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Full Length Research Article

ANALYSIS OF MARKETING PERFORMANCE OF ONION (*Allium cepa*) AMONG PARTICIPANTS IN KADUNA AND KATSINA STATES, NIGERIA

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ABSTRACT
The study analyzed the marketing of onion in Kaduna and Katsina States, Nigeria. A survey of 100 onion farmers and 200 traders in these two states was conducted in 2022. Four villages and four markets were purposively selected. Random sampling was used to select respondents using structured questionnaire alongside oral interview. The analytical tools used were descriptive statistics, marketing margin and multiple regression. Majority of the traders (71%) had marketing experience between 5 to 25 years. Analysis on marketing margin shows that the producer's share in the price that the final consumer pays was 56%, the wholesaler receives 14% and the retailer gets 30%, while the total marketing margin in the complete distribution chain was 43%. Analysis on the effect of marketing costs on marketing margin using multiple regression reveals that commission paid to agents was significant at 1% for regional wholesalers and 5% for inter-regional wholesalers. Transportation cost had positive coefficients significant at 10% for regional wholesalers and 5% for inter-regional wholesalers. At the level of retailers, the commission and transport charges have insignificant effect and where they exhibited significant effect, they have negative t-values. The loading/un-loading cost, revenue charges and storage cost had insignificant coefficients and negative t-values. The study recommends provision of simple drying machine for processing onion into durable products, provision of efficient transport system, onion exportation to create competition, market access to reduce glut and enlightenment of market participants on joining cooperative societies for solving many of the marketing problems.

Keywords: Onion, Market Participants, Marketing Margin, Multiple Regression, Kaduna and Katsina

INTRODUCTION

Onion (*Allium cepa*) ranks second in value after tomatoes on list of cultivated vegetable crops worldwide. The highest producers being China, Japan and India for both the green and dry onions. All the plant parts of alliums may be consumed by humans (except perhaps the seeds), and many wild species are exploited by local inhabitants. Onion is also one of the most consumed vegetables in the world (Robinwith and Currah, 2002).

In Nigeria, onion is one of the most important commercial vegetables produced, which is mostly grown in the northern part of the country because of the favourable climatic condition of the region that allow the crop to thrive very well. The largest producing states include Kebbi, Sokoto, Kano, Jigawa, Kaduna, Katsina, Plateau and Bauchi. Accordingly, this region hosts the biggest onion traders including the regional and inter-regional wholesalers. The onion marketing warrants special attention for several reasons, hence justifying significance of the study. First, onion play a very important role in the diet of every home in Nigeria; secondly, onion is grown in small holder farms as irrigated crop therefore contributing to the economy of the small and middle-income earners; and thirdly, the onion marketing chain play a significant role in the economy of the people and the nation in general.

The onion crop passes through various market participants and exchange points before it reaches the final consumers. At every stage of the marketing chain, onion has to be packed and unpacked, loaded and unloaded to meet consumers' demand. Depending on the length of the chain, each handling cost may not be much, but the sum total of these costs could be significant. Consequently, the difference between the price paid by the final consumer at the urban centre and that received by the producer at the farm gate can be great leading to a wider marketing margin between the producer and the final consumer. A high marketing margin may be used to argue that producers or consumers are being exploited, but this cannot often be fully justified unless the costs involved, and the value added at every stage of the marketing chain are fully determined and clearly understood.

The onion marketing is being faced with serious problem of post-harvest losses resulting to a gloomy market situation of the commodity, which serves as disincentive to the farmers and traders. The unorganized marketing system of onion compounds the constraints imposed upon the traders in their operations. There is no doubt that reducing the post-harvest losses of onion through improvement of the marketing system will reduce the economic losses incurred by market participants and consequently make the production and marketing of this commodity more attractive. The prevailing marketing problems will require a detail and up to date understanding of the marketing system of onion and the factors militating against the efficient functioning of the marketing of this commodity from the farm gate to the level of consumption.

Ahmed, et al. (2021) in a study carried out on determinants of onion marketing among smallholder producers in Gemechis District, West Hararghe Zone, Oromia National Regional State, Ethiopia reported that quantity of onion produced positively and significantly affected the quantity of onion supplied to the market at 1% significance level. Distance from the nearest market affected onion supply negatively and significantly at 10% significance level. Non/off-farm income significantly and positively influenced the volume sales of onion at 5% significance level. Land allocated for onion had positive and significant effect on volume of sales of onion at 1% significance level. Lagged market price affected quantity of onion supplied to the market positively and significantly at 5% significance level.

Teklebrhan et al. (2020) conducted research entitled "Factors

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affecting onion market supply in Medebay Zana district, Tigray regional state, Northern Ethiopia. Results of the multiple regression model indicated that the amount of onion produced, access to extension service and market information positively and significantly predicted the quantity of onion supplied to the market. It was recommended that government, non-governmental organizations, and other stockholders should play a vital role in addressing the constraints of onion production. Extension agents need to help onion farmers to improve onion production through improved farm management and conservation, as well as through improved varieties and integrated water, nutrient and pest management. An integrated agricultural marketing information system strengthens the linkage between onion producer and other value chain actors in the district and beyond.

