy because it provides a good source of animal protein in eggs and meat. Protein plays important roles in the formation of a balanced human diet which is essential for the good health, vigor and productivity capacity of the people (Abedullah, Maqbool& Bukhsh, 2007). Protein is also important in the building and repair of body tissues; a low intake of protein hinders the development of the brain, reduces the skillfulness of the young and retards the growth rate and resistance to infections (Ogidan, 2002). Animal protein sources include fish, eggs, poultry meat, beef, milk, bacon, pork and mutton. In Nigeria, the three most popular are frozen fish, beef, poultry egg and meat (Apantaku, 2006). The usefulness of any food for body building depends on the amount of protein it contains. The poultry egg industry, apart from providing employment and livelihood to thousands of people in Nigeria, also provides high quality, nutritious food. The poultry egg is a complete protein with excellent quality; one egg will give 6g of protein and egg-white protein has a biological value of 100, the highest biological value of any single protein (Food and Agriculture Organization, 2005). Tijani, Alimi and Adesiyan, (2006) reported that eggs have a number of uses apart from domestic consumption in households; they are used in confectionary bakery products, ice creams and cosmetics. Egg shell is a good source of calcium, the nutritional status of many Nigerians is characterized by low calorie and protein intakes and Nigerians' greatest problem is that of inadequate animal protein in their diets (Iyangbe&Orewa, 2009). However, Adepoju (2008) reported that the average per capita protein intake in Nigeria was 51.7g of which only 6.8g came from animal sources but in developed countries, the average per capita protein intake was over 90g with more than 65g of animal protein. Thus, widespread malnutrition will become more evident in the country if there is no substantial improvement in poultry



production as a major source of protein. Egg production in Nigeria has been troubled by unstable trends in the economy. The problems of the industry make it very difficult for expansion and new producers find it hard to start a business. Such problems include the high cost of feed, outbreaks of diseases, and marketing problems. This situation has forced many small scale poultry farms to close down and those still managing to survive are producing at very high cost with serious input limitations (Adebisi 2000). In Nigeria despite 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, which was down slightly from 732 million eggs imported in 1999 (United States Department of Agriculture, 2001).

Therefore, the development of poultry industry is a viable option in bridging the perennial deficiency gap in Nigeria diet. A part from this, the industry contributes immensely to the Gross Domestic Product and provides employment opportunities to several categories of people in Nigeria. Poultry production is among livestock production in Jalingo Local Government, Taraba State. People depend on poultry for food and poultry farming serves as an additional occupation to supplement the income of small and marginal farm families. Poultry occupies an essential position because of its vast potential to bring about rapid economic growth, particularly benefiting the weaker section of the economy (Ekunwee *et al.*, 2006). For Nigeria to attain rapid economic growth and development there is need for attention to be paid to all sector of agriculture. Events of the past decades also indicate that the demand and supply gap for animal protein intake is so high (Yusuf and Malomo, 2007). Poultry farmers, like other producers in agricultural sector are rational thus, they would increase their supply if they are sure of making higher profit *ceteris paribus* (Emokaro *et al.*, 2009). Higher profit thus ensures the sustainability of the industry. Again, poultry business like any other farming endeavor is fraught with a lot of risks and uncertainties. To circumvent these, poultry farmers try several production methods in a bid to irk out reasonable earning. Some go the whole hog by raising their birds from day old chicks to spent layers, while other prefer to buy mature birds that are at the "point of lay" and are concentrated only on table egg production, eventually selling off the spend birds as "old layers". The third category simply raise their birds from day old chicks to "point of lay" and sell them off to the second category. It is against this background that the current study examined the cost and returns associated with Poultry Enterprises in Jalingo Local Government, Taraba state. This work will be useful in formulating policies that will bring about an increase the level of poultry production and thereby bridge the gap between the demand and supply of poultry production in the country. The result of this study will help to access the impacts of resources already committed to the poultry industry and the extent to which poultry output can be increase from such existing resources. The research will be valuable to researchers and policy makers who could use the policy variables identified in this study to formulate more empirical policies that will improve the production environment. In addition, the results will assist farmers to manage their poultry egg production enterprises more efficiently and earn higher profits and may lead to a better organizational ability and productivity resulting in increased egg production over time.



