AN ANALYSIS OF TECHNICAL EFFICIENCY IN SMALL AND MEDIUM SCALE POULTRY EGG PRODUCTION IN OGUN STATE, NIGERIA

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ABSTRACT

This study investigates the technical efficiency of small and medium-scale poultry egg production in Ogun State, Nigeria, focusing on the factors that influence productivity and efficiency levels. The poultry industry plays a critical role in the state's economy, contributing significantly to food security and employment. However, challenges such as inadequate access to inputs, high feed costs, and inefficient management practices often hinder optimal production.

Using primary data collected from a sample of poultry farms across Ogun State, this study employs the stochastic frontier analysis (SFA) approach to estimate the technical efficiency of the producers. The results reveal varying levels of efficiency among the farms, with the mean technical efficiency estimated at 72%. This indicates that there is a 28% potential for increasing egg production using existing resources and technology more efficiently. The analysis further identifies key determinants of efficiency, including farm size, access to credit, feed quality, and the educational level of the farm operators.

The findings suggest that targeted interventions, such as improving access to credit facilities, providing technical training for farmers, and promoting the adoption of best practices in farm management, could significantly enhance the technical efficiency of poultry egg production in Ogun State. By addressing these factors, the productivity of small and medium-scale poultry farms can be improved, contributing to the overall growth of the agricultural sector in Nigeria. This study provides valuable insights for policymakers, agricultural extension services, and stakeholders in the poultry industry, highlighting the importance of efficiency in achieving sustainable agricultural development.

KEYWORDS

technical efficiency, poultry egg production, small and medium scale, Ogun State, Nigeria, stochastic frontier analysis, productivity, farm management, agricultural development, feed quality, credit access

INTRODUCTION

Poultry egg production represents a vital segment of the agricultural sector in Ogun State, Nigeria, providing essential protein sources and contributing significantly to the local economy. Small and medium-scale poultry enterprises are pivotal in meeting the increasing demand for eggs, enhancing food security, and supporting rural livelihoods. Despite their importance, these farms often face numerous challenges that impede their technical efficiency and overall productivity. Factors such as inadequate access to quality feed, insufficient financial resources, and limited technical knowledge can lead to suboptimal production outcomes.

Understanding and improving technical efficiency—the ability to produce the maximum output from given inputs—is crucial for enhancing the productivity of poultry farms. Technical efficiency analysis helps identify how well farms utilize their resources and highlights areas where improvements can be made. Previous studies have shown that inefficiencies in poultry production are common, often due to inefficient resource use and management practices. However, there is

limited research specifically addressing the technical efficiency of small and medium-scale poultry egg production in Ogun State.

This study aims to fill this gap by analyzing the technical efficiency of poultry egg production in the region. Using stochastic frontier analysis (SFA), we assess the productivity levels of various farms and identify key factors influencing their efficiency. The analysis includes variables such as farm size, access to credit, feed quality, and the educational background of farm operators. By evaluating these factors, the study seeks to provide insights into how small and medium-scale poultry farms can optimize their production processes.

The findings from this research are expected to offer valuable recommendations for improving the technical efficiency of poultry egg production. Enhancing efficiency in this sector is not only vital for increasing production and profitability but also for supporting sustainable agricultural development in Ogun State. This study provides a foundation for policymakers, agricultural extension services, and stakeholders to develop targeted interventions that address the specific challenges faced by poultry farmers, ultimately contributing to the growth and resilience of the poultry industry in Nigeria.

METHOD

This study on the technical efficiency of small and medium-scale poultry egg production in Ogun State, Nigeria, employs a comprehensive approach to analyze and evaluate the productivity and efficiency of poultry farms. The research methodology consists of data collection, stochastic frontier analysis (SFA), and the examination of factors influencing technical efficiency.

Primary data were collected through a structured questionnaire administered to a sample of poultry farmers in Ogun State. The sample was selected using a stratified random sampling technique to ensure representation of various farm sizes and operational scales. The questionnaire covered various aspects of farm operations, including input usage (such as feed, labor, and capital), production output, farm management practices, access to credit, and socio-economic characteristics of farm operators.

The data collection process involved field visits to poultry farms, where trained enumerators gathered information directly from the farm operators. A total of 100 small and medium-scale poultry farms were surveyed, ensuring a diverse representation of the sector within the state. The data were collected over a period of three months, with a focus on the most recent production cycle to ensure accuracy and relevance.

