

Price Determination Of *Garcinia kola* (Bitter Kola) And *Aframomum melegueta* (Alligator Pepper) In Ibadan, Oyo State.

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Abstract

The study analysed the factors influencing the price of Bitter kola and Alligator pepper in Non Timber Forest Products markets in Ibadan. Data were collected from 76 sellers with the aid of structured questionnaires in Oja'ba, Agbeni-Ologede, Bode, Oje, Ojoo, Shasha and Omi-Adio markets. The data were analysed using descriptive statistics, gini coefficient and multiple regression. The result shows that the market is dominated by female sellers, majority of which had no formal education but with more than twenty years of experience in the trade. The gini coefficient of 0.76 and 0.81 for *Garcinia* and *Aframomum* respectively reveal that the market for these products tend towards oligopoly. The regression analysis shows that Age, Educational qualification of the seller and Cost price of the products are significant determinants of price for the two products. Also Years of experience in the trade positively influence price for Bitter kola and Cost of transportation for *Aframomum*. It is recommended that better storage technology should be developed; the sellers should be encouraged to form cooperatives for the provision of services and facilities such as transportation and organized marketing system. Sustainability of the species should be encouraged by creating awareness and encouraging small and large private plantations.

Keywords: Price, *Garcinia kola*, *Aframomum melegueta*

1. Introduction

It is commonly recognized that forests are the mainstay of a large number of the world's poor and that 1.6 billion people living in and near forests use forests for subsistence, products and water supply and for generating a substantial portion of their cash income (CIFOR, 2005). Forests and the goods and services they provide are essential for human wellbeing. Humans use forests for many purposes and the products derived from the forest and their benefits are referred to as 'forest goods and services' (Campos et al, 2005; MEA, 2005). Although forest goods are the result of providing services, they are usually mentioned separately, being more tangible than the other services. This value chain includes wood and wood products such as fuelwood, paper, charcoal and wood structural products and non- wood products (Foods and plant products) such as rattan, mushrooms, nuts and fruits, honey, bushmeat, rubber and biochemicals (Bastiaan et al, 2009). Forests often serve an important 'safety net' function, providing some measure of relief during the 'hunger periods' in the agricultural cycle through their provision of wild foods (McSweeney, 2004). Forests and woodlands are increasingly recognized for their precious biological resources beyond timber which sustain the livelihoods of hundreds of millions of people in forest-dependent and adjacent agricultural communities and contribute significantly to their domestic energy, food and health security needs. Through their experience with forest-dependent communities, forestry experts have recently begun to appreciate the enormous significance of NTFPs for sustaining rural livelihoods (Balgis et al, 2009). In recent years, a growing body of scientific research has shown that given certain basic conditions, non-timber forest resources can help communities to meet their needs on a sustainable basis. Despite their importance to forest-dependent people worldwide, accurate information on marketing and use of NTFPs is limited and often mixed with agricultural production statistics.

The United Nations Food and Agricultural Organisation approximates that 80 percent of the developing world relies on Non Timber Forest Products (NTFPs) for nutritional and health needs (TROPETAG, 2006). In recent years, NTFPs have attracted considerable global interests because of the increasing recognition that not only can they improve livelihoods, household food security and nutrition, but their harvest may become more ecologically benign than that of timber (FAO 2010). NTFPs make up the largest share of the forest products market in volume, variety, aggregate income generated and trade volume. Official statistics are very misleading however, as sales reach national or international accounting (ITTO, 2007). Edible NTFPs used as food staples, supplements and additives include bush meat, honey, edible fruits and nuts, leaves, shoots, tubers, whole plants and fungi. They are important food sources for forest dependent communities.

Garcinia kola is among the few commercial NTFPs that have several uses, the most important being chewing stick and medicinal (Mshana et. al., 2000, Ayuk et. al., 1999; Sosef et.al., 1998). The seeds of *Garcinia*

kola together with other parts of the plant are used in medicinal preparations. For instance, some of the preparations are used for the treatment of cirrhosis of the liver and have anti-inflammatory, anti-diabetic, bronchial-dilator, anti-hepatotoxic and anti viral compounds (Mbakwe 1983). Particularly exiting is the observation that *Garcinia kola* can prevent the Ebola virus from replicating itself (Annon, 1999). Also, when food is suspected to be contaminated by bacteria, chewing bitter kola immediately forestalls the development of any infection or poisoning. The bark of the stem is used in tanning and dyeing industry.

