Research Journal of Applied Sciences 2 (2): 160-164, 2007

Cost and Returns on Egg Production in Southwestern Nigeria

F.I. Olagunju
Department of Agricultural Economics and Extension Ladoke Akintola,
University of Technology, P.M.B. 4000 Ogbomoso, Oyo State Nigeria

Abstract: This article determines the cost and returns of laying bird according to different scale of operations in egg production. Four hundred and five poultry egg farmers were surveyed by using multi-stage sampling techniques. Budgetary analysis revealed feed as a major cost item in egg production constituting between 64.5 and 65.3% of the total cost of production. It was also discovered that the large scale producers had the highest gross margin of ₦1, 183 per hen per laying period. This implied a lowest fixed cost, highest net returns and minimum variable cost. Egg production was profitable in the study area especially the large scale production that took the advantage of economies of scale.

Key words: Egg, gross margin, net revenue, profitability, scale production

INTRODUCTION

The role of poultry in alleviating the problems of under-nourishment and malnourishment in a high proportion of Nigerians cannot be over emphasized. Poultry egg, which is one of the major products of poultry production, is one of the most nutritious and complete foods known to man. Chicken egg protein has biological value of 1.0 and so shares with human protein the distinction of being a perfect protein (Orji *et al*., 1981).

Using FAO's statistics, between 1961 and 2000, annual world egg production rose by more than 3.5 times to reach about 55 million tons (all eggs-not just hen eggs), about 6% are hatching eggs. This large, rather linear, increase was due to the rapid expansion in egg production of developing. On the other hand, developed countries increased their production by only 1.6% annually.

In Nigeria, poultry production contributes to the nation's Gross Domestic Product (GDP) as it provides gainful employment and income for a sizeable proportion of the population. With the inclusion of the other livestock the contribution to the GDP had been increasing over years. Poultry eggs and meat contribution of the livestock share of the GDP increased from 27% in 1999 to 32% in 2000 (CBN, 2000). This significant improvement in poultry production has been sustained by availability and use of improved vaccines, which curtailed mortality rates in birds, reduction in the tariff on imported day old chicks and parent stock (CBN, 2000) and the relative ease of compounding efficient feed using easily available local feedstuffs (Ojo and Afolabi, 2000).

Recent experiences of farmers have shown that poultry has been suffering some set backs caused by increasing cost of feeds, parent stock, day old chicks, drugs, vaccines among others thus reducing the net returns from the business significantly. The high cost of purchasing these inputs and their scarcity in the market threatens the survival of poultry industry and thus calls for concerted efforts to save the industry from collapse. Failure to do this could lead to a serious reduction in poultry production and protein intake of people resulting into malnutrition and ill health which again can transform into lower productivity and output. Cost minimization with maximum net returns from egg production is paramount to the success of poultry farmers and sustenance of the industry.

This present study examines the following specific objectives;

- To examine the socio-economic characteristics of the producers
- To examine the cost structure of the various scales of operation in the study area
- To examine the gross margin and profit level of different categories of producer.

Literature review: Eggs are a very valuable source of animal protein and a very convenient one easily packaged, distributed and needing no preparation before consumption apart from cooking the product one way or another (Smith, 1990). Verma and Sigh (1997) discussing the problems of availability and high quality feeds in the intensive livestock industry found that feed industries were faced with scarcity and high cost of grains like guinea corn, maize and millet which constituted about 60% of the weight of most compounded feeds. Other feed

additives like bone meal, oyster shell, blood meal and micro nutrients are scarce and very costly. This had made the prices of feed relatively high and also leads to scarcity of feeds in the market.

Most of the past studies on profitability of poultry egg production have also focused on nutritional aspects emphasizing the need to improve feed efficiency since feed cost constitutes 50-80% of total cost in commercial poultry production (depending on the level of management efficiency). This assertion derives from studies like those of Adesimi (1979), Olomola (1990). Ukeja (1992) asserted that there has been a steady increase in the population of livestock in Lagos states since the inception of Structural Adjustment Programme (SAP) except poultry where there was unfortunate slum in production due to high cost of feed. This probably was due to the problem of high feed cost. Odunlami (1995) investigated the structures of costs, output, gross margin and profits on poultry enterprises located at Ogbomoso and its environs in Oyo State. It was discovered that feed alone accounted for an average of 61% on the farm and that the productivity differentials in egg production on the farm may derive from the differences in the level of management practices and scale of operation in use on the farms. A large scale producer is one who maintains at least 5.000 layers a medium producer maintains between 1.001-4.999 layers while a farmer who keeps at most 1000 layers is regarded as small scale producer. This is based on the classification used by Omotosho and Ladele (1988). Agbamu (1998) pointed out that the cost incurred and the benefit gained in livestock production vary and differ to scales of operation. Such approach described so far will put together all the factors that can effect egg production to determine the economic age at which birds should be disposed off, thus, addressing the issue of profit maximization in a more justifiable manner.

