

Economic analysis of poultry production in Ekiti State, Nigeria

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Abstract

Livestock production in Nigeria significantly impacts socio-economic, food, and nutritional security, with over 85 million small- to medium-scale poultry farmers relying on poultry production for employment and income. The study aimed to assess the profitability of poultry production in Ekiti State, using a multi-stage sampling technique to randomly select 90 registered poultry farmers in the state. Primary data were collected with the use of structured questionnaires. Descriptive statistics, farm budgetary analysis and a 5-point Likert scale was used to measure the objectives of the study. The findings revealed a mean age of 36 years, 57% male, 68.6% married, 87.2% educated, with an average of 5 persons per household, and 55.8% fully engaged in poultry farming. The findings further revealed an average total revenue of ₦1,040,300.00, with investment of ₦638,142.14 as total cost per production cycle. These consists of total variable costs (₦547,624.77), which accounted for 85.82% of total cost, and the total fixed cost (₦90,517.37) which accounted for 14.18% of total cost. The net farm income was ₦402,157.68, while the gross margin was ₦492,153.23. The profitability ratio of 0.39 means that for every N1 invested into poultry farming, 39% (N0.39k) was generated as profit. while 61% (N0.61) was attributed to the total cost. This study concludes that poultry production is a very profitable venture given the high gross margin ratio and profitability index. However, lack of capital, seasonal diseases, and heat stress are the major challenges of poultry farming.

Keywords: Animal protein, poultry, profitability, poultry production, farm budgeting techniques.

Running title: Economic analysis of poultry production in Ekiti State

Analyse économique de la production avicole dans l'État d'Ekiti, Nigéria

Résumé

La production animale au Nigéria a un impact significatif sur la sécurité socio-économique, alimentaire et nutritionnelle, avec plus de 85 millions d'agriculteurs avicoles de petite à moyenne échelle dépendant de la production avicole pour l'emploi et les revenus. L'étude visait à évaluer la rentabilité de la production avicole dans l'État d'Ekiti, en utilisant une technique d'échantillonnage en plusieurs étapes pour sélectionner au hasard 90 aviculteurs enregistrés dans l'État. Les données primaires ont été collectées à l'aide de questionnaires structurés. Des statistiques descriptives, une analyse budgétaire de la ferme et une échelle de Likert à 5 points ont été utilisées pour mesurer les objectifs de l'étude. Les résultats ont révélé un âge moyen de 36 ans, 57 % d'hommes, 68,6 % mariés, 87,2 % éduqués, avec une moyenne de 5 personnes par ménage, et 55,8 % pleinement engagés dans l'aviculture. Les résultats ont également révélé un revenu total moyen de ₦1 040 300,00, avec un investissement de ₦638 142,14 comme coût total par cycle de production. Ceux-ci se composent des coûts variables totaux (₦547 624,77), représentant 85,82 % du coût total, et des coûts fixes totaux (₦90 517,37), représentant 14,18 % du coût total. Le revenu net de la ferme était de ₦402 157,68, tandis que la marge brute était de ₦492 153,23. Le ratio de rentabilité de 0,39 signifie que pour chaque N1 investi dans la production avicole, 39 % (0,39 Naira) étaient générés sous forme de profit, tandis que 61 % (0,61 Naira) étaient attribués au coût total. Cette étude conclut que la production avicole est une activité très rentable compte tenu du ratio élevé de marge brute et de l'indice de rentabilité. Toutefois, le manque de capital, les maladies saisonnières et le stress thermique sont les principaux défis de l'aviculture.

Mots-clés : Protéine animale, aviculture, rentabilité, production avicole, techniques de budgétisation de ferme.

Introduction

In sub-Saharan Africa, livestock production value chains play important socio-economic and food security roles (Kamau et al., 2018). This is attributed to the demand for animal-source food in tandem with population growth, higher incomes, and urbanization (Thieme, et al., 2014), thus making livestock production becoming

increasingly important. The domestication of birds such as chicken, duck, quails, turkey, and geese with the intent of rearing them for meat, egg production as well as using their incidental products such as faecal droppings and feathers in industries as natural unprocessed material is known as poultry farming (production) (Stiles, 2017). Egg and meat production are the two

major divisions of poultry production (USDA, 2018), although other divisions exist such as chick production, point of lay production, feed production, poultry tools and equipment production in addition to poultry processing and marketing (CIWA, 2019). The nutritional benefit derived from poultry products such as animal protein, mineral, fat-soluble vitamins, carbohydrates, pigments, fluids and cholesterol is attributable to its relevance as the world major source of food (Dilger et al., 2016).

