

Analysis of the Effect of Economic Variables on the Profitability of Yam Marketers in Kogi State, Nigeria

By

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ABSTRACT

The study analysed the effects of economic variables on the profitability of yam marketers in Kogi State, Nigeria. The study specifically described the marketing channel for yam, examined the market performance of yam, determined the effect of selected economic variables on the profitability of yam marketers, and identified constraints to yam marketing in the state. A sample size of 200 yam marketers were proportionately selected from the four agricultural zones (A, B, C and D) in the state for questionnaire administration. Data obtained from these respondents were analysed using descriptive statistics, OLS regression analysis and mean score from a three point Likert type of scale. Results showed that yam marketing in the state had decentralized distribution channel. Market in agricultural zones B and C had significant correlation coefficient in their marketing performance. Transportation cost, rent/levies/commission, and quantity of yam purchased influenced yam marketers' profitability at 5% level. Furthermore, yam marketers in the state were constrained with inadequate market infrastructure, lack of uniform measure, long chain of distribution, and seasonality of the product. It is recommended that government should provide adequate transportation facilities and provision of extension services on marketing system and information to rural marketers.

Keywords: Marketing, Variables, Exponential, Performance, Channels

INTRODUCTION

Yam, a tropical crop in the genus *Dioscorea*, has as many as 600 species out of which six are economically important staple species. These are: *Dioscorea rotundata* (white guinea yam), *Dioscorea alata* (Water yam), *Dioscorea Cayensis* (yellow yam), *Dioscorea bulbifera* (aerial yam), *Dioscorea esculanta* (Chinese yam) and *Dioscorea dumetorum* (trifoliate yam). Out of these, *Dioscorea rotundata* (white yam) and *Dioscorea alata* (water yam) are the most common species in Nigeria (Acquah *et al.* 2007). According to Food and Agricultural Organisation (FAO, 2002), yam is one of Nigeria's leading root crops, both in terms of land under cultivation, the volume and value of production.

In 2005, FAO reported that Nigeria produces about 66.6% (26.6 million metric tons) of total world's yam production, with Ghana producing 9.8% (3.9 million metric tons) every year. Yam tubers are the consumable product of yam crop, and the tubers are sources of carbohydrate. The tubers can be prepared for consumption by boiling and eating with stew, roasted and eating with stew, boiling and pounding and eaten with stew, as pottage, yam balls, peeled, sliced and fried into yam chips (Opeke 2006).

Yam production in Nigeria has witnessed increased output yet has not been able to meet the demand of the people (FAO, 2002). Oyaide (2002) observed that this insufficiency is as a result of an increase in the Nigeria population. He noted that the growth rate of the Nigerian population is 4.3 percent as against the agricultural growth rate of 3.2 percent. So, the gap between domestic supply and demand is still wide but in favour of demand.

Yam marketers constitute an overwhelming population of those who are involved in agricultural produce marketing. According to Onyeabor (2009), yam marketing depicts a picture of a process of demand and motivation of sellers to distribute food items unto ultimate consumers at a profit. Olayemi (2004) observed that yam marketing is a very important but neglected aspect of agricultural development. He noted that more emphasis is usually placed by government on policies to increase food production with little or no consideration on how to distribute the food produced efficiently and in a manner that will enhance increased productivity and profitability.

The study was designed to analyse the effects of economic variables on the profitability of yam marketers in Kogi State, Nigeria. Precisely, the study described the marketing channel for yam, examined the performance of yam market, determined the effect of selected economic variables on the profitability of yam marketers, and identified constraints to yam marketing in the study area.

LITERATURE REVIEW

There are approximately 200 different varieties of yam with flesh colours varying from white to ivory to yellow to purple while their thick skin comes in white, pink or brownish-black. Their shape is long and cylindrical (oftentimes having offshoots referred to as "toes") while their exterior texture is rough and scaly. Moalic *et al* (2001) reported that although yam tubers are available throughout the year their season runs from October through December when they are at their best.

The nutritional value of yam in diet is remarkable. Yam contains a higher value in protein (2.4%) and substantial amount of vitamins (Thiamine, Riboflavin and Ascorbic acid) and some other minerals like calcium, phosphorus, Vitamins and

iron than any other common tuber crop (Oitolaiye and Hamzat, 1999 and Oyenuga, 1968). It is also comparable to any starchy root crop in energy and the fleshy tuber is one of the main sources of carbohydrate in the diet of many Nigerians. CGIAR (1996), further reported that the protein, phosphorus and potassium content of yam is considerably high than in sweet potatoes though the latter is richer in Vitamin A and C. Yam is a preferred food and a food security crop in some sub-Saharan African countries. Yam could be eaten as boiled yam or fried in oil. It can also be processed into yam flour or pounded yam. In many yam producing areas of Nigeria, yam is "food and food is yam" (Babaleye, 2003).