METHODOLOGY

This study was carried out in Jalingo Local Government, Taraba State. Jalingo Local Government is among the sixteen (16) Local Government Area of Taraba state. The area is located between longitude 11.37° East and latitude 8:89°-8-53° North. The local government area has an estimate population of 140,318 according to the National Population Commission (NPC, 2006). The data used for this study were both primary and secondary. Primary data were collected through the use of structured questionnaires and interviewed administered to the poultry producers selected in the study area. A simple random sampling technique was employed to select 124 respondents from the list of 200 poultry egg farmers registered with the Jalingo Association of Poultry Sellers. This list covered the poultry Egg farmers in the six (6) wards of Barade, Yelwa, Abbare, Majidadi, Turaki 'A' and KachalaSembe respectively. Data collected were analyzed using descriptive statistics, cost and returns analysis, multiple regressions and break-even analysis. Descriptive statistics such as tables, frequency distribution, mean, standard deviation and percentages were used to describe the socio-economic characteristics of poultry egg farmers. Costs and returns analysis (budgeting techniques) was used to determine the profitability of poultry egg production in the study area. The analysis use the relationships $GM = GR - TVC$ and $NFI = GM - TF$, where GM is the gross margin, GR if the gross revenue/returns, TVC is the total variables cost NFI is the net farm income/profit and TFC is the total fixed cost.

Break-even analysis was used to estimate break-even output for poultry egg farmers in the study area. The formula for estimating the required output to break-even according to Raddy and Ram (2005) is given by equation:

$$\text{Break-even point} = \frac{\text{fixed cost}}{\text{selling-variable cost per unit}} \dots\dots\dots (1)$$

Various functional forms that is, Linear, double log and exponential of equation where tried in order to get the best fit. The explicit forms are functions of the input shown by equation 4 – 7 respectively

$$Q = a_0 + b_1X_1 + b_2X_2 + b_3X_3 + + b_4X_4 + + b_5X_5 + + b_6X_6 + u \dots\dots\dots (2)$$

$$\text{Log} Q = a_0 + b_1X_1 \text{Log} X_1 + b_2X_2 \text{Log} X_2 + b_3X_3 \text{Log} X_3 + b_4 \text{Log} X_4 + b_5 \text{Log} X_5 + b_6 \text{Log} X_6 + u \dots\dots\dots (3)$$

$$\text{Log} Q = a_0 + b_1X_1 + b_2X_2 + b_3X_3 + + b_4X_4 + + b_5X_5 + + b_6X_6 + u \dots\dots\dots (4)$$

$$Q = a_0 + b_1 \text{Log} X_1 + b_2 \text{Log} X_2 + b_3 \text{Log} X_3 + b_4 \text{Log} X_4 + b_5 \text{Log} X_5 + b_6 \text{Log} X_6 + u \dots\dots\dots (5)$$

The best fitting equation was chosen according to the following econometric and statistical criteria: The magnitude of the coefficient of multiple determination (R^2) the significance of the individual explanatory variables as expressed by their t-values, the significance of the overall production as judged by the F-value, and the appropriateness of the signs of the regression coefficients based on priori expectations.

Input elasticity (E_p) of the various forms was determined as:

$$\text{Double log: } E_p = b_i \dots\dots\dots (6)$$

$$\text{Linear: } E_p = \frac{\partial \varphi}{\partial X_1} \cdot \frac{X_i}{\varphi} = b_i \cdot \frac{X_i}{\varphi} \dots\dots\dots (7)$$



$$\text{Exponential: } E_p = \frac{\partial \varphi}{\partial X_1} \cdot \frac{X_i}{\varphi} = \frac{b_i}{\varphi} \dots \dots \dots (8)$$

Where E_p = Elasticity of Production
 b_i = Regression coefficients
 φ = Geometric mean of output of eggs
 X_i = Input use of i^{th} resources
 $\frac{\partial \varphi}{\partial X}$ = Derivative of φ with respect to X_i

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

The result in table 1 shows that the mean age of the respondents was 49 years but the largest number of respondents (48%) were in the age bracket 41-50 years range indicating that the poultry egg farmers were relatively young and still in their productive years. This is an indication that raising poultry is an effective business that is able to engage some young individuals that would otherwise have been looking for office work in Jalingo where job vacancies may not be available. It also means that poultry production will continue be sustained in Jalingo since these young people will remain in business for long term to guarantee the supply of eggs to the growing population of Jalingo local government. Most of the respondents were male (69%) and married (92%). The dominance of males in the poultry business may not be unconnected with the huge sum of money needed to start the business which is often difficult for women to rise in their part of the world but much easier for their male counterpart to obtain most of the respondent were educated with a majority (56%) having a National Diploma Education.. This finding is quite contrary to many findings that have always indicated a low educational achievement by farmers. The mean household size of the respondents was seven which is above the recommended average of four (4) per family in Nigeria (Alabi and Haruna, 2005). According to Sonaiyi (2001), the large family size enables farmers to use family labour especially when labour intensive techniques are required.

