

Analysis of Onion Marketing Structure in Yola North Local Government Area of Adamawa State, Nigeria

¹Abdulazeez Idris, ²Maurice David Chinda, ²Muhammad Auwal Ahmed

¹Department of Agricultural Economics and Extension,
Federal University Dutse, Jigawa State, Nigeria.

²Department of Agricultural Economics and Extension,
Modibbo Adama University of Technology, Yola, Nigeria

Abstract

This study analyzed the structure of onion marketing in Yola North Local Government Area of Adamawa State, Nigeria. Data were collected from Jimeta Modern market, Old market and Yola by-pass market based on the existing sampling frame. Descriptive statistics, Gini index and Marketing efficiency were the analytical tools employed. The results revealed that majority (92.5%) of the respondents were male, 62.5% were married with an average family size of 4 persons per household and 52.5% had some level of formal education with a mean marketing experience of 10 years. The average sales recorded per month for wholesalers and retailers were ₦2,888,000.00 and ₦372,237.50 respectively, while their respective net incomes per month were ₦234,610.00 and ₦35,743.73 respectively. The value of Gini coefficient for wholesalers and retailers were 0.47 and 0.52 respectively, an indication of inequality in earnings among the marketers due to high market concentration resulting to poor market structure. The results further revealed that onion marketing is inefficient in the study area with marketing efficiency scores of 8.82% and 10.62% for wholesalers and retailers respectively. The Return on Investment (ROI) for wholesalers and retailers were ₦0.081 and ₦0.096 respectively with retailers having relatively higher ROI. Lack of credit facilities (80%), high cost of transportation (73%) and security challenges (42.5%) were identified as the major problems affecting onion marketers in the area. The study recommends that government should expand its anchor borrower scheme program to include marketers in order to enable them expand their business and improve marketing efficiency.

Keywords: Onion, Marketing, Structure, Efficiency, Adamawa, Nigeria.

1. Introduction

Onion (*Allium cepa*) is a vegetable which belongs to the family *Liliaceae* (Alabi and Adebayo, 2008). It is one of the most consumed vegetable crops in Asia and Africa, especially Nigeria (Stan, 2016). The bulb grows underground and is used for energy storage, leading to the possibility of confusion with a tuber which it is not (Wikipedia, 2017). The leaves are bluish green and hollow, the bulbs are large, fleshy and firm. It is marketed mainly as a fresh fruit vegetable and features prominently in most households in the preparation of food and is effective against common cold, heart diseases, diabetes, osteoporosis, and cough and sore-throat. They are high in flavonoids which is concentrated on the outer layer of the flesh (Nemeth *et al.*, 2007). Onion is the second most important vegetable after tomato (Hussani *et al.*, 2000). It is extensively cultivated throughout the country under a wide range of climatic conditions and it can be biennial, triennial or a perennial crop. About 60 million tons of dry onions are produced annually, with the crop being grown across 7.4 million acres in over 134 different countries (Yara International [Y.I.], 2017). According to Yara International (2017), about 240,000 tons of green onions and 1,350,000 tons of dry onions were produced in Nigeria alone in 2012, excluding the rest of Africa or the world at large. This large figure places Nigeria on the list of the top 10 largest producers of onions in the world (Stan, 2016). With a 5.5% (4.3 million tons)

global share of green onions and 1.6% (83 million tons) of the global share of dry onions in 2012 alone, the potential in onion farming in Nigeria or anywhere else in Africa continues to grow brighter with every passing year (Stan, 2016). This represents a doubling in world production over the last ten years. Biggest producers are China, India and United States accounting for about half of the world's dry onion production. Other countries with annual production figures above 1.1 million tons are Brazil, Iran, Japan, Pakistan, Turkey and Russia. The current average world yield stands at 7.6 tons/acre, but highest average yields of 17 - 26 tons/acre are found in Korea, Japan, Europe and the USA (Yara International, 2017).