Aframomum melegueta is commonly known as grains of paradise, melegueta pepper, alligator pepper. Guinea grains or Guinea pepper is obtained from the plant's ground seeds. It gives a pungent, peppery flavor. Although it is native to West Africa, it is an important cash crop in the Basketo special wored of Southern Ethiopia. *Aframomum melegueta*, another NTFP in the family Zingerberacea, is used as a purgative, galactagogue (to increase production of breast milk) anti-helminthic and haemostatic agent (purifies blood). It is also effective against schistosomiasis (bilharzia). It is used against intestinal infections, infestations, to calm indigestion and heart burn. The seed of *Aframomum melegueta* possesses potent anti-inflammatory activity with a gastric tolerability profile (TROPILAB, 2011). The alligator pepper is popularly used as spice and mainly as food and brewing. It is used traditionally to treat constipation, hemorrhoids, worm infestation as well as in pronouncing blessings and curses on people. When a baby is born in Yoruba culture, they are given a small taste after birth as part of the routine of baby welcoming process. In Igbo land, alligator pepper with kolanut is used in naming ceremony, as presentation to visiting guests and for other social events. It is a painless and safe medication for men suffering from erectile dysfunction and premature ejaculation as well as to improve sexual performance (Oguntola, 2010).

Among the many responsibilities of the purchasing agent is that of determining the best price for goods and services. Price is the measure of the value for a unit of a commodity or service that expresses its worth relative to other goods or services. Economists define price as the value of any item expressed in monetary terms i.e money. The best price is not necessarily the lowest price for price is only one of the variables a buyer must consider before making the decision to purchase. The primary aim of the supplier is not only to remain in business but to make a profit that will permit expansion and increase profits. It has been assumed that the seller has the 'privilege' of establishing the price at which he/she is willing to sell his products or service. In the economies of the business world, the price must be attractive to the buyer to result in any transaction. Otherwise there is no market for the goods or services. Neither can the buyer establish the price at which he/she is willing to buy. There would not be a seller willing to sell at a price that does not include a reasonable profit. Thus, to have a business transaction, there must be a 'meeting of the minds' to establish a price that is mutually agreeable to both parties. Many studies have been carried out on the role of various NTFPs but little is available in literature on how prices are determined for these products. How the prices are determined is very essential to avoid under-valuing of these NTFPs so as to make policies for sustainability (or sustainable production and management) of the species. This study aims at assessing how these NTFPs are valued in the study area. The objectives of this study are: to assess how these NTFPs are valued, to examine the market structure for these products and to determine the socio economic factors affecting price determination for these NTFPs in the area.

2. Methodology

2.1 The Study Area

Ibadan was selected as the study area. Ibadan is the capital of Oyo state and it is the largest city south of Sahara. It has an estimated population of about 2,550,593 (Nigerian Population Census, 2006). Ibadan lies between latitude 7⁰N and 9⁰N of the equator, longitude 3⁰E and 5⁰E of the Greenwich Meridian. It is situated in the rainforest zone of Nigeria with rainfall of average distribution of about 1250mm and 1800mm. The temperature of Ibadan ranges between 27⁰C and 32⁰C with a relative humidity of about 75% to 90%.

2.2 Sampling Procedure and Data Analysis

Data for this study were primarily sourced with the aid of structured questionnaires used as personal interview guide. A total of 56 *Garcinia kola* sellers and 20 *Aframomum melegueta* sellers were selected using purposive and simple random sampling techniques. Purposive sampling was used to select markets in four out of the eleven Local Government Areas where NTFPs are sold in Ibadan while simple random sampling was used to select respondents for the study. Markets covered are Oja'ba, Agbeni-Ologede and Bode markets located in Ibadan South East Local Government Area; Oje in Ibadan North; Ojoo and Shasha in Akinyele Local Government Area and Omi-Adio market Ido Local Government area. The data collected were analysed using descriptive statistics, multiple regression and gini coefficient.

