

**TRADE ENHANCEMENT CHARACTERISTICS OF DESSERT BANANA FRUITS AND ESTIMATES OF TRANSACTION COSTS IN OKIGWE METROPOLIS, IMO STATE NIGERIA**

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**Abstract**

*This study on trade enhancement Characteristics of sweet (dessert) banana fruit and estimation of transaction costs was conducted in Okigwe Metropolis of Imo State, Nigeria. Stratified random sampling technique was adopted in selecting 80 respondents comprising 40 dessert banana traders (panelists) and 40 dessert banana consumers. Monthly trade data was collected from the respondents using pretested semi-structured questionnaire during dry season (November-April) and rain season (May-October) for the year 2012. Data collected were subjected to descriptive statistical analysis; with transaction costs estimated as ex ante and ex post components. Hedonic pricing regression model was used in determining buyer socioeconomic/banana attributes that influenced willingness to pay price. Fruit characteristics that significantly enhanced trade of sweet banana in descending order were taste (3.83), fruit variety (3.57), and fruit skin colour (3.50). Other significant factors were level of ripeness (3.49), availability in off-season (3.46), fruit size (3.20) and cleanliness (3.20). Mean ex-ante transaction costs for sweet banana was ₦77, 800.00/trader and its mean ex-post transaction cost was ₦25,080.00/trader. We recommended that traders should take advantage of Global Mobile System (GSM) to overcome information barriers on banana trading. Government and health institutions should intensify consumer safety education, and encourage horticultural unions to heighten postharvest monitoring of stored and displayed dessert banana fruits to enforce observance of ripening standards.*

**Key Words:** *Information cost, Bargaining cost, Induced ripening, Exchange.*

**1. Introduction**

Dessert or sweet species of Banana fruit (*Musa sapientum L*) is a native of Southeast Asia that has remained one great natural source of vitamins and minerals grown and marketed in Nigeria. Individuals in households and travelers buy and consume this fruit at homes and while on journeys. It is a reliable hunger breaking food for persons traveling in and out of urban areas. Not all available dessert bananas attract equal willingness of consumers to pay for them. Price changes affect buyer willingness to buy, purchasing power and quantity demanded of foods, except such food is a necessity that

must be bought, no matter the price (Brunso *et al.*, 2002). Most times a consumers' willingness to pay for food or an agricultural product is influenced by information on the product available to him or her, use knowledge and attitude of other consumers towards such product (Birner, 2006; Aryal, 2009, Okeke *et al.*, 2008). There are also many health benefits linked with consumption of banana which medical science has found to be rich in iron, fibre, vitamins, and minerals. Like most fruits, there are some preferred quality characteristics of dessert bananas that attract consumers to price for them (Poole, *et al.*, 2000). Ripe banana depending on its variety shows varied skin tones including yellow, reddish brown, pink, purple or black. Available sweet banana include types referred to as 'lady's finger', and 'apple banana'.

Prices which are placed on fruits displayed for sale in the metropolis depend on purchase cost and on market transaction costs. There is a long history and prevalence of transaction cost such that its definition has been so difficult to agree on. That notwithstanding, there are today, two lines of definitions prevailing in literature. One of the lines defines transaction costs as only occurring when a market transaction takes place while the other defines it as occurring whenever any property right is established or requires protection (Allen & Lueck, 1993). We chose to adopt the former in this work to recognize that transaction costs are the costs associated with the time and effort needed to search out, negotiate and consummate an exchange (Arnold, 2001). The fact that parties to exchanges must find one another, communicate and exchange information, the necessity to inspect and measure goods to be transferred, bargain, appoint agents and transfer title is there at expense of some resource (cost). These costs are not all observable as some of them are hidden but must be associated with the exchange. Holloway *et al.*, (2000) described them as costs that guarantee access to and constitute barriers to participation in the market. Depending on who provides these services, transaction costs can take one of two forms, inputs or resources including time by buyer and/or a seller or a margin between the buying and selling price of a commodity in a given market (Stavins, 1995). Thus information costs, measurement/bargaining costs, and costs of monitoring and enforcing any associated trade rules constitute transaction costs in market economies. Reducing these costs will greatly enhance volume of exchange between a buyer and a seller.