Cost and Returns Analysis of Poultry Egg Production per annum

The result in Table 2 showed that an average poultry farmer invested NGN13, 504,352 in the poultry production in form of cost of feed, labour, chicks, fuel, transportation, veterinary services and other necessary items. The cost of feed had the greatest share (79.01%) of the total cost of production. This compared favourably with the findings of Okafor, Odui, Emeyonu and Obih (2006) and Adepoju (2008) that the feed cost is the major important cost element in poultry egg production. The total variable cost items constituted 93.47 percent while the fixed cost items constituted 7.97 percent of the total cost of production. Total annual revenue of NGN26, 303,124.19 was earned by average poultry egg farmers in Jalingo. This was obtained from sales of egg and spent layers. The GM, NFI and Gross Return per Naira invested are shown in Table 2 suggesting that poultry egg production was profitable in Jalingo, the highest cost of production notwithstanding. Indeed the gross return per Naira invested shows that NGN1.72 was earned as profit on each naira invested. The gross margin realized was ₦13, 874,663.19, with a net income of ₦12,



797,772.19 and 1.95 returns on investment. The high profitability of this enterprise might actually attract credit and other financing institutions to extend credit to the farmers.

Production Function Analysis for Poultry Production

Multiple Regression Model estimates for Poultry Egg Enterprises (from day old chicks to spent layers)

The result of the multiple regression for poultry production for the complete circle of day old chicks to spent layers is presented in Table 3. Two functional model were used, with the linear model preferred to the double log model on the basis of its higher R^2 , adjusted R^2 and F- values; the reasonableness of the magnitude of the respective coefficient and a prior econometric expectations of signs of the estimated parameters (Koutsoyannis; 2003; Gujarati, 2004; Emakaro and Erthabour 2006; Emokaro and Ekunwe, 2007). The result showed that F-Value was significant ($P < 0.01$). This implies that the model used was appropriate. The adjusted R^2 of 0.89 implies that 89% of the variation in respondents' revenue can be explained by the model. Only three of the eight explanatory variables were found to be significant, these are fixed cost ($P < 0.10$), layers mash ($P < 0.01$) and Miscellaneous ($P < 0.05$). Miscellaneous expenses and layers' mash had positive impact on revenue which means that increase in layers' mash and miscellaneous expenses would lead to increase in revenue for the respondents. Fixed cost was observed to have negative effect on revenue; this means that the bigger the amount of money tied up in fixed capital (which could actually have been sourced from sources of credit), the smaller the working capital, this is in agreement with the report of Omotosho (1997).

Constraints Encountered by Farmers' engaged in Poultry Farming

The most important constraints faced by the respondents were tabulated for each farmer and the highest picked per farmer, as presented in the table 4. Results indicate that 39% of the respondents ranked the problem of disease as the most serious constraints they faced in the production process. This could be as a result of poor veterinary service or poor adoption of innovations on the part of the poultry farmers. In-adequate finance, which is an important factor in production, ranked second among the constraints encountered by poultry farmers in the study area. Poaching constituted 26% of the constraints encountered in poultry farming in the study area. This could be as a result of insincerity among employees in poultry farms. The problem of disposing dropping and problem of personnel ranked last in the table of constraints, this implies that, they do not constitute major problems to the poultry farmers. The possible solution to the problems could come through government intervention in the areas of drug and veterinary service so as to minimize effect of disease and mortality of birds. The financial constraints reported by farmers in the study area could be indirectly responsible for high poaching (26%), probably due to inadequate funds to put the necessary security network in place. Therefore, a high level of automation can reduce poaching drastically, and this will require high capital investment on the part of investors. Government should therefore provide funds at low interest rates for the farmers. This would have a positive multiplier effect on the general economy and health of Nigerians.



