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## Evaluation of Poultry Egg Marketing in South-Western Nigeria

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**Abstract:** The study evaluated poultry egg marketing in Nigeria. It specifically identified the socio-economic characteristics of the respondents, examined the market structure for egg in the study area, determined the profitability of egg marketing and determined the influence of some socio-economic characteristics on the sales revenue of respondents. A multistage sampling technique was used to select 200 egg marketers in the study area and structured questionnaire administered on them. Descriptive statistics such as frequency and percentages were used to analyze the socio-economic characteristics of respondents while Gross margin analysis was employed to determine the profitability of the egg business in the study area. Gini coefficient was used to examine the market structure while production function was used to determine the influence of some factors on the sales revenue of respondents. The result showed that only 10% of the respondents were single while the remaining 90% were married. A literacy level of 70.50% was obtained among these marketers. Analysis also revealed that 67% of these marketers were retailers while only 10% were producer/sellers. The profitability analysis showed that an average marketer earned ₦4222.55 as gross margin per month. The Gini coefficient of 0.87692 obtained in this study indicates a high level of inequality in income among the respondents. The result also revealed that the regressors explained about 67.1% in the variability of the regressand.

**Key words:** Poultry egg marketing, socio-economic characteristics, profitability of egg business

### Introduction

The livestock sub sector is an important component of the Nigerian agricultural economy in terms of being both an economic enterprise and as an employment generating sector at the primary, secondary and tertiary levels. Using the 1984 factor based data, the sub sector contributes, on annual basis, a little over 5% of the Gross Domestic Product (GDP) between 1996 and year 2000. In the case of its role in the Nigerian agricultural sector itself, the livestock sub sector is second only to the crop sub sector and represents on average over 13% of agriculture's contributions during the period under consideration (Central Bank of Nigeria, 2000). In terms of provision of the much needed meat to average Nigerian, the performance of the livestock sub sector has not been encouraging. For example from cattle, less than 2 kg of beef were available to an average Nigerian per year and just mere 4 kg of egg per annum could be supplied locally to each Nigerian during the period under consideration. The egg supply is very low being 10.56 g per day as compared with the usual recommendation that an egg should be consumed by an adult per day. This recommendation would imply a crate of 30 eggs per month (Okuneye, 2002).

The protein intake of average Nigerian is abysmally low due to poverty. For instance, the British Medical Association recommends a minimum animal protein intake of 34 g per capita per day. Also, the Food and Agricultural Organization (FAO) of the United Nations

recommends 20g of animal protein per capita per day as the minimum for consumption for developing countries (Okuneye and Banwo, 1990), but 75 g as optimum for normal growth and development (FAO, 1992). However, according to Olayemi *et al.* (1986), the average animal protein intake per caput per day in Nigeria was a mere 7.6 g i.e. 38% of the FAO minimum requirement for developing countries and a mere 10% for excellent growth and development. It can be logical to suggest that the best solution to our national meat scarcity is to increase poultry production because of the popularity of poultry meat and their products particularly eggs in the diet of many Nigerians due to few or no social or religious stigma attached to them. However, if production increases without a well developed marketing system, all possible gains from the production effort would only go into the drains of post-harvest losses. According to Malcolm (1999), the analysis of the state of Nigerian food losses during marketing shows: plantain and banana, 20 – 80%, yam, 20 – 30%, maize, 25 – 30%, pineapple up to 70% and pawpaw, 40 – 60%. He summarized that in all, about 50% of harvested farm produce is lost before reaching the final consumer's table. Poultry egg being an agricultural commodity cannot be an exception. This study therefore (i) examined the socio-economic characteristics of poultry egg marketers in the study area (ii) determined the profitability of egg marketing in the study area (iii) examined the market structure for egg in

the study area (iv) examined some factors that influence the sales revenue of respondents.

