Investigating the influence of cowpea characteristics on cowpea prices in Akure Metropolis Ondo state, Nigeria: An analysis of covariance model approach.

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ABSTRACT

This paper investigated the influence of cowpea characteristics on cowpea prices in Akure Metropolis of Ondo State, Nigeria, using an analysis of covariance model approach. A total of 104 cowpea sellers were randomly selected from chosen in the markets. Interview schedule with the aid of structural questionnaire was used to collect data from markets: Oja oba, Isinkan, Adedeji, Araromi, and Isolo in the study area. 12% of the cowpea sellers were from Oja-oba, 27.88% from Isinkan, 18.27% from Araromi, 16.35% from Adedeji and 15.38% from Isolo market respectively. 72.12% were female while the rest 27.88% were male. 64.42% of the cowpea sellers sold all the varieties of cowpea in the study area i.e. Peu/Drum, Sokoto white, Mala, Olo and Oloyin. 38.46% of the cowpea sellers sold Peu/Drum for its popularity. 44.23% of them sold Sokoto for its popularity. 30.77% of them sold Mala for customary reasons, 31.73% of them sold Olo for its popularity, 30.77% of them sold Oloyin for its availability and nutritive value. 49.04% of the cowpea sellers said that their customers use the cowpea bought for all it can be used for. From the study, 37.50% of the cowpea sellers said that their customers prefer Oloyin for whole grain cooking because of its colour and flavour, 8.65% of them said that their customers prefer Oloyin for whole grain cooking due to its quick cooking quality. 31.73% of the cowpea sellers said that their customers prefer both Peu/Drum and Sokoto for making fried balls (akara) because of its peeling and binding quality. 32.69% of the cowpea sellers said that their customers prefer both Peu/Drum and Sokoto for steamed cake (moin-moin) for its flavour and texture. The mean prices of peu/drum cowpea, sokoto white cowpea, mala cowpea, olo cowpea and oloyin cowpea are ₦362.50, ₦263.75, ₦296.83, ₦304.81, and ₦393.85. The analysis of covariance (ANCOVA) which was used capture price-quality relationship of the type of cowpea purchased by consumers revealed that there is a significant relationship between the number of holes in each of the cowpea varieties and their respective prices in the various markets sampled in the study area. Hence, the numbers of holes appear to be the major determining factors affecting the prices of various cowpea types in the study area.

Introduction

Cowpea (*Vigna Unguiculata L. Walp*) is one of the most important indigenous legumes of the tropics and sub tropics (NRC, 2006). It is regarded as a key protein source for the urban and rural poor and plays an important role as cash crop (Langyintuo *et. al.*, 2003). Cowpea is one of the most ancient crops known to man, with its center of origin and subsequent domestication being closely associated with pearl millet and sorghum. In the modern world it is a broadly adapted and highly variable crop, cultivated around the world primarily as a pulse, but also as a vegetable (for both the grains and the green peas), a cover crop and for fodder (Faye et. al., 2002

Cowpea has many varieties. The most commonly cultivated varieties are: IT 90K-76, IT 90K-59, IT 90K-277-2, IT 87D-941, IT 89KD-88, IT 98KD-88,IAR-48 and Ife brown (Afolabi, 2002). However when they reach the markets it becomes difficult to identify them by their code variety names. Traders in the state however, generally sell five basic types of the commodity, which they have categorized in line with physical features and their price premium. These are locally dubbed *peu/drum*, *sokoto, mala, oloyin*(flat and large)' and *olo*.

According to Faye et. al., (2002), cowpea is one of the most ancient crops known to man, with its center of origin and subsequent domestication being closely associated with pearl millet and sorghum. In the modern world it is a broadly adapted and highly variable crop, cultivated around the world primarily as a pulse, but also as a vegetable (for both the grains and the green peas), a cover crop and for fodder. Cowpea has many varietie

Cowpea production in West and Central Africa represents almost 70% of world production of cowpea and about 80% of world cowpea. Nigeria is the largest cowpea producer accounting for about 22% of the total, followed by Brazil which produces 10% on 1.144 million hectares of land annually (Pereira, *et al.*, 2001).

The general objective of the study was to analyse cowpea markets and consumers' preferences in Akure metropolis

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using a household hedonic approach, and the specific objectives were to: analyse the different characteristics of cowpea in the various market in Akure metropolis; compare these characteristics across market and consumers preference in Akure metropolis; and estimate the relationship between cowpea price and cowpea characteristics preferred by consumers in Akure metropolis.

