FUDMA Journal of Agriculture and Agricultural Technology
ISSN: 2504-9496
Vol. 10 No. 1, March 2024: Pp. 31-38

https://doi.org/10.33003/jaat.2024.1001.05

SOCIOECONOMIC DYNAMICS AND PROFITABILITY DRIVERS IN BROILER CHICKEN PRODUCTION IN SABON GARI LOCAL GOVERNMENT AREA OF KADUNA STATE, NIGERIA

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ABSTRACT

This study investigated the socioeconomic dynamics and profitability drivers in broiler chicken production in Sabon Gari Local Government Area (LGA) of Kaduna State, Nigeria. Multi-stage sampling procedure was used in selecting one hundred and fifty (150) broiler chicken producers. Primary data were collected through the use of a structured questionnaire. Tools of analysis used were descriptive statistics, farm budgetary techniques, and the multiple regression model. The socio-economic characteristics of the producers revealed a mean age of 44 years, with the majority (62.50%) of the producers being male. The broiler farmers had one form of education or another, with a mean flock size of 213 birds. It was found that the percentage contribution of the purchase of feed to the total variable cost of production was the highest (45.79%), with a sum of ₦ 756.06 at average as the total cost incurred in the production of broilers was realized. Consequently, the return on Naira invested of ₦ 1.38 implies that for any ₦ 1 invested in broiler production, the farmers generated 38k. The results from regression analysis revealed that sex, age, farming experience, household size, education, and membership in cooperatives were the determinants of the profitability of broiler chicken production. It was concluded that broiler production in the study area was profitable and that several socio-economic factors significantly influence profitability. It was therefore recommended that producers consider joining cooperative membership to explore the benefits of cooperatives and leverage bulk purchasing discounts and knowledge sharing opportunities, potentially improving profitability for members.

***Keywords**: Socioeconomic Dynamics, Profitability Drivers, Broiler Chicken Production*

INTRODUCTION

Nigerians are consuming more chicken due to the increasing demand for protein, leading to significant growth in the poultry industry, particularly in broiler production. This growth has positive implications for the economy, including job creation and improved food security across Nigeria's regions (Ali *et al*., 2022). However, challenges persist in optimizing production efficiency and ensuring fair benefits for all involved parties. Kaduna State emerges as a key player in poultry production, with a mix of small-scale backyard farms and large commercial enterprises contributing to the state's economic stability and food self-sufficiency (Mshelizah *et al.*, 2022). To enhance the profitability of broiler production in Kaduna, it's crucial to understand the complex interactions among various social, economic, and cultural factors. These factors, such as land ownership, access to financial resources, education, and cultural norms, influence farmers' choices, poultry rearing practices, and ultimately, financial outcomes. Large commercial farms, with their potential for economies of scale, present an opportunity for increased profitability (Akinwumi *et al.*, 2022).

Large commercial farms control a much larger portion of land compared to small-scale farmers, limiting the land available for smaller operations and restricting their ability to grow their production (Aja *et al.*, 2020). Small-scale farmers often struggle to access the small loans and financial services needed to invest in essential equipment and resources for their broiler production (Olawumi *et al.*, 2022). Many farmers lack the knowledge or don't implement best practices in broiler management, disease control, and efficient feed use, leading to lower production and profitability (Ajayi *et al.*, 2021). Small-scale producers often lack connections to effective markets and face higher transportation costs compared to larger farms. This reduces their competitiveness, exposes them to price fluctuations, and ultimately affects their income stability (Okafor, 2021; Akinwumi *et al.*, 2023).

Large-scale farms concentrating profits can hinder poverty reduction efforts in rural areas where small-scale agriculture plays a vital role. This can happen in several ways, such as Limiting land availability, Contract farming arrangements and Reduced employment opportunities (World Bank, 2018). Inefficient production and limited access to affordable chicken for small producers can worsen food insecurity and malnutrition, especially for vulnerable populations (FAO, 2023). The uneven distribution of benefits within the broiler industry restricts its potential to create jobs, develop local markets, and contribute to Kaduna State's overall economic growth (IFAD, 2023). Excluding marginalised groups, particularly women, from profitable broiler production further widens existing social inequalities and hinders long-term development (FAO, 2023). Understanding these factors can help design interventions and policies that improve production, income, food security, and equitable development, ultimately aligning with national goals. Addressing these issues can pave the way for a more sustainable, equitable,

and impactful poultry sector, significantly contributing to Kaduna State's and Nigeria's development goals. In light of this background, this study investigated the socioeconomic dynamics and profitability drivers in broiler chicken production in Sabon Gari Local Government Area (LGA) of Kaduna State, Nigeria.

