

Analysis of Poultry (Layers) Enterprises in IGABI Local Government Area, Kaduna State Nigeria

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Abstract: *The study examined analysis of poultry (layers) enterprises in Igabi Local Government Area of Kaduna State. Fifty four farmers were purposively selected in the area for the study. Data were collected using structured questionnaires and analyzed using descriptive statistics, farm budget model and multiple regression analysis. The results reveal that 55.56% of the respondents were within the age bracket of 31 – 41 years with an average age of 40 years. The results further show that 68.52% of the respondents were male with an average family size of 9 persons. Similarly, majority (81.48%) of the respondents have acquired tertiary education and operating on average flock size of 6,465 chickens. Also the results indicate that the net income and return per naira Invested (RNI) were ₦18, 400,848.60 and ₦0.62, respectively per production season. The operating, fixed and gross ratios were 0.47, 0.15 and 0.62 respectively. The results on regression analysis also show that capital position of the farmers had positive coefficient and significant at $P < 0.001$. The coefficient of determination (R^2) was 0.988 and F-value of 632.78 which was statistically significant at $P < 0.001$. The major constraints affecting the producers include high cost of feeds and inadequate capital among others. Thus, the study recommends that producers should be encouraged to formulate feeds in their farms and to form cooperative societies in order to have easy access to formal sources of financing their business and benefit from group marketing in the study area.*

Keywords: *Poultry, Layers, Eggs, Enterprise, profitability, Igabi L.G.A., Kaduna State*

I. Introduction

Poultry production is generally a category of domesticated birds kept by humans for the purpose of collecting their eggs or raising them for meat or feathers. The livestock sub sector is an important component of the Nigerian agricultural economy. The increasing population of the country over the years coupled with the poor economic situation has led to low animal protein intake. This trend of event has shown serious trait on health status and the general wellbeing of the population. Poultry rearing is the most common of all animal husbandry, comprises broilers, layers, cockerel fowl are reared practically in almost every household. These birds occurs more often in scattered household flocks that scavenge for their food and survive with little management, are being replaced by mass production of broiler and layers in controlled environment with high level of management. Backyard and free range birds accounted for as much as 70 percent of total poultry production in low income and food- deficient- countries (FAO, 2003). The consequences of these developments are the increase in poultry products, profits and number of commercial farmers (Ruskin, 1991).

The protein intake of average Nigerian is abysmally low due to poverty. For instance, the British Medical Association recommends a minimum animal protein intake of 34g per capita per day. Also, the Food and Agricultural Organization (FAO) of the United Nations recommends 20g of animal protein per capita per day as the minimum for consumption for developing countries. It can be logical to suggest that the best solution to our national meat scarcity is to increase poultry products because of the acceptability of poultry products particularly eggs in the diet of many Nigerians, since there is no social and religious stigma attached to them. This will meet the population's protein requirement, and will also serve as additional income and employment to many farmers (Gueye, 2002).

Food is a basic necessity of life. It has been the determining factor of growth and Survival of any nation. Access to protein and calories diet is one of the major problems of most Nigerian family. Poultry products, offers considerable potential for meeting human needs for dietary animal supply. (Folorunsho and Onibi, 2005). Poultry is an important source of protein that helps to strike a balance in tackling malnutrition issue. Poultry production in the past was not counted as an important occupation because in some communities, the fowl is used in the past as a means of knowing the time of the day. Nowadays, poultry production has developed and occupies a place of pride among the livestock enterprises due to its rapid monetary turnover. The single reason among others made the enterprise attractive and popular among small and medium as well large scale poultry farmers. 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 (Amos, 2006).