Market oriented study on onion production through value chain approach in agricultural regions of the Gambia was conducted by Saikou (2014). The report indicated that onion has simple agronomic practice and high economic returns with good management practices. The objective of the study was to examine the linkages of onion producers along the value chain, yield, income, and constraints. The methodology was random sampling with sample size of 183 respondents using structured questionnaire through face-to-face interview in six agricultural zones of the Gambia. The study reveals that 30.1% of the producers earned an income of >D10,000 while on average 16.4% were found to earned D6000 respectively. In addition, production constraints are lack of storage facilities and adequate market outlets of 25.7% and 20.8% respectively. In conclusion, value chain approach was proved to be most effective and efficient of producing onions. It was therefore recommended that the government, non-governmental organizations, and private sector to support women in their wake of improving their livelihood through onion production.

Birhanu-Mentafa, et al. (2017) carried out research titled "Marketing channels, dynamics and economic incentives for onion production in Ethiopia: A case study from Oromiya Regional State, Ethiopia". They reported that the explanatory variables such as sex of household, age of household, access to credit service, market information and distance to market centre were insignificant to determine the marketable supply of onion in the study areas.

A study was conducted on Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya by Omiti et al. (2009). Results showed that farmers in peri-urban areas sold higher proportions of their output than those in rural areas. Distance from farm to point of sale is a major constraint to the intensity of market participation. Better output price and market information are key incentives for increased sales. These findings demonstrate the urgent need to strengthen market information delivery systems, upgrade roads in both rural and peri-urban areas, encourage market integration initiatives, and establish more retail outlets with improved market facilities in the remote rural villages to promote production and trade in high value commodities by rural farmers.

Objectives of the Study

The broad objective of the study is to analyze the marketing performance of onion among participants in Kaduna and Katsina States, Nigeria. The specific objectives are to:

i. describe the socio-economic characteristics of onion marketers in the study area
ii. describe the onion marketing chain and the participants in the study area
iii. determine the factors affecting efficiency of onion marketing in the study area
iv. describe the major constraints to onion marketing and the factors for enhancing the marketing system in the study area

METHODOLOGY

Study Area

The study was conducted in Kaduna and Katsina States, Nigeria. Kaduna State has an estimated population of 9,029,638 with an estimated land area of 45,061km^2 while Katsina State has an estimated population of 8,568,934 with an estimated land area of 24,253km^2. Eighty per cent of the population of these states live in rural communities with about 70% of the population engaged in farming.

These states have a vast arable land comprising both up-land used for rain-fed agriculture and low-land used for irrigated cropping during the dry season. Therefore, these states have great potentials for crop production all the year round. The mean annual rainfall ranges from 500mm to nearly 1,200mm. The rains are unimodal and fall from 3 – 5 months, the period constituting the main growing season. The mean annual temperature ranges between 17^o and 32^{o}C, although high temperatures of up to 42^{o}C occur during April/May. In December/January, low temperatures of around 15^{o}C are experienced, which permit the growing of crops like wheat and onion.

These states are within the north-west region of the country which is the major supplier of food crops including onion to other regions and sells nearly 40% of its produce to other regions.

Sampling Procedure

Multi-stage sampling technique was employed for this study. The first stage involved purposive selection of four Local Government Areas, comprising of two each from these two states based on intensity of production, differences in socio-economic characteristics, the need to have a wider coverage of the marketing system and the desire for better understanding of the marketing system of onion across the area of study. The four Local Government Areas, included Kubau and Giwa in Kaduna State, then Danja and Funtua in Katsina State are well known areas in terms of onion production in their respective states and the North-West region, hence these areas are very important centres of onion marketing attracting buyers and sellers from near and far places.

The second stage involved purposive selection of a representative village for the purpose of interviewing onion farmers as well as a particular market for the purpose of interviewing onion traders in each of the Local Government Areas based on their importance in onion production and marketing respectively. Among the markets selected, two are rural/supply markets and the other two are urban/demand markets, ensuring that each of these categories of markets are from different Local Government Areas and in separate States.

The third stage involved random sampling of the farmers and a stratified random sampling of different categories of the traders in a systematic manner. The sample of onion farmers was obtained by taking a percentage from the total population derived from a list of onion producers registered by Zonal Offices of the Agricultural Development Agencies of these States. Similarly, the sample of onion traders was acquired through obtaining a percentage of the

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total registered onion traders from the Market Associations of the selected markets. The categories of traders sampled included all actors in the marketing system, which comprise of regional wholesalers, inter-regional wholesalers and retailers.
As shown in Table 1, a total of 100 onion farmers representing 15% of the total population of the onion producers in the study area and 200 onion traders representing 30% of the total population of all the categories of the onion traders in the study area were sampled in the manner stated above. In view of the fact that the number of registered onion producers in the villages visited and the number of onion traders across the markets studied were found to be of the same range, equal sample size for each category of respondents across the studied locations were taken as presented in table 1.

