Econometric Analysis of Characteristics Affecting Consumer Preference For Banana Fruits in Kano Metropolis, Nigeria

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Abstract: This study was carried out to determine the effect of banana fruits quality attributes on consumer preference and price in Kano metropolis, Nigeria using the Yanlemo fruits market which is a specialized, international and regional bulking market. A total of 120 retailers and 120 consumers of banana fruits were selected for the study for using random progressive and accidental sampling. Structured questionnaires, laboratory measurements of the fruits and survey forms for price and quality studies were used to elicit the necessary data. Descriptive results showed significant presence of good quality reveled that cluster size of fruits was positive and significant of $p<0.01$, weight softness and degree of ripeness of fruits was positive and significant $p<0.05$ and length (long) of fruits also positive and significant at $p<0.1$. This means that consumers are willing to pay premium price for fruits with these significant characteristics and will ask for discount if otherwise. It is therefore, recommended that breeding and research efforts should target those characteristics of banana fruits consumers showed sensitivity so as to enhance their market and economic value to farmers and marketers of banana.

Key words: Consumer preference, quality characteristics, Hedonic analysis, fruits, softness, breeding

INTRODUCTION

Banana (*Musa sapientum* L.) belongs to the Musaceae family and is said to be native to South-East Asia and represents the 4th largest staple food crop in the developing world (Rice *et al.*, 1987). In Nigeria, annual production of banana is about 120,000 metric ton with production mostly concentrated in the South Eastern, South Western and North Central regions (Oladunni *et al.*, 2006). Banana is an important nutritional, economic and industrial crop. Nutritionally, the fruit is an important source of vitamins and minerals while its softness aids digestion and bowel movement and thus promotes good health. Industrially, it can be processed into canned or bottled juice which together with the packaged fresh fruits is exported to earn foreign exchange (Rao, 2005). Product quality variable is an immensely important consideration in the marketing of any good. Fruits particularly banana, like other agricultural produce consist of a bundle of quality attributes which influence consumer's preference and price. This is because each drop variety represents a differentiated product, since it supplies a unique bundle of characteristics (Kohls and

Uhl, 1980; Edmeades, 2006). Therefore in the market, banana fruit consumers purchase a whole of fruit attributes rather than the fruits themselves and it is these attributes that influence a consumer's preference and demand. Generally in agriculture, consumer preferences are direct signals which influence the production decisions of farmers, since they are most likely to produce crops with high demand in the market while plant breeders will always strive to target and produce those crops with quality attributes that are of economic and market value to farmers.

These preferences also ensure that the right type of crops are produced, thus ensuring that agricultural resources are appropriately deployed to the best advantage. Indeed, this phenomenon of farmers reacting to the preferences of consumers is called supply response and is of great importance not only to farmers and marketers of agricultural produce but also to policy makers who plan for the peasant farmers. Most pricing policies and other intervention measures of government can be traced directly to this concept (Adegeye and Dittoh, 1985; Musa, 2003). Therefore, it is important that research efforts should be focused in this area so as to

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provide guidance for future crop improvement efforts while taking into consideration banana varieties that will be of economic and market value to farmers and also produce utility to consumers (Edmeades, 2006). In Nigeria, studies on quality characteristics of fruits particularly for banana that influence consumers preference and price are rare. Most studies have concentrated on their general marketing, especially on the structure, conduct and performance of their market. It was based on this that this study was carried out to determine the effects of characteristics of banana fruits on consumer preference and price in Kano metropolis, Nigeria. The specific objectives of the study are to:

- Identify the key banana fruit characteristics that influence preference and price in the study area
- Determine the effect of the key banana fruit characteristics on consumer's preference and price in the study area

Null hypotheses
- There is no significant presence of good quality characteristics in banana fruits sold in the study area
- There is no significant relationship between the physical quality characteristics of banana fruits and consumer preference and price

Theoretical framework: The conceptual basis for estimating consumers demand for a good's quality is Lancaster's 91966 Model of Consumption Theory which regards the properties of a good and not the good itself as the direct object of utility. This is the central focus of the Hedonic Pricing Model which stipulates that the price of a good is a linear summation of the implicit value of its attributes (Rosen, 1974; Wooldridge, 2000). Musa (2003) also argued that consumers' tastes and preferences are reflected in the market, though the price discounts and premiums they can pay for crop characteristics and not the crop themselves. Therefore, produce quality characteristics are the major stimuli that influence consumers affect, cognition and behavior and thus, their preference levels and the amount they are ready to pay or discount for any produce. This means that the management of these quality attributes is a very important aspect of effective product planning and production (Kotler and Armstrong, 1999).

