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Profitability, Input Elasticities and Economic Efficiency of Poultry Production among Youth Farmers in Osun State, Nigeria

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Abstract: The aim of the study was to determine the profitability, returns to scale and economic efficiency of poultry production by youth farmers in Osun State, Nigeria. Primary data were obtained from 62 representative farmers drawn from the study area using simple random technique. Data were analyzed by the use of descriptive statistics, multiple regression and costs and returns analysis. The results showed that majority of the poultry farmers were in the age range of between 20 and 29 years and were highly educated. The results revealed that youth poultry farmers had positive decreasing returns to scale ($RTS = 0.76$) in poultry production which indicated that poultry production was in the rational stage of production (Stage II). The results obtained further revealed that although youth poultry farmers were not fully economically efficient in the use of resources, poultry production was profitable among youth poultry farmers. The study concluded by making suggestions which could improve the profitability of poultry production among the youth in the study area and in Nigeria as a whole.

Key words: Input elasticities, profitability, efficiency, youth farmers

Introduction

The importance of poultry production to the biological needs, economic and social development of the people in any nation cannot be overemphasized. Oluyemi and Roberts (1979) claimed that poultry production in Nigeria as well as other warm climate countries has a high priority rating compared with other types of livestock because poultry has better energy and protein conversion ratio and that net return on investment are relatively high. Apart from these, poultry product most especially eggs and meat (broilers) are good sources of animal protein. Poultry production has been identified as a means of ensuring sustainable family income. Poultry can be established with minimum capital, and as a side project (Sani *et al.*, 2000). Moreover, they can fend for themselves on free range without much care (Umeh and Odo, 2002).

A major concern of the Federal Government in Nigeria is how to tackle the problem of unemployment among the youth in the country. According to Umeh and Odo (2002), various regions in Nigeria have designed and executed several self-employment programmes to enhance the economic empowerment of youths. One of such programmes in Osun State of Nigeria is the youth poultry farming of the National Directorate of Employment (NDE) with its major objective of creating self-employment to its participants.

According to Iwala (2006), youth constitute a formidable force for sustainable agricultural development of any nation, particularly the agrarian ones including Nigeria. This is because they possess a lot of energies and other inestimable assets for productivity and general sustainable socio-economic development. Food and

Agriculture Organization (FAO) of the United Nations defined youth as young man and woman between the ages of 14-24 years. However, in order to take into cognizance the reality of African environment and circumstances which include poverty, unemployment and deprivation which make some categories of people to still depend on others for survival, protection and development up to age 40 years, Adedoyin (2005), defined youth to comprise people between ages 19 and 40 years by the Children – in – Agriculture Programme (CIAP) of Nigeria. The subject of economic analysis of poultry production in Nigeria has received considerable attention in the literature (Sani *et al.*, 2000; Umeh and Odo, 2002; Olarinde and Kuponiyi, 2004; Adebayo and Adeola, 2005; Ekunwe *et al.*, 2006; Amos, 2006 and Okafor *et al.*, 2006). However, none of such studies from the study area has estimated profitability of poultry production, input elasticities as well as determined economic efficiency in poultry production. Thus, this study aimed at:

- identifying the socio-economic characteristics of the youth poultry farmers;
- estimating the profitability of poultry production among youth poultry farmers;
- determining returns to scale in poultry production ;
- determining economic efficiency of resource use in poultry production by youth poultry farmers in the study area.

Materials and Methods

The study was carried out in Obokun Local Government Area (LGA) in Ife/Ijesha Agricultural zone of Osun State, Nigeria. The LGA is one of the 30 LGAs in the State. The

present Obokun LGA with its headquarter in Ibokun town, was carved out of the defunct Obokun LGA which then had its headquarter at Ijebu-jesa. The present Obokun LGA shares boundaries with Ondo State in the East, Boluwaduro and Boriye LGAs in the North, Oriade, Ilesa-East and Atakumosa West LGAs in the South, and Osogbo LGA in the West. Ibokun, the headquarter of the LGA is a distance of about 18 kilometres away from Osogbo, the Osun State Capital. The major occupation of the people in the LGA is farming especially in the areas of cultivation of food crops such as yam, maize, rice, cassava, cocoa, kolanut, citrus, oil palm and poultry production. A combination of purposive and simple random sampling techniques was employed in selecting the poultry farmers interviewed. Obokun LGAs was purposely selected being one of the LGAs actively involved in youth poultry farming of the NDE. The population frame was obtained from the information unit of the LGA. Seven youth poultry farmers were chosen by simple random technique from each of the ten wards of the LGA making 70 respondents in all. Data were obtained with the aid of structured questionnaire. A total of 70 questionnaires were administered to the youth poultry farmers. However, 62 copies of the questionnaires which were adequately and correctly filled were used in the analysis. Information on socio-economic characteristics such as age, gender, marital status, educational status, system of management, sources of labour used, household size, poultry output, price of output, amount spent on inputs and total revenue were elicited from the respondents.