Data Collection
The study used both primary and secondary sources of data. The primary data were collected through the use of structured questionnaire alongside an oral interview. Two sets of questionnaire were used, one set for the onion farmers and the other set for onion traders.
Data collected from the farmers included socio-economic characteristics such as age, sex of the respondent, family size, level of education, farming experience, crop yield, storage system, time of crop sale, how it was sold, to whom it was sold, producer prices, economic and social constraints, etc. The data collected from the traders included age, sex of the respondent, level of education, status of trader, marketing experience, place of purchases, from whom it was purchased, size of purchases, place of sales, volume of sales, to whom it was sold, use of commission agents, storage activities, transportation costs, market charges payable to authorities, handling charges, charges at roadblocks, revenue charges at motor parks, market information, problems facing their businesses, etc. All these were collected from field survey for 2022 cropping season.
The secondary data were collected from Agricultural Development Agencies of the two States. The data collected included average monthly prices for 2022.

Analytical Technique
The analytical tools used for data analysis in this study include descriptive statistics, marketing margin, and multiple regression.

Descriptive Statistics
Descriptive statistics such as means, percentages, ratios, frequency distribution and charts were used to group the responses required to satisfy objectives (i), (ii) and (iv).

Marketing Margin
The model in Figure 1 illustrates the various stages at which the margins were estimated along an onion marketing channel to satisfy part of objective (iii).

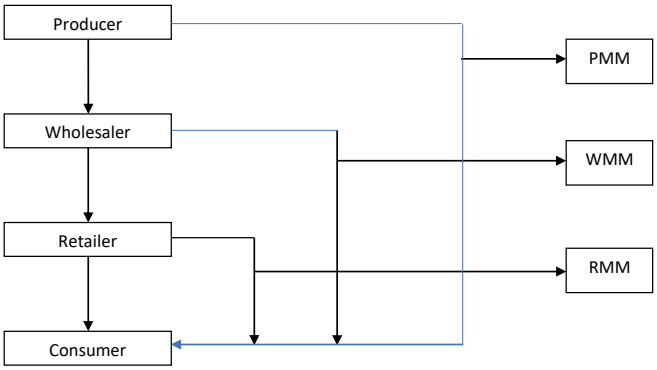

Figure 1: Flow Chart illustration of Marketing Margin Estimation

PMM - Producer Marketing Margin
WMM - Wholesaler Marketing Margin
RMM - Retailer Marketing Margin
Figure 1: Flow Chart Illustration of Marketing Margin Estimation

According to Mendoza (1995), when there are several participants in the marketing chain, the margin is calculated by finding the price variations at different segments and then comparing them with the final price to the consumer. The consumer price then is the base or common denominator for all marketing margins. Some errors and misunderstandings result when the margin calculations are done using a different denominator other than consumer price. These relative margins expressed as a percentage cannot be compared between themselves as if they belonged to the same chain because they have different bases. That is why margin calculation should be done using a single basis, that is, the final consumer price.

From the foregoing, marketing margin estimation for this research was achieved using the mathematical models below to satisfy part of objective (iii).

$$TGMM = \frac{P_c - P_p}{P_c} \times 100 \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$GMM_w = \frac{P_w - P_p}{P_c} \times 100 \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$GMM_r = \frac{P_r - P_w}{P_c} \times 100 \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$TGMM = GMM_w + GMM_r \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$GMM_p = 100\% - TGMM \quad \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Where:
TGMM = Total Gross Marketing Margin (complete distribution chain)
GMM_w = Wholesaler's Gross Marketing Margin
GMM_r = Retailer's Gross Marketing Margin

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GMM_p = Producer's Gross Marketing Margin
P_c = Consumer Price
P_p = Producer's Selling Price
P_w = Wholesaler's Selling Price
P_r = Retailer's Selling Price

Ordinary Least Square (OLS) Regression Technique
Multiple regressions using OLS were used to analyze the factors affecting efficiency of onion marketing by evaluating the determinants of marketing margin of onion by the different categories of traders as it moves from farm gate to the ultimate consumers. The model is specified to achieve objective (iii) as follows:

Implicit Function
$Y = f(X_1, X_2, X_3, X_4, X_5, \mu_i)$ ..... (6)

Explicit Function
$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + \mu_i$ ..... (7)

Where:
Y = Marketing Margin of Onion (Dependent Variable) (₦)
a = Constant
X_1 = Transportation Cost (₦)
X_2 = Loading and Off-loading Cost (₦)
X_3 = Revenue Charges (₦)
X_4 = Commission Charges (₦)
X_5 = Storage Cost (₦)
$b_1 \ldots b_5$ = Coefficients
$X_1 \ldots X_5$ = Independent Variables
μ = Disturbance Term

A priori, the coefficients of the independent variables were expected to be positive and have significant relationship with the dependent variable, indicating effect of marketing costs on the marketing margin.

Dependent Variable
Marketing Margin of Onion
This is the price variations at different segments along the marketing chain and then comparing them with the final price paid by the consumer. It is a continuous variable representing dependent variable measured in naira per bag of 100kg.

Independent Variables
Transportation Cost
This is the cost of transporting onion as it moves along the marketing chain. It is a continuous variable measured in naira. Because of the bulky nature of agricultural produce, particularly onion, coupled with the poor condition of most rural roads in Nigeria, transportation cost is expected to have a positive and significant effect on the marketing margin of the commodity.