Musa (2003) further pointed out the price differences a cross different units of transaction are due mainly to quality differences that can be measured in terms of the physical factors found in a good. This in effect means that the Hedonic function disaggregates transaction unit into commodity characteristics (Bowman and Ethridge, 1992; Langyintuo *et al.*, 2000). Ladd and Survannut (1976) and Edmeades (2006) have also argued that because the attribute of a good affects the price, the attribute of goods

traded in markets are integral part of market price determination because they are the objects of utility which characterize the preference structure of individuals. Therefore, when objectively measured goods attributes are mapped to observed equilibrium market prices in a competitive economy, the marginal implicit worth of output characteristics can be derived from a Hedonic price function that traces the behavior of consumers and producers of differentiated products. This is basically the economic principle on which the Hedonic Econometric Model is based.

From the study, it could be inferred that consumer preference which is the process whereby a consumer chooses one product rather than the other because of visibly appealing quality characteristics is predicated upon congruence between the quality expectations of the consumer and the quality characteristics, he finds in the product. He is ready to pay premium price, he finds these characteristics in a product but asks for a discount when he is not satisfied with the quality characteristics of the product. A product is demanded for the utility it provides which in turn is a function of the characteristics of the product (Musa, 2003; McCluskey *et al.*, 2007).

MATERIALS AND METHODS

Study area: This study was carried out in Kano metropolis, Nigeria, using the Yan-Lemo fruits market and the Faculty of Agriculture, Bayero University, Kano as the main study areas. The Yan-Lemo fruits market was purposively chosen because it is a specialized, international urban regional bulking market. Kano is located within latitudes 10°33' North and longitudes 9°29' East in the Sudan savanna vegetation zone of Nigeria with a population of 9,383,682 (NPC, 2007).

Sampling procedures: A total of 120 retailers and 14 who lesalers of sweet orange fruits were selected from the Yan-Lemo fruits market using simple random progressive sampling. Also, 120 consumers of banana fruits were sampled from the staff and students of the Faculty of Agriculture, Bayero University, Kano using accidental sampling.

Source of data: Structured questionnaire, laboratory measurements of the fruit characteristics and price and quality survey forms were used to collect data from the marketers and consumers of banana fruits for the study. The consumers were asked to see and taste a set of weekly purchased banana fruits and thereafter, given a questionnaire to rank their levels of preference for the fruits and indicate their willingness to buy the fruits at the prevailing market price after tasting them. The study was carried out for 24 weeks (6 months) from September, 2008 to February, 2009.

Data analysis: The data collected were analyzed using descriptive statistics. Also, Hedonic regression analysis using SHAZAM statistical package was used to determine the effect of banana fruits quality attributes on price and consumer choice.

It should be noted that the Hedonic regression analysis, essentially involved comparing variables along the same regression line and also comparing them between average situations. Within variables, the indicators with the highest frequency were used as the baseline for comparison and therefore did not appear in the regression (Table 1).