Literature Review

Several analytical methods have been used in measuring consumer's acceptance and willingness to pay for products. These include; product improvement index model (Thomas, 2002), Analysis of Variance (ANOVA) (Mead *et. al.*, 1993) and hedonic pricing method (Ladd and Martin, 1976).

The concept underlying hedonic models is that the price of a heterogeneous good is a function of the attributes of that good. The model then tries to capture the relative importance of each attribute in determining the price of the good (Ladd and Martin, 1976). The approach is based on the assumption of perfect competition and utility maximization and that, participants are price takers and have full information and the product is assumed to be purchased by consumers for its attributes (Ladd and Martin, 1976).

The availability of market for cowpea both domestically and regionally makes it a potential income and food security crop for the rural poor and so the need to understand its consumers, hence defining the market. The critical characteristic of a market is that it brings buyers and sellers together to set prices and quantities; leading to their definition of a market as a mechanism by which buyers and sellers interact to determine the price and quantity of a good or service (Samuelson and Nordhau, 1995; Adipala *et. al.,* 1999).

Materials and Methods

The study was conducted in Akure metropolis which is a city in the south-western region of Nigeria, and is the largest city and capital of Ondo State. The city has a population of approximately 387,087 in which the people are of Yoruba ethnic group. Its geographical coordinates are 7° 15' 0" North, 5° 12' 0" East. The climatic condition of Akure has been observed to be very favourable for agricultural purposes in terms of rainfall, humidity, temperature and so on. The city can be described as an important center for commercial activities. It comprises different set of people with diversified socio-cultural characteristics. Primary data was used for this study. In all, 104 cowpea sellers were selected from five major markets of Oja Oba, Adedeji, Araromi, Isinkan and Isolo markets according to volume of cowpea sales and geographical spread in Akure Metropolis. The data was collected through the use of structured questionnaire. Information collected were input – output data as well as those on the socioeconomic characteristics of the farmers. Price and non-price data was collected through a questionnaire directed at cowpea sellers.

The questionnaire was translated into the local language to facilitate understanding of the questions by the sellers. In the market, the retail prices of purchased cowpeas were noted. Cowpea grains are usually being sold in bowl weights and one Congo and this is equivalent to 1.64kg. The prices were expressed in naira per kilogram. Other non-price variables that were observed and recorded were gender of sellers, variety of cowpea, the number of bruchid holes per 100 grains, skin texture and skin colour of purchased samples. In the laboratory, 100 grains of each sample was

counted into cellophanes and the number of grains which has holes from the 100 grains were recorded.

The data used was analysed using descriptive statistics and Analysis of covariance (ANCOVA) model approach. Descriptive statistics involved the computation of mean and frequency counts data was presented using tables and percentages. An analysis of covariance (ANCOVA) was used to estimate the relationship between cowpea price and cowpea characteristics.

Results and Discussion

Market: 22.12% of the cowpea sellers were from Oja-oba market, 27.88% of them were from Isinkan market, 18.27% of them were from Araromi market, 16.35% of them were from Adedeji market and the rest 15.38% of them from Isolo market respectively.

Sex: 27.88% of the cowpea sellers were male while the rest 72.12% of them were female. This implies that the enterprise is a female dominated one.

Type of Cowpea sold: 0.96% of the cowpea sellers sold only Sokoto white and only Olo cowpea respectively. 15.38% of the cowpea sellers sold only Oloyin, 18.27% of them sold both Sokoto and Olo cowpea while about 64.42% of them sold all the varieties i.e. Peu/Drum, Sokoto, Mala, Olo and Oloyin.

Reason for selling each of the cowpea varieties

peu/drum

8.65% of the cowpea sellers sold Peu/Drum due to customary reasons, 38.46% of them sold it for its popularity, 24.04% of them sold it for its nutritive value, 3.85% of them sold it for its ease of preparation, 22.12% of them sold it for its availability and the rest 2.88% of them sold it for other reasons.

Sokoto white

8.65% of the cowpea seller sold sokoto white cowpea for customary reason, 44.23% of them sold it for its popularity. 21.15% of them sold it for its nutritive value and availability respectively. 2.88% of the cowpea sellers sold it for its ease of preparation, and the rest 1.92% of them sold it for other reasons.