Descriptive statistics such as tables, frequencies and percentages was used to analyze the socio-economic characteristics of youth poultry farmers, costs and returns analysis was used to determine the profitability or otherwise of poultry production by youth farmers, econometric methods using the ordinary least squares (OLS) was used to determine input elasticities and returns to scale.

The implicit form of the model was specified thus:

$$Q = f(X_1, X_2, X_3, X_4, X_5, X_6, \mu) \text{ -----(1)}$$

Where

Q = amount of poultry products produced (kilogram)

X1 = total number of birds

X2 = amount of hired labour (man days)

X3 = amount of family labour (man days)

X4 = total cost of drugs and chemicals (Naira)

X5 = total cost of feed (Naira)

X6 = years of experience in poultry production

μ = stochastic error term

The model was fitted in four functional forms of linear, double – log, Semi – log and exponential. The final choice of functional form was based on:

- (i) highest value of adjusted R^2 ,
- (ii) Significance of regression coefficients, and
- (iii) F-value.

In order to evaluate the economic efficiency of youth poultry farmers as users of resources, the study adopted the method used by Oladeebo and Ezekiel (2006), where the marginal value productivities (MVPs) for each resource were computed and such computed MVPs were then compared with their respective acquisition cost (MFC).

The MVP of a particular resources was computed thus:

$$MVP = MPPx_i.P_o \text{ -----(2)}$$

Depending on the functional form selected as lead equation for regression, the MPP and the corresponding values of MVP were obtained as follows:

| | | |
|--------------|---------------------------|---------------------------|
| Linear | MPP = $dQ/dx = \beta_i$; | MVP = $\beta_i.P_o$ |
| Double log: | MPP = $\beta_i.Q/X_i$; | MVP = $\beta_i.Q/X_i.P_o$ |
| Exponential: | MPP = $\beta_i.Q_i$; | MVP = $\beta_i.Q.P_o$ |
| Semi log: | MPP = β_i/X_i ; | MVP = $\beta_i.X_i.P_o$ |

Resource-use efficiency = MVP/P_o , that is, MVP/MFC

Where

β_i = regression coefficient

Q = mean output of poultry products

X_i = mean value of resource

dQ/dX = derivative of Q_i and X_i

P_{xi} = price of resource per unit

P_o = price of output per unit

MFC = marginal factor cost

Thus,

When Resource-use efficiency RUE =1, resources are optimally utilized. When $RUE < 1$, resources are over utilized. When $RUE > 1$, resources are underutilized

Results and Discussion

Socio-economic characteristics of youth poultry farmers: Table 1 revealed that the respondents age ranged from 19-49 years with majority in the age range of 20-29 years (about 73%) and the least was between the age range of 40-48 years. This is an indication of the fact that most of these farmers were in their active and productive years who can easily adopt new innovations that could enhance poultry production. Majority (about 74%) of the farmers were males which implied that poultry production as an occupation was not popular among females in the study area. Table 1 also revealed that most of the respondents were married (about 89%) which implied that majority of the poultry farmers would be more relatively stable in their place of farming than their single counterparts. Stability of farmers in their places of farming can enhance poultry production. All the respondents were educated with their level of education ranging from primary education to university education. Educated farmers would be highly receptive to new innovations, which could enhance poultry production. Majority (84%) of the respondents engaged in deep litter system of management. While majority of the respondents (56%) utilized family labour, their household size ranged from 2-11, majority (42%) of the