Model specification

The Hedonic Pricing Econometric Model: In this study, the Hedonic Econometric Model as used by Musa (2003) was adopted. This model is mathematically expressed as:

$$P_b = \sum_{j=1}^{m} X_{bj} P_{bj} \tag{1}$$

Table 1: Coding key for banana quality characteristics

Variables	Coding
Skin colour	1. Green yellow
	2. Yellow orange
	3. Orange
	4. Red
Fruit size	1. Small (3.0-3.5 cm)
	2. Medium (3.6-3.7 cm)
	3. Large (≥3.8 cm)
Cluster size	1. Small (1-10 fingers)
	2. Medium (11-14 fingers)
	3. Large (≥15 fingers)
Fruit length	1. Short (<15 cm)
	2. Medium (16-19 cm)
	3. Long (≥20 cm)
Taste	0. Undecided
	1. Not sweet
	2. Moderately sweet
	3. Sweet
	4. Very sweet
Ripeness	0. Undecided
	1. Not ripe
	2. Moderately ripe
	3. Ripe
	4. Very ripe
Softness	1. Not soft
	2. Moderately soft
	3. Soft
Surface blemish	1. No blemish
	2. Trace
	3. Light
	4. Medium
	5. Severe
Cleanliness of fruit	1. Not clean
	2. Moderately clean
	3. Clean
Variety	1. Gros Michel
	2. Paranta
	3. Omini
	4. Red cavendish

Where:
P_b = Price of banana fruits
X_{bj} = Quality characteristics of banana fruits
P_{bj} = Implicit price of banana fruits characteristics (Musa, 2003)

The implicit Ordinary Least Square (OLS) Regression Model used was specified in the general form as:

$$Y = (f(X_1, X_2 - X_n U) \tag{2}$$

Where:
Y = Price paid for the banana fruits
F = Functional notation
$X_1 - X_n$ = Independent or explanatory variables
U = Error terms

As derived from Eq. 2, the functional linear form of the model was specified as:

$$Y = a + b_1 X_1 + b_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + \\ b_7 X_7 + b_8 X_8 + b_9 X_9 + b_{10} X_{10} + b_{11} X_{11} + b_{12} X_{12} + U \tag{3}$$

Where:
Y = Price paid banana fruits
a = The intercept
b_i = The coefficient of X_1
X_1 = Colour of banana fruits
X_2 = Fruit size (cm)
X_3 = Level of ripeness of the fruits
X_4 = Softness of the fruits
X_5 = Area of surface blemish of the fruits
X_6 = Cleanliness of the fruits
X_7 = Variety of fruits
X_8 = Source of the fruits or region of production
X_9 = Seasonality of the fruits
X_{10} = Weight of banana fruits (kg)
X_{11} = Length of banana fruits (cm)
X_{12} = Size of clusters of the banana fruits (cm)
U = Error terms

From the regression analysis of the above parameters, the R^2 value, variance of the estimate, the number of significant independent variables, the appropriateness of the signs on the parameter estimate and the p-values were determined.

RESULTS AND DISCUSSION

Table 2 shows the demographic characteristics of the respondent. The average age of the banana fruit sellers was 39 years while that of consumers was 33 years, meaning that they are in their active years. The literacy

level indicated that about 70.8% of the sellers had a minimum of Quranic education while 57.5% of the consumers had tertiary education showing that they had one form of education or the other. The average trading experience was 12 years.

All these go to show that since, the sellers and consumers are in their active years with one form of education or the other a reasonable number of years of trading experience they are therefore expected to be more flexible, matured, articulate and rational in taking and adopting decisions and innovations that may positively affect their marketing activities and consumption preferences and thus, maximize their profitability and utility (Ayoola, 1999; Ogunbile *et al.*, 2002; Musa, 2003; Olarinde *et al.*, 2008).

The summary of the results in Table 3 is shown that most banana fruits sold in Kano metropolis during the study period were orange in colour (54.2%) with a coding mean of 2.7 which is approximately orange colour. The fruits were medium in size (69.2%) with a mean of 1.73 have medium size clusters (58.3%) with a mean of 2.38 and also medium in length (50%) with a mean of 2.45. About 62.5% of the fruits had very sweet taste with a mean of 3.56, ripe (49.2%) with a mean of 3.41 and soft (95%) with a mean of 2.95. It was equally observed that 56% of the banana fruit had medium surface blemish with a mean of 3.71, clean (72.5%) with a mean of 2.73 while the dominant variety sold in the market was gros Michel (70, 8%) with a mean of 1.30. The clusters of fruit and fingers averagely weighed 1.52 and 0.11 kg, respectively. Table 1 shows for the coding key used for the banana fruit quality characteristics.

