*UNIZIK Journal of Agricultural Economics and Extension (UJAEE) Vol. 2 No. 2 (2025): 122-132*
*A Journal of the Department of Agricultural Economics and Extension, Nnamdi Azikiwe University, Nigeria*
*ISSN: 3043-6540 (Print) and 3043-6559 (Electronic) / Available at: https://journals.unizik.edu.ng/ujaee*

# Effect of Food Security Status on Economic Efficiency Among Small Scale Broiler Producers in Southern Taraba State Nigeria

**Olayiwola, S. A.*[1], Maiwayo, C. D.[1] and Akintunde, M. O.[2]**

[1]*Department of Agricultural Economics and Extension, Faculty of Agriculture and Life Sciences, Federal University Wukari, Taraba State, Nigeria*
[2]*Department of Agricultural Economics and Extension, Faculty of Agriculture, Taraba State University, P.M.B. 1167, Jalingo, Taraba State, Nigeria*

***DOI:*** *https://www.doi.org/10.5281/zenodo.18074708*

**KEYWORDS:**
*Broiler,*
*Economic,*
*Efficiency,*
*Food security*

***CORRESPONDING AUTHOR:**
*adekunle@fuwukari.edu.ng*
*ollyskool1@gmail.com*

**ABSTRACT**

*This study examined the effect of food security status on economic efficiency among small-scale broiler producers in Southern Taraba State, Nigeria. Specifically, it described the socioeconomic characteristics of broiler farmers, assessed their food security status, analyzed the cost and returns of broiler production, and analyzed effect of food security on broiler production. Primary data were collected from 138 respondents using a structured questionnaire through a multi-stage sampling technique. Analytical tools employed included descriptive statistics such as mean and standard deviation, food security index, enterprise budgeting, and the stochastic frontier production function. Results showed that the average age of broiler farmers was 35 years, with most having formal education and moderate household sizes. About 76.8% of households were food secure, with a food security index of 2.7 and an average daily calorie intake significantly above the recommended threshold. Profitability indicators such as a net return on investment of 1.4 and a profitability index of 0.6 confirmed that broiler production is economically viable and the average economic efficiency was estimated at 66%. Key determinants of economic efficiency included cost of day-old chicks (0.7718191), feed (0.1091954), water (-0.0318129), and litter material (0.0118794), while age (-0.0043665), sex (0.0612589), household size (0.0099204), and food security status (0.1173318) significantly influenced inefficiency. The study concludes that food security enhances broiler producers' economic efficiency, with food-secure farmers performing better than food-insecure ones. It recommends policies enhancing farmers' welfare, stable input supply, feed management training, and credit access to improve both food security and production efficiency in the study area.*

## INTRODUCTION

Food security remains a pressing global concern, particularly in Sub-Saharan Africa, where poverty, conflicts, and climate variability persistently threaten the availability, accessibility, and affordability of food (Bappah and Adejoh, 2024). According to Nwanmuoh *et al.* (2024), over 33% of the population in Sub-Saharan Africa remains food insecure, with rural agricultural households most affected. In Nigeria, food insecurity has worsened due to inflation, insecurity, and inefficiencies in agricultural production (Sakanko *et al.,* 2025). Taraba State, despite its vast agricultural potential, is not exempted, as a significant proportion of its farming households still grapple with both food insecurity and low productivity (Dearsley and Enganya, 2024).

Poultry farming, especially broiler production, is a critical sub-sector of Nigeria's livestock industry. It serves as a significant source of animal protein, income, and employment for rural households (Ojo, 2023). Broiler farming is particularly attractive to smallholder farmers due to its short production cycle, high turnover rate, and relative ease of management (Awoyomi, 2021). However, many of these producers operate under constrained production environments characterized by high input costs, limited access to veterinary services, poor technical knowledge, and limited market access (Abadula *et al.,* 2022).

Food security refers to a condition where people consistently have both physical and economic access to adequate, safe, and nutritious food. This ensures they can meet their dietary needs and preferences to maintain an active and healthy life (World Health Organization 2021). For rural small-scale broiler producers, achieving food security depends not only on income earned from poultry but also on how efficiently resources are allocated and utilized in the production process (Saheed, 2023). Economic efficiency in broiler production implies the ability of producers to maximize output (broilers) with minimum cost while maintaining profitability (Ojo *et al.,* 2021). An economically efficient farmer is more likely to enjoy higher income and thus better food access and dietary quality (Ogunniyi *et al.,* 2021).