Kohls and Downey (2002) described agricultural marketing as "the performance of all business activities involved in the flow of agricultural goods and services from the point of initial production to the point where they are in the hands of customers. Abbot and Makehan (2000) described agricultural marketing, as including the selling to farmers of supplies needed for production. These include fertilizers, pesticides other agricultural chemicals, livestock feeds, farm machinery tools and equipment. Adegeye and Dittoh (2005) pointed out that marketing is concerned with all stages of operation which aid the movement of commodities from the farms to the consumers and this include: assemblage of goods, storage, transportation, processing, grading of all these activities. According to them, agricultural marketing also involves the supply of raw materials to processing industries and the marketing of processed products including an assessment of demand as well as related to agricultural marketing.

Profit is the excess of revenue over cost. Profit making is the major goal of any business because its realization leads to the attainment of other goals. Marketing profits are measured as net marketing contribution (NMC) (Ehirim *et al.*, 2003). Net marketing contribution is composed of three major components: sales, percent gross margin and marketing & sales expenses (M&SE). Marketing not only influences net profit but also affect investment levels (Farris *et al* 2010). According to Kohls and Uhl (1990), profits vary depending on the risk of business and the competitive nature of its markets.

METHODOLOGY

The study was carried out in Kogi State, North Central, Nigeria. Kogi State is located on latitude 6°30'N and 8°48'N and longitude 5°23'E and 7°48'E. The major occupations of the people are farming, civil service and trading among others. Kogi State has a total land Area of 29, 833km² (11,518.659 square miles), population estimate is 3,595,789 (Federal Republic of Nigeria 2007). Kogi State has two seasons, wet and dry seasons. The wet season begins in March and ends in October and the dry season spans between November and March. The annual rainfall is between 106mm and 1524mm while the mean daily temperature ranges between 24° centigrade and 27° centigrade. There is a wide stretch of arable land for farming,

good grazing ground for livestock and large bodies of water for fishing. Cash crops commonly grown in commercial quantities include yam, cassava, rice, maize, beniseed (sesame), guinea corn, cocoa, coffee, cashew and oil palm. About 381,000 hectares of the total land area of Kogi State is under forest cover. The resources are very valuable for construction and furniture industries (Agricultural Development Project 2014).

One Local Government Area (LGA) was purposively selected from each of the four agricultural zones (A, B, C and D) in the state. The LGAs were selected due to their high level of involvement in yam marketing. One major market was selected from each LGA. The sampling procedure is shown below:

Table 1: Distribution of Sample Size

LGAs Selected	Sample Frame	Sample Size	Percentage
Kabba /Bunu	3313	24	12
Dekina	12895	94	47
Ajaokuta	1897	14	7
Ofu	9316	68	34
Total	2,7421	200	100

Questionnaire was administered to the sampled respondents for data collection. Data obtained from the respondents were analysed using descriptive statistics, Ordinary Least Square (OLS) multiple regression model and mean score from a three point Likert type of scale.

OLS Multiple Regression Model

This model was used to determine the effect of economic variables on profitability of yam marketers. The model for the multiple regression is specified thus;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e_i$$

Where: Y = Profitability (in naira)
 X_1 = Transportation cost (in naira)
 X_2 = Quantity of yam purchase (in kilogram)
 X_3 = Educational level of the marketers (in years)
 X_4 = Cost of labour for loading/ offloading (in naira)

$$\bar{X} = \frac{\sum FX}{N}$$

Where: \bar{X} = mean response, \sum = summation, F = number of respondents choosing a particular scale point, X = numerical value of the scale point and N = total number of respondents.

$$\frac{\text{Mean Score}}{\text{Scale Point}} \times \frac{100}{1}$$

RESULTS AND DISCUSSION

Channel of Yam Marketing

The channel of yam marketing in the study area is shown in Figure 1 and Table 1

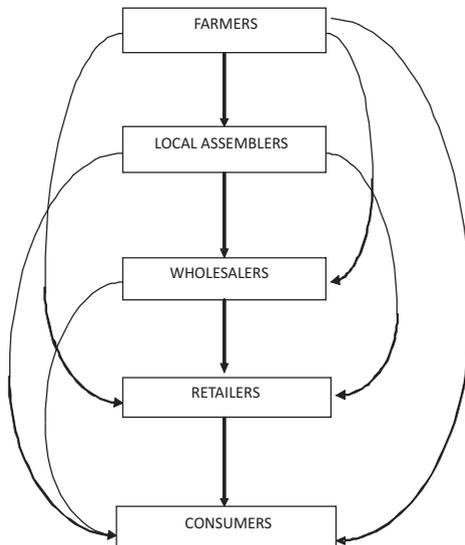


Figure 1: Marketing Channel for Yam in Kogi State, Nigeria

Source: Field Survey, 2014.