The results in Table 4 show that 46.4% ($R^2 = 0.464$) of the variable in the price of banana fruit was explain by the explanatory variable included in the model. These variables were the colour, size degree of ripeness, softness, surface blemish as well as cleanliness of the banana fruits. Other were the variety, weight, length and cluster size of the fruits. The remaining 53.6% not explained could be attributable to the error or random disturbance in the model. The intercept (constant) which was statistically significant at p<0.01, amount to 1386.8, meaning that only ₦1,386.8 worth of banana fruits could be bought by consumers without considering the attribute variables mentioned above. Since, most of the variables in the model are intrinsic and subjective, the R^2 of 0.464 could be considered reasonable in a hedonic regression of this nature.

Table 2: Demographic characteristics of banana fruits retailers and consumers in Kano metropolis, Nigeria

| | Respondents | | | |
| | Sellers | | Consumers | |
Variables	Frequency	Percentage	Frequency	Percentage
Age class (years)				
10-20	6	5.00	3	2.5
21-30	35	29.17	54	4.5
31-40	34	28.33	35	29.2
41-50	15	12.50	23	19.2
51-60	16	13.33	5	4.1
61-70	14	11.67	-	-
Total	120	100.00	120	100.0
Mean (years)				
Gender composition				
Male	113	94.17	96	80.0
Female	7	5.83	24	20.0
Total	120	100.00	120	100.0
Marital status				
Married	101	84.17	69	57.5
Single	19	15.83	51	42.5
Total	120	100.00	120	100.0
Level of education				
Quranic	85	70.83	-	-
Primary	15	12.50	-	-
Secondary	17	14.17	51	42.5
Tertiary	3	2.50	69	57.5
Total	120	100.00	120	100.0
Trading experience (years)				
1-10	70	58.30	-	-
11-20	26	21.70	-	-
21-30	17	14.20	-	-
31-40	5	4.20	-	-
41-50	2	1.60	-	-
Total	120	100.00	-	-
Mean	12 years			

Table 3: Distribution of characteristics of banana fruits affecting consumer preference in Kano metropolis

Variables	Coding for estimate	Minimum	Maximum	Mean	Based on remarks coding
Colour	1-4	Red (4)* 1.6%	Orange (2) 54.2%	2.7	Approx. orange colour
Fruit size	1-3	Large (3) 5.8%	Medium (2) 69.2%	1.73	Approx. medium size
Cluster size	1-3	Small (1) 1.7%	Medium (2) 58.3%	2.38	Slightly above medium size
Fruit length	1-3	Short (1) 2.5%	Medium (2) 50%	2.45	Slightly above medium length
Taste	0-4	Sweet (3) 7.5%	Very sweet (4) 62.5%	3.56	Above sweet taste
Level of ripeness	0-4	Moderately ripe (2) 5%	Ripe (3) 49.2%	3.41	Above ripe
Softness	1-3	Moderately soft (2) 5%	Soft (3) 95%	2.95	Approx. soft
Level of surface blemish	1-5	Trace (2) 0.8%	Medium (4) 65%	3.71	Approx. medium surface blemish
Cleanliness of fruit	1-3	Moderately clean (2) 27.7%	Clean (3) 72.5%	2.73	Approx. clean
Variety	1-3	Red cavendish (4) 1.7%	Gros Michel (1) 70.8%	1.30	Gros Michel
Wt. of cluster	-	0.95 kg	2.30 kg	1.53 kg	-
Wt. of finger	-	0.07 kg	0.16	0.11 kg	-

* Figures in parenthesis are coding values

Table 4: Results of estimated Hedonic regression for physical or commodity characteristics affecting consumer choice for banana in Kano metropolis