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Table 1: Frequency and Percentage Distribution of Respondents according to the Socio-economic Characteristics

| Characteristics | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| Age In Years | | |
| < 20 | 6 | 9.68 |
| 20 – 29 | 45 | 72.58 |
| 30 – 39 | 8 | 12.90 |
| 40 – 49 | 3 | 4.84 |
| Total | 62 | 100.00 |
| Gender | | |
| Male | 46 | 74.19 |
| Female | 16 | 25.81 |
| Total | 62 | 100.00 |
| Marital Status | | |
| Married | 55 | 88.71 |
| Single | 3 | 4.84 |
| Widowed | 1 | 1.61 |
| Divorced | 3 | 4.84 |
| Total | 62 | 100.00 |
| Education Status | | |
| No Formal | 0 | 0.0 |
| Primary | 0 | 0.0 |
| Secondary | 8 | 12.9 |
| National Certificate of Education | 9 | 14.52 |
| University | 45 | 72.58 |
| Total | 62 | 100.00 |
| System of Management | | |
| Deep Litter | 52 | 83.87 |
| Battery Cage | 3 | 4.84 |
| Both | 7 | 11.29 |
| Total | 62 | 100.00 |
| Source of Labour | | |
| Hired | 15 | 24.19 |
| Family | 35 | 56.45 |
| Hired/Family | 12 | 19.36 |
| Total | 62 | 100 |
| Household Size | | |
| 2-5 | 24 | 38.71 |
| 6-9 | 26 | 41.94 |
| > 10 | 12 | 19.35 |
| Total | 62 | 100.00 |

Source: Field Survey, 2005

Table 2: Elasticity of Productive Resource and Returns to Scale

| Inputs | Elasticity |
|-----------------------------------|------------|
| Total number birds | 0.882 |
| Amount of hired labour | -0.233 |
| Amount of family labour | -0.0722 |
| Total cost of drugs and chemicals | -0.0355 |
| Total cost of feed | 0.227 |
| Years of experience | -0.0083 |
| Returns to scale | 0.76 |

Source: Computed from Field Survey Data, 2005

respondents had their household size ranged between 6-9 members. The results of the socio-economic characteristics compare favourably with the findings of Adebayo and Adeola (2005).

Production function estimates: Out of all the four functional forms estimated, Cobb-Douglas form has a better fit for poultry production. It is shown in equation (3)

$$\begin{aligned} \log Q = & 4.934 + 0.882 \log X_1 - 0.233 \log X_2 - 0.0722 \\ & (9.644) (13.23) \quad (-2.995) \\ & \log X_3 - 0.0355 \log X_4 + 0.227 \log X_5 \\ & (-1.182) \quad (-0.563) \quad (4.319) \\ & -0.0083 \log X_6 \quad \text{-----} (3) \\ & (-0.167) \end{aligned}$$

$$R^2 = 0.957 \quad \text{Adjusted } R^2 = 0.952 \quad F = 203.02^*$$

* means significant at 1%

** means significant at 5%

Figures in parenthesis are the t-values.

The results in equation (3) showed that the included explanatory variables explained 95.0% of adjusted variability observed in poultry production among youth farmers while the remaining 5.0% was as a result of residual error. The equation also showed that all other relevant variables will increase the output of poultry products to the tune of 493.4kg. All the variables except amount of family labour, total cost of drugs and chemicals and years of experience were not significant at either 1% or 5% level of significance. Variables of total number of birds and total cost of feed were significant and positively signed. The implication of these positive signs is that an increase in each of these variables would lead to an increase in the level of poultry products produced. Amount of hired labour was significant but negatively signed. The negative sign on coefficient of hired labour implies that increase in this variable would cause a decrease in the level of poultry products produced. The input elasticities of production is shown in Table 2. The summation of the elasticities of 0.76 obtained indicated a positive decreasing returns to scale and that poultry production was in stage II of the production region. The nature of returns to scale obtained in this study compares favourably with similar study by Ojo (2003).

Resource use efficiency: In order to determine the economic efficiency in the use of resources by the youth poultry farmers, the MVP of each resource was compared with its MFC. The estimates of the Cobb-Douglas production function which was log – linearized were used in the computation of MVPs of each of the resource. The results are presented in Table 3. The efficiency indicator in Table 3 revealed that total number of birds (proxy for farm size) and feed were over-utilized. Youth poultry farmers were not only grossly inefficient but also over-utilized resources such as hired labour, family, labour, drugs and chemicals. Economic efficiency and productivity could be improved if the farmers use less of these resources.

