International Journal of Agriculture Innovations and Research
Volume 3, Issue 1, ISSN (Online) 2319-1473
Manuscript Processing Details (dd/mm/yyyy) :
Received : 07/04/2014 | Accepted on : 15/04/2014 | Published : 02/08/2014

Economics of Small-Scale Layer Production in Three Selected Local Government Areas (LGAs) of Sokoto State, Nigeria

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***Abstract* – The study was conducted in three LGAs of Sokoto State to assess the economic performance of small-scale layer production. The three LGAs were purposively chosen because they represented areas with high concentration of poultry farmers in the State. Using a sampling frame of poultry farmers obtained from the State Ministry of Agriculture and Agricultural development Project (ADP), 40 poultry farmers were randomly selected from each LGA giving a total of 120 farmers who were used for the study. Data were collected with the aid of a structured questionnaire administered by field enumerators. Farm budgeting, financial ratios and descriptive statistics were used to analyze the data. The results showed that majority of the layer producers were male (70%), had tertiary education (77.4%) and were within the working age group (89.2%). Self financing was the predominant (65%) source of investment fund and intensive management system was most common (95%) among the layer producers. Variable cost contributed more (94.46%) to the total cost of production. Among the variable costs, however, cost of feed was the most important accounting for 43.75% of the total cost. Revenue from egg sale contributed most (59.12%) to the gross income realized per bird. The NFI/bird was ₦1793.41 indicating that layer production enterprise was profitable in the study area. The gross ratio was .33 indicating a successful business performance and the simple rate of return was 2.00 indicating a return of N2 for every ₦1 invested into the enterprise. Furthermore the operating ratio was .31 indicating high strength of the enterprise to maintain the current profitability and the income/expense ratio was 3.00 indicating that the enterprise was very solvent. Based on the results obtained, layer production in the study area was found to be an economically lucrative business venture.**

***Keywords* – Economics, Layers, Production, Small-Scale, Sokoto State.**

I. INTRODUCTION

Two decades ago, the poultry industry in Nigeria was not taken seriously, rather it was just considered as a sideline activity [1]. However, the late 70's and early 80's witnessed tremendous growth of the industry, particularly in big cities. Thus, the demand for poultry meat as an additional source of protein to meet the supply of the rapidly growing population of Nigeria was recognized. That led to the establishment of the first integrated farm in Imo State and other parts of the country [2].

Since then, many authors such as [3] believed that poultry industries constitute an important agricultural enterprise in terms of profitability and quick returns on capital invested. The industry also plays a major role in protein production from the livestock sub sector of the national economy. This sub sector provides about 36.5% of the total protein intake in Nigeria [4]. It also contributes substantially to the Nigeria Gross Domestic Product [5]. One major advantage is that, Poultry meat and eggs enjoys no cultural or religious taboos among the citizens of the country [6]. According to [7], birds constitute over 90% of the current national livestock population and are of appreciable economic and social value to the investors and consumers. Poultry products which are sold contribute about 15% to the annual income of a typical poultry producing household [8]. Poultry provide meat, egg, feather, manure (convertible to fertilizer and natural gas) to play an important role in rural economy [9].

In Nigeria, the bulk of the poultry sub-sector is dominated by small-scale farm holdings. The small-scale poultry production is characterized by small number of birds ranging from 1 to 500 for a typical enterprise that contributes to farm household in the rural economy [10]. This small scale poultry production has been an important element in diversifying agricultural production and increasing household food security. It contributes to the socio-economic welfare of rural families and plays various cultural roles which vary from community to community [11].

In contrast to the temperate countries, the Nigerian poultry industry is less capitalized, consisting of smaller units that depend more in manual labour. Birds usually perform at a lower level, and partly on this account, cost of poultry production tends to be higher contributing to the lower consumption of poultry products in Nigeria. Cost of Production in poultry includes fixed costs and variable costs. The fixed costs include rent on land, depreciation on buildings, expenses on feeders and drinkers. The variable costs include day old chicks, labour, feeds, repair and maintenance costs. In return, a farmer realizes outputs such as eggs, spent layers and litter, in the case of layer production [12].

However, Cost of production is a complex issue which depends upon several factors like scale of production, method of production, efficiency of production, entrepreneurial ability and sources of labour and raw material [13]. [12] emphasized that knowledge on the full account of revenue and cost structure of the business is the key determining factor before profit.

Costs reduction in poultry production holds great promises for improving the probability of the enterprise.

The major areas of concern in any cost reduction scheme for poultry production are: feed, day old chicks, and point of lay pullets. As part of costs reduction strategy therefore, [14] suggested that poultry farmers should source for good quality chick or point of lay pullet from disease free hatcheries or from reliable distributors.