In agriculture, horticultural crops including onions have a significant place; the crop not only contributes to the share of agriculture in national economy, but possesses a great potential and comparative advantage to compete in the economy. The ease of cultivation, widespread uses and excellent health and financial benefits of onions makes them a top choice in the preparation of most meals in Nigeria (Stan, 2016). This high demand has not just made onion farming a top agribusiness choice to venture into, but has made it a source of constant recurrent revenue for thousands of farmers in Nigeria. Onions are chopped and used as food ingredients in many homes. Almost every household uses onions as a key ingredient in their meals; as a result of this, many farmers venture into onion farming on a large scale. On a small scale, onion farming can also be a source of food ingredients and also serve as a monthly income source to farmers around the world growing a sufficient quantity to sell periodically can establish a steady revenue stream for any agribusiness entrepreneur (Stan, 2016). Onions are usually cultivated towards the end of the year, and harvested towards the middle of the following year. They are best grown in seasons without extreme heat or cold and can be grown at elevations of 1,400 meters to 2,000 meters under adequate rainy conditions. Their planting times are best between April and August (Stan, 2016).

Onion, like other vegetable marketing assumes greater importance in the Nigerian economy because the excess production from the farm must be disposed-off in order to earn income with which farmers can purchase goods and services not produced by them. The growing of vegetables is beneficial to farmers in terms of rewards and empowerments and cuts across different classes, races and cultures (Inuwa, 2001). Onion consumption is spread throughout the year and there is a constant demand for onion bulb all year round and hence, it poses a problem because most of the onion produced in the country comes from the northern part notably Kano, Sokoto, Borno, Bauchi, Jigawa, Kastina and Zamfara States (Inuwa, 2001). This causes its movement from the north to consumers in the eastern states who are very far apart a difficult task.

The main aim of marketing is to achieve efficiency, but most of Nigerian agricultural markets are inefficient due to high market margin, abnormal profits, poor infrastructural facilities, high marketing cost and poor pricing performance (Bila and Bulama, 2007). The inadequacy of marketing facilities and socio economic infrastructure in most developing countries might also have effect on both consumers and sellers of onions and other commodities. Therefore, this study describes the socio-economic characteristics of onion marketers, determines the marketing structure and efficiency as well as identifies the problems of onion marketing in the study area.

2. Research Methodology

2.1 Study Area

Yola North is the administrative center of Adamawa State, Nigeria, located along Longitude 9°13'48"N and Latitude 12° 17'36"E (Wikipedia, 2018). It has a projected population of 280,407 using 2.5% population growth rate per annum (NPC, 2006) and a total area of 831 km². The Local Government area (LGA) is bounded to the north by the Mandara Mountains and to the south are the Shebshi Mountains with Dimlang (Vogel) Peak the second highest point (2,042m) in Nigeria after Chappal Waddi; bounded by Yola South from south and West and Girei LGA from north and east. The area lies in the hot climatic Guinea Savannah zone of Nigeria, with an annual rainfall of 958.99mm. August and September are considered as the wettest months, the dry season is between November and April with a temperature range of between 39°C to 45°C (Adebayo, 1999). More than 80% of households in the area are smallholder farmers growing crops such as maize, sorghum, millet, soy beans and cassava. The study area is located near the bank of River Benue which favours the production of onion in both dry and rainy season.

2.2 Sampling Method

The major markets namely Jimeta Modern Market, Old market and Yola By-pass market were purposively selected based on the concentration of onion marketers. Of these markets, 80 marketers comprising of 16 wholesalers and 64 retailers were randomly selected from the existing sampling frame and were used for the study.

2.3 Analytical Techniques

Descriptive statistics, Gini coefficient, Lorenze curve, marketing efficiency model and Returned on Investment (ROI) were employed for the analysis as used by Abdullahi *et al.* (2014); Illo *et al.* (2016); and Zorina, P. (2016). Descriptive statistics was used to describe the socio-economic characteristics of onion marketers as well as the problems faced in marketing the produce. It involves the use of mean, frequency distribution and percentages.