The Nigerian poultry industry, the second largest in Africa after South Africa comprises about 180 million birds (SAHEL, 2015). Poultry production in Nigeria amounts up to 454 million tonnes of meat and 3.8 million eggs per year, with a standing population of 180 million birds. Of this figure, about 80 million chickens are raised in extensive systems, 60 million in semi-intensive and the remaining 40 million in intensive systems (FAO, 2018). From roughly 70% broilers and 30% layers farmed each year, the country produces 21 billion eggs annually in addition to 454 million tons of poultry meat resulting in a \$4.2 billion market value. As for per capita consumption, Nigerians eat approximately 3.5 kg of eggs and 2.5 kg of poultry meat, which is significantly less than the average for the world, which is 15.2kg and 9.4kg, respectively (FAO, 2018).

The Nigeria poultry industry presents a unique opportunity for trade and investments in certain aspects of the value chains. According to the Central Bank of Nigeria CBN, the poultry industry is worth N1.6trn, and contributes about 25% of agricultural GDP to the Nigerian economy (Oluseyi, 2019). The sector supports the livelihood of more than 13 million households who earn part or all their income from poultry business.

According to Okoli *et al.* (2005), 85% of rural families keep small ruminants and local fowls primarily as an investment and sources of manure or meat at home or for use during festivals. In spite of all this, poultry production has not been able to keep pace with the animal protein demand by Nigerians. According to the FAO recommendation, the minimum intake of protein by an average person should be 65gm per day; of this, 36gm (i.e., 40%) should come from animal

sources. However, Nigeria is presently unable to meet this requirement. The animal protein consumption in Nigeria is 15gm per person per day (Tijjani *et al.*, 2012), which is a far cry from the FAO recommendation. As a result of the above, wide spread hunger and malnutrition are obvious in the country.

Poultry meat and egg offer considerable potential for bridging the nutritional gap in view of the fact that high yielding exotic poultry are easily adaptable to our environment and the technology of production is relatively simple with returns on investment appreciably high. Animal scientists, economists and policy makers are of the opinion that the development of the livestock industry is the only option for bridging the protein deficiency gap in Nigeria's diets. The need to meet animal protein requirements from domestic sources has created huge opportunities for the poultry industry in Nigeria. The economic analysis of poultry production in the state is crucial due to the sector's significant role in the local economy and its potential for economic development.

Poultry farming is key agricultural activity in the state, providing income and employment for many households. Therefore, the economic analysis aspects help understands the profitability, cost structures and financial sustainability of poultry operations. Given the rising demand for poultry products and the challenges posed by fluctuating feed costs, disease management, and market access, a detailed economic analysis can inform policy decisions, guide investments and support the development of strategies to enhance the sector's resilience and growth. Hence, this study seeks to examine the profitability of poultry production in Ekiti State, Nigeria. The specific objectives are to: describe the socio-economic characteristics of poultry farmers in the study area; estimate the cost and returns (profitability) of poultry production; identify the types of birds been reared by gender among poultry farmers; and identify the challenges faced by poultry farmers in the study area.

Materials and Methods

Study Area

The study was carried out in Ekiti State, South West Nigeria. Ekiti State is situated entirely

within the tropics. It is located between longitudes 40°51' and 50°451' East of the Greenwich meridian and latitudes 70°151' and 80°51' north of the Equator. It lies south of Kwara and Kogi State, East of Osun State and bounded by Ondo State in the East and in the South, with a total land Area of 6,353sq km. Ekiti State has 16 Local Government Councils, divided into three (3) Agricultural Zones, sixteen (16) blocks, and one hundred and twenty-eight (128) cells. Zone 1 comprises of Ado, Igede, Ijero, Efon and Aramoko as headquarter. Zone 2 comprises of Ilawe, Ise, Emure, Ode, and Ikere as headquarter, while Zone 3 has Oye, Ido, Iye, Otun, Omuo and Ikole as the headquarter (ESADP, 2017). The population of Ekiti State as at 2020 is put at 3,592,200 people at an annual population growth rate of 2.6% (Thomas, 2022). Ekiti State enjoys a tropical climate with two distinct seasons: the rainy season (April to October) and the dry season (November to March). The temperature varies from 21°C to 28°C, with high humidity. Agriculture is the main occupation, providing income and employment for more than 75% of its population. The major cash crops grown in the state are cocoa, coffee, kolanut, cashew and oil palm. Arable crops grown are yam, cassava, maize, cowpea and cocoyam. The major livestock reared in the state include poultry, pig, sheep and goat (Abike et al., 2017).