Figure 1 shows that apart from the normal flowing sequence of yam from farmers to assemblers to wholesalers, to retailers and consumers, other interaction existed where the wholesalers and the retailers form an important group of intermediaries handling yam directly from the farmers.

Table 1: Categories of Yam Marketers

Category	Frequency	Percentage
Farmers	75	37.50
Local assemblers	46	23.00
Wholesalers	60	30.00
Retailers	19	9.50
Total	200	100

Source: Field Survey, 2014

Table 1 indicated that 37.50 percent of the yam marketers purchased yam from the farmers directly, 23 percent from local assemblers, 30 percent from wholesalers while only 9 percent purchased yam from the retailers. Also the handling of yam by retailers directly from the assembler existed in marketing of yam in the study area. This is an evidence of a decentralized distribution channel. This finding agrees with Ilori (2002) in a similar study.

Yam Market Performance

Market performance is the assessment of how well the process of marketing is carried out and how successfully its aims are accomplished. Olayemi (2004) considered the two major points in market performance to include market integration and average prices.

The essence of market integration is to determine whether there is a significant relationship between prices in two (2) markets. That is, whether there is a relationship between the prices per tuber in the various markets. Result in Table 2 indicated that only markets in zone B and zone C correlation coefficient was significant with 0.447. This implies that prices in the two markets were co-integrated while correlation coefficients between markets in other zones were not co-integrated. This could be as a result of variation in the purchase and selling price in both markets.

Table 2: Distribution According to Market Integration

Market Integration	Correlation Coefficient
Markets in Zone A and Zone B	0.035
Markets in Zone A and Zone C	0.018
Markets in Zone A and Zone D	0.123
Markets in Zone B and Zone C	0.447
Markets in Zone B and Zone D	0.052
Markets in Zone C and Zone D	0.091

Source: Field Survey, 2014

Average prices (total cost and total revenue) at different market in the zones for 50 tubers are presented in Table 3. The result shows that all yam marketers in Kogi state sell their product at prices more than the cost price. Even though the market in zone A tends to sell at higher prices, the result of the survey revealed that they do not earn much profit than markets in other zones. This could be attributed to higher cost incurred in the marketing process.

Table 3: Average Price Per 50 tubers at Different Levels [₦]

Market participation	Markets/Zones	Prices [₦] 50 tubers		
		Total Revenue(TR)	Total Cost (TC)	Profit(TR-TC)
1. Local assembler	Market in Zone A	12500	9000	3500
	Market in Zone B	7500	6000	1500
	Market in Zone C	9500	7000	2500
	Market in Zone D	10000	8000	2000
2. Wholesaler	Market in Zone A	15000	12000	3000
	Market in Zone B	11000	8000	3000
	Market in Zone C	12500	9000	3500
	Market in Zone D	11500	9000	2500
3. Retailer	Market in Zone A	17500	15000	2500
	Market in Zone B	13000	10500	2500
	Market in Zone C	14000	11500	2500
	Market in Zone D	14300	11000	3300

Source: Field Survey, 2014

Effect of Economic Variables on Yam Marketers' Profit

Output of the OLS analysis on the effect of economic variables on yam marketers' profit is presented in Table 4.

Out of the (7) seven variables included in the model, four (Transportation cost X_1 , quantity of yam purchase X_2 , educational level X_3 and rent/levies/commission charge X_5) were statistically significant. This indicates that these variables have influence on yam marketer's profit.

Transportation cost was found to be positively related to yam marketer's profitability and significant at 5 percent. This indicates that holding other variables constant and increasing transportation cost will lead to increase in yam marketer's profit. This agrees with Hail (2009) who reported that cost of transportation had important influence upon market prices and income received by marketers.

The coefficient for quantity of yam purchase was positive and statistically significant at 1 percent level. This is an indication that an increase in the quantity of yam purchased, holding all other variables constant will lead to an increase in yam marketer's profit. The result on educational level shows that the variable had direct relationship with marketers' profit and significant at 10 percent, implying that an increase in educational level of the yam marketers holding other variables constant will lead to an increase in yam marketer's profitability. This finding agrees with Bzugu *et al.* (2005), that the level of education influenced yam marketer's profit.

Table 4 also indicated that rent/levies/communication charges showed a negative coefficient and was statistically significant at 5 percent level, implying that an increase in rent/levies/communication charge will lead to a decrease in yam marketers' profit, while decrease in rent/levies/communication charges holding all other variables constant will lead to increase in yam marketers' profit.

