COMPARATIVE PROFITABILITY ANALYSIS OF BROILER AND LAYER PRODUCTION IN NORTHERN ZONE OF CROSS RIVER STATE, NIGERIA

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Abstract

This study compared the profitability of broiler and layer production in Northern Cross River State, Nigeria. The specific objectives were to: (i) describe the socio-economic characteristics of broiler and layer producers in the study area, and (ii) determine the profitability of these enterprises. Primary data were collected from 213 poultry farmers, comprising 117 broiler and 96 layer producers, using structured questionnaires and oral interviews. Descriptive statistics and budgetary analysis were employed to analyze the data. The cost and return analysis showed that feed constituted the highest production cost, accounting for 46.95% in broiler production and 68.12% in layer production. Both enterprises were profitable; however, differences in gross margins and net farm incomes indicated that layer production yielded slightly higher returns, though not statistically significant. The average total cost of production was ₦541,320.01 for broilers and ₦1,500,859.18 for layers, with variable costs representing 64% and 75% of total costs, respectively. Broiler production was found to be short-term and more capital-intensive, while layer production required higher operational outlay but generated continuous revenue through egg sales. Key determinants of profitability included high feed costs, limited access to credit, disease outbreaks, and inadequate extension services. The study concludes that although both enterprises are economically viable, the profitability difference is not statistically significant. It recommends improved feed management, greater access to affordable credit, and strengthened extension support to enhance poultry enterprise performance in the region.

Keywords: Broiler, Layer, Profitability, Cost and Return Analysis

Introduction

Poultry production is a critical subsector of Nigerian agriculture, providing affordable animal protein, employment, and income for rural and urban households. Broiler and layer as key poultry enterprises types play complementary roles in this sector. while: broilers supply quick-turnover meat, layers provide continuous egg production that sustains household nutrition and cash flow (FAO, 2018). Despite its recognized importance, the poultry sector faces significant challenges including high feed costs, limited credit, disease outbreaks, and weak infrastructure, which undermine profitability and technical efficiency (Adeyemi & Akinola, 2021; Musa, Ibrahim, & Olayemi, 2022). These constraints have forced many farmers out of business, while those remaining struggle due to escalating production costs (Dalhatu & Muhammad, 2023). Government

interventions have focused mostly on input subsidies, neglecting crucial aspects such as efficient housing systems. Efficient resource utilization remains fundamental to maximizing productivity in poultry operations (Inyang, 2024).

Comparative profitability analysis is therefore crucial to identify which enterprise performs better under local production and market conditions, and to guide policy and extension interventions. While several studies have assessed poultry profitability in Nigeria; for instance, Akpaeti, Udo, Akpan, Isip, and Ibok (2024) examined costs and returns of broiler and layer enterprises in Uyo Agricultural Zone, Dalhatu and Muhammad (2023) focused on Cost and Returns Analysis and Problems Encountered by Layer and Broiler Farmers in Sokoto State, Nigeria, Inyang (2024) studied the Profitability of Battery Cage Broiler Production Systems in Uyo Metropolis, Akwa Ibom State, Nigeria. Others, such as Muojekwu, Offiah-Nwankwo, Ozor, Chukwudozie, and Onubogu (2023) analyzed the structure and profitability of broiler and layer marketing in Anambra State.

Comparative studies remain limited, especially in under-researched regions such as Northern Zone of Cross River State. This study addresses this gap by applying farm budgeting to provide empirical evidence on costs, returns, profitability, and challenges faced by broiler and layer producers in the area (Muojekwu, *et a*l., 2023).

Despite the substantial contribution of poultry production to food security and rural livelihoods in Nigeria, producers experience variations in profitability arising from structural and market-induced constraints. Feed cost, which constitutes approximately 70% of total production expenditure, remains the most critical determinant of profitability, as rising maize and soybean prices significantly increase production costs and narrow profit margins (Musa et al., 2022). Limited access to affordable credit further constrains investment in quality inputs and efficient technologies, thereby lowering productive efficiency. Inadequate infrastructure and recurrent disease outbreaks exacerbate financial losses through increased mortality rates and higher expenditure on drugs and vaccines (Akinola & Oyekunle, 2017; Okoro & Omeje, 2020).

Inyang (2024) corroborated these findings, identifying lack of funds (40%), high feed costs (36%), disease outbreaks (10%), inadequate drugs and vaccines (8%), and limited extension services (6%) as the major constraints to broiler production. These factors collectively depress enterprise viability by increasing cost outlays and reducing net returns. Notably, broiler and layer enterprises exhibit differential profitability responses to these challenges: broiler production, though characterized by faster turnover, is more sensitive to feed price volatility, whereas layer production offers more stable income streams but demands higher capital investment and sustained management costs. Thus, profitability in poultry enterprises is largely contingent on effective cost management and mitigation of production constraints.