It can help in boosting the economy of the populace in the study area and the nation as a whole. Thus, this study will help farmersto improve their production practices which in turn may have a positive effect on their economic status and economic growth of a nation as a whole. The specific objectives of the study are to:

- i. Determine the socio-economic characteristics of the poultry (layer) producers in the study area
- ii. Compute the costsand returns of poultry (layer) enterprises
- iii. Examine socio-economic variables that influence number of eggs produce in the enterprises
- iv. Identify the constraints affecting poultry(layer) producers in the study area

II. Methodology

The Study Area

The study area is Igabi local government area of Kaduna state, Nigeria. It was created out of Zaria Local Government in 1989 with its headquarters at Turunku and it is located in the northern part of the state. The local government has thirteen districts namely; Jaji ,Rigasa, Marababanjos, Riga chukun, Panshanu, Gwaraji, Zangoaya, Afaka, Igabi, Sabonbirini, Turunku, Kerawa and Kwarau with a population of 180,860 person (NPC, 2006).

The climate ranges from Sahel to Sudan savannah with an annual rainfall in the south of about 1200mm which may span from May - October. The region has two main prevailing winds which are from North to East during the dry season from the Sahara desert and the South –West monsoon winds from the gulf of the guinea. The area is located at a height of about 650m above sea level with minimum and maximum temperature of 12.8^oC and 35^oC respectively. The location of the area is at latitude 10^o47'N and longitude 7^o46'E. Agriculture is the main source of livelihood of the people. There are about 20 different enterprises in the area among which are poultry farming, blacksmith, crop production etc.

Sampling Techniques and Sample Size

A purposive sampling technique was used in selecting the districts, villages and respondents. The selection of the district and villages was due to the large volume of poultry(layer) production in the area. Seven districts were selected out of the thirteen districts and they are; Riga chukun , Rigasa, kerawa, kwarau, Sabonbirini, Gwaraji and Afaka while the villages include; Dankande, Ungwangwari, Sabon file, Hayin Bello, Hayin Dan Mani, Gwada, kutungare, Mando, Rihogi, Rubu, Makera, Fauta ,Bina,Wusar, Maganda and kashirmu. A total of 60 commercials farms were selected in the areas. However, only 54 questionnaires were retrieved and analyzed.

Method of Data Collection

Primary data were collected using structured questionnaires. The data collected were those on socio-economic characteristics of the respondents and information on layers production in the study area. The parameters considered include costs and returns in layers production, while socio-economic variables comprises age of the respondent, sex, education, household size source of initial capital, experience among others.

Analytical Techniques

The tools for data analysis used for this research work include descriptive statistics, farm budgeting model and multiple regression analysis. Descriptive statistics, such as mean, frequency distribution and percentage were used in analyzing objective one. Farm budgeting model was used analyzing objective number two which has to do with profitability of the enterprise in the area. Multiple regression analysis was used in analyzing objective three, while objective four was achieved by using descriptive statistics.

Farm budgeting model: Farm budget is a detailed physical and financial plan for operation of farm for a certain period (Olukosi and Erhabor, 2005) which was used to determining the profitability of a farm. This was used to examine the profitability of the farm enterprises in the study area through the estimation of total expenses and returns. The total cost incurred during the production period is obtained by multiplying the various input resources by their unit market prices (Olukosi and Erhabor, 2005), while the term revenue refers to the sum of outputs multiplied by their unit price which is also known as the gross income (GI). The farm budgeting model applied in this study is estimated as:

$$NFI = GI - TC \text{ ----- (1)}$$

NFI = GI – TC

GI = Gross Income

TC = Total cost.

Furthermore, fixed cost was computed using straight line method of the asset depreciation. It estimated as:

$$D = \frac{P - S}{N} \text{ ----- (2)}$$

Where;

- D = Depreciation
- S = Salvage value
- N = Number of years
- P = Price of the asset

Financial Analysis: This is done in order to evaluate the financial position and strength of the farm at a point in the production process. Gross ratio, operating and fixed ratio were considered. The gross ratio measures the overall financial success of an enterprise or farm. The lower the ratio, the higher the return per naira invested. The rule says a less than one(1) ratio is desirable for any farm business. An operating ratio that is less than one (1) indicates that the total farm revenue is able to set-off the cost variable input used in the farm. A fixed ratio of less than one (1) indicates that the total revenue (gross income) of the farm can set-off its fixed asset used (Olukosi and Erhabor, 2005). The ratios are estimated as follows:

$$GR = \frac{TFE}{GI} \text{----- (3)}$$

Where;