Table 4: OLS Regression Output on the Effect of Economic Variables on Yam Marketers' Profit

Variables	Linear	Double log	Semi log	Exponential
Constant	13720.61 (1.20)	4.552937 (4.04)*	-94783.53 (-1.95)***	9.482452 (28.08)*
Transportation cost	0.3718393 (0.27)	-0.0045777 (-1.04)	-289.8671 (-1.52)	0.0000987 (2.38)**
Quantity of yam purchased	22.93777 (12.87)*	0.816873 (17.74)*	23285.32 (11.69)*	0.0007259 (13.78)*
Educational level	1522.194 (1.41)	0.0569724 (1.33)	1322.88 [0.71]	0.0528832 (1.66)***
Cost of labour, loading/offloading	-0.2810637 (-1.31)	0.009163 (1.57)	17.816611 (0.07)	-8.54e-06 (-1.34)
Rent/levies/commission charges	-0.3214096 (-3.07)*	-0.0067818 (-2.93)*	-317.11 (-3.17)	-6.50e-06 (2.10)**
Selling price	-27.88676 (-0.37)	0.0244035 (0.12)	-5054.706 (-0.57)	-0.0012678 (-0.56)
Communication charges	-96.8565 (-0.10)	-0.0543257 (-1.15)	-3672.869 (-1.95)***	0.0243294 (0.89)
F-ratio 7, 192	38.35 (0.0000)	103.43 (0.0000)	42.37 (0.0000)	47.94 (0.0000)
R ²	0.5830	0.7904	0.6070	0.6361

Source: Computed from Field Survey Data, 2014.

Notes: Figures in parenthesis are t-values *, **, and *** denote 1, 5, 10 percent level of significance respectively.

Constraints to Yam Marketing

Major constraints to yam marketing identified by the respondents are presented in Table 5. Inadequate market infrastructure also ranked moderately severe with a mean score of 2.31 and a proportion of 77 percent of the respondents, lack of uniform measurement was ranked as moderate constraints with a mean score of 2.15 and a proportion of 71.5 percent. The result agreed with Adegeye and Dittoh (2005) that most agricultural product is seasonal while the demand is stable throughout the year. This could be attributed to the fact that prices of most products do not remain constant following the chain of distribution in each season since they follow some regular seasonal pattern.

Table 5: A 3-point Likert type of scale on the constraints to yam marketing

Constraints	HS	MS	NS	Mean score	Proportion (%)
Inadequate market infrastructure	30	78	92	2.31	77.0
Lack of uniform measurement	42	87	71	2.15	71.5
Seasonality and perishability of the product	38	109	53	2.08	69.2
Poor transportation	54	111	35	1.91	63.5
Inadequate storage and warehousing facilities	78	80	42	1.82	60.7
Inadequate funding	113	71	16	1.52	50.5

Field Survey, 2014; HS= Highly Severe, MS= Moderately Severe, NS= Not Severe

Seasonality and perishability of the product had a mean score of 2.1 with a proportion of 69.2 percent which was moderately severe. This agrees with Okorie (2001) that there is loss of total rational yam production due to perishability nature of the product. The implication may be due to seasonal nature of the product.

Poor transportation ranked moderately severe with a mean score of 1.91 and proportion of 63.5 percent. According to Osuji (2010), road networks as well deplorable state of Nigeria roads hinder food crop distribution. Hail (2009) also asserted that costs of transportation had important influence upon market prices and income received by African marketers. The reason could be inadequacy of

vehicles and majority of feeder roads are not motorable during the rainy season resulting in high cost of transport charged. More so, instability of the price of Petroleum Motor Spirit-PMS (petrol) in Nigeria could lead to increased cost of transporting yam.

Conclusion and Recommendations

The marketing channel for yam in the study area is the decentralized one involving a fairly large number of traders effecting the distribution of yam from the producer to the final consumer. Transportation cost, quantity of yam purchase, educational level and rent/levies/commission charges significantly influenced the profit of yam marketers.

Based on the findings, the following recommendations were made:

1. There should be provision for adequate transportation facilities. Government should create conducive environment that would encourage private vehicle owners to set up commercial transportation services. Duties on new vehicles and spare parts should be reduced to make them affordable to intending transporters.
2. Taking into cognizance the role of education in yam marketers' profitability, government at all levels should organize extension services to educate marketers on marketing system. This will enhance their knowledge with its multiplier effect on increased profit.
3. Processing, grading, packaging, efficient handling facilities should be made available to both the farmers, marketers and consumer of agricultural food product in order to avoid post-harvest losses which will in turn improve farmers/marketers income, increase his purchasing power and result in food security.
4. There should be uniform unit of measurement, large market size and proper dissemination of duty by the security agencies for effective long chain of distribution.
5. The yam marketers should take the trade union more serious, as this will make the trade to have one voice and unity, which will enhance effective decision making.

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