Variables	Coefficient	t-ratio	p-values
Constant (a)	1386.80	7.43	0.000
Colour of fruits (X_1)			
Red	-347.90*	-1.79	0.076
Yellow orange	-119.92[NS]	-1.61	0.506
Green yellow	-53.18[NS]	0.71	0.482
Size of fruit (X_2)			
Large	169.63*	1.69	0.094
Small	-190.79*	-1.82	0.071
Degree of ripeness (X_3)			
Very ripe	129.46**	2.71	0.008
Moderately ripe	11.60[NS]	0.10	0.917
Softness (moderate, X_4)	339.93**	3.01	0.003
Surface Blemish (X_5)			
Severe	-72.24[NS]	0.54	0.589
Light	-56.26[NS]	-109.00	0.280
Cleanliness of fruit (X_6)			
Moderately clean	-24.03[NS]	-0.41	0.686
Variety (X_7)			
Red cavendish	-52.81[NS]	-0.27	0.785
Paranta	27.80[NS]	0.59	0.557
Weight (X_{10})	278.20**	3.27	0.001
Length of fruits (X_{11})			
Long	95.67*	1.99	0.050
Short	-235.89*	-1.76	0.081
Cluster size (X_{12})			
Large	651.85*	3.99	0.000
Small	-196.73*	-1.93	0.056
Monthly dummies			
October	-278.90***	-3.83	0.000
November	-348.08***	-478.00	0.000
December	-199.97*	-2.56	0.012
January	-267.97***	-13.62	0.000
February	-100.03[NS]	-1.33	0.187

$R^2 = 0.464$; R^2 adjusted = 0.398; ***Significant at 1% level; **Significant at 5% level; *Significant at 10% level; NS = Not Significant

Thus, an A2 of 50% is a good indication that there is significant relationship between the physical quality characteristics of banana fruits and consumer preference and price in the study area. The result generally showed significant consumer preference for colour, size and degree of ripeness and softness, weight, length and cluster size of banana fruits. Specifically, red coloured fruits were statistically significant at $p < 0.1$ but with negative coefficient with orange colour being used as the baseline for regression because of its preponderance (54.2%) among the fruits sampled. Therefore because of the negative coefficient of the red coloured fruits, it means consumers preferred and are ready to pay premium price for orange coloured fruits than those with other colours. Large size fruits were also significant at $p < 0.1$ but with negative signs.

This means consumers preferred large size fruit to smaller ones. Thus, the larger the size of the fruits, the higher the price they will attract while smaller ones will attract discount equivalent to their negative coefficient. Degree of ripeness (very ripe) and moderate softness were both significant at $p < 0.05$. Ripeness has a relationship

with softness but if the fruit is too soft, it is an indication of spoilage. Therefore, consumers will prefer a very ripe fruit but which is moderately soft. Consumers also showed sensitivity to the weight of the fruits, hence its positive significance at $p < 0.05$.

This is important because the weight of the fruits is an indication of its internal content, the weightier the fruit the more the content and the more its preference. The length of the fruit was other important variable consumers were sensitive to. Long fruits were significant at $p > 0.1$ with positive signs while small fruits were also the higher the price they will attract and vice versa. The most important attribute consumers were sensitive to was the cluster size of the fruits. Large cluster size was positively significant $p < 0.01$ while cluster size was significant at $p < 0.1$ but with negative signs. This means the large the cluster size, the higher the rice [consumers are willing to pay while small clusters will attract a discount equivalent to its negative coefficient (-196.73)]. Consumers did not show sensitivity to surface blemish, cleanliness and variety of banana fruits sold.

All the monthly dummies except February, 2009 were statistically significant with negative coefficients. This means consumers paid higher prices for banana fruits in September, 2008 which was the baseline month, ostensibly because it coincided with the Ramadan for that year when Muslims break their Fast with fruits. This led to an upsurge in the demand for banana fruits (since, Kano is predominantly a Muslim state), thus resulting in higher prices. The statistic significant of most of the months also indicates that marketing of banana fruits was generally profitable in the months, the study was undertaken (September, 2008 to February, 2009).

The finding of this study are in conformity with those of Stover and Simmonds (1987) who observed that finger length and size of banana fruits influence consumer preference. Smale and Tushemereirwe (2007) also reported that bunch size, size of the fruit, taste, colour and softness of the fruits significant influence and affect consumer preference and price for banana fruits in Uganda. In a related research in Uganda, Edmeades (2006) confirmed that attributes such as taste, softness, colour, size of fruit and bunch size significantly determine the price paid and received for banana bunches at the farm gate.