Mala

30.77% of the cowpea seller sold Mala cowpea for customary reason, 23.08% of them sold it for its popularity, 20.19% of them sold it for its nutritive value, 1.92% of them sold it for its easy preparation and other reasons, while the rest 22.12% of them sold it for its availability.

Olo

15.38% of the cowpea seller sold Olo cowpea for customary reasons, 31.73% of them sold it for its popularity, 24.04% of them sold it for its nutritive value, 3.85% of them sold it for its ease of preparation, 23.08% of them sold it for its availability and the rest 1.92% of them sold it for its other reasons.

Oloyin

5.77% of the cowpea seller sold Oloyin variety for customary reason, 19.23% of them sold it for its popularity, 20.19% of them sold it for its nutritive value, 2.88% of them sold it for its ease of preparation, 30.77% of them sold it for its availability and the rest 21.15% of them sold it for other reasons.

Intended uses of cowpea purchased

0.96% of the cowpea sellers said that their customers use the cowpea for whole grain cooking, 5.77% of them said that their customer use it for steam cake (moin-moin), 12.50% of them said that their customers use it for fried balls (Akara),

49.04% of them said that their customers use it for whole grain cooking, steam cake (moin-moin) and fried balls (Akara) while the rest 31.73% of them had no idea what their customers use the cowpea purchased for.

Type of cowpea, buyers like best

For whole grain cooking

4.81% of cowpea sellers said that their customers prefer Peu/Drum for whole grain cooking. 29.81% of them said that their customers prefer both Peu/Drum and Sokoto for whole grain cooking. 0.96% of them said that their customers prefer Olo for whole grain cooking. 37.50% of them said that their customers prefer Oloyin for whole grain cooking. 22.12% of them said that their customers prefer all the available cowpea varieties for whole grain cooking while the rest 4.81% of cowpea sellers said that their customers prefer sokoto white cowpea for whole grain cooking.

For fried cowpea balls (akara)

2.88% of the cowpea sellers said that their customers bought Peu/Drum for fried cowpea balls. 26.92% of the cowpea sellers said that their customers bought sokoto white for fried cowpea balls. 31.73% of the cowpea sellers said that their customers bought both Peu/Drum and Sokoto white for fried cowpea balls. 2.88% of the cowpea sellers said that their customers bought Olo for fried cowpea balls. 7.69% of the cowpea sellers said that their customers bought Oloyin for fried cowpea balls while the rest 27.88% of the cowpea sellers said that their customers bought all the varieties for making fried balls (akara).

For steamed cowpea cake (moin-moin)

3.85% of the cowpea sellers said that their customers bought Peu/Drum to make steamed cowpea cake (moin-moin). 27.88% of the cowpea sellers said that their customers bought sokoto white to make steamed cowpea cake (moin-moin). 32.69% of the cowpea sellers said that their customers bought both Peu/Drum and Sokoto to make steamed cowpea cake (moin-moin). 7.69% of the cowpea sellers said that their customers bought Oloyin to make steamed cowpea cake (moin-moin) while the rest 27.88% of the cowpea sellers said that their customers bought all of the varieties to steamed cake (moin-moin).

Reason for preference of Oloyin Cowpea by buyers for whole grain cooking

0.96% of the customers of the cowpea sellers prefer the Oloyin for its colour. 25.96% of them prefer it for its colour and flavour, 8.65% of them prefer it for its quick cooking quality. 9.62% of them prefer it for its colour, flavour and ease of preparation. 7.69% of them prefer it for other reasons while the rest 47.12% of them prefer it for its colour, size, flavour, and ease of preparation as well as increase in volume after preparation.

Reason for preference of Sokoto white cowpea by buyers for fried cowpea balls

8.65% of the customers of the cowpea sellers prefer sokoto white cowpea for fried cowpea balls because of its peeling quality, 3.85% of the customers of the cowpea sellers prefer sokoto white cowpea for fried cowpea balls for its binding quality, 28.92% of the customers of the cowpea sellers prefer sokoto white cowpea for fried cowpea balls for both its peeling and binding quality, 13.46% of the customers of the cowpea sellers prefer sokoto white cowpea for fried cowpea ballsbecause of its appearance and high foaming capacity while the rest 47.11% of the customers of the cowpea sellers prefer sokoto white cowpea for fried cowpea balls for other reasons.