Obtaining information about bananas for trade and about whom the buyers and sellers are is therefore not costless as most times these stakeholders are separated by distances and ignorance. Most times also, this cost of obtaining information is so high that Government may be attracted to respond by introducing measures, rules, weights and standards that regulate marketing operations. These on their own are not without costs either. In effect, issues of transaction costs though sometimes apparently latent are very vital if trading is to be efficient.

Effective buying and selling of non-durable farm products like dessert banana therefore requires that associated transaction costs remained low relative to the value of transaction (Birner, 2006).

To measure magnitude of these costs and determine significant attributes that enhance trade on sweet banana, this study specifically set out to (i) rank characteristics of dessert banana fruits that enhanced its trade; (ii) determine socioeconomic/banana characteristics that influence consumer willingness to pay for the fruits; and (iii) estimate transaction costs incurred by traders on dessert banana fruits in a year in Okigwe urban areas of Imo State, Nigeria.

## **2. Methodology**

### **2.1 Study Area**

This study was conducted in Okigwe urban of Imo State Nigeria. This city located between Enugu and Umuahia along Enugu-Port Harcourt Expressway has grown into a transit cattle market in the eastern heartland of Nigeria, plays host to many visitors, traders and students and is a major commercial city in Imo State Nigeria. Okigwe is geographically located between Longitudes 08° 07' E and 09° 08' E of the Greenwich Meridian and Latitudes 05° 56' N and 06° 02' N of the Equator. The Nigerian 2006 population census enumerated Okigwe local Government Area (LGA) with a population of 132,237 inhabitants made up of 69,232 males and 63,005 females (NBS, 2006). The metropolis harbours half of this population with immigrants from Enugu and Abia States and shares boundary with seven communities namely: Umulolo, Abumulolo, Ihube, Umuokpara, Umuka, Opeh and Umuzegem. Inhabitants of these communities surrounding the metropolis are mainly farmers practicing terrace cultivation on the hilly farmlands and growing horticultural crops like, plantain, bananas, pepper, African oil bean, pineapples, guavas, citrus, cucumber, and vegetables. Banana and Plantains are grown more in Opeh, Umuka and Umuokpara communities that are endowed with relatively better fertile soils. Transportation in the metropolis is by foot, bicycles, motorcycles, tricycles, cars and buses which convey human and non-human materials including farm products.

### **2.2 Sampling Technique and Data Collection**

Participants in this study were drawn from strata of banana traders and consumers. The traders were stratified into wholesalers and retailers based on their volume of trade and size of wares. The wholesalers were traders that bought up to ten tons of cut banana bunches at a time and the retailers were traders that bought bunches of relatively less quantity from them (wholesalers). These two groups were subjected to random sampling using their list compiled during reconnaissance visit of the area. From this list, forty (40) of the marketers made up of ten (10) wholesalers and thirty (30) retailers (located at Eke Okigwe market, beside premises of Federal Government College Okigwe and two Express road Junction Motor parks) were involved. Three quarterly data were collected using semi-structured questionnaire administered during the rain and dry seasons on their own. Another set of respondents, forty (40) consumers that came to buy sweet banana from the traders each time data was collected during the seasons was sampled. This gave a sample of eighty (80) respondents consisting of forty banana traders (in the panel) and forty banana consumers who came to make banana purchases. Each of these consumers (buyers) was approached and given at least one finger of the banana variety (the type he/she purchased) for an on-the-spot tasting. They were given this free of charge and pleaded with to eat it before being administered with the questionnaire. This enabled consumers to rank the banana according to its characteristics including taste. Data collected included socioeconomic characteristics of the sellers and buyers such as age, gender, marital status, skin colour of banana, fruit size, fruit length, cluster size, taste, ripeness, softness, and presence of surface blemish, cleanliness of fruit, variety, and health safety.