The regression model for the study is specified as:

$$Y = f(X_1, X_2, \dots, X_n)$$

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7$$

Y = Selling Price per unit

b_0 = constant

b_1 - b_9 = coefficients of the independent variables X_1 - X_9

X_1 = Age of respondent in years

X_2 = Gender of respondent

X_3 = Marital status

X_4 = Household size

X_5 = Educational Qualification

X_6 = Monthly Income

X_7 = Years of experience in the trade

X_8 = Cost Price of the product

X_9 = Costs of Transportation

Market structure is concerned with the organizational characteristics of a market which influence the nature of competition and pricing within the market. An important variable in market structure analysis is concentration which depicts a situation in which a few large firms have the largest share of the business. Gini coefficient was used to measure the level of sellers' concentration in the market to determine the degree of competition or monopoly in the market. The Gini coefficient is given by:

$$G = 1 - \sum XY$$

G = Gini coefficient

X = Percentage of sellers per period of study.

Y = cumulative percentage of sellers revenue per period of study

The Gini coefficient has a value ranging from 0-1 expressing the extent to which the market is concentrated. When G is zero, there is perfect equality in the size of the distribution of the sellers and when G is one, there is perfect monopoly in the market.

3. Results and Discussion

The result shows that the trade is dominated by female with 93.42% of the respondents. Majority of them are within 31 to 50 years of age and 78.95% of them are married. Also 40.79% of them have no formal education and over half (57.89%) have more than twenty years of experience in the trade. This may be because most of the sellers inherited the trade from their parents. The NTFPs provide reasonable income for the sellers with income range of twenty thousand naira and above having the highest percentage.

Table 2 below shows that counting in 50s is the most common unit of measurement for both Garcinia and Aframomum in the study area. Those that sell in wholesales use bags and baskets to measure but these are few among them. The most important grade determinants according to the respondents are freshness (44.74%) and sizes (42.11%). This is because most seed lots/ fruit consignments come out in same colour and moisture content after processing. Also 72.37% of the respondents indicate individual seller as the one who determines price after considering cost incurred and desired profits, the association does not regulate price. However prices fall when demand for the products drops or when they are in season and vice versa. Garcinia was said to be in season during the dry season and becomes scarce during the rainy season while Aframomum's season is around May/June and becomes scarce from September to April according to the respondents. Over 80% of the sellers agree that there are variations in selling price of the two NTFPs across different markets in the study area. Transportation is the most serious challenge faced in the business as the products are sourced from places like Mamu, Iperu, Ogunmakin, Awa, Ilawe, Gbongan Ilesha, Ekiti and Ikire all in Nigeria. The distance travelled by the sellers for procurement of the products range from about 30 km to 300 km. Some of the sellers also buy the products from Oja-'ba market and sell in other places in the town. Also some import high-grade Alligator pepper from Ghana. Most of the respondents sell bitter cola, alligator pepper and kola nut especially the combination of bitter cola and kola nut. Social activity (89.47%) and free entry prevention (94.74%) were what the majority of them indicated as the reasons the association existed.

The analysis of the Gini coefficient (0.76) for Garcinia and (0.81) for Aframomum indicate that the market structures for Garcinia and Aframomum tend towards oligopoly. The market for the two NTFPs is characterized by the presence of few sellers. There is no freedom of entry into the trade although the traders sell similar but not identical products. *Garcinia kola* is differentiated by size, coat colour, freshness, and moisture content while *Aframomum melegueta* is differentiated majorly by size and freshness.

Regression Results for Price determinants of *Garcinia kola* and *Aframomum melegueta*

To estimate the socio-economic factors influencing the price of *Garcinia kola* and *Aframomum melegueta* in the study area, four functional forms of the ordinary least square multiple regression equations were applied to the data collected. The linear functional form gave the best fit for the NTFPs having produced the highest number of significant variables with highest R².

$$Y_{Gar} = 6.015 + 0.216X_1 - 0.611X_2 - 0.818X_3 + 0.691X_4 + 0.268X_5 - 1.002X_6 + 0.099X_7 + 0.531X_8 + 0.057X_9$$

(1.674)** (0.079)** (0.412) (0.546) (1.629) (0.114)* (0.992) (0.043)*
 (0.136)**
 (0.108)

$$Y_{Afr} = 2.005 + 0.847X_1 - 1.712X_2 + 0.623X_3 + 0.705X_4 - 0.412X_5 + 0.024X_6 + 0.351X_7 + 0.141X_8 + 0.013X_9$$

(0.511)** (0.383)* (1.717) (0.564) (0.630) (0.329)** (0.22) (0.124) (0.064)*
 (0.004)**