Despite the vital role of broiler farming in improving household welfare, there remains a limited understanding of the relationship between food security status and the economic efficiency of broiler producers, particularly in Nigeria. Several studies have analyzed food security or farm efficiency independently (Omodara *et al.,* 2023; Ikuemonisan, 2024), but few have empirically linked the two. Theoretically, food-secure households may be better positioned to allocate labor more productively, make informed decisions, and reinvest profits into improved production practices, all of which can enhance economic efficiency (Adeniyi, 2019). Conversely, food-insecure households might divert labor to off-farm jobs, sell inputs prematurely, or make suboptimal production decisions, thereby reducing efficiency (Collins-Sowah, 2021).

In Southern Taraba, smallholder poultry producers face multiple challenges that may hinder both their food security and productive efficiency. These include high feed costs, inadequate extension services, disease outbreaks, and fluctuating market prices (Attia *et al.,* 2022). As a result, even though poultry farming presents an opportunity for poverty alleviation and nutritional improvement, these opportunities are not fully harnessed due to production inefficiencies (Kumar *et al.,* 2021). A better understanding of the link between food security status and the economic efficiency of broiler farmers can offer new insights into how best to support farmers to achieve both improved welfare and productivity.

Furthermore, assessing the economic efficiency of broiler producers provides a basis for identifying key determinants of inefficiency, such as access to credit, education, training, and food security status (Ramukhithi *et al.,* 2023). Previous studies, such as that by Mivumbi *et al.* (2023), found that improving farmers' technical and allocative efficiency significantly enhances overall productivity. Similarly, Kapari *et al.* (2023) showed that food security is positively influenced by farm income and production efficiency, particularly in smallholder systems. This study, therefore, seeks to investigate the effect of food security status on the economic efficiency of small-scale broiler producers in Southern Taraba State. It is motivated by the need to fill the existing empirical gap and provide data-driven insights for policymakers, development partners, and extension practitioners. A better understanding of this nexus will help in designing policies that not only enhance poultry productivity but also improve household food security outcomes in a sustainable manner. Given the rising cost of poultry inputs and the growing threat of food insecurity in Nigeria, it is imperative to understand the dynamics at play between food access and production efficiency. The specific objectives for the studies were to; socioeconomic characteristics of small scale Broiler farmers; food security status of farmers; cost and return of broiler production and effects of broiler production on food security status of small scale broiler farmers in the study area

## METHODOLOGY

### Study Area

The research was carried out in Southern Taraba, located within Taraba State, Nigeria. The region comprises five Local Government Areas—Wukari, Takum, Donga, Ussa, and Ibbi—and one Special Development Area, Yangtu. Geographically, it lies between latitudes 8°30′N and 9°03′E and longitudes 8°30′N and 10°30′E (Danladi et al., 2024). Southern Taraba occupies a land area of approximately 14,099 km² and had a population of 687,077 people according to the 2006 National Population Census (NPC, 2006). Based on the National Population Commission's estimated annual growth rate of 3.5%, the population was projected to reach about 1,233,080 by 2023 (Danladi et al., 2024). The area is predominantly agrarian, with most residents engaged in small-scale farming of both food and cash crops such as yam, maize, sorghum, cassava, rice, and sesame. In addition, freshwater fishing and forestry are common livelihood activities, while livestock rearing plays a relatively minor economic role.

### Sources of Data /Data Collection

Primary data was used for this research work. A well-structured questionnaire was used to collect the data from respondents in the study area.

### Sampling procedures

A multistage sampling procedure was adopted to select respondents for the study. At the first stage, all five local government areas constituting Southern Taraba were included. In the second stage, three wards were randomly chosen from each of the selected local government areas. At the final stage, a total of 138 small-scale broiler farmers were identified and interviewed using the snowball sampling approach, which facilitated the selection of farmers within the chosen wards.

### Analytical techniques

Data collected for the study were subjected to both descriptive and inferential statistical analyses. Descriptive statistics, including percentages, means, and standard deviations, were employed to examine the socioeconomic characteristics of small-scale broiler farmers in the study area (Objective i). The food security status of the farmers (Objective ii) was assessed using the Food Security Index (FSI), with the food security line derived from the daily recommended calorie intake of 2,260 kcal (Ojeleye, 2015). The cost and returns associated with broiler production (Objective iii) were determined through enterprise budgeting tools such as gross margin, net farm income, net return on investment, gross ratio, and profitability index. Finally, the influence of broiler production on the food security status of small-scale broiler farmers (Objective iv) was estimated using the Stochastic Frontier Analysis (SFA) model.