- GR = Gross Ratio
- TFE = Total farm Expenses (variable and fixed cost for layer production)
- GI = Gross Income for layer production.

$$OR = \frac{TVC}{GI} \text{----- (4)}$$

Where;

- OR = Operating ratio
- TVC = Total Variable Cost for layer production
- GI = Gross Income for layer production

$$FR = \frac{TFC}{GI} \text{----- (5)}$$

Where;

- FR = Fixed Ratio
- TFC = Total fixed cost for layer production
- GI = Gross Income for layer production

Return per naira invested was employed and it shows return from poultry (layer) enterprises for every naira invested in the business and it is estimated as:

$$RNI = \frac{NFI}{TC} \text{----- (6)}$$

Where;

- RNI = Return per Naira Invested on poultry (layer) production
- NFI = Net farm Income for poultry (layer) production
- TC = Total Cost for poultry (layer) production

Multiple regressions: Multiple regression models were used in order to examine socio-economic variables that influenced output (crate of eggs). The linear function was selected on the basis of the magnitude of the coefficient of determination (R^2), the priority expectation and the statistical significance of the estimated regression coefficients. The multiple regression analysis is estimated in liner functional form as:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e \text{----- (7)}$$

Where;

- Y = Output(eggs produced)
- X₁ = capital position (₦)
- X₂ = Age (number of years)
- X₃ = Years of experience (number of years)
- X₄ = Marital Status (married 1, single 0)
- X₅ = Education (number of years in school)
- X₆ = Household Size (number of persons)
- a = constant
- b₁ – b₆ = regression coefficients.
- e = error term

III. Results And Discussion

Socio-economic Characteristics of the Respondents

The result in Table 1 shows that majority (55.56%) of the producers fell within the age bracket of 31 – 41 years with an average age of 40 years. The implication of this result is that the layer producers are within the economic productive age which is in agreement with the findings of Abubakar (2002) and Bamiro et al., (2006) reported that farmers within the age range of 20 – 40 years are in their productive age and they will be able to make fast management decisions as well as taking risks in expectation of profit. The results further reveal that majority of the respondents were male which constituted about 68.52% implying that male dominated the layer production enterprise in the study areas. The result is in conformity with the work of Bappa (2008) who reported that due to the cultural belief, males in the Northern part of Nigeria engage in outdoors economic activities, while the female mostly stay indoors as housewives and participated in some micro enterprises. Similarly, the results show that 48.15% of the respondents had the highest family size of 6 – 10 persons with an average household size of 9 persons. The results also indicate that majority (81.48%) of the farmers obtained tertiary education and only 3.70% has obtained Qur’anic education. This implies that majority of the respondents were literate. This finding is in line with that of Apantaku (2006) who reported that majority of his respondents had post secondary education which is evident in their knowledge to take good decisions in their business.

Table 1 Socio-economic characteristics of poultry(layers) producers

Variables	Frequency	Percentage
Age		
20 – 30	3	5.56
31 – 41	30	55.56
42 – 52	16	29.62
53 - 63	4	7.49
64 – 74	1	1.85
\bar{X} = 40 years		
Sex		
Male	37	68.52
Female	17	31.48
Household size		
1 – 5	11	20.37
6 – 10	26	48.15
11 – 15	11	20.37
16 – 20	6	11.11
\bar{X} = 9 person		
Level of education		
Qur’anic education	2	3.76
Primary education	3	5.56
Secondary education	5	9.27
Tertiary education	44	81.48

Source: Field Survey, 2012.