MATERIALS AND ETHODS

Description of the Study Area

The study was conducted in the Sabon Gari Local Government Area of Kaduna State, Nigeria. It is located between latitudes 11°9'50" N and longitudes 7°41'49" E of the equator. It has a significant district within the Zaria metropolis under the Zazzau Emirate Council (Baguda, 1974). The local government area has an estimated land area of 263 km^2 (102 sq mi), with an estimated population of 286,871 projected at 430,500 in 2022 under an annual growth rate of 50.1% (National Population Commission, 2006). The region has distinct seasons: a wet season with annual rainfall ranging from 1000mm to 1,300mm, lasting approximately five months from May to October, followed by a dry season from October to April. The maximum temperature ranges from 27.20 °C to 35 °C in April (Ali, 1997). Sabon Gari LGA is primarily inhabited by Hausa-Fulani residents of various tribes. Agriculture, trade, and civil service are common occupations, with crops such as maize, millet, sorghum, cowpea, soybeans, and vegetables being cultivated (Sabon Gari Secretariat, 2022). Livestock rearing, including goats, sheep, pigs, cattle, and poultry birds, is also prevalent. Residents actively engage in broiler production activities, ranging from small-scale, peri-urban operations to large, vertically integrated facilities. The state is renowned for having a significant chicken market, considered the largest in northern Nigeria (Jibril *et al.*, 2021).

Sampling Procedure and Sampling Size

A multi-stage sampling procedure was employed. In 2021, the researcher conducted a reconnaissance survey to compile a list of small-scale broiler chicken producers in the study area from the Kaduna Agricultural Development Agency (KADA). Firstly, Sabon Gari Local Government Area was purposefully selected due to its significant volume of broiler production. Subsequently, three (3) wards were randomly selected from twelve (12) wards. These selected wards are Samaru, Dogarawa, and Basawa. Within Samaru ward, six communities were proportionately selected from the twenty-three available (Ganga Uku, Danraka, 'Yar Dorawa, Unguwan Gwaiba, Mangorori, and Area-C). In Dogarawa ward, four communities were proportionately selected from the twenty-seven (Unguwan Gwarzo, Gwanda, Zangon Dan Borno, and Sakadadi). Lastly, in Basawa ward, four communities were proportionately selected from the fifteen (Unguwan Rimi, Palladan, Layin Zomo, and Dufa-Dufa), resulting in a total of fourteen communities. The Yamane (1967) formula was used to randomly select one hundred and fifty (150) broiler chicken producers. The formula is given as follows:

$$\mathbf{n} = \frac{\mathbf{N}}{\mathbf{1+N\,(\alpha)^2}}$$

Where, n = Sample size, N = Population size (Sampling Frame) and e = Significance level (0.05)

$$n = \frac{214}{1+241*(0.05)^2}=150$$

Table 1: Population and sample size of broiler chicken producers in the study area

LGA	Ward	Community	*Sample frame	Sample size (62.4%)
Sabon Gari	Samaru	Ganga Uku	19	12
		Dan raka	15	9
		‘Yar dorawa	17	11
		Unguwan gwaiba	15	9
		Mangorori	14	9
		Area C	21	13
		Sub-total	**101**	**63**
	Dogarawa	Unguwan gwarzo	17	11
		Gwanda	15	9
		Zangon Dan Barno	17	11
		Sakadadi	19	12
		Sub-total	**68**	**42**
	Basawa	Unguwan rimi	21	13
		Palladan	15	9
		Layin zomo	17	11
		Dufa-dufa	19	12
		Sub-total	**72**	**45**
		Grand total	**241**	**150**

**Reconnaissance survey, 2022*

Data Collection

Primary data were used for this study. Data were collected with the aid of a structured questionnaire administered to small-scale broiler producers by well-trained field enumerators under the researcher's supervision. The data collection was based on the year 2021 broiler chicken production cycle. Information was collected on socio-economic characteristics, including

age, marital status, household size, educational qualifications, number of years in farming, gender, secondary occupation, annual income, and flock size, as well as profitability.