MATERIALS AND METHODS

The data used in this study were collected from a cross-sectional survey of poultry eggs farmers in Osun State. The state is one of the 36 States in Nigeria. It is located in the southwestern part of the country. The state has a land area of 8802 km^2 and a population of 2.2 million (FOS, 1996). The state is agrarian and well suited for the production of permanent crops such as coca and oil palm and arable crops (maize yam and cassava) because of favourable climatic conditions. The annual rainfall is between 1000 mm and 1500 mm with high daily temperature of about 30°C. The people are predominantly peasant farmers cultivating food and cash crops. They also embark on small, medium and large scale livestock production such as rearing of goats, pigs poultry, sheep and rabbits as well as marketing of their products.

The data for this study were primary data collected from 405 poultry egg farmers selected from five Local Government Area (Osogbo, Ede, Ife Central, Ilesa and Ikirun) of Osun-State, Nigeria. Multistage sampling technique was used in collecting the data. The first stage involved a purposively sampling of the five local government areas based on the population of poultry farmers, size and availability of market for the poultry products. The second stage involved a simple random selection of large, medium and small scale producers from densely populated area like Osogbo, Ilesa and Ife Central and less densely populated areas like Ede and Ikirun local government area. The total numbers of 40, 25 and 20 respondents were chosen for large, medium and small scale production respectively in the densely populated area while 30, 25 and 20 respondents were chosen from the less populated local government area. Data were collected with the use of a structured questionnaire designed to collect information on output, inputs, returns, cost and some major socio-economic characteristics of the farmers in the study area.

Descriptive statistics (mean, standard deviation), budgetary techniques and profitability ratio were used to analyze the socio-economic characteristics, cost and returns and their performance, respectively. The socio-economic characteristics variables include age of farmers (years), experience of farmers in poultry production (years), years of schooling of farmers (years). Inputs were categorized into four groups stock of bird (farm size), feed intake (kilogram), operating expenses (naira) and other cost (depreciation values on farm implements). The value of output was obtained by adding cash receipts from the sale of eggs produced and value of eggs consumed by the farmer house hold with those given out as gifts, revenue from sales of empty used feed bags and sales of culled birds.

Gross margin analyses and profitability ratio were used to examine the cost and returns of poultry egg farming in the study area.

Gross margin analysis is given by Eq. 1

$$GM = TR - TVC \quad (1)$$

Where

GM = Gross Margin (₦)
TR = Total Revenue (₦)
TVC = Total Variable cost (₦)

The performance and economic worth of the respondents can be determined by the use of the following profitability ratios:-

- Benefit Cost Ratio (BCR) = TR/TC
- Expense Structure Ratio (ESR) = FC/ VC
- Rate of Return (ROR) = NR/TC
- Gross Ratio (GR) = TC/ TR

The estimation of Total Cost and Revenue for different scales of operation was based on the unit of 785. 2.828 and 7.650 birds and the mean stock size for small, medium and large scale respectively. The farmers' gross margins and profits were computed in relation to each crate of eggs (30 pieces) produced, empty used feed bags, culled and chicken droppings. The variable costs composed of feed, water, drugs and veterinary services, labour and transportation while depreciation on stock buildings, cages, stores and interest on loan constitute fixed costs. The straight line method was used to estimate the depreciation charges.

$TR = Y_1 + Y_2 + Y_3 + Y_4$
$TVC = X_1 + X_2 + X_3 + X_4 + X_5$
Y_1 = Revenue from scale of eggs
Y_2 = Revenue from scale of empty used feed bags
Y_3 = Revenue from sales of chicken droppings
Y_4 = revenue from sales of culled birds
X_1 = cost of water
X_2 = cost of drugs and veterinary services
X_3 = cost of feed
X_4 = cost labour
X_5 = transportation cost

Total Cost (TC) composed of the variables X_1 to X_5 as defined above and other fixed Costs for the laying period.

X_6 = depreciation on stock
X_7 = depreciation on buildings and crates
X_8 = depreciation on storage facilities
X_9 = interest on loans (loan charges)

RESULTS AND DISCUSSION

Socio-economic characteristics of poultry farmers: The socio-economic characteristics of the poultry farmers on Table 1 revealed the mean age to be 47 years indicating that there are young dynamic farmers who are more likely to adopt new innovations than older people. An insignificant 12% were female among the sampled farmers.