<b>Variables</b>	<b>Nominal/Likert scoring</b>
<b>Skin colour</b>	1= Green 2= Yellow 3= Orange 4 = Red
<b>Fruit size</b>	1= Small (3.0 – 3.5 cm) 2= Medium (3.6 – 3.7 cm) 3= Large ( $\geq$ 3.8)
<b>Fruit Length</b>	1= Short (< 15 cm) 2= Medium (16.0 – 19.0cm) 3= Long ( $\geq$ 20.0cm)
<b>Cluster Size</b>	1=Small (1-10 fingers) 2= Medium (11 – 14 fingers) 3= Large ( $\geq$ 15 fingers)
<b>Taste</b>	0= Undecided 1=Not sweet 2= Moderately 3= Sweet 4= Very Sweet
<b>Ripeness</b>	0= Undecided 1= Not ripe 2= Moderately ripe 3= Ripe 4= Over ripped
<b>Softness</b>	0= Undecided 1= Not soft 2= Moderately soft 3= Soft 4= Very soft
<b>Surface Blemish</b>	0= Undecided 1= No blemish 2=Trace blemish 3=Medium blemish 4= Severe blemish
<b>Cleanliness of Fruit</b>	0= Undecided 1= Dirty 2= Moderately clean 3= Clean 4= Very clean
<b>Fruit Variety</b>	1= Parany 2= Red Cavendish 3= Grosz Michael
<b>Health/Safety</b>	1= Induced ripening 2= Not thoroughly ripped 3= Rotten.

### **2.3 Analytical Technique**

Data were subjected to descriptive and inferential statistical analyses including use of frequency distribution tables mean and hedonic regression analysis. The hedonic regression essentially compared fruit characteristics along with the price and compared them between average situations. Only banana characteristics which were valued by consumers as determined during the reconnaissance visit were included in the model. Hedonic pricing regression model estimates price as a function of product characteristics and as used by Musa (2003) was adopted for this study. This model was specified as follows:

$$Pb = \sum_{j=1}^m \beta X_{ij} + u_{it} \quad (1)$$

Thus:

$$\text{Log}(Pb_{ij}) = B_0 + X_{ij}\beta + u_{it} \quad (2)$$

$$\text{Assumes that: } E [u_{it}|x_{it}] = 0 \quad (3)$$

Pb = Bunch Price of banana fruit;

X<sub>ij</sub> = Vector of quality (characteristics) of banana fruits;

β<sub>ij</sub> = Implicit price of characteristics of banana fruit;

Coding key for banana quality characteristics as used were:

The X<sub>ij</sub>s are:

X<sub>1</sub> = Colour of skin of banana fruits;

X<sub>2</sub> = Size of banana cluster (number);

X<sub>3</sub> = Level of ripeness of banana fruits;

X<sub>4</sub> = Surface blemish on fruit skin;

X<sub>5</sub> = Cleanliness of the fruits;

X<sub>6</sub> = Fruit variety;

X<sub>7</sub> = Distance of fruit Source (km);

X<sub>8</sub> = Seasonality (Rain season =1; Dry season =2);

X<sub>9</sub> = Variety of banana fruits;

X<sub>10</sub> = Length of banana fruit (cm);

X<sub>11</sub> = Health safety;

U<sub>i</sub> = Error term.

## **3. Results and Discussions**

### **3.1 Socioeconomic Characteristics**

The socioeconomic characteristics of the respondents (marketers and consumers) are summarized in Table 1. The Table revealed that females more than males were involved both in the marketing and in the consumption of dessert bananas in Okigwe metropolis. The proportion of females involved in the marketing of banana was about five times (82.5%) greater than that of the males (17.5%) involved in the business in the study area. Equally, more females came buying ripped banana for consumption (65.0%) as against 35.0% male consumers of the product. These differences notwithstanding,

banana was food for both males and females across the ages. Amongst the traders, the table showed that more married persons (67.5%) than the singles (23.5%) were involved. The marketers included children hawkers (< 18 years) (10.0%), persons aged between 18 and 54 years- a cumulative 72.5%, and persons aged at most 70 years (17.5%).The wholesalers bought these products from communities in the neighborhood of the metropolis especially from Opeh, Umuka and Umuokpara communities.