Loading and Unloading Cost
As the commodity move from the farm gate to the final consumer, it is loaded and off-loaded at various points. The charges for loading and off-loading are referred to as handling charges and this is assumed to have positive relationship with the marketing margin of the commodity. It is a continuous variable measured in naira.
Tax Charges
The tax is a charge usually collected by government authorities through their officials as well as marketing associations at marketplaces and motor parks. Taxes are collected at every stage of the marketing process. These charges put together could have significant effects on the marketing margin of the commodity. It is a continuous variable measured in naira.

Commission Charges
Commission is a charge paid to commission agents for their services in providing specialist knowledge as well as linking buyers and sellers. In view of the fact that, commission agents play a vital role in onion marketing, it is expected that these charges would contribute significantly to influencing the marketing margin of the commodity positively. It is a continuous variable measured in naira.

Storage Cost
Considering the perishability nature of onion, provision of good storage facility is very important to prevent spoilage and consequently avoid produce losses. It is therefore expected that the cost of providing storage facilities will have significant and positive effect on the marketing margin of the commodity. It is a continuous variable measured in naira.

Table 1: Study Locations and Distribution of Respondents in the Selected Areas

States Sampled	LGA's Selected	Farmer's Villages Covered	Trader's Markets Visited	Market Type	Enumerator Survey FR	RW	IW	RT	Row Total
Kaduna	Kubau	Kubau	Anchau	Rural/Supply	25	15	10	25	**75**
Katsina	Danja	Kahutu	Danja	Rural/Supply	25	15	10	25	**75**
Kaduna	Giwa	Shika	Giwa	Urban/Demand	25	15	10	25	**75**
Katsina	Funtua	Maska	Funtua	Urban/Demand	25	15	10	25	**75**
2 States	4 LGA's	4 Villages	4 Markets	4 Markets	100	60	40	100	300

Enumerator Survey Key
FR - Farmers
RW - Regional Wholesalers
IW - Inter-regional Wholesalers

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RT - Retailers

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Market Participants

Onion is traded virtually in every city or village where there is a market in Nigeria. It is found both in the big (wholesale) and small (retail) markets being one of the major vegetables consumed in every home. The major participants whose socio-economic characteristics were captured during the survey include the farmers and the traders.

Table 2: Socio-Economic Characteristics of Participants in Marketing of Onion in the Study Area

Variable	Farmers		Traders	
Age (Years)	Frequency	%	Frequency	%
15 – 35 (Young Aged)	55	55	98	49
36 – 50 (Middle Aged)	33	33	76	38
Above 50 (Old Aged)	12	12	26	13
Minimum	16		18	
Maximum	62		54	
Mean	38		36`	
Gender				
Male	88	88	166	83
Female	12	12	34	17
Level of Education				
Primary	31	31	52	26
Secondary	24	24	44	22
Tertiary	11	11	12	6
Adult Education	14	14	32	16
Informal	18	18	56	28
None	2	2	4	2
Marketing Experience (Years)				
05 – 25	68	68	142	71
26 – 40	26	26	46	23
Above 40	6	6	12	6
Minimum	5		4	
Maximum	43		45	
Mean	22		18	
Farm Size (Hectares)				
0.1 – 5.0 (Small Scale)	58	58		
5.1 – 10.0 (Medium Scale)	32	32		
Above 10.0 (Large Scale)	10	10		

Source: Survey Data, 2022

Market Chain

A market chain for onion in the study area is shown in Figure 2. The study found that onion is taken from the farm or the farmer's compound to a rural bulking market, then to urban regional as well as inter-regional bulking markets, and finally to an urban retail market. Another path that onion moves is from the farm/farmer's compound to a village market, then to a rural bulking market or an urban regional bulking market, and finally to a village retail market. A different path is where the onion moves directly from the farm/farmer's compound to urban inter-regional as well as regional bulking markets or an urban retail market. It was also found that the onion moves from urban regional bulking market to urban inter-regional bulking market. The importance of these paths as it relates to quantity of the commodity that flows between these markets is differentiated with thick, thin and dotted lines.

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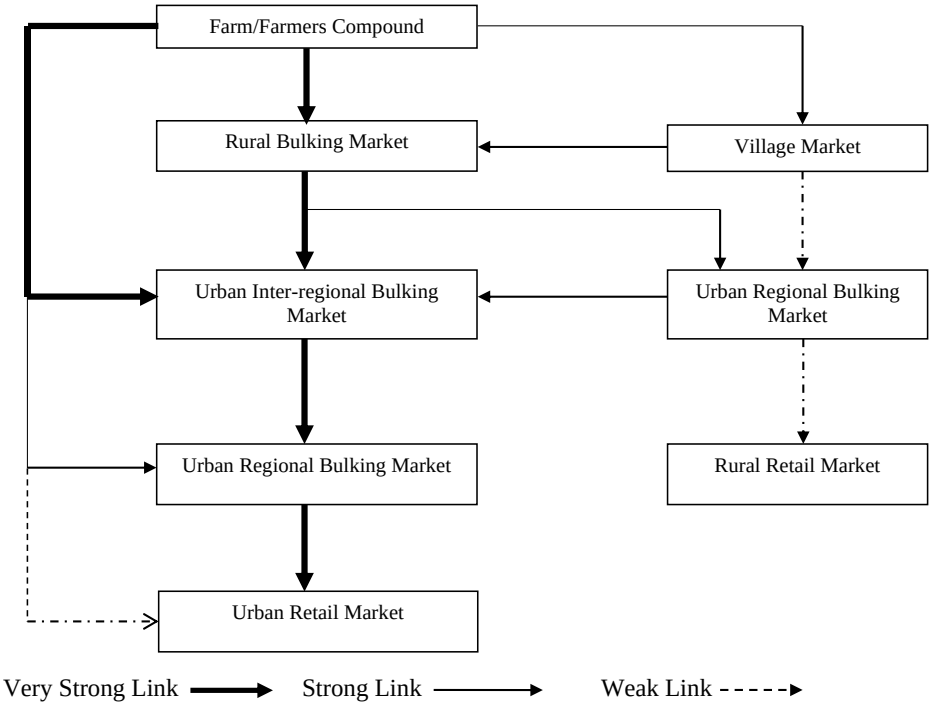