Sampling Procedure and Sample Size

A multi-stage sampling procedure was adopted in selecting poultry farmers for the study. The first stage was a purposive selection of three (3) blocks out of 16 blocks - one (1) block each from the three agricultural zones in the State – Ado Ekiti, Ikere and Ido. This is due to the predominance of registered poultry farmers in the selected areas. The second stage involved a random selection of 3 cells (villages/community) from each block, making a total of 9 cells. The third stage, was the random selection of 10 poultry farmers from each cell, making a total of 90 poultry farmers constituting the sample for the study. Primary data were collected with the use of structured questionnaires designed in line with the objectives of the study.

Method of Data Analysis

Descriptive statistics, farm budgetary analysis and a 5-point Likert scale was used to measure the objectives of the study. Descriptive statistics such as means, percentages, and frequency distributions were used to describe the socio-economic characteristics and the types of bird rear by gender among poultry farmers in the study area. Farm Budgetary Analysis was used to measure and evaluate the costs and returns components, and the profitability of an enterprise. The cost and returns related with poultry enterprise was adopted to determine the profitability of the enterprise in the study area. According to Omolayo (2018), a farm budget is a detailed physical and financial plan for the operation of a farm for a certain period. The farm budgetary analysis therefore, helps to determine the total cost and total revenue that accrued to the enterprise within a specific production cycle. The Gross Margin Analysis (GMA) is one of the simplest analytical tools used in farm management to evaluate the efficiency of an enterprise (or farm plan) in order to assess and compare the various enterprises existing within the farm business. Gross margin (GM) is the difference between the Total Revenue (TR) and the Total Variable Cost (TVC). The model for estimating farm budgeting techniques is outlined thus;

$$GM = TR - TVC$$

where: TR = Total Revenue

TVC = Total Variable Cost

TR was obtained by multiplying the total output with market prices of the output expressed in naira. TVC comprises expenses on stocking of birds, energy & water, labour, vaccination, etc., while the Total Fixed Cost (TFC) comprises expenses on land, equipment, generator, farm houses, etc.

The Net Farm Income (NFI) = TR – TC,

where: TR = Total Revenue

TVC = Total Variable Cost

TFC = Total Fixed Cost

TC = Total Cost (TVC + TFC)

Therefore, NFI = TR – TC

Return on Investment (RoI) = NFI / TC multiply by 100

Profitability Ratio (PR) – NFI / TR

A 5-point Likert scale was also used to measure the challenges faced by poultry farmers. This is to allow respondents to indicate what they perceived as challenges to poultry production in the study area. This was structured into Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D) and Strongly Disagree (SD) with corresponding values of 5, 4, 3, 2 and 1 respectively. The criteria reference or cut-off point for the mean value was 3.00 using Statistical Package for Social Sciences (SPSS). This implies that 3 and above is regarded as agree, while below 3 is disagree.

Result and Discussion

Socio-economic characteristics of the respondents.

The socio-economic characteristics of the poultry farmers in the study area are presented in Table 1. The table showed that the average age of the poultry farmers is 39 years. This implies that majority of the poultry farmers are in their active

and productive age. The findings also revealed that 49% of the respondents were male, 37% were female, while majority (68.6%) of the respondents married, and over 96% of them educated. This implies that most of the poultry farmers were literate, thereby increasing their access to relevant information on poultry production. This validates the finding of Didunyemi and Owoeye (2022) that majority of the poultry farmers are literate. Also, the table revealed that 72.4% of the respondents had a household size of 1 – 5, with a mean of 5 persons per household. 48.8% of the poultry farmers acquired agricultural land through rent/lease, while 25.6% used inherited family land, and purchased the land, respectively. However, the findings further revealed that 55.8% of the respondents were fully engaged in poultry farming as their main occupation, while 44.2% engaged in other primary occupation, aside poultry farming.

Table 1: Socio-economic characteristics of the poultry farmers.