The results in Table 2 show that cumulatively 61.12% of the farmers were operating on the flock size ranging between 500 – 6502 chickens. The average flock size was 6,465 chicks which indicated that the farmers were operating on a large scale. Also, the results reveal that majority (64.81%) of the respondents employed hired labour, while 35.19% of them used both family and hired labour in their farms. The implication of this result is that egg production requires skill and unskilled labour to work in the field in order to hold such a large flock. This agrees with the finding of Adewuyi, *et al.*, (2009) where hired labour is mostly used in large scale to medium scale farm enterprise for the purpose of effective operations and management.

Table 2: Distribution of respondents according to flock size handled and type of labour used

Flock Size	Frequency	Percentage
500 – 2500	3	5.56
2501 – 4501	20	37.04
4502 – 6502	10	18.52
6503 – 8503	5	9.26
8504 – 10504	2	3.70
10505 – 12505	13	24.07
12506 – 14506	1	1.85
\bar{X} = 6465 chicks		
Type of labour		
Hired	35	64.81
Both family and hired	19	35.19

Source: Field Survey, 2012.

Analysis of Cost and Return

Table 3 shows the cost and returns from egg production for a complete production season with the average flock size of 6,465 birds. The variable cost of the production amounted about 75.54% while this remaining 24.46% was covered by for the fixed costs. This implies that the variable cost which include; cost of day old chick, feed, medication, electricity, transportation, labour, litter material and miscellaneous covered a substantial amount of the total cost of production. The results further reveal that the total costs and returns for layer production were ₦29, 569,090.52 and ₦47, 969,934.12, respectively for a complete production season. The net income and return per naira invested (RNI) were ₦18, 400,848.60 and ₦0.62, respectively. The returns per naira invested implied that in every naira invested in egg production enterprise the farmer realize a return of ₦0.62. Thus, egg production is a profitable business in the study area. This result is in agreement with the findings of Haruna *et al.*, (2007); Ala and Boniface (2009) who reported that egg production is a profitable enterprise.

Similarly, the results in Table 3 show the coefficient of gross ratio was 0.62, which implies that 62% of the gross income went to off-set total farm costs. The gross ratio measures the overall financial success of the enterprise. The lower the gross ratio, the higher the return per naira invested. The coefficient of operating ratio was 0.47, implying that about 47.0% of the gross income goes to cover the total variable costs in egg production. The coefficient of fixed ratio was 0.15 which implies that 15% of the gross income goes to cover fixed assets which indicate that the fixed resources were efficiently utilized. Thus, the results reveal that all the three ratios were < 1, implying that layer production is a profitable business in the study hence, worth undertaking.

Table 3: Analysis of costs and returns of poultry (layers) enterprise (6,465 chicks)

	Items	Amount (₦)	Percentage
A.	Variable Cost		
	Day old chicks	1,413,560.46	
	Feeds	18,006,173.42	
	Medication	450,564.00	
	Water	214,750.25	
	Electricity	107,672.14	
	Transportation	468,531.18	
	Litter material	1,582.18	
	Labour	1,298,738.18	
	Miscellaneous	439,231.45	
	Total variable cost	22,400,803.82	75.76
B.	Fixed Cost		
	Depreciation on assets	7,168,286.70	
	Total fixed cost	7,168,286.70	
	Total cost of production	29,569,090.52	24.24
C.	Returns		
	Eggs	38,300,991.15	
	Spent layers	7,478,135.16	
	Poultry litter	2,170,807.81	
	Total returns	47,969,934.12	
	Net Income	18,400,843.60	
	Return Per Naira Invested (RNI)		
	Operating ratio	0.62	
	Fixed ratio	0.15	
	Gross ratio	0.62	
	Total	100.00	

Source:Field Survey, 2012

Socio-economic Factors Influencing Output (Crate of eggs)