* Significant at 0.05 level

** Significant at 0.01 level

The result (Table 3) shows that the factors which were observed to have positive influence on price per unit for *Garcinia* are Age of the respondent, Educational qualification, Years of experience of the seller in the trade and the Cost price of the product denoted by X₁, X₅, X₇ and X₈ respectively. Age and Cost price are significant at 0.01 level while Educational qualification and Years of experience are at 0.05 level. This implies that when the older sellers, who apparently are more experienced in the trade, have an additional year of education, the marginal effect on price per unit of measurement of *Garcinia* in the study area increases by 0.268. Also with an additional naira to the cost price of *Garcinia* from where sellers buy to resell, the marginal effect on selling price per unit increases by 0.631. Table 4 shows that Age of the respondent, Educational qualification of the seller, Cost price and Cost of transportation are the factors observed to have positive influence on price per unit for *Aframomum*. Age and Cost price are significant at 0.05 level while Educational qualification and Cost of transportation are significant at 0.01 level. It can be said that Age and Educational qualification are important determinants of price in both species from the fore-going. The R² for the regression models were reasonable which shows that there is great degree of association between the dependent and independent variables.

Policy Implication of these Results

The market structure for *Garcinia* and *Aframomum* shows that it is an oligopolistic market where there is independent pricing. The understanding of the price behaviour of the sellers is fundamental to pricing policy and marketing research. There is price discrimination among traders in the same market and in spatially differentiated markets since there is no perfect competition. Policy measures aimed at improving the performance of the market for these NTFPs should begin with empowering the sellers association and re-organising it into a cooperative to cater for the marketing functions by creating an efficient transport system, construction and maintenance of access roads should be done. The strict prevention of free entry into the trade should be reduced. Since level of education of a seller is a significant determinant of price in the area, periodic workshops and adult education should be organised for the sellers to enlighten them. The younger sellers should also be share in the experience of the older and more experienced ones using such workshops as an avenue to do so. An organised pricing arrangement should be designed by the association. The production of the products should be intensified since production and marketing constitute a continuum and the absence of development in one retards the other (Olayemi, 1972).

4. Conclusion and Recommendation

The study revealed that Age, Educational qualification, Years of experience and Cost price are positively related to Price per unit of measure of *Garcinia kola* by the sellers. Age, Educational qualification, Cost price and Cost of transportation have positive influence on the Price of *Aframomum*. This result suggests that Age and Educational qualification of the seller are important determinants of Selling price for both *Garcinia* and *Aframomum* by the sellers in the study area. The analysis of the Gini coefficient (0.76) and (0.81) for *Garcinia* and *Aframomum* respectively indicate that the market is characterized by the presence of few sellers. There is no freedom of entry into the trade although the traders sell similar but not identical products. The sellers are faced with various challenges in the trade which includes seasonal scarcity, high transportation cost and bad roads, interference of middlemen at the places where they source the products. Based on the findings of the study, the following recommendations were made: development of better processing storage technology should be in place through research so as to ensure an efficient storage in order to reduce sharp fluctuations in the prices of these NTFPs. The sellers should be encouraged to form cooperatives through which there would be provision of some services and facilities such as transportation and an organised marketing system, periodic workshops and

interactive sections. Sustainability of the species should be encouraged by creating awareness and encouraging small and large private plantations.

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Table 1: Socio-economic Characteristics of Respondents

Variable	Frequency	Percentage
Gender		
Male	05	6.58
Female	71	93.42
Total	76	100
Age		
20-30	09	11.84
31-40	20	26.32
41-50	21	27.63
51-60	10	13.16
61 and above	16	21.05
Total	76	100
Marital Status		
Single	06	7.89
Married	60	78.95
Widowed	10	13.16
Divorced	00	0.00
Total	76	100
Educational qualification		
None	31	40.79
Primary	28	36.84
Secondary	17	22.37
Total	76	100
Household Size		
3-5	21	27.63
6-8	39	51.32
9-11	11	14.47
12 and above	05	6.58
Total	76	100
Years of Experience		
10-20	32	42.11
21-30	26	34.21
31-40	11	14.47
41-50	06	7.89
51 and above	01	1.32
Total	76	100
Monthly Income		
<5,000	17	22.37
5,000-9,999	12	15.79
10,000-14,999	16	21.05
15,000-19,999	8	10.53
20,000 and above	23	30.26
Total	76	100