In order to lend credence to [12], this study is aimed at shedding more light on the economics of poultry production in Nigeria with emphasis on the area of study. Important cost items would be uncovered and revenue accruable to the business would be known. At the end, it might add to the existing body of knowledge for making judgment by the prospective entrepreneurs on whether to invest in to the poultry sub-sector.

II. METHODOLOGY

Description of the study Area

The study was conducted in three selected local government areas of Sokoto state. Sokoto state was created in January 1976 with the headquarter in Sokoto . Sokoto state is made up of 23 Local Government Areas (LGAs) covering a total land area of 26,648,480 square kilometer [15]. It shares common borders with Niger republic to the north, Kebbi state to the west and Zamfara state to the east. The state is located within latitudes 11^0 30^1 – 13^0 50^1 N and longitudes 4^0 07^1 - 6^0 56^1 E. The state has a population of 4,244,399 people based on 2006 population census [16]. Rainfall starts late (may) and ends early (September/October) with mean annual rainfall ranging between 130mm to 500mm [14]. The mean minimum and maximum temperature are 23^0C and 43^0C, respectively [14].

Livestock farming and arable crop production are the major occupations of the people in the state. The people of the state are involved in the production and marketing of farm products and the main livestock reared included: poultry, cattle, sheep and goats [16].

Sampling technique and sample size

The study was conducted in three selected local government areas of Sokoto state, namely; Sokoto North, Sokoto South and Wamakko local government areas. The local government areas were purposively chosen based on the high concentration of poultry farmers in the areas which also was related to their cosmopolitan nature and high human population bringing about high demand for poultry products. A total of forty (40) respondents were randomly selected from each of the selected local government area, to make up a sample size of 120 respondents. A sampling frame which denoted the list of layer producers in the selected local government areas was obtained from the State Ministry of Agriculture. Agricultural Development Programme (ADP) extension agents resident in each of the three locations were consulted, adequately trained on the nature and type of data required from the respondents and later co-opted in the data collection process for the study. They assisted in eliciting relevant information using the questionnaire as primary data collection instrument. Secondary information was also obtained from journals, previous research works and textbooks.

The information collected from the respondents included their socio-economic characteristics such as age, level of education, years of experience in the business, source of funds, number of birds, feeds, labour used and management system . Other information on quantitative variables such as production inputs, outputs and their respective prices were also collected. Data collection lasted from July to September, 2012.

III. DATA ANALYSIS

The analytical techniques used in this study include descriptive statistics such as frequency distributions and percentages, farm budgeting model and some financial ratios. The farm budgeting model is a tool used to determine the level of resources used and output realized in farm enterprises [17]. The farm budgeting model was used to ascertain the profitability of small scale layer producers in the study area. The farm budget model is defined as:

NFI=GI-TC (1)

NFI= Income or profit (refers to the difference between gross income and total of costs of layer production in the study area).

GI= Gross income represents the sum of total value of layer production (sales of egg, birds and poultry droppings).

TC= Total cost refers to all the expenses incurred in the layer production by the farmer. These include fixed costs and variable costs.

NFI = GI - (TVC + TFC) (2)

NFI = GI - TVC – TFC (3)

$$NFI = \sum_{j=1}^{m} PjQj - \sum_{k=1} PkQk - TFC \quad (4)$$

Where, Pj = price of unit of Jth output, Qj = quantity of Jth output, Pk = price of Kth input, Qk = quantity of Kth input, $\sum$ = summation sign, TVC = total variable cost, TFC = total fixed cost.

Four types of financial ratios were computed to assess the economic performance of layer enterprise in the study area. They include; Gross ratio, simple rate of return, operating ratio and income/expenses ratio.

Gross ratio:-This measures the proportion of gross income that is used to meet farm expenses. The lower the ratio, the higher the return per naira invested. A less than I ratio is desirable for any farm business. The ratio was obtained by dividing total farm expenses by the gross income, i.e.

Gross ratio = Total farm expense/Gross income (5)

Simple rate of return: This is defined as net income divided by total investment,Thus:

Simple rate of return =Net income/Total investment cost (6)

The ratios in equation (5) and (6) were used to measure the efficiency with which capital is employed by the entrepreneurs.

Operating ratio:- This measures the ability of the egg producers to control operating expenses. A lower operating ratio is considered ideal because it indicates that, in the event of a decline in sales or revenue, a business will maintain profitability. It is defined as operating expenses divided by the total revenue;

Operating ratio = Operating expenses / Total revenue (7)

Income/expenses ratio:- This is used to measure the proportion of output exceeding the total costs of production. It is calculated by dividing income by total costs.