### Model Specification:

**The economic efficiency model was specified as follows:**

$$\ln Yi = \beta o + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + \beta_7 \ln X_7 + \beta_8 \ln X_8 + e \quad \ldots\ldots\ldots(1)$$

Where:

$Yi$ = Total production (₦), $X_1$ = Cost of day old chicks (₦), $X_2$= Cost of feeding (₦)
$X_3$= Cost of labour (₦), $X_4$ = Cost of water (₦), $X_5$ = Cost of medication / vaccine (₦), $X_6$ = Cost of warming and lighting (₦), X7 = Cost of liter material (₦), X8 = Cost of transportation (₦), $Bi$ = Parameters to be estimated, Ln = Natural logarithms, $e$ = Composite error term defined as $vi - ui$.

**The economic inefficiency model is specified as:**

$$Ui = \delta 0 + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_4 Z_4 + \delta_5 Z_5 + \delta_6 Z_6 + \delta_7 Z_7 + \delta_8 Z_8 + \delta_8 Z_8 + \text{ei} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where:

$Ui$ = Economic inefficiency of the Yam farmers, $Z_1$ = Age of farmers (years), $Z_2$ = Sex (1= Male, 0 =

Female), $Z_3$ = Farming experience (years), $Z_4$ = Level of education (Years), $Z_5$ = Household size (number of persons), $Z_6$ = Extension contact (1=Yes, 0 = No), $Z_7$ = Number of broiler reared (Number), $Z_8$ = Cooperative membership (1 =Yes, 0 = No), Z9 = Food security status (1 = food secure, 0 = food insecure), $\delta i$ = Parameters to be estimated.

## RESULTS AND DISCUSION

### Socioeconomic Characteristics of Small-Scale Broiler Farmers

The findings revealed that the average age of small-scale broiler farmers was approximately 35 years, with 76.8% below 40, suggesting that broiler farming is dominated by young, economically active individuals capable of adopting innovations (Saheed, 2023). The average household size was five, which can support labor availability, though large sizes may strain food resources (Ayaz and Mughal, 2024; Giller *et al.,* 2021). Regarding education, 40.6% had secondary and 30.4% had tertiary education, which supports informed decision-making and technology adoption (Masere and Worth, 2022; Saheed, 2023).

The average farming experience was 9 years, with 73.9% having less than 10 years, indicating potential for further training and capacity building (Bello *et al.,* 2021). An average flock size of 37 birds, with 69.6% keeping 40 or fewer, confirms the small-scale nature of operations due to capital limitations and high input costs (Tahmasbi, 2024; Balana and Oyeyemi, 2022). Only 17.4% of farmers engaged in broiler farming full-time, while most combined it with other livelihoods like crop farming and trading, reflecting its role as a supplementary income source (Arowolo *et al.,* 2022).

Access to credit was limited, with an average borrowed amount of ₦101,666.67, pointing to undercapitalization and restricted investment in essential inputs (Karamchedu *et al.,* 2022). Extension contact was very low (13.0%), limiting farmers' access to updated knowledge and innovations (Saheed, 2023; Aromolaran *et al.,* 2024). Only 18.8% belonged to cooperatives, reflecting weak institutional support, which undermines service delivery and market access. Strengthening cooperatives could significantly enhance productivity and farmer welfare (Biswas, 2024).

**Table 1: Socioeconomic characteristics of small-scale broiler farmers**

| Variables | Frequency | Percentage | Mean (Standard Deviation) |
|---|---|---|---|
| **Age** | | | |
| ≤ 30 | 60 | 43.5 | |
| 31 – 40 | 46 | 33.3 | |
| 41 – 50 | 26 | 18.8 | |
| > 50 | 6 | 4.3 | 34.7681(±8.78310) |
| **Household Size** | | | |
| ≤ 5 | 102 | 73.9 | |
| 6 – 10 | 30 | 21.7 | |
| > 10 | 6 | 4.3 | 4.6667 (±3.03106) |
| **Educational Level** | | | |
| No Formal Education | 28 | 20.3 | |
| Primary Education | 12 | 8.7 | |
| Secondary Education | 56 | 40.6 | |
| Tertiary Education | 42 | 30.4 | |
| **Farming Experience** | | | |
| ≤ 5 | 58 | 42.0 | |
| 6-10 | 44 | 31.9 | |
| 11-15 | 18 | 13.0 | |
| 16-20 | 12 | 8.7 | |
| > 20 | 6 | 4.3 | 9.0870 (±6.60179) |