## Materials and Methods

**Theoretical framework:** Marketing margin is the difference between producer and consumer prices of an equivalent quantity and quality of a given commodity (Vanessa and Jonathan, 1992). Adekanye (1988) said that small margins can be regarded as proof that distribution or marketing is efficient but Vanessa and Jonathan (1992) opined that gross marketing margin cannot be treated as an indicator of economic performance as such low margin may coexist with inefficient use of resources, poor coordination and poor consumer satisfaction as well as disproportionate profit level. Harris (1993) said that market structure consist of the characteristics of the organization of a market which seems to influence strategically the nature of competition and pricing within the market. The set up of the market consists of the degree of concentration of buyers and sellers, integration, product differentiation and the degree of competition between buyers and sellers. Imoudu and Afolabi (2002) posited that market structure for agricultural products in Nigeria is not perfect competitive due to collusive tendencies of sellers by forming associations for particular product. The market structure can be examined by using the Lorenz curve and Gini coefficient (Dillon and Hardaker, 1993). According to them, the Lorenz curve is obtained by plotting the cumulative proportion of sellers from the smallest number to the largest against the cumulative proportion of their sales earnings. If the distribution is totally equitable, the curve will fall on the 45-degree line. The greater the inequality, the greater the departure from 45-degree line. Gini coefficient is the rate of the area between the curve and the 45-degree line to the area under the 45-degree line. It is also a measure of inequality. Gini coefficient greater than 0.35 are high indicating inequitable distribution (Dillon and Hardaker, 1993). In other words, higher Gini coefficient means higher level of concentration and consequently, high inefficiency in the market structure.

**Study Area:** This study was conducted in South-Western Nigeria. Oyo State is one of the five states that made up South-Western Nigeria. Oyo State was purposively selected because of the unique nature of Ibadan, the state capital. Oyo state lies between latitudes 7° and 9.3°N and longitude 2° and 4°E and characterized by two climatic seasons. The rainy season between April and October and the dry season between November and March. The state is made up of 33 local government areas with a total population of 3,488,789 people (National Population Commission, 1991). The favourable climate of the area encouraged about 70 per cent of the inhabitants to engage in agriculture. They grow both arable and permanent crops. They also rear

livestock particularly poultry. Apart from farming, the inhabitants also engaged in other occupations like trading, manufacturing and commerce.

**Method of data collection:** A multistage sampling technique was used to select 200 poultry egg sellers in the study area. Oyo state was purposively selected because its state capital i.e. Ibadan is the largest city in West Africa and for having a large concentration of egg producers and sellers. Ibadan metropolis is made up of 5 local government areas (i.e. Ibadan South East, Ibadan South West, Ibadan North, Ibadan North East and Ibadan North West). A simple random sampling technique was then used to select 40 respondents from each of the 5 local government areas making a total of 200 respondents and structured questionnaire administered on them coupled with interview schedule to collect the data used for the study.

**Analytical technique:** Descriptive statistics such as frequencies and percentages were used to analyze some socio-economic characteristics of the respondents. Gini coefficient was used to examine the market concentration for poultry egg in the study area. Mathematically, it is represented by equation (1) i.e.

$$G.C = 1 - \sum XY$$

where

G.C = Gini coefficient

X = the percentage of poultry egg sellers

Y = the cumulative percentage of their sales.

Gross margin analysis was employed to determine the profitability of egg marketing in the study area. The gross margin was represented by equation (2) i.e.

$$GM = GI - TVC$$

where

G.M = Gross margin

G.I = Gross Sales/Income

TVC = Total variable cost

Some of the factors that influence the sales revenue of egg marketers is determined quantitatively using the production function analysis with the use of the Ordinary Least Square multiple regression analysis (OLS) under the assumption that data collected fulfilled the assumptions of multiple regression model. These assumptions include absence of multicollinearity among independent variables, normally distributed error term with zero mean and constant variance and non-autoregression disturbance (Koutsoyiannis, 1977).

The production function postulated for poultry egg marketers in the study area is implicitly presented by equation (3) i.e.

$$Y = f(X_1, X_2, X_3, X_4, X_5, \mu_i)$$

where

Y = Sales revenue of respondents (₦)

X<sub>1</sub> = Labour (Mandays)

X<sub>2</sub> = Cost of purchase (₦)

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$X_3$  = Cost of storage (₦)  
 $X_4$  = Cost of transportation (₦)  
 $X_5$  = Marketing experience (yrs.)  
 $\mu_i$  = The error term (which is assumed to have zero mean and constant variance).