Despite these contrasts, few comparative profitability studies exist for Northern Zone of Cross River State. The absence of such empirical evidence limits understanding of the relative economic performance of broiler and layer enterprises within the region. Consequently, policymakers and extension agents lack the data-driven insights required to design enterprise-specific interventions aimed at enhancing productivity, profitability, and long-term sustainability (Eze & Okonkwo, 2021; Muojekwu et al., 2023).

This gap necessitates a comparative profitability analysis of broiler and layer production to provide empirical evidence

on cost structures, determinants of profitability, and major constraints, thereby supporting policy and investment decisions on poultry enterprises. On this note the main objective of this study is to conduct a comparative profitability analysis of broiler and layer production in Northern Zone of Cross River State, Nigeria. While the specific objectives are to: (i) describe the socio-economic characteristics of broiler and layer producers in the study area and (ii) determine the profitability of broiler and layer production enterprises.

Research Methodology

Study Area

The study was conducted in the northern zone of Cross River State, Nigeria, which comprises Obanliku, Obudu, Bekwarra, Ogoja, and Yala Local Government Areas. The State covers a land area of 23,074 km² with an estimated population of about 2.89 million (NPC, 2006). This figure was projected to approximately 4.64 million people in 2024 (based on a 2.6% annual growth rate from the 2006 NPC baseline). The northern zone is characterized by a mix of semi-savanna and highland vegetation, with agriculture being the predominant economic activity. Poultry production is a major component of the farming systems in the area, contributing significantly to household income and food security.

Data Source

Primary data were collected through structured questionnaires and supplemented by oral interviews for respondents with literacy challenges. Information gathered included socio-economic characteristics of farmers, production inputs and outputs and costs and returns of poultry production.

Sampling Technique

The study adopted a multi-stage non-probability sampling procedure, involving purposive selection of three major poultry-producing Local Government Areas (Ogoja, Yala, and Bekwarra), followed by snowball sampling to identify poultry farmers within these areas, resulting in a total of 213 respondents (117 broiler and 96-layer producers). Representing 54.93% broiler producers and 45.07%-layer producers respectively in the study area. This approach was considered appropriate given the absence of a comprehensive sampling frame for poultry farmers in the study area and the dispersed nature of production units, which made it necessary to rely on informed selection and farmer networks to identify active producers.

Analytical Techniques

Both descriptive statistics and Budgetary analysis were employed in the analysis. Descriptive statistics such as percentages, frequency counts, and arithmetic means were used to analyze the socioeconomic characteristics of the farmers. Budgetary analysis, which included net farm income and gross margin, was used to assess the costs, returns, and profitability of broiler and layer production in the study area.

Model Specification

Budgetary Analysis involves examining and explaining the components of budget expenditure and revenue as specified below:

NFI = GI – TVC – TFC or NFI = GM - TFC (1)

GM = TVP – TVC or GM = TR – TVC (2)

$$ROI = \frac{NFI}{TVC + TFC} \quad (3)$$

Where;

NFI = Net Farm Income (Naira)
GI = Gross Income (Naira)
TVC = Total Variable Cost (Naira)
TFC = Total Fixed Cost (Naira)
GM = Gross Margin
TVP = Total Value of Production

TR = Total Revenue = $P \times Q$ (P = Unit selling price; Q = Quantity sold)

TC = Total Cost
TFC = Total Fixed Cost (N)
ROI = Rate of Return on Investment

Results and Discussion

Socio-Economic Characteristics of Respondents

The socioeconomic characteristics of poultry producers in the study area as shown in Table 1 indicate that approximately 83% of broiler farmers and 81% of layer farmers were below 60 years of age, with mean ages of 43.2 and 44.7 years, respectively. This suggests that poultry production in the area is largely undertaken by economically active individuals capable of adopting modern management practices. This observation corroborates the findings of Adeyemi and Akinola (2021) and Inyang et al. (2023), who reported that farmers within this age bracket are in their productive years and possess the physical capacity and adaptability required for efficient poultry production, thereby enhancing productivity and profitability.

Gender distribution revealed that males constituted the majority, representing about 64% of broiler and 67% of layer producers. This confirms earlier reports by Inyang (2024) that poultry farming remains a male-dominated enterprise due to its labour and capital-intensive nature. The predominance of male farmers may also be linked to the relatively higher physical and financial demands associated with the enterprise.