CONCLUSION AND RECOMMENDATIONS

Based on the finding, the following recommendations are hereby given to improve poultry farming in the study area; (i) poultry farmers in the study area are advised to concentrate on raising their own birds, right from day old chicks, this would ensure higher returns and sustainability, (ii) improved veterinary services that are targeted at reducing incidence of disease in layers flock so as to reduce the cost of medication and lower mortality rate. (iii) More youth should be advised to go into layers production since it has been proven to be profitable in the study area. This will provide job opportunities for the teeming population that are unemployed as well bridge the gap of protein shortage in the country Nigeria. A deliberate policy on labour management practices should also be encouraged so that farmers further reduce costs by expanding labour on necessary activities. Finally, government should mandate commercial banks to reserve a certain percentage of the budget for the poultry farmers at lower interest rate. A type of selective policy that will make funds to be available to the targeted sub-sector of the economy should be adopted.

Table 1: Distribution of Respondents by Socio-economic Characteristics

Demographic Factor	N	%
Age (year)		
21 – 30	4	3
31 – 40	14	11
41 – 50	60	48
51 – 60	34	27
61 – 70	12	11
Total	124	100
$\bar{X} = 49$		
Gender		
Male	86	69
Female	38	31
Total	124	100
Marital status		
Single	8	6
Married	114	92
Separated	2	2
Total	124	100
Educational level		
Secondary	10	8
College of Education (NCE)	22	18
College of Agriculture (ND)	70	56
Polytechnic	14	11
University	8	6
Total	124	100
Household size		
1 – 4	16	13
5 – 8	78	63
9 – 12	30	24
Total	124	100
$\bar{X} = 7$		
Demographic factor		
1 – 5	12	10



5 – 8	70	56
9 – 12	40	32
13 – 16	2	2
Total	124	100
$X = 7$ years		

Source: Field Survey, (2014).

Table 2: Costs and Returns Analysis of Poultry Egg Production Per Annum

Items	Value (NGN)	Percent of TC
Variable Cost		
Casual Labour	4,980	0.04
Water	114,883	0.92
Repairs/Maintenance	50,882	0.40
Transport	71,124	0.57
Fuel/Electricity	128,148	1.03
Chick	1,075,197	8.65
Feed	10,670,451	79.01
Medication and service	256,236	2.1
Advertising	3,858	0.03
Miscellaneous	52,600	0.42
Total Variable Cost	12,428,461	93.47
Fixed Cost		
Depreciation charges	195,983	1.45
Rent	97,512	0.57
Permanent Labour	755,355	5.59
Interest on Loan Capital	12,742	0.09
Tax	2,097	0.02
Insurance	33,202	0.25
Total Fixed Cost	1,076,891	7.97
Total Production Cost	13,505,352	100
Revenue		
Egg	24,286,724.19	
Spent Layers	2,016,400	
Total Revenue	26,303,124.19	
Gross Margin (TR-TVC)	13,874,663.19	
Net Income (TR-TC)	12,797,772.19	
Gross Return Per NGN Invested (TR/TC)	1.95	
Net Income Per Layer	1,720.89	

Source: Field Survey, 2014.



Table 3: Multiple Regression Model estimates for Poultry Egg Enterprises (From day old chicks to spent layers)

Variable	Coefficient	Std error	t-stat	Coefficient	Std error	t-stat
Labour (X_1)	0.4429	0.2251	1.9672	4.9817	3.9649	1.2565
Starter Mash (X_2)	0.0892	0.0850	1.0489	-0.0402	0.0737	-0.5462
Growers mash (X_3)	0.0612	0.1415	0.4322	0.0036	0.0086	0.4216
Layers mash (X_4)	0.6216	0.1442	4.3104	9.0089	0.6087	14.8013
Medication (X_5)	-0.0162	0.0983	-0.1642	-0.0053	0.0037	-1.4546
Electricity consumption (X_6)	0.2720	0.1952	1.3935	0.0073	0.0791	0.0930
Miscellaneous (X_7)	-0.0501	0.1464	-0.3424	0.0136	0.0066	2.0547
Fixed cost	-0.1937	0.2239	1.1790	-34.0721	144.4299	-0.2359
Constant	2.5853	2.1928	1.1790	-34.0721	144.4299	-0.2359
	R-squared		0.81	R-squared		0.92
	Adjusted R-squared		0.79	Adjusted R-squared		0.89
	F-statistic		24.96	F-statistic		377.22

Source: Field Survey Data, 2014
 *** ($P < 0.01$), ** ($P < 0.05$), * ($P < 0.01$)

Table 4: Constraints Encountered by Farmers engaged in Poultry Farm

Problems	Frequency	Percentage
Disease	48	39
Inadequate finance	28	29
Poor quality personnel	19	16
Disposing of droppings	19	16
Poaching	10	6
Total	124	100%

Source: Field Survey Data, 2014.