The poultry farmers were experienced with about 10.6 year's experience. They were well educated with 15.62 yrs in school. This accounted for the high standard of management of the existing poultry farmer and thus the large profit from the enterprise. Despite the high standard of management about 70% of the farmers rely on finished feed over whose quality and cost they had little or no control. Availability of good water is very improved in poultry production as it reduces disease outbreak and also improves feed intake for improved laying capacity. The study revealed that 75% of the respondents use pipe-borne water and water tankers. About 80% of the farmers used hired labour while the other farmers relied on both family and bird labour. The availability of hired labour was an important factor in determining the success of poultry business in the area as most of the farms were operating principally as commercial ventures. The location of farm distribution showed that about 58% of the farms were located in urban centers where market for eggs is readily available due to the large population of enlighten people who see eggs in their diet as a necessity and not a luxury.

Table 1: Socio-economic characteristics of egg producers

Items	Absolute frequency	Relative frequency
Age (years)		
<30	50	12.35
31-50	210	51.85
51-60	110	27.16
61-70	35	8.64
Total	405	100.00
Mean = 47 yrs		
Education (yrs)		
No formal education	14	3.46
Primary education	38	9.38
Post primary education	97	23.95
Higher education	256	63. 21
Total	405	100.00
Mean = 15.6years		
Production experience (yrs)		
<5	113	27.90
5-10	252	62.22
11-15	33	8.15
16-20	07	1.73
Total	405	100.00
Mean =10.6 yrs		
Sources of feed		
Owned feed mill	283	70.00
Market	122	30.00
Total	405	100.00
Uses of labour		
Hired labour	324	80.00
Family	60	14.80
Total	405	100.00

Source: Field Survey, 2005

BUDGETARY ANALYSIS

Cost composition in poultry production: The average total cost in naira per hen for small, medium and large scale was ₦1, 300, ₦1, 290 and ₦1, 285, respectively while the average revenue for the laying periods was ₦2.042, ₦ 2.055 and

₦2, 068, respectively. There was a tremendous increase in cost of production per layer as pointed out by the producers but they still generate a lot of revenue from

the egg production business. As revealed from Table 2, the large scale producers incurred less total cost of production per hen than the medium and small scale producers. They however, generated more revenue than the lower scale producers. Consequently, were able to earn more returns than the medium and small-scale producers. Table 3 shows that feed was the major cost item, constituting about 64.5-65.3% of the total costs of egg production. It is therefore imperative that farmers should find a way of increasing the efficiency of feed utilization in all its ramifications. The cost of storage facilities was found to constitute the lowest proportion of costs of production showing that very little provision (if any) were made for egg storage.

Profitability estimates: The highest Benefit Cost Ratio (BCR) obtained for the large scale producers was 1.6 (Table2).

This ratio is one of the concepts of discount method of project evaluation. As a rule of thumb project with Benefit Cost Ratio greater than one equal to one or less than one indicate profit, break-even or loss respectively. Since the ratio is greater than one, it shows profit and indicates that the enterprise is profitable even with little capital invested in it. It is therefore possible to have higher value of BCR with increased capitals and skilled labour just as the case of large scale producers.

Table 2: Budgetary Analysis of poultry egg production

ITEMS	Small scale	Medium scale	Large scale
TVC	870	880	885
FC	430	410	400
TC	1.300	1.290	1.285
TR	2.040	2.055	2.285
GM	1.172	1.175	1.183
NR	742	765	783
BC (TR/TC)	1.5	1.5	1.6
ROR (NR/TC)	57%	59%	61%
GR (TC/TR)	0.64	0.63	0.62
ESR (FC/VC)	0.6	0.5	0.4

Source: Field Survey, 2005

The highest value of Gross Ratio was recorded in the small scale production with 0.64 while the lowest was 0.62 for the large scale production. This implies that the small scale producers spend about ₦ 0.02 than what the large scale producers will spend out of ₦1.00 returns to the enterprise on one hen. The differences in the cost incurred by the producers were as a result of economies of scale which was more favourable to the large scale producers than others. The Rate of Return to production was highest in the large scale production with 61% and lowest in small scale production with 57%. The implication of this is that for every ₦1.00 invested, 57kobo, 59kobo and 61kobo is gained by the respective scale produces. The large scale producers had larger percentage of returns due to advantage of economic of scale.

The Expense Structure Ratio (ESR) dictates the percentage of the fixed component out of the total cost. The small and medium scale producers had the highest value of ESR as 0.5 that is 50% of the total cost made up of the fixed cost component. The large scale producers had 40% of its total cost being made up of fixed cost components. The wide difference between the scales indicated that the later was able to increase production with variable cost which increased the total revenue leaving the fixed cost unchanged. The capacity of the brooder house, cages being kept by the small scale producers hence they had to spend extra cost on such structures.