Figure 2: Market Chain for Onion in the Study Area

Market Participants for Onion in the Study Area

In relation to the market chain analysis, the market participants for onion in the study area are shown in figure 3. One of the paths through which onion moves in the marketing system in the study area is from the producers to the middlemen that comprises the rural buyers, wholesalers and the retailers, and then to the consumers. Another channel which onion moves is from the producers to the wholesalers or to the retailers or directly to consumers. The onion also moves from the producers through the commission agents or brokers, who buy for the assemblers, the wholesalers or the speculators before it reaches the retailers, and then to the consumers. It also moves from the producers through the brokers to the rural buyers or the wholesalers. One other path is from the producers to the commission agents or to the speculators. The speculators may either sell to the wholesalers, the retailers or the consumers.

The importance of these paths as it relates to movement of the commodity between the participants along the channel is differentiated with thick, thin and dotted lines.

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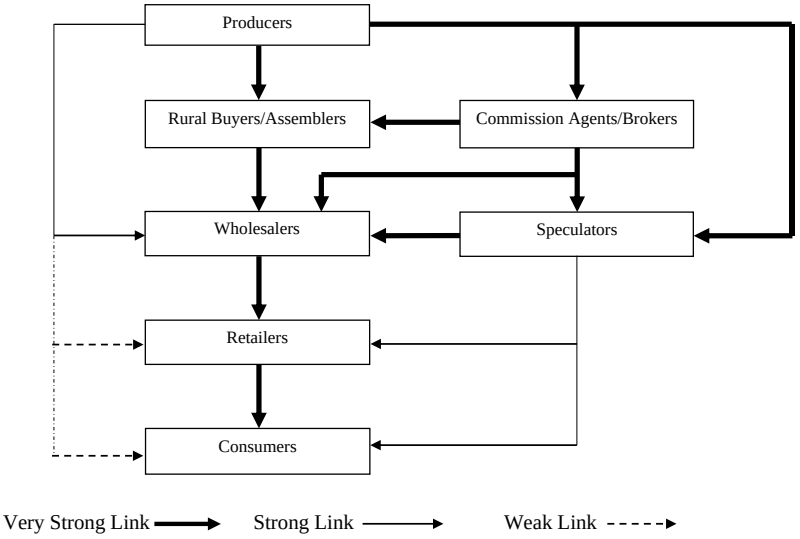

Figure 3: Market Participants for Onion in the Study Area

Marketing Margin

The marketing margin was used as a measure of performance in the marketing system. The marketing margin of onion in the study area is expressed in percentage for the different categories of participants in the four studied markets. These include the gross marketing margin for the producer, the wholesaler and the retailer as well as the total gross marketing margin in the complete distribution chain for each of the four markets, comprising of Anchau (rural market), Danja (rural market), Giwa (urban market) and Funtua (urban market).

The average marketing margin shows that the producer's share in the price that the final consumer pays was 56%, the wholesaler receives a margin of 14% and the retailer gets a margin of 30%, while the total marketing margin in the complete distribution chain was 43%. The average marketing margin at Anchau market was 46%, Danja market had 44%, Giwa market had 41% and Funtua market had 41%. The higher marketing margin at Anchau and Danja markets compared to Giwa and Funtua markets could be attributed to difference in production level and supplies in the different areas.

The analysis in general, indicates a fair distribution of the margins among the various participants, considering the type of services each of these participants rendered. It also indicates that onion marketing is relatively efficient in the study area.

Table 3: Marketing Margin of Onion in the Study Area (₦/100kg Bag)

Market Participants	Marketing Margin (%)				
	Anchau Market	Danja Market	Giwa Market	Funtua Market	Average
Producer (GMMp)					
Producer's Gross MM	52.34	54.56	58.50	58.98	56.09
Wholesaler (GMMw)					
Wholesaler's Gross MM	14.72	14.20	12.66	12.48	13.52
Retailer (GMMr)					
Retailer's Gross MM	32.94	31.24	28.84	28.54	30.39
Total (TGMM)					
Total Gross MM	46.16	44.39	41.43	41.32	43.33

Source: Survey Data, 2022

Factors Affecting Efficiency of Onion Marketing

In order to determine the factors affecting efficiency of onion marketing in the study area, relationship between marketing margin and marketing costs in the marketing of onion as the commodity moved from the farm gate to the ultimate consumers, multiple regressions using Ordinary Least Squares was used. The analyses conducted included marketing margin as the dependent variable against marketing costs comprising of transport charges, loading and off-loading charges, revenue charges, commission charges and storage cost as independent variables. These were analyzed for each category of trader consisting of regional wholesalers, inter-regional wholesalers and retailers in the study area.

