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Resource use pattern among poultry enterprises in Abia State, Nigeria

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Abstract

The challenge to increase meat production in Nigeria appears to be more urgent now than ever. This is in view of the rapidly increasing population, the imminent decline in hunting and the low protein intake in rural areas. Poultry meat especially broiler is one of the easiest to produce, hence its purposive selection. Input-Output data were generated from selected poultry farmers in Abia State. The data were analyzed by use of descriptive statistics and econometric estimations. Efficiency in the resource use pattern was examined using Marginal Value Product of each of the examined resources with its unit price. It was identified that there are possibilities of increasing broiler meat supply through higher levels of resource-use pattern under the existing technology.

Keywords: *Marginal value products, geometric mean, marginal factor cost, enterprise, resource-use pattern.*

Introduction

The problem of malnutrition in Nigeria is highly attributable to low-animal protein intake. The current level of consumption of meat and animal protein is estimated at 8g per caput per day (Ndubuisi, 1992; Oluyemi, 1985; FAO, 1969, 1974 and 1985). The average consumption of animal protein has been estimated at lower than the minimum recommended for daily maintenance of the health of the population. According to FAO (1985) and Olomu (1995), recommendation for nitrogen in balanced diet is 0.6g/kg weight per day. This is regarded as the best average requirement for proteins of high quality such as the broiler. This amounts to about 36g of animal protein per day for an adult of 60kg weight.

Obioha (1992) observed that a matured broiler weighing about1.5kg dressed carcass which is equivalent to about 300g of animal protein is sufficient to satisfy an adult's animal protein requirement for nine-days. But as at now the consumption level is about 28g less than the minimum requirement recommended by FAO expert Committee.

The task of meeting this animal protein requirement can best be realized through increased broiler production. Broiler production is seen as an honest approach towards realizing improved animal protein intake because of its inherent potentials in meeting the protein needs

of the rural population. It is not only that it is the quickest source of meat, its production requires the least hazardous and arduous processes in relation to other livestock enterprises (Obioha, 1992).

A number of strategies (such as price policies, establishment of poultry demonstration farms, input subsidies, organization and supervision of marketing, production credits, liberalisation) has been adopted by various governments and individuals in their bid to reduce the incidence of low protein intake including importation. Yet, the poultry enterprises especially the broiler industry is still beclouded with great uncertainty.

Close examination of the situation in Nigeria would reveal a number of factors namely; technical, institutional, structural, infra-structural, policy formulation, funding, financial and marketing. The rapid expansion of the enterprise seemed not to be matched by equivalent development in the management and technical expertise to guide the enterprise. Also, an increase in population and per capita incomes, relative prices and availability of substitutes, expanded taste preference and nutritional education, had jointly led to a boost in the demand for broiler meat. Unfortunately, this observed increase in demand seemed not matched by an equivalent increase in production. The net effect has been a demand-supply deficit gap, which has been widening in recent times (Oluyemi *et al.*, 1986).

Among other constraints, inefficient resource-use pattern is one area that appears peculiar to broiler production (Mbanasor and Chidebelu, 1997). One way of increasing the output productivity and income of the farmers and hence meeting the animal protein requirement is by the introduction of a number of measures aimed at increasing the level of use of farm-resources in a most efficient manner (Heady, 1962). Efficiency of resource use is amenable to technical research, thereby leading to the identification of opportunities for increased meat production through appropriate adjustment in the pattern of resource use. To attain this goal, there is need to ascertain what the existing patterns of investment is in this potential enterprise which will provide basis for improvement. This study is therefore designed to economically analyze the resources-use pattern in Abia State. Specifically, it was aimed at achieving the following.

i. Determine the extent of resource use among the broiler farmers in the State.
ii. Determine the resource-use efficiency
iii. Determine the resource-use requirement of the farmers under the existing technology.
iv. Make policy recommendation

Materials and methods

The study was conducted in Abia State, which was purposively selected due to its importance in poultry production. The State was classified according to Agricultural Development Project (ADP) structure, namely Aba, Bende and Umuahia zones. In each zone, 10 broiler farmers were randomly selected based on survey listings, giving a total of 30 broiler farmers used in the study. This size was based on the population of rural broiler farmers in the State as at 1997. As at then there were about twenty broiler farmers per zone, who had at least two hundred and fifty broilers. All the broiler farmers fulfilled the above condition. The primary data for the study were collected over a period of one year, using cost-route technique and ADP trained enumerators in each zone.