| | | | |
|---|---|---|---|
| **Number of Broilers** | | | |
| ≤ 20 | 56 | 40.6 | |
| 21-40 | 40 | 29.0 | |
| 41-60 | 10 | 7.2 | |
| 61-80 | 14 | 10.1 | |
| > 80 | 18 | 13.0 | 36.6087 (±28.71568) |
| **Major Occupation** | | | |
| Crop Farming | 50 | 36.2 | |
| Broiler Production | 24 | 17.4 | |
| Students | 22 | 15.9 | |
| Civil Servant | 18 | 13.0 | |
| Trading | 16 | 11.6 | |
| Artisan | 8 | 5.8 | |
| **Amount Borrowed** | | | |
| ≤ 50000 | 2 | 16.7 | |
| 50001-100000 | 8 | 66.6 | |
| >100000 | 2 | 16.7 | 101666.67 (±50602.43) |
| **Extension Contact** | | | |
| Yes | 18 | 13.0 | |
| No | 120 | 87.0 | |
| **Cooperative Membership** | | | |
| Yes | 26 | 18.8 | |
| No | 112 | 81.2 | |
| **Total** | 138 | 100 | |

*Source: Field Survey, 2025*

**Food security status of small scale broiler farmers**

Food security exists when individuals have consistent physical, social, and economic access to safe, nutritious food that meets dietary needs (World Health Organization, 2021). In this study, the calorie intake approach was used, with 2260 kcal per adult per day as the threshold for food security, as recommended by national guidelines (Ademola *et al.,* 2021). Results show that 76.8% (106 households) of broiler farming households were food secure, while 23.2% (32 households) were food insecure. This suggests that most small-scale broiler farmers in Southern Taraba can meet their dietary needs, likely due to income from poultry sales enhancing their food purchasing power. This finding supports previous studies by Omodara *et al.* (2023) and Edafe *et al.* (2023), who found that poultry farming significantly improves household food security. Food-secure households had an average daily calorie intake of 6108.40 kcal, exceeding the minimum by 3848.4 kcal, resulting in a food security index of 2.7 and a surplus index of 1.7. This indicates not only adequacy but possible overconsumption, raising concerns about dietary balance and food waste (Hussain *et al.,* 2025). In contrast, food-insecure households averaged 1664.51 kcal daily 595.50 kcal below the threshold with a food insecurity index of 0.7 and a shortage index of 0.3, reflecting a significant calorie deficit.

Cost and Return of Small-Scale Broiler Production

Profitability analysis provides key insights into the economic viability of small-scale broiler production in Southern Taraba. The average total revenue per cycle was ₦629,850.70, derived mainly from bird sales (₦578,937.70) and poultry droppings (₦50,913.04), underscoring the contribution of by-products to overall revenue (Kabugo *et al.,* 2023). Total variable cost stood at ₦249,668.10, with feeding (₦118,926.10; 47.6%) and stocking (₦111,647.80; 44.7%) as major expenses, highlighting the need for cost-effective feed and day-old chicks. Other costs included labor (₦9,672.46), water (₦2,088.41), and medication (₦1,807.25), with low labor costs reflecting family labor usage.

Total fixed cost was ₦8,544.35 (3.2% of total cost), mainly from depreciation of basic equipment, indicating low capital investment (Zaehringer *et al.,* 2021). The gross margin of ₦380,182.60 shows strong ability to cover variable costs, while a net farm income of ₦363,093.90 demonstrates high profitability. A return on investment (ROI) of 1.4 confirms the venture's profitability—comparable to studies by Aminu and Hermanns (2021) and Akoh and Jimoh (2024). A gross ratio of 0.4 reflects high cost efficiency, while a profitability index of 0.6 shows that 60% of total revenue is retained as profit (Al-Rikabi, 2021). Overall, despite small flock sizes (average 36 birds), the sector proves to be financially sustainable and economically efficient.

**Table 2: Food security status of small scale broiler farmers**

| Variable in Average | |
|---|---|
| **Food secured households** | 106 |
| Food security index | 2.7 |
| Surplus index | 1.7 |
| Average household daily calorie consumption for food secured households | 6108.40 |
| Average calorie consumption in excess of recommended (2260Kcal) | 3848.40 |
| Percentage of food secured household | 76.8% |
| **Food insecure households** | 32 |
| Food insecurity index | 0.7 |
| Shortage index | 0.3 |
| Average household daily calorie consumption (Kcal) for food insecure households | 1664.51 |
| Average calorie consumption in shortage of recommended (2260Kcal) | 595.50 |
| Percentage of food insecure household | 23.2% |

*Source: Field Survey, 2025*

**Determinants of Economic Efficiency of Broiler Production**

The stochastic frontier analysis (SFA) model was used to analyze economic efficiency and its determinants among small-scale broiler producers, incorporating both cost inputs and socioeconomic variables (Sultana *et al.,* 2023). Results showed that the Cost of Day-Old Chicks ($X_1$) had a positive and significant effect (1%), where a unit increase raised output by 0.77%, reflecting high elasticity with respect to chick quality and quantity (Mukailan et al., 2023). Cost of Feeding ($X_2$) was also positive and significant at 1%, reinforcing the importance of feed in productivity and aligning with Reis *et al.* (2021) who reported feed as a key cost driver and performance enhancer. In contrast, Cost of Water ($X_4$) was significant at 5% with a negative effect, indicating that higher water expenses reduce output, possibly due to poor access or quality, as noted by Sullivan *et al.* (2021). Cost of Litter Material ($X_7$) positively influenced output at 1% significance, emphasizing its role in improving hygiene and reducing disease (Abougabal and Taboosha, 2023).