Analytical techniques

Descriptive statistics, net farm income, and multiple regression analysis were used to achieve the objectives of the study.

Descriptive statistics such as mean, frequency, percentage, standard deviation, minimum, and maximum were used to describe the socio-economic characteristics of broiler chicken producers.

Net farm income (NFI) was used to measure the profitability of broiler production. Gross income or revenue is computed from the quantity of broiler output sold, droppings, and the cost of empty bags of feed. The total variable cost comprises the costs of birds or chicks, the purchase of feeds and vaccines, transportation costs, bulbs, brooms, and labour, while the fixed cost is the rental cost of a chicken house, equipment, and water source. This was used to estimate the profitability of broiler production in the study area. It is given as follows:

GM = GR – TVC---------- *(1)*

NFI = GM – TFC---------- *(2)*

Where:

GM (gross margin): This was calculated from the quantity of broilers sold, manure sales (droppings), and the cost recovered from selling empty feed bags.

TVC (Total Variable Costs): These included the cost (₦) of chicks, feed purchases, vaccines, transportation, light bulbs, brooms, and labour.

TFC (Total Fixed Costs): These encompassed the depreciation of the rental cost (₦) of the poultry house, equipment, and water source.

A multiple regression analysis was employed to estimate the determinants of profitability. The multiple regression model is specified as follows:

$Y = \beta + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots\ldots\ldots + \beta_{12} X_{12} + e$ ……... *(3)*

Where:

β_1- β_{12} = Regression coefficient
X_1 =Sex (male=1, female=0)
X_2 =Age (years)
X_3 =Household size (Number of persons)
X_4 =Marital status (Married=1, Otherwise= 0)
X_5 =Education (years)
X_6 =Years of experience (years)
X_7 =Flock size (numbers of bird)
X_8 =Membership of an association (years)
X_9 = Access to credit (₦)
e= error term

RESULTS AND DISCUSSION

Socioeconomic characteristics of broiler chicken producer in the study area

The result in Table 2 outlines key socioeconomic characteristics of broiler chicken producers in the study area. Notably, 63% of broiler chicken producers were male, while 37% were female. This suggests greater male participation in broiler chicken production activities in the study area. This aligns with Khan and Afzal (2018), who found a prevalence of male-led households in broiler farming.

The age distribution of producers revealed that 43% fell within the 30-39 year age range, with a mean age of 44 years. This indicates that producers were economically active and capable of meeting the demands of broiler chicken production. This supports the findings of Folawole *et al*. (2014), who reported a mean age of 36 years for broiler farmers in Nigeria.

The result of marital status indicated that 74% of producers were married, while 26% were still single. Raising broilers can be demanding, requiring long hours and constant care. Marriage could provide a partner to share labour, decision-making, and financial risks involved in running a broiler operation. Broiler production should be seen as a family business where both partners contribute. These findings align with those of Nmadu *et al.* (2014), who concluded that marital status significantly influences production activities.

Furthermore, the result in Table 2 of the household size revealed that 32% had 5-8 people, with a mean of 6 members. This indicates that there is a link between household size and broiler production, suggesting a potential role for families in this industry. Larger families can provide a readily available source of labour for broiler production activities, reducing reliance on hired help. This supports the view that family size serves as a workforce for essential farm tasks (Emaikwu *et al*., 2011).

In terms of education, 58% of producers had received 11–15 years of schooling, with a mean of 14 years. This suggests a relatively high level of education among broiler producers, indicating a potentially knowledge-intensive industry. Modern broiler production often involves complex techniques for broiler health, nutrition, and management. A higher level of education might equip producers with the knowledge to understand these practices. These findings agree with Chukwu's (2012) conclusion that higher literacy levels enhance farmers' productivity and their ability to embrace modern production practices.

