

## RESOURCE USE EFFICIENCY OF LOCAL CHICKEN PRODUCTION IN KUMBOTSO LOCAL GOVERNMENT AREA, KANO STATE, NIGERIA

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### ABSTRACT

*The study was conducted to investigate the resource use efficiency of local chicken in Kumbotso local government area of Kano State. Data were randomly collected from fifty (50) local chicken farmers through structured questionnaires. Cobb-Douglas model was the best fit and reveals that the variable factors explained the local chicken production by 61% ( $R^2 = 0.605$ ) with positive regression coefficients of 0.615, and 0.184 for chicken and feed respectively while vaccine/drugs (-0.117) was negatively related indicating decreasing return with its increment. Using production elasticity, the MPP, MVP values were estimated. The findings show that resource use efficiency indexes ( $r$ ) for chicken (18.78), feed (26.55) were above unity indicating under-utilization of resources while drugs/ vaccines (-317.12) were over-utilized. The Return to Scale value of 0.682, indicates decreasing return to scale thus, implying production irrationality leading to decrease in output. The study concluded that resources were not efficiently utilized for local chicken production in the study area. Local chicken producers need to be assisted by government and cooperative societies on promoting improved production through efficient resource use and disease control strategies.*

**KEYWORDS:** Resource use, Local chicken, Kano State.

### INTRODUCTION

Local chicken production systems are mainly based on free-range indigenous chickens which are kept at the subsistence level and are found in almost all rural households. The predominance of the indigenous chickens long after the introduction of the exotic strains shows that these chickens have the potential to form the basis for improved local chicken products and can be transformed from subsistence to increased food security and income in the poor rural households (Banaerjee, 1992).

Poultry farming is the raising of birds domestically or commercially, primarily for meat and eggs but also for feathers. Chickens, turkeys, ducks, and geese are of primary importance, while guinea fowl and squabs are chiefly of local interest (Poultry, 2008). It is an important component of the livestock sub-sector in Nigeria as it is a major source of animal protein which contains vitamins, minerals and lipids required in human diets for healthy growth. However, with a total of 190 million chickens, of which 80% are local breeds, Nigeria rates highest in Africa (Eduvie et. al, 2002). Byarugaba, (2007) observed that local chickens represent a significant component of rural household livelihood as a source of income, nutrition and as gifts to strengthen social relationships.

Eduvie et. al (2002) concluded that local chickens have invaluable characteristics that are not found in the exotic strains. These characteristics are appropriate to the traditional low input, low output farming systems. Local chickens are mainly sold when there is a need for money by a farmer. However, to the urban areas there is general preference for local chickens over their exotic breed because of the belief that they are testier and have no drugs residue. This

puts marketing of local chickens in a check as to how their demand and supply could interplay (Msami and Kapaga, 2001). Most of the local chickens are sold in village markets to wholesalers or retailers who subsequently assemble and transport them to urban markets. However, the advantages of local chickens over improved ones are as follows: local chickens are broody (they incubate, hatch eggs and they can rear), can be maintained on free range easily, can hatch eggs from other birds and rear them (Aliyu, 2000).

Generally, people believe that chicken production is a profitable venture, because it needs low capital investment and yet assures quick returns within weeks and months. Despite this fact, the local chicken farmers and marketers are still complaining of high cost of inputs; feed, drugs/vaccines and the optimum ways of their utilizations. This seems to discourage old and new poultry farmers from investing more resources into the enterprise. These problems coupled with inadequate information on the profitability or otherwise needs to be disclosed for proper interventions and development. Therefore, objective of the study was to examine the productivity of resource use of local chicken production in the study area.

### METHODOLOGY

#### The Study Area

Kumbotso local government was created in 1989 and has an area of 730 square kilometers. The headquarters of the local government area is Kumbotso town. The area is located between latitudes 11.06°N and 12°N and longitudes 8.4°E and 8.5°E (Bulletin, 1996). The monthly mean temperature ranges between 18°C and 21°C in the coldest month (November – January).

This period reasonably, supports the performance of both local and improved chickens (broilers and layers) while the hottest period experiences an average monthly temperature of 30 - 34°C is suitable for brooding (Kumbotso Local Government Bulletin, 2007). It has a total population of 294, 391 and population density of 390.09pp/km (NPC, 2006). The predominant tribes are Hausa - Fulani. The crops produced include maize, rice, sorghum, potato and vegetable such as lettuce, garden egg. The livestock enterprises include cattle, sheep, goat and poultry.

**Sampling Techniques and Data Collection**

Five towns were randomly selected from a list of eleven major towns in the local government area namely: Kumbotso town (13) Tamburawa (10), Panshekara (10), Mariri (10) and Dan Bare (7). Fifty local poultry farmers (50) were purposely selected and required data were sourced through well structured questionnaires. The sample sizes for the various towns are in parentheses. Information sourced included socio-economic, input-output and problems associated with local chicken production in the study area.

**Analytical Tools**

**Multiple Regression Model;** Olayide and Heady (1982) described production function as technical relationship between inputs and output in any production scheme or processes. Therefore, for the purpose of this study linear, semi-log, Double-log, Quadratic, square-root function were fitted but Cobb-Douglas was found to best fit based on the *a priori* expectations, R<sup>2</sup>, signs and significance of the coefficients. The implicit form is given as:

$$Y = F(x_1, x_2, x_3, x_4, u) \dots\dots\dots (7)$$

The Cobb - Douglas function is expressed as: -

$$Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + u$$

$$\text{Log}y = \text{log}b_0 + b_1\text{log}x_1 + b_2\text{Log}x_2 + b_3\text{log}x_3 + b_4\text{log}x_4 + U \dots\dots\dots (8)$$

Where:

Y = Chicken production revenues (from sales of eggs and birds).