In the inefficiency model, Age ($Z_1$) was negatively significant at 1%, suggesting that older farmers are more efficient, likely due to experience. Sex ($Z_2$) was significant at 1% and had a positive effect on inefficiency which showed that male farmers were more inefficient than females, perhaps due to women's stronger management practices (Anderson *et al.,* 2021). Household Size ($Z_5$) was significant at 5% and had a positive effect on inefficiency, indicating that larger households may dilute resources and reduce efficiency, consistent with Smith and Landry (2021). Interestingly, Food Security Status ($Z_9$) increased inefficiency at 1% significance suggesting that food-secure farmers may deprioritize cost minimization, aligning with Khumalo et al. (2024), who observed that well-nourished households sometimes underperform economically due to reduced urgency in profit optimization.

**Table 3: Cost and return of small-scale broiler production**

| S/N | Description | Broilers Production Cost |
|---|---|---|
| 1 | Stocks | |
| | Average Opening Stocks (37 birds per production cycle of 3 months) | |
| | Average Closing Stocks (36 birds per production cycle of 3 months) | |
| 2 | Revenue | Value (₦) |
| **a.** | Sales of Birds | 578937.7 |
| **b.** | Sales of droppings | 50913.04 |
| | Total Revenue (TR) | 629850.7 |
| 3 | Variable Cost: | |
| | Stocking | 111647.8 |
| | Feeding | 118926.1 |
| | Labour | 9672.464 |
| | Water | 2088.406 |
| | Medication/Vaccination/Additives | 1807.246 |
| | Warming + lighting and fuel | 1500.145 |
| | Litter Material | 783.1884 |
| | Transportation | 2762.319 |
| | Other Utility expenses | 480.4348 |
| | Total Variable Cost (TVC) | 249668.1 |
| 4 | Fixed Cost: | |
| | Depreciation on: | |
| | Buildings / cages | 2226.087 |
| | Feeders | 1345.652 |
| | Drinkers | 1300.725 |
| | Stove | 822.029 |
| | Jerry-can, Bucket and Basins | 1047.681 |
| | Spades and Shovel | 977.5362 |
| | Wheel Barrows | 824.6377 |
| | Total Fixed Cost (TFC) | 8544.348 |
| | Total Cost (TC) | 266756.8 |
| | Gross Margin (GM) | 380182.6 |
| | Net Farm Income (NFI) | 363093.9 |
| | Net Return On Investment (NFI / TC) | 1.4 |
| | Gross Ratio | 0.4 |
| | Profitability Index (PI) | 0.6 |

*Source: Field Survey, 2025*

**Economic Efficiency of Broiler Production**

The study found that the average economic efficiency of small-scale broiler producers in Southern Taraba State is 66%, indicating that farmers could reduce their production costs by 34% without lowering output. The majority of farmers (44.2%) operated within a moderate efficiency range (0.61–0.80), while only 20.3% approached full efficiency (0.81–1.0). A small portion (2.9%) exhibited very low efficiency levels. These variations suggest that while some farmers are performing relatively well, many still face challenges related to poor input management, limited technical knowledge, and access to resources. The results highlight the need for targeted interventions such as training, better access to credit, and extension services

to improve economic efficiency. The findings are consistent with the study by Nwaubani *et al.* (2023) who emphasize the importance of managerial ability and cost control in broiler production.