The linear, semilog and Cobb-Douglas functional forms of the production function were fitted to data collected. The estimated functions were evaluated in terms of the statistical significance of  $R^2$  as indicated by the F-value, the significance of the coefficients as given by the t-values, the signs of the coefficient and the magnitude of the standard errors.

### Results and Discussion

**Socio-economic characteristics of respondents:** Table 1 reveals that 60.5% of the respondents belong to the middle age group while 11.5% can be regarded as aged. This age distribution can have positive impact on the business aggressiveness of the respondents. Table 1 also shows that 80.5% of the respondents were females while 19.5% were males. The dominance of the females in the egg marketing activities may be due to the fact that it involves little or no stress. Analysis also reveals that 90% of these respondents were married though 2.5% and 1.0% of them were widowed and divorced respectively. This may have positive effect on the availability of family labour.

The Table also showed that 70.5% of these marketers were literates which can have positive influence on their business acumen.

**Category of Sellers Interviewed:** The result in Table 2 reveals that 5% of the respondents were producers/sellers while 14.5% were wholesalers. About 23.5% were wholesaler/retailers while 57% were retailers. The dominance of egg marketing in the study area by retailers may be due to small capital outlay required to start the business.

**Gross margin and profitability analysis:** The gross margin and profitability analyses shown in Table 3 reveals that cost of purchase accounted for 95.83% of the total cost while transportation cost took 1.38%. The cost of storage accounted for 0.21% while labour accounted for 2.34%.

The profitability analysis shows that an average marketer incurred a total variable cost of ₦21599.48 per month but earned an average revenue of ₦25822 per month. This indicates that an average marketer earned ₦4222.55 as gross margin per month suggesting that egg marketing is a profitable ventures in the study area.

**Market structure:** The Gini coefficient of 0.87692 obtained in this study shown in Table 4 indicates a high level of inequality in sales revenue of respondents and

Table 1: Socio economic Characteristics of Respondents

Variable	Frequency	Percentage
<b>Age (Years):</b>		
≤ 26	15	7.5
26 – 35	41	20.5
36 – 45	67	33.5
46 – 55	54	27
> 55	23	11.5
Total	200	100
<b>Sex:</b>		
Male	39	19.5
Female	161	80.5
Total	200	100
<b>Marital Status:</b>		
Single	20	10
Married	173	86.5
Widowed	5	2.5
Divorced	2	1.0
Total	200	100
<b>Level of education:</b>		
No formal education	59	29.5
Primary education	35	17.5
Secondary education	29.5	14.75
Tertiary education	17.5	8.75
Total	200	100

Table 2: Category of Sellers in the Study Area

Category of seller	Frequency	Percentage
Producer/sellers	10	5
Wholesalers	29	14.5
Wholesaler/retailers	47	23.5
Retailers	114	57
Total	200	100

hence high level of concentration. This is a reflection of inefficiency in the market structure for poultry egg in the study area.

**Estimated production function:** The summary of the estimated production function postulated for poultry egg marketers in the study area is presented in Table 5. The Cobb-Douglas functional form was selected as the lead equation for having the highest value of the coefficient of multiple determination ( $R^2$ ). The estimated  $R^2$  shows that 67.1% in the variation of the sales revenue of respondents was explained by the explanatory variables. The coefficients of the explanatory variables i.e. cost of purchase ( $X_2$ ), cost of storage ( $X_3$ ), cost of transportation ( $X_4$ ) and marketing experience ( $X_5$ ) had positive signs except labour ( $X_1$ ) which had negative sign. The coefficients with positive signs indicate that an increase in the level of these variables would lead to an increase in the sales revenue of respondents *ceteris paribus*. The coefficient of labour that had negative sign implied

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Table 3: Costs and Returns of Respondents