There were two sources of data used in this study, namely primary and secondary. The primary data were collected by the administration of structured questionnaire schedules designed to cover value of outputs

(Naira), size of the farm (Number of birds), Labour in mandays, capital inputs (Naira) and other production expenses (Naira). The secondary data were elucidated from published data namely, Journals, Proceedings, Annual Reports etc.

Data analysis

The appropriate approach for testing resource use pattern on individual farm is first to hypothesize the behaviour of the producers and, secondly, to formulate a statistical model on the basis of these hypothesis (Chennareddy, 1967). The sample design and the estimation procedure were such that the estimated parameters were unbiased, consistent and efficient.

Model specification

The econometric model used to examine the resource use pattern was specified implicity based on previous studies (Chennareddy, 1967 and Olomola, 1988).

VAP = F(SF,Lb, Dcc, Ope, W).

Where;

VAP = Value of products estimated on the basis of prevailing prices.

SF = Size of the farm (total number of broilers)

Lb = Labour, quantified in mandays (eight hours) based on the various operations.

Dcc = Depreciation capital costs (Naira)

Ope = Other production capital costs (Naira)

W = Stochastic error term.

The value of farm product was expected to be positively related to the size of the farm, labour, depreciation capital costs, and other production expenses.

Using the empirical data, the model was estimated using various forms namely, power, exponential, linear and semi-log and the lead equation was selected. The inclusion of farm size in the model was based on the smallness of the enterprise which showed no harmful collinearity (Olomola, 1988).

Marginal factor cost/opportunity cost of the various resources was determined. The marginal factor cost for a matured broiler was ₦300, the average wage rate per manday was ₦100, and the prevailing interest rate of 14% was used to obtain the opportunity cost of capital and other production expenses. The opportunity cost for every Naira spent on production was therefore ₦1.14.

Marginal productivity of resources

Due to the fact that our lead equation was semi-log, the Marginal productivity of the resources was calculated using the formular (Saini, 1957).

$$MPP_{(ri)} = \frac{bi}{ri}$$

Where:

$MPP_{(ri)}$ = Marginal physical product of each resource

bi = the regression coefficient of each resources

ri = the geometric mean of each resource.

The marginal value product was obtained by multiplying $MPP_{(ri)}$ of each resources with the geometric mean price of the products. The geometric mean was used because of the non-constant variations observed within the year of study (Olagoke, 1990).

Resources – Use pattern requirement among the broiler farmers

In order to determine the required resources-use pattern in each of the specified resource within the enterprise, the absolute value of the required percentage change in the marginal

value products to arrive at equality in each of the resource was calculated according to Olagoke (1990) thus:

$$C_{xi} = \frac{a_{xi} - b_{xi}}{a_{xi}} \times \frac{100}{1}$$

$$= [1 - \frac{1}{r}] 100$$

Where:

C_{xi} = the absolute value of the required percentage change in each resource use pattern

a_{xi} = Marginal Value Product of each specified resource

b_{xi} = Marginal factor cost of each specified resource

r = axi/bxi

Results and discussion

In an attempt to examine the resource use behaviour of the farmers in detail an econometric model was estimated. The estimated model exhibited considerable variations in the explanatory power of the independent variables included, particularly, in terms of the signs, magnitude and significant levels of the coefficients obtained. Three functional forms were adequately found to characterize the empirical data as indicated by the Value of the coefficients of multiple determination (R^2) in each case. The R^2 from the semi-log, power and linear functions showed that 84%, 76% and 78% respectively of the variations in the gross value of output of the broiler farmers as explained by the explanatory variable specified in the model (Table 1). The regression coefficients had the expected signs and those that were statistically significant were shown in Table 1. The results of the semi-logarithm form of the estimation was used for further analysis on the bases of fulfilling certain *apriori* economic expectations with respect to the signs, magnitude of the regression coefficients and the significance of the F-ratio at one percent.