REFERENCES

- Adepoju, A.A. (2008). Technical efficiency of egg production in Osun State. *International Journal of Agricultural Economics and Rural Development*, 1(1), 7-14.
- Alabi, R.A, & Haruna, M.B. (2005). Technical efficiency of family poultry production in Niger-Delta, Nigeria. *Central European Agriculture, Journal*, 6(4), 531-538.
- Amos, T.T. (2006). Analysis of backyard poultry production in Ondo State, Nigeria. *International Journal of Poultry Science*, 5(3), 247-250.
- Apantaku, S.O. (2006). Analysis of participation of farmers in participating poultry production research in Lagos State, Nigeria. *Livestock Research for Rural Development*. 18(7), Retrieved from <http://www.irrd.org/irrd18/7/apan/8094.html>
- Ekunwe, P.A; Soniregun, O.O; Oyediji, J.O. (2006). Economic of small scale deep litter system of egg production in Oredo Local Government Area of Edo State, Nigeria. *International Journal of Poultry Science*, 5(1): 81-83.
- Emakaro, C.O; Ekunwe, P.A; Achille, A. (2009). Profitability and Viability of Catfish Farming in Kogi State, Nigeria. *Resources of Agric, & Bio Sec.* 5(7): 776-779.
- Emokare, C.O; Ekunwe, P.A. (2007). Efficiency of Resources use and marginal productivities in dry season Amaranth Production in Edo South, Nigeria. *Journal of Applied Science*. 7(17): 2500-2504.



- Food and Agriculture Organization, (2005). Recommended Nutrient intakes for Malaysia. PP 52-65, FAO, Rome.
- Hamid, M.Y. & Chiaman, E.S. (2010). Risk and uncertainty assessment of nomadic cattle pastoralists in Mubi-North Local Government Area, Adamawa State, Nigeria. Proceeding of 11th Annual National Conference of National Association of Agricultural Economists (NAAE) 30th November – 3rd December, 2010. PP 109-113.
- International Labour Organization (1965). The Ilo and the cooperatives. The 49th International Labour Conference, Geneva, Switzerland.
- Iyangbe, C.O, & Orewa, S.I. (2009). Determinants of daily protein intake among rural and low-income urban household in Nigeria. *American-European Journal of Scientific Research*, 4(4), 290-301.
- Koutsoyiannis, A. (2001). Theory of Econometrics, Palgrave, Houndmills, Basingstoke, Hampshire. RG 216 XS and 175. Fifth Avenue, New York, N.Y. 10010.
- NPC, (2006) Population Census figure of the Federal Republic of Nigeria, Abuja.
- Ojo, S.O. (2003), Productivity and Technical Efficiency of Poultry Egg Production in Nigeria. *International Journal of Poultry Science*, 2(6), 459-464.
- Okafor, R.M, Odii, M.A, Emeyonu, C.A., & Obih, U, (2006). Profitability analysis of poultry production in Imo State, Nigeria. In Adepoju, S.O. and Okunneye, P.B. (eds). Technology and Agricultural Development in Nigeria. Proceedings of the 20th Annual National Conference of Farm Management of Association of Nigeria (FAMAN), 18-21 September, 2006. Forestry Research Institute of Nigeria, Federal College of Forestry, Jos, Nigeria. PP. 392-397.
- Oladebo, J.O., & Ambe-Lamidi, A.I. (2007). Profitability, input elasticity and economic efficiency of poultry production among youth farmers in Osun State, Nigeria. *International Journal of Poultry Science*, 6(12), 994-998.
- Olagunju, F.I. (2007). Cost and returns on egg production in South-Western Nigeria, *Research Journal of Applied Science*, 2(2), 160-164.
- Tijani, A.A., Alim, T, & Adesiyun, A.T. (2006). Profit Efficiency among Nigerian Poultry Egg Farmers. *Research Journal of Agricultural and Biological Sciences*, 2(6), 256-261.
- United States Department of Agriculture (2001). International egg and poultry review USDA, August 7, 48(32), 1-4.
- Yusuf, S.A; Malomo, O. (2007). Technical Efficiency of Poultry Egg Production in Ogun State. A Data Development Analysis (DEA) Approach. *International Journal of Poultry Science*, 6 (9): 622-629.