This was used to measure the market structure of onion. It is expressed as;

$$GC = 1 - \sum XY$$

Where: GC = Gini-Coefficient

X = the percentage of sellers in the category

Y = cumulative percentage of total sales, and

\sum = summation sign.

Marketing efficiency was estimated using Shepherd Futrell model as used by Adebayo *et al.* (2006). It is expressed as:

$$\text{Marketing Efficiency} = \frac{\text{Total Returns (N)}}{\text{Total Marketing Cost (N)}} \times 100$$

Return on Investment was used to estimate the returns on every Naira invested in the onion business. It is expressed as:

$$\text{Return On Investmet} = \frac{\text{Total Revenue} - \text{Total Cost}}{\text{Total Cost}} \times 100$$

3. Results and Discussion

The results in Table 1 revealed that majority (92.5%) of onion marketers in the study area were male, while only 7.5% were female. This could be as a result of stressful nature of the business which requires active and energetic personnel in running the business. Similar result was obtained by Illo *et al.* (2016), in Kebbi State who found that majority of onion marketers in the study area were male.

The result reveals that 27.5% of the marketers were aged between 21-29 years, 25% were aged between 40-49 years, while very few (7.5%) were aged 50 years and above. The mean age of the marketers is 33 years. This implies that the marketers were in their active and productive ages and hence are more likely to be efficient in performing the various marketing functions. According to Ironkwe and Olojede (2012), productive age contains the innovative and motivated individuals. This finding is similar to the one obtained by Grema *et al.* (2015), in Bade and Geidam Local Government Areas of Yobe State who found that majority (65%) of onion marketers were within the age range of 25-54 years. By implication, onion marketing requires young and active people who can withstand the stressful nature of the business.

The result in Table 1, further showed that 62.5% of the onion marketers were married, 32.4% were single and only 5% were divorced. This is an indication that the business provides source of livelihood; hence household heads are involved in order to meet their family obligations. This finding is in agreement with the finding of Grema *et al.* (2015), who in Bade and Geidam Local Government Areas of Yobe State found that majority (72.5%) of the onion marketers in the study area were married.

The study revealed that majority (77.5%) of the respondents had household size of between 1-5 persons, while 15% and 7.5% of the marketers had household size of between 6-10 and 11-15 persons respectively.

The mean of the household size is 4 with a standard deviation of 3.56. This is an indication that household size in the area is small and this could have implications on supply of family labour. The finding of this study contradict that of Illo *et al.* (2016) who in Aliero Local Government Area of Kebbi State found that majority (48.3%) of the onion marketers had a fairly large household size of between 6-10 persons.

The result also revealed that 47.5% had no formal education, 37.5% of the respondents attained secondary school, 10.0% attended primary school, while 5% attained tertiary level. This implies that 52.5% of the marketers have acquired one form of education or the other, while 47.5% of the marketers have attended non-formal education. Similar result was obtained by Isabella and Steve (2007) who found a positive relationship between years of formal education and higher bargaining power of marketers in the Kenyan Highlands.

As shown in Table 1, majority (65%) of the respondents had between 3-10 years of onion marketing experience, 27.5% had between 11-20 years, while the remaining 7.5% had over 21 years of experience with the mean of 10 years' experience. This indicates that marketers are well experienced in onion marketing which is expected to enhance the efficiency with which the trading activities are performed.