Most respondents were married (70.9% for broilers and 75% for layers), indicating a stable family structure that could contribute to farm labour and management. Educational attainment was generally high, as over 80% of respondents had at least secondary education, suggesting a literate population capable of adopting improved technologies. In addition, most farmers had 1–10 years of experience, with mean years of four and five for broilers and layers, respectively. Despite this, extension contact remained low, as over 78% of broiler and 80% of layer farmers reported only one to five visits annually, reflecting limited technical support (Inyang et al., 2023).

Table 1: Distribution of Poultry's Producers Based on Socioeconomic Characteristics in Northern Cross River State.

Item		Frequency (N = 213)		Percentage		Mean
		Broilers	Layers	Broilers	Layers	
1	**Age**					
	20-40	44	31	37.6	32.3	
	41-60	53	47	45.3	49	**43.2**
	>60	20	18	17.1	18.7	**44.7**
2	**Gender**					
	Male	75	64	64.1	66.67	
	Female	42	32	35.89	33.33	
3	**Marital Status**					
	Married	83	72	70.94	75	
	Single	21	17	17.95	17.71	
	Divorced	9	5	7.69	5.21	
	Widowed	4	2	3.42	2.08	

4	**Educational Status**					
	No Formal Education	3	4	2.56	4.17	
	Primary Education	11	13	9.40	13.54	
	Secondary Education	56	48	47.86	50	
	Tertiary Education	47	31	40.17	32.29	
5	**Years of Farming Experience**					
	1 – 10	87	61	74.36	63.54	
	11 – 20	19	22	16.24	22.92	4.1
	>20	11	13	9.40	13.54	5.3
6	**Household size**					
	1 – 5	71	54	60.68	56.25	
	6 – 10	33	26	28.21	27.08	4.5
	>10	13	16	11.11	16.67	5.3
7	**Number of Contact by Extension Agent**					
	1 – 5	92	77	78.63	80.21	
	6 – 10	19	15	16.24	15.63	3.1
	>10	6	4	5.13	4.17	3.6

Source: Field survey, 2023

Cost and Return Analysis

Table 2 presents the cost and return analysis for broiler and layer production in the study area, detailing production costs, revenues, and net returns. The analysis assesses profitability, efficiency, and economic viability, highlighting differences in cost structure and financial performance between the two poultry enterprises under prevailing production conditions.

Cost Structure:

The total cost of production for broiler farms was ₦541,320.01, while layer farms incurred a total cost of ₦1,500,859.18. In both production systems, variable costs constituted the major component of total production costs. For broiler production, variable costs amounted to ₦345,923.08 (approximately 64% of total cost), while fixed costs were ₦195,396.93 (about 36%). Similarly, in layer production, variable costs total was ₦1,120,720.21 (about 75% of total cost), whereas fixed costs stood at ₦380,138.97 (approximately 25%).

The relatively higher proportion of fixed costs in broiler production indicates greater capital intensity due to substantial investments in housing and equipment within a short production cycle. Conversely, the higher share of variable costs in layer production reflects increased operational expenses associated with feed, labour, and healthcare over the extended laying period. These observations align with the findings of Dalhatu and Muhammad (2023), who reported that variable costs particularly feed constitute the bulk of poultry production expenses, while broiler enterprises tend to have higher fixed costs arising from housing and equipment investments.

Feed cost was the dominant variable expense in both enterprises, accounting for 46.95% of total variable costs in broiler farms and 68.12% in layer farms. This underscores feed as the most critical cost

component influencing poultry profitability, corroborating Inyang's (2024) findings that high feed costs significantly affect broiler profitability in Uyo Metropolis, Akwa Ibom State. Labour costs followed closely in broiler farms (35.19%) but were relatively lower in layer farms (21.19%), reflecting the more labour-intensive nature of broiler operations within their shorter production cycle. Other variable expenses including; medication, fuel, electricity, and litter materials constituted smaller proportions in both enterprises. The major fixed cost items in both systems were the cost of birds and housing/land, jointly accounting for over 70% of total fixed costs.

Revenue and Returns:

The total revenue generated was ₦673,576.22 for broiler farms and ₦1,917,275.28 for layer farms. In broiler enterprises, the sale of table-size birds contributed the largest portion of revenue at ₦663,255.32, representing 98.2% of total income. Conversely, in layer enterprises, egg sales constituted the primary source of revenue, amounting to ₦1,672,113.02 (87.21%), followed by sales of spent layers ₦201,036.51 (10.49%) and poultry droppings ₦37,201.44 (1.94%).