Socio-economic variables	Frequency	Percentages	Mean
Age			
20 – 30	19	22.1	39 years
31 – 40	35	40.7	
41 – 50	24	27.9	
51 – 60	4	4.7	
61 and above	4	4.7	
Gender			
Male	49	57	
Female	37	43	
Marital Status			
Single	14	16.3	
Married	59	68.6	
Widow/Widower	7	8.1	
Divorced	6	7.0	
Educational Qualification			
No formal education	11	12.8	
Primary education	20	23.3	
Secondary education	26	30.2	
Tertiary Education	29	33.7	
Household Size			
1 – 5	55	72.4	5 persons
6 – 10	21	27.6	

Land Acquisition

Inheritance	22	25.6
Rent/Lease	42	48.8
Purchase	22	25.6

Main Occupation

Poultry farming	48	55.8
Trading	15	17.4
Civil servant	19	22.1
Others	4	4.7

Source: Field survey 2023

Cost and Returns on Poultry Production.

As indicated in Table 2, the cost and returns analysis indicates that ₦1,040,300.00 was realized as average total revenues from the sales of birds and eggs by the poultry farmer for one production cycle. The result also shows that an average poultry farmer invested ₦638,142.14 as total costs of production for the enterprise per cycle. This consist of both total variable cost and total fixed cost. The total variable costs (₦547,624.77) accounted for 85.82% of the total cost, while the total fixed cost (₦90,517.37) representing 14.18% of the total cost of production. N180, 000.00, which stand for stocking of day-old chicks, represent 28.21% of total cost. Labour cost (N93, 450.00) represents 14.64% of total cost, while energy & water (₦18,500.00) represent 2.90% of total cost. ₦214, 254.63 representing 33.57% of the total cost was spent on feeds, while (₦19, 550.00) representing 3.06% of total cost was spent on vaccination/medication, and ₦21, 870.14, representing 3.43% of the total cost of production was spent on sawdust, etc. Table 2 further revealed that the total fixed cost for the enterprise for one production cycle was ₦90,517.37, while the Net Farm Income (NFI) realised was

₦402,157. 68. The Gross Margin per production cycle was ₦492,153.23, and the gross margin ratio was 0.47. The gross margin ratio is used to compare the gross margin of the enterprises to its revenue. It shows how much profit the farm makes after paying its Total Variable Cost (TVC). The GMR (0.47) indicates that for every ₦1 revenue generated by the poultry farmer, ₦0.47k is retained, while ₦0.53k is attributed to total variable cost. The table also revealed that the Return on Investment (RoI) is 0.63 (63%). According to Kramaric et al., (2017), the RoI is a profitability matrix that measure the profitability of an investment relative to its cost. It calculates the percentage return in investment, and it is used to evaluate the performance of an enterprise over a given period of time. With RoI (63%), this implies that for every N1 invested in poultry production, the poultry farmer generates a return of N0.63k. The profitability ratio (PR) evaluates the enterprise ability to generate profit above its production cost. The Profitability Ratio is 0.39, which implies that for every N1 invested into poultry farming, 39% (N0.39k) was generated as profit, while 61% (N0.61) was attributed to the total cost of production within one production cycle. This shows that the poultry farm business is profitable in the study area.

Table 2: Cost and Returns on Poultry Production in Ekiti state

Items	Mean Value (₦)	% of Mean to (TC)
Total Revenue (TR)		
Sales of Birds (average stock of 290 @ N3,200)	928,000.00	
Sales of Eggs	112,300.00	
	1,040,300.00	
Total Variable Cost (TVC)		
Stocking of 300-day old layers (average) @ N600	180,000.00	28.21
Labour (Man/Day)	93,450.00	14.64
Energy & water cost	18,500.00	2.90
Feeds	214,254.63	33.57
Vaccine/Medication	19,550.00	3.06

Other variable cost (sawdust, etc.)	21,870.14	3.43
	547,624.77	85.82
Total Fixed Cost (TFC)		
Depreciation on:		
Poultry House	21,433.30	
Battery Cage	15,175.73	
Feeding and Water trough	3,884.89	
Egg crates	1,207.41	
Land Rent	43,580.00	
Generator	5,236.04	
	90,517.37	14.18
Total Cost (TC) = (TVC + TFC)	638,142.14	
Net Farm Income (NFI) = (TR - TC)	402,157.86	
Gross Margin (GM) = (TR - TVC)	492,675.23	
Gross margin Ratio (GMR) = (GM/TR)	0.47	
Return on investment (RoI) = (NFI/TC)	0.63	
Profitability Ratio (PR) = (NFI/TR)	0.39	