**Table 4: Determinant of Economic Efficiency of broiler production**

| Variable | Coefficient | Standard error | z | P>/z/ |
|---|---|---|---|---|
| Constant | 3.651397 | 0.153395 | 23.80 | 0.000 |
| Cost of Day old chicks ($X_1$) | 0.7718191*** | 0.022555 | 34.22 | 0.000 |
| Cost of feeding ($X_2$) | 0.1091954*** | 0.016172 | 6.75 | 0.000 |
| Cost of labour ($X_3$) | 0.0076588 | 0.0112256 | 0.68 | 0.495 |
| Cost of water ($X_4$) | -0.0318129** | 0.0150148 | -2.12 | 0.034 |
| Cost of Medication / Vaccine ($X_5$) | -0.0083731 | 0.0064075 | -1.31 | 0.191 |
| Cost of Warming and lighting ($X_6$) | -0.0088899 | 0.01253 | -0.71 | 0.478 |
| Cost of liter material ($X_7$) | 0.0118794*** | 0.0043424 | 2.74 | 0.006 |
| Cost of Transportation ($X_8$) | -0.0140068 | 0.0192755 | -0.73 | 0.467 |
| Number of Observation | 138 | | | |
| Prob > F | 0.0000 | | | |
| sigma2 | 0.0432779 | 0.0071276 | | |
| Lambda | 6.324288 | 0.0288873 | | |
| **Inefficiency model** | | | | |
| Constant | 0.1641926 | 0.0547768 | 3.00 | 0.003 |
| Age ($Z_1$) | -0.0043665*** | 0.0014611 | -2.99 | 0.003 |
| Sex ($Z_2$) | 0.0612589*** | 0.0190487 | 3.22 | 0.002 |
| Farming experience ($Z_3$) | -0.0012832 | 0.001897 | -0.68 | 0.500 |
| Level of education ($Z_4$) | 0.0013731 | 0.001594 | 0.86 | 0.391 |
| Household size ($Z_5$) | 0.0099204** | 0.0048577 | 2.04 | 0.043 |
| Extension contact ($Z_6$) | -0.0377158 | 0.0365131 | -1.03 | 0.304 |
| Number of broiler ($Z_7$) | -0.0005366 | 0.000435 | -1.23 | 0.220 |
| Cooperative membership ($Z_8$) | -0.001053 | 0.0341928 | -0.03 | 0.975 |
| Food security status ($Z_9$) | 0.1173318*** | 0.0303989 | 3.86 | 0.000 |

*Source: Field Survey, 2025* **** sign at 1%, ** sig at 5% and * sig at 10%*

**Table 5: Economic efficiency estimate of broiler production**

| Efficiency Level | Economic Efficiency | |
|---|---|---|
| | Frequency | Percentage (%) |
| 0.11 – 0.2 | 4 | 2.9 |
| 0.21 – 0.4 | 2 | 1.4 |
| 0.41 – 0.6 | 43 | 31.2 |
| 0.61 – 0.8 | 61 | 44.2 |
| 0.81 – 1.0 | 28 | 20.3 |
| **Total** | 138 | 100 |
| Mean | 0.66 | |
| Std dev. | 0.18 | |
| Minimum | 0.15 | |
| Maximum | 0.99 | |

***Source:*** *Field Survey, 2025*

## CONCLUSION

In conclusion Small-scale broiler production in Southern Taraba State is profitable and plays a significant role in enhancing household food security. However, food security status significantly enhances the economic efficiency of small-scale broiler producers, with food-secure farmers performing better than their food-insecure counterparts, underscoring the need for policies that jointly address household welfare and production constraints.

Based on the findings, it is recommended that policies promoting household food security among broiler producers be prioritized, as improving farmers' welfare can lead to better production efficiency and profitability. Support programs should focus on ensuring stable input supply, extension training on feed management, and credit access to strengthen both food security and economic efficiency in broiler production systems.

## REFERENCES

Abadula, T. A., Jilo, S. A., Hussein, J. A. & Abadura, S. Z. (2022). Poultry production status, major constraints, and future prospective. *Journal of World's Poultry Science*, *1*(1), 22-28.

Abougabal, M. S. & Taboosha, M. F. (2023). Effect of different types of available litter materials on the performance and welfare of broiler chickens. *Al-Azhar Journal of Agricultural Research*, *48*(1), 139-152.

Ademola, A., Isaac, A. & Adeleke, O. (2021). Determinants of food security status and coping strategies to food insecurity among rural crop farming households in Ondo State, Nigeria.

Adeniyi, D. A. S. (2019). Sustainable irrigation agriculture for food security and poverty reduction among smallholder farmers in Northern Nigeria.

Akoh, J. P. & Jimoh, O. A. (2024). Economic analysis of poultry production in Ekiti State, Nigeria. *Nigerian Journal of Animal Production*, *51*(3), 95-103.

Al-Rikabi, N. S. (2021). Profitability index and its impact on short and long-term decisions. *Pt. 2 J. Legal Ethical and Regul. Isses*, *24*, 1.

Aminu, F. O. & Hermanns, U. (2021). Profitability evaluation of poultry production in Lagos state, Nigeria. *Discovery Agriculture*, *7*(17), 37-44.

Anderson, C. L., Reynolds, T. W., Biscaye, P., Patwardhan, V. & Schmidt, C. (2021). Economic benefits of empowering women in agriculture: Assumptions and evidence. *The Journal of Development Studies*, *57*(2), 193-208.