These results reveal that broiler profitability is largely dependent on the efficient marketing of live birds within a relatively short production cycle, rendering the enterprise more susceptible to market price fluctuations and demand shocks. In contrast, layer production provides more diversified and stable income streams through continuous egg sales and additional earnings from spent layers and droppings. This diversification enhances the financial stability and resilience of layer farms, ensuring a more consistent cash flow over time. Consequently, while broiler enterprises may offer quicker turnover and faster returns on investment, layer production demonstrates greater sustainability and long-term profitability potential.

These findings corroborate the results of Dalhatu and Muhammad (2023), who reported that net farm income per bird is significantly higher in layer enterprises due to continuous egg production and diversified revenue sources. Similarly, Akpaeti, Udo, Akpan, Isip, and Ibok (2024) observed that broiler farms derive nearly all their income from the sale of table-size birds, whereas layer farms generate most of their revenue from eggs, supplemented by spent layers and droppings.

Profitability Indicators: The gross margin was ₦327,653.14 for broilers and ₦796,555.07 for layers, while the net farm income was ₦132,256.21 and ₦416,416.10 for broilers and layers respectively. The rate of return on investment (ROI) was 1.24 for broilers and 1.28 for layers, indicating that for every ₦1.00 invested, broiler farmers earned ₦1.24 while layer farmers earned ₦1.28. The positive return to Naira invested for both enterprises signifies that broiler and layer production were profitable in the study area. This finding aligns with Inyang (2024), who reported a positive return to naira invested, indicating the profitability of broiler production under the battery cage and deep litter system in Uyo, Akwa Ibom State.

Similarly, the profitability index was 0.24 (24%) for broilers and 0.28 (28%) for layers, showing that layer production was slightly more profitable. The higher ROI and profitability index for layers suggest that, despite higher capital and operational costs, layer production yields better long-term returns. These results are consistent with **Musa et al. (2022)** and **Okoro and Omeje (2020)**, who found layers to be more profitable in the long run due to continuous egg sales.

Table 2: Cost and Return of Broiler and Layer Producers.

	Broiler		**Layers**	
Variable Costs	**Value (₦)**	**Percentage (%)**	**Value (₦)**	**Percentage (%)**
Feed	162,415.04	46.95	763,415.88	68.12
Medication/Sanitation	16,893.41	4.88	22,893.01	2.04
Water	3,283.33	0.95	11,287.14	1.01
Fuel	17,332.81	5.01	35,902.47	3.20
Litter Material	5,122.56	1.48	14,723.75	1.31
Transportation	7,357.14	2.13	13,982.20	1.25
Electricity	11,796.57	3.41	21,003.67	1.87
Labour	121,722.22	35.19	237,512.09	21.19
Total Variable Cost	**345,923.08**	**100**	**1,120,720.21**	**100**
Fixed Costs				
Birds	73,150.00	37.44	166,318.63	43.75
Land/Housing	72,738.14	37.23	132,091.15	34.75
Equipment/Tools	49,508.79	25.34	81,729.19	21.49
Total Fixed Cost	195,396.93	100	380,138.97	100
Total Costs	**541,320.01**		**1,500,859.18**	
Revenue				
Egg	-	-	1,672,113.02	87.21
Table Size Birds	663,255.32	98.20	-	-
Spent Layer	-	-	201,036.51	10.49
Poultry Droppings	7,321.45	1.28	37,201.44	1.94
Empty Bags	1,966.67	0.34	5,161.92	0.27
Feather	1,032.78	0.18	1,762.39	0.09
Total Revenue	**673,576.22**	**100**	**1,917,275.28**	**100**
Gross Margin	**327,653.14**		**796,555.07**	
Net Farm Income	**132,256.21**		**416416.1**	
Rate of Return on Investment	**1.24**		**1.28**	
Profitability Index	**0.24 (24%)**	24	**0.28 (28%)**	28

Source: Field Survey, 2023

Conclusion

The study concluded that both broiler and layer production enterprises are profitable ventures in Northern Zone of Cross River State, Nigeria. However, layer production exhibited slightly higher profitability than broiler production, primarily due to the continuous nature of egg sales and more stable long-term returns. Feed cost

constituted the largest component of production expenses, underscoring its critical role in determining overall profitability. Poultry production in the area is largely dominated by educated and economically active individuals, suggesting strong potential for innovation, efficiency improvement, and enterprise expansion if properly managed. The positive return on investment across both enterprises confirms that poultry farming remains a viable and sustainable livelihood source, contributing significantly to income generation, employment creation, and food security in the region.