Table 2: Socioeconomic characteristics of broiler chicken producer in the study area

Variable	Frequency	Percentage
Sex		
Male	94	63
Female	56	37
Age		
20-29	44	29
30-39	64	43
40-49	21	14
50-59	21	14
Mean	36	
Marital Status		
Married	111	74
Single	39	26
Household Size		
1-4	39	26
5-8	48	32
9-12	21	14
13-16	28	18
17-20	15	10
Mean	6	
Years of Schooling		
1-5	8	5
5-10	16	11
11-15	88	58
16-20	23	15
21-25	16	10
Mean	14	
Experience		
1-5	100	67
6-10	31	21
11-15	14	9
16-20	1	1
21-25	4	3
Mean	6	
Membership of Cooperatives Society		
Membership	28	18
Non membership	123	82
Flock Size		
50-249	116	78
250-449	9	6
450-649	9	6
650-849	5	3
850-1049	6	4
≥ 1050	5	3
Total	**150**	**100**
Mean	213	

Regarding experience in broiler production, 67% of producers had been engaged in the business for 1–5 years, with a mean of 6 years. This suggests that broiler production is a dynamic industry. Entering broiler production might require significant initial investment, potentially limiting entry for experienced individuals but attracting new ones with access to capital. Experience is crucial for making informed decisions for optimal productivity and income, in line with the general expectation that productivity increases with years of experience (Umar *et al.*, 2017).

Only 18% of producers were members of poultry farmers' associations, while 82% were not affiliated with any cooperative societies. This lack of association membership may limit access to credit and other benefits, highlighting the importance of cooperative involvement, as noted by Idi (2021). Poultry farmers' associations can facilitate resource pooling and improve

access to agricultural extension services, financial institutions, and government and private support. Approximately 78% of broiler producers stocked etween 50 and 249 birds, with an average flock size of 213 birds. This suggests that the majority of broiler producers in this study operate on a small scale, indicating a dominance of small-sized farms in the broiler industry. Small farms may not be able to achieve some economies of scale, which can lead to higher production costs.

Profitability of Broiler Chicken Production in the Study Area

The outcomes of the study as detailed in Table 3 revealed that, on average, farmers generated a total revenue of ₦3249.84 per bird, a figure inclusive of not only the sale of live birds but also secondary sources such as poultry dung and used feed bags. This multifaceted revenue stream underscores the importance of diversification in income sources for broiler production in this region. Conversely, the total cost incurred per bird stood at ₦2340.46. Notably, feeds and the cost of birds represented 45% and 42% of the total variable costs, respectively. This suggests that variable costs constitute the largest portion of the total cost in the broiler production enterprise, aligning with the conclusions drawn by Oluwatayo *et al.* (2016). The high proportion of feed and chick costs within the total cost structure suggests that interventions aimed at improving feed management practices and strategies for negotiating chick prices could yield substantial improvements in broiler farm profitability. An analysis of profitability estimates unveiled a return on investment (ROI) of ₦1.38 per broiler chicken, indicating that for every ₦1 invested in a single broiler chicken, a profit of 38 kobo was realized. This result is consistent with the findings of Hassan et al. (2016), who discovered that the total cost of production and net farm income per 100 layers were ₦206,610.44 and ₦208,079.75, respectively, with a return per naira invested of ₦1.01.

Table 3: Estimate of the profitability of Broiler production

Variables	Average value (₦)	Percentage (%)
Sales of birds	3015	
Sales of dung	193.60	
Sales of used feed bags	5.24	
Total revenue (TR)	3249.84	
Variable cost:		
Cost of chicks	701.63	42.49
Transportation cost	15.08	0.91
Fuel cost	33.71	2.04
Electricity cost	52.00	3.14
Maintenance cost	42.30	2.56
Labour cost	8.57	0.51
Cost of Drugs and Vaccines	25.46	1.54
Purchase of feed	756.06	45.7
Miscellaneous	16.33	0.98
Total variable cost (TVC)	1651.14	
Fixed cost depreciated		
Equipment	582.96	84.57
Water (well, tap)	11.01	0.66
Housing	95.35	5.77
Total fixed cost (TFC)	689.32	
Total cost (TC)	2340.46	
Net farm income (NFI)	909.38	
Return per naira invested	1.38	

Determinants of Profitability of Broiler Production in the Study Area

The result of the regression analysis of the determinants of profitability for broiler chicken production is presented in Table 4. An adjusted R-squared value of 0.57 indicates that approximately 6

57% of the variation in profitability can be explained by the independent variables included in the model, while the remaining variance of 38.55% of the variation in profitability remains unexplained by the model. This R-squared value suggests that the model provides a moderately good fit for understanding the factors affecting broiler profitability. Notably, four out of five independent variables (age, sex, farming experience, and education) were statistically significant at the 1% level, while household size and cooperative membership were significant at the 5% level.