Aromolaran, A. K., Sanusi, N. O., Bamiduro, P. O., Wole-Alo, F. I. & Tiamiyu, L. O. (2024). Extension Agents' Perspective on the Effect of Funders' Mandate and Fund Access in Sustainable Development in Ogun State Nigeria. *Journal of Agricultural Extension*, *28*(3), 50-59.

Arowolo, A. O., Ibrahim, S. B., Aminu, R. O., Olanrewaju, A. E., Ashimiu, S. M. & Kadiri, O. J. (2022). Effect of financial inclusion on livelihood diversification among smallholder farming households in Oyo state, Nigeria. *Nigeria Agricultural Journal*, *53*(1), 67-75.

Attia, Y. A., Rahman, M. T., Hossain, M. J., Basiouni, S., Khafaga, A. F., Shehata, A. A. & Hafez, H. M. (2022). Poultry production and sustainability in developing countries under the COVID-19 crisis: Lessons learned. *Animals*, *12*(5), 644.

Awoyomi, F. S. O. (2021). Competitiveness of broiler chicken value chain in Southwestern Nigeria *(Doctoral Dissertation)*.

Ayaz, M. & Mughal, M. (2024). Farm size and productivity: The role of family labor. *Economic Development and Cultural Change*, *72*(2), 959-995.

Balana, B. B. & Oyeyemi, M. A. (2022). Agricultural credit constraints in smallholder farming in developing countries: Evidence from Nigeria. *World Development Sustainability*, *1*, 100012.

Bappah, F. & Adejoh, S. (2024). Mitigating Post-Harvest Losses to Ensure Food Security in North-West Nigeria. *Academy Journal of Multidisciplinary Doctoral Research*, *2*(2), 118-127.

Bello, L. O., Baiyegunhi, L. J. & Danso-Abbeam, G. (2021). Productivity impact of improved rice varieties' adoption: case of smallholder rice farmers in Nigeria. *Economics of Innovation and New Technology*, *30*(7), 750-766.

Biswas, N. (2024). The Role of Co-operative Societies in Enhancing Agricultural Production: Opportunities and Challenges. *Journal of Environmental Agriculture and Agroecosystem Management*, *1*(1), 29-38.

Collins-Sowah, P. (2021). Farm household adaptation to climate shocks in Senegal: A microeconometric analysis of strategies and welfare impacts (*Doctoral dissertation*).

Dearsley, D. J. & Enganya, Y. (2024). Impact of Rural Banditry on Food Security in Taraba State, Nigeria. *Jalingo Journal of Social And Management Sciences*, *6*(1), 66-78.

Edafe, O. D., Osabuohien, E., Matthew, O., Olurinola, I., Edafe, J. & Osabohien, R. (2023). Large-scale agricultural land investments and food security in Nigeria. *Heliyon*, *9*(9).

Giller, K. E., Delaune, T., Silva, J. V., Descheemaeker, K., Van De Ven, G., Schut, A. G., ... & van Ittersum, M. K. (2021). The future of farming: Who will produce our food?. *Food Security*, *13*(5), 1073-1099.

Hussain, M. A., Li, L., Kalu, A., Wu, X. & Naumovski, N. (2025). Sustainable Food Security and Nutritional Challenges. *Sustainability*, *17*(3), 874.

Kabugo, S., Okello, S., Nalule, S. A. & Kahwa, D. (2023). Utilisation of Non-Conventional Animal Waste as Feeds by Multiple Livestock Species Farmers in Lake Victoria Crescent of Central Uganda. *Agricultural Sciences*, *14*(11), 1561-1572.

Kapari, M., Hlophe-Ginindza, S., Nhamo, L. & Mpandeli, S. (2023). Contribution of smallholder farmers to food security and opportunities for resilient farming systems. *Frontiers in Sustainable Food Systems*, *7*, 1149854.

Karamchedu, A., Syndicus, I. & Tak, M. T. (2022). Identifying economic and financial drivers of industrial livestock production-the case of the global chicken industry. *Tiny Beam Fund*, *40548*.

Khumalo, N. Z., Mdoda, L. & Sibanda, M. (2024). Uptake and Level of Use of Climate-Smart Agricultural Practices by Small-Scale Urban Crop Farmers in eThekwini Municipality. *Sustainability*, *16*(13), 5348.

Kumar, M., Dahiya, S. P. & Ratwan, P. (2021). Backyard poultry farming in India: A tool for nutritional security and women empowerment. *Biological Rhythm Research*, *52*(10), 1476-1491.