Profitability Analysis of Poultry Production Enterprise:

Table 4 indicates the result of the analysis of the costs and returns accruing to an average youth poultry farmer in the study area. The result showed that an average farmers invested N173,320 in the enterprise. These comprised of costs on purchase of such items as chicks

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Table 3: Resource Use Efficiency Indicators

| Resources | MVP | MFC | MVP/MFC | Efficiency Index |
|--|--------|-------------|---------|--|
| Number of birds (X1) | 209.6 | 500N/bird | 0.42 | Overutilization |
| Hired Labour (X2) | -1624 | 45N/manhour | -36.0 | Gross inefficiency and overutilization |
| Family Labour (X3) | -199 | 45N/manhour | -4.42 | Gross inefficiency and overutilization |
| Expenditure on drug and chemicals (X4) | -1.476 | 250N/unit | 0.006 | Gross inefficiency and overutilization |
| Expenditure on feed (X5) | 0.405 | 17N/kg | 0.024 | overutilization |

Source: Computed from Field Survey Data, 2005

Table 4: Average Costs and Returns to Youth Poultry Farmers per month

| Items | Values (N) | Cost component as % of TC |
|---|------------|---------------------------|
| Revenue | | |
| Income from egg production | 106,250 | |
| Income from broiler (meat) production | 85,800 | |
| Total revenue (TR) | 192,050 | |
| Expenditure | | |
| Variable Cost (VC) | | |
| Chicks | 36,000 | 20.77 |
| Feed | 83,000 | 47.89 |
| Labour | 15,070 | 8.69 |
| Veterinary service | 8,750 | 5.05 |
| Miscellaneous | 6,000 | 3.46 |
| Total Variable Cost (TVC) | 148,820 | 85.86 |
| Fixed Costs (FC) | | |
| Depreciation on housing | 15,250 | 8.80 |
| Depreciation on Equipment | 9,250 | 5.34 |
| Total Fixed Cost (TFC) | 24,500 | 14.14 |
| Total Cost of Production (TC = TFC+TVC) | 173,320 | |
| Profitability Indicators | | |
| Net Income (TR – TC) | 18,730 | |
| Gross Margin (GM = TR-TVC) | 43.23 | |
| Gross Return per Naira Invested (TR/TC) | 1.1 | |

Source: Computed from Field Survey Data, 2005

feed, labour, veterinary serves and other necessary items. Cost of poultry feed (N83,000) constituted the greatest share of the total cost of production representing 47.89%. This compares favourably with the findings of Okafor *et al.* (2006); Effiong and Onyenweaku (2006) that feed cost is the major important single cost item associated with poultry production due to the increase costs of poultry feed ingredients such as maize, groundnut cake, soya bean meal and scarcity of wheat and corn offal. This shows the importance of feed availability and affordability if poultry production is to be improved. Cost of purchased chicks was next in value of the amount invested in poultry production accounting for 20.77% of TC. Costs of labour, veterinary services, and miscellaneous constituted 8.69%, 5.05% and 3.46% of TC respectively. The total variable cost items constituted 85.86% while fixed cost constituted 14.14% of the TC. This further corroborates the assertion of Sani *et al.* (2000), that poultry production requires minimal capital investment.

It could further be seen in Table 4 that TR of N192,050 was earned by an average youth farmer during the

period. Three profitability indicators were estimated. These were net income, gross margin and gross return per naira invested. The net income was calculated to be N18,730 while the gross margin was N43,230. These values suggested that returns from poultry production by youth farmers were substantial notwithstanding the high cost of production. A gross return per naira invested of 1.11 obtained showed that every naira invested in poultry production earned N1.11. The values obtained for profitability indicators showed that poultry production is a profitable business in Osun State.

Conclusion: This study showed that most of the youth poultry farmers had their age ranged between 20 and 29 years and were highly educated. Majority of the respondents had their household size ranged between 6-9 members. Estimates of the production function indicated that farm size (total number of birds), total cost of feed, and amount of hired labour were the major important factors in poultry production by the youth farmers. While the estimates of the returns to scale obtained indicated positive decreasing returns to scale, youth poultry farmers were not economically efficient in the use of their production resources. Findings from the study also showed that poultry production was profitable among youth poultry farmers. However in order to improve profitability, farmers need to make inputs use more efficient by reducing the level of employment of inputs. However, there is the need to reduce feed cost, chicks cost, labour cost and veterinary costs. Some ways of achieving these is for the government to subsidize feed and chicks cost; livestock research centers and State Agricultural Developing Programmes should develop genetically improved breeds of poultry which efficiently convert feed; there should also be improved extension linkage to sensitize the youth farmers of the need for the use of improved breed of poultry.

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