Income/expenses ratio = Income / Total cost (8)

IV. Results and Discussion

A farm household's managerial success, which may be measured by the levels of production and productivity, is a function of its socio-economic profile. [18] pointed out that socio-economic characteristics such as sex, age and education have strong correlation with the productivity of a farm household, and were therefore considered in this study. Information on some socio-economic characteristics of the respondents was investigated and the results were presented in Table I.

Table I: Socio-Economic characteristics of the layer producers

Sex	Frequency	Percentage
Male	84	70.00
Female	36	30.00
Age range(year)		
20-28	38	31.70
29-36	50	41.10
37-44	19	15.80
45-52	9	7.50
53-60	4	3.30
Education level		
Qura'nic	13	10.80
Primary	2	1.70
Secondary	12	10.00
Tertiary	93	77.4
Family size		
1-3	39	32.50
4-7	50	41.70
8-11	21	17.50
12-15	10	8.30
Source of fund		
Self financing	78	65.00
Cooperative society	39	32.50
Commercial bank	1	0.80
Friends/relatives	1	0.80
Money lenders	1	0.80
Management system		
Intensive	114	95.00
Semi-intensive	2	1.70
Extensive	4	1.30

Source: Field survey, 2012

Information pertaining to Sex distribution of the respondents revealed that majority (70%) were males, while the remaining (30%) were females. This indicates that layer production in the study area was dominated by male. The high proportion of males to females may be because of the belief that males are solely responsible for meeting the households' needs. The implication of male dominance may also be that productivity is expected to be higher, because, males have the tendency to be more labour productive as compared to their female counterparts.

However, this finding underscores the need for the design of policy to take into account gender related peculiarities. Taking labour efficiencies into concern, this finding was supported by [19] who found that male folk were more profit efficient as compared to their female counterparts in the study area.

Age is another factor affecting decision and action made in agriculture. This is because people's thoughts, behaviour and needs are primarily related to their ages [20]. The table shows that 41.7% of the farmers were within the age range of 29 to 30 years, 31.7% were within the age range of 20 to 28 years, 15.8% were within the age range of 37 to 44years and 3.3% were within the ages of 53 and above. The distribution indicated that majority of the farmers were relatively young and still in their active age. The implication is that younger farmers are more likely to adopt innovation faster than older ones. The finding is in agreement with [21].

Educational statuses of the respondents were also investigated. This is because studies have revealed that education influences the adoption of practices of modern agriculture [22]. The reason is that more educated person is likely to adopt innovations easier and quicker than the less educated. The table shows that majority (77.4%) of the layer producers in the study area had tertiary education. It is expected that the level of education demonstrated by the respondents should contribute significantly to their positive decision making. This finding was supported by [22]; [23] and [24] that level of education determines the quality of skill of farmers, their allocative abilities and capacity to adapt to the improved technologies.

Under peasant agriculture, much reliance is placed on the strength of a family to supply the much needed farm labour in the absence of mechanical equipment [25]. The significance of family size in agriculture centres on the fact that it determines the availability of labour for farm production as well as the amount of farm produce retained for home consumption [26]. The Table shows that 41.7% had family size ranging from 4 to 7 individuals per household, 32.5% had family size ranging from 1 to 3 individuals/ per household, 17.5% had family ranging from 8 to 11 individuals per household and 8.3% had family size ranging from 12 to 15 individuals per household. Reference [26] opined that the larger the family size, the greater would be the labour on the farm, and thus, the greater the output from the farm.

Table I also shows that majority of the respondents (65.0%) sourced their funds from personal savings, while

32.5% sourced their funds from cooperative society. This situation could be explained by the nature of their farm holdings and the absence of collateral security that may be needed by the financial institutions before granting loans to prospective farmers [27]. Also, commercial banks demand much collateral and high interest rate from the farmers which made it difficult for them to obtain loan.

The results revealed further that almost all the respondents (95%) used intensive management system of layer production. Intensive management system is known to increase efficiency in poultry production, facilitate effective management of very large flock, maximizes the use of labour, reduces the loss of egg and activities of predator, and reduces the risk of disease outbreak as well as facilitating ease of identification of sick birds (2000).

Profitability of layer production enterprises

Farm budgeting tool was used to determine the profitability of small-scale layer producers in the study area. The results of the analysis are presented in Table II. The findings showed that the total variable costs constituted the highest proportion (94.46%) of the total cost of production. Among the variable cost items, cost of feeding was the most important accounting for 43.75% of the total cost of production. This implies that feed is an essential cost item in layer production. This agrees with [28], [29], [30] and [31] who also found that feed cost comprised the highest share in the total cost of poultry production. . In the case of revenue items, proceeds from sale of eggs were the most important when compared to sale of spent layer and droppings. Proceeds from the sale of eggs accounted for 59.12% of the total gross income realized per bird, while sale of spent layer accounted for 25.52% and droppings 15.36% of the total gross income per bird, respectively.