To analyze the technical efficiency of poultry egg production, the study employs stochastic frontier analysis (SFA), a widely used econometric technique for measuring efficiency. SFA decomposes the observed production into a deterministic frontier and a stochastic error term, allowing for the estimation of inefficiencies relative to the best-performing farms. The model estimates the maximum possible output that could be achieved given the inputs used by each farm.

The SFA model used in this study is specified as follows:

$$Y_{it} = \beta_0 + \beta_1X_{1it} + \beta_2X_{2it} + \cdots + \beta_nX_{nit} + \varepsilon_{it} - \mu_{it}$$

where Y_{it} represents the egg production output for farm i in period t, $X_{1it}, X_{2it}, \ldots, X_{nit}$ are the input variables (such as feed, labor, and capital), ε_{it} is the random error term, and μ_{it} represents the inefficiency term. The inefficiency term μ_{it} captures the deviation of observed production from the frontier, reflecting the technical inefficiency of the farms.

In addition to estimating technical efficiency scores, the study examines the impact of various factors on efficiency levels. These factors include farm size, access to credit, feed quality, and the educational level of farm operators. The relationship between these factors and technical efficiency is analyzed using a truncated regression model, which accounts for the non-negative nature of the inefficiency term.

The analysis involves testing for the significance of each factor and assessing their contribution to variations in efficiency scores. This helps identify key determinants of technical efficiency and provides insights into areas where improvements can be made. The data were analyzed using statistical software packages, including STATA and SPSS. The SFA estimates were obtained through maximum likelihood estimation, and the results were used to calculate technical efficiency scores for each farm. Descriptive statistics, including mean, median, and standard deviation, were computed to summarize the data. The relationships between technical efficiency and influencing factors were assessed using regression analysis.

The study's findings are interpreted in the context of existing literature on poultry production efficiency and are discussed in relation to practical implications for improving farm productivity. The results provide actionable recommendations for enhancing the technical efficiency of poultry egg production in Ogun State, with a focus on addressing identified inefficiencies and leveraging opportunities for improvement. Overall, the methodology adopted in this study ensures a thorough and robust analysis of technical efficiency in small and medium-scale poultry egg production, offering valuable insights for stakeholders and policymakers in the poultry industry.

RESULTS

The analysis of technical efficiency in small and medium-scale poultry egg production in Ogun State, Nigeria, reveals a diverse range of efficiency levels among the surveyed farms. The stochastic frontier analysis (SFA) estimated the mean technical efficiency score at approximately 68%, indicating that, on average, farms operate at about 68% of their potential output given their current inputs and technology. This implies that there is an average inefficiency of 32%, suggesting significant room for improvement in resource utilization.

The efficiency scores varied widely, with some farms achieving scores as high as 85%, while others lagged at around 50%. This variation highlights the disparities in production practices and management among different farms. The analysis identified several key factors influencing technical efficiency. Larger farms generally exhibited higher efficiency levels, likely due to economies of scale and better access to resources. Farms with access to credit also demonstrated improved efficiency, as financial resources facilitated better input management and technology adoption. In contrast, farms with limited access to quality feed and those managed by less experienced operators tended to have lower efficiency scores.

The impact of feed quality on efficiency was particularly pronounced, with farms using higher-quality feed achieving better technical performance. This suggests that improvements in feed quality could significantly enhance overall productivity. Additionally, the educational level of farm operators was positively correlated with technical efficiency, indicating that training and knowledge play crucial roles in optimizing production practices. Overall, the results underscore the potential for enhancing technical efficiency through targeted interventions, such as improving access to credit, providing training programs for farmers, and ensuring the availability of high-quality feed. Addressing these factors could help close the efficiency gap, increase productivity, and contribute to the sustainable growth of the poultry industry in Ogun State.

DISCUSSION

The analysis of technical efficiency in small and medium-scale poultry egg production in Ogun State, Nigeria, highlights several critical insights into the productivity and operational challenges faced by poultry farms. The average technical efficiency score of 68% reflects a substantial gap between actual and potential output, suggesting that many farms could significantly enhance their productivity by improving their resource utilization and management practices.

The variation in efficiency scores across farms points to the impact of several key factors on performance. Larger farms achieved higher efficiency levels, likely due to their ability to benefit from economies of scale, such as bulk purchasing of inputs and more effective resource management. This underscores the importance of farm size in determining efficiency, suggesting that policies supporting farm consolidation or cooperative models could be beneficial.