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Factors Affecting Marketing Margin of Onion among Regional Wholesalers

Result of the analysis on regression estimates of marketing margin against marketing costs in the marketing of onion among regional wholesalers in the study area is presented in Tables 4 for Kaduna state and 5 for Katsina state.

The regression analysis for both Kaduna and Katsina states revealed that commission paid to agents was significant at 1% implying a positive relationship between the commission charges and marketing margin of onion in the two states. This indicates that commission agents play a major role in the marketing of onion at the level of regional wholesalers, which confirms that majority of the onion wholesalers do not engage in the buying and selling of the onion themselves but does it through the commission agents.

Transportation cost had a positive coefficient significant at 10%. The implication is that the higher the transportation costs paid by the regional wholesalers of onion in Kaduna and Katsina states the higher the marketing margin. Storage cost, though significant at 10%, it had negative t-value. This implies that the storage cost had minimal effect, but the negative coefficient may lead to decrease in the marketing margin. Also, the negative coefficient exhibited by storage may be due to the fact that most regional wholesalers do not store the onion they bought, rather they sell immediately to other fellow traders that come to buy from near and far places. The loading/off-loading cost and revenue charges had insignificant coefficients and negative t-values. This means that loading/off-loading cost and revenue charges had minimal effect in the marketing margin of onion among regional wholesalers in the two states.

Table 4: Regression Estimates of Factors Affecting Marketing Margin of Onion among Regional Wholesalers in Kaduna State

Variable	Parameter	Coefficient	Standard Error	T-Value	Significant Level
Constant	a	24.2174	8.4066	2.8808	0.0121**
Transportation Cost (X_1)	b_1	0.0765	0.0405	1.8888	0.0798*
Loading/Off-loading Cost (X_2)	b_2	-0.0609	0.0431	-1.4110	0.1801
Revenue Charges (X_3)	b_3	-0.0004	0.0086	-0.0504	0.9605
Commission Charges (X_4)	b_4	0.0591	0.0186	3.1809	0.0067***
Storage Cost (X_5)	b_5	-0.0865	0.0426	-2.0292	0.0619*
Number of Observations (N)	20				
Degrees of Freedom (df) (df)	19				
R^2	0.7271				
Adjusted R^2	0.6297				
F-Value	7.4616				0.0013***

*** = Significant at 1% (P < 0.01)
** = Significant at 5% (P < 0.05)
* = Significant at 10% (P < 0.10)

Table 5: Regression Estimates of Factors Affecting Marketing Margin of Onion among Regional Wholesalers in Katsina State

Variable	Parameter	Coefficient	Standard Error	T-Value	Significant Level
Constant	a	24.2993	8.7394	2.7804	0.0147**
Transportation Cost (X_1)	b_1	0.0755	0.0421	1.7918	0.0948*
Loading/Off-loading (X_2)	b_2	-0.0527	0.0448	-1.1758	0.2593
Revenue Charges (X_3)	b_3	-0.0008	0.0090	-0.0929	0.9273
Commission Charges (X_4)	b_4	0.0598	0.0193	3.0956	0.0079***
Storage Cost (X_5)	b_5	-0.0889	0.0443	-2.0050	0.0647*

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Number of Observations (N)	20	
Degrees of Freedom (df)	19	
R^2	0.7327	
Adjusted R^2	0.6373	
F-Value	7.6758	0.0012***

*** = Significant at 1% (P < 0.01)
** = Significant at 5% (P < 0.05)
* = Significant at 10% (P < 0.10)

Factors Affecting Marketing Margin of Onion among Inter-Regional Wholesalers

Tables 6 and 7 show results of regression estimates of marketing margin against marketing costs among inter-regional wholesalers in the marketing of onion in Kaduna state and Katsina state respectively. The regression analysis reveals that commission charges had positive coefficients significant at 5% indicative of a positive relationship between marketing margin and commission charges. The significant effect of commission charges is due to the high charges by the commission agents who are fully involved in the buying and selling of the commodity for the inter-regional wholesalers.

Transportation cost, revenue charges and storage cost are positive and significant at 10%. The significant effect of transport cost on the marketing margin among inter-regional wholesalers is due the fact that this category of traders incurs high transport charges in the course of moving the commodity between regions. The positive and significant effect exhibited by revenue charges shows that the inter-regional wholesalers pays much higher taxes than the other categories of traders probably because they encounter the revenue officials more, couple with the fact that they handle a larger volume that attracts higher taxes. The positive and significant relationship exhibited by storage cost indicates that the inter-regional wholesalers incur some storage cost between the time they purchase and the time they sell the onion between the regions, possibly as a result of the distance or storing the commodity to a later date in order to obtain a better price. Loading and off-loading, though significant, had negative coefficient. This implies that loading and off-loading cost is minimal and may lead to a decrease in the marketing margin.