Out of the two non-commodity variables in the non-commodity factor model in Table 5, none was significant. However, the two variables season and source of supply carried positive signs meaning that though not significant, they can still have some influence on consumer choice and price. Table 6 shows that the highest problem plaguing the marketing of banana fruits in Kano metropolis is that of perishability of fruits

Table 5: Results of estimated Hedonic regression for physical or non-commodity factors affecting consumer choice for banana in Kano metropolis

Variables	Coefficient	t-ratio	p-values
Constant (a)	1498.00	23.380	0.000
Source (South-West) (X_8)	14.09^{NS}	1.024	0.810
Season (X_9)	-347.90*		
Heat season	128.85^{NS}	1.062	0.291
Cold season	103.58^{NS}	0.550	0.581
Monthly dummies			
October	-262.90*	-12.560	0.012
November	-305.06*	-2.140	0.034
December	-126.54^{NS}	-0.690	0.486
January	-261.46^{NS}	-1.290	0.199
February	-50.06^{NS}	-05.250	0.804

$R^2 = 0.142$; R^2 adjusted $= 0.080$; *Significant at 10% level; NS = Not Significant

Table 6: Distribution of problems associated with banana fruits marketing in Kano metropolis

Transportation	Frequency	Percentage
Perishability and poor storage facilities	50	1000 1st
Transportation	46	92 2nd
Inadequate capital	35	70 3rd
Multiple taxes	33	66 4th
Poor refuse disposal	32	64 5th
High competition	30	60 6th
Inadequate pricing	28	56 7th

Multiple responses possible

aggravated by poor storage facilities (100%). This is followed by high cost of transportation (92%) inadequate capital to inject into their business by sellers (70%) and multiple market taxes by authorities (66%). Others are poor refuse disposal in the market (64%), high competition from fellow sellers (66%) and inadequate pricing by consumers (56%). Most of these problems are similar to those reported by Kudi *et al.* (1996) in their study of banana marketing in Kaduna state, Nigeria. Reddy *et al.* (2004) equally mentioned similar proems associated with marketing of agricultural products in India.

CONCLUSION

The study revealed that most of the banana fruits sold in Kano metropolis during the study period were orange colour, medium in size, medium in length, ripe, very sweet, softy and clean with medium level of surface blemish. Gross Michel was the dominant variety sold. This means that there is significant presence of good quality characteristics in banana fruits soft in Kano metropolis. The cluster size, degree of ripeness, softness, weight, length, size and colour of banana fruits were statistically significant and therefore, affected consumer preference and price for banana fruits in the study area. This means that consumers are willing to pay premium price for banana fruits with these significant characteristics while they will ask for discount where these characteristics are absent.

Consumers were not sensitive to surface blemish, cleanliness, variety, source and seasons of the banana fruits. The major constraints to the marketing of banana fruits in the study area were those of perishability of fruits, high cost of transportation, inadequate capital to inject in business by sellers, multiple taxes and poor refuse disposal in the market.

RECOMMENDATIONS

Based on the findings of this study, it is therefore, recommended that in order to ensure profitable production, marketing and consumption of banana fruits, agronomic, breeding and research efforts by farmers, government and private agencies should dwell fully on the quality characteristics that consumers showed sensitivity to in this study. The government and private agencies should also provide efficient and technical extension services to disseminate the findings of studies of this nature to farmers marketers and consumers to enhance better production, marketing and consumption decisions. The government should equally provide improved storage facilities and waste disposal structures and reduce multiple taxes and charges imposed on sellers in specialized agricultural produce markets. Credit facilities should also be extended to sellers of sweet orange fruits to inject into their businesses so as to expand the scope of their operation.

REFERENCES

Adegeye, A.J. and J.S. Dittoh, 1985. Essentials of Agricultural Economics. Impact Publishers Nigeria Ltd., Ibadan.

Ayoola, J.B., 1999. Economic analysis of women entrepreneurship in low income households of Benue State. Ph.D. Thesis, Abubakar Tafawa Balewa University, Bauchi, Nigeria.

