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Full Length Research Paper

Evaluation of the Technical Effectiveness of Nigeria's Cross River State Poultry Farmers

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According to reports, one of the main issues Nigerians are currently facing is a lack of sufficient protein consumption, both in terms of quantity and quality, to sustain the country's constantly expanding population. Thus, the purpose of this study was to evaluate the technical efficiency of poultry producers in Nigeria's Cross River State. The study employed a purposive and random selection strategy to choose 295 poultry farmers. Structured questionnaires and an interview schedule were used to gather data, and descriptive statistics and stochastic frontier production functions were used to analyze the results. The estimated production function of day-old chicks was significant at the 1% level, meaning that an increase of 0.401 percent in the proportion of chicks will result in an increase in output. Extension visits, association membership, and credit all had negative correlations, suggesting that these factors improve chicken farmers' technical efficiency. Additionally, chicken producers have an average technical efficiency of 58%, which suggests that, given the state of technology now, technical efficiency may rise by 42% if the resources available are used effectively. Therefore, it is advised that credit be made available and used, as this can greatly increase welfare and productivity. To boost poultry farmers' productivity in the Study Area, the government should also promote extension visits and association participation.

Key words: Technical, Efficiency, Poultry, Farmers.

INTRODUCTION

The For most low-income countries, agriculture remains a key area of development. Approximately 40% of the world's working population is employed by it. Over 60% of people in sub-Saharan Africa, Asia, and the Pacific are dependent on agriculture, compared to 18% and 4% in high-income nations and Latin America, respectively (World Bank, 2006). The demand for animal products is predicted to rise in the developing countries due to rising incomes, urbanization, and population increase. This could raise the standard of living for impoverished farmers and food processors. The demand for animal products is predicted to rise by almost 50% between 19993 and 2020, with emerging nations bearing the majority of this growth (Delgado et al. 1999). Between 1997 and 2020, the total amount of meat and milk consumed in sub-Saharan Africa (SSA) is predicted to quadruple, reaching 11.3 and 35.4 million tons (Simon et al. 2002). Food security and the reduction of poverty among SSA's rural populations are significantly impacted by this anticipated rise in demand for animal products. For impoverished smallholder livestock farmers, the anticipated demand for animal goods in particular offers growing market potential (Sirak and Siegfried, 2007). Lack of sufficient protein consumption, both in terms of quality and quantity, to feed the country's expanding population is one of the biggest issues facing millions of Nigerians today. Malnutrition is the result of this deficiency. Serious protein intake deficiencies have a negative impact on people's health, especially their mental capacity and productivity at work, which ultimately affects the growth of the national economy as a whole (Okoruwa and Olakanmi, 1999, Kareem et al. 2008). Additionally, it has been noted that inefficient use of productive resources is one of the biggest obstacles to agricultural growth in Nigeria, and that significant growth can be attained by merely increasing resource use efficiency (Fabiyi and Adegboye, 1978; Ogunfowora, 1975, Kareem et al. 2008). The ability to provide a specific level of output using a minimal amount of inputs under a specific technology is known as technical

efficiency. Additionally, efficiency is a crucial contributes to the rise of productivity. Efficiency studies can demonstrate that increasing efficiency without expanding the resource base or creating new technology can boost production in an economy with limited resources and limited prospects for new technologies. Determining the degree of inefficiency also aids in choosing whether to create new technologies or increase efficiency in order to increase agricultural yield (Tijani, 2006). Many research have tried to ascertain the technological efficiencies of farmers in developing nations since policymakers need to know the efficiency status of farmers (e.g. Obwona, 2000; Son et al, 1993) (Tijani, 2006). Thus, the technical efficiency of poultry producers in Nigeria's Cross River State was examined in this study.

THEORETICAL FRAMEWORK

Cobb-Douglas Production Function

The Cobb-Douglas (CD) production function, which illustrates a functional relationship between inputs and output, served as the theoretical foundation for this investigation. Additionally, unitary elasticity of substitution and constant returns to scale are assumed by the Cobb-Douglas (CD) function.