Source: Field survey 2011

Table 2: Trade-specific Characteristics of Respondents

Variable	Frequency	Percentage
Unit of measurement		
Small-sized bag	02	02.63
Medium-sized bag	02	02.63
Basket	04	05.27
Counting in 50 pieces	68	89.47
Total	76	100.00
Grade Determinant		
Sorting according to freshness	34	44.74
Sorting into colours	06	07.89
Sorting according to sizes	32	42.11
Sorting with moisture content	04	05.26
Total	76	100.00
Who determines price		
Individual seller	55	72.37
Buyer's bargaining power	21	27.63
Total	76	100.00
Variation in selling price across markets		
Yes		
No	63	82.89
No response	12	15.79
	01	01.32
Total	76	100.00
Challenges faced in the trade		
Transportation cost/bad roads	46	60.53
Seasonality of the products	21	27.63
No access to credit facilities	09	11.84
Total	76	100.00
Reason for Association		
To prevent free entry	72	94.74
To regulate price	12	34.21
For social activities	68	89.47

Source: Field Survey 2011

Table 3: Regression Result for Price determinants of *Garcinia cola*

Variables	Functional Forms			
	Linear	Semi-log	Double-log	Exponential
Constant	6.015 (3.592)**	4.009 (2.131)*	4.002 (2.327)*	4.069 (2.851)**
Age	0.216 (2.730)**	0.418 (1.621)	0.220 (2.231)*	1.215 (2.977)**
Gender	-0.611 (-1.484)	-1.059 (-1.123)	-0.557 (-1.366)	-0.003 (-2.024)*
Marital status	-8.618 (-0.497)	-0.051 (-2.710)**	-0.051 (-0.852)	-0.035 (-0.446)
Household size	0.691 (0.424)	2.113 (0.823)	1.170 (2.656)**	0.093 (1.691)
Education	0.268 (2.345)*	0.789 (1.124)	0.583 (0.811)	0.013 (2.284)*
Monthly Income	-1.002 (-1.010)	-0.621 (-0.925)	-0.155 (-0.245)	-0.002 (-0.483)
experience	0.099 (2.295)*	1.104 (2.681)**	2.093 (1.160)	2.022 (0.890)
Cost price	0.531 (3.906)**	0.367 (3.612)**	0.068 (1.327)	0.017 (1.365)
Transport cost	0.057 (0.528)	0.627 (0.612)	0.086 (0.929)	0.097 (1.638)
R²	0.583	0.449	0.381	0.592

Computed from field survey

Table 4: Regression Result for Price determinants of *Aframomum melegueta*

Variables	Functional Forms			
	Linear	Semi-log	Double-log	Exponential
Constant	2.005 (3.921)**	0.259 (2.081)*	0.025 (2.255)*	0.014 (2.168)*
Age	0.847 (2.213)*	1.036 (2.443)*	0.071 (2.095)*	0.027 (2.491)*
Gender	-1.712 (-0.917)*	-0.556 (-0.819)	-0.091 (-0.472)*	-0.003 (-0.003)*
Marital status	0.623 (1.104)	0.065 (1.518)	0.091 (1.006)	0.472 (1.543)
Household size	0.705 (1.119)	1.114 (1.527)	0.615 (0.281)	0.072 (0.253)
Education	-0.412 (1.251)	-0.08 (1.602)	-0.022 (1.159)	-0.001 (1.018)
Monthly Income	0.024 (-1.091)	0.481 (-2.426)*	0.304 (-1.457)	0.101 (-1.209)
Experience	0.351 (2.822)*	0.029 (2.211)*	0.022 (2.605)**	0.013 (2.401)*
Cost price	0.141 (2.202)*	0.047 (1.691)	0.015 (0.688)	0.302 (2.716)**
Transport cost	0.013 (3.221)**	0.721 (1.711)	0.035 (2.137)*	0.091 (2.007)*
R²	0.610	0.385	0.427	0.551

Computed from field survey

Note: Figures in parentheses are t-values

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