Table 6: Regression Estimates of Factors Affecting Marketing Margin of Onion among Inter-Regional Wholesalers in Kaduna State

Variable	Parameter	Coefficient	Standard Error	T-Value	Significant Level
Constant	a	20.1212	5.4605	3.6848	0.0211**
Transportation Cost (X_1)	b_1	0.0563	0.0207	2.7238	0.0528*
Loading/Off-loading Cost (X_2)	b_2	-0.0891	0.0263	-3.3910	0.0275**
Revenue Charges (X_3)	b_3	0.0188	0.0074	2.5244	0.0651*
Commission Charges (X_4)	b_4	0.0442	0.0149	2.9723	0.0411**
Storage Cost (X_5)	b_5	0.0048	0.0135	0.3582	0.7383*
Number of Observations (N)	10				
Degrees of Freedom (df)	9				
R^2	0.9491				
Adjusted R^2	0.8854				
F-Value	14.9034				0.0108**

*** = Significant at 1% (P < 0.01)
** = Significant at 5% (P < 0.05)
* = Significant at 10% (P < 0.10)

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Table 7: Regression Estimates of Factors Affecting Marketing Margin of Onion among Inter-Regional Wholesalers in Katsina State

Variable	Parameter	Coefficient	Standard	T-Value Error	Significant Level
Constant	a	20.1212	5.4605	3.6848	0.0211**
Transportation Cost (X_1)	b_1	0.0564	0.0207	2.7238	0.0528*
Loading/Off-loading Cost (X_2)	b_2	-0.0891	0.0263	-3.3910	0.0275**
Revenue Charges (X_3)	b_3	0.0188	0.0074	2.5244	0.0651*
Commission Charges (X_4)	b_4	0.0442	0.0149	2.9723	0.0411**
Storage Cost (X_5)	b_5	0.0048	0.0135	0.7383	0.7383*
Number of Observations (N)	10				
Degrees of Freedom (df)	9				
R^2	0.9491				
Adjusted R^2	0.8854				
F-Value	14.9034				0.0108**

*** = Significant at 1% (P < 0.01)
** = Significant at 5% (P < 0.05)
* = Significant at 10% (P < 0.10)

Factors Affecting Marketing Margin of Onion among Retailers

Tables 8 and 9 show results of regression estimates of marketing margin against marketing costs among retailers in the marketing of onion in Kaduna state and Katsina state respectively.

The results of the regression analysis reveal that revenue charges and commission charges were significant at 1%, while storage cost was significant at 5% with negative t-values. This could be as a result of the small volume of the commodity handled by the retailers compared to other categories of traders. Therefore, they are not charged heavy taxes by revenue officials and do not require the services of commission agents, nor do they engage in storage of the commodity. Consequently, this leads to a decrease in the marketing margin.

Transportation and loading/off-loading costs were positive but not significant suggesting that they are minimal to make any remarkable effect on the marketing margin. This could be attributed to the fact that the retailers buy from nearby wholesale markets or even within the same market and therefore do not incur any or much transport cost. Also, because they buy in small quantities, they do not require loading and off-loading by labourers.

Table 8: Regression Estimates of Factors Affecting Marketing Margin of Onion among Retailers in Kaduna State

Variable	Parameter	Coefficient	Standard Error	T-Value	Significant Level
Constant	a	43.5005	12.8978	3.3727	0.0019***
Transportation Cost (X_1)	b_1	0.0878	0.0622	1.4131	0.1667
Loading/Off-loading Cost (X_2)	b_2	0.0955	0.0662	1.4423	0.1584
Revenue Charges (X_3)	b_3	-0.0370	0.0132	-2.7953	0.0085***
Commission Charges (X_4)	b_4	-0.1136	0.0285	-3.9845	0.0003***
Storage Cost (X_5)	b_5	-0.1657	0.0654	-2.5331	0.0161**
Number of Observations (N)	40				

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Degrees of Freedom (df)	39	
R^2	0.5016	
Adjusted R^2	0.4284	
F-Value	6.8450	0.0002***

*** = Significant at 1% (P < 0.01)
** = Significant at 5% (P < 0.05)
* = Significant at 10% (P < 0.10)

Table 9: Regression Estimates of Factors Affecting Marketing Margin of Onion among Retailers in Katsina State

Variable	Parameter	Coefficient	Standard Error	T-Value	Significant Level
Constant	a	48.6531	12.9785	3.7487	0.0007***
Transportation Cost (X_1)	b_1	0.0727	0.0625	1.1628	0.2530
Loading/Off-loading Cost (X_2)	b_2	0.0958	0.0666	1.4385	0.1594
Revenue Charges (X_3)	b_3	-0.0403	0.0133	-3.0246	0.0047***
Commission Charges (X_4)	b_4	-0.1149	0.0287	-4.0032	0.0003***
Storage Cost (X_5)	b_5	-0.1485	0.0658	-2.2556	0.0306**
Number of Observations (N).	40				
Degrees of Freedom (df)	39				
R^2	0.5012				
Adjusted R^2	0.4278				
F-Value	6.8314				0.0002***

*** = Significant at 1% (P < 0.01)
** = Significant at 5% (P < 0.05)
* = Significant at 10% (P < 0.10)

PROBLEMS OF ONION MARKETING

The study discovered some problems that served as constraints to the efficient marketing of onion in the study area. Table 10 shows the distribution of farmers and traders according to the nature of constraints to onion marketing.