For two variable inputs, the function can be expressed as $Y = A L^{b1} K^{b2} e$

Where Y = level of output, L and K = variable inputs, A = multiplicative constant, b^1 and b^2 are the coefficient of L and K and they represent the direct measure of elasticity of the respective factors of production, and e = error term. The type of returns to scale is indicated by the sum of b1 and b2. According to Upton (1979), Terfa and Terwase (2011) noted that the Cobb-Douglas production function does not provide a technical optimum and may overestimate the economic optimum since it is unable to display both rising and falling marginal productivity in a single response curve. Notwithstanding these drawbacks, researchers continue to find the Cobb-Douglas production function to be helpful for analyzing surveys with a large number of variable inputs and when measuring returns to scale, the intensity of production variables, and overall production efficiency. Additionally, it can offer a way to get coefficients for hypothesis testing (Cobb and Douglas 1928; Erhabor, 1982; Terfa and Terwase, 2011). According to Terfa and Terwase (2011), who commented on the superiority of the Cobb-Douglas production function over other types of production functions, the reason it is utilized more frequently than the other two is that it meets the economic, statistical, and econometric requirements of a greater number of studies.

EMPERICAL REVIEW

Obwona (2006) found that extension services, education, and loan availability are factors that favorably affect the efficiency and, of course, productivity of 65 small and medium-sized tobacco farmers in Uganda. Ajibefun and Daramola (2003) emphasized age and education as additional factors that influence how efficient microbusinesses are in Nigeria. Rhaji (2005) observed that the efficiency of rice production in Niger State, north central Nigeria, was significantly influenced by credit availability for both adopters and non-adopters of enhanced management methods. According to Bhasin and Akpalu's (2001) findings, the efficiency of Cape Coast's micro-enterprises (hairdressers, dressmakers, and wood processors) was shown to be statistically significant for a number of variables, including business experience, training, and credit. The goal of a study conducted by Amaza and Maurice (2005) was to identify the variables that affect technical efficiency in Nigerian rice-based production systems. They discovered that farmers in the research area had significant differences in efficiency and that by making better use of resources, rice-based crop production could be raised by 20%. The efficiency levels of farmers in rice-based production were found to be favorably and significantly influenced by farmer-specific characteristics, such as education and farming experience. In their study of marsh and upland rice farms in southeast Nigeria, Onyenweaku and Ohajianya (2005) discovered a favorable correlation between education and technical efficiency in rice production. According to Aye and Mungatana (2012), the efficiency of Nigerian maize farmers was shown to be significantly impacted by better maize seed, inorganic fertilizers, conservation techniques, farm holding size, education, and access to extension services, loans, and markets.

METHODOLOGY

The Study Area: The study was conducted in the south-south Nigerian state of Cross River. Before taking on its current name in 1976, the state was known as the South Eastern State. It was established in 1967 from a portion of the former Eastern area. What is presently known as Akwa Ibom state was once a part of the state. According to the 2006 census, there are an estimated 3,104,446 people living in the coastal state of Cross River. Its land area is 20,156 km2, and it shares an eastern border with Cameroon. The cross river that flows across the state is the reason for its name. With 18 local government areas and three primary languages—Efik, Ejagham, and Bekwara—it spans the three senatorial districts of the south, middle, and north, respectively. Calabar serves as its capital.

Population, Sampling Procedure and Data Collection: A two-phase sampling strategy was used. Purposive sampling of six local government areas was the initial step. Given the proportional number of farms in these local government areas—Calabar (193), Akamkpa (26), Ikom (32), Obubra (25), Ogoja (15), and Yala (4)—this was done. The Cross River State Ministry of Agriculture's department of livestock development and services provided the information for the number of farms shown in brackets in 2007. There were at least 200 birds on the registered farm. Calabar, Ikom, and Ogoja are the three local government areas that were randomly selected for the second stage. A well-structured questionnaire was used to gather information from poultry farmers in the sampled area. In particular, a random sample procedure was used to gather data from respondents in three local government areas: Ogoja, Ikom, and Calabar.

Variable Specification/Model Specification: The Cobb- Douglas frontier production function. The model is represented as:

$$\ln Y_i = a_o + a_i \ln X_{ij} + V_i - U_i \quad \ldots\ldots$$

The inefficiency of production was modelled in terms of the factors that are assumed to affect the efficiency of production of the farmers. Such factors are assumed to be independently distributed such that U_i is obtained by truncation (at zero) of the normal distribution with variance δ^2 and mean u where the mean is defined by

RESULTS AND DISCUSSION

σ2 and γ have variance values of 1.219 and 0.949, respectively. At the 1% level, they are statistically significant. The gamma shows that the main sources of random errors are systematic factors that cannot be explained by the production function. On the other hand, the sigma squared shows how well the distributional form fits the composite error term and how accurate it is. This suggests that the impacts of inefficiency significantly contribute to farmers' economic efficiencies. All independent variables (chickens, feeds, water, labor, and veterinary services) obtained positive estimates for their coefficients. Only the number of day-old chicks was a significant variable at the 1% level, though. This suggests that output will rise by 0.401 percent for every 1% increase in the number of chicks.