Source: Field survey 2023

Types of Birds reared by Gender among the poultry farmers

Table 3 shows the types of birds reared by gender in the study area. The table revealed that out of 27 poultry farmers that rear layers, 55% of them are male, while 45% are females, while out of the 45 poultry farmers that rear broilers, 60% of them are male, while 40% are females. The table shows high concentration on broilers probably because broilers are specifically for meat production, with fast growing breeds and low mortality compare to layers. Also, out of the 9 respondents involved in Cockerels' farming, 55.5% were male, while

44.5% were females. For turkey, only 4 respondents were engaged in rearing turkey, of which 50% of them were male, while the remaining 50% were female. However, it was observed that a lot of the respondents did not engage in cockerels and turkey as compared to layers and broilers having less than 50% of the total respondents. This may be because cockerel being male chicken is used mainly for meat, and the cost implication for turkey production may be high and costly to maintain, compared to layers and broiler chickens.

Table 3: Types of Birds reared by Gender

Gender	Types of Birds				Total
	Layers	Broilers	Cockerels	Turkey	
Male	15 (55%)	27 (60%)	5 (55.5%)	2 (50%)	49 (57%)
Female	12 (45%)	19 (40%)	4 (44.5%)	2 (50%)	37 (43%)
Total	27 (100%)	46 (100%)	9 (100%)	4 (100%)	86 (100%)

Source: Field survey, 2023

Challenges faced by Poultry farmers in the study area.

Table 4 below describes the challenges faced by poultry farmers in the study area. The result in the table revealed that lack of capital base ranked 1st among the challenges with a mean value of 4.26 representing 42.6% of the respondents, who

agreed to this as the major challenge in the industry, as observed by Oluwole and Paul (2020). Also, 42.3% of the respondents agreed that seasonal disease and parasites is one of the major challenges faced by poultry farmers, and this is ranked 2nd with a mean value of 4.23, which is in line with Didunyemi and Owoeye,

(2022). Heat stress ranked 3rd among the challenges faced by poultry farmers with a mean value of 3.84, representing 38.4% of the respondents, while climate change was ranked 4th with a mean value of 3.80 representing 38% agreeing to it. The result further revealed that feed quality, and the availability/affordability of vaccines ranked 5th & 6th respectively among the

challenges faced by poultry farmers with mean values of 3.66 and 3.21, representing 36.6% and 32.1% respectively. Lack of good market and adequate information on poultry production ranked 7th and 8th with mean values of 3.11 and 2.01 representing 31.1% and 20.1% of the respondents respectively agreeing to it as a challenge in the study area.

Table 4: Challenges faced by poultry farmer in the study area.

Challenges	Mean values	Decision Rule	Ranking
Low capital base	4.26	A	1 st
Seasonal diseases and parasites	4.23	A	2 nd
Heat stress	3.84	A	3 rd
Climatic change	3.80	A	4 th
Feed quality	3.66	A	5 th
Availability/affordability of vaccines	3.21	A	6 th
Lack of good market	3.11	A	7 th
Lack of adequate information	3.01	A	8 th

Source: Field survey 2023

Decision Rule: A = Agree ($\bar{x} \leq 2.99$); D = Disagree ($\bar{x} \geq 3$)

Conclusion

This study concludes that poultry production is a very profitable venture given the high gross margin ratio and profitability index.

Recommendations

- i. The State Government should collaborate with agriculturally friendly Commercial and Microfinance banks to develop a farmer-friendly credit policy that will provide easy access to credit for poultry farmers at a lower interest rate, so that they can expand production to meet the consumption demand of the poultry market in the State.
- ii. Adequate extension services, such as training and support on best practices should be extended to the poultry farmers by the Extension Agents to enhance the efficiency and productivity of the poultry farm business. This will also expose them to much needed information that will enhance their efficiency and productivity.
- iii. Government should ensure adequate provision and maintenance of infrastructures, such as electricity, water, good road network, etc. to reduce cost of production in poultry farming. They should also encourage Veterinary Doctors with good incentives to provide sufficient

training on hygienic management to poultry farmers in rural areas. This has the power of increasing productivity and farm income, thereby reducing poverty among the poultry farmers in Ekiti State.

- iv. The Ekiti State Government can explore the poultry industry by providing training on poultry value chains to the youth and empower them with start-up capital at a lower interest rate to engage in poultry farming and other related businesses along the value chains. This is because local production only addresses about 30% of the demand for eggs and meat in Nigeria, thus providing a huge market for expansion in the industry. This will go a long way in reducing youth unemployment and poverty in Ekiti State

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