Table II: Average costs and returns of layer production in Naira per bird

Cost items	Amount (N)/bird	Percentage of total
A. Variable costs		
i) Foundation stock	239.36	26.74
ii)Feeds and supplements	393.49	43.95
iii)Vaccines and medication	72.19	8.06
iv) Electricity	27.91	3.12
v) Water	28.47	3.18
vi) Salaries	35.06	3.92
vii) Repairs and maintenance	18.69	2.09
viii) Transport	13.28	1.48
ix) Litter material	9.45	1.06
x) Commission/tax	7.84	0.88
Total variable costs	845.73	94.46
Fixed cost (Depreciation on fixed assets such as feeders, drinkers, interest payments, etc)	49.57	5.54
Total cost	895.30	100.00
Revenue		
i) Egg	1,589.54	59.12
ii) Culled layer	686.16	25.52
iii) Droppings	413.00	15.36
Total gross income	2,688.71	100.00
Net Profit	1, 793.41	

Source: field survey, 2012

This is similar to the findings of [32], [33] and [34] who found that sale of eggs contributed the highest share of the total revenue realized by layer producers. The result further showed that average gross income per bird was N2688.71 and net income was N1793.41 per bird. This implies that layer production was profitable in the study area. The result agrees with the findings of [35] and [33] who observed that gross margins and net returns increases with increase in farm size and was profitable. It also lent credence to the findings of [30], [21] and [32] that many factors affect the profitability of layer production which may include cost of birds and price of egg, depending on the location of the farm.

Farm Financial Performance of Layer Production Enterprise

Farm financial analysis was used to provide additional information on the economic performance of layer production enterprise in the study area. Results of the farm financial ratios considered in this study were presented in Table III.

Table III: Farm Financial Performance of Layer Production Enterprise

Farm financial ratios	Value
i) Gross ratio	0.33
ii) fixed ratio	2.00
iii) Operating ratio	0.31
iv) Income/expense ratio	3.00

Source: field survey, 2012

The gross ratio was .33. This implies that total cost accounted for 33% of the gross income realized indicating a high return to investment outlay. An enterprise that has a high return to investment outlay is considered to be successful in term of performance. Only an enterprise with a ratio of greater than 1 is disastrous because it is indicating overutilization of certain resources [8].

The value of the simple rate of return was 2.00. This means that the business makes a return of 2 kobo for every naira invested on the farm. According to [8], a ratio greater than 1 is acceptable for a farm business.

The operating ratio was 0.31 meaning that, only 31% proportion of the gross income was used to pay operating expenses. This shows that, in the event of decline in sales revenue, the layer production enterprise is capable of maintaining its profitability. Usually, an operating ratio of up to .80 is desirable [8].

The Income/expenses ratio was 3.00. This shows that the value of output exceeds the total costs of production, implying that the enterprise is solvent. This means that the enterprise is capable of generating revenue enough to upset costs of production.

Problems facing layer producers

The findings of this study also indicated that farmers encountered several problems in their layer production activities. The problems were captured and the results are presented in Table VI.

Table VI: Problems encountered by layer producers in the study area

Problem	Frequency*	Percentage
Disease incidence	115	96.00
Land	75	62.50
Poor extension services	70	58.30
Inadequate funds	68	56.70
Lack of access to credit	47	39.20
Poor prices of poultry products	36	30.00
Total	431*	

Source: field survey, 2012
*=Multiple responses were recorded.

The layer producers in the study area faced many problems. The most important problem faced by the respondents was disease incidence (96%). A problem of this nature could be as a result of lack of access to veterinary services brought about by the inability to pay for the services and lack of proper orientation on the need for vetirinary services delivery. 62.5% identified land as another problem. The reason could be due to the cosmopolitan nature of the study area. Layer birds prefer to be raised in a well ventilated and low noise area which was actually difficult to obtain in an evolving city like the study area. Others reported that poor extension service (58.3%) was the mainproblem they encountered. Inadequate fund was reported by 56.7% and access to credit reported 39.2% of the respondents. This may be due to the absence of collateral security which may be needed by financial institutions before granting loans to prospective farmers [27].

In conclusion, despite the fact that farmers engaged into the enterprise did face certain problems such as incidence of diseases and inadequate land for poultry keeping, Layer production in the study area was found to have a socially favourable environment for survival. The current state of production is economically lucrative and the enterprise has the capacity to survive in the event of decline in revenue.

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