The inefficiency model's outcome demonstrates that the coefficients of extension visits, association membership, and credit are important factors influencing farmers' productivity. The inefficiency model interprets the signs on the coefficients in the opposite way: a negative sign indicates that the variable enhances efficiency, while a positive sign indicates that it diminishes technical efficiency. The outcome indicates that technical efficiency will rise as farmers make more extension contacts. Farmer awareness of new innovations and efficiency-boosting techniques is increased through extension contact. At the 1% level, the extension visit was determined to be statistically significant. Once more, it was discovered that the farmers' association membership was statistically significant at the 10% level. It was inversely correlated with technical inefficiency. At the association level, members frequently exchange ideas and business experiences, which can increase farmers' productivity. At the 5% level, credit was determined to be statistically significant. This suggests that one of the factors influencing the farmers' efficiency in the study area was their ability to obtain finance. The coefficient's negative sign indicates that using credit lowers inefficiency. Additionally, farmers can greatly boost productivity if they have greater access to and effective use of loans.

CONCLUSION AND RECOMMENDATIONS

The purpose of this study was to evaluate the technical proficiency of chicken producers in Nigeria's Cross River State. The findings showed that all of the independent variables—chickens, feeds, water, labor, and veterinary services—had positive estimates for their coefficients. Only the number of day-old chicks was significant at the 1% level, though, suggesting that an increase in chicks will result in a 0.401 percent increase in output. Extension visits, association membership, and credit all had negative correlations, suggesting that these factors improve chicken farmers' technical efficiency. Additionally, the average technological efficiency for chicken farmers is 58%. Given the state of technology now, this implies that if the resources are used effectively, technical efficiency may rise by 42%. Therefore, it is advised that:

i) Credit access and use be promoted since they can greatly increase welfare and productivity.

ii) To boost poultry farmers' production in the study area, the government should support extension visits and association membership.

iii) Poultry producers should be encouraged to stay in the industry because they are comparatively technically proficient.

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Table1*: Maximum Likelihood Estimates of parameter of Cobb-Douglass Stochastic frontier Production function*

Variables	Coefficient	Std-Error	T ratio
Stochastic frontier			
Constant	10.224***	0.654	15.634
X1	0.094	0.74	1.275
(Labour)	0.401***	0.071	5.695
X2	0.058	0.058	0.959
(Chicks)	0.055	0.053	1.027
X3 (water)	0.074	0.046	1.599
X4 (Vet services)			
X5 (feed)			
Inefficiency Model			
Constant	4.117	2.359	0.175
Z_1	-0.1682	0.783	-0.215
(Gender)	-0.7932	0.656	-0.121
Z_2 (Age of farmers)	0.1734	0.783	0.223
Z_3 (Educational	-0.4163	0.280	-1.485
level) Z_4	0.1734	0.783	10.223
(Household size)	-0.6387	0.242	-0.147
Z_5 (Years of	0.3085	0.717	0.429
experience Z_6 (	-0.999***	0.151	6.626
Distance)	-0.987*	0.512	-1.923
Z_7 (Training)	-0.5755**	0.353	2.378
Z_8 (Extension visit)			
Z_9 (membership of			
association) Z_{10} (credit)			
Variance Parameters			
Sigma squared σ^2	1.219***	0.355	3.456
Gamma γ	0.949***	0.024	39.317

*, **, *** significant at 10%, 5% and 1% levels respectively

Table2. ***Efficiency Estimates:*** *The calculated technical efficiency has a mean value of 0.58 and ranges from 0.24 to 0.98. According to this result, if the existing resources are used effectively, chicken farmers' technical efficiency might be raised by 42% given the state of technology today.*

Description of Efficiency estimate

Efficiency estimate	Frequency
0-0.1	4
0.11-0.20	13
0.21-0.30	10
0.31-0.40	13
0.41-0.50	18
0.51-0.60	20
0.61-0.70	22
0.71-0.80	19
0.81-0.90	24
>0.90	4

Figure1. *Graphical repre sentation of efficiency estimate of the farmers*