Table 1: Socio-economic characteristics of Onion Marketers

Variables	Frequency	Percent (%)
Sex		
Male	74	92.5
Female	6	7.5
Age (years)		
≤ 20	16	20.0
21-29	22	27.5
30-39	16	20.0
40-49	20	25.0
50-69	6	7.5
Mean = 33		
Marital Status		
Married	50	62.5
Single	26	32.5
Divorced	4	5.0
Household Size		
1-5	62	77.5
6-10	12	15.0
11-13	6	7.5
Mean = 4		
Level of Education		
Non-Formal	38	47.5
Primary	8	10.0
Secondary	30	37.5
Tertiary	4	5.0
Experience (years)		
3-10	52	65.0
11-20	22	27.5
21-30	6	7.5
Mean = 10		

Source: Field Survey, 2018

3.1 Market Structure

Market structure as defined by Onu (2015) is how market is organized, with particular emphasis on the characteristics that determine the relationship among the various sellers in a market. The Gini coefficient

and Lorenz curve were used by several researchers to determine the market structure for different agricultural commodities. Some of these studies are; Tiku *et al.* (2012) found a Gini coefficient of 0.65 and 0.54 for merchants and processors respectively, indicating an oligopoly market structure among palm oil marketers in Cross river state, Nigeria. Ngigi (2008) found a Gini coefficient of 0.7 for the grain market in South Sudan, indicating a highly concentrated market. Haruna *et al.* (2012) also identified a highly concentrated tomato market in Pwalungu, Ghana, with concentration ratios of 0.58 and 0.64 for wholesalers and retailers respectively. In this study, the Gini index for onion marketers as shown in Tables 2 and 3 are 0.47 and 0.52 for the wholesalers and retailers respectively. Gini index of 0.35 and above is regarded as high (Illo *et al.*, 2016); an indication of highly concentrated market of both retailers and wholesalers. However, that of retailers is higher in concentration than that of wholesalers. Thus, it can be deduced that there may be an element of monopoly in the market. This finding contradicts the findings of Illo *et al.* (2016) who in Aliero Local Government Area of Kebbi State found that the Gini Index for wholesalers and Retailers were 0.026 and 0.103 respectively which indicated a low market concentration.

Table 2: Computation of Gini-Coefficient of Onion Wholesalers

Income(₦)	Frequency (No. of sellers)	Proportion of Sellers (X)	Cum. Prop. of Sellers	Total Sales (₦)	Proportion of sales	Cum. Prop. of sales (Y)	$\sum XY$
1,800,000 -2,160,000	4	0.250	0.2500	3,624,000	0.1569	0.1569	0.0392
2,160,001-2,550,000	2	0.125	0.3750	2,400,000	0.1039	0.2607	0.0326
2,550,001-2,880,000	2	0.125	0.5000	2,800,000	0.1212	0.3819	0.0477
2,880,001-3.240,000	4	0.250	0.7500	6,120,000	0.2649	0.6468	0.1617
3,240,001 and above	4	0.250	1.0000	8,160,000	0.3532	1.0000	0.2500
Total	16			23,104,000			0.5312

Source: Field Survey, 2018

The Gini index therefore is;

$$\begin{aligned}
 GI &= 1 - \sum XY \\
 &= 1 - 0.53 \\
 &= 0.47
 \end{aligned}$$

Table 3: Computation of Gini-Coefficient of Onion Retailers

Income (₦)	Frequency (No. of sellers)	Proportion of Sellers (X)	Cum. Prop. of Sellers	Total Sales (₦)	proportion of sales	cum. Prop. of sales(Y)	$\sum XY$
38,000-148,750	14	0.2188	0.2188	577600	0.0485	0.0485	0.0106
148,751-259,500	6	0.0938	0.3125	622000	0.0522	0.1007	0.0094
259,501-370,250	6	0.0938	0.4063	926000	0.0777	0.1784	0.0167
370,251-481,000	26	0.4063	0.8125	5760000	0.4836	0.6620	0.2689
481,001-591,750	4	0.0625	0.8750	994000	0.0834	0.7455	0.0466
591,751 above	8	0.1250	1.0000	3032000	0.2545	1.0000	0.1250
Total	64			1,191,1600			0.4772