**Table 1. Socioeconomic Characteristics of Banana Marketers and Consumers in Okigwe Imo State Nigeria, 2012**

Variables	Marketers (n=40)		Consumers (n=40)	
	Frequency	Percent (%)	Frequency	Percent (%)
<b>Gender :</b>				
Male	7	17.5	14	35.0
Female	33	82.5	26	65.0
<b>Marital Status:</b>				
Married	27	67.5	18	45.0
Single	13	32.5	22	55.0
<b>Age (Years):</b>				
< 18	4	10.0	7	17.5
18 - 35	17	42.5	13	32.5
36 – 54	12	30.0	16	40.0
55 – 70	7	17.5	2	5.0
>70	nil	nil	2	5.0

**Source:** Field Survey, 2012

### 3.2 Trade Enhancing Characteristics of Dessert Banana Fruit

Table 2.0 showed the ranking of consumers perceived characteristics of dessert banana that appealed to them. The consumption enhancing characteristics of banana elicited from consumers included fruit skin colour (green, yellow, yellowish orange, and orange red), fruit size, fruit cluster size, taste, variety, level of ripeness of fruit, blemish on fruit skin, cleanliness, availability in off-season.

**Table 2.0 Distribution of Trade Enhancing Characteristics of Banana as Perceived by Consumers in Okigwe Metropolis, 2012**

Fruit Characteristics	Mean Score	Ranking
Skin colour	3.50	3
Size	3.20	6.5
Cluster size	2.15	9
Taste	3.83	1
Variety	3.57	2
Seasonality	3.46	5
Level of ripeness	3.49	4
Blemish on fruit skin	2.90	8
Cleanliness	3.20	6.5

**Source:** Field Survey, 2012

According to the Table 2.0, fruit taste (3.83), was ranked first and fruit cluster size was ranked 9<sup>th</sup> and last. Fruit variety (3.57), skin colour (3.50), level of ripeness (3.49), availability at off-season (3.46), fruit size (3.20), cleanliness (3.20) scored above threshold score of 3.00 and stood as factors regarded much by banana consumers in the study area. Two other factors, blemish on fruit skin (2.90), and cluster size (2.90) scored below the threshold and were the least considered factors by banana consumers in Okigwe metropolis. Banana traders should therefore watch out for these attributes in stocking their stalls.

### 3.3 Banana Characteristics/Socioeconomics that Influence Consumer Willingness to Pay in Okigwe Imo State, Nigeria

Fruit and socioeconomic characteristics that influenced consumers' willingness to pay for traded sweet banana were analyzed with Hedonic regression model and estimates shown in Table 3.0.

**Table 3.0 Determinants of Consumers Willingness to Pay for Dessert Banana in Okigwe Metropolis, 2012**

Variable	Coefficient	t-ratio
Constant	10892.15***	4.070
Fruit Skin Colour	0.362***	0.406
Fruit size	0.223	0.049
Fruit Taste	0.371***	3.407
Fruit Variety	0.293**	2.743
Level of ripeness	-0.382***	-3.641
Cluster size	0.373***	3.06
Cleanliness	0.231**	2.822
Surface blemish	1.107	0.074
Fruit source distance to market	2.638	1.328
Seasonality	1.012	1.132
Fruit length	0.528	2.465
Health safety	-0.431**	-2.764
<b>Pseudo R-Squared</b>	0.881	
<b>F-Ratio</b>	5.915***	

**Source: Field Survey, 2012**

\*\*Significant at 5.0%; \*\*\* Significant 1.0%; Dependent Variable= Bunch price

The table showed that four factors significantly and very highly ( $P < 0.01$ ) influenced consumers' willingness in paying the market determined prices on sweet banana fruits in the area. These were the skin colour, taste, cluster size, and level of ripeness of the fruit. Apart from level of ripeness, these factors were signed positive meaning that the more their values, the more consumers were willing to pay for the retail prices on the dessert banana. The negative sign on the level of ripeness explain the fact consumers were less willing to pay the price on the banana fruit whenever the fruit was over ripped.