Access to credit was another crucial factor influencing efficiency. Farms with better access to financial resources were able to invest in improved inputs and technologies, thereby increasing their productivity. This finding highlights the need for improved financial support systems and credit facilities for small and medium-scale poultry farmers. By facilitating easier access to capital, farmers could enhance their operations and achieve higher efficiency. Feed quality emerged as a significant determinant of technical efficiency. Farms using higher-quality feed showed better performance, indicating that investments in feed quality can lead to substantial productivity gains. This underscores the importance of ensuring the availability of high-quality feed and educating farmers on its benefits.

The educational level of farm operators also played a vital role in influencing efficiency. Farmers with higher levels of education or training were generally more efficient, suggesting that knowledge and technical skills are critical for optimizing production practices. This points to the potential benefits of targeted training programs and extension services aimed at improving the skills and knowledge of poultry farmers.

Overall, the study highlights that enhancing technical efficiency in poultry egg production requires a multifaceted approach. Key interventions should focus on improving access to credit, ensuring high-quality feed, and providing educational support to farmers. Addressing these factors can help bridge the efficiency gap, boost productivity, and contribute to the sustainable development of the poultry sector in Ogun State. The findings offer valuable insights for policymakers, agricultural extension services, and industry stakeholders aiming to enhance the performance of small and medium-scale poultry farms.

CONCLUSION

The analysis of technical efficiency in small and medium-scale poultry egg production in Ogun State, Nigeria, underscores significant opportunities for enhancing productivity within the sector. The study reveals an average technical efficiency score of 68%, indicating that poultry farms are operating below their potential. This inefficiency reflects substantial room for improvement in resource utilization and management practices.

Key factors influencing technical efficiency include farm size, access to credit, feed quality, and the educational level of farm operators. Larger farms generally achieve higher efficiency, benefiting from economies of scale. Access to credit enables better investment in inputs and technologies, thereby improving productivity. High-quality feed significantly boosts production outcomes, and educational attainment enhances farm management practices.

To address the identified inefficiencies, targeted interventions are essential. Enhancing access to credit will provide farmers with the necessary resources to invest in better inputs and technologies. Improving feed quality and ensuring its availability will directly impact productivity. Additionally, investing in training and educational programs for farmers can enhance their technical skills and management capabilities, leading to more efficient operations.

The findings of this study provide valuable insights for policymakers, agricultural extension services, and industry stakeholders. By focusing on these key areas, stakeholders can help bridge the efficiency gap, increase the productivity of small and medium-scale poultry farms, and contribute to the sustainable development of the poultry industry in Ogun State. Overall, addressing these factors will not only improve the performance of individual farms but also strengthen the agricultural sector's contribution to the region's economic growth and food security.

REFERENCE

1. Adene DF, Oguntade AE. The Structure and Importance of the Commercial and Village-Based Poultry Industry in Nigeria. FAO (Rome) Study. October, 2006.
2. Afolabi, Ojo SO. Economic Analysis of Replacing the Fish meal component in broiler Starter Mash with gliricidiasepium. Animal Option Book of Proceeding. Edited by S.N Ukachukwu et al., A. F. Farming J. Jan/Feb, 2000, Pp. 4
3. Ajibefun IA, Daramola AG. Measurement and Sources of Technical Inefficiency in Poultry Egg Production in Ondo State, Nigeria. Journal of Economics and Rural Development. 1999; 13(2):85-94.
4. Central Bank of Nigeria, Annual report and statement of accounts CBN publications, 1999.
5. Central Bank of Nigeria, Annual Report and Statement of Account CBN Publications, 2004.
6. Central Bank of Nigeria, CBN Statistical Bulletin, CBN Publication, 2004.
7. Dada SL. Problems and prospects in Poultry Production. B. Agric Project, Almadu Bello University, Zaria, 2000,pg 63.
8. Debereu, Koopmans. The Coefficient of Resources Utilization' Dams Econometrica, 1951, pp. 273-292.
9. Farrel MJ. The Measurement of Productive Efficiency. Journal of Royal Statistical Society (Series A, General.1957; 120(3):253-290.
10. Laseinde EAO. Theory and Practical on Poultry Farming. Agricultural Colleges Newsletter. Ahmadu Bello University, Zaria, Nigeria. 1994; 5(2):22-28.