Source: Field Survey, 2018

The Gini index therefore is;

$$\begin{aligned}
 GI &= 1 - \sum XY \\
 &= 1 - 0.48 \\
 &= 0.52
 \end{aligned}$$

3.2 Lorenz Curve

According to Prateek (2017), the Lorenz Curve (the actual distribution of income curve), is a graphical distribution of wealth developed by Max Lorenz in 1906, it shows the proportion of income earned by any given percentage of the population. The line at the 45° angle shows perfectly equal income distribution,

while the other line shows the actual distribution of income. The further away from the diagonal, the more unequal the size of distribution of income. Lorenz curve in Figure 1 showed that retailers are farther away from the line of equal distribution than the wholesalers an indication that there was a high level of inequality in the earnings among the retailers than wholesalers. The Lorenz curve for the wholesalers is closer to the line of equal distribution than that of retailers. Being far away from the line of equal distribution is an indication of inequality in the earnings and hence high concentration of marketers. The result and effect of this is poor market structure due to high concentration of marketers as indicated by the Gini coefficient.

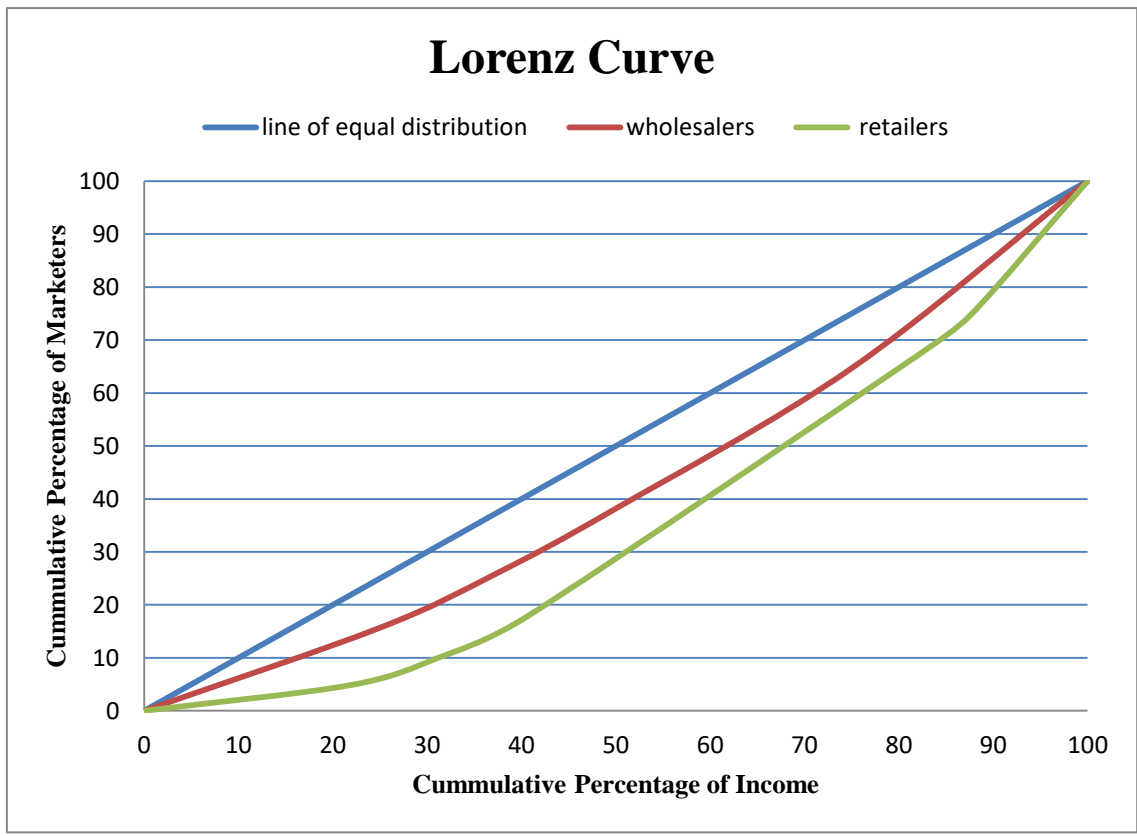


Figure 1: Lorenz Curve for Wholesalers and Retailers
Source: Field Survey, 2018

3.3 Costs and Returns in Onion Marketing

The result as shown in Table 4, revealed that the average total revenue per month for wholesalers and retailers were ₦2,888,000.00 and ₦372,237.50 respectively. Wholesalers take in more revenue than the retailers this might be connected to the higher volume of the product purchased and sold per month. This finding contradicts that of Sulumbe *et al.* (2015) who analyzed onion marketing in Borno State Nigeria and found that retailers received more revenue per 50kg bag of onion than the wholesalers. The findings revealed that wholesalers have an average total variable cost of ₦2,653,390.00 per month; of this amount, 84.9% is purchase cost of the product, while 10.10% is the cost of transportation. Retailers, being the least, incurred ₦336,399.39 as variable cost with purchase cost accounting for 99.14%; while transportation cost was very low (0.47%) for the retailers as compared to the transportation cost incurred by the wholesalers. The result of the study also revealed that wholesalers generated an average income of ₦234,083.75 per month, while the retailers generated lower amount of income of ₦35,743.73 per month. These indicate that onion marketing profitable to both wholesalers and retailers.