Table 1 *Regression coefficients of resources and their standard errors*

Semi-log form	Regression	T-value	Significant level (%)
Constant Term	45063	2.731	5
	(16500.75)		
Resources			
Labour (Mandays)	117	0.95	NS
	(135.84)		
Depreciated Costs (₦)	4.86	3.20	1
	(1.52)		
Farm Size (No.)	52.66	3.11	1
	(16.97)		
Other prod. Expen.	0.0882	0.405	NS
	(0.2178)		
R^2	0.84	-	-
F-value	34.15	-	-
Sample size	30	-	-

Standard errors appear in parentheses

NS = Non-significant

Source: Computer from field data, 1997

Table 2 *Geometric mean of variables and marginal value products of broiler enterprises*

Resources	Geometric means	Marginal value products
Output values (₦)	81666.26	-
Depreciated cost (₦)	2246.81	175.65
Other production expenses (₦)	46844.45	9.6
Farm size (No. of broilers)	289	14880.75
Labour (Man-days)	72	133308.83

Sources: computer from field data 1997

The MVP of the respective resource is presented in Table 2. The MVP showed the amount by which the total value of output will increase in value term with an addition of one more unit of each of the specified variables. This was essential in elucidating the extent of resource-use pattern and efficiency presented in Table 3. The result indicates that the broiler farmers were under-utilizing all the specified variable inputs included in the model namely: labour, capital costs, farm size, and other production expenses. According to Olomola (1988), Nwosu (1975) and Chennareddy (1967) resources are efficiently utilized when the marginal value product of each specified variable is equal to the opportunity cost or marginal factor cost. They independently observed that when the ratio of marginal value product and marginal cost of a resource is greater than one, there is under utilization of the resource, while a less that one ratio shows over utilization of the resource. The results implied that the marginal revenue resulting from the acquisition of one more unit of labour was 1333.09 times its acquisition cost, while depreciated capital assets, farm size and other production expenses were 154.08, 148.81 and 8.3 times their acquisition costs respectively. The significance of this finding is that there is high possibility of increasing broiler meat supply profitably under the existing level of technology in the rural areas. This can be achieved through the use of higher level in each of the specified resources.

In order to determine the required change in resource-use pattern in each of the specified variable within the enterprise the absolute value of the required percentage was calculated as elucidated in the methodology. The result is presented in Table 4. According to Olagoke (1990), absolute efficiency in resource use pattern is said to be achieved at the point of equality of the marginal value product and the unit price of each of the resource. At that point, the percentage change required in MVP to equate the marginal factor cost/opportunity cost will be zero. The result shows that the broiler farmers in Abia State need to increase their use of labour, capital inputs, farm size and other operating expenses by 99%, 99.4%, 98% and 88% respectively in order to achieve maximum resource-use pattern.

Table 3 *Ratios of marginal products to the marginal factor costs of resources*

Resources	MVP/MFC
Labour (Mandays)	1333.09
Depreciated costs (₦)	154.08
Farm size (No. of broilers)	148.81
Other production costs (₦)	8.3

Computed from field data, 1997

Table 4 *Percentage change required in resource-use pattern of each resource in the enterprise*

Resources	Required %
Labour (mandays)	99.93
Depreciated costs ₦	99.35
Farm size (No. of broilers)	97.98
Other product expenses ₦	87.95

Computed from field data, 1997

Conclusion

The result of this investigation shows that despite the low level of existing technology, broiler farmers are under utilizing the use of the basic resources let alone breaking the state of the art. It is evident in this study that the poultry meat supply in the State can be improved through a more efficient resource-use pattern, thereby enhancing nutritional status of the rural populace. A rapid and mass development of the broiler industry can not only be achieved through the breaking of the existing level of technology as currently being practiced, but also through a more efficient resource-use pattern. This resource use inefficiency may have been a result of low resource endowment of the farmers which made accessibility of the farmers to resource a little difficult. Another reason may be the fact that broiler demand is very seasonal and many producers sell at loss during the on-season because of glut. The government is therefore urged to come out with a policy that will re-organise inputs distribution including credits to enable the poultry farmers increase their resource-use pattern which would enhance increased production through efficient marketing system like the Commodity Exchange System being proposed by the organized private sector. The poultry industry in Nigeria requires selective treatment in view of its role in enhancing the nutritional status of the rural community.

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