Reason for preference of Peu/Drum and Sokoto White Cowpea by buyers for steamed cowpea cake (moin-moin)

12.50% of the customers of the cowpea sellers prefer Peu/Drum and Sokoto White Cowpea for their flavour, 3.85% of the customers of the cowpea sellers prefer them for their texture, 46.15% of the customers of the cowpea sellers prefer them for both their flavour and texture, 0.96% of the customers of the cowpea sellers prefer them for their sizes, 8.65% of the customers of the cowpea sellers prefer them for other reasons while the rest 27.88% of the customers of the cowpea sellers prefer them such reasons as: flavour, texture, grinding ability and size.

Numbers of holes of cowpea per Congo

Peu/drum

In Isolo market, the peu/drum cowpea has an average of 17 holes per Congo. In Adedeji market and Araromi market, the peu/drum cowpea has an average of 19 holes per Congo respectively. In Isinkan market, the peu/drum cowpea has an average of 26 holes per Congo. In Oja-oba market, the peu/drum cowpea has an average of 23 holes per Congo.

Sokoto White

In Isolo market, the sokoto white cowpea has an average of 16 holes per Congo. In Adedeji market and Araromi market, the sokoto white cowpea has an average of 19 holes per Congo respectively. In Isinkan market, the sokoto white cowpea has an average of 26 holes per Congo. In Oja-oba market, the sokoto white cowpea has an average of 24 holes per Congo.

Mala

In Isolo market, the Mala cowpea has an average of 16 holes per Congo. In Adedeji market and Araromi market, the Mala cowpea has an average of 19 holes per Congo respectively. In Isinkan market, the sokoto white cowpea has an average of 26 holes per Congo. In Oja-oba market, the sokoto white cowpea has an average of 24 holes per Congo.

Olo

In Isolo market, the Olo cowpea has an average of 16 holes per Congo. In Adedeji market and Araromi market, the Olo cowpea has an average of 19 holes per Congo respectively. In Isinkan market, the Olo cowpea has an average of 26 holes per Congo. In Oja-oba market, the Olo cowpea has an average of 24 holes per Congo.

Oloyin

In Oja-oba market, the Oloyin cowpea has an average of 24 holes per Congo. In Adedeji market and Isolo market, the Oloyin cowpea has an average of 35 holes per Congo respectively In Isinkan market, the Oloyin cowpea has an average of 26 holes per Congo. In Araromi market, the Oloyin cowpea has an average of 19 holes per Congo.

Mean price of cowpea: The cowpea seller in the various sampled markets sold peu/drum, sokoto white, Mala, Olo and Oloyin at such mean prices as ₦362.50, ₦263.75, ₦296.83, ₦304.81, and ₦393.85 respectively. The result shows that Oloyin is the most expensive while sokoto is the cheapest.

Analysis of Covariance (ANCOVA)

The result from the analysis of covariance (ANCOVA) showed that there is a significant relationship between the number of holes in each of the cowpea varieties and their respective prices in the various markets sampled in the study area. By implications, the numbers of holes in each variety of cowpea significantly affect their respective selling prices. Hence, the higher the number of holes, the lower will be prices that will be charged per each variety of cowpea across the various markets in the study area.

Descriptive Statistics of Cowpea sellers and Characteristics of the sampled cowpea

Characteristics	Frequency	%

Market Distribution

Oja-oba	23	22.12
Isinkan	29	27.88
Araromi	19	18.27
Adedeji	17	16.35
Isolo	16	15.38

Sex

Male	29	27.88
Female	75	72.12

Type of cowpea sold

Sokoto	1	0.96
Olo	1	0.96
Oloyin	16	15.38
Sokoto and Olo	19	18.27
All the varieties	67	64.42

Reason for selling drum

Customary	9	8.65
Popular	40	38.46
Nutritive value	25	24.04
Easy to prepare	4	3.85
Availability	23	22.12
Other	3	2.88

Reason for selling Sokoto White

Customary	9	8.65
Popular	46	44.23
Nutritive value	22	21.15
Easy to prepare	3	2.88
Availability	22	21.15
Other	2	1.92

Reason for selling Mala

Customary	32	30.77
Popular	24	23.08
Nutritive value	21	20.19
Easy to prepare	2	1.92
Availability	23	23.12
Other	2	1.92

Reason for selling Olo

Customary	16	15.38
Popular	33	31.73
Nutritive value	25	24.04
Easy to prepare	4	3.85
Availability	24	23.08
Other	2	1.92