Table 4: Average Costs and Returns (per month) in Onion Marketing

Item	Retailers (₦)	Percent (%)	Wholesalers (₦)	Percent (%)
Total Revenue				
Sales		372,237.50		2,888,000.00
Variable Costs				
Purchase cost	333,512.50	99.14	2,252,500.00	84.89
Transportation	1,578.13	0.47	267,000.00	10.06
Tax	571.88	0.17	62,837.5	2.37
Commission Agents	175.00	0.05	60,750.00	2.29
Loading/offloading	62.50	0.02	6,875.00	0.26
Sorting	-	-	3,250.00	0.12
Polythene bags	499.38	0.15	177.50	0.01
Total Variable cost	336,399.39	100	2,653,390.00	100
Fixed Cost				
Rent	94.38	-	526.25	-
Total Fixed Cost	94.38	-	526.25	-
Total Cost (VC+FC)	336,493.77		2,653,916.25	
Net Income		35,743.73		234,083.75

Source: Field Survey, 2018

Note: ₦ = Naira, Nigerian currency

3.4 Marketing Efficiency of Onion

Marketing efficiency is the ratio of total value of goods marketed to the total marketing costs (Shepherd, 1993). According to Tracy, (2017), the lower the ratio of marketing efficiency, the better (50% is generally regarded as the maximum optimal ratio). However, the marketing efficiencies for retailers and wholesalers of onion marketers in this study were calculated as follows:

$$\text{ME (Retailers)} = \left(\frac{372,237.50}{336,493.77} - 1 \right) \times 100 = 10.62\%$$

$$\text{ME (Wholesalers)} = \left(\frac{2,888,000.00}{2,653,916.25} - 1 \right) \times 100 = 8.82\%$$

The results revealed that wholesalers had an efficiency of 8.82% meaning that it will cost them ₦0.0882 to generate ₦1.00 as revenue. Consequently, retailers had an efficiency of 10.62% meaning that it will cost them ₦0.1062 to generate ₦1.00 revenue. These indicate that onion marketing is inefficient in the study area with efficiency score of less than 50%. Relatively, retailers are more efficient than the wholesalers. This finding contradict the one of Sulumbe *et al.* (2015) who in Monguno Local Government Area of Borno State reported that despite inefficiencies in onion marketing, wholesalers are more efficient than the retailers. This could be attributed to the higher revenue generated per month by the wholesalers which amounted to ₦2,888,000 as compared to retailers who received ₦372,237.5 per month.