Gross margin and net returns: Table 2 gives the gross margin of ₦1,172; ₦1, 175 and ₦1, 183 of hen/laying period of small, medium and large scale production respectively. According to Adegeye and Dittoh (1982) Gross Margin is a good measure of profitable. It was therefore shown that egg production is highly profitable in the study area. The large scale egg producers had the highest gross margin of ₦1, 183 per hen. This implies that

Table 3: Percentage composition of total cost of production per hen for the laying periods

	Small scale		Medium scale		Large scale	
Items	Av.cost per hen ₦	%	Av.cost per hen ₦	%	Av.cost per hen ₦	%
Feed	568.19	65.3	570.20	64.8	571.0	64.5
Water	80.00	9.2	72.00	8.2	72.5	8.2
Drugs	110.32	12.7	110.60	12.6	111.2	12.6
Labour	86.00	9.9	97.10	11.0	98.3	11.1
Transport	25.49	12.9	30 .10	3.4	32.0	3.6
Total variable cost	870.00	100.0	880.00	100.0	885.0	100.0
Buildings and cages	23.04	5.4	20.08	4.9	20.1	5.0
Storage	9.80	2.2	9.40	2.3	9.32	2.3
Loan charges	9.84	2.3	9.50	2.3	9.45	2.4
Depreciation on stock						
Laying birds	387.32	90.1	371.02	90.5	361.13	90.3
Total fixed cost (FC)	430.00	100.0	410.00	100.0	400.00	100.0
Total cost (TC)		1.300		1.290		1.285

Source: Field Survey, 2005

they had minimum variable cost of production coupled with low fixed cost, hence gave the highest net returns per N/hen of egg production in the study area.

CONCLUSION

The results of the analysis of socio-economic characteristics of the farmers in the study area showed that 63% of the farmers had tertiary education with the average of 10.6 yrs experience. 30% of the farmers depended on finished purchased feeds and 75% had access to good water supply. On the average, most of the farmers had 785. 2.828 and 7.650 birds in stock for small, medium and large scale production respectively. The budgetary analysis shows feed as a major cost item constituting between 64.5-65.3% of total cost of production. The farmers made on the average, a gross margin of ₦742, ₦765 and ₦783 per hen for small, medium and large scale production from the point of lay of lay to the optimum laying period of 43 weeks.

The results therefore imply that poultry farmer should find means of increasing efficiency of feed utilization even though egg production was found profitable in the area. In addition, local manufacturers of poultry equipment need to be encouraged through technical and financial assistance to supplement the input of such equipment.

Small and medium scale producers are encouraged to increase their stock sizes to take advantage of large economies of scale. With these and other several complementary policies, the poultry industry, will overcome all the attending production cost problems and serve as a source of employment while at the same time improve the level of nutrition of the majority in Nigeria.

REFERENCES

Adegeye, A.J. and J.S. Dittoh, 1982. Essentials of Agricultural Economics. Impact publishers Ibadan, pp: 113-116.

Adesimi, A.A., 1979. Economic of Poultry Management: A Comparative Study of Asoloeso and Strategy Enterprises Niger. Agric. J., pp: 47-58.

Agbamu, J.B., 1998. Analysis of Cost and Benefit in Livestock Production: A Case Study of Ogun State. An unpublished M.sc thesis submitted to the department of University of Ibadan, Ibadan, pp:1-121.

Central Bank of Nigeria, 2000. Annual Report and Statement of Account, CBN publications.

FAO, 2000. Economist with Food and Agriculture Organization of the United Nations internet files/OLK, 258: 1-24.

Federal Office of Statistics (FOS), 1996. Population Figures FOS publication

Odunlami, F.I., 1996. Economic Analysis of Poultry Production in Ogbomoso, Oyo State. An unpublished B. tech thesis submitted to Ladoke Akintola University of Technology Ogbomoso.

Ojo, S.O. and J.A. Afolabi, 2000. Economic Analysis of Replacing the fish meal component in broiler starter mash with gliricidia sepium animal production in the new millennium, challenges and options. Book of Proceedings edited by S.N Ukachuckwu *et al.*

Olomola, A.S., 1990. An Economic Analysis of the demand for meat in Sokoto State, paper presented at the national conference on Nigerian Livestock Industry and Prospects for the 1990s, Lugard hall, Kaduna.

Omotosho, O.A. and A.A. Ladele, 1988. Management Problems in Large Scale Poultry Business in Nigeria. FAMAN J., 3: 27-35.

Orji, B.I., C. Igbodi and P.J. Oyeke, 1981. The Effect of Pre-Incubation Storage Embryonic Growth Rate of Mortality, Hatch Ability and Total Incubation Period of Food Egg. Nigeria J. Agric. Sci., 3: 99-103 and 174.

Smith, A.J., 1990. The Tropical Agriculturist: Poultry Macmillan Publishers.

Ukeja, E.V., 1992. The Impact of SAP on Nigerian Agricultural and Rural Life. A CBN/NISER National Survey of Bendel kwara, Lagos and Ondo States. Vol. II.

Verma, L.C. and K.S. Singh, 1997. Cost and Returns Structure in Layer Farming. Indian J. Poultry Sci., 32: 152-158.