Bowman, K. and D. Ethridge, 1992. Characteristics supplies and demands in a hedonic framework: US market for cotton fiber attributes. Am. J. Agric. Econ., 74: 991-1002.

Edmeades, S., 2006. A hedonic approach to estimating the supply of variety attributes to a subsistence crop. EPT Discussion Paper No. 148, International Food Policy Research Institute (IFPRI), Washington, DC., USA., pp: 1-31.

Kohls, R.L. and J.N. Uhl, 1980. Marketing of Agricultural Products. 5th Edn., Collier Macmillan, London, UK., Pages: 612.

Kotler, P. and G. Armstrong, 1999. Principles of Marketing. 6th Edn., Prentice Hall International, New Delhi, India, Pages: 692.

Kudi, T.M., Z. Abdulsalam and D.T. Chinyio, 1996. Banana marketing in Kaduna State. Proceedings of Annual Conference of the Horticultural Society of Nigeria, April 1-4, 1996, Nigeria, pp: 191-194.

Ladd, G. and V. Survannut, 1976. A model of consumer goods characteristics. Am. J. Agric. Econ., 58: 504-511.

Langyintuo, A., M. Larry, J. Lowenberg-DeBoer and G. Ntoukam, 2000. The market value of Cowpea characteristics in Cameroon and Ghana. Proceedings of the World Cowpea Conference III, September 4-8, 2000, IITA, Ibadan, Nigeria.

McCluskey, J.J., R.C. Mittelhammer, A.B. Marin and K.S. Wright, 2007. Effect of quality characteristics on consumers' willingness to pay for gala apples. Can. J. Agric. Econ., 55: 217-231.

Musa, S.A., 2003. Marketing of cowpea in Nigeria: Econometric studies of quality factors and market integration. Ph.D. Thesis, Abubakar Tafawa Balewa University, Bauchi, Nigeria.

NPC, 2007. Federal Republic of Nigeria Official Gazette. Vol. 94, Federal Government Printer, Lagos, Nigeria.

Ogunbile, A.O., R. Tabo and S.A. Rahma, 2002. Factors affecting adoption of ICSVIII and ICSV400 sorghum varieties in Guinea and Sudan Savanna of Nigeria. Plant Sci., 3: 21-32.

Oladunni, O., A. Lamido, G. Bawa and A. Njoku, 2006. Agricultural Meeting Extension Handbook. Publication of the National Strategic Food Reserve Department, Federal Ministry of Agriculture and Rural Development, Abuja, Nigeria, Pages: 196.

Olarinde, L.O., A.O. Ajao and S.O. Okunola, 2008. Determinants of technical efficiency in bee keeping farms in Oyo State, Nigeria: A stochastic production frontier approach. Res. J. Agric. Biol. Sci., 4: 65-69.

Rao, K.M., 2005. A Textbook of Horticulture. Macmillan India Ltd., New Delhi, India, Pages: 295.

Reddy, S., P.R. Ram, T.N. Sastry and I.B. Devi, 2004. Agricultural Economics. Oxford and IBH Publishing, New Delhi, India, Pages: 646.

Rice, R.P., L.W. Rice and H.D. Tindall, 1987. Fruit and Vegetable Production in Africa. Macmillan Publishers, London, UK., ISBN-13: 9780333426098, Pages: 371.

Rosen, S., 1974. Hedonic prices and implicit markets: Product differentiation in pure competition. J. Polit. Econ., 82: 34-55.

Smale, M. and W. Tushemereirwe, 2007. An Economic Asessment of banana Genetic Improvement and Innovations in Lake Victoria Region of Uganda and Tanzani. International Food Policy Research Institute (IFPRI), Washington, DC., USA., ISBN-13: 9780896291645, Pages: 188.

Stover, R.H. and N.W. Simmonds, 1987. Banana. 3rd Edn., Longman, London, UK., Pages: 468.

Wooldridge, J.M., 2000. Introductory Econometrics: A Modern Approach. South-Western College Publishing Series in Economics, USA., Pages: 936.