Recommendations

Given that layer production demonstrated comparatively higher profitability and income stability, prospective investors and existing poultry farmers are encouraged to expand or diversify into layer enterprises to take advantage of continuous revenue from egg sales and supplementary income from spent layers and droppings. However, broiler farming should not be neglected, as it provides quicker turnover and meets the high demand for poultry meat, which is essential for short-term liquidity.

To enhance productivity and profitability across both enterprises, the following measures are recommended:

Government and Policymakers: Should subsidize feed inputs and promote local feed production; provide accessible and affordable credit facilities for poultry farmers; strengthen veterinary and extension services; improve rural infrastructure; and enhance farm security to reduce losses.

Farmers: Should adopt efficient feed and labour management practices; explore integrated operations combining both broiler and layer production where feasible; and form cooperative groups to enhance access to inputs, markets, and credit.

Researchers and Extension Agents: Should develop and promote cost-effective alternative feed formulations to reduce dependence on imported materials; conduct periodic comparative profitability studies across regions; and organize training on modern management, biosecurity, and sustainable poultry production practices.

References

Adeyemi, A. A., & Akinola, A. A. (2021). Profitability and technical efficiency of broiler production in Southwest Nigeria. *Tropical Animal Health and Production, 53*(5), 1–12. https://doi.org/10.1007/s11250-021-02815-0

Akinola, L. A., & Oyekunle, O. (2017). Profitability and resource use efficiency of poultry egg production in Oyo State, Nigeria. *Livestock Research for Rural Development, 29*(12), 1–9.

Akpaeti, A. J., Udo, U. J., Akpan, E. U., Isip, I. F., & Ibok, I. B. (2024). Costs and Returns Analysis of Broilers and Layers Enterprise in Uyo Agricultural Zone, Akwa Ibom State, Nigeria AKSU Journal of Agricultural Economics, Extension and Rural Development. 7(3), 130 – 137

Dalhatu Musa and Muhammad Makwashi (2023). Cost and Returns Analysis

and Problems Encountered by Layer and Broiler Farmers in Sokoto State, Nigeria. SosPoly: Journal of Science & Agriculture, 5(1), 1-13

Eze, C. N., & Okonkwo, V. N. (2021). Determinants of profitability of layer production enterprises in Southeast Nigeria. *Journal of Agricultural Economics and Rural Development, 9*(2), 32–40.

FAO (2018). *Poultry Sector Country Review: Nigeria.* Food and Agriculture Organization of the United Nations. https://www.fao.org/poultry-production-products/resources/publications/en/

Inyang, H. B. (2024). Profitability of Battery Cage Broiler Production Systems in Uyo

Metropolis, Akwa Ibom State, Nigeria. *AKSU Journal of Agricultural Economics, Extension and Rural Development,* 7(1), 97 – 104.

Inyang, H. B. (2024). Analysis of Factors Influencing the Returns on Broilers Production in Uyo Local Government Area, Akwa Ibom State, Nigeria. *Nigerian Journal of Agriculture and Agricultural Technology***,** 4 (1), 31-38.

Inyang, H. B., Esheya, S. E. & Udoh, M. I. (2023). Analysis of the Profitability of Poultry Egg Production in Etim Ekpo Local Government Area, Akwa Ibom State, Nigeria *Journal of Agriculture and Food Sciences*, 21(1), 40-53.

John, D. A., & Owoeye, R. S. (2022). *Comparative profitability analysis of broiler production systems in Ekiti State, Nigeria*. International Journal of Research and Advanced Studies. https://ijras.org/administrator/components/com_jresearch/files/publications/IJRAS_1078_FINAL.pdf

Muojekwu, A. C., Offiah-Nwankwo, E. O., Ozor, M. U., Chukwudozie, R. A., & Onubogu, O. H. (2023). *Structure and profitability of broiler and layer poultry marketing in Anambra State, Nigeria*. IRE Journal of Agriculture and Economics.

https://www.irejournals.com/formatedpaper/1708131.pdf

Musa, A. Y., Ibrahim, H., & Olayemi, J. (2022). Economic analysis of smallholder poultry production in North Central Nigeria: Implications for sustainable livelihoods. *Journal of Agricultural Extension, 26*(3), 15–26.

National Population Commission. (2006). *2006 Population and housing census of the Federal Republic of Nigeria: National and state population and housing tables*. NPC, Abuja, Nigeria.

Okoro, C. S., & Omeje, J. N. (2020). Comparative analysis of profitability of broiler and layer production in Enugu State, Nigeria. *International Journal of Agricultural Economics, 5*(2), 45–52.