The linear regression result in table 4 shows the best fit out of the functional forms employed. The results also show that capital position of the farmers had positive coefficient and significant at P< 0.001. This implies that the higher the capital position, the higher the output of eggs, because farmers used the fund to increase the flock size of their farms. Similarly, age and household size have positive coefficient and significant at P<0.05 and P< 0.001, respectively. The implication of this was that the respondents were in their active age and as previously indicated in Table 1; hence they can adopt improved technologies on layer production. Accordingly, the larger the household size, the more family labour and which in turn influence the total output. The coefficient of determination (R²) was 0.988 implying that about 98% variation in output (eggs produced) was influenced by the explanatory variables included in the model. The F-value was 632.78 and significant at P<0.001, showing the joint effects of the explanatory variables on the dependent variable. The result is in line with the finding of Amos (2006) and Adewuyi *et al.*, (2009) who reported that socio-economic characteristics have significant influence on the output in poultry (egg) enterprise.

Table 4: Result on regression for socio-economic factors influencing output (Crate of eggs)

Variables	Linear	Semi-log	Cobb Douglas
Constant	596 (0.46)	-204778 (-4.32)	1.2316 (5.71)
Capital position (x ₁)	9.4980 (31.17) ^{***}	110475 (9.92) ^{***}	1.13450 (22.36) ^{***}
Age (x ₂)	0.012736 (2.57) [*]	590 (-0.09) ^{NS}	0.01395 (0.49) ^{NS}
Years of experience (x ₃)	0.007696 (-1.00) ^{NS}	-15276 (-3.56) ^{***}	-0.03114 (-1.58) ^{NS}
Marital status (x ₄)	0.009910 (1.62) ^{NS}	-8030 (-1.25) ^{NS}	0.01955 (0.67) ^{NS}
Level of education (x ₅)	0.00167 (1.09) ^{NS}	7433 (0.78) ^{NS}	-0.04920 (-1.13) ^{NS}
Household size (x ₆)	0.009480 (4.05) ^{***}	-14390 (-2.57) ^{***}	-0.09062 (-3.55) ^{***}
R ²	0.988	0.865	0.977
R ² adjust	0.986	0.848	0.975
F	632.76 ^{***}	50.10 ^{***}	339.79 ^{***}

***=P < 0.001, **=P < 0.01; * =P < 0.05, NS = Not Significant, Values in parenthesis implies t-values.
Source: Field survey, 2012

Constraints affecting Poultry(layer) Producers in the study area

The problems confronting the farmers in the study area are presented in Table 5. The results show that majority (74.04%) of the producers confirmed that high cost of feed is the most serious constraints affecting their enterprises in the study area. This was followed by 66.67% of them who complained on inadequate capital as the problems militating against their operations in the enterprises. Only 27.78% of the respondents acknowledged seasonality in production among the constraints affecting their services in the farms. The results agreed with the finding of Bappa (2008) observed that high cost of feeds was the most serious problem affecting the layer producers.

Table 5: Distribution of respondents according to the problem affecting their activities

problems	Frequency	Percentage
High cost of feed	40	74.04
High cost in construction of pen	19	35.19
Inadequate capital	36	66.67
Inadequate extension services	30	55.56
High cost of labour	25	46.30
High infestation of pest and disease	19	35.19
Seasonality in production	15	27.78
Poor market prices	27	50.00
High cost of day old chick	32	59.30
Total	243*450.03*	

*Multiple responses were obtained
Source: Field survey, 2012.

IV. Conclusion And Recommendations

Based on the results of the study, it can be concluded thatpoultry(layer) enterprises were very profitable agribusiness in the study area. Based on the results of the findings, the following recommendations were made:

- ✓ Poultry (layer) producers should compound their feeds to reduce the cost of production.
- ✓ Producers should maintain feed intake of the layers during the hot season by increasing the nutrient quality thereby giving the birds less quantity to avoid excess weight, since heavy weight can seize the laying process.
- ✓ Farmers should be encouraged to form cooperative societies in the study area for ease procurement of loans and farm inputs as well as to benefit from group marketing.
- ✓ Extension workers should encourage layer producers to embark on good management practice in all stage of the layers’ growth and eggs production in order to maximize net income.

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