Items	Amount (₦)	% of TC	% of Total Sales Revenue
Cost of purchase	4,146,805	95.83	80.3
Transportation cost	59,716	1.38	1.16
Storage cost	9,087	0.21	0.18
Cost of labour	101,258	2.34	1.96
Miscellaneous	3,029	0.07	0.06
Depreciation	7,356	0.17	0.14
Total Variable Cost (TVC)	4,319,895	99.83	83.65
Total Cost (TC)	4,327,251	100	83.79
Total Revenue	5,164,400		
Total variable cost/seller	21,599.48		
Total cost/seller	21,636.26		
Total Revenue/seller	25,822		
Gross margin/seller	4,222.55		
Net revenue/seller	4,185.75		

Table 4: Computation of Gini coefficient for Poultry Egg Sellers in South-Western Nigeria

Income (sales) (₦)	Number of sellers (freq.)	Percentage of sellers (X)	Cumulative frequency	Cumulative percentage of sellers	Total sales (₦)	Percentage of total sales (Y)	XY
≤ 10,000	52	26	52	26	4,164,595	19.35	0.05031
10,001 - 20,000	48	24	100	50	490,320	9.49	0.02278
20,001 - 30,000		155	131	65.5	623,875	12.08	0.01872
30,001 - 40,000	31	13.0	157	78.5	785,980	15.23	0.01980
40,001 - 50,000		8.0	173	86.5	659,200	12.76	0.01021
50,001 - 60,000	26	5.5	184	92	551,650	10.68	0.00059
60,001 - 70,000		4.5	193	96.5	542,250	10.50	0.00047
70,001 - 80,000	16	2.5	198	99	350,500	6.79	0.00017
> 80,000		1.0	200	100	161,120	3.12	0.00003
	11						
	9						
	5						

Mean value of sales = ₦25822. Gini Coefficient =  $1 - \sum XY = 1 - 0.12308 = 0.87692$

Table 5: Estimates of the Production Function

Variables	Functional Form					
	Linear		Cobb-Douglas		Semilog	
Constant	1045.690	(3755.221)	6.430	(2.534)	-1224.191	(3548.270)
Labour ( $X_1$ )	0.41322	(0.2585)	-0.118	(0.211)	8546.881	(4694.172)
Cost of Purchase ( $X_2$ )	180.402	(796.41)	*0.378	(0.193)	*7373.714	(2200.790)
Cost of Storage ( $X_3$ )	-367.891	(1398.471)	*0.451	(0.066)	-2647.681	(6788.433)
Cost of Transportation ( $X_4$ )	130.120	(57.860)	0.288	(0.179)	2140.620	(1291.86)
Marketing experience ( $X_5$ )	748.212	(679.141)	*0.205	(0.078)	985.460	(8464.212)
$R^2$	0.644		0.671		0.523	
$R^2$	0.582		0.627		0.456	
F-value	29.14		23.72		19.880	

\*Estimates significant at 5% level. Figures in parenthesis are standard errors.

that an increase in this input would lead to a decrease in the sales revenue of respondents.

**Conclusion:** The study evaluated poultry egg marketing in South-Western Nigeria. The study revealed that the egg market is dominated (i.e. 88.95%) by young people whose age ranged between 26 years and 55 years. The females accounted for 80.5% of the marketers. The finding also showed that only 10% of the respondents

were single and a high percentage (i.e. 70.5%) were literates. Analysis revealed that 67% of the respondents were retailers while only 10% were producers/sellers. The result also showed that an average marketer incurred a total variable cost of ₦21599.48 per month but earned an average revenue of ₦25822 over the same period indicating a gross margin of ₦4222.55 per month. The Gini coefficient of 0.87692 obtained in this study suggest a high level of concentration in the market

for egg. The hypothesized regressors (i.e. labour, cost of purchase, cost of transportation, cost of storage and marketing experience) explained about 67.1% of the variability of sales revenue of respondents. Conclusively one can say without mincing words that egg marketing can be a viable strategy to alleviate poverty as small capital outlay is required to start the business.

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