Masere, T. P. & Worth, S. H. (2022). Factors influencing adoption, innovation of new technology and decision-making by small-scale resource constrained farmers: The perspective of farmers in lower Gweru, Zimbabwe. *African Journal of Food, Agriculture, Nutrition and Development*, *22*(3), 20013-20035.

Mivumbi, M. & Yuan, X. (2023). Sustainable environmental economics in farmers' production factors via irrigation resources utilization using technical efficiency and allocative efficiency. *Sustainability*, *15*(5), 4101.

Mukaila, R., Folorunso, D. K. & Falola, A. (2023). Drivers of profitability of commercial broiler production: Empirical evidence from Nigeria. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *71*(4).

Nwanmuoh, E. E., Okolo-Obasi, N. E. V., Anene, J. N., Uwakwe, I. V., Udu, F. T., Amuka, I. & Emeter, P. O. (2024). Agricultural Marketing and Sustainable Household Food Security in Sub-Saharan Africa: Evidence from Nigeria. *African Journal of Agricultural Science and Food Research*, *17*(1), 68-97.

Nwaubani, R. U., Daniel, C. O., Nwoye, M. & Abubakar, H. S. (2023). Effect of enterprise management on the performance of poultry farming in North Central Nigeria. *Design Construction Maintenance*, *3*(4), 32-45.

Ogunniyi, A. I., Omotoso, S. O., Salman, K. K., Omotayo, A. O., Olagunju, K. O. & Aremu, A. O. (2021). Socio-economic drivers of food security among rural households in Nigeria: Evidence from smallholder maize farmers. *Social Indicators Research*, *155*, 583-599.

Ojeleye, O. A. (2015). Analysis of farm household and community food security in Kaduna state, Nigeria. *A Ph. D thesis submitted to the Post Graduate School of Ahmadu Bello University, Zaria*, 23.

Ojo, B. J. (2023). Determinants of Saving and Investment Strategies Among Poultry Farmers in Kwara State, Nigeria *(Master's thesis, Kwara State University (Nigeria)*).

Ojo, S. O., Falaye, M. H. & Ojaomo, E. T. (2021). Determinants of profitability of broiler production in the out-growers schemes in Southwest Nigeria. *International Journal of Economics and Business Administration, IX*, *2*, 363-373.

Omodara, O. D., Oyebanji, A. T. & Oluwasola, O. (2023). Improving food security of farming households in Nigeria: Does broiler outgrowers' program make any difference?. *Plos one*, *18*(9), e0291611.

Ramukhithi, T. F., Nephawe, K. A., Mpofu, T. J., Raphulu, T., Munhuweyi, K., Ramukhithi, F. V. & Mtileni, B. (2023). An assessment of economic sustainability and efficiency in small-scale broiler farms in limpopo province: a review. *Sustainability*, *15*(3), 2030.

Reis, J., Weldon, A., Ito, P., Stites, W., Rhodes, M. & Davis, D. A. (2021). Automated feeding systems for shrimp: Effects of feeding schedules and passive feedback feeding systems. *Aquaculture*, *541*, 736800.

Saheed, B. S. (2023). Process Innovation and Performance of Small Scale Poultry Farms in Kabba, Kogi State (Master's thesis, Kwara State University (Nigeria)).

Sakanko, M. A., Adeniji, S. O. & Akume, M. (2025). Exploring the drivers of inflation in Nigeria: the roles of insecurity, oil, food and crop production. *African Journal of Economic and Management Studies*.

Smith, T. A. & Landry, C. E. (2021). Household food waste and inefficiencies in food production. *American Journal of Agricultural Economics*, *103*(1), 4-21.

Sullivan, S. M. P., Corra, J. W. & Hayes, J. T. (2021). Urbanization mediates the effects of water quality and climate on a model aerial insectivorous bird. *Ecological Monographs*, *91*(2), 01442.

Sultana, S., Hossain, M. M. & Haque, M. N. (2023). Estimating the potato farming efficiency: A comparative study between stochastic frontier analysis and data envelopment analysis. *Plos one*, *18*(4), e0284391.

Tahmasbi, P. (2024). Investigation in the relationship between competition, quality, price, market share, and financial efficiency in the poultry industry *(Doctoral dissertation, University of Essex)*.

World Health Organization. (2021). The State of Food Security and Nutrition in the World 2021*: Transforming food systems for food security, improved nutrition and affordable healthy diets for all* (Vol. 2021). Food and Agriculture Org..

Zaehringer, J. G., Messerli, P., Giger, M., Kiteme, B., Atumane, A., Da Silva, M. & Eckert, S. (2021). Large-scale agricultural investments in Eastern Africa: consequences for small-scale farmers and the environment. *Ecosystems and People*, *17*(1), 342-357.

.