The analysis reveals that transportation problem was the major constraint to onion marketing for both the farmers and traders in the study area. This is followed by high rate of spoilage of the product and poor storage facilities.

Table 10: Distribution of Participants According to Nature of Constraint to Onion Marketing in the Study Area

Variable	Farmers		Traders	
	Frequency	%	Frequency	%
High rate of Spoilage	22	19.64	52	23.85
Cheating by Middlemen	10	8.93	12	5.51
Poor Transport Facilities	34	30.36	68	31.19
Poor Storage Facilities	18	16.07	38	17.43
High Price Fluctuation	16	14.29	34	15.60
Poor Producer Price	12	10.71	-	-
Poor Market Condition	-	-	14	6.42
Total	112*	100.00	218*	100.00

Source: Survey Data, 2022
*Greater than sample size due to multiple entries of some variables by respondents

CONCLUSION AND RECOMMENDATIONS

In this study, effort was made to describe the socio-economic characteristics of onion marketers in the study area. The organization

of onion marketing was examined through identification of the different kinds of markets and intermediaries involved in the marketing channel of this commodity. In addition, the performance of onion marketing was analyzed through the estimation of margins of the marketing intermediaries and determinants of the marketing margin using multiple regression analysis. Also, the major constraints to onion marketing in the study area and the factors for enhancing the marketing system were investigated.

Analysis on the effect of marketing costs on marketing margin reveals that commission paid to agents was significant at 1% for regional wholesalers and 5% for inter-regional wholesalers implying a positive relationship between the commission charges and marketing margin of onion among regional and inter-regional wholesalers in the study area. This indicates that commission agents play a major role in the marketing of onion at the level of wholesalers. Transportation cost had positive coefficients significant at 10% for regional wholesalers and 5% for inter-regional wholesalers, indicative of positive relationship between the marketing margin and transportation. The significant effect of transport cost on the marketing margin among wholesalers is due to the fact that this category of traders incurs high transport charges in the course of moving the commodity within and between regions. At the level of retailers, the commission and transport charges have insignificant effect and where they exhibited significant effect, they have negative t-values, implying a minimal effect on the marketing margin of the commodity. The loading/off-loading cost, revenue charges and storage cost had insignificant coefficients and negative t-values. These means that loading/off-loading cost, revenue charges and storage cost had minimal effect in the marketing margin of onion among traders in the study area. The negative coefficient exhibited by these variables, especially storage may be due to the fact that most of the traders do not store the onion they bought, rather they sell immediately to other fellow traders that come to buy from near and far places. The consequence of which is a decrease in the marketing margin.

The study however revealed that there are some constraints associated with onion marketing in the study area, which affects directly or indirectly the marketing system and consequently, impede a better efficiency of the marketing system. Among these problems were transportation problem relating to high cost of transport and lack of good roads, high rate of spoilage, poor storage facilities and high price fluctuation. Others are poor market condition relating to inadequate stalls and poor sanitation, poor producer price and cheating by middlemen.

Based on the findings of the study, the following recommendations are made with the objective of making the onion marketing system more efficient.

i. Since high cost of transport has direct relationship with the bulkiness nature of onion in relation to its value as well as high cost of petroleum and lack of good roads, provision of rail transport system across the country that will link the producing areas with the consuming centres by the Federal Government will certainly alleviate the problem of transportation.
ii. There is need for Agricultural Research Institutes in Nigeria, especially in the Northern Region, where onion is produced in large quantities in collaboration with Departments of Agricultural and Mechanical Engineering in the Universities and Polytechnics to design and manufacture simple drying machine for the processing of onion into more durable products. This will solve a lot of problems associated with onion marketing, ranging from post-harvest loses, glut in the system during harvest period and scarcity during off-season, poor producer price and price fluctuation between seasons.
iii. The traders at different levels should improvise appropriate storage facilities for onion to curtail the problem of high spoilage that occur in the marketing process. In addition, the Agricultural Development Projects would need to organize workshops for the market participants to enlighten them on good storage techniques.
iv. There is need for the market participants through their farmers and traders' associations, in collaboration with States Ministry of Agriculture to develop cottage industries for processing and packaging of onion either in liquid, paste or powder form just like orange, tomato or garlic.
v. The onion wholesalers need to engage in onion exportation in order to create more competition and market access and consequently ameliorate the problem of poor producer price and poor marketability of the product, and generally boost the profit received by the market participants.
vi. Considering the multiple sizes of measures used for selling onion as identified in the study, marketing associations in collaboration with Local Government Authorities should come up with an acceptable measure to be used by onion traders, which would in effect ensure efficient decision-making by customers and reduce cheating by middlemen.
vii. The Agricultural Development Projects at the various zones and the Nigerian Agricultural Extension and Research Liaison Services should undertake a vigorous campaign to enlighten the market participants on the importance of establishing and joining cooperative societies, which invariably would solve many marketing problems facing the system. It is a fact that collective effort could solve a problem that ordinarily would be difficult to solve through individual efforts.

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