The coefficient of sex is positive and statistically significant at the 1% level. This suggests that cultural norms or social expectations might influence how male and female producers manage their flocks, which could lead to profitability differences. This implies that both

men and women can have a noticeable influence on broiler production. However, traditional gender roles associated with certain professions might influence decision-making and opportunities within the workforce (Rochlen *et al.*, 2012).

The coefficient of age is negative and statistically significant at the 1% level. This means broiler production profitability decreases as the age of the producers increases. This suggests that the increasing age of the household head might be associated with a decrease in broiler production. This trend could be due to the potential challenges faced by older farmers in performing physically demanding tasks associated with broiler production (Eshetu and Mekonnen, 2016). This finding is in accordance with the study of Afodu *et al.* (2020), who reported that as the age of the broiler farmers increases, their profit level decreases.

The coefficient of household size is positive and statistically significant at the 5% level. This means broiler production profitability increases as the household size of the producer increases. Larger households might have more available family labour to contribute to broiler production activities. This can reduce reliance on hired labour, lower overall production costs, and potentially lead to improved bird health and performance. This finding aligns with Adegbite's (2016) statement that larger households can collaborate to pool resources for basic needs and might also adopt cost-saving measures that limit broiler production. This finding is at variance with findings by Afodu *et al.* (2020), who stated that as household size increases, the profit of the farmers may decrease.

The coefficient of experience is negative and statistically significant at the 1% level. The negative coefficient means that broiler production profitability decreases as the producer's experience increases. A plausible explanation is that less profitable producers are more likely to stay in the broiler industry for longer, leading to a spurious correlation between experience and lower profitability. Beginners might exit the industry if they experience initial losses, leaving a pool of producers who haven't been able to optimise their practices. This finding is in tandem with Khan and Afzal (2018) and Adeyonu and Odozi (2022), who reported a positive association between experience and profitability of broiler farms.

The coefficient of educational level is positive and statistically significant at the 1% level. A positive and statistically significant coefficient of educational level in a broiler profitability model suggests a valuable connection. Higher education can equip producers with the knowledge, skills, and resources necessary to optimise broiler production practices and ultimately increase profitability. This aligns with the findings of the Organisation for Economic Co-operation and Development (OECD, 2011) that emphasise the importance of farmer education and training for achieving a balance between economic efficiency and environmental and social sustainability. This is in line with the findings of Afodu *et al.* (2020), who found that educational status was significant and positively contributed to the profit level of the broiler farmers.

The coefficient of cooperative membership was positive and statistically significant at the 5% level. This suggests a positive association. Broiler production profitability increases for producers who are members of cooperatives. Perhaps this is because cooperative membership can offer broiler producers a range of advantages, including facilitating knowledge exchange and collaboration among members, which can lead to improved management practices, disease control strategies, and overall flock performance, potentially increasing profitability. This finding agrees with the findings by Adeyonu and Odozi (2022), who reported that the membership of associations is positively significant at 1% levels. Additionally, social capital and entrepreneurial skills could be fostered through cooperative participation (Spielman, 2015).

Table 4: Estimate of the determinants of profitability of broiler production in the study area

Variable	**Coefficient**	**Std. Error**	**T-value**
Constant	1.242	1.129	1.088
Sex	7.879***	2.580	2.495
Age	-4.851***	1.271	-3.089
Household size	0.157**	0.058	0.278
Experience	-0.034***	1.584	-5.495
Marital Status	7.849	1.736	0.512
Flock size	5.184	0.001	1.472
Access to credit	3.232	1.320	-1.031
Educational level	0.040***	0.098	4.116
Cooperative membership	0.123**	0.052	2.351
Prob> F	0.0000		
R^2	0.61		
Adjusted R^2	0.57		

*Note: The asterisks *** and ** denote statistical significance at probability of 1% and 5% respectively*.

CONCLUSION AND RECOMMENDATIONS

It was concluded that broiler production in the study area was profitable and that several socio-economic factors significantly influence profitability. Based on the findings, the study recommends the following actions to improve the profitability and sustainability of broiler production in Sabon Gari LGA:

i. Producers can consider joining cooperative membership to explore the benefits of cooperatives and leverage bulk purchasing discounts and knowledge sharing opportunities, potentially improving profitability for members;
ii. Policymakers and stakeholders can support cooperative development by providing support and resources to strengthen existing cooperatives or facilitate the formation of new ones.

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