**Table 4.0 Estimated Mean Annual Transaction Costs incurred on Dessert Banana By Marketers in Okigwe Imo State, Nigeria 2012**

Transaction Cost Item*	Annual value (₦)	Annual value per marketer (₦)	Percent (%)
<b>(a) Wholesalers Ex-ante Costs: (n=10)</b>			
Information seeking (GSM recharge cards)	260,000.00	26,000.00	
Transport fares Searching/screening bananas	182,000.00	18,200.00	
Bargaining Expenses (Agency charges)	130,000.00	13,000.00	
Advance payment in contracted buying	50,000.00	5,000.00	
<b>Retailers Ex-ante costs: (n=30)</b>			
Information seeking (GSM recharge cards)	312,000.00	10,400.00	75.43
Transport fares Searching/screening bananas	156,000.00	5,200.00	
Bargaining Expenses (Agency charges)	nil	nil	
Advance payments in contracted buying	nil	nil	
<b>Sub-Total</b>	<b>1,090,000.00</b>	<b>77,800.00</b>	
<b>(b) Wholesalers Ex-post Costs (n=10)</b>			
Monitoring banana delivery (GSM recharge cards)	130,000.00	13,000.00	
Enforcement of delivery when default exists	10,000.00	1,000.00	
Security charges on delivered banana	30,800.00	3,080.00	
<b>Retailers Ex-post Costs: (n- 30)</b>			
Monitoring banana delivery (GSM recharge cards)	156,000.00	5,200.00	24.57
Enforcement of delivery when default exists	nil	nil	
Security charges on delivered banana	nil	nil	
Hawkers Permit	28,200.00	2,800.00	
<b>Sub-Total</b>	<b>355,000.00</b>	<b>25,080.00</b>	
<b>Total (a) + (b)</b>	<b>1,445,000.00</b>	<b>102,880.00</b>	

**Source:** Field survey, 2012; \* Note: These charges are not necessarily charges on the bananas but some charges on transactions for having bananas for sale.

Other factors that were significant ( $P < 0.05$ ) in determining a consumers' willingness to pay for banana prices in the area according to Table 3.0 were fruit variety, cleanliness and health safety. They were all signed positive except health safety. Consumers preferred Grosz Michael variety to others and were willing to pay the price when the displayed banana was neat, orderly displayed and clean but were scared anytime they suspected the banana on display was induced to ripe. Inducing ripening on fruits was done with chemicals such as calcium carbide, and hot ash which may have adverse health implications.

### 3.4 Transaction Costs in Dessert Banana Marketing

Table 4.0 revealed the transaction costs incurred by banana marketers in Okigwe metropolis. The *ex-ante* costs are those costs incurred in obtaining information needed to identify worthwhile transactions. Here they included costs of obtaining information about existence of ripped or matured sweet bananas and whom their owners were and which communities they existed every week a marketer was about going for purchases. These buyers networked amongst their colleagues and sometimes with their informants using the Global System of Mobile (GSM) Phones at some costs. They visited and screened the available banana, bargained with the owners and made advance payments to farmers in cases of contract buying in anticipation of delivering cut banana bunches after purchases.

Table 4.0 showed that the 40 marketers involved this study incurred a total of ₦1,445,000.00 (mean: ₦102,880.00) as transaction costs made up ₦1,090,000.00 as *ex-ante* transaction cost and ₦355,000.00 as *ex-post* component in 2012.

A further analysis of these costs showed that *ex-ante* component constituted 75.43% and *ex-post* component constituted 24.57% of the transaction costs in marketing of the dessert banana in the area. The *ex-post* transaction costs were mainly costs of recharge cards bought and used up in monitoring delivery of bought banana bunches, payments for security charges at the market place and cost of hawkers permit issued by the Local Government authority.