X<sub>1</sub> = Chicken X<sub>2</sub> = Feed per (kg)

X<sub>3</sub> = Drugs and vaccines per liter

X<sub>4</sub> = Labour (man-days) u = Error term

b<sub>1</sub> ..... b<sub>4</sub> = Regression coefficients (elasticities) of the production used in the determination of marginal value products (MVP).

**Efficiency of Resource-use**

Efficiency of resource-use was determined by the ratio of Marginal value product (MVP) to unit factor cost of inputs (MFC). It is given as:

$$r = \text{MVP}/\text{MFC} \dots\dots\dots (3)$$

Where;

MVP = MPP, Py

MPP = bi. Y/X

MFC = Pxi

Where

MVP = Marginal value product

MPP = Marginal physical product

MFC = Unit factor cost

Y = Mean of output

X = Mean of input

Pxi = Unit price of input xi

Py = Unit price of output

**Decision Rule:**

If r = 1, Optimization

If r > 1, Under utilization

If r < 1, Over-utilization

EP = 1, Constant return to scale

EP >1 Increasing return to scale

EP < 1 Decreasing return to scale

**RESULTS AND DISCUSSION**

**Production elasticity**

Elasticity of production is the measure of response of output to changes in the variable input. From the results, the value of R<sup>2</sup> value of 0.61 implies that 61% of the variation in the local chicken production (Y) is explained by the selected explanatory variables. However, chicken (X<sub>1</sub>) and feeds per kg (X<sub>2</sub>) were positively related with chicken production. This further implies that on the average, and keeping all other explanatory variables constant, a unit increase in the number of chickens and Kilogramme of feed will lead to increase in production revenues by (0.615) and (0.184) respectively. Drugs and vaccines per liter (X<sub>3</sub>) were negatively related implying that a unit increase in litres of drugs/vaccines to a certain level will decrease chicken production revenues by the corresponding value of its coefficient (-0.117). The Return to Scale (RTS), summing up of the production elasticities of the inputs amount to 0.682 which is less than unity and thus characterized by decreasing return to scale. This implies that production was in the irrational zone of production (stage 3) and that the percentage change in the variable input could lead to decrease in output revenues.

**Resource use efficiency**

Economic efficiency of resources use in groundnut production was determined using the ratios of their Marginal Value Product (MVPs) to the unit price of inputs or the Marginal Factor Cost (MFC). The MVP for each input was calculated by multiplying the marginal physical product (MPP) of each input by the arithmetic mean price of the output. The values of the Marginal Physical Products (MPP) was determined the product of the various elasticities and the ratios of output to input According to MVP to MVP figures, on the average and with all other factors kept constant, a unit increase in number of chicken will increase production revenues by MPP value of 3.4 units at MVP value of N 2327.72 while a unit increase in drugs/vaccines will decrease production revenue units by MVP value of N4170.08.

Furthermore, the ratios of the MVP to MFC (r) shows that the values of number of chicken (18.780) and feed (26.553 ) were above unity implying that both resources were under-utilized thus indicating the need to optimise their utilizations for maximum output. Drugs/vaccines

(-317.12) was over-utilized, thus implying irrationality in their utilization at a certain level Therefore, farmers would have to reduce their application to maximize efficiency in production and profit.

**Table 1: Multiple Regression Results for Local Chickens Production**

Variables	Coefficient	Standard error	T-Values	Sig.
Constant	3.647	0.843	4.324	0 .0001
Chicken (x <sub>1</sub> )	0.615	0.114	5.411	0.0000*
Feed (x <sub>2</sub> )	0.184	0.061	3.032	0.0041*
Drugs/vaccines (x <sub>3</sub> )	-0.117	0.056	-2.101	0.0414**
Labour (x <sub>4</sub> )	0.012	0.076	0.160	0.8740ns

Source: Computed from field data, 2010.

Note: \* and \*\* indicate significance level at 1% and 5% respectively.

F - Value 13.50

R<sup>2</sup> = 0.605

Return to scale estimates (RTS) = 0.682

Ns = Not significant

**Table 2: Estimates of MPP, MVP and Resource Use Efficiency Index**

Resource	MPP	Unit price of output(N)	MVP(N)	MFC(N)	R=MVP/MFC
Chicken	3.40	684.63	2327.74	123.92	18.78
Feed	1.17	684.63	803.76	30.27	26.55
Drugs	6.09	684.63	4170.08	13.15	-317.12

Source: Computed from field data, 2010.

### CONCLUSION AND RECOMMENDATIONS

From the findings of this study, it can be concluded that resources were not efficiently utilized for local chicken production in the study area. In essence, there were evidence of under-utilization of chicken stock and feed while drugs/vaccines were over-utilized. However, to increase aggregate output and net profit, farmers need to adjust resource use to the optimum. In view of the results of the study, the following recommendations are made for effective production and marketing of local chickens in Kumbotso Local government area of Kano State.

1. Local chicken farmers and marketers need to be trained and included in the education programmes for production and business management. This can be achieved through government interventions.
2. Government should provide incentive to financial institutions to make formal credit available to local chickens producers as soft loans.
3. Local chicken producers need to be assisted by government and cooperative societies at promoting improved production through efficient resource use, other managerial and disease control strategies.

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