3.5 Return on Investment (ROI)

According to Investopedia (2018), Return on Investment is the performance measure used to evaluate the efficiency of an investment or compare the efficiency of a number of different investments. ROI measures the amount of return on an investment, relative to the investment's cost. To calculate ROI, the benefit (or return) of an investment is divided by the cost of the investment.

$$\text{Wholesaler ROI} = \frac{2,888,000.00 - 2,653,916.25}{2,888,000.00} = 0.081$$

$$\text{Retailers ROI} = \frac{372,237.50 - 336,493.77}{372,237.50} = 0.096$$

The result revealed that the ROI in onion marketing for wholesalers and retailers were 0.081 and 0.096 respectively with retailers having relatively higher ROI than the wholesalers. Meaning that marketers performed relatively better in retailing than the wholesaling in the area. By implication, for every Naira invested in onion marketing by the wholesalers and retailers, ₦0.081 and ₦0.096 will be received as returns on investment. The finding of this study is in contradiction with the one conducted by Sulumbe *et al.* (2015) in Borno State, Nigeria who despite the profitability of onion marketing, found that the ROI for wholesalers was relatively higher than that of retailers.

3.6 Problems Associated with Onion Marketing in the Study Area

The constraints affecting onion marketing in the study area were identified as presented in Table 6. It shows that lack of credit facilities was the major problem faced in the onion marketing as indicated by 80% of the respondents. Credit facilities play an important role in expansion of the business which will lead to higher income. Nearest to the credit is the problem of high cost of transportation. About 73% of the respondents indicated that high cost of transportation is a problem to their business. High cost of transportation will lead to high cost of marketing services and hence affect marketing efficiency. This agrees with the findings of Grema *et al.* (2015) in Bade and Geidam Local Government Areas of Yobe State who reported that high cost of transportation was the major problem of onion marketers in the area. Other problems in the onion marketing include security challenges (42.5%), lack of storage facilities (40%) which were ranked 3rd and 4th respectively. Poor market information (37.5%), poor market structure (37.5%), High marketing tax (35%), supply fluctuation (35%), price fluctuation (27.5%) and lack of uniform unit of measurement (15%) were also indicated as problems of onion marketing and these are ranked 5th, 6th, 7th, 8th, 9th and 10th respectively in order of severity.

Table 6: Problems Associated with Onion Marketing in the Study Area

Problems	Frequency*	Percentage (%)	Rank
Lack of Credit Facilities	64	80.0	1
High Cost of Transportation	58	72.5	2
Security Challenges	34	42.5	3
Lack of Storage Facilities	32	40.0	4
Poor Market Information	30	37.5	5
Poor Market Structure	30	37.5	5
High Marketing Tax	28	35.0	7
Supply Fluctuation	28	35.0	7
Price Fluctuation	22	27.5	9
Lack of Uniform Measurement Unit	12	15.0	10
Total		80	

Source: Field Survey, 2018

* Multiple responses exist

4. Conclusion

The study revealed that onion marketing is a profitable business in the study area and the business is dominated by male. Wholesalers had higher marketing margin than the retailers, and that the retailers were more concentrated in the market than the wholesalers. The study also revealed that retailers were more efficient marketing than the wholesalers. The major problems of onion marketing discovered were lack of

credit facilities to expand the business and high cost of transportation due to bad feeder roads to the study area.

5. Recommendations

Based on the findings the following recommendations are made:

- i. Government should expand its anchor borrower scheme to marketers in order to expand their business.
- ii. There should be more investment in infrastructural facilities by the government, especially roads so as to facilitate movement of the commodity which will in turn reduce the cost of transportation.
- iii. Marketers should be provided with credit facilities with low interest rate so as to boost marketing of onion in the study area.
- iv. Storage facilities should be provided to marketers so as to reduce losses which will in turn maximize marketers profit.

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