## 4. Conclusion

Dessert banana is traded at wholesale and retail levels in Okigwe metropolis of Imo State Nigeria. The wholesalers bought their wares from the farmers in the hinterlands and communities surrounding the metropolis. The fruit buyers networked amongst their colleagues and sometimes with their informants using the Global System of Mobile (GSM) Phones at some transaction costs. The fruit buyers visited and screened the available banana, bargained with the owners and made advance payments in cases of contract buying in anticipation of delivering cut banana bunches after purchases.

Mean *ex-ante* transaction costs for sweet banana was ₦77,800.00/trader and its mean *ex-post* transaction cost was ₦25,080.00/trader. Fruit taste was ranked first and fruit cluster size was ranked 9<sup>th</sup> and last in influencing trade on banana in the area.

Some banana fruit sellers induce their green purchases to ripen. This was considered a health risk. Four factors significantly influenced consumers' willingness in paying prices on banana fruits in the area. These were the taste, skin colour, cluster size, and level of ripeness of the fruit.

## 5. Recommendations

Recognizing and incurring transaction costs is one sure way of guaranteeing access to market and overcoming all barriers to the fruit trade. We recommended that the new

entrants be informed of this to enable them incur such costs reasonably and participate actively in banana trading with no hindrances in the area. Traders are advised to take advantage of Global Mobile System (GSM) to overcome any information barriers on banana trading. Since ripening inducement done by some traders involved using chemicals (Calcium carbide, hot ash), safety of consumers should be protected. Government and health institutions should intensify consumer safety education, and should encourage horticultural unions to intensify postharvest monitoring of stored and displayed dessert banana fruits to enforce observance of ripening standards by marketers.

## **References**

- Allen, D.W. & Leuck, D. (1993). Transaction Costs and the Design of Crop share Contracts. *Rand Journal of Economics* (24): 78 – 100.
- Arnold, R.A. (2001). *Economics*. Fifth edition California State University, San Marcos.
- Aryal, K.P. (2009). Consumers Willingness to Pay for Organic products. A Case from Kathmandu Valley.
- Birner, R. (2006). “Best Practice to Best fit”: A framework for Designing an Analysis. Pluralistic Agricultural Advisory Services Economic Analysis of Property right.
- Brunso, K. Fjord T.A. & Klaus, G.G. (2002). Consumers Food Choice and Quality Perception, The Aarhus School of Business Working Paper, No. 77, ISSN 09072101.
- Holloway, G.J., Delgado, N., Dtaad, C.F., Sand C., & Ehiu, S. (2000). Agro-Industrialization, Through Institutional Innovation, Transaction Cost, Cooperatives and Milk Market Development in East African Highlands. *Agricultural Economics* (23): 279- 288.
- Musa, S.A. (2003). Marketing of Cowpea in Nigeria: Econometric Studies of Quality Factors/Market Integration. A Ph.D Thesis submitted to Abubakar Tafawa Balewa University Bauchi Nigeria.
- National Bureau of Statistics (NBS) (2006). Legal Notice of the Publication of Breakdown of National and State Totals. Official Gazette FGP 71/52007/2,500 (OL24). [www.nigerianstat.gov.ng](http://www.nigerianstat.gov.ng)
- Okeke , E.C., Ene-Obong, H.N., Uzuegbunam ,A.O., Ozioko A.O., & Kuhnlein, H. (2008). Igbo Traditional Food System: Documentation, Uses and Research Needs. *Pakistan Journal of Nutrition* 7 (2):365-376. ISSN 1680-5194.
- Poole, N.D, Kudd, J, & Wilkin, K. (2000). Overcoming Informational Constraints: Improving Horticultural Marketing and Technical information flow to Smallholders. DFID Crop Post-Harvest Programme Project. R7151.
- Stavins, R. N. (1995). Transaction Costs and Tradable Permits. *Journal of Environmental Economics and Management*. 29:133-148.