Reason for selling oloyin

Customary	6	5.77
Popular	20	19.23
Nutritive value	21	20.19
Easy to prepare	3	2.88
Availability	32	30.77
Other	22	21.15

Intended uses of cowpea purchased by buyers

Whole grain cooking	1	0.96
Steamed cake (moin-moin)	6	5.77
Fried balls (akara	13	12.50
All uses	51	49.04
No idea of use	33	31.73

Types of cowpea, buyers like best for whole grain cooking

Peu/Drum	5	4.81
Sokoto	5	4.81
Peu/Drum + Sokoto	31	29.81
Olo	1	0.96
Oloyin	39	37.50
All varieties	23	22.12

Reason for Oloyin cowpea being preferred by buyers for boiled whole grain cooking.

Colour	1	0.96
Colour + Flavour Quick cooking	27	25.96
quality	9	8.65
Colour + Flavour + Quick cooking quality	10	9.62
Other reasons	8	7.69
All reasons	49	47.12

Types of cowpea buyer like for fried cowpea balls (akara)

Peu/Drum	3	2.88
Sokoto	28	26.92
Peu/Drum + Sokoto	33	31.73
Olo	3	2.88
Oloyin	8	7.69
All	29	27.88

Reason for Sokoto White cowpea being preferred by buyers for fried cowpea balls

Peeling quality	9	8.65
Binding quality	4	3.85
Peeling and binding quality	28	26.92
Appearance and high foaming capacity	14	13.46
Other reasons	49	47.11

Types of cowpea buyer like for steamed cowpea cake (moin-moin)

Peu/Drum	4	3.85
Sokoto white	29	27.88
Peu/Drum + Sokoto	34	32.69
Oloyin	8	7.69
All	29	27.88

Reason for Peu/Drum and Sokoto White Cowpea preferred by buyer for steamed cowpea cake (moin-moin)

Flavour	13	12.50
Texture	4	3.85
Flavour + Size	48	46.15
Size	1	0.96
Other reasons	9	8.65
All reasons	29	27.88

Numbers of holes of peu/drum per Congo

Isolo	17	16.35
Adedeji	19	18.27
Isinkan	26	25.00
Oja-oba	23	22.12
Araromi	19	18.27

Numbers of holes of Sokoto per Congo

Oja-oba	24	23.08
Isolo	16	15.38
Isinkan	26	25.00
Adedeji	19	18.27
Araromi	19	18.27

Numbers of holes of Mala per Congo

Isinkan	26	25.00
Isolo	16	15.38
Araromi	19	18.27
Adedeji	19	18.27
Oja-oba	24	23.08

Numbers of holes of Olo per Congo

Oja-oba	24	23.08
Isolo	16	15.38
Araromi	19	18.27
Adedeji	19	18.27
Isinkan	26	25.00

Numbers of holes of Oloyin per Congo

Oja-oba	24	23.08
Adedeji	35	33.65
Isolo	35	33.65
Isinkan	26	25.00
Araromi	19	18.27

Cowpea	Mean price (₦)
Peu/Drum	362.50
Sokoto	263.75
Mala	296.83
Olo	304.81
Oloyin	393.85

Analysis of Co-Variance for average cowpea price (ANCOVA)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Type of cowpea sold	1	43.30	5.28	5.28	0.20	0.653
Average no of hole/100	5	5411.32	5411.32	1082.26	41.65	0.000
Error	98	2546.37	2546.37	25.98		
Total	104	8000.99				

Conclusions and Recommendations

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From the study, 37.50% of the cowpea sellers said that their customers prefer Oloyin for whole grain cooking because of its colour and flavour, 8.65% of them said that their customers prefer Oloyin for whole grain cooking due to its quick cooking quality. 31.73% of the cowpea sellers said

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The mean prices of peu/drum cowpea, sokoto white cowpea, mala cowpea, olo cowpea and oloyin cowpea are ₦362.50, ₦263.75, ₦296.83, ₦304.81, and ₦393.85. The analysis of covariance (ANCOVA) which was used capture price-quality relationship of the type of cowpea purchased by consumers revealed that there is a significant relationship between the number of holes in each of the cowpea varieties and their respective prices in the various markets sampled in the study area. Hence, the numbers of holes appear to be the major determining factors